

Catalog | March 2015

Catalog 2015 Electronic Products and Relays

Machine Safety Jokab Safety products



Productivity and safety go hand in hand

Jokab Safety was acquired by ABB in 2010. This gives us extra strength and a sales network in 120 countries. Our goal is to become even better at supporting you as a customer through cooperation within ABB Jokab Safety globally and locally. The fact that the leading power and automation technology company, ABB, and a leader in machine safety, Jokab Safety, have joined forces means a lot more than just a new organizational chart. ABB has a huge footprint in the industry - from power supply to the control of each individual motor - and has been delivering reliable solutions for decades that boost productivity in the industry. The acquisition of Jokab Safety means the last building block is in place. We can now offer our customers tailored, turnkey solutions where machine safety is an integral and value-enhancing component.

Jokab Safety offering:

- Safety PLC
 - Pluto, Pluto AS-i, Gateways, Safe Encoder
- Safety controller
 - Vital and Tina safety systems
- Safety relays
 - RT series, JSB series, safety timers, expansion relays
- Light curtains, light grids, light beams and scanner
 Focus II, Spot, Look
- Sensors, switches and locks
 - Eden, Sense, MKey, Magne, Dalton, Knox
- Control devices
 - JSHD4, Safeball, Fox2
- Emergency stop devices
 - Inca, Smile, EStrong, LineStrong
- Contact rails, bumpers and safety mats
- Fencing systems
 - Quick-Guard, SafeCad, Roller doors

Electronic Products and Relays News



Thermistor motor protection relays in new housing

The thermistor motor protection relays of the CM-MSS range monitor the winding temperature of motors which have PTC temperature sensors installed. These sensors are incorporated in the motor windings thus measuring the motor heat directly. This direct temperature measurement enables the thermistor motor protection relays to evaluate various motor conditions such as overheating, overload and insufficient cooling. Depending on the product also the ATEX approval is available for the use in hazardous areas.

The new housing provides two different connection terminals: The proven double-chamber cage connection terminals and the Easy Connect Technology with Push-in terminals.



CR-S Range pluggable small interface relays

The pluggable interface relays of the CR-S Range are used for electrical isolation, amplification and signal matching between the electronic controlling, e.g. PLC, iPC or field bus systems and the sensor / actuator level. The CR-S Range combines the flexibility of a modular system and the ability of switching high currents on a small footprint thus can be used in applications where space saving is essential.



Universal Motor Controller UMC100.3 now available

The intelligent ABB Motor Controllers for motor protection, motor control, fieldbus and Ethernet communication and fault diagnosis. Due to the benefits it provides, the UMC is used worldwide in many segments and in Projects with several thousand motor controllers. Beside the proven UMC100 the new UMC100.3 offers even more capabilities like 24 V DC or 110-220 V AC/DC supply voltage and fieldbus communication interfaces.



Grid feeding monitoring relays from the CM-UFD.Mx range

The multifunctional grid feeding monitoring relays of the CM-UFD range are designed to monitor several grid parameters when feeding energy into the public grid. The intention is to trip a section switch which is connected between the distributed generation and the public grid in order to disconnect the distributed generation in case of problems (e.g. unstable grid), faults or maintenance on the grid. Different monitoring functions such as 10-minutes average value, real time over- and undervoltage as well as over- and underfrequency are configurable via the front face display.

- CM-UFD.M22: Third party certificate confirming accordance with CEI 0-21: 2012-06 + CEI 0-21; V1: 2012-12 + A70 Terna
- CM-UFD.M31: Third party certificate confirming accordance with VDE-AR-N 4105: 2011-08; BDEW, June 2008 "Technische Richtlinie - Erzeugungsanlagen am Mittelspannungsnetz" including supplementary provisions of January 2013
- CM-UFD.M33: Factory certificate confirming accordance with Engineering Recommendation G59 Issue 3 - September 2013; Engineering Recommendation G83 Issue 2 - December 2012

| Electronic Products | and | Relays |
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Approvals and marks for the world market Overview

ABB low-voltage switching devices are developed and produced in accordance with the applicable regulations as stated in the international IEC publications, the European EN specifications and the national VDE standards.

In most countries, low-voltage switching devices are produced according to such regulations under the responsibility of the manufacturers. This is why the devices are not subject to further approval. However, for those devices which are intended for use in household or for public use our customers can request test reports of our internal laboratory for presentation to the various qualified local organizations. In other countries, approvals are prescribed by law. For devices installed in ships, an approval issued by independent shipping companies, such as the GL, are demanded by the maritime insurance companies.

Marks of conformity and examples of approvals (device-dependent)

International

CB scheme

CB

The CB (Certification Body) Scheme is a system designed to facilitate international trade by establishing mutual acceptance of test reports among participating safety certification organizations (the National Certification Bodies) in more than 30 countries. The CB Scheme was established by the International

Electrotechnical Committee for Conformity Testing to Standards for Electrical Equipment (IECEE).

Europe

Conformité Européen (CE)



All devices which comply with the European low voltage directive and which are intended for sale within the European Union must have the CE sign applied. All products in this catalog are CE marked.

The CE sign must not be confused with a certificate of quality issued by the EU. It is solely used to confirm that the respective product complies with the applicable European directives *). The CE sign is part of an administrative procedure to guarantee free movement of goods within the European Community.

*) Directives:

Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC Machinery Directive 98/37/EEC

Verband der Elektrotechnik Elektronik Informationstechnik (VDE)



Applicable for technical instruments covered by the German Gerätesicherheitsgesetz (GSG) as well as for single parts and electrical wiring devices.

Berufsgenossenschaft der Feinmechanik und Elektrotechnik (BGFE)



The BG-PRÜFZERT sign is a voluntary safety mark, awarded by the BGFE following successful safety testing.

Explosion protection (EX)



Explosion protection acc. to Directive 94/9/EG (ATEX 100a)

Swiss insurance institution (SUVA)



Department accident prevention suvaPRO

Germanischer Lloyd (GL)



Shipping approval

Lloyds Register



Shipping approval

Russia

In Russia, low-voltage switching devices are subject to certification and have to be provided with a sign.

Eurasian Conformity



EAC certification is mandatory for many products. This certification is based on a safety test (IEC standards with Russiaspecific deviations) and an EMC test.

Russian Maritime Register of Shipping RMRS



Shipping approval

Australia, New Zealand

C-Tick Mark



The C-Tick Mark certifies compliance with the Australian EMC requirements. The Mark is also recognized in New Zealand.

China

CCC (China Compulsory Certification)



In China the CCC certification mark is a compulsory certification mark in the field of safety and quality for products sold on the Chinese market.

North America

Canadian and US standards are more or less equivalent but considerably differ from the IEC and VDE regulations.

USA

Underwriters Laboratories (UL) Listing



Released for installation in systems and for sale as individual component in the USA

Recognition



Released for installation in systems, if the respective system has been completely mounted and wired by qualified personnel.

Canada

Canadian Standards Association (CSA)



USA and Canada

The combined UL signs for the USA and Canada are recognized by the authorities of both countries. Devices with this certificate meet the requirements of both countries.

Listing



Recognition

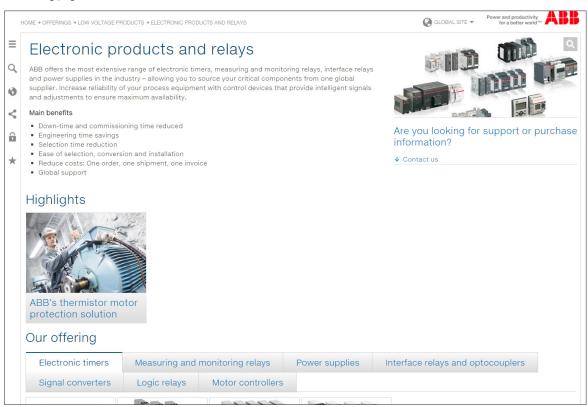


Find Electronic Products and Relays product information and documentation on our web page

The following steps will guide you to the documentation and product search section of the Electronic Products and Relays portfolio on www.ABB.com.

Enter http://new.abb.com/low-voltage/products/epr in your internet browser.

You will be redirected to the following page:



Latest information about the Electronic Products and Relays product range could be found in the Highlights section.

In the lower area of the web page you can find the Our offering section.

The assortment of the Electronic Products and Relays range is listed here as shown in the screenshot below:



Select the register of the relevant product group to see all the products related to the product group.

Choose a product range from which you want to see the documentation or from which you want to choose a specific product.

In this example the CT-S range from the register Electronic timers has been selected as shown on the screenshot.

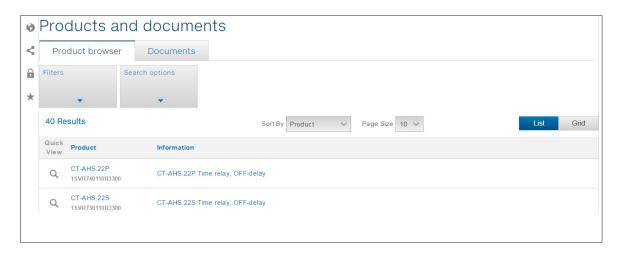
Find Electronic Products and Relays product information and documentation on our web page

You will be redirected to the following page:



Latest information about the Electronic Products and Relays product range could be found in the **Highlights** sections. In the lower area of the web page you can find the **Products and documents** section.

The functions to choose a product or a document are listed here as in the screenshot below:



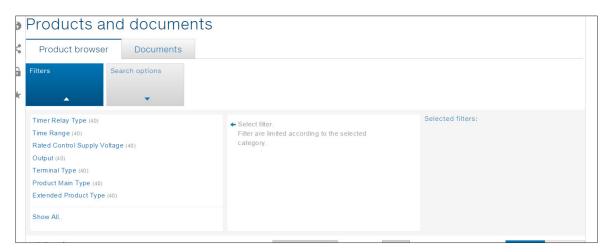
To search for a product continue on page 9.

To search for documentation continue on page 10.

Find Electronic Products and Relays product information and documentation on our web page How to find the right product

Click on Filters to see the different search attributes for the selected product range.

The filter section will be expanded as shown below.



The different product filters are shown.

Click on the filter attribute to continue the product search process.

In this example Output has been chosen.



In the right part mark the corresponding check box to narrow down the search. You can also select several check boxes.

Click on Apply to submit your filter.

The search results are now listed according to your selection.

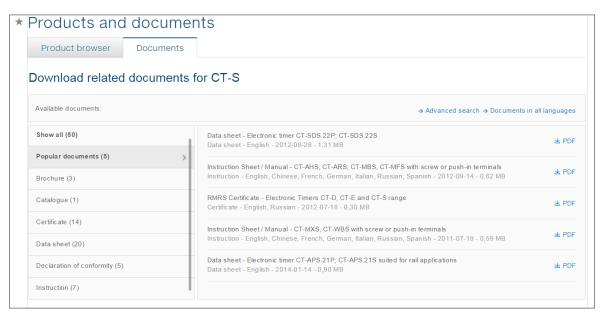
Proceed this approach with different filters until the right product is listed.

Click on the product in the Result section to get the dedicated product information listed in your browser.

Find Electronic Products and Relays product information and documentation on our web page How to find the right documentation

Click on **Documents** to see the different types of documentation for the product.

The document section will be expanded as shown below.



On the left side select the type of document related to the product. In the example **Popular documents** has been selected. In the right area click on the document related to the product.

The document is opened or downloaded, depending on the individual browser settings.

Electronic timers Product group picture



Electronic timers Table of contents

Electronic timers

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Electronic timers Overview













CT-D range

CT-E range

CT-S range

| Timing function | multifunctional | single-functional | multifunctional | single-functional | multifunctional | single-functional | |
|--|--|---|---|---|---|---|--|
| ON-delay | CT-MFD | CT-ERD | CT-MFE, CT-MKE | CT-ERE, CT-EKE | CT-MVS, CT-MFS, CT-MBS, CT-WBS | CT-ERS | |
| OFF-delay | CT-MFD | CT-AHD | CT-MFE | CT-AHE, CT-ARE, CT-AKE | CT-MVS, CT-MFS, CT-MBS | CT-APS, CT-AHS, CT-ARS | |
| ON- and OFF-delay | | | | | CT-MVS, CT-MXS, CT-MFS, CT-MBS | | |
| 1∏⊠Impulse-ON | CT-MFD | CT-VWD | CT-MFE, CT-MKE | CT-VWE | CT-MVS, CT-MFS, CT-MBS, CT-WBS | | |
| 1√ Impulse-OFF | CT-MFD | | | CT-AWE | CT-MVS, CT-MFS, CT-MBS | | |
| 1Л≅ Impulse-ON and OFF | | | | | CT-MXS | | |
| ☐ Flasher starting with ON | CT-MFD | CT-EBD | CT-MFE, CT-MKE | | CT-MFS, CT-MBS, CT-WBS | | |
| ☐ Flasher staring with OFF | CT-MFD | | CT-MFE, CT-MKE | CT-EBE | CT-MFS, CT-MBS, CT-WBS | | |
| Flasher starting with ON or OFF | | | | | CT-MVS | | |
| Pulse generator starting with ON or OFF | | CT-TGD | | | CT-MXS | | |
| 1 Pulse former | CT-MFD | | CT-MFE | | CT-MVS, CT-MFS, CT-MBS | | |
| △ Star-delta change-over | | CT-SDD, CT-SAD | | | | CT-SDS | |
| △1☐ Star-delta change-over with impulse | | | | CT-SDE | CT-MVS.2x, CT-MFS, CT-MBS | | |
| △Star-delta change-over twice ON-delayed | | | | CT-YDE | | | |
| ### ################################## | | | | | CT-MVS, CT-MXS, CT-MFS, CT-MBS, CT-WBS | | |
| Technical data (extract) | | | | | | | |
| | | | | | | | |
| Time ranges | 7 (0.05 s - 100 h CT-SDD, CT-SAD 4 (0.05 s - 10 mi |): | Multifunction devices: 10 (0.05 s - 300 8 (0.05 s - 100 h) CT-ARS, CT-SDS Single-function devices: 7 (0.05 s- 10 mir 5 single ranges (0.05-1 s, 0.1-10 s, 0.3-30 s, 3-300 s, 0.3-300 min) | | | | |
| Control supply voltage | Wide and multi ra | anges | Wide ranges Single and dual ranges | | Wide, multi and s | ingle ranges | |
| Type and number of contacts | | 1 or 2 c/o contacts CT-SDD, CT-SAD: 2 n/o contacts | | 1 c/ o contact CT-SDE: 1 n/o contact and 1 n/c contact CT-MKE, CT-EKE, CT-AKE: 1 thyristor | | 1 or 2 c/o contacts CT-MVS.21, CT-MFS, CT-MBS: 2nd c/o contact selectable as inst. contact CT-SDS: 2 n/o contacts | |
| Control inputs | voltage-related to polarized, capab parallel load | | voltage-related to CT-MFE, CT-AHE with auxiliary volt | | voltage-related triggering, non- polarized, capable of switching a parallel load CT-MFS, CT-MBS, CT-AHS: volt-free triggering | | |

Electronic timers Approvals and marks

| ■ | existing pending | | | | | | | СТ | -D | | | | | | |
|-------------------|-----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1000 | 12 | 21 | 12 | 22 | 12 | 22 | 12 | 12 | 12 | 22 | 22 | 52 | | |
| | | <u>.</u> | Ğ. | Ď. | <u>۾</u> | 후. | 무 | Ŋ. | | Ö. | Ğ. | 9 | 9 | | |
| | | CT-MFD.12 | CT-MFD.21 | CT-ERD.12 | CT-ERD .22 | CT-AHD.12 | CT-AHD.22 | CT-VWD.12 | CT-EBD.12 | CT-TGD.12 | CT-TGD.22 | CT-SDD.22 | CT-SAD.22 | | |
| Approv | | | | | | | | | | | | | | | |
| €UL) US | UL 508, CAN/CSA C22.2 No.14 | • | • | • | • | • | • | • | • | • | • | • | • | | |
| CB scheme | CB scheme | • | | • | | • | - | • | • | • | | | | | |
| EAC | EAC | • | - | • | - | - | - | - | - | - | - | - | • | | |
| | CCC | • | • | | - | - | | - | - | - | • | • | • | | |
| Marka | RMRS | _ | - | • | • | • | • | - | - | • | - | | | | |
| Marks (€ | CE | | | | | | | | • | | | | | 1 | |
| <u>&</u> | RCM | | - | - | _ | | _ | - | - | | - | - | - | | |
| | RUM | _ | | - | | - | | - | - | - | | | | | |
| | | | | | | | | | | | | | | | |
| ■ existi | | | | | | | | C1 | ī-E | | | | | | |
| □ pendi | ing | | 1 | | | | | | 1 | 1 | 1 | 1 | 1 | | 1 |
| | | | | | | | | | | | | | | | |
| | | CT-MFE | CT-ERE | CT-AHE | CT-ARE | CT-VWE | CT-AWE | CT-EBE | CT-YDE | CT-SDE | CT-MKE | CT-EKE | CT-AKE | | |
| | | ≥ | 쁜 | | | <u>}</u> | \frac{1}{4} | 世 | <u> </u> | S- | ≥ | "! | Y-T: | | |
| Approv | 1 | | _ | - | | | | | | | | 1 | | | |
| c (UL) US (GL) | UL 508, CAN/CSA C22.2 No.14 | • | - | • | - | • | • | - | • | • | • | • | • | | |
| | GL | • | - | - | - | - | - | - | - | - | - | - | - | | |
| CB sizes | CB scheme EAC | • | • | • | - | - | - | - | • | - | | | | | |
| ## EHE | CCC | • | • | • | • | • | • | • | • | • | • | • | • | | |
| - ((() | | • | • | • | • | • | • | • | • | • | | | | - | |
| Marks | RMRS | • | • | • | • | • | • | • | • | • | | • | • | | |
| CE | CE | | T _ | T _ | | _ | | | _ | T _ | I _ | T _ | T _ | | |
| <u> </u> | RCM | • | - | • | - | - | - | • | • | • | • | • | • | | |
| | RCIVI | • | • | • | • | • | • | • | • | • | • | • | • | | |
| | | | | | | | | | | | | | | | |
| ■ existi | = | | | | | | | CT | - S | | | | | | |
| □ pendi | ing | | | | | | | | | | | | | | |
| | | _ | | | | | | | | | | | | | |
| | | S/P | S/P | S/P | S/P | S/R | J/S | S/P |
| | | 12 | .2x | .22 | 12. | 3.22 | 3.22 | 12 | , 2X | 12 | X | .22 | Ė. | 12. | 2. X |
| | | § | § | WXS | /FS | /BS | VBS | l BS | L SH | PS | PS | L SH | RS | RS | SOS |
| Approv | ale | CT-MVS.12S/P | CT-MVS.2xS/P | CT-MXS.22S/P | CT-MFS.21S/P | CT-MBS.22S/P | CT-WBS.22S/P | CT-ERS.12S/P | CT-ERS.2xS/P | CT-APS.12S/P | CT-APS.2xS/P | CT-AHS.22S/P | CT-ARS.11S/P | CT-ARS.21S/P | CT-SDS.2xS/P |
| | UL 508, CAN/CSA C22.2 No.14 | | | | | | | | | | | | | | |
| CUL) US LISTED | GL 508, CAN/GSA G22.2 No.14 | - | - | - | - | - | - | - | - | - | - | - | • | - | - |
| EAL | EAC | - | - | - | - | - | - | - | - | - | - | - | _ | _ | - |
| CB scheme | CB scheme | - | - | - | - | - | - | - | _ | - | - | - | - | - | - |
| witness (CC) | CCC | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| - @ | RMRS | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| <u> </u> | Rail applications 1) | • | - | • | - | - | • | • | - | • | - | • | • | - | • |
| Marks | Γιαιι αμμισατιστίδ 7 | | _ | • | • | | | | • | | • | | | • | |
| CE | CE | _ | Ι - | _ | _ | _ | _ | _ | _ | T - | _ | _ | T - | _ | _ |
| <u>&</u> | RCM | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| (8) | | | | | | | | | | | | | | | |

¹⁾ Applicable in rail application following the latest standards for rail applications. Further information are available in our rail segment brochure 2CDC110084B0201.

CT-D range Product group picture



CT-D range Table of contents

CT-D Range

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CT-D range Benefits and advantages

Characteristics

- Diversity:
 - 2 multifunction timers
 - 10 single-function timers
- Control supply voltages:
 - Wide range: 12-240 V AC/DC
 - Multi range: 24-48 V DC, 24-240 V AC
- 7 time ranges from 0.05 s to 100 h or
 4 time ranges from 0.05 s to 10 min
- Width of only 17.5 mm
- Light-grey housing in RAL 7035
- Devices with:
 - 1 c/o contact (250 V / 6 A) or 2 c/o contacts (250 V / 5 A) Control input: voltage-related triggering, polarized, capable of switching parallel loads
- Approvals / Marks (partly pending, details see page 1/4)



¹⁾ Only for devices with 1 c/o (SPDT) contact

Benefits

Direct reading scales ①

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.

LEDs for status indication ②

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Switching currents

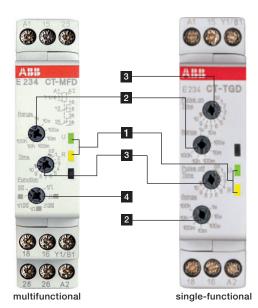
The CT-D range timers allow an output load of up to 6 A on devices with 1 c/o contact and up to 5 A on devices with 2 c/o contacts.

Connection terminals ③

Wide terminal spacing allows connection of wires: $2 \times 1.5 \text{ mm}^2$ (2 x 16 AWG) with wire end ferrules or $2 \times 2.5 \text{ mm}^2$ (2 x 14 AWG) without ferrules.

Width 17.5 mm ④

With their width of 17.5 mm only, the CT-D range timers are ideally suited for installation in distribution panels.

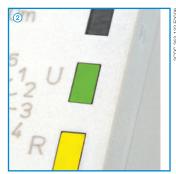


Operating controls

1 LEDs for status indication

- 2 Time range adjustment
- 3 Fine adjustment of the time delay
- 4 Preselection of the timing function









CT-D range Ordering details

Description

The CT-D range in MDRC design with a width of only 17.5 mm fits into all domestic installation and distribution panels.

The CT-D range represents a link between industry and the installation types. For maximum flexibility in operation, 10 single-function as well as 2 multifunction devices with 7 timing functions are available. The devices offer 4 or 7 time ranges from 0.05 seconds up to 100 hours. Their wide input range allows the use in applications worldwide.

Ordering details

| Timing function | Rated control supply | Time ranges | Con- trol input | Output | Туре | Order code | Price | Weight (1 pce) |
|------------------------------------|----------------------------|-----------------------|-----------------------|--------|-------------------------|-----------------|--------|-------------------|
| | voltage | | | | | | 1 pce | kg (lb) |
| Multifunc- tional ¹⁾ | 24-240 V AC 24-48 V DC | 7 (0.05 s - 100 h) | | 1 c/o | CT-MFD.12 | 1SVR500020R0000 | | 0.060 (0.132) |
| Multifunc- tional ¹⁾ | 12-240 V AC/DC | 7 (0.05 s - 100 h) | • | 2 c/o | CT-MFD.21 | 1SVR500020R1100 | | 0.065 (0.143) |
| ON dolay | | | - | 1 c/o | CT-ERD.12 | 1SVR500100R0000 | | 0.060 (0.132) |
| ON-delay | | | - | 2 c/o | CT-ERD.22 | 1SVR500100R0100 | | 0.065 (0.143) |
| OFF-delay | | | | 1 c/o | CT-AHD.12 | 1SVR500110R0000 | | 0.060 (0.132) |
| OFF-delay | | 7 (0.05 s - 100 h) | | 2 c/o | CT-AHD.22 | 1SVR500110R0100 | | 0.065 (0.143) |
| Impulse- ON | 24-240 V AC 24-48 V DC | | - | | CT-VWD.12 | 1SVR500130R0000 | | 0.060 |
| Flasher starting with ON | | | - | 1 c/o | CT-EBD.12 | 1SVR500150R0000 | (0.132 | |
| Pulse | | 2×7 (0.05 s - | | | CT-TGD.12 ²⁾ | 1SVR500160R0000 | | 0.060 (0.132) |
| generator | | 100 h) | | 2 c/o | CT-TGD.22 ²⁾ | 1SVR500160R0100 | | 0.065 (0.143) |
| Star-delta | | 4 (0.05 s - | - | 2 c/o | CT-SDD.223) | 1SVR500211R0100 | | 0.065 |
| change- over | | 10 min) | - | 2 6/0 | CT-SAD.224) | 1SVR500210R0100 | | (0.143) |



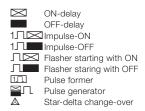
²⁾ ON and OFF times adjustable independently: 2 x 7 time ranges 0.05 s - 100 h



CT-MFD.12



CT-ERD.22



Synonyms

| -,, | | | |
|-----------------|---------------------------|-----------------|---------------------------|
| used expression | alternative expression(s) | used expression | alternative expression(s) |
| 1 c/o contact | SPDT | voltage-related | wet / non-floating |
| 2 c/o contacts | DPDT | volt-free | dry / floating |

³⁾ Transition time 50 ms fixed 4) Transition time adjustable

[■] Control input with voltage-related triggering

no triggering

Remarks Legend

Control supply voltage not applied / Output contact open Control supply voltage applied / Output contact closed

A1-Y1/B1 Control input with voltage-related triggering

Terminal designations on the device and in the diagrams

The 1st c/o contact is always designated 15-16/18. The 2nd c/o contact is designated 25-26/28.

The n/o contacts of the star-delta timers are designated with 17-18 and 17-28.

Control supply voltage is always applied to terminals A1-A2.

Function of the yellow LED

The yellow LED R glows as soon as the output relay energizes and turns off when the output relay de-energizes.

\boxtimes ON-delay (Delay on make) CT-ERD, CT-MFD

This function requires continuous control supply voltage for

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

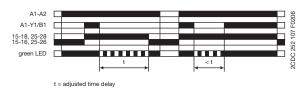
If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.

Control input A1-Y1/B1 of the CT-MFD is disabled when this function is selected.



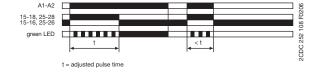
OFF-delay with auxiliary voltage (Delay on break) CT-AHD, CT-MFD

This function requires continuous control supply voltage for timing. If control input A1-Y1/B1 is closed, the output relay energizes immediately. If control input A1-Y1/B1 is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de- energizes and the flashing green LED turns steady. If control input A1-Y1/B1 recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input A1-Y1/B1 re-opens. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



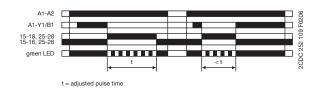
1 □ Impulse-ON (Interval) CT-VWD, CT-MFD

This function requires continuous control supply voltage for timing. The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input A1-Y1/B1 of the CT-MFD is disabled when this function is selected.



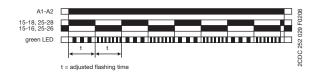
1 ☐ Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MFD

This function requires continuous control supply voltage for timing. If control supply voltage is applied, opening control input A1-Y1/B1 energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady. Closing control input A1-Y1/B1, before the time delay is complete, de-energizes the output relay and resets the time delay. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



$\square \bowtie$ Flasher, starting with the ON time (Recycling equal times, ON first) CT-EBD, CT-MFD

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input A1-Y1/B1 of the CT-MFD is disabled when this function is selected.

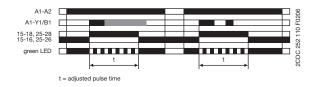


Pulse former (Single shot) CT-MFD

1...

This function requires continuous control supply voltage for timing.

Closing control input A1-Y1/B1 energizes the output relay immediately and starts timing. Operating the control contact switch A1-Y1/B1 during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input A1-Y1/B1. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Flasher, starting with the OFF time (Recycling equal times, OFF first) CT-MFD

function is selected.

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input A1-Y1/B1 of the CT-MFD is disabled when this

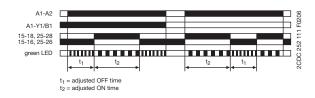


Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first) CT-TGD

This function requires continuous control supply voltage for timina.

Applying control supply voltage, with open control input A1-Y1/B1, starts timing with an ON time first. Applying control supply voltage, with closed control input A1-Y1/B1, starts timing with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

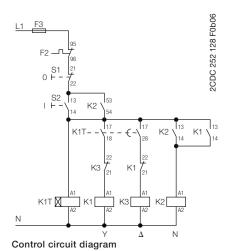


Star-delta change-over (Star-delta starting) CT-SDD, CT-SAD

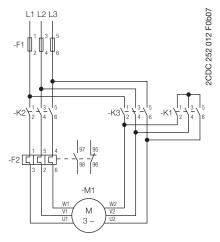
This function requires continuous control supply voltage for

Applying control supply voltage to terminals A1-A2, energizes the star contactor connected to terminals 17-18 and begins the set starting time t₁. The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor.

Now, the transition time t_a starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals 17-28. The delta contactor remains energized as long as control supply voltage is applied to the unit.



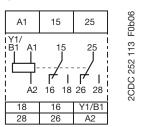
A1-A2 17-18 17-28 $\begin{array}{l} t_1 = \text{adjusted starting time} \\ t_2 = \text{transition time} \\ \text{CT-SDD: } t_2 = 50 \text{ ms} \\ \text{CT-SAD: } t_2 \text{ adjustable} \end{array}$



Power circuit diagram

CT-D range Connection diagrams

CT-MFD.21



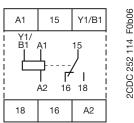
A1-A2 A1-Y1/B1

15-16/18

25-26/28

Supply: 12-240 V AC/DC Control input 1. c/o contact 2. c/o contact

CT-MFD.12

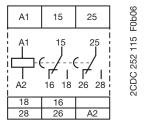


A1-A2

Supply: 24-48 V DC or 24-240 V AC Control input

A1-Y1/B1 15-16/18 1. c/o contact

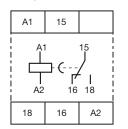
⊠ CT-ERD.22



A1-A2

Supply: 24-48 V DC or 24-240 V AC 15-16/18 1. c/o contact 25-26/28 2. c/o contact

⊠ CT-ERD.12



A1-A2

15-16/18

Supply: 24-48 V DC or 24-240 V AC 1. c/o contact

2CDC 252 177 F0b05

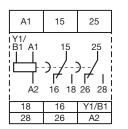
F0b05

2CDC 252 180

F0b06

2CDC 252 160

CT-AHD.22



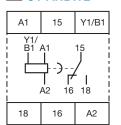
A1-A2

Supply: 24-48 V DC or 24-240 V AC

2CDC 252 116 F0b06

A1-Y1/B1 15-16/18 25-26/28 Control input 1. c/o contact 2. c/o contact

CT-AHD.12



A1-A2

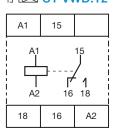
Supply: 24-48 V DC or 24-240 V AC

2CDC 252 117 F0b06

A1-Y1/B1 15-16/18

Control input 1. c/o contact

1 □ CT-VWD.12



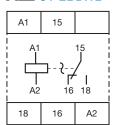
A1-A2

Supply: 24-48 V DC or 24-240 V AC

2CDC 252 179 F0b05

15-16/18 1. c/o contact

∏ CT-EBD.12

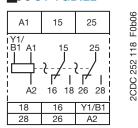


A1-A2

Supply: 24-48 V DC or 24-240 V AC

15-16/18 1. c/o contact

≅⊓ CT-TGD.22

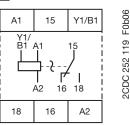


A1-A2

Supply: 24-48 V DC or 24-240 V AC

A1-Y1/B1 15-16/18 25-26/28 Control input 1. c/o contact 2. c/o contact

≅⊓ CT-TGD.12

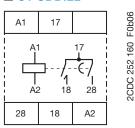


A1-A2

Supply: 24-48 V DC or 24-240 V AC

A1-Y1/B1 Control input 15-16/18 1. c/o contact

△ CT-SDD.22



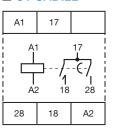
A1-A2

Supply: 24-48 V DC or 24-240 V AC 1. n/o contact

17-18

(star contactor) 17-28 2. n/o contact (delta contactor)

△ CT-SAD.22



A1-A2

Supply: 24-48 V DC or 24-240 V AC

17-18 17-28

1. n/o contact (star contactor) 2. n/o contact

(delta contactor)

CT-D range Technical data

Data at $\rm T_{\rm a}$ = 25 $^{\circ}\rm C$ and rated values, unless otherwise indicated

| | CT-D with 1 c/o contact | CT-D with 2 c/o contacts | CT-MFD.21 | | |
|---|--|------------------------------|--------------------------|--|--|
| Input circuit - Supply circuit | | | | | |
| Rated control supply voltage U _s | 24-240 V AC / 24-4 | 8 V DC | 12-240 V AC/DC | | |
| Rated control supply voltage U _s tolerance | -15+10 % | | <u>4</u> | | |
| Rated frequency | DC or 50/60 Hz | | | | |
| Frequency range AC | 47-63 Hz | | | | |
| Typical current / power consumption | see data sheet | ······ | | | |
| Power failure buffering time Release voltage | min. 20 ms | num rated control supply | v voltage I I | | |
| | > 10 /0 01 the 1111111 | | y voitage o _s | | |
| Input circuit - Control circuit Control input, control function A1-Y1 | /B1 start timing externa | <u> </u> | | | |
| Kind of triggoring | voltage-related trig | | ······ | | |
| Resistance to reverse polarity | yes | | | | |
| Parallel load / polarized | yes / yes | | | | |
| Maximum cable length to the control inputs Minimum control pulse length | 50 m - 100 pF/m 20 ms | <u>.</u> | | | |
| Control voltage potential | see rated control s | unnly voltage | ····· | | |
| Current consumption of the control input | see data sheet | apply voltage | ····· | | |
| Timing circuit | | | | | |
| Time ranges 7 time ranges 0.05 s - 10 | 00 h 1.) 0.05-1 s 2.) 0.5 | 5-10 s 3.) 5-100 s 4.) | 0.5-10 min | | |
| 4 time ranges 0.05 s - 10 min (CT-SDD, CT-S | 5.) 5-100 min 6.) | 0.5-10 h 7.) 5-100 h | 0.5.40!- | | |
| Recovery time | < 50 ms | 5-10 8 3.) 5-100 8 4.) | 0.5-10 mm | | |
| Accuracy within the rated control supply voltage tolerance | Δt < 0.005 % / V | ······· | ······ | | |
| Accuracy within the temperature range | Δt < 0.06 % / °C | ••••• | | | |
| Repeat accuracy (constant parameters) | $\Delta t < \pm 0.5 \%$ | | | | |
| Repeat accuracy (constant parameters) Setting accuracy of time delay Star-delta transition time IEC/EN 618 CT-SDD / CT-S | 12-1 ± 10% of full-scale | -1 ± 10% of full-scale value | | | |
| Star-delta transition time C1-SDD / C1-S | adjustable: 20 ms. | 30 ms, 40 ms, 50 ms, 60 | 0 ms. 80 ms or 100 ms | | |
| Star-delta transition time tolerance CT-SDD / CT-S | | | | | |
| Indication of operational states | | | | | |
| Control supply voltage / timing U: green | LED : control su | pply voltage applied | | | |
| Relay energized (1 c/o contact / R: yellow | : timing LED | | ·····- | | |
| 2 c/o contacts or inst. contact) | LLD 1 Output reid | ay energized | | | |
| Operating elements and controls | <u> </u> | | | | |
| Adjustment of the time range | | vitch, direct reading scal | es | | |
| Fine adjustment of the time value | front-face potention | | | | |
| Preselection of the timing function at multifunction devices | front-face rotary sw SAD front-face potention | vitch, direct reading scal | es | | |
| Adjustment of the transition time CT-S Output circuit | SAD Iront-tace potentior | neter | | | |
| | 6/18 Relay, 1 c/o contac | it - | | | |
| 15-16/18; 25-26 | | Relay, 2 c/o contac | ts | | |
| 17-18; 17 | | Relay, 2 n/o contac | ts (CT-SDD, CT-SAD) | | |
| Contact material Rated operational voltage U | AgNi alloy, Cd free 250 V | | | | |
| | | | | | |
| Minimum switching voltage / minimum switching current Maximum switching voltage / maximum switching current | 12 V / 100 mA 250 V AC / 6 A | 250 V AC / 5 A | | | |
| Rated operational current I AC-12 (resistive) at 23 | | 5 A | | | |
| (IEC/EN 60947-5-1) AC-15 (inductive) at 23 | | 3 A | n/o: 3 A n/c: 0.75 A | | |
| DC-12 (resistive) at 2 | | 5 A | | | |
| DC-13 (inductive) at 2 | | 2 A | 1 A | | |
| AC rating (UL 508) utilization category (Control Circuit Rating Communication and Communication | | | n/o: B 300 n/c: C 300 | | |
| Maximum continuous thermal current at B | ······································ | | n/o: 5 A | | |
| Maximum continuous thermal current at C | 300 - | | n/c: 2.5 A | | |
| max. making/breaking apparent power at B | | | n/o: 3600/360 VA | | |
| max. making/breaking apparent power at C | 300 - 30 x 10 ⁶ switching | cvclas | n/c: 1800/180 VA | | |
| Mechanical lifetime Electrical lifetime | 0.1 x 10° switching | | | | |
| | tact 6 A fast-acting | -,-:00 | | | |
| (IEC/EN 60947-5-1) n/o con | tact 10 A fast-acting | | 6 A fast-acting | | |

CT-D range Technical data

| | | CT-D with 1 c/o contact | CT-D with 2 c/o contacts | CT-MFD.21 |
|--|------------------|--|---|--|
| General data | | | <u> </u> | • |
| Mean time between failures (MTBF) | | on request | | |
| Duty time | | 100% | | |
| Dimensions (W x H x D) | | 17.5 x 70 x 58 mm (0.69 x 2.76 x 2.28 in) | 17.5 x 80 x 58 mm) (0.69 x 3.15 x 2.28 in |) |
| Weight | | see ordering details | ····· | ······································ |
| Mounting | | | 5), snap-mounting with | out any tool |
| Mounting position | | any | | |
| | | no / no | | |
| 0 1 | ng / terminals | IP50 / IP20 | | |
| Electrical connection | | | | |
| Wire size fine-strand with(out) w | vire end ferrule | 2 x 0.5-1.5 mm ² (2 x 2 | | |
| | | 1 x 0.5-2.5 mm ² (1 x 2 | 20-14 AWG) | |
| | rigid | 2 x 0.5-1.5 mm ² (2 x 2 | | |
| Obdereits a Lease! | | 1 x 0.5-4 mm ² (1 x 20 | 1-12 AWG) | |
| Stripping length | | 7 mm (0.28 in) | 5 H- 5-3 | |
| Tightening torque | | 0.5-0.8 Nm (4.43-7.08 | g Ip'iu) | |
| Environmental data | | | | |
| Ambient temperature range opera | tion / storage | -20 +60 °C / -40 | +85 °C | |
| Climatic class IEC/EN | V 60068-2-30 | 3K3 | | |
| Relative humidity range | | 25-85% | | |
| Shock (half-sine) IEC/EN | N 60068-2-27 | 150 m/s², 11 ms | | |
| Isolation data | | | | |
| Rated impulse withstand voltage U _{imp} IEC between all isolated circuits | C/EN 60664-1 | type test: 4 kV; 1.2/50 | 0 μs | |
| Pollution category IEC | C/EN 60664-1 | 3 | | |
| Overvoltage category IEC | C/EN 60664-1 | III | | |
| Rated insulation voltage U input circuit / | output circuit | 300 V | | |
| output circuit 1 / ou | utput circuit 2 | not available | 300 V | 300 V |
| Basic insulation (IEC/EN 61140) input circuit / | output circuit | 300 V | | |
| Protective separation input circuit / (IEC/EN 61140, EN 50178) | output circuit | 250 V | | |
| Power-frequency withstand voltage test between all isc | plated circuits | routine test: 2.5 kV; 5 | | |
| (test voltage) | | type test: 2.5 kV; 50 l | | |
| Standards | | | | |
| Product standard | | IEC/EN 61812-1 | | |
| Low Voltage Directive | | 2006/95/EC | | |
| EMC Directive | | 2004/108/EC | | |
| RoHS Directive | | 2011/65/EC | | |
| Electromagnetic compatibility | | | | |
| nterference immunity to | | IEC/EN 61000-6-1, IE | C/EN 61000-6-2 | |
| electrostatic discharge IE | | Level 3 (6 kV / 8 kV) | | |
| radiated, radio-frequency, electromagnetic field IE | EC/EN 61000-4-3 | Level 3 (10 V / m) | | |
| electrical fast transient / burst IE | C/EN 61000-4-4 | Level 3 (2 kV / 5 kHz) | | |
| | | Level 4 (2 kV L-L) | | |
| conducted disturbances, induced by radio-frequency fields | C/EN 61000-4-6 | Level 3 (10 V) | | |
| nterference emission | | IEC/EN 61000-6-3, IE | EC/EN 61000-6-4 | |
| | 22, EN 55022 | • | | |
| | 22, EN 55022 | Class B | | |

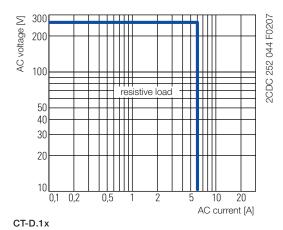
"Approvals and marks" see page 1/4.

CT-D range Technical data, Technical diagrams

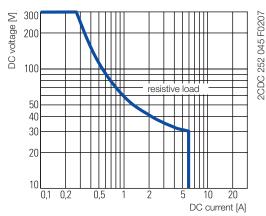
Technical diagrams

Load limit curves

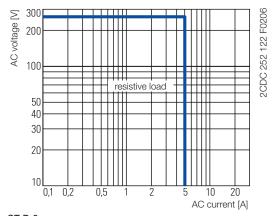
AC load (resistive)



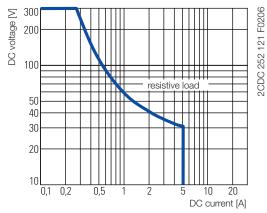
DC load (resistive)



CT-D.1x

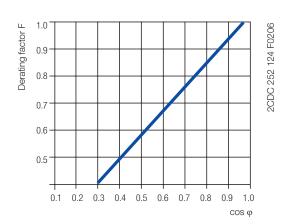


CT-D.2x

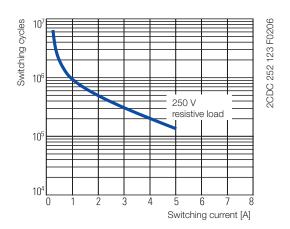


CT-D.2x

Derating factor F for inductive AC load



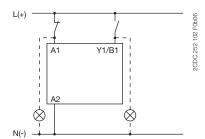
Contact lifetime



CT-D range Wiring notes, Dimensional drawings

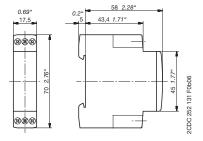
Wiring notes for devices with control input

A parallel load to the control input is possible

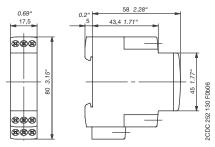


Dimensional drawings

dimensions in mm



CT-D devices with 1 c/o contact or 2 n/o contacts



CT-D devices with 2 c/o contacts

CT-E range Product group picture



CT-E range Table of contents

CT-E Range

| Product group picture | 1/17 |
|---|------|
| Table of contents | 1/18 |
| Benefits and advantages | 1/19 |
| Ordering details | 1/20 |
| Function diagrams | 1/22 |
| Connection diagrams | 1/27 |
| Connection diagrams, Technical diagrams | 1/28 |
| Technical data | 1/29 |
| Wiring notes, Dimensional drawings | 1/31 |
| Notes | 1/32 |

CT-E range Benefits and advantages

Characteristics

- Diversity:
 - 2 multifunction timers
 - 56 single-function timers
- Control supply voltages:
 - Dual range: 24 V AC/DC
 - Single range: 110-130 V AC, 220-240 V AC
 - Wide range: 24-240 V AC/DC (CT-MFE)
- Time ranges
 - 5 single ranges: 0.05-1 s, 0.1-10 s, 0.3-30 s, 3-300 s, 0.3-30 min
 - 8 time ranges: 0.05 s 100 h (CT-MFE)
- Devices with 1 c/o (SPDT) contact (250 V / 4 A) or solid-state output for high switching frequencies (thyristor 0.8 A)
- Approvals / Marks (details see page 1/4)
 - ^c∰us, ௵, [Ⅲ, CB, ⋘, ⊛ / C €, 趣

Benefits

Direct reading scales ①

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.

LEDs for status indication ②

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Connection screws in M3 (Pozidrive 1) 3

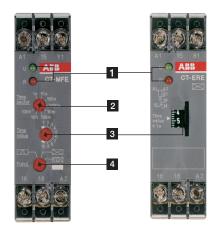
Easy and fast tightening and release of the connection screws with pozidrive, pan- or crosshead screwdriver.

Solid-state output 4

Devices with solid-state output are the perfect solution for high operation cycles.

Synonyms

| used expression | alternative expression(s) | used expression | alternative expression(s) |
|-----------------|---------------------------|-----------------|---------------------------|
| 1 c/o contact | SPDT | voltage-related | wet / non-floating |
| 2 c/o contacts | DPDT | volt-free | dry / floating |

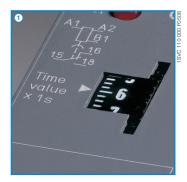


Operating controls

1 LEDs for status indication

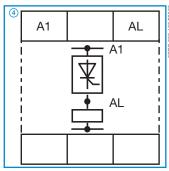
U - green LED: Control supply voltage applied R2: red LED: output relay energized

- 2 Time range adjustment (only multifunctional devices)
- 3 Fine adjustment of the time delay
- 4 Preselection of the timing function (only multifunctional devices)









CT-E range Ordering details

Description

The CT-E range with its excellent price/performance ratio offers an ideal solution for serial applications. 56 single-function devices with 5 different time ranges as well as 2 multifunction timers with 6 functions and 8 time ranges offer the highest possible flexibility for almost every application. For high operating cycles, contact-free CT-E timers with solid-state output are available.

| Timing function | Rated con- trol supply voltage | Time ranges | Con- trol Input | Output | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|-------------------------|--------------------------------------|-----------------------|-----------------------|--------|--------|-----------------|----------------|------------------------------|
| Multifunc- tional 1) | 24-240 V AC/DC | 8 (0.05 s - 100 h) | • | 1 c/o | CT-MFE | 1SVR550029R8100 | | 0.08 (0.18) |
| ON-delay | 24 V AC/DC, 220-240 V AC | 0.1-10 s | | 1 c/o | CT-ERE | 1SVR550107R1100 | | 0.08 (0.18) |
| | | 0.3-30 s | | | | 1SVR550107R4100 | | |
| | | 3-300 s | | | | 1SVR550107R2100 | | |
| | | 0.3-30 min | | | | 1SVR550107R5100 | | |
| | 110-130 V AC | 0.1-10 s | | | | 1SVR550100R1100 | | |
| | | 0.3-30 s | | | | 1SVR550100R4100 | | |
| | | 3-300 s | | | | 1SVR550100R2100 | | |
| | | 0.3-30 min | | | | 1SVR550100R5100 | | |
| OFF-delay | 24 V AC/DC | 0.1-10 s | | 1 c/o | СТ-АНЕ | 1SVR550118R1100 | | 0.08 (0.18) |
| | | 0.3-30 s | | | | 1SVR550118R4100 | | |
| | | 3-300 s | | | | 1SVR550118R2100 | | |
| | 110-130 V AC | 0.1-10 s | | | | 1SVR550110R1100 | | |
| | | 0.3-30 s | | | | 1SVR550110R4100 | | |
| | | 3-300 s | | | | 1SVR550110R2100 | | |
| | 220-240 V AC | 0.1-10 s | | | | 1SVR550111R1100 | | |
| | | 0.3-30 s | | | | 1SVR550111R4100 | | |
| | | 3-300 s | | | | 1SVR550111R2100 | | |
| OFF-delay ²⁾ | 24 V AC/DC, 220-240 V AC | 0.1-10 s | - | 1 c/o | CT-ARE | 1SVR550127R1100 | | 0.08 (0.18) |
| | | 0.3-30 s | | | | 1SVR550127R4100 | | |
| | 110-130 V AC | 0.1-10 s | | | | 1SVR550120R1100 | | |
| | | 0.3-30 s | | | | 1SVR550120R4100 | | |
| Impulse-ON | 24 V AC/DC, 220-240 V AC | 0.1-10 s | - | 1 c/o | CT-VWE | 1SVR550137R1100 | | 0.08 (0.18) |
| | | 0.3-30 s | | | | 1SVR550137R4100 | | |
| | | 3-300 s | | | | 1SVR550137R2100 | | |
| | 110-130 V AC | 0.1-10 s | | | | 1SVR550130R1100 | | |
| | | 0.3-30 s | | | | 1SVR550130R4100 | | |
| | | | | | | | | |



CT-AWE

1 c/o

24 V AC/DC

110-130 V AC

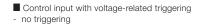
220-240 V AC

Impulse-

OFF²⁾

3-300 s

0.05-1 s

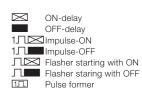




CT-MFE



CT-AHE



1SVR550130R2100

1SVR550158R3100

1SVR550150R3100

1SVR550151R3100

0.08 (0.18)

²⁾ without auxiliary voltage, True Off-delay timer

CT-E range Ordering details







| \bowtie | ON-delay |
|------------------------|----------------------------|
| | OFF-delay |
| $1 \square \boxtimes$ | Impulse-ON |
| 1√. | Impulse-OFF |
| \square | Flasher starting with ON |
| | Flasher staring with OFF |
| 1 | Pulse former |
| $\mathbb{A} \boxtimes$ | Star-delta change-over twi |
| | ON-delayed |

△1Л Star-delta change-over with impulse

Pulse generator starting with ON or OFF

Bestellangaben

| Timing function | Rated con- trol supply- voltage | Time ranges | Con- trol Input | Output | Туре | Order code | Price | Weight (1 pce) |
|---|---------------------------------------|----------------------|-----------------------|------------------|----------------------|-----------------|-------|-------------------|
| | voltage | | imput | | | | 1 pce | kg (lb) |
| Impulse- OFF | 24 V AC/DC | 0.1-10 s | | 1 c/o | CT-AWE | 1SVR550148R1100 | | 0.08 (0.18) |
| | | 0.3-30 s | | | | 1SVR550148R4100 | | |
| | | 3-300 s | 1 | | | 1SVR550148R2100 | | |
| | 110-130 V AC | 0.1-10 s | Ī | | | 1SVR550140R1100 | | |
| | | 0.3-30 s | | | | 1SVR550140R4100 | | |
| | | 3-300 s | | | | 1SVR550140R2100 | | |
| | 220-240 V AC | 0.1-10 s | | | | 1SVR550141R1100 | | |
| | | 0.3-30 s | | | | 1SVR550141R4100 | | |
| | | 3-300 s | 1 | | | 1SVR550141R2100 | | |
| Flasher staring with | 24 V AC/DC, 220-240 V AC | 0.1-10 s | - | 1 c/o | CT-EBE ⁴⁾ | 1SVR550167R1100 | | 0.08 (0.18) |
| OFF | 110-130 V AC | | | | | 1SVR550160R1100 | | |
| *************************************** | | 0.1-10 s | | 1 c/o | • | 1SVR550207R1100 | | 0.08 (0.18) |
| 0 | 24 V AC/DC, 220-240 V AC | 0.3-30 s | 7 | | CT-YDE | 1SVR550207R4100 | | |
| Star-delta change- over twice ON-delayed | | 3-300 s | | | | 1SVR550207R2100 | | |
| | 110-130 V AC | 0.1-10 s | | | | 1SVR550200R1100 | | |
| | | 0.3-30 s | | | | 1SVR550200R4100 | | |
| | | 3-300 s | | | | 1SVR550200R2100 | | |
| Star-delta change-over with impuls | 24 V AC/DC, 220-240 V AC | 0.3-30 s | - | 1 n/o + 1 n/c | CT-SDE 2) 5) | 1SVR550217R4100 | | 0.08 (0.18) |
| | 110-130 V AC | | | | | 1SVR550210R4100 | | |
| | 380-415 V AC | 7 | | | | 1SVR550212R4100 | | |
| Multifunc- tional ⁸⁾ | 24-240V AC/DC | 0.1-10 s, 3-300 s | - | | CT-MKE | 1SVR550019R0000 | | 0.08 (0.18) |
| ON-delay | 24-240 V AC/DC | 0.1-10 s | | solide- state | CT-EKE | 1SVR550509R1000 | | 0.08 (0.18) |
| | | 0.3-30 s | - | | | 1SVR550509R4000 | , | |
| | | 3-300 s | | | | 1SVR550509R2000 | | |
| OFF-delay | 24-240 V AC | 0.1-10 s | Ī | | CT-AKE | 1SVR550519R1000 | | 0.08 (0.18) |
| | | 0.3-30 s | - | | | 1SVR550519R4000 | | |
| | | 3-300 s | - | | | 1SVR550519R2000 | | |

¹⁾ without auxiliary voltage

Notice

CT-...KE are solid-state timers with thyristor output for 2-wire applications. They are connected directly in series with the control coil of contactors or relays. Voltage should not be applied without a load connected, because there is no current limiting in the unit.

²⁾ with fixed transition time

[■] Control input with voltage-related triggering - no triggering

³⁾ solid-state output, functions and time range selection via external jumpers

⁴⁾ symetric ON & OFF times

⁵⁾ common contact

⁶⁾ Functions: ON-delay (AC/DC), Impuls-ON (AC only), Flasher starting with OFF (AC only)

Remarks

Legend

- ☐ Control supply voltage not applied / Output contact open Control supply voltage applied / Output contact closed
- A1-Y1/B1: Control input with voltage-related triggering

Terminal designations on the device and in the diagrams

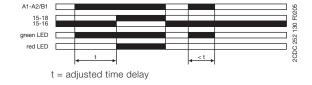
The c/o contact is always designated 15-16/18. The n/o contacts are designated with 15-16 and 15-18. Control supply voltage is always applied to terminals A1-A2/B1.

Function of the red LED

The red LED R glows as soon as the output relay energizes and turns off when the output relay de-energizes.

\bowtie ON-delay (Delay on make) CT-ERE, CT-MFE

Applying control supply voltage starts timing. When the selected time delay is complete, the output relay energizes. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Interrupting control supply voltage before the time delay is complete, resets the time delay. The output relay does not energize.



OFF-delay, with auxiliary voltage (Delay on break) CT-AHE, CT-MFE

This function requires continuous control supply voltage for timing.

Timing is controlled by control input A1-Y1. If the control input is closed, the output relay energizes. If control input A1-Y1 is opened, the selected time delay starts. When the time delay is complete, the output relay de-energizes. If control input A1-Y1 is closed before the time delay is complete, the time delay is reset. Timing starts again when the control input re-opens.

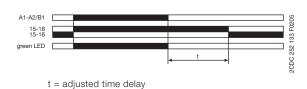


Minimum control pulse length: 20 ms

OFF-delay, without auxiliary voltage (true delay on break) CT-ARE

The OFF-delay function without auxiliary voltage does not require continuous control supply voltage for timing. Applying control supply voltage, energizes the output relay. If control supply voltage is interrupted, the OFF-delay starts. When timing is complete, the output relay de-energizes. If control supply voltage is re-applied before the time delay is complete, the time delay is reset and the output relay remains energized.

Control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.

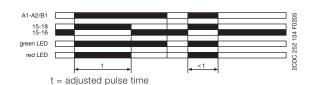


1 ☐ Impulse-ON (Interval) CT-VWE. CT-MFE

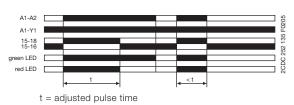
The output relay energizes immediately when control supply voltage is applied and de-energizes after the selected time delay is complete. If control supply voltage is interrupted before the time delay is complete, the output relay de-energizes and the time delay is reset.

Control input A1-Y1 has to be jumpered, when this timing function is selected.

CT-VWE:



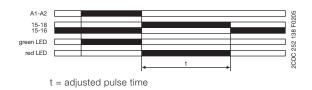
CT-MFE:



1 ☐ Impulse-OFF, without auxiliary voltage (True trailing edge interval) CT-AWE

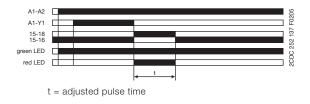
The Impulse-OFF function without auxiliary voltage does not require continuous control supply voltage for timing. If control supply voltage is interrupted, the output relay energizes and the OFF time starts. When timing is complete, the output relay de-energizes. If control supply voltage is re-applied before the time delay is complete, the time delay is reset and the output relay de-energizes.

Control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.



Impulse-OFF, with auxiliary voltage (Trailing edge interval) CT-AWE

This function requires continuous control supply voltage for timing. Timing is controlled by control input A1-Y1. If the control input is opened, the output relay energizes and timing begins. When the selected time delay is complete, the output relay de-energizes. Interrupting control supply voltage or closing control input A1-Y1, before the time delay is complete, de-energizes the output relay and resets the time delay.



\square Flasher starting with ON (Recycling equal times, ON first) CT-MFE

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input A1-Y1 has to be open, when this timing function is selected.



t = adjusted flashing time

Flasher starting with OFF (Recycling equal times, OFF first) CT-EBE, CT-MFE

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input A1-Y1 has to be jumpered, when this timing function is selected.

CT-EBE:



t = adjusted flashing time

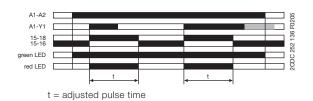
CT-MFE:



t = adjusted flashing time

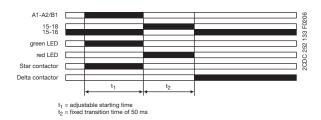
1√ Pulse former (Single shot) CT-MFE

Closing the control input A1-Y1, with control supply voltage applied, energizes the output relay for the selected ON time. Operating the control input during timing has no effect. When the ON time is complete, the output relay de-energizes. Timing can be restarted by re-closing control input A1-Y1. If control supply voltage is interrupted during timing, the output relay de-energizes and the ON time is reset.



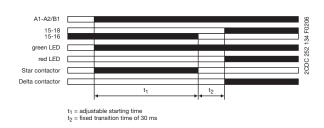
Star-delta change-overCT-YDE

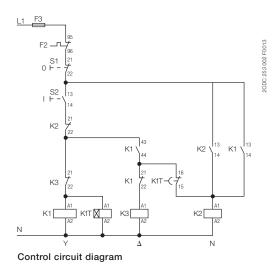
Applying control supply voltage energizes the star contactor (K1) and the line contactor (K2) and begins the set starting time. When the starting time is complete, contact 15-16 de-energizes the star contactor (K1) Now, the fix transition time starts. When the transition time is complete, contact 15-16 energizes the delta contactor (K3).

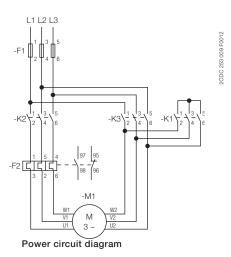


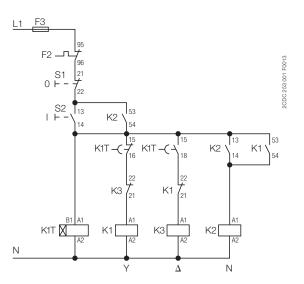
△1☐ Star-delta change-over CT-SDE

Applying control supply voltage energizes the star contactor (K1) and the line contactor (K2) and begins the set starting time. When the starting time is complete, contact 15-16 de-energizes the star contactor (K1). Now, the fix transition time starts. When the transition time is complete, contact 15-18 energizes the delta contactor (K3).









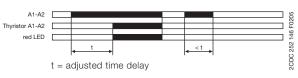
Control circuit diagram

Multifunction timer CT-MKE

Functions and time ranges are programmed by simply plugging in external wire jumpers.

ON-delay (Delay on Make)

Without external connection. Timing begins when control supply voltage is applied to terminal A1 and the load connected in series with A2. When Thyristor A1-A2 the selected time delay is complete, the load energizes. If control supply voltage is interrupted, the load de-energizes and the time delay is reset. Interrupting supply voltage before the time delay is complete, resets the time delay. The load does not energize.



1 ☐ Impulse-ON (Interval)

External connection X1-X4 required. The load energizes and timing starts when control supply voltage is applied to terminal A1 and the load Thyristor A1-A2 connected in series with A2. When the selected time delay is complete, the load de-energizes. Interrupting control supply voltage before the time delay is complete, de-energizes the load and resets the time delay.



Flasher, starting with ON

External connection X1-X4 and X2-X4 required. When control supply voltage is applied to terminal A1 and the load connected in series with A2, the load energizes and de-energizes with the selected ON & OFF times. The ON & OFF times are equal. The cycle starts with an ON time first (load energized). If control supply voltage is interrupted, the load de-energizes and the time delay is reset.





Flasher, starting with OFF

External connection X2-X4 required. When control supply voltage is applied to terminal A1 and the load connected in series with A2, the load energizes and de-energizes with the selected ON & OFF times. The ON & OFF times are equal. The cycle starts with an OFF time first (load de-energized). If control supply voltage is interrupted, the load de-energizes and the time delay is reset.

Programming the time ranges

X3-X4 jumpered: 0.1-10 s X3-X4 open: 3-300 s

ON-delay (Delay on make) CT-EKE

before the time delay is complete, resets the time delay. The load does not energize.

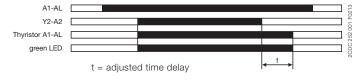
Timing begins when control supply voltage is applied to terminal A1 and the load connected in series with AL. When the selected time delay is complete, the load energizes. The green LED glows as long as the load is energized. If control supply voltage is interrupted, the load de-energizes and the time delay is reset. Interrupting control supply voltage



OFF-delay, with auxiliary voltage (Delay on break) CT-AKE

The OFF-delay function with auxiliary voltage requires continuous control supply voltage at terminal A1, and the load connected in series with AL, for timing.

Timing is controlled by control input Y2-A2. When the control input is closed, the load energizes. If the control input is opened, the selected time delay starts (minimum control pulse length is 20 ms). The green LED glows as long as the load is energized. When the selected time delay is complete, the load de-energizes. If control input Y2-A2 is closed before the time delay is complete, the time delay is reset and the load remains energized. Timing starts again when the control input is re-opened. Interrupting control supply voltage resets the time delay and de-energizes the load.

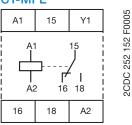


Notice:

CT-...KE are solid-state timers with thyristor output for 2-wire applications. They are connected directly in series with the control coil of contactors or relays. Voltage should not be applied without a load connected, because there is no current limiting in the unit.

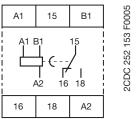
CT-E range Connection diagrams

CT-MFE



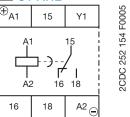
A1-A2 Supply: 24-240 V AC/DC
A1-Y1 Control input
15-16/18 c/o contact

⊠ CT-ERE



A1-A2 Supply: 220-240 V AC or 110-130 V AC A1-B1 Supply: 24 V AC/DC

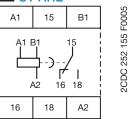
CT-AHE 1)



A1-A2 Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC

A1-Y1 Control input 15-16/18 c/o contact

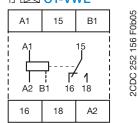
■ CT-ARE



A1-A2 Supply: 220-240 V AC or 110-130 V AC A1-B1 Supply: 24 V AC/DC

A1-B1 Supply: 24 V AC. 15-16/18 c/o contact

1Л⊠ CT-VWE

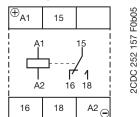


A1-A2 Supply: 220-240 V AC or 110-130 V AC

A1-B1 Supply: 24 V AC/DC 15-16/18 c/o contact

1. CT-AWE

15-16/18 c/o contact

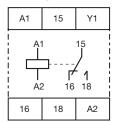


Device without aux. voltage

A1(+)-A2(-) Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC

15-16/18 c/o contact

1JT CT-AWE 1)



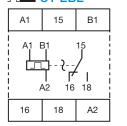
2CDC 252 158 F0b05

Device with aux. voltage

A1-A2 Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC

A1-Y1 Control input 15-16/18 c/o contact

л СТ-ЕВЕ

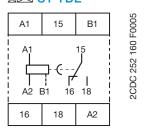


2CDC 252 159 F0005

A1-A2 Supply: 220-240 V AC or 110-130 V AC A1-B1 Supply: 24 V AC/DC

15-16/18 c/o contact

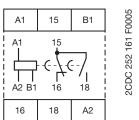
△ CT-YDE



A1-A2 Supply: 220-240 V AC or 110-130 V AC A1-B1 Supply: 24 V AC/DC

15-16/18 c/o contact

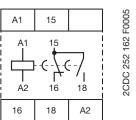
△1/ CT-SDE



Device: 1SVR 550 217 R4100

A1-A2 Supply: 220-240 V AC
A1-B1 Supply: 24 V AC/DC
15-16 n/c contact
15-18 n/o contact
with common contact

△1/ CT-SDE

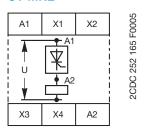


Devices: 1SVR 550 210 R4100, 1SVR 550 212 R4100

A1-A2 Supply: 110-130 V AC or 380-415 V AC

15-16 n/c contact 15-18 n/o contact with common contact

CT-MKE



A1-A2 Supply: 24-240 V AC/DC

A1-A2 Thyristor

X1-X4 Timing function adjustment X2-X4 Timing function adjustment X3-X4 Time range adjustment

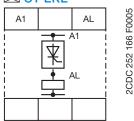
(Details see function diagrams)

^{1) &}quot;"Wiring notes, Dimensional drawings" see page 1/31.

CT-E range

Connection diagrams, Technical diagrams

⊠ CT-EKE



A1-AL Supply: 24-240 V AC/DC

A1-AL Thyristor CT-AKE 2CDC 252 167 F0005 AL Y2 A2

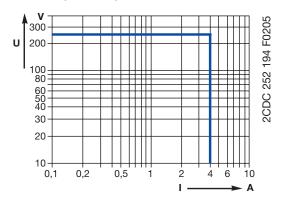
A1-AL A1-AL Y2-A2

Supply: 24-240 V AC Thyristor Control input

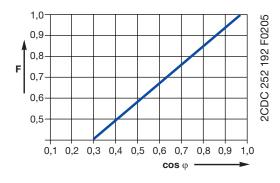
Technical diagrams

Load limit curves

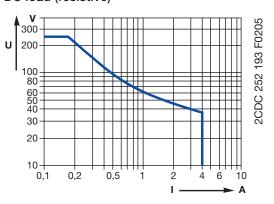
AC load (resistive)



Derating factor F for inductive AC load

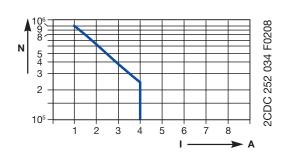


DC load (resistive)



220 V 50 Hz AC1 360 cycles/h

Contact lifetime



CT-E range Technical data

Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

| - | | CT-E (relays) | CT-E (solid-state) |
|--|--|--|---|
| Input circuit - Supply circuit | | | |
| Rated control supply voltage U | A1-A2 A1-AI | 24-240 V AC/DC | |
| riated certifol cappily vertage os | A1-A2, A1-AL | | • |
| | Λ1 ΛΣ, Λ1 ΛΣ | 110-130 V AC | _ |
| | | 220-240 V AC | _ |
| | Λ1-Λ2 Λ1 ΛΩ | 380-415 V AC | : -T |
| | A1-A2 | 24 V AC/DC | - |
| Datad control cumply voltage II, talerone | AI-DI | 15 .10 0/ | - |
| Rated control supply voltage U _s tolerand | | -15+10 % | |
| Rated frequency | AC/DC versions | DC or 50/60 Hz | |
| | AC versions | 50/60 Hz | |
| Typical current / power consumption | 24-240 V AC/DC, 24-240 V AC | approx. 1.0-2.0 VA/W | |
| | 110-130 V AC, 220-240 V AC | approx. 2.0 VA | - |
| | | approx. 3.0 VA | - |
| | | approx. 1.0 VA/W | - |
| Minimum energizing time | CT-ARE, CT-AWE w/o aux. voltage | 200 ms | _ |
| Ourrent consumption while timing | OT-ATIL, OT-AWL W/O aux. Voltage | 200 1115 | ≤ 2 mA (24-60 V AC/DC) |
| ourrent consumption write timing | | _ | ≤ 8 mA (60-240 V AC/DC) |
| | | | (CT-AKE only AC) |
| | | | (CT-ARE OTHY AC) |
| nput circuit - Control circuit | | | |
| Kind of triggering | | voltage-related triggering | = |
| Control input, Control function | A1-Y1 | start timing external | - |
| Parallel load / polarized | | no / yes ¹⁾ | = |
| Minimum control pulse length | ···· | 20 ms | - |
| Control voltage potential | ······································ | see rated control supply voltage | - |
| Timing circuit | | coo rated control capply voltage | : |
| | 5.0 | 10.05 / /0./ /0.00 / 0.00 | |
| Time ranges 1 of | | | 0 s / 0.3-30 min |
| 8 | time ranges 0.05 s - 100 h (CT-MFE) | 1.) 0.05-1 s 2.) 0.5-10 s | - |
| | | 3.) 5-100 s 4.) 50-1000 s | |
| | | 5.) 0.5-10 min 6.) 5-100 min | |
| | | 7.) 0.5-10 h 8.) 5-100 h | |
| | 2 time ranges 0.1-300 s (CT-MKE) | - | 1.) 0.1-10 s |
| | | | 2.) 3-300 s |
| Recovery time | •••• | <50 ms | CT-EKE: <50 ms |
| , | | CT-ARE: <200 ms | CT-MKE: <100 ms |
| | | CT-AWE, CT-SDE: <400 ms | CT-AKE: <300 ms |
| | | CT-YDE: <500 ms | |
| Accuracy within the rated control supply | voltage tolerance | Δt < 0.5 % / V | <u>.</u> |
| Accuracy within the temperature range | | Δt < 0.1 % / °C | |
| toodiacy within the temperature range | | CT-MFE: \(\Delta\) < 0.06 \(\Omega\) / \(\circ\) | _ |
| Repeat accuracy (constant parameters) | | \(\text{\ti}\text{\texit{\text{\tett{\text{\tetx{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texi}\text{\text{\texi}\text{\text{\text{\text{\texit{\texitit{\text{\texit{\texi}\text{\texit{\text{\texi}\tex{\text{\texi}\text{\text{\texit{\texit{\texit{\texi}\til\t | <u> </u> |
| | CT-YDE / CT-SDE | | : |
| Star-delta transition time | OI-THE / CI-SHE | 00 1118 / 30 1118 | <u>: -</u> |
| Output circuit | | | |
| Kind of output | 15-16/18 | Relay, 1 c/o contact | - |
| | CT-SDE: 15-16, 15-18 | 1 n/c, 1 n/o contact with common | |
| | | contact | |
| | A1-A2. A1-AL | - | Thyristor |
| Contact material | | AgCdO | - |
| Rated operational voltage U | IEC/EN 60947-1 | 250 V | . |
| | 120/211 00947-1 | | ····· |
| Maximum switching voltage | | 250 V AC, 250 V DC | |
| Rated operational current I | AC-12 (resistive) at 230 V | 4 A | - |
| IEC/EN 60947-5-1) | AC-15 (inductive) at 230 V | 3 A | - |
| | DC-12 (resistive) at 24 V | 4 A | - |
| | DC-13 (inductive) at 24 V | | - |
| | | · | • · · · · · · · · · · · · · · · · · · · |

¹⁾ CT-MFE: yes / no

CT-E range Technical data

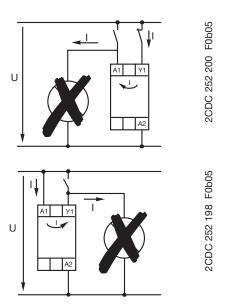
| | | CT-E (relays) | CT-E (solid-state) |
|--|--|---|---|
| AC rating (UL 508) Utilization catego | ry (Control Circuit Rating Code) | B 300 | - |
| | max. rated operational voltage | 300 V AC | - |
| Maximum cont | tinuous thermal current at B300 | 5 A | - |
| | eaking apparent power at B300 | | - |
| Mechanical lifetime | | 30 x 10 ⁶ switching cycles | - |
| Electrical lifetime | at AC-12 230 V 4 A | 0.1 x 10 ⁶ switching cycles | _ |
| Max. fuse rating to achieve short-circuit | | 10 A fast-acting, CT-ARE: 5 A | - |
| protection (IEC/EN 60947-5-1) | | 10 A fast-acting, CT-ARE: 5 A | _ |
| Minimum load current | 11/0 COIIIaCi | 10 / Tast-acting, OT-ATIL. J A | CT-MKE: 20 mA |
| wiii iii ii ii ii oau Gullelli | | | CT-MKE: 20 MA CT-EKE, CT-AKE: 10 mA |
| Maximum load current | | | CT-MKE: 0.8 A at T ₂ = 20 °C |
| iviaxiiilulii ioau cultelli | | _ | CT-KKE: 0.8 A at 1 = 20 °C CT-EKE, CT-AKE: 0.7 A |
| Load current reduction / Deseting | | <u> </u> | |
| Load current reduction / Derating | | - | 10 mA/°C |
| Maximum surge current | | - | CT-MKE: ≤ 20 A for t ≤ 20 ms |
| | | - | CT-EKE, CT-AKE: ≤ 15 A |
| Voltage drop in connected state | | - | ≤3V |
| Cable length between solid-state timer | at 24 V AC | - | 220 m / 22 nF |
| and connected load at 50 Hz and a | at 42 V AC | | 100 m / 10 nF |
| cable capacity of 100 pF/m: | at 60 V AC | | 65 m / 6.5 nF |
| | at 110 V AC | | 50 m / 5 nF |
| | at 240 V AC | - | 22 m / 2.2 nF |
| General data | | | |
| Duty time | | 100% | |
| Dimensions (W x H x D) | ······································ | 22.5 x 78 x 78.5 mm (0.886 x 3.0 | 7 x 3.09 in) |
| Weight | | approx. 80 g (0.176 lb) | |
| Mounting | ······ | DIN rail (IEC/EN 60715) | ····· |
| Mounting position | | any | |
| Minimum distance to other units | horizontal / vertical | no / no | |
| Degree of protection | housing / terminals | | |
| Electrical connection | nousing / terminals | 11 00 / 11 20 | |
| | fine-strand with wire and farrula | 2 x 0.75-1.5 mm ² (2 x 18-16 AWG) | |
| fino | -strand without wire end ferrule | $2 \times 1.15 \text{ mm}^2 / 2 \times 18.16 \text{ AWG}$ | <u></u> |
| IIIIC | rigid | 2 x 0.75-1.5 mm ² (2 x 18-16 AWG) | |
| Ctrinning longth | rigiu | | · · · · · · · · · · · · · · · · · · · |
| Stripping length Tightening torque | | 10 mm (0.39 in) 0.6-0.8 Nm (5.31-7.08 lb.in) | |
| | | 0.0-0.0 MIII (5.31-7.06 ID.III) | |
| Environmental data | | | |
| Ambient temperature ranges | operation / storage | -20+60 °C / -40+85 °C | |
| Damp heat | IEC/EN 60068-2-30 | 24 h cycle, 55 °C, 93 % rel., 96 h | |
| Operational reliability | IEC/EN 60068-2-6 | 6 g | |
| Mechanical resistance | IEC/EN 60068-2-6 | | |
| Isolation data | | . <u> </u> | |
| Dated impulse withstand voltage II | IEC/EN 60664.1 | tupo toot: 4 lo/: 1 0/E0 up | <u> </u> |
| Rated impulse withstand voltage U _{imp} | IEG/EN 60664-1 | type test: 4 kV; 1.2/50 µs | - |
| between all isolated circuits | IEO/EN OOGE | ļ | |
| Pollution category | IEC/EN 60664-1 | 3 | |
| Overvoltage category | IEC/EN 60664-1 | | ···· |
| Power-frequency withstand voltage (test | | routine test: 2.5 kV; 50 Hz; 1 s | = |
| voltage) between all isolated circuits | | type test: 2.5 kV; 50 Hz; 60 s | |
| Basic insulation (IEC/EN 61140) | input circuit / output circuit | 300 V | - |
| Rated insulation voltage U | input circuit / output circuit | 300 V (supply up to 240 V) | - |
| · 1 | | 500 V (supply up to 440 V) | - |
| Test voltage between all isolated circuits | routine test | 2.5 kV, 50 Hz, 1 s | - |
| Standards | | | |
| | | IEC 61910 1 EN 61910 1 . A11 D | IN VDE 0425 Toil 2001 |
| Product standard | | IEC 61812-1, EN 61812-1 + A11, D | UIN VUE 0400 TEII ZUZT |
| Low Voltage Directive | | 2006/95/EC | |
| EMC Directive | | 2004/108/EC | |
| Electromagnetic compatibility | | | |
| Interference immunity to | | IEC/EN 61000-6-2 | |
| electrostatic discharge | IEC/EN 61000-4-2 | † | |
| radiated, radio-frequency | IEC/EN 61000-4-3 | | |
| electromagnetic field | .20,21,01000 4 0 | | |
| electrical fast transient / burst | IEC/EN 61000-4-4 | Level 3 (2 kV / 5 kHz) | |
| ••••••••••••••••••••••••••••••••• | | Level 4 (2 kV L-L) | |
| surge | | | |
| conducted disturbances, induced by rac | dio- IEC/EN 61000-4-6 | Level 3 (IU V) | |
| frequency fields | | LEC/EN 61000 6 4 | |
| Interference emission | | IEC/EN 61000-6-4 | |
| Approvale and marks" acc page 1/4 | | | |

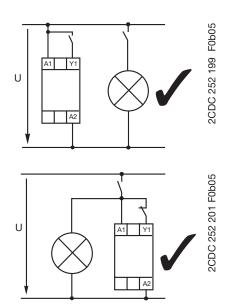
"Approvals and marks" see page 1/4.

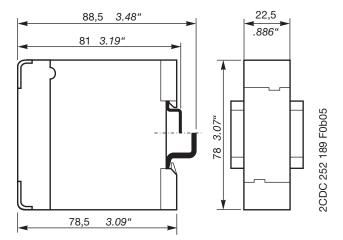
CT-E range Wiring notes, Dimensional drawings

Wiring notes

for single-function devices with control contact (CT-AHE, CT-AWE with auxiliary voltage)







CT-E range Notes

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CT-S range Product group picture



CT-S range Table of contents

CT-S Range

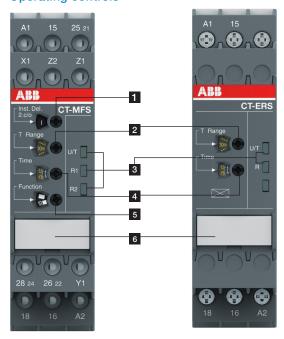
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CT-S range Benefits and advantages

Characteristics

- Diversity:
 - 8 multifunction timers
 - 13 single-function timers
- Control supply voltages:
 - Multi range: 24-48 V DC, 24-240 V AC
 - Wide range: 24-240 V AC/DCSingle range: 380-440 V AC
- Innovative connection technology
 - Double-chamber cage connection terminals
 - Easy Connect Technology
- Devices with:
 - 1 or 2 c/o (SPDT) contacts
 - 2nd c/o contact can be selected as instantaneous contact 1)
 - Remote potentiometer connection 1)
 - Control input with volt-free or voltage-related triggering e.g. to start timing, pause timing
 - Extended operating temperature range down to -40 $^{\circ}\text{C}^{\ \ ^{1)}}$
- Sealable transparent cover for protection against unauthorized changes of time values
- Integrated marker label
- Approvals / Marks (partly pending, details see page 1/4)
 - ${}^{\text{\tiny CM}_{\text{laster}}},$ ${}^{\text{\tiny CM}},$ ${}^{\text{\tiny CM}},$ ${}^{\text{\tiny CM}},$ ${}^{\text{\tiny CM}},$ ${}^{\text{\tiny CM}},$ ${}^{\text{\tiny CM}}$

Operating controls



- 1 2nd contact as an instantaneous contact
- 2 Preselection of the time range
- 3 Indication of operational states

U/T: \tag{Control} control supply voltage applied / \tag{L} timing R: \tag{Output relay energized}

- 4 Fine adjustment of time delay
- 5 Preselection of timing function
- 6 Marker label

CT-S range Benefits and advantages

Easy Connect Technology

Tool-free wiring and excellent vibration resistance. Push-in terminals provide connection of wires up to 2 x 0.5 - 1.5 mm² (2 x 20 -16 AWG), rigid or fine-strand with or without wire end ferrules. The extended type designators for products with push-in terminals are indicated by a P following the extended type designator e.g. CT-xxS.xxP.

Double-chamber cage connection terminals ②

Double-chamber cage connection terminals provide connection of wires up to 2 x 0.5-2.5 mm² (2 x 20-14 AWG) rigid or fine-strand, with or without wire end ferrules. Potential distribution does not require additional terminals. The extended type designators for products with double-chamber cage connection terminals are indicated by a **S** following the extended type designator e.g. CT-xxS.xxS.

Time range preselection and fine adjustment 3

Direct assignment of the preselected time range to the fine adjustment potentiometer scale by multicolor scales.

Higher utility class

The Easy Connect Technology provides excellent vibration resistance with gas tight push-in terminals - the right solution for harsh environment. Selected products of the electronic timers and measuring and monitoring relays comply to the latest rail standards NF F 16-101/102, EN 45545, EN 50155 and more standards which are relevant for railway applications. Find more inforamtion in the rail brochure 2CDC110084B0201.

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Integrated marker label

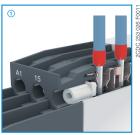
Integrated marker labels allow the product to be marked quickly and simply. No additional marker labels are required.

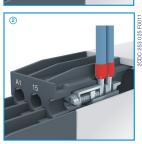
Sealable transparent cover

Protection against unauthorized changes of time and threshold values. Available as an accessory.

Snap-On housing

Tool-free DIN rail installation and deinstallation of the electronic timer.

















CT-S range Ordering details - multifunctional



CT-MVS.21P



CT-MBS.22P

OFF-delay without aux. voltage 1. Impulse-ON 1. Impulse-OFF Symmetrical ON-delay and OFF-delay Flasher starting with ON Flasher staring with OFF

(+) ON-delay (accumulative)

Pulse generator starting

A1 Star-delta change-over with impulse

Pulse former

ON/OFF-function

Star-delta change-over twice
ON-delayed

with ON or OFF

Pulse generator starting with
ON or OFF

Single-pulse generator

Impulse-ON/OFF

Flasher starting with ON

Flasher starting with OFF

Impulse with adjustab

Flasher starting with OFF

In the starting with Adjustable time delay

■1 Adjustable impulse with fixed time delay

Description

The highly sophisticated CT-S range in ABB's new S-range housing offers two different types of connection terminals and is ideally suited for universal use. Two different connection technologies are available:

- Double-chamber cage connection terminals
- Easy Connect Technology

Accessories:

The CT-S range offers the possibility of using accessories such as a remote potentiometer to adjust the time delay or a sealable, transparent cover to protect against unauthorized changes. of time and threshold values.

Ordering details

| Timing function | Rated control supply volt- | Time ranges | Control input | Output | Туре | Order code | Price | Weight (1 pce) |
|----------------------|----------------------------|----------------|---------------|----------|-----------------------------|-----------------|-------|-------------------|
| | age | | | | | | 1 pce | kg (lb) |
| | | | | | CT-MVS.21S | 1SVR730020R0200 | | 0.148 (0.326) |
| | 24- 240 V AC/DC | | | | CT-MVS.21P | 1SVR740020R0200 | | 0.136 (0.30) |
| Multifunc- | 24-48 V DC. | 10 (0.05 s - | _ | 0 / | CT-MVS.22S | 1SVR730020R3300 | | 0.142 (0.313) |
| tional 5) | 24-240 V AC | 300 h) | | 2 c/o | CT-MVS.22P | 1SVR740020R3300 | | 0.131 (0.289) |
| | | | | | CT-MVS.23S | 1SVR730021R2300 | | 0.144 (0.317) |
| | 380-440 V AC | | | <u> </u> | CT-MVS.23P | 1SVR740021R2300 | | 0.133 (0.293) |
| Multifunc- | 24-48 V DC. | 10 (0.05 s - | _ | d -/- | CT-MVS.12S | 1SVR730020R3100 | | 0.107 (0.236) |
| tional ⁶⁾ | 24-240 V AC | 300 h) | | 1 c/o | CT-MVS.12P | 1SVR740020R3100 | | 0.102 (0.225) |
| Multifunc- | 24-48 V DC. | 2×10 (0.05 s - | _ | | CT- MXS.22S 4) | 1SVR730030R3300 | | 0.142 (0.313) |
| tional 7) | 24-240 V AC | 300 h) | | 2 c/o | CT-MXS.22P 4) | 1SVR740030R3300 | | 0.131 (0.289) |
| ••••• | | 10 (0.05 s - | | | CT-MFS.21S | 1SVR730010R0200 | | 0.145 (0.32) |
| Multifunc- | 24- 240 V AC/DC | 300 h) | | 2 c/o | CT-MFS.21P | 1SVR740010R0200 | | 0.133 (0.293) |
| tional ⁸⁾ | 24-48 V DC. | 10 (0.05 s - | | 2 c/o | CT-MBS.22S ^{2) 3)} | 1SVR730010R3200 | | 0.14 (0.309) |
| | 24-240 V AC | | _/_ | | CT-MBS.22P ^{2) 3)} | 1SVR740010R3200 | | 0.129 (0.284) |
| Multifunc- | 24-48 V DC, | 10 (0.05 s - | | | CT-WBS.22S | 1SVR730040R3300 | | 0.123 (0.271) |
| tional 9) | 24-240 V AC | 300 h) | - | 2 c/o | CT-WBS.22P | 1SVR740040R3300 | | 0.115 (0.254) |

- 1) Extended temperature range -40 °C
- ²⁾ Remote potentiometer connection
- $^{\mbox{\tiny 3)}}$ 2nd c/o contact selectable as instantaneous contact
- 4) 2 remote potentiometer connections

- Control input with voltage-related triggering

 ☐ Control input with volt-free triggering
- \square / \square two control input with volt-free triggering
- no triggering
- S: screw connection
- P: push-in / easy connect
- ⁵⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Star-delta change-over with impulse, Pulse former, Accumulative ON-delay, ON/ OFF-function
- ⁶⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Pulse former, Accumulative ON-delay, ON/OFF-function
- ⁷⁾ Functions: Select function via DIP switches behind the marker label on the front of the unit, asymmetrical ON- and OFF-delay, Impulse-ON/OFF, Pulse generator starting with ON or OFF, Single pulse generator, ON/OFF-function
- ⁸⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON, Flasher starting with OFF, Star-delta change-over with impulse, Pulse former, ON/OFF-function
- ⁹⁾ Functions: Flasher starting with ON, Flasher starting with OFF, Impulse-ON, ON-delay, fixed impulse with adjustable time delay, Adjustable impulse with fixed time delay, ON/OFF-function

CT-S range Ordering details - singlefunctional



CT-ERS.21P



CT-AHS.22P



CT-SDS.23P

- (+) ON-delay (accumulative) OFF-delay without aux.voltage 1√⊠Impulse-ON ☐ Flasher starting with ON Flasher staring with OFF

 Impulse-ON/OFF ☐ Flasher starting with ON Flasher starting with OFF ⊠1∏ fixed impulse with adjustable
 - time delay ■1 Adjustable impulse with fixed time delay
- Star-delta change-over

| Timing function | Rated con- trol supply voltage | Time ranges | Con- trol input | Output | Туре | Order code | Price | Weight (1 pce) |
|---------------------------|--------------------------------------|------------------------|-----------------------|----------------|--------------------------|-----------------|-------|-------------------|
| | | | p.u.t | | | | 1 pce | kg (lb) |
| | 24-240 V AC/DC | | | | CT-ERS.21S ¹⁾ | 1SVR730100R0300 | | 0.13 (0.287) |
| | 24-240 V AO/DO | | | 2 c/o | CT-ERS.21P1) | 1SVR740100R0300 | | 0.121 (0.267) |
| ON-delay | 24-48 V DC, | 10 (0.05 s - | | 20/0 | CT-ERS.22S | 1SVR730100R3300 | | 0.121 (0.267) |
| OIV dolay | 24-240 V AC | 300 h) | | | CT-ERS.22P | 1SVR740100R3300 | | 0.113 (0.249) |
| | 24-48 V DC, | | _ | 1 c/o | CT-ERS.12S | 1SVR730100R3100 | | 0.106 (0.234) |
| | 24-240 V AC | | | 1 0/0 | CT-ERS.12P | 1SVR740100R3100 | | 0.101 (0.222) |
| | 24-240 V AC/DC | | | | CT-APS.21S ¹⁾ | 1SVR730180R0300 | | 0.146 (0.322) |
| | | 10 (0.05 s - 300 h) | • | 2 c/o 1 c/o | CT-APS.21P ¹⁾ | 1SVR740180R0300 | | 0.125 (0.276) |
| | 24-48 V DC, 24-240 V AC | | | | CT-APS.22S | 1SVR730180R3300 | | 0.138 (0.304) |
| OFF-delay | | | | | CT-APS.22P | 1SVR740180R3300 | | 0.127 (0.28) |
| | | | | | CT-APS.12S | 1SVR730180R3100 | | 0.109 (0.24) |
| | | | | | CT-APS.12P | 1SVR740180R3100 | | 0.103 (0.227) |
| | 24-48 V DC, | 10 (0.05 s - | • | 2 c/o | CT-AHS.22S | 1SVR730110R3300 | | 0.136 (0.30) |
| | 24-240 V AC | 300 h) | | | CT-AHS.22P | 1SVR740110R3300 | | 0.125 (0.276) |
| | | | - | 1 c/o | CT-ARS.11S | 1SVR730120R3100 | | 0.106 (0.234) |
| OFF-delay ⁵⁾ | 24-240 | 7 (0.05 s - | | | CT-ARS.11P | 1SVR740120R3100 | | 0.10 (0.22) |
| | V AC/DC | 10 min) | - | 2 c/o | CT-ARS.21S | 1SVR730120R3300 | | 0.124 (0.273) |
| | | <u>:</u> | | | CT-ARS.21P | 1SVR740120R3300 | | 0.115 (0.254) |
| | 24-48 V DC, | | _ | | CT-SDS.22S | 1SVR730210R3300 | | 0.114 (0.251) |
| Star-delta | 24-240 V AC | 7 (0.05 s - | | 2 n/o | CT-SDS.22P | 1SVR740210R3300 | | 0.108 (0.238) |
| change-over ⁶⁾ | 380-440 V AC | 10 min) | | | CT-SDS.23S | 1SVR730211R2300 | | 0.118 (0.26) |
| | | | | | CT-SDS.23P | 1SVR740211R2300 | | 0.112 (0.247) |

- $^{\mbox{\tiny 1)}}$ Extended temperature range -40 $^{\circ}\mbox{C}$
- ²⁾ Remote potentiometer connection
- $^{\scriptscriptstyle (3)}$ 2nd c/o contact selectable as instantaneous contact
- 4) 2 remote potentiometer connections
- ⁵⁾ Without auxiliary voltage
- 6) 50 ms transition time

- Control input with voltage-related triggering
- ☐ Control input with volt-free triggering
- ☐/☐ two control input with volt-free triggering
- no triggering
- S: screw connection
- P: push-in / easy connect

CT-S range Ordering details - Accessories



MT-x50B



30 mm adapters

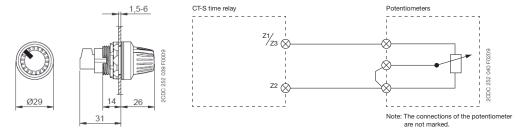


Marker label 29.6 x 44.5 mm

Remote potentiometer

50 k Ω ±20 % - 0.2 Ω , degree of protection IP66

| Material | Diameter | Diameter Type | | Price | Pack | Weight 1 piece |
|-----------------|----------|---------------|-----------------|---------|--------|-------------------|
| | in mm | | | 1 piece | pieces | g / oz |
| Plastic, black | 22.5 | MT-150B | 1SFA611410R1506 | | 1 | 0.040 |
| Plastic, chrome | 22.5 | MT-250B | 1SFA611410R2506 | | 1 | 0.040 |
| Metal, chrome | 22.5 | MT-350B | 1SFA611410R3506 | | 1 | 0.048 |



Note: Technical specifications see data sheet

Marker label with scale 0-10 48.5 x 44.5 mm



Marker label with scale 0-30 48.5 x 44.5 mm

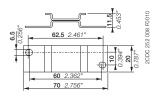
30 mm adapter for attaching the potentiometer 22 mm in 30 mm mounting hole

| Material | Туре | | Price 1 piece | | Weight 1 piece g / oz |
|----------------|----------|-----------------|------------------|---|-----------------------------|
| Plastic, black | KA1-8029 | 1SFA616920R8029 | | 1 | |
| Metal, chrome | KA1-8030 | 1SFA616920R8030 | | 1 | |

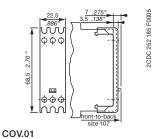
Marker label

| Caption | Туре | Order code | Price 1 piece | Pack unit pieces | Weight 1 piece g / oz |
|---------------------------|---------------|-----------------|------------------|------------------------|-----------------------------|
| Symbol (see illustration) | SK 615 562-87 | GJD6155620R0087 | | 1 | 0.002 |
| Scale 0 - 10 | SK 615 562-88 | GJD6155620R0088 | | 1 | 0.002 |
| Scale 0 - 30 | MA16-1060 | 1SFA611940R1060 | | 1 | 0.002 |

CT-S range Ordering details - Accessories

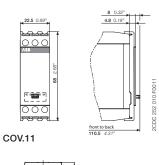


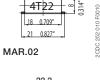
ADP.01





MAR.01







Accessories for CT-S in new housing (1SVR7...)

| Description | Туре | | Price 1 piece | unit | Weight 1 piece q / oz |
|--|--------|-----------------|---------------|------|-----------------------|
| Adapter for screw mounting | ADP.01 | 1SVR430029R0100 | | 1 | 0.018 (0.040) |
| Sealable transparent cover | COV.11 | 1SVR730005R0100 | | 1 | 0.004 (0.009) |
| Marker label for devices w/o DIP switches | MAR.01 | 1SVR366017R0100 | | 10 | 0.001 (0.002) |
| Marker label for devices with DIP switches | MAR.12 | 1SVR730006R0000 | | 10 | 0.001 (0.002) |

Accessories for CT-S in old housing (1SVR4...)

| Description | Type | Order code | Price 1 piece | Pack unit pieces | Weight 1 piece g / oz |
|--|--------|-----------------|---------------|------------------------|-----------------------|
| Adapter for screw mounting | ADP.01 | 1SVR430029R0100 | | 1 | 0.018 (0.040) |
| Sealable transparent cover | COV.01 | 1SVR430005R0100 | | 1 | 0.004 (0.009) |
| Marker label for devices w/o DIP switches | MAR.01 | 1SVR366017R0100 | | 10 | 0.001 (0.002) |
| Marker label for devices with DIP switches | MAR.02 | 1SVR430043R0000 | | 10 | 0.001 (0.002) |

Remarks

Legend

Control supply voltage not applied / Output contact open Control supply voltage applied / Output contact closed

A1-Y1/B1 Control input with voltage-related triggering

Y1-Z2 Control input with volt-free triggering

X1-Z2 Control input with volt-free triggering

Remote potentiometer connection:

When an external potentiometer is connected to the remote potentiometer connection (terminals Z1-Z2, Z3-Z2 respectively), the internal, front-face potentiometer is disabled and the time adjustment is made via the external potentiometer.

2nd c/o contact selectable as instantaneous contact:

When switch position Inst. "I" is selected, the functionality of the 2nd c/o contact changes to an instantaneous contact. It acts like the c/o contacts of a switching relay, i.e. applying or interrupting the control supply voltage energizes or de-energizes the c/o contact. The designation of the 2nd c/o contact changes from 25-26/28 to 21-22/24, when selected as instantaneous contact.

Terminal designations on the device and in the diagrams:

The 1st c/o contact is always designated 15-16/18.

The 2nd c/o contact is designated 25-26/28, if it responds to the time delay.

If the 2nd c/o contact is selected as an instantaneous contact, the designation 25-26/28 is replaced by 21-22/24. Control supply voltage is always applied to terminals A1-A2.

Function of the yellow LEDs:

On devices without the function '2nd c/o contact selectable as instantaneous contact', the yellow LED R glows as soon as the output relay energizes and turns off when the output relay de-energizes.

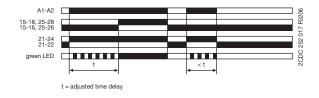
Devices with the function '2nd c/o contact selectable as instantaneous contact' have two yellow LEDs, designated R1 and R2. LED R1 shows the status of the 1st c/o contact (15-16/18) and LED R2 shows the status of the 2nd c/o contact (25-26/28, 21-22/24 resp.). LED R1 or R2 glow as soon as the corresponding output relay energizes and turns off when the corresponding output relay de-energizes.

\bowtie **ON-delay** (Delay on make) CT-MVS, CT-ERS, CT-WBS

This function requires continuous control supply voltage for timing.

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



\bowtie **ON-delay** (Delay on make) CT-MFS, CT-MBS

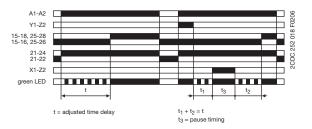
This function requires continuous control supply voltage for timing.

If control input Y1-Z2 is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input Y1-Z2 also starts timing. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

If control input Y1-Z2 closes before the time delay is complete, the time delay is reset and the output relay remains de-energized.

Pause timing / Accumulative ON-delay (CT-MFS):

Timing can be paused by closing control input X1-Z2. The elapsed time t1 is stored and continues from this time value when X1-Z2 is re-opened. This can be repeated as often as required.



⊠+ Accumulative ON-delay (Accumulative delay on make) **CT-MVS**

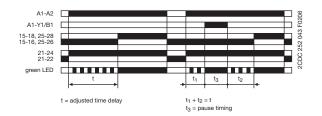
This function requires continuous control supply voltage for timing.

Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

Timing can be paused by closing control input A1-Y1/B1. The elapsed time t1 is stored and continues from this time value when A1-Y1/B1 is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



OFF-delay with auxiliary voltage (Delay on break) CT-MFS, CT-MBS, CT-AHS

This function requires continuous control supply voltage for timing.

If control input Y1-Z2 is closed, the output relay energizes immediately. If control input Y1-Z2 is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady.

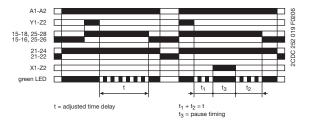
If control input Y1-Z2 closes before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input Y1-Z2 re-opens.

Pause timing / Accumulative OFF-delay (CT-MFS):

Timing can be paused by closing control input X1-Z2. The elapsed time t1 is stored and continues from this time value when X1-Z2 is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



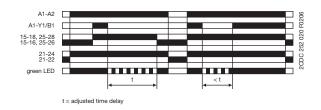
OFF-delay with auxiliary voltage (Delay on break) CT-MVS, CT-APS

This function requires continuous control supply voltage for

If control input A1-Y1/B1 is closed, the output relay energizes immediately. If control input A1-Y1/B1 is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady.

If control input A1-Y1/B1 recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input A1-Y1/B1 re-opens.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.

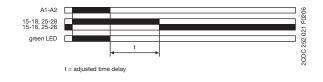


OFF-delay without auxiliary voltage (True delay on break) CT-ARS

The OFF-delay function without auxiliary voltage does not require continuous control supply voltage for timing. After a storage time of several months without any voltage, a formatting time of about 5 minutes is necessary.

Applying control supply voltage energizes the output relay immediately. Applied control supply voltage is displayed by the glowing green LED. If control supply voltage is interrupted, the OFF-delay starts and the LED turns off. When timing is complete, the output relay de-energizes.

For correct operation of the unit, it is necessary to complete the minimum energizing time. As soon as timing starts, the LED turns off.



 \times

Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MFS, CT-MBS

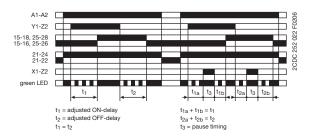
This function requires continuous control supply voltage for timing.

Closing control input Y1-Z2 starts the ON-delay t_1 . When timing is complete, the output relay energizes. Opening control input Y1-Z2 starts the OFF-delay t_2 . Both timing functions are displayed by the flashing green LED. When the OFF-delay t_2 is complete, the output relay de-energizes.

If control input Y1-Z2 opens before the ON-delay $\rm t_1$ is complete, the time delay is reset and the output relay remains denergized. If control input Y1-Z2 closes before the OFF-delay $\rm t_2$ is complete, the time delay is reset and the output relay remains energized.

Pause timing / Accumulative, symmetrical ON-delay and OFF-delay (CT-MFS): Timing can be paused by closing control input X1-Z2. The elapsed time t_{1a} or t_{2a} is stored and continues from this time value when X1-Z2 is re-opened. This can be repeated as often as required.

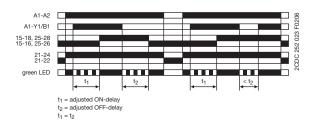
If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



Symmetrical ON-delay and OFF-delay
(Symmetrical delay on make and delay on break)
CT-MVS

This function requires continuous control supply voltage for timing.

Closing control input A1-Y1/B1 starts the ON-delay t_1 . When timing is complete, the output relay energizes. Opening control input A1-Y1/B1 starts the OFF-delay t_2 . Both timing functions are displayed by the flashing green LED. When the OFF-delay t_2 is complete, the output relay de-energizes. If control input A1-Y1/B1 opens before the ON-delay t_1 is complete, the time delay is reset and the output relay remains de-energized. If control input A1-Y1/B1 closes before the OFF-delay t_2 is complete, the time delay is reset and the output relay remains energized.





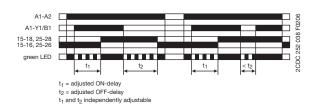
Asymmetrical ON-delay and OFF-delay (Asymmetrical delay on make and delay on break) **CT-MXS**

This function requires continuous control supply voltage for timina.

Closing control input A1-Y1/B1 starts the ON-delay t.. When timing is complete, the output relay energizes. Opening control input A1-Y1/B1 starts the OFF-delay t_a. When the OFF-delay is complete, the output relay de-energizes. Both timing functions are displayed by the flashing green LED. The ON-delay and OFF-delay are independently adjustable. If control input A1-Y1/B1 opens before the ON-delay is complete (<t,), the time delay is reset and the output relay remains de-energized.

If control input A1-Y1/B1 closes before the OFF-delay is complete (<t_a), the time delay is reset and the output relay remains energized.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.

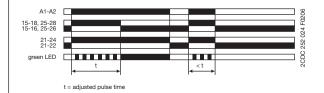


1Л⊠ Impulse-ON (Interval) CT-MVS, CT-WBS

This function requires continuous control supply voltage for timing.

The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



Impulse-ON 1Л⊠ (Interval) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.

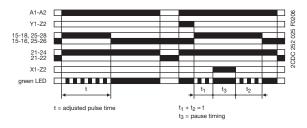
The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. If control input Y1-Z2 is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input Y1-Z2 starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input Y1-Z2, before the pulse time is complete, de-energizes the output relay and resets the pulse time. Pause timing / Accumulative impulse-ON (CT-MFS):

Timing can be paused by closing control input X1-Z2. The elapsed time t, is stored and continues from this time value when X1-Z2 is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MFS, CT-MBS

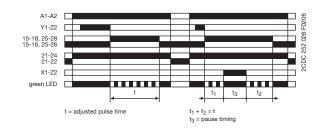
This function requires continuous control supply voltage for timing.

If control supply voltage is applied, opening control input Y1-Z2 energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input Y1-Z2, before the pulse time is complete, de-energizes the output relay and resets the pulse time. Pause timing / Accumulative impulse-OFF (CT-MFS):

Timing can be paused by closing control input X1-Z2. The elapsed time t, is stored and continues from this time value when X1-Z2 is re-opened.

This can be repeated as often as required.

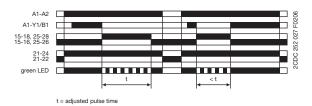


Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MVS

This function requires continuous control supply voltage for timing.

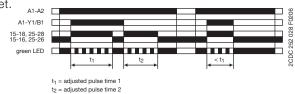
If control supply voltage is applied, opening control input A1-Y1/B1 energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

Closing control input A1-Y1/B1, before the pulse time is complete, de-energizes the output relay and resets the pulse time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



1 ☐ Impulse-ON and impulse-OFF (Interval and trailing edge interval) CT-MXS

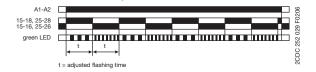
This function requires continuous control supply voltage for timing. If control supply voltage is applied, closing control input A1-Y1/B1 energizes the output relay immediately and starts the pulse time t₁. The green LED flashes during timing. When t, is complete, the output relay de-energizes and the flashing green LED turns steady. Re-opening control input A1-Y1/B1 energizes the output relay immediately and starts the pulse time t2. The green LED flashes during timing. When t_a is complete, the output relay de-energizes and the flashing green LED turns steady. t, and to are independently adjustable. If control input A1-Y1/B1 changes state before the pulse time is complete, the output relay de-energizes and the pulse time is reset. If control input A1-Y1/B1 changes state again, the interrupted pulse time restarts. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



☐ Flasher, starting with the ON time (Recycling equal times, ON first) CT-WBS

 $\square \bowtie$

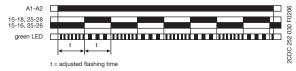
Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



Flasher, starting with the OFF time (Recycling equal times, OFF first) CT-WBS

П

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.

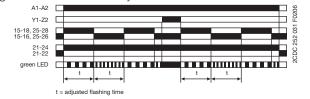


Flasher with reset, starting with the ON time (Recycling equal times with reset, ON first) CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The time delay can be reset by closing control input Y1-Z2. Opening control input Y1-Z2 starts the timer pulsing again with symmetrical ON & OFF times.

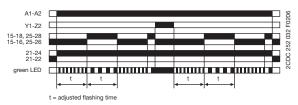
If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



Flasher with reset, starting with the OFF time (Recycling equal times with reset, OFF first) CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The time delay can be reset by closing control input Y1-Z2. Opening control input Y1-Z2 starts the timer pulsing again with symmetrical ON & OFF times.

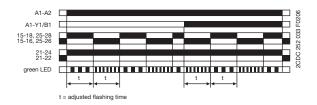




Flasher, starting with the ON or OFF time (Recycling equal times, ON or OFF first) **CT-MVS**

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. Closing control input A1-Y1/B1, with control supply voltage applied, starts the cycle with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



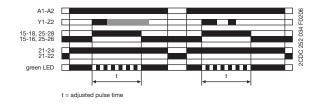
1.

Pulse former (Single shot) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing.

Closing control input Y1-Z2 energizes the output relay immediately and starts timing. Operating the control contact switch Y1-Z2 during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input Y1-Z2.

If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.

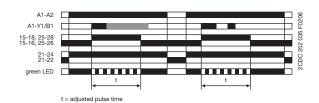


1.

Pulse former (Single shot) **CT-MVS**

This function requires continuous control supply voltage for timing.

Closing control input A1-Y1/B1 energizes the output relay immediately and starts timing. Operating the control contact switch A1-Y1/B1 during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input A1-Y1/B1. If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



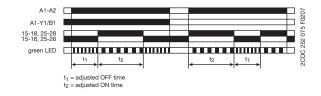
⊠∏

Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first) CT-MXS

This function requires continuous control supply voltage for timing.

Applying control supply voltage, with open control input A1-Y1/B1, starts timing with an ON time to first. Applying control supply voltage, with closed control input A1-Y1/B1, starts timing with an OFF time t, first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable. If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



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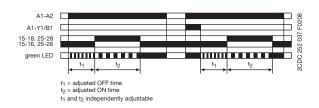
Single-pulse generator, starting with the OFF time (Delay on make with interval output) CT-MXS

This function requires continuous control supply voltage for timina.

Applying control supply voltage, or, if control supply voltage is already applied, opening control input A1-Y1/B1 energizes the output relay after the OFF time t, is complete. When the following ON time t₂ is complete, the output relay de-energizes. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable. Closing control input A1-Y1/B1, with control supply voltage applied, de-energizes the output relay and resets the time delav.

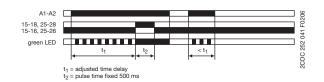
If control supply voltage is interrupted, the output relay deenergizes and the time delay is reset.



⊠1Л Fixed impulse with adjustable time delay (Delayed pulse output) **CT-WBS**

This function requires continuous control supply voltage for timina.

The time delay t, starts when control supply voltage is applied. The green LED flashes during timing. When t, is complete, the output relay energizes for the fixed impulse time to of 500 ms and the flashing green LED turns steady. If control supply voltage is interrupted, the time delay is reset. The output relay does not change state.

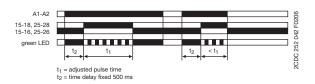


Adjustable impulse with fixed time delay (Delayed Interval) CT-WBS

This function requires continuous control supply voltage for

Applying control supply voltage starts the fixed time delay to of 500 ms. When t_o is complete, the output relay energizes and the selected pulse time t, starts. The green LED flashes during timing. When t₁ is complete, the output relay de-energizes and the flashing green LED turns steady.

If control supply voltage is interrupted, the pulse time is reset. The output relay does not change state.



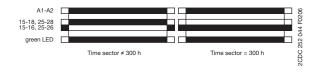
ON/OFF-Function CT-MFS, CT-MBS, CT-MVS, CT-MXS, CT-WBS

This function is used for test purposes during commissioning and troubleshooting.

If the selected max. value of the time range is smaller than 300 h (front-face potentiometer "Time sector" ≠ 300 h), applying control supply voltage energizes the output relay immediately and the green LED glows. Interrupting control supply voltage, de-energizes the output relay.

If the selected max. value of the time range is 300 h (frontface potentiometer "Time sector" = 300 h) and control supply voltage is applied, the green LED glows, but the output relay does not energize.

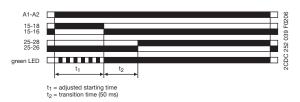
Time settings and operating of the control inputs have no effect on the operation.



∆1Л Star-delta change-over with impulse function (Star-delta starting, interval/delay on make) CT-MFS, CT-MBS, CT-MVS.2x

This function requires continuous control supply voltage for timing. Applying control supply voltage to terminals A1-A2, energizes the star contactor connected to terminals 15-18 and begins the set starting time t₁. The green LED flashes during timing. When the starting time is complete, the first c/o contact de-energizes the star contactor.

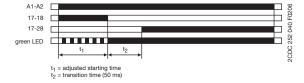
Now, the fixed transition time to of 50 ms starts. When the transition time is complete, the second c/o contact energizes the delta contactor connected to terminals 25-28. The delta contactor remains energized as long as control supply voltage is applied to the unit.

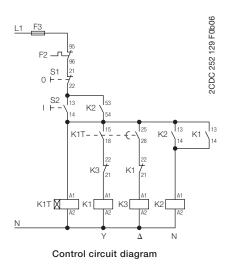


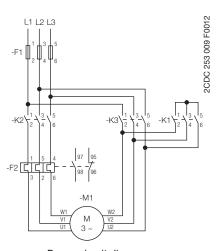
Δ Star-delta change-over (Star-delta starting) CT-SDS

This function requires continuous control supply voltage for timing. Applying control supply voltage to terminals A1-A2, energizes the star contactor connected to terminals 17-18 and begins the set starting time t₁. The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor.

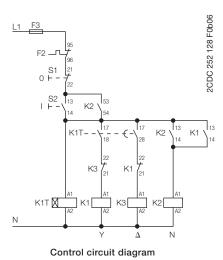
Now, the fixed transition time to of 50 ms starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals 17-28. The delta contactor remains energized as long as control supply voltage is applied to the unit.







Power circuit diagram



CT-S range Connection diagrams

CT-MVS.21

| | A1 | 15 | 25 21 | 90 |
|---|--------|------------|----------------|---------------|
| | Y1/B1 | Z2 | Z1 | 용 |
| i | Y1/ | 45 | 25 21 | 252 002 F0b06 |
| i | B1 A1 | 15 | 21 | 8 |
| | ╏┍┸┷┸┰ | / | / | 252 |
| | | ⊬ ı | ⊬ ı | |
| | A2 1 | 16 18 | 26 28 | 2CDC |
| Į | | | 22 24 | . ~ |
| | 28 24 | 26 22 | | |
| | 18 | 16 | A2 | |

A1-A2 Supply: 24-240 V AC/DC A1-Y1/B1 Control input

15-16/18 1. c/o contact 25-26/28 2. c/o contact

21-22/24 2. c/o contact as instantaneous contact

Z1-Z2 Remote potentiometer connection

CT-MVS.22

| A1 Y1/B1 | 15 | 25 | 9090 |
|------------------|----------------------------|----------------------|--------------------|
| Y1/ B1 A1 | 15 6 18 | 25 1 26 28 | 2CDC 252 003 F0b06 |
| 28 | 26 | | |
| 18 | 16 | A2 | |

Supply: 224-48 V DC A1-A2 or 24-240 V AC A1-Y1/B1 Control input 15-16/18 1. c/o contact

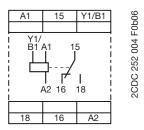
25-26/28 2. c/o contact

CT-MVS.23

| A1 | 15 | 25 | 900 |
|--------------------|----|--|--------------------|
| Y1/B1 | | | g0: |
| Y1/ B1 A1 | | 25 26 28 | 2CDC 252 003 F0b06 |
| 28 | 26 | | |
| 18 | 16 | A2 | |

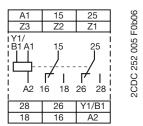
A1-A2 Supply: 380-440V AC A1-Y1/B1 Control input 15-16/18 1, c/o contact 25-26/28 2. c/o contact

CT-MVS.12



Supply: 24-48 V DC or 24-240 V AC A1-A2 A1-Y1/B1 Control input 15-16/18 1. c/o contact

CT-MXS.22



Supply: 24-48 V DC A1-A2 or 24-240 V AC

A1-Y1/B1 Control input

15-16/18 1. c/o contact

25-26/28 2. c/o contact

Remote **Z1-Z2**

potentiometer

connection Z3-Z2 Remote

potentiometer connection

CT-MFS.21

| A1 | 15 | 25 21 | |
|-------|-------|--------------|--|
| X1 | Z2 | Z1 | |
| | | 25 21 | |
| 28 24 | 26 22 | Y1 | |
| 18 | 16 | A2 | |

Supply: 24-240 V AC/DC A1-A2

2CDC 252 006 F0b06

15-16/18 1. c/o contact 25-26/28 2. c/o contact

21-22/24 2. c/o contact as instantaneous contact

Y1-Z2 Control input X1-Z2 Control input

Z1-Z2 Remote potentiometer connection

CT-MBS.22

| A1 | 15 | 25 21 | 9 |
|-------|-------|----------------------------|--------------------|
| | Z2 | Z1 | |
| | | 25 21 26 28 22 24 | 2000 252 007 E0b06 |
| 28 24 | 26 22 | Y1 | |
| 18 | 16 | A2 | |

Supply: 24-48 V DC A1-A2 or 24-240 V AC

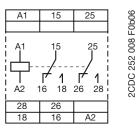
15-16/18 1. c/o contact 25-26/28 2. c/o contact

21-22/24 2. c/o contact as instantaneous

contact Y1-Z2 Control input

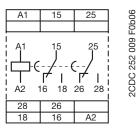
Remote Z1-Z2 potentiometer connection

CT-WBS.22



Supply: 24-48 V DC or 24-240 V AC A1-A2 15-16/18 1. c/o contact 25-26/28 2. c/o contact

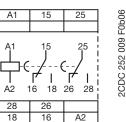
⊠ CT-ERS.21



Supply: 24-240 V AC/DC A1-A2

15-16/18 1. c/o contact 25-26/28 2. c/o contact

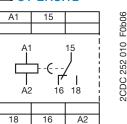
◯ CT-ERS.22



A1-A2 or 24-240 V AC 15-16/18 1. c/o contact

Supply: 24-48 V DC 25-26/28 2. c/o contact

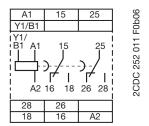
⊠ CT-ERS.12



Supply: 24-48 V DC A1-A2 or 24-240 V AC 15-16/18 1. c/o contact

CT-S range Connection diagrams

■ CT-APS.21



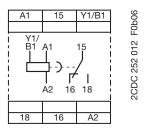
Supply: 24-240 V AC/DC A1-A2 A1-Y1/B1 Control input 15-16/18 1. c/o contact 25-26/28 2. c/o contact

■ CT-APS.22

| A1 | 15 | 25 | 90 |
|---|---------------------------------|-----------------|--------------------|
| Y1/B1 | | | g G |
| Y1/ B1 A1 | 15 | 25 -) -/ | 2CDC 252 011 F0b06 |
| 28 | 26 | | |
| 18 | 16 | A2 | |

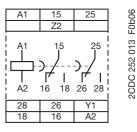
Supply: 24-48 V DC or 24-240 V AC A1-A2 A1-Y1/B1 Control input 15-16/18 1. c/o contact 25-26/28 2. c/o contact

CT-APS.12



Supply: 24-48 V DC or 24-240 V AC A1-A2 A1-Y1/B1 Control input 15-16/18 1. c/o contact

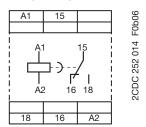
■ CT-AHS.22



Supply: 24-48 V DC or 24-240 V AC A1-A2 Y1-Z2 Control input

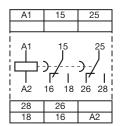
15-16/18 1. c/o contact 25-26/28 2. c/o contact

CT-ARS.11



Supply: 24-240 V AC/DC A1-A2 15-16/18 1. c/o contact

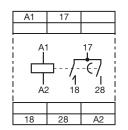
CT-ARS.21



Supply: 24-240 V AC/DC A1-A2 15-16/18 1. c/o contact 25-26/28 2. c/o contact

2CDC 252 015 F0b06

△ CT-SDS.22

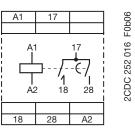


Supply: 24-48 V DC or 24-240 V AC A1-A2 17-18 1. n/o contact

2CDC 252 016 F0b06

17-28 2. n/o contact

△ CT-SDS.23



A1-A2 Supply: 380-440 V AC 17-18 1. n/o contact

17-28 2. n/o contact

CT-S range Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

| Data at T _a = 25° O and rated values, unle | | |
|--|------------------------------|--|
| | | CT-S |
| Input circuit - Supply circuit | | Ta. 2.2.1.1.2.12 |
| Rated control supply voltage U _s | CI-xxx.x1 | 24-240 V AC/DC 24-48 V DC, 24-240 V AC |
| <u></u> | CT-xxx.x2 | 380-440 V AC |
| | CT-xxx.x4 | 110-240 V AC |
| | CT-xxx.x5 | 220-240 V AC |
| ············ | CT-xxx.x6 | 24 V AC/DC |
| | | 100-127 V AC or 110 V DC |
| Patad control aupply voltage II. talerance | C1-xxx.x8 | 200-240V AC/DC -15+10 % |
| Rated control supply voltage U _s tolerance | | |
| Rated frequency Frequency range AC | | DC or 50/60 Hz 47-63 Hz |
| Frequency range AC Typical current / power consumption | ····· | depending on device, see data sheet |
| Power failure buffering time | 24 V DC | min. 15 ms |
| | 24 V DC 230/400 V AC | min. 20 ms |
| Minimum energizing time | | 100 ms (CT-ARS) |
| Formatting time 1) | | 5 min (CT-ARS) |
| Input circuit - Control circuit | | |
| Kind of triggering | CT-MVS, CT-MXS, CT-APS | voltage-related triggering |
| Control input, Control function | A1-Y1/B1 | start timing external |
| Parallel load / polarized | | yes / no |
| Maximum cable length to the control input | • | 50 m - 100 pF/m |
| Minimum control pulse length | | 20 ms |
| Control voltage potential | ····· | see rated control supply voltage |
| Current consumption of the control input | 24 V DC | 1 2 mA |
| Carrent concamption of the control input | 230 V AC | |
| | | • |
| | 400 V AC | |
| Kind of triggering | CT-MFS, CT-MBS, CT-AHS | volt-free triggering |
| Control input, Control function | Y1-Z2 | start timing external |
| | X1-Z2 | pause timing / accumulative functions (CT-MFS) |
| Maximum switching current in the control ci | rcuit | 1 mA |
| Maximum cable length to the control input | | 50 m - 100 pF/m |
| Minimum control pulse length | | 20 ms 10-40 V DC |
| Minimum control pulse length No-load voltage at the control inputs Remote potentiometer | | 10-40 V DC |
| Remote potentiometer connections, Resistance | | 50 kΩ (CT-MFS, CT-MBS, CT-MVS.21, CT-MXS) |
| nemote potentiometer connections, nesistance | | |
| | | 50 kΩ (CT-MXS) |
| Maximum cable length to remote potentiometer | · | 2 x 25 m, shielded with 100 pF/m |
| Shield connection | | Z2 |
| Timing circuit | | |
| Time ranges | 0 time ranges 0.05 s - 300 h | 1.) 0.05-1 s 2.) 0.15-3 s 3.) 0.5-10 s 4.) 1.5-30 s 5.) 5-100 s 6.) 15-300 s 7.) 1.5-30 min 8.) 15-300 min 9.) 1.5-30 h 10.) 15-300 h |
| 7 time ran | | 1.) 0.05-1 s 2.) 0.15-3 s 3.) 0.5-10 s 4.) 1.5-30 s 5.) 5-100 s 6.) 15-300 s 7.) 0.5-10 min |
| Recovery time | 24-240 V AC/DC | < 50 ms |
| | 24-48 V DC, 24-240 V AC | |
| | 380-440 V AC | <u> </u> |
| A serve or within the rote of sector 1 | | < 60 ms |
| Accuracy within the rated control supply voltage | e tolerance | \(\text{\tinx{\tint{\text{\tin}\text{\tintert{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tin}\text{\te}\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tetx{\text{\text{\texi}\text{\text{\texi}\text{\text{\text{\text{\tin}\tint{\text{\text{\text{\text{\texi}\text{\texit{\text{\text{\ti}\tint{\text{\tinte\tint{\tiint{\text{\texi}\text{\texi |
| Accuracy within the temperature range | | Δt < 0.03 % / °C |
| Repeat accuracy (constant parameters) | | < ±0.2 % |
| Star-delta transition time | | fixed 50 ms (CT-SDS, CT-MBS, CT-MFS, CT-MVS.2x) |
| Star-delta transition time tolerance | ····· | ±2 ms |

¹⁾ prior to first commisioning and after a six-month stop in operation

CT-S range Technical data

| Indication of operational states | | | |
|--|--|--|--|
| Control supply voltage / timing | U/T: green LED | : control supply voltage ap | plied / \textit{\subset} \subset |
| Control supply voltage | U: green LED | 1: control supply voltage ap | |
| Relay state | R, R1, R2: yellow LED | : output relay energized | • |
| Output circuit | | | |
| Kind of output | 15-16/18 | relay, 1 c/o contact | |
| | 15-16/18; 25-26/28 | relay, 2 c/o contacts | • |
| | 15-16/18; 25(21)-26(22)/28(24) | relay, 2 c/o contacts, 2nd c/o cont | act selectable as inst. contact |
| | 17-18; 17-28 | relay, 2 n/o contacts (CT-SDS) | |
| Contact material | | Cd-free, on request | |
| Rated operational voltage U _e | IEC/EN 60947-1 | 250 V | |
| Minimum switching voltage / minimum | switching current | 12 V / 10 mA | |
| Maximum switching voltage / maximur | n switching current | see load limit curves | |
| Rated operational current I _e | AC-12 (resistive) at 230 V | 4 A | |
| (IEC/EN 60947-5-1) | AC-15 (inductive) at 230 V | 3 A | |
| | DC-12 (resistive) at 24 V | 4 A | |
| | DC-13 (inductive) at 24 V | 2 A (CT-ARS; 1.5 A) | - |
| AC rating (UL 508) Utilization (| category (Control Circuit Rating Code) | В 300 | |
| | max. rated operational voltage | 300 V AC | |
| Maximui | m continuous thermal current at B300 | 5 A | |
| | ing/breaking apparent power at B300 | 3600 VA / 360 VA | ······································ |
| Mechanical lifetime | | 30 x 10 ⁶ switching cycles | ······································ |
| Electrical lifetime | at AC-12, 230 V, 4 A | 0.1 x 10 ⁶ switching cycles | ······ |
| Max. fuse rating to achieve short-circu | ······································ | 6 A fast-acting | ······ |
| (IEC/EN 60947-5-1) | n/o contact | 10 A fast-acting | ····· |
| General data 2) | | <u> </u> | |
| MTBF | | on request | |
| Duty time | ····· | 100% | |
| Dimensions (W x H x D) | product dimensions | 22.5 x 85.6 x 103.7 mm (0.89 x 3.3 | 37 x 4.08 in) |
| | packaging dimensions | 97 x 109 x 30 mm (3.82 x 4.29 x 1. | |
| Weight | | depending on device, see ordering | details |
| Mounting | | DIN rail (IEC/EN 60715), snap-on n | nounting without any tool |
| Mounting position | | any | |
| Minimum distance to other units | vertical / horizontal | not necessary / not necessary | ······································ |
| Material of housing | | UL 94 V-0 | ······ |
| Degree of protection | housing / terminals | IP50 / IP20 | |
| Electrical connection 2) | | | |
| | | Screw connection technology | Easy Connect Technology |
| | | | (Push-in) |
| Wire size | | 1 x 0.5-2.5 mm ² (1 x 20-14 AWG) 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| | rigid | 1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-2.5 mm² (2 x 20-14 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| Stripping length | ····· | 8 mm (0.32 in) | <u>:</u> |
| | | to the state of th | |

²⁾ Data for all references 1SVR 730 xxx xxx and 1SVR 740 xxx xxx. For devices with 1SVR 430 xxx xxx please refer to the data sheet.

CT-S range Technical data

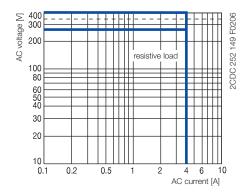
| Environmental data | | | | | | | | | | | |
|---|---|---|----------------------|--|--|--|--|--|--|--|--|
| Ambient temperature ranges | operation / storage | e -25+60 °C / -40+85 °C, -40+60 °C / -40+85 °C (CT-MVS.21, CT-MFS.21, CT-ERS.21, CT-APS.21) | | | | | | | | | |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | ····· | 6 x 24 h cycle, 55 °C, 95 % RH | | | | | | | | | |
| Vibration, sinusoidal (IEC/EN 60068-2-6) | functioning | 40 m/s², 10-58/60-150 Hz | | | | | | | | | |
| | resistance | 60 m/s ² , 10-58/60-150 Hz, 20 cycl | es | | | | | | | | |
| Vibration, seismic (IEC/EN 60068-3-3) | functioning | 20 m/s ² | | | | | | | | | |
| Shock, half-sine (IEC/EN 60068-2-27) | functioning | 100 m/s², 11 ms, 3 shocks/directio | n | | | | | | | | |
| | resistance | 300 m/s2, 11 ms, 3 shocks/direction | | | | | | | | | |
| Isolation data | | CT-S with 1 c/o | CT-S with 2 c/o | | | | | | | | |
| Rated insulation voltage U _i outp | input circuit / output circuit ut circuit 1 / output circuit 2 | not available | 300 V | | | | | | | | |
| Rated impulse withstand voltage U _{imp} between a (IEC/EN 60664-1) | | type test: 4 kV; 1.2/50 μs | | | | | | | | | |
| Power-frequency withstand voltage (test voltage circuits | e) between all isolated | routine test: 2.0 kV; 50 Hz; 1 s type test: 2.0 kV; 50 Hz; 60 s | | | | | | | | | |
| Basic insulation (IEC/EN 61140) | input circuit / output circuit | 500 V | | | | | | | | | |
| Protective separation (IEC/EN 61140; EN 50178) | input circuit / output circuit | 250 V | | | | | | | | | |
| Pollution degree Overvoltage category | IEC/EN 60664-1 IEC/EN 60664-1 | 3 III | | | | | | | | | |
| Standards | | | | | | | | | | | |
| Product standard | | IEC 61812-1, EN 61812-1 + A11, DII | N VDE 0435 part 2021 | | | | | | | | |
| Low Voltage Directive | • | 2006/95/EC | | | | | | | | | |
| EMC Directive | | 2004/108/EC | | | | | | | | | |
| RoHS Directive | | 2011/65/EC | | | | | | | | | |
| Electromagnetic compatibility | | | | | | | | | | | |
| Interference immunity to | | IEC/EN 61000-6-1, IEC/EN 61000- | 6-2 | | | | | | | | |
| electrostatic discharge | | Level 3, 6 kV / 8 kV | | | | | | | | | |
| radiated, radio-frequency electromagnetic field | | Level 3, 10 V/m (1 GHz) 3 V/m (2 G | Hz) 1 V/m (2.7 GHz) | | | | | | | | |
| electrical fast transient / burst | | Level 3, 2 kV / 5 kHz | | | | | | | | | |
| surge | | Level 4, 2 kV A1-A2 | | | | | | | | | |
| conducted disturbances, induced by | IEC/EN 61000-4-6 | Level 3, 10 V | | | | | | | | | |
| radio-frequency fields | JEO/EN 04000 | | | | | | | | | | |
| harmonics and interharmonics | IEC/EN 61000-4-13 | | 0.4 | | | | | | | | |
| Interference emission | IFO/OIODD OO FN 55000 | IEC/EN 61000-6-3, IEC/EN 61000- | -0-4 | | | | | | | | |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | | | | | | | | | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Ulass B | | | | | | | | | |

CT-S range Technical diagrams

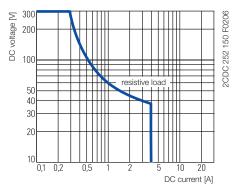
Technical diagrams

Load limit curves

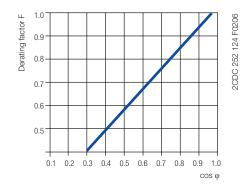
AC load (resistive)



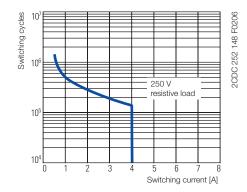
DC load (resistive)



Derating factor F for inductive AC load



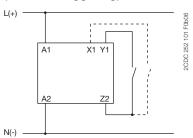
Contact lifetime



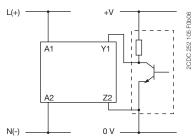
CT-S range Wiring notes, Dimensional drawings

Wiring notes

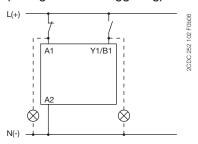
Control inputs (volt-free triggering)

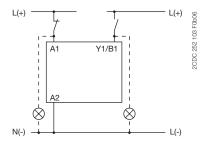


Triggering of the control inputs (volt-free) with a proximity switch (3 wire)



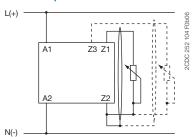
Control inputs (voltage-related triggering)





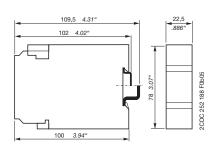
The control input Y1/B1 is triggered with electric potential against A2. It is possible to use the control supply voltage from terminal A1 or any other voltage within the rated control supply voltage range.

Remote potentiometer

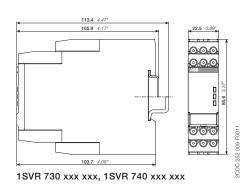


Dimensional drawing

Dimensions in mm







Measuring and monitoring relays Product group picture



Measuring and monitoring relays Table of contents

Measuring and monitoring relays

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|---|---------|
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| Three-phase monitoring relays | 2/27 |
| Grid feeding monitoring relays - | |
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| Motor load monitoring relays | 2/73 |
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| Thermistor motor protection relays | 2/85 |
| Temperature monitoring relays | 2/97 |
| Liquid level monitors and controls | . 2/109 |
| Constal technical data Association Current transformers | 0/100 |

Measuring and monitoring relays Benefits and advantages

CM-N range: Multifunctional



- 45 mm wide housing
- Output contacts: 2 c/o (SPDT) contacts
- Continuous voltage range (24-240 V AC/DC) or single-supply
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- Adjustable time delays
- Integrated and snap-fitted front-face marker label
- Sealable transparent cover (accessory)

CM-S range: Universal and multifunctional



- Only 22.5 mm wide housing
- Output contacts: 1 or 2 c/o (SPDT) con-
- One supply voltage range or supplied by measuring circuit
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading
- Integrated and snap-fitted front-face marker
- Snap-on housing: The relays can be placed on a DIN rail tool-free - just snap it on or remove it tool-free
- Sealable transparent cover (accessory)

CM-E range: Economy



- Only 22.5 mm wide housing
- Output contacts: 1 c/o contact or 1 n/o contact
- One supply voltage range
- One monitoring function
- Cost-efficient solution for **OEM** applications
- Preset monitoring ranges

ABB's measuring and monitoring relays in a new housing

Benefits at a glance

Easy Connect Technology

New options:

Additionally to the existing well established screw connections a new innovative connection technology can be offered: Easy Connect Technology with push-in terminals.

Tool-free wiring:

The push-in terminals can be wired with rigid or fine stranded wires with wire end ferrules totally tool-free. The connection direction is exactly the same as the screw version.

Higher utility class:

The Easy Connect Technology provides excellent vibration resistance with gas tight push-in terminals – the right solution for harsh environment.

Extended features

Flammability:

The plastic housing material used meets the requirements for the highest flammability class. (UL94 V-0 rated)

Look and feel:

The new housing fits perfectly with ABB's control products

Measuring and monitoring relays Benefits and advantages

Higher utility class ①

The Easy Connect Technology provides excellent vibration resistance with gas tight push-in terminals – the right solution for harsh environment. Selected products of the electronic timers and measuring and monitoring relays comply to the latest rail standards NF F 16-101/102, EN 45545, EN 50155 and more standards which are relevant for railway applications. Find more inforamtion in the rail brochure 2CDC110084B0201.

Safety 2

The "real distance" is hidden.

The clearance and the creepage distances of our products exceed international standards and substantially increase the safety of our products.

Easy Connect Technology 3

Tool-free wiring and excellent vibration resistance. Push-in terminals provide connection of wires up to 2 x 0.5 - 1.5 mm² (2 x 20 -16 AWG), rigid or fine-strand with or without wire end ferrules. The extended type designators for products with push-in terminals are indicated by a $\bf P$ following the extended type designator e.g. CM-xxS.xx $\bf P$.

Double-chamber cage connection terminals ④

Double-chamber cage connection terminals provide connection of wires up to 2 x 0.5-2.5 mm² (2 x 20-14 AWG) rigid or fine-strand, with or without wire end ferrules. Potential distribution does not require additional terminals. The extended type designators for products with double-chamber cage connection terminals are indicated by a $\bf S$ following the extended type designator e.g. CM-xxS.xx $\bf S$.

LED's for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Integrated marker label 6

Integrated marker labels allow the product to be marked quickly and simply. No additional marker labels are required.

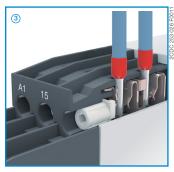
Sealable transparent cover ⑦

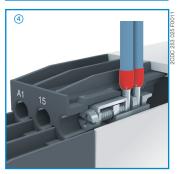
Protection against unauthorized changes of time and threshold values. Available as an accessory.

Snap-On housing ®

Tool-free DIN rail installation and deinstallation of the monitoring relay.















Measuring and monitoring relays Monitoring features and application ranges

Single-phase current and voltage monitoring

- Over- or undercurrent monitoring CM-SRS and CM-SRS.M
- Over- and undercurrent monitoring CM-SFS
- Over- or undervoltage monitoring CM-ESS and CM-ESS.M
- Over- and undervoltage monitoring CM-EFS



Current monitoring

- Monitoring of motor current consumption
- Monitoring of lighting installations and heating circuits
- Monitoring of hoisting gear and transportation equipment
- Monitoring of locking devices, electromechanical brake gear and locked rotor

Voltage monitoring

- Speed monitoring of DC motors
- Monitoring of battery voltages and other supply networks
- Monitoring of upper and lower voltage threshold values

Insulation monitoring

- For electrically isolated AC systems: CM-IWS.2
- For electrically isolated AC, DC and mixed AC/DC systems: CM-IWS.1, CM-IWN.1 and especially for solar applications:

 \leq 500 μ F: CM-IWN.4 \leq 1000 μ F: CM.IWN.5 ≤ 2000 µF: CM-IWN.6



- Monitoring of electrically isolated supply mains for insulation resistance failure
- Detection of initial faults
- Protection against earth faults

Motor load monitoring

CM-LWN monitoring relays load states of single- and threephase asynchronous motors.



- Detection of V-belt breaking
- Motor protection against overload
- Monitoring of filters for clogging
- Protection of pumps against dry running
- Detection of high pressure in conduit systems
- Monitoring for dulling blades in sawing and cutting machines

Three-phase monitoring

- Phase failure CM-PBE
- Over- and undervoltage CM-PVE
- Phase sequence and phase failure CM-PFE and CM-PFS
- Phase sequence and phase failure, over- and undervoltage CM-PSS.xx and CM-PVS.xx
- Phase sequence and phase failure, unbalance CM-PAS.xx
- Phase sequence and phase failure, unbalance, over- and undervoltage CM-MPS.xx and CM-MPN.xx
- Over- and undervoltage, over- and underfrequency CM-UFS.1



Three-phase voltage monitoring

- Voltage monitoring of mobile three-phase equipment
- Protection of personnel and installations against phase
- Monitoring of the supply voltage to machines and installa-
- Protection of equipment against damage caused by unstable supply voltage
- Switching to emergency or auxiliary supply
- Protection of motors against damage caused by unbalanced phase voltages and phase loss
- Automatic connection & disconnection of decentralised power stations to the grid

Grid feeding monitoring relays

The CM-UFx range monitors all voltage and frequency parameters in a grid and ensures the safe feeding of decentral produced eletrical energy into the grid.

- Monitoring of the voltage with up to 2 thresholds for overand undervoltage
- Monitoring of the frequency with up to 2 thresholds for over- and underfrequency
- Optional ROCOF (rate of change of frequency and vector shift
- Acc. to national grid feeding standards such as CEI 0-21, VDE AR-N 4105 etc.



Thermistor motor protection

CM-MSS provide full protection of motors with integrated PTC resistor sensors.

Protection of motors against thermal overload, e. g. caused by insufficient cooling, heavy load starting conditions, undersized motors, etc.



Measuring and monitoring relays Monitoring features and application ranges

Liquid level monitoring and control

CM-ENE, CM-ENS and CM-ENN for control and regulation of liquid levels and ratios of mixtures of conductive fluids.



- Protection of pumps against dry running
- Protection against container overflow
- Control of liquid levels
- Detection of leaks
- Control of mixing ratios

Temperature monitoring

Acquisition, messaging and regulation of temperatures of solid, liquid and gaseous media in processes and machines

- with CM-TCS via PT100 sensorwith C512 and C513 with PT100, PT1000 KTY83, KTY84 or NTC sensors
- Motor and system protection
- Control panel temperature monitoring
- Frost monitoring
- Temperature limits for process variables, e.g. in the packing or electroplating industry
- Control of systems and machines like heating, air-conditioning and ventilation systems, solar collectors, heat pumps or hot water supply systems
- Monitoring of servomotors with KTY sensors
- Bearing and gear oil monitoring
- Coolant monitoring



Measuring and monitoring relays Approvals and marks

| | | | | Current and voltage monitoring, single-phase | | | | | | | Thr | ee-p | has | e m | onit | orin | g | | | | | | |
|--------------|-----------------------------|--------------|------------|--|-------------|--------------|------------|-------------|--------------|--|--------|--------|--------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Appro | ovals | CM-SRS.1xS/P | CM-SRS.2xS | CM.SRS.MS/P | CM-SFS.2S/P | CM-ESS.1xS/P | CM-ESS.2xS | CM-ESS.MS/P | CM- EFS.2S/P | | CM-PBE | CM-PVE | CM-PFE | CM-PFS.S/P | CM-PSS.x1S/P | CM-PVS.x1S/P | CM-PVS.81S/P | CM-PAS.x1S/P | CM-MPS.x1S/P | CM-MPS.x3S/P | CM-MPN.52S/P | CM-MPN.62S/P | CM-MPN.72S/P |
| cUL) US | UL 508, CAN/CSA C22.2 No.14 | | - | - | | | - | | - | | • | • | • | | • | • | • | | | | • | • | |
| (i) | GL | - | - | - | - | - | - | | - | | | | | • | | • | • | | | | | • | • |
| ERE | EAC | | • | - | - | | - | | - | | - | | | | | • | | | | | • | | - |
| CB | CB scheme | | • | - | - | | | | - | | - | • | | - | | • | • | | | • | • | • | - |
| (C) | CCC | | • | - | - | | - | | - | | • | • | • | | • | • | • | | | | • | • | • |
| ⊛ | RMRS | - | • | • | - | | • | - | - | | • | - | - | | • | • | • | | | • | • | • | • |
| = | Rail applications 1) | • | • | • | | | • | | | | | | | | | • | | | | • | | | |
| | Marks | | | | | | | | | | | | | | | | | | | | | | = |
| C€ | CE | - | | • | | | | - | - | | - | • | - | • | • | • | • | - | - | - | - | - | |
| <u>&</u> | RCM | - | • | - | | | - | | - | | - | | | | | | | - | | • | • | - | |

| ■ exis | | rela | lation ys for ply m | r ung | | | 1 | otor load onitoring | | ture | _ | ra- ring | | Grid feed mod rela | ring | |
|----------------|--|-------------|---------------------------|-------------|------------------|------------|--------|------------------------|--|-------------|------|-------------|---|-----------------------------|------------|------------|
| Appro | ovals | CM-IWS.2S/P | CM-IWS.1S/P | CM-IWN.1S/P | CM-IWN.4,5,6.S/P | CM-IVN.S/P | CM-LWN | | | CM-TCS.xS/P | C512 | C513 | | CM-UFD.M22 | CM-UFD.M31 | CM-UFD.M33 |
| CUL) US LISTED | UL 508, CAN/CSA C22.2 No.14 | | | | | • | • | | | | | | | | | - |
| (GL) | GL | | - | - | | • | • | | | | | | | | | |
| ERC | EAC | | - | | | | • | | | • | | | | | | |
| CB | CB scheme | | | | | • | • | | | • | | | | | | П |
| (1) | ccc | | | | | • | • | | | • | | | | | | |
| ⊛ | RMRS | | - | | | | • | | | | | | | | | |
| = | Rail applications 1) | | | - | | | | | | | | | | | | |
| | CEI 0-21 | | | | | | | | | | | | 1 | • | | |
| | G59/3 LV + G83/2, G59/3 HV | | | | | | | | | | | | 1 | | | - |
| 0 | VDE-AR-N 4105 "Erzeugungsanlagen am Niederspannungsnetz" | | | | | | | | | | | | | | • | |
| 0 | BDEW "Erzeugungsanlagen am Mittelspannungsnetz" | | | | | | | | | | | | | | • | |
| Marks | | | | | | | | | | | | | | | | |
| CE | CE | | | | | | | | | | | | | • | • | • |
| ◬ | RCM | | | | | • | | | | | | | | | | |

¹⁾ Applicable in rail application following the latest standards for rail applications: NF F 16-101/102 (I2/F2 classified), EN 45545 (Hazard Level 3), DIN 5510, EN 50155, IEC 60571. Further information is available in our rail segment brochure 2CDC110084B0201.

Measuring and monitoring relays Approvals and marks

| ■ exis | | Thermistor motor protection | | | | | | | | | Liquid level monitoring | | | | | | | | |
|--------|------------------------------|-----------------------------|--------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------|------------|------------|-------------|------------|--------|--|--|--|
| Appro | ovals | | CM-MSE | CM-MSS.x1 | CM-MSS.12 | CM-MSS.13 | CM-MSS.22 | CM-MSS.23 | CM-MSS.32 | CM-MSS.33 | | OM-ENE MIN | CM-ENE MAX | CM-ENS | CM-ENS UP/ | CM-ENN | | | |
| cUL US | UL 508, CAN/CSA C22.2 No.14 | | - | • | | • | - | | - | | | | • | - | - | • | | | |
| (i) | GL | ſ | | | | • | - | • | - | • | | | | ■ 1) | | • | | | |
| ERE | EAC | | _ | • | | • | - | | | | | • | • | • | | • | | | |
| ⟨Ex⟩ | II (2) G D, PTB 02 ATEX 3080 | ľ | | | | | | | | | | | | | | П | | | |
| CB | CB scheme | Ī | - | • | • | • | - | | - | | | - | • | | | - | | | |
| (W) | CCC | | - | | | | - | | | | | | • | | | • | | | |
| ⊛ | RMRS | Ī | - | | | | | | | | | - | • | | | • | | | |
| ⟨Ex⟩ | ATEX | | | | | | | | | | | | | | | П | | | |
| Marks | | | | | | | | | | | | | | | | | | | |
| CE | CE | | | | | | - | • | - | • | | - | • | • | • | • | | | |
| ◬ | RCM | | | | | | | | | | | | | | | • | | | |

 $^{^{\}mbox{\tiny 1)}}$ Version with protective separation without @ approval

Current and voltage monitoring relays, single-phase Product group picture



Current and voltage monitoring relays, single-phase Table of contents

Current and voltage monitoring relays, single-phase

| Benefits and advantages | 2/11 |
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| Operating controls | 2/12 |
| Selection table - Current monitoring relays | 2/13 |
| Selection table - Voltage monitoring relays | 2/14 |
| Ordering details - Current monitoring relays | 2/15 |
| Ordering details - Voltage monitoring relays | 2/16 |
| Function diagrams | 2/17 |
| Connection diagrams, DIP switches | 2/20 |
| Technical data - Current monitoring relays | 2/22 |
| Technical data - Voltage monitoring relays | 2/24 |

Current and voltage monitoring relays, single-phase Benefits and advantages





Characteristics current and voltage monitoring relays

- Monitoring of DC and AC currents: 3 mA to 15 A 1)
- Monitoring of DC and AC voltages from 3-600 V
- TRMS measuring principle
- One device includes 3 measuring ranges
- One device includes 4 measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
- Over- and undercurrent monitoring¹⁾
- Over- and undervoltage monitoring¹⁾
- ON or OFF-delay configurable¹⁾
- Open- or closed-circuit principle configurable¹⁾
- Threshold values for >U and/or <U adjustable¹⁾
- Latching function configurable¹⁾
- Thresholds for >I and/or <I adjustable¹⁾
- Fixed hysteresis of 5 %1)
- Start-up delay T_v adjustable 0; 0.1-30 $s^{1)}$
- Tripping delay T_v adjustable 0; 0.1-30 s¹⁾
- 1 x 2 c/o contacts (common signal) or 2 x 1 c/o contact (separate signals for >I and <I) configurable 1)
- 1 x 2 c/o contacts (common signal) or 2 x 1 c/o contact (separate signals for >U and <U) configurable¹⁾
- 22.5 mm width
- 3 LEDs for the indication of operational states
- Approvals / Marks



Current monitoring, single-phase

The ABB current monitoring relays CM-SRS.xx reliably monitor the occurence of currents that exceed or fall below the selected threshold value. The functions overcurrent or undercurrent monitoring can be preselected. Single- and multifunction devices for the monitoring of direct or alternating currents from 3 mA to 15 A are available.

Current window monitoring (I_{min}, I_n

The window monitoring relay CM-SFS.2x is available if the application requires the simultaneous monitoring of over- and undercurrents.

Voltage monitoring, single-phase

The ABB voltage monitoring relays CM-SRS.xx are used to monitor direct and alternating voltages within a range of 3-600 V. Over- or undervoltage detection can be preselected.

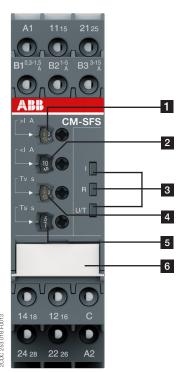
Voltage window monitoring (U_{min}, U_{max})

For the simultaneous detection of over- and undervoltages, the window monitoring relay CM-EFS.2 can be used.

²⁾ Applicable in rail application following the latest standards for rail applications: NF F 16-101/102 (I2/F2 classified), EN 45545 (Hazard Level 3), DIN 5510, EN 50155, IEC 60571. Further information is available in our rail segment brochure 2CDC110084B0201.

Current and voltage monitoring relays, single-phase Operating controls

Current monitoring relays



- 1 Adjustment of the threshold value >I for overcurrent
- 2 Adjustment of the threshold value <I for undercurrent
- 3 Indication of operational states

U/T: green LED - control supply voltage/timing R: yellow LED - relay status I: red LED - over- / undercurrent

- 4 Adjustment of the tripping delay T,
- 5 Adjustment of the start-up delay T_s
- 6 DIP switches (see DIP switch functions on page 2/20)

 - OFF-delay
 - Closed-circuit principle
 - Open-circuit principle
 - Latching function activated
 - Latching function not activated
 - 2x1 c/o (SPDT) contact
 - 1x2 c/o (SPDT) contacts

Voltage monitoring relays



- 1 Adjustment of the threshold value >U for overvoltage
- 2 Adjustment of the threshold value <U for undervoltage
- 3 Indication of operational states

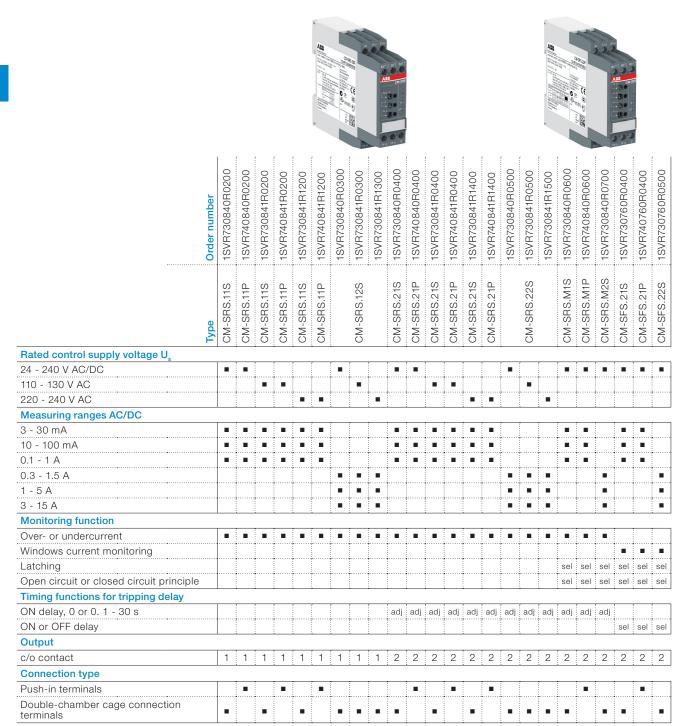
U/T: green LED - control supply voltage/timing R: yellow LED - relay status

U: red LED - over- / undervoltage

- 4 Adjustment of the tripping delay T_v
- 5 Adjustment of the measuring range
- 6 DIP switches (see DIP switch functions on page 2/20)

 - OFF-delay
 - Closed-circuit principle
 - Open-circuit principle
 - Latching function activated
 - Latching function not activated
 - 2x1 c/o (SPDT) contact
 - 1x2 c/o (SPDT) contacts

Current and voltage monitoring relays, single-phase Selection table - Current monitoring relays



adj: adjustable sel: selectable

Current and voltage monitoring relays, single-phase Selection table - Voltage monitoring relays

| | | | | | 22 | ABB COUNTY OF THE PROPERTY OF | 1000 | | | | | | | 1 | 1110 2730 A110 Part 1110 Carrier 1110 Carrie | CHES | |
|---|--------------|-----------------|-----------------|-----------------|-----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--|-----------------|-----------------|
| | Order number | 1SVR730830R0300 | 1SVR740830R0300 | 1SVR730831R0300 | 1SVR740831R0300 | 1SVR730831R1300 | 1SVR740831R1300 | 1SVR730830R0400 | 1SVR740830R0400 | 1SVR730831R0400 | 1SVR740831R0400 | 1SVR730831R1400 | 1SVR740831R1400 | 1SVR730830R0500 | 1SVR740830R0500 | 1SVR730750R0400 | 1SVR740750R0400 |
| | Туре | CM-ESS.1S | CM-ESS.1P | CM-ESS.1S | CM-ESS.1P | CM-ESS.1S | CM-ESS.1P | CM-ESS.2S | CM-ESS.2P | CM-ESS.2S | CM-ESS.2P | CM-ESS.2S | CM-ESS.2P | CM-ESS.MS | CM-ESS.MP | CM-EFS.2S | CM-EFS.2P |
| Rated control supply voltage U _s | | | | | | | | | | | | | | | | | |
| 24 - 240 V AC/DC | | | • | | | ļ | <u>.</u> | • | • | | <u>.</u> | <u>.</u> | <u>.</u> | | • | • | • |
| 110 - 130 V AC | | | | • | • | | <u> </u> | <u>.</u> | | • | • | <u> </u> | <u>.</u> | <u>.</u> | | | |
| 220 - 240 V AC | | | | | | • | • | | | | | • | • | | | | |
| Measuring ranges AC/DC | | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| 3 - 30 V | | | • | • | - | - | | - | | - | - | | | | • | | • |
| 6 - 60 V | | - | - | - | _ | - | | - | - | - | - | - | - | | - | | - |
| 30 - 300 V 60 - 600 V | | | - | - | - | - | | - | - | - | - | | - | - | | - | - |
| | | - | - | - | | - | - | - | - | - | - | | - | _ | - | | ا |
| Monitoring function Over- or undervoltage | | - | | | | | | | | | | | | | | | |
| Windows voltage monitoring | | . | | | | | | <u>-</u> | <u>-</u> | <u>-</u> | | | <u>-</u> | | - | | |
| Latching | | | | | | | <u>.</u> | | | | | <u> </u> | | sel | sel | sel | sel |
| Open circuit or closed circuit principle | | | | | | | <u>.</u> | | : | | <u>.</u> | <u>.</u> | : | sel | sel | sel | |
| Timing functions for tripping delay | | | | - | - | : | : | | - | - | i | : | - | | | | |
| ON delay, 0 or 0.1 - 30 s | | | | | | | | adi | adj | adi | adj | adi | adj | adj | adi | | |
| ON or OFF delay | | | | | | | ! | , | , | , | | | | | | sel | sel |
| Output | | | • | • | • | • | • | • | • | • | | • | | | | | |
| c/o contact | | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Connection type | | | | | | | | | | • | | | | | | | |
| Push-in terminals | | | • | | • | | • | | • | | • | | • | | • | | • |
| Double-chamber cage connection terminals | | • | | • | | • | | • | | • | | • | | • | | • | |

adj: adjustable sel: selectable

Current and voltage monitoring relays, single-phase Ordering details - Current monitoring relays

Description

The CM range current monitoring relays protect single-phase mains (DC or AC) from over- and undercurrent from 3 mA to 15 A. Two different terminal versions are available. You can choose between the proven screw connection technology (double-chamber cage connecting terminals) and the completely tool-free Easy Connect Technology (push-in terminals).

| Ordering deta | ails | | | | | | |
|------------------------------|--------------------|----------------------------------|-----------------------------------|------------|-----------------|----------------|------------------------------|
| Rated control supply voltage | Function | Tripping delay T _v | Measuring range | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
| 24-240 V AC/DC | 困 | | | | 1SVR730840R0200 | | 0.145 (0.320) |
| 110-130 V AC | | | | CM-SRS.11S | 1SVR730841R0200 | | 0.161 (0.355) |
| 220-240 V AC | | without | 3-30 mA, 10-100 mA, | | 1SVR730841R1200 | | 0.161 (0.355) |
| 24-240 V AC/DC | | Williout | 0.1-1 A | | 1SVR740840R0200 | | 0.137 (0.302) |
| 110-130 V AC | | | | CM-SRS.11P | 1SVR740841R0200 | | 0.153 (0.337) |
| 220-240 V AC | | | | | 1SVR740841R1200 | | 0.153 (0.337) |
| 24-240 V AC/DC | | | | | 1SVR730840R0300 | | 0.137 (0.302) |
| 110-130 V AC | <u>₹</u> | without | 0.3-1.5 A, 1-5 A, 3-15 A | CM-SRS.12S | 1SVR730841R0300 | | 0.168 (0.370) |
| 220-240 V AC | | | 3-13 A | | 1SVR730841R1300 | | 0.168 (0.370) |
| 24-240 V AC/DC | | | 3-30 mA, 10-100 mA, 0.1-1 A | CM-SRS.21S | 1SVR730840R0400 | | 0.152 (0.335) |
| 110-130 V AC | | | | | 1SVR730841R0400 | | 0.179 (0.395) |
| 220-240 V AC | A | adjustable | | | 1SVR730841R1400 | | 0.179 (0.395) |
| 24-240 V AC/DC | ₩ | 0 or 0.1-30 s | | | 1SVR740840R0400 | | 0.141 (0.311) |
| 110-130 V AC | | | | CM-SRS.21P | 1SVR740841R0400 | | 0.168 (0.370) |
| 220-240 V AC | - | | | | 1SVR740841R1400 | | 0.168 (0.370) |
| 24-240 V AC/DC | | | 0.3-1.5 A, 1-5 A, | | 1SVR730840R0500 | | 0.144 (0.399) |
| 110-130 V AC | <u>₹</u> | adjustable 0 or 0.1-30 s | | | 1SVR730841R0500 | | 0.181 (0.399) |
| 220-240 V AC | | | 3-13 A | | 1SVR730841R1500 | | 0.181 (0.399) |
| 04 040 \/ 40 //00 | | adjustable | 3-30 mA, | CM-SRS.M1S | 1SVR730840R0600 | | 0.153 (0.337) |
| 24-240 V AC/DC | ∑ | 0 or 0.1-30 s | 10-100 mA, 0.1-1 A | CM-SRS.M1P | 1SVR740840R0600 | | 0.142 (0.313) |
| 24-240 V AC/DC | | adjustable 0 or 0.1-30 s | 0.3-1.5 A, 1-5 A, 3-15 A | CM-SRS.M2S | 1SVR730840R0700 | | 0.155 (0.342) |
| 24-240 V AC/DC | 矛 | adjustable | 3-30 mA, | CM-SFS.21S | 1SVR730760R0400 | | 0.150 (0.331) |
| 24-240 V AU/DU | ⊠ ⊞ | 0 or 0.1-30 s | 10-100 mA, 0.1-1 A | CM-SFS.21P | 1SVR740760R0400 | | 0.139 (0.306) |
| 24-240 V AC/DC | 1x2 c/o 2x1 c/o | adjustable 0 or 0.1-30 s | 0.3-1.5 A, 1-5 A, 3-15 A | CM-SFS.22S | 1SVR730760R0500 | | 0.158 (0.348) |



P: push-in / easy connect



CM-SRS.22S



CM-SFS.22P



Overcurrent monitoring Undercurrent monitoring With latching 1x2 c/o (SPDT) contacts 2x1 c/o (SPDT) contact

Current and voltage monitoring relays, single-phase Ordering details - Voltage monitoring relays

Description

The CM range voltage monitoring relays provide reliable monitoring of voltages as well as detection of phase loss in single-phase mains.

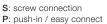
All devices are available with two different terminal versions. You can choose between the proven screw connection technology (double-chamber cage connecting terminals) and the completely tool-free Easy Connect Technology (push-in terminals).

Ordering details



CM-ESS.MP

| Rated control supply voltage | Function | Tripping delay T _v | Measur- ing range AC/DC | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) | | | | | | | | | | | | |
|------------------------------|---------------------------------------|----------------------------------|---|-----------|-----------------|----------------|------------------------------|--|---------------|--|--|--|--|--|--|--|-----------------|--|---------------|
| 24-240 V AC/DC | | | | | 1SVR730830R0300 | | 0.135 (0.298) | | | | | | | | | | | | |
| 110-130 V AC | | | | CM-ESS.1S | 1SVR730831R0300 | | 0.164 (0.362) | | | | | | | | | | | | |
| 220-240 V AC | → | | 3-30 V, 6-60 V, | | 1SVR730831R1300 | | 0.164 (0.362) | | | | | | | | | | | | |
| 24-240 V AC/DC | ₩ | without | 30-300 V, 60-600 V | | 1SVR740830R0300 | | 0.126 (0.278) | | | | | | | | | | | | |
| 110-130 V AC | | | | CM-ESS.1P | 1SVR740831R0300 | | 0.155 (0.342) | | | | | | | | | | | | |
| 220-240 V AC | | | | | 1SVR740831R1300 | | 0.155 (0.342) | | | | | | | | | | | | |
| 24-240 V AC/DC | | | | | 1SVR730830R0400 | | 0.153 (0.337) | | | | | | | | | | | | |
| 110-130 V AC | •• • • • • • • • | adjustable | 3-30 V, 6-60 V, 30-300 V, 60-600 V | CM-ESS.2S | 1SVR730831R0400 | | 0.181 (0.399) | | | | | | | | | | | | |
| 220-240 V AC | | | | | 1SVR730831R1400 | | 0.181 (0.399) | | | | | | | | | | | | |
| 24-240 V AC/DC | 庚 | 0 or 0.1-30 s | | | | | | | | | | | | | | | 1SVR740830R0400 | | 0.142 (0.313) |
| 110-130 V AC | | | | | | CM-ESS.2P | 1SVR740831R0400 | | 0.170 (0.375) | | | | | | | | | | |
| 220-240 V AC | | | | | 1SVR740831R1400 | | 0.170 (0.375) | | | | | | | | | | | | |
| 24-240 V AC/DC | | adjustable | 3-30 V, 6-60 V, | CM-ESS.MS | 1SVR730830R0500 | | 0.154 (0.340) | | | | | | | | | | | | |
| 24-240 V AO/DO | ₹ | 0 or 0.1-30 s | 30-300 V, 60-600 V | CM-ESS.MP | 1SVR740830R0500 | | 0.143 (0.320) | | | | | | | | | | | | |
| 04 040 V AC/DC | ∄ | | 3-30 V, 6-60 V, | CM-EFS.2S | 1SVR730750R0400 | | 0.157 (0.346) | | | | | | | | | | | | |
| 24-240 V AC/DC | 1x2 c/o 2x1 c/o | 0 ór 0.1-30 s | 30-300 V, 60-600 V | CM-EFS.2P | 1SVR740750R0400 | | 0.146 (0.322) | | | | | | | | | | | | |





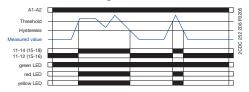
CM-EFS.2

| \neq | Overcurrent monitoring |
|------------------|------------------------|
| \rightarrow | Undercurrent monitorin |
| \triangleright | Without latching |
| | With latching |
| 1x2 c/o | 1x2 c/o (SPDT) contact |
| 2x1 c/o | 2v1 c/o (SPDT) contact |

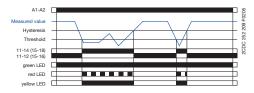
Current and voltage monitoring relays, single-phase Function diagrams

Function diagrams - CM-SRS.1

Overcurrent monitoring =

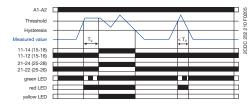


Undercurrent monitoring **►**

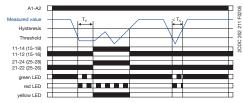


Function diagrams - CM-SRS.2

Overcurrent monitoring



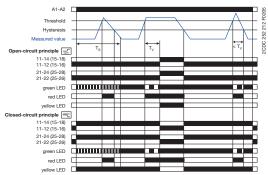
Undercurrent monitoring **→**

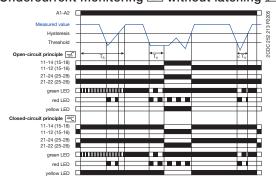


If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-SRS.1 immediately, on the CM-SRS.2 after the set tripping delay $T_{\rm v}$. If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s). The hysteresis is adjustable within a range of 3-30 % of the threshold value.

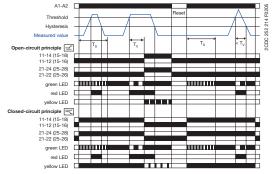
Function diagrams - CM-SRS.M

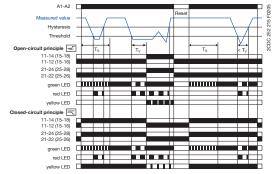






Overcurrent monitoring 🖃 with latching 🗖





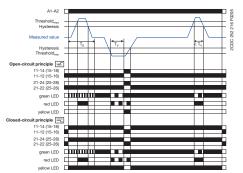
If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state. If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize \Box / de-energize \Box .

If the measured value exceeds resp. drops below the threshold value minus resp. plus the set hysteresis and the latching function is not activated \bowtie , the output relays de-energize \bowtie / energize \bowtie . With activated latching function \bowtie the output relays remain energized \bowtie and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized \bowtie and energize only, when the supply voltage is switched off and then again switched on = Reset.

Current and voltage monitoring relays, single-phase Function diagrams

Function diagrams - CM-SFS.2

Current window monitoring 1x2 c/o contact was ON-delayed ≥ without latching □



Further function diagrams see data sheet.

ON-delayed ⊠ current window monitoring with parallel switching c/o contacts ::

If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_s is complete, the output relays do not change their actual state.

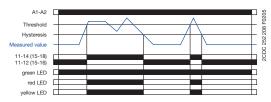
If the measured value exceeds resp. drops below the adjusted threshold value when T_s is complete, the tripping delay T_v starts, when \boxtimes is configured. If T_v is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize 🖃 /de-energize 🖭.

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated , the output relays de-energize = / energize <a> .. With activated latching function <a> the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain deenergized and energize only, when the supply voltage is switched off and then again switched on = Reset.

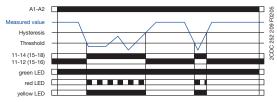
Function diagrams - CM-ESS.1

Overvoltage monitoring

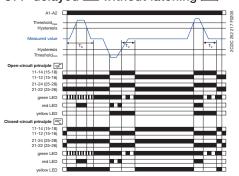
—



Undervoltage monitoring E



Current window monitoring 1x2 c/o contact was OFF-delayed ■ without latching ≥



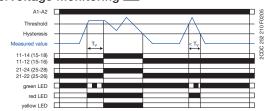
OFF-delayed **c**urrent window monitoring with parallel switching c/o contacts 15200:

If the measured value exceeds resp. drops below the adjusted threshold value when the set start-up delay T_s is complete, the output relays energize 🖃 / de-energize 🖭, when 🖿 is configured, and remain in this position during the set tripping delay T_v. If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated M, the tripping delay T, starts. After completion of T_v, the output relays de-energize / energize , provided that the latching function is not activated . With activated latching function . the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset. When is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

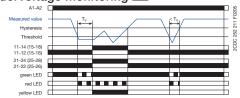
">|" =
$$11_{15}$$
- 12_{16} / 14_{18} ; "<|" = 21_{25} - 22_{26} / 24_{28}

Function diagrams - CM-ESS.2

Overvoltage monitoring 🗺



Undervoltage monitoring 🛬

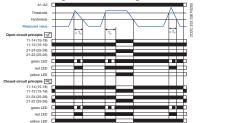


Depending on the configuration, the voltage monitoring relays CM-ESS.1 and CM-ESS.2 can be used for over- 🖃 or undervoltage monitoring 🖎 in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. The devices work according the open-circuit principle. If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-ESS.1 immediately, on the CM-ESS.2 after the set tripping delay T_{v} . If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s). The hysteresis is adjustable within a range of 3-30 % of the threshold value.

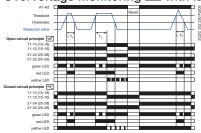
Current and voltage monitoring relays, single-phase Function diagrams

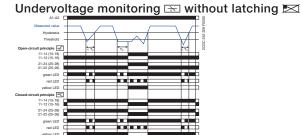
Function diagrams - CM-ESS.M

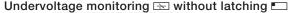
Overvoltage monitoring 🔀 without latching 🔀

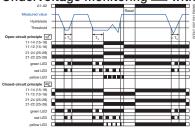


Overvoltage monitoring 🗺 with latching 🗀





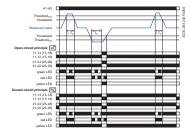




If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_v starts. If T_v is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize 🖃 / de-energize 🖭.

If the measured value exceeds resp. drops below the threshold value plus resp. minus the set hysteresis and the latching function is not activated 🔀, the output relays de-energize 🖃 / energize 🖃. With activated latching function 🗀 the output relays remain energized 🖃 and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized 🖃 and energize only, when the supply voltage is switched off and then again switched on = Reset. The hysteresis is adjustable within a range of 3-30 % of the threshold value. Further function diagrams see data sheet.

Voltage window monitoring 1x2 c/o contact was ON-delayed ≥ without latching ≥

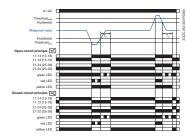


ON-delayed 🖂 voltage window monitoring with parallel switching c/o contacts 🔤: If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_v starts, when \(\square\) is configured. If T_v is complete and the measured value is still exceeding

resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize 🖃 /de-energize 🖃.

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated ⋈, the output relays de-energize ☑ / energize 🖃. With activated latching function 💌 the output relays remain energized 🖃 and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized 🖃 and energize only, when the supply voltage is switched off and then again switched on = Reset.

Voltage window monitoring 1x2 c/o contact ∞ OFF-delayed without latching M



OFF-delayed ■ voltage window monitoring with parallel switching c/o contacts : If the measured value exceeds resp. drops below the adjusted threshold value, the output relays energize 🖃 / de-energize 🖃, when 🖿 is configured, and remain in this position during the set tripping delay T_v.

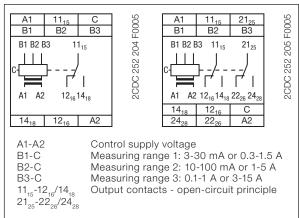
If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated \bowtie , the tripping delay T_v starts. After completion of T_v, the output relays de-energize 🖃 / energize 🖃, provided that the latching function is not activated ⋈. With activated latching function ⋈ the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized 🖃 and energize only, when the supply voltage is switched off and then again switched on = Reset.

When so is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

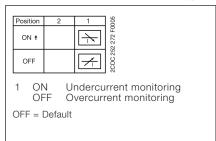
">U" =
$$11_{15}$$
- 12_{16} / 14_{18} ; "21_{25}- 22_{26} / 24_{28}

Current and voltage monitoring relays, single-phase Connection diagrams, DIP switches

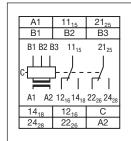
Connection diagram CM-SRS.1, CM-SRS.2



DIP switch functions CM-SRS.1, CM-SRS.2



Connection diagram CM-SRS.M



F0005 B1-C B2-C 2CDC 252 205 В3-С 11₁₅-12₁₆/14₁₈ 21₂₅-22₂₆/24₂₈ Control supply voltage Measuring range 1: 3-30 mA or 0.3-1.5 A Measuring range 2: 10-100 mA or 1-5 A Measuring range 3: 0.1-1 A or 3-15 A Output contacts - open- or closed circuit principle

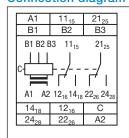
DIP switch functions CM-SRS.M



Undercurrent monitoring OFF Overcurrent monitoring 2 ON Closed-circuit principle Open-circuit principle

3 ON Latching function activated OFF Latching function not activated OFF = Default

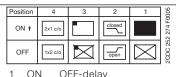
Connection diagram CM-SFS.2



A1-A2 205 F0005 B1-C B2-C В3-С 11₁₅-12₁₆/14₁₈

Control supply voltage Measuring range 1: 3-30 mA or 0.3-1.5 A Measuring range 2: 10-100 mA or 1-5 A Measuring range 3: 0.1-1 A or 3-15 A Output contacts - open- or closed circuit principle 21 25 - 22 26 / 24 28

DIP switch function CM-SFS.2



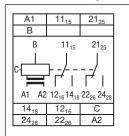
OFF-delay OFF ON-delay

2 ONClosed-circuit principle OFF Open-circuit principle

Latching function activated ONLatching function not activated OFF

ON 2x1 c/o contact OFF 1x2 c/o contacts

Connection diagram CM-ESS.M



F0005 A1-A2 В-С 207

Control supply voltage Measuring ranges AC/DC: 3-30 V; 6-60 V 30-300 V; 60-600 V 11₁₅-12₁₆/14₁₈ Output contacts - open- or closed circuit principle 21₂₅-22₂₆/24₂₈

DIP switch functions CM-ESS.M

| Position | 4 | 3 | 2 | 1 | |
|----------|---|---|--------|---------------|--|
| ON † | | | closed | \rightarrow | |
| OFF | | M | open | / | |

Undervoltage monitoring OFF Overvoltage monitoring

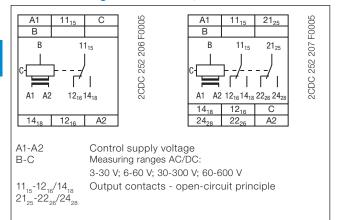
Closed-circuit principle 2 ON OFF Open-circuit principle

ON Latching function activated 3 Latching function not activated

OFF = Default

Current and voltage monitoring relays, single-phase Connection diagrams, DIP switches

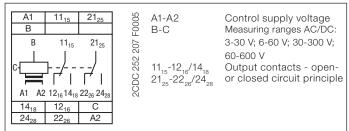
Connection diagram CM-ESS.1, CM-ESS.2



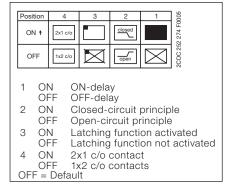
DIP switch functions CM-ESS.1, CM-ESS.2

| Position | 2 | 1 | 0002 | | | | |
|---|---|--------------|-------------|--|--|--|--|
| ON † | | \ | 2 275 F0005 | | | | |
| OFF | | / v | 2CDC 252 | | | | |
| 1 ON Undervoltage monitoring OFF Overvoltage monitoring | | | | | | | |
| OFF = Default | | | | | | | |
| | | | | | | | |

Connection diagram CM-EFS.2



DIP switch functions CM-EFS.2



Current monitoring relays, single-phase Technical data - Current monitoring relays

| Туре | CM-SRS.1 CM-SRS.2 CM-SRS.M CM-SFS.2 |
|--|--|
| Input circuit - Supply circuit | A1-A2 |
| 11 | 2 110-130 V AC |
| | 2 220-240 V AC |
| | 2 24-240 V AC/DC |
| Rated control supply voltage U _s tolerance | -15+10 % |
| Rated frequency AC versions | |
| AC/DC versions | s 50/60 Hz or DC |
| Current / power consumption | see data sheets |
| Power failure buffering time | 20 ms |
| Transient overvoltage protection | Varistors |
| Input circuit - Measuring circuit | B1/B2/B3-C |
| Monitoring function | over- or undercurrent monitoring over- and under- |
| - | configurable current monitorin |
| Measuring method | True RMS measuring principle |
| Measuring inputs | CM-SxS.x1 CM-SxS.x2 |
| Terminal connection | |
| Measuring ranges AC/DC | |
| Input resistance Pulse overload capacity t < 1 s | Θ 3.3 Ω 1 Ω 0.1 Ω 0.05 Ω 0.01 Ω 0.0025 S 500 mA 1 A 10 A 15 A 50 A 100 A |
| Continuous capacity | |
| Threshold value(s) | adjustable within the indicated measuring range |
| Setting accuracy of threshold value | 10 % |
| Hysteresis related to the threshold value Measuring signal frequency range | 3-30 % adjustable 5 % fixed DC / 15 Hz - 2 kHz |
| Rated measuring signal frequency range | DC / 50-60 Hz |
| Maximum response time | AC: 80 ms / DC: 120 ms |
| Accuracy within the control supply voltage tolerance | ΔU ≤ 0.5 % |
| Accuracy within the temperature range | $\Delta U \leq 0.06 \% / °C$ |
| Timing circuit | 0 - 0 0 0 0 0 |
| Start-up delay T _S | none 0 or 0.1-30 s adjustable |
| Tripping delay T _v | none 0 or 0.1-30 s adjustable |
| Repeat accuracy (constant parameters) | ±0.07 % of full scale |
| Accuracy within the control supply voltage tolerance Accuracy within the temperature range | - Δt ≤ 0.5 % - Δt ≤ 0.06 % / °C |
| Indication of operational states | : At = 0.00 /0 / 0 |
| Control supply voltage U/T: green LED | : control supply voltage applied, |
| 5 T T T T T T T T T T T T T T T T T T T | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ |
| Measured value I: red LED | ЛЛЛL: start-up delay T _s active, Г∟Г∟: tripping delay T _v active |
| Measured value I: red LED | D |
| Relay status R: yellow LED | D |
| The state of the s | חחח: relay energized, active latching function |
| | ILLL: relay de-energized, active latching function |
| Output circuits | 11(15)-12(16)/14(18), 21(25)-22(26)/24(28) - Relays |
| Kind of output | 1 c/o contact 2 c/o contacts 1x2 c/o contacts or 2x1 c/o contact |
| | configurable |
| Operating principle | open-circuit principle ¹⁾ open- or closed-circuit principle configurable ¹⁾ |
| Contact material | AgNi |
| Rated operational voltage U _e IEC/EN 60947-1 | 1 250 V |
| Minimum switching voltage / minimum switching current | 24 V / 10 mA |
| Maximum switching voltage / maximum switching current Rated operational current I AC-12 (resistive) at 230 V | 250 V AC / 4 A AC / 4 A |
| (IEC/EN 60947-5-1) AC-12 (resistive) at 230 V AC-15 (inductive) at 230 V | |
| DC-12 (resistive) at 24 V | / 4 A |
| DC-13 (inductive) at 24 V | |
| AC rating Utilization category (UL 508) (Control Circuit Rating Code) | |
| (Control Circuit Hating Code) max. rated operational voltage | 6-h |
| max. continuous thermal current at B 300 | |
| max. making/breaking apparent power | r 3600/360 VA |
| (Make/Break) at B 300 | |
| | 30x10 ⁶ switching cycles |
| Mechanical lifetime | |
| Electrical lifetime (AC-12, 230 V, 4 A) | 0.1x10 ^c switching cycles t 6 A fast-acting 10 A fast-acting 6 A fast-acting |

¹⁾ Open-circuit principle: output relay energizes if the measured value exceeds 🗲 / falls below 🖎 the adjusted threshold value Closed-circuit principle: output relay de-energizes if measured value exceeds 🗲 / falls below 🖎 the adjusted threshold value 2) In case of measured currents > 10 A, lateral spacing has to be min. 10 mm

Current monitoring relays, single-phase Technical data - Current monitoring relays

| Туре | CM-SRS.1 CM-SRS.2 | CM-SRS.M CM-SFS.2 |
|--|---|---|
| General data | | |
| MTBF | on request | |
| Duty time | 100% | |
| (A) II D) | 22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4 | |
| (W x H x D) packaging dimensions | 97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in |) |
| Weight net weight | depending on device, see ordering deta | ails |
| gross weight | depending on device, see ordering deta | ails |
| Mounting | DIN rail (IEC/EN 60715), snap-on moun | ting without any tool |
| Mounting position | any | |
| Minimum distance to other units | 10 mm (0.39 in) at measured current > | 10 A 2 |
| Material of housing | UL 94 V-0 | 10 A |
| Degree of protection housing / terminals | | |
| Electrical connection | | |
| Wire size | Screw connection technology | Easy Connect Technology (Push-in) |
| fine-strand with(out) wire end ferrule | | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| into straita with out with only into | 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) | 2 x 0.0 1.0 mm (2 x 20 10 / w a) |
| rigid | 1 x 0.5-4 mm ² (1 x 20-12 AWG) | 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) |
| - | 2 x 0.5-2.5 mm ² (2 x 20-14 AWG) | |
| Stripping length | 8 mm (0.32 in) | |
| Tightening torque | 0.6-0.8 Nm (5.31-7.08 lb.in) | - |
| Environmental data | | • |
| Ambient temperature range operation / | -20+60 °C / -40+85 °C | |
| storage | | |
| Damp heat (IEC 60068-2-30) | 55 °C, 6 cycles | |
| Vibration (sinusoidal) (IEC/EN 60255-21-1) | Class 2 | |
| Shock (IEC/EN 60255-21-2) | Class 2 | |
| Isolation data | | |
| Rated insulation voltage supply / | 600 V | |
| (VDE 0110, IEC 60947-1, measuring circuit / output | | |
| IEC/EN 60255-5) supply / output 1/2 | | |
| Rated impulse withstand supply /measuring | 6 kV 1.2/50 μs | |
| voltage U _{imp} (IEC/EN 60947-1, circuit / output | 411/40/50 | |
| IEC/EN 60255-5) supply / output 1/2 | 4 KV 1.2/50 μS | |
| Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5) | 3 | |
| Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5) | III | |
| Standards | | |
| Product standard | IEC/EN 60255-1, IEC/EN 60255-27, EN | 50178 |
| Low Voltage Directive | 2006/95/EC | ······ |
| EMC Directive | 2004/108/EC | |
| Electromagnetic compatibility | | |
| Interference immunity to | IEC/EN 61000-6-2 | |
| electrostatic discharge IEC/EN 61000-4-2 | | |
| | | |
| radiated, radio-frequency, IEC/EN 61000-4-3 electromagnetic field | Level 3 | |
| electrical fast transient / burst IEC/EN 61000-4-4 | Level 3 | |
| surge IEC/EN 61000-4-5 | | |
| | L | |
| conducted disturbances, induced by radio-frequency fields IEC/EN 61000-4-6 | | |
| Interference emission | IEC/EN 61000-6-3 | ······································ |
| high-frequency radiated IEC/CISPR 22; EN 55022 | Class B | |
| high-frequency conducted IEC/CISPR 22; EN 55022 | Class B | |
| 5 - 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1 | - | |

Voltage monitoring relays, single-phase Technical data - Voltage monitoring relays

| Туре | CM-ESS.1 | CM-ESS.2 | CM-ESS.M | CM-EFS.2 |
|---|---|---|--|---|
| Input circuit - Supply circuit | | A | 1-A2 | |
| Rated control supply voltage U _s A1-A2 | 110-130 V AC | | | |
| | 220-240 V AC | •••• | | |
| | 24-240 V AC/DC | *************************************** | ····• | ····• |
| Rated control supply voltage U _s tolerance | -15+10 % | | | |
| Rated frequency AC versions | 50/60 Hz | ••••• | ••••• | |
| AC/DC versions | 50/60 Hz or DC | | | |
| Current / power consumption | see data sheet | ••••• | ····• | ····• |
| Power failure buffering time | 20 ms | • | | |
| Transient overvoltage protection | Varistors | | | |
| Input circuit - Measuring circuit | | | B-C | |
| Monitoring function | over- or undervoltage configurable | e monitoring | | over- and undervoltage monitoring configurable |
| Measuring method | True RMS measuring | principle | | <u>i</u> |
| Measuring | That this moderning | | И-ExS | |
| inputs Terminal connection | B-C | B-C | B-C | B-C |
| Measuring range AC/DC | 3-30 V | 6-60 V | 30-300 V | 60-600 V |
| Input resistance | 600 k Ω | 600 k Ω | 600 k Ω | 600 k Ω |
| Pulse overload capacity t < 1 s | 800 V | 800 V | 800 V | 800 V |
| Continous capacity | 660 V | 660 V | 660 V | 660 V |
| Threshold value(s) | adjustable within the | indicated measuring | range | |
| Setting accuracy of threshold value | 10 % | • | | F 0/ five al |
| Hysteresis related to the threshold value Measuring signal frequency range | 3-30 % adjustable DC / 15 Hz - 2 kHz | • | | 5 % fixed |
| Rated measuring signal frequency range | DC / 50-60 Hz | ••••• | ····• | |
| Maximum response time | AC: 80 ms / DC: 120 | ms | | |
| Accuracy within the control supply voltage tolerance | $\Delta U \leq 0.5 \%$ | • | •••• | |
| Accuracy within the temperature range Transient overvoltage protection | ΔU ≤ 0.06 % / °C Varistors | | | |
| Timing circuit | | | | |
| Delay time T _v | none | 0 or 0.1-30 s adjust | able | |
| Repeat accuracy (constant parameters) | ±0.07 % of full scale | | | |
| Accuracy within the control supply voltage tolerance Accuracy within the temperature range | - | $\Delta t \le 0.5 \%$ $\Delta t \le 0.06 \% / °C$ | | |
| Indication of operational states |] - | <u> </u> | | |
| | | 1 D P 1 | | |
| | l: control supp | av T. active | | |
| | ☐ : overvoltage☐ ☐ : undervoltag | e | | |
| Relay status R: yellow LED | I relay energi. IIII: relay energi. IIIII: relay de-ene | zed, no latching func zed, active latching for praized, active latching | unction | |
| Output circuits | Juluum. Telay de-elle | orgized, active laterill | ig idilotion | |
| | 1 0/0 000+00+ | 0.0/0.00=============================== | | 140 0/2 22-1 |
| Kind of output | 1 c/o contact | 2 c/o contacts | | 1x2 c/o contacts 2x1 c/o contact configurable |
| Operating principle | open-circuit principle | ¹⁾ | open- or closed-cir configurable 1) | . |
| Contact material | AgNi | | <u>.</u> | <u>.</u> |
| Rated operational voltage U _e IEC/EN 60947-1 | 250 V | | | |
| Minimum switching voltage / minimum switching current | 24 V / 10 mA | | | |
| Maximum switching voltage / maximum switching current | 250 V AC / 4 A AC | • | ····· | |
| Rated operational current AC-12 (resistive) at 230 V | 4 A | *************************************** | | |
| (IEC/EN 60947-5-1) AC-15 (inductive) at 230 V | 3 A | • | | |
| | 4 A | • | ····• | |
| | 2 A | | | |
| AC rating Utilization category (Control Circuit Rating Code) (UL 508) max. rated operational voltage | 300 V AC | ••••• | | |
| max. continuous thermal current at B 300 | 5 A | • | | |
| max. continuous triefinial current at 6 300 max. making/breaking apparent power (Make/Break) at 8 300 | 3600/360 VA | | | |
| Mechanical lifetime | 30x10 ⁶ switching cyc | les | ····· | ····· |
| | 0.1x10 ⁶ switching cyc | | ······································ | |
| | 6 A fast-acting | 10 A fast-acting | | 6 A fast-acting |
| circuit protection n/o contact | 10 A fast-acting | | | |

Voltage monitoring relays, single-phase Technical data - Voltage monitoring relays

| Туре | CM-ESS.1 | CM-ESS.2 | CM-ESS.M | CM-EFS.2 |
|---|------------------------------------|----------------------|----------------------------------|-----------------------|
| General data | • | | • | • |
| MTBF | on request | | | |
| Duty time | 100% | | ·····• | |
| Dimensions (W x H x D) product dimensions | 22.5 x 85.6 x 103.7 m | ım (0.89 x 3.37 x 4. | 08 in) | ••••• |
| packaging dimensions | | | ••••• | ••••• |
| Weight net weight | | | ls | ••••••• |
| gross weight | depending on device | see ordering detai | ls | ••••• |
| Mounting | DIN rail (IEC/EN 6071 | 5), snap-on mountir | ng without any tool | |
| Mounting position | any | | | |
| Minimum distance to other units vertical / horizontal | | ecessary | | |
| Material of housing | UL 94 V-0 | | ····· | |
| Degree of protection housing / terminals | IP50 / IP20 | | | |
| Environmental data | | | | |
| Ambient temperature ranges operation | -20+60 °C | | | |
| storage | | | | |
| Damp heat, cyclic (IEC/EN 60068-2-30) | 55 °C, 6 cycle | | | |
| Vibration, sinusoidal (IEC/EN 60255-21-1) | Class 2 | | | |
| Shock (IEC/EN 60255-21-2) | Class 2 | | | |
| Electrical connection | | | | |
| Wire size | Screw connect | ion technology | Easy Connect Te | chnology (Push-in) |
| fine-strand with(out) wire end ferrule | 1 x 0.5-2.5 mm ² (1 x 2 | 20-14 AWG) | 2 x 0.5-1.5 mm ² (2 x | 20-16 AWG) |
| | 2 x 0.5-1.5 mm ² (2 x 2 | 20-16 AWG) | | |
| rigid | 1 x 0.5-4 mm ² (1 x 20 | | 2 x 0.5-1.5 mm ² (2 x | 20-16 AWG) |
| | 2 x 0.5-2.5 mm ² (2 x 2 | 20-14 AWG) | | |
| Stripping length | 8 mm (0.32 in) | | ····· | |
| Tightening torque | 0.6-0.8 Nm (5.31-7.08 | 3 lb.in) | | |
| Isolation data | | | | |
| Rated insulation voltage supply / measuring | 600 V | | | |
| (VDE 0110, IEC 60947-1, IEC/EN circuit / output | | | ····· | |
| 60255-5) supply / output 1/2 | | | ····· | |
| Rated impulse withstand voltage U _{imp} supply / measuring | | | | |
| (IEC/EN 60947-1, IEC/EN 60255-5) circuit / output supply / output 1/2 | 414/10/50 | | ····· | |
| Supply / output 1/2 Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5) | 4 KV 1.2/50 μS 3 | | ····· | |
| Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5) | 3 | | ····- | |
| Standards | III | | | |
| Product standard | IEC/EN 60255-1. IEC/ | 'EN 60255-27 EN 5 | M178 | |
| Low Voltage Directive | 2006/95/EC | LIV 00200 27, LIV 0 | .0170 | |
| EMC Directive | 2004/108/EC | | ····· | |
| Electromagnetic compatibility | 2001/100/20 | | | |
| Interference immunity to | IEC/EN 61000-6-2 | | | |
| electrostatic discharge IEC/EN 61000-4-2 | | | | |
| radiated, radio-frequency, IEC/EN 61000-4-3 | | | | |
| electromagnetic field | 200010 | | | |
| 9 | <u> </u> | | ·····• | ··•··· |
| electrical fast transient / burst IEC/EN 61000-4-4 | | | ·····• | |
| surge IEC/EN 61000-4-5 | | | | |
| conducted disturbances, induced by IEC/EN 61000-4-6 | Level 3 | | | |
| radio-frequency fields | JEO/EN 04000 C C | | | |
| Interference emission | IEC/EN 61000-6-3 | | <u>.</u> | ··•····· |
| high-frequency radiated IEC/CISPR 22; EN 55022 | | | ·····• | ·· · ····· |
| high-frequency conducted IEC/CISPR 22; EN 55022 | l Class R | | | |

¹⁾ Open-circuit principle: output relay energizes if the measured value exceeds 🔀 / falls below 🔃 the adjusted threshold value Closed-circuit principle: output relay de-energizes if measured value exceeds 🔀 / falls below 🔂 the adjusted threshold value

Three-phase monitoring relays Product group picture



Three-phase monitoring relays Table of contents

Three-phase monitoring relays

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Three-phase monitoring relays Benefits and advantages, Applications

Characteristics of the CM range three-phase monitors

- Adjustable phase unbalance threshold value ¹⁾
- Adjustable ON-delay/OFF-delay time 1)
- Dual frequency measuring 50/60 Hz
- Powered by the measuring circuit
- 1 n/o contact, 1 or 2 c/o contacts
- LEDs for the indication of operational states
- Multifunctional and single-functional devices
- Phase failure detection
- Phase sequence monitoring ¹⁾
- Over- and undervoltage monitoring (fixed or adjustable)¹⁾
- Wide-range operating voltage guarantees world-wide operation



¹⁾ depending on device type

Phase unbalance monitoring

If the supply by the three-phase system is unbalanced due to uneven distribution of the load, the motor will convert a part of the energy into reactive power. This energy gets lost unexploited; also the motor is exposed to higher thermal stress. Other thermal protection devices fail to dete ct continuing unbalances which can lead to damage or destruction of the motor. The CM range three-phase monitors with phase unbalance monitoring can reliably detect this critical situation.

Phase sequence

Changing the phase sequence during operation or a wrong phase sequence prior to startup causes a change of the rotational direction of the connected device. Generators, pumps or fans rotate in the wrong direction and the installation is no longer working properly. Especially for moveable equipment, such as construction machinery, phase sequence detection prior to the startup process is highly reasonable.

Phase loss

In case of phase loss, undefined stats of the installation are likely to occur. E.g. the startup process of motors is disturbed. All three-phase monitors of the ABB CM range detect a phase loss as soon as the voltage of one phase drops below 60% of its nominal value.

Voltage monitoring

All electric devices can be damaged when operated continuously in a network with out-of-range voltages. For example, safe starting is not ensured in case of undervoltage. Also, the switching state of a contactor is not clearly defined when operated in a "forbidden" voltage range. This can lead to undefined states of the installtion and cause damage or destruction of valuable parts.

Extended functionality

ABB's new generation of three-phase monitoring relays feature additional functions making the application field for the devices considerably larger.

Selectable phase sequence monitoring

The phase sequence monitoring can be switched off by means of a rotary switch or a DIP switch. This enables monitoring of three-phase mains where phase sequence is not relevant for the application, for example in case of motors with forward and reverse rotation, heating applications, etc.

Automatic phase sequence correction

The automatic phase sequence correction is activated by means of a DIP switch. With activated phase sequence correction, it is ensured that for any non-fixed or portable equipment, e.g. construction machinery, the correct phase sequence is always applied to the input terminals of the load. For details regarding the wiring, please see function description / diagrams.

Structure of the type designation

CM-_ _ x.yz

x: width of enclosure

y: Control supply voltage / measuring range

| <i>y</i> . 0011 | ther eappry vertage / measuring range |
|-----------------|---|
| 1 | 110, 115, 120, 127 V supply systems (phase- |
| | neutral) |
| 2 | 220, 230, 240 V supply systems (phase-neutral) |
| 3 | 200, 208, 220, 230, 240, 257, 260 V supply sys- |
| | tems (phase-phase) |
| 4 | 440, 460 V supply systems (phase-phase) |
| 5 | 480, 500 V supply systems (phase-phase) |
| 6 | 575, 600 V supply systems (phase-phase) |
| 7 | 660, 690 V supply systems (phase-phase) |
| 8 | 200, 400 V supply systems (phase-phase) |

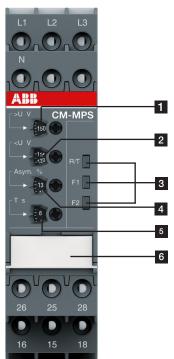
z: Rated frequency / output circuit

| 1 | 50/60 Hz - 1x2 c/o |
|---|---------------------------------|
| 2 | 50/60 Hz - 1x2 or 2x1 c/o |
| 3 | 50/60/400 Hz - 1x2 oder 2x1 c/o |

²⁾ Applicable in rail application following the latest standards for rail applications: NF F 16-101/102 (I2/F2 classified), EN 45545 (Hazard Level 3), DIN 5510, EN 50155, IEC 60571. Further information is available in our rail segment brochure 2CDC110084B0201.

Three-phase monitoring relays Operating controls

S-Range Housing



- 1 Adjustment of the hysteresis >U for overvoltage
- 2 Adjustment of the threshold value <U for undervoltage
- 3 Indication of operational states

R/T: red LED – Relay status / timing F1: yellow LED – Fault message F2: yellow LED – Fault message

- 4 Adjustment of the threshold value Asym. for phase unbalance
- 5 Adjustment of the tripping delay T
- 6 DIP switches (see DIP switch functions on page 2/40)

ON-delay

OFF-delay

Phase sequence monitoring deactivated

Phase sequence monitoring activated

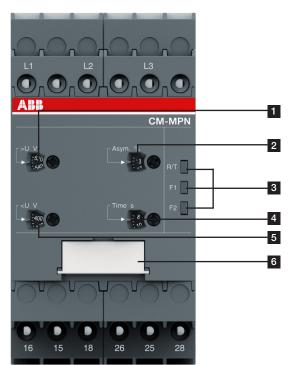
Phase sequence correction activated

Phase sequence correction deactivated

2x1 c/o (SPDT) contact

1x2 c/o (SPDT) contacts

N-Range Housing



- 1 Adjustment of the hysteresis >U for overvoltage
- 2 Adjustment of the threshold value Asym. for phase unbalance
- 3 Indication of operational states

R/T: red LED - Relay status / timing

F1: yellow LED - Fault message

F2: yellow LED - Fault message

- 4 Adjustment of the tripping delay T_v
- 5 Adjustment of the hysteresis <U for undervoltage
- 6 DIP switches (see DIP switch functions on page 2/40)

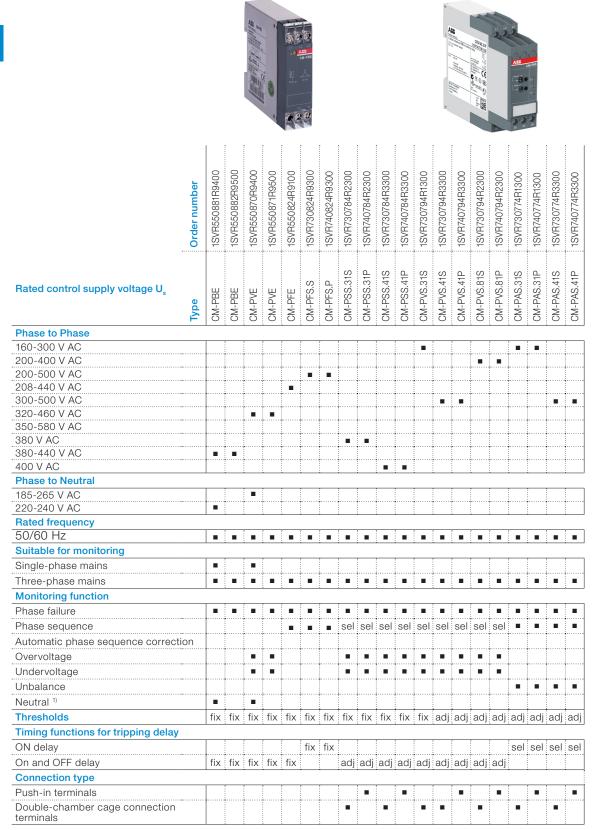
OFF-delay

- Phase sequence monitoring deactivated
- Phase sequence monitoring activated
- Phase sequence correction activated
- Phase sequence correction deactivated

2x1 c/o (SPDT) contact

1x2 c/o (SPDT) contacts

Three-phase monitoring relays Selection table singlefunctional



¹⁾ The external conductor voltage towards the neutral conductor is measured.

adj: adjustable sel: selectable

Three-phase monitoring relays Selection table multifunctional

| | | The second second second | | BERTHAM STATE OF STAT | 200 | ARI L. Be L. Be L. Be | A COLOR OF THE PARTY OF THE PAR | | | | | W. 11. 50 11. 10 11. 10. 11. 11. 11. 11. 11. 11. | | | | ASS I. Zo | | DAME OF THE PROPERTY OF THE PR | |
|---|--------------|--------------------------|------------------------|--|------------------------|--------------------------------|--|-----------------|-----------------|------------------------|-----------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|--|-----------------|
| | Order number | 1SVR730885R1300 | 1SVR740885R1300 | 1SVR730885R3300 | 1SVR740885R3300 | 1SVR730884R1300 | 1SVR740884R1300 | 1SVR730884R3300 | 1SVR740884R3300 | 1SVR730885R4300 | 1SVR740885R4300 | 1SVR730884R4300 | 1SVR740884R4300 | 1SVR750487R8300 | 1SVR760487R8300 | 1SVR750488R8300 | 1SVR760488R8300 | 1SVR750489R8300 | 1SVR760489R8300 |
| Rated control supply voltage U _s | Туре | CM-MPS.11S | CM-MPS.11P | CM-MPS.21S | CM-MPS.21P | CM-MPS.31S | CM-MPS.31P | CM-MPS.41S | CM-MPS.41P | CM-MPS.23S | CM-MPS.23P | CM-MPS.43S | CM-MPS.43P | CM-MPN.52S | CM-MPN.52P | CM-MPN.62S | CM-MPN.62P | CM-MPN.72S | CM-MPN.72P |
| Phase to Phase | | • | | | | | | • | • | • | | | | | | | | | |
| 160-300 V AC | | | | | | • | - | : | | | | | | | | | | | |
| 300-500 V AC | | | | | | | | • | - | | | • | • | | | | | | |
| 350-580 V AC | | | | | | | | ļ | | <u>.</u> | <u>.</u> | <u>.</u> | | • | • | | <u>.</u> | | |
| 450-720 V AC 530-820 V AC | | | | | | | | | | | <u>.</u> | | | | | • | • | | |
| Phase to Neutral | | | | | | | | | | | | | | | | | | | - |
| 90-170 V AC | | | | | | | | | | : | : | : | | | | : | : | | |
| 180-280 V AC | | | | • | | | | <u>.</u> | | | | <u>.</u> | <u>.</u> | | | | <u>.</u> | | |
| Rated frequency | | | | | | | | - | | - | - | | | | | | - | | |
| 50/60 Hz | | | | • | | | - | | • | | | | | • | • | | | | |
| 50/60/400 Hz | | | | | | | | | | • | • | • | • | | | | | | |
| Suitable for monitoring | | | | | | | | | | | | | | | | | | | |
| Single-phase mains | | - | • | • | • | | | | | • | • | | | | | | | | |
| Three-phase mains | | • | • | • | • | • | - | • | • | • | • | • | • | • | • | • | • | • | • |
| Monitoring function | | | | | | | | | | | | | | | | | | | |
| Phase failure | | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | • | • | • |
| Phase sequence | | sel | sel | sel | sel | sel | sel | sel | sel | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj |
| Automatic phase sequence correction | n | | | | | | | <u>.</u> | | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj |
| Overvoltage | | • | • | • | • | • | - | • | • | • | • | • | • | • | • | • | • | • | • |
| Undervoltage | | | • | • | • | • | | • | • | • | • | • | • | • | • | • | • | • | - |
| Unbalance | | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | • | • | • |
| Neutral 1) | | = 2) | ■ ²⁾ | ■ ²⁾ | ■ ²⁾ | | | | | ■ ²⁾ | ■ 2) | | | | | | | | |
| Thresholds | | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj |
| Timing functions for tripping delay | | | | | | | | | | | | | | | | | | | |
| On and OFF delay | | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj | adj |
| Connection type | | 1 | : | : | | | | : | : | : | : | : | : | : | | : | : | | : |
| Push-in terminals | | l <u>.</u> | • | | - | | | | • | | • | | • | | - | | • | | • |
| Double-chamber cage connection terminals | | • | | • | | • | | • | | • | | • | | • | | • | | • | |

 $^{^{\}rm 1)}$ The external conductor voltage towards the neutral conductor is measured. $^{\rm 2)}$ Interrupted neutral monitoring

adj: adjustable

sel: selectable

Three-phase monitoring relays Ordering details - Singlefunctional

Description

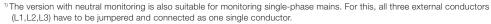
Only reliable and continuous monitoring of a three-phase network guarantees the trouble-free and economic operation of machines and installations.

Ordering details

| Rated control supply voltage = measuring voltage | Monitoring function | Neutral monitor- ing | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--|--|----------------------------|----------------------|-----------------|----------------|------------------------------|
| 3x380-440 V AC, 220-240 V C | Phase failure detection | • | CM-PBE ¹⁾ | 1SVR550881R9400 | | 0.08 (0.17) |
| 3x380-440 V AC | (Single- and three-phase) | | CM-PBE | 1SVR550882R9500 | | 0.08 (0.17) |
| 3x320-460 V AC, 185-265 V AC | Over- / under- voltage and phase failure | • | CM-PVE 1) | 1SVR550870R9400 | | 0.08 (0.17) |
| 3x320-460 V AC | detection (Single- and three-phase) | | CM-PVE | 1SVR550871R9500 | | 0.08 (0.17) |
| 3x208-440 V AC | Phase sequence monitoring and phase failure detection (Three- phase) | | CM-PFE ²⁾ | 1SVR550824R9100 | | 0.08 (0.17) |

Ordering details

| Rated control supply voltage = measuring voltage | Monitoring function | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--|--|------------|-----------------|----------------|------------------------------|
| 2 222 522 4 2 | Phase sequence monitoring | CM-PFS.S | 1SVR730824R9300 | | 0.127 (0.280) |
| 3x200-500 V AC | and phase failure detection (Three-phase) | CM-PFS.P | 1SVR740824R9300 | | 0.119 (0.262) |
| 0.000.1/40 | | CM-PSS.31S | 1SVR730784R2300 | | 0.132 (0.291) |
| 3x380 V AC | Over- / undervoltage with | CM-PSS.31P | 1SVR740784R2300 | | 0.123 (0.271) |
| 0.400 V AO | fixed threshold values ± 10 % | CM-PSS.41S | 1SVR730784R3300 | | 0.132 (0.291) |
| 3x400 V AC | | CM-PSS.41P | 1SVR740784R3300 | | 0.123 (0.271) |
| 0.400.000.V.AO | | CM-PVS.31S | 1SVR730794R1300 | | 0.141 (0.311) |
| 3x160-300 V AC | | CM-PVS.31P | 1SVR740794R1300 | | 0.132 (0.291) |
| 0.000.500.4.0 | Over- and undervoltage | CM-PVS.41S | 1SVR730794R3300 | | 0.139 (0.306) |
| 3x300-500 V AC | with adjustable threshold values (Three-phase) | CM-PVS.41P | 1SVR740794R3300 | | 0.131 (0.289) |
| | | CM-PVS.81S | 1SVR730794R2300 | | 0.136 (0.300) |
| 3x200-400 V AC | | CM-PVS.81P | 1SVR740794R2300 | | 0.128 (0.282) |
| 0.400.000.V.40 | | CM-PAS.31S | 1SVR730774R1300 | | 0.133 (0.293) |
| 3x160-300 V AC | Phase unbalance (Three- | CM-PAS.31P | 1SVR740774R1300 | | 0.124 (0.273) |
| 0.000.500.V.40 | phase) | CM-PAS.41S | 1SVR730774R3300 | | 0.132 (0.291) |
| 3x300-500 V AC | | CM-PAS.41P | 1SVR740774R3300 | | 0.123 (0.271) |



²⁾ For applications where a reverse fed voltage >60% is expected, we recommend to use our three-phase monitoring relays for unbalance CM-PAS.xx



 $[\]textbf{P} : \text{push-in / easy connect}$



CM-PBE



CM-PSS.41P



CM-PAS.31P

Three-phase monitoring relays Ordering details - Multifunctional



CM-MPS.23P



CM-MPN.52P

| \bowtie | ON-delayed |
|------------|------------------------|
| | OFF-delayed |
| \bigcirc | Phase sequence |
| | monitoring activated |
| Ø | Phase sequence |
| | monitoring deactivated |
| (A) | Phase sequence |
| | correction activated |
| Ø | Phase sequence |
| | correction deactivated |

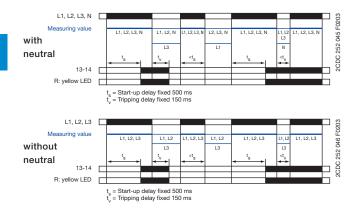
2x1 c/o (SPDT) contacts 1x2 c/o (SPDT) contacts

| Ordering deta Rated control supply voltage = measuring voltage | DIP | Monitoring function | Neutral monitoring | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------------|---|--------------------------|--------------------------|--------------------------|-----------------------------|------------------------------|--------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------|-----------------------------|-----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------|-----------------------------|--------------------------|-----------------------------|-----------------------------|------------|---------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|--|------------|-----------------|--|---------------|
| 90-170 V AC | | | | CM-MPS.11S | 1SVR730885R1300 | | 0.148 (0.326) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90-170 V AC | | Multifunctional | _ | CM-MPS.11P | 1SVR740885R1300 | | 0.137 (0.302) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 180-280 V AC | | (Three-phase phase failure | - | CM-MPS.21S | 1SVR730885R3300 | | 0.146 (0.322) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10U-20U V AU | ⊠ ■ | detection, Phase | | CM-MPS.21P | 1SVR740885R3300 | | 0.135 (0.298) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3x160-300 V AC | Ø | sequence monitoring, overvoltage, undervoltage, Phase | | CM-MPS.31S | 1SVR730884R1300 | | 0.142 (0.313) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3X100-300 V AC | | | | CM-MPS.31P | 1SVR740884R1300 | | 0.133 (0.293) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3x300-500 V AC | | unbalance) | | CM-MPS.41S | 1SVR730884R3300 | | 0.140 (0.309) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3X300-300 V AC | | | | CM-MPS.41P | 1SVR740884R3300 | | 0.132 (0.291) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 180-280 V AC | \bowtie | | _ | CM-MPS.23S | 1SVR730885R4300 | | 0.149 (0.328) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100-200 V AC | | | • | CM-MPS.23P | 1SVR740885R4300 | | 0.138 (0.304) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3x300-500 V AC | (A) (Ø) (2x1 c/o | Multifunctional | | CM-MPS.43S | 1SVR730884R4300 | | 0.148 (0.327) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3X300-500 V AC | 1x2 c/o | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | phase failure detection, | detection, | (Three-phase phase failure detection, | phase failure detection, | ohase failure detection, | ohase failure detection, | phase failure detection, | phase failure detection, | | CM-MPS.43P | 1SVR740884R4300 | | 0.137 (0.302) |
| | | sequence monitoring, | | CM-MPN.52S | 1SVR750487R8300 | | 0.230 (0.507) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3x350-580 V AC | \boxtimes | overvoltage, undervoltage, | | CM-MPN.52P | 1SVR760487R8300 | | 0.226 (0.498) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Phase unbalance) | Phase | Phase | Phase | Phase | Phase | Phase | CM-MPN.62S | 1SVR750488R8300 | | 0.229 (0.505) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3x450-720 V AC | (A) | | | CM-MPN.62P | 1SVR760488R8300 | | 0.225 (0.496) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.500.000.1/40 | 2x1 c/o 1x2 c/o | | | CM-MPN.72S | 1SVR750489R8300 | | 0.224 (0.494) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3x530-820 V AC | | | | CM-MPN.72P | 1SVR760489R8300 | | 0.220 (0.485) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

S: screw connection P: push-in / easy connect

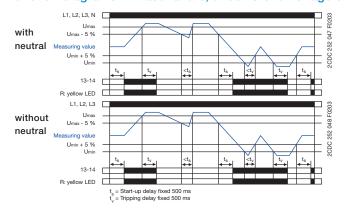
Three-phase monitoring relays Function diagrams

Function diagrams - Phase failure detection CM-PBE



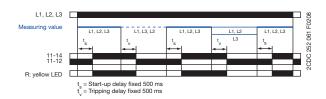
If all phases (and the neutral) are present, the output relay energizes after the start-up delay to is complete. If a phase failure occurs, the tripping delay t starts. When timing is complete, the output relay de-energizes. As soon as the voltage returns to the tolerance range, timing of ts starts. When timing is complete, the output relay re-energizes automatically. The yellow LED glows when the output relay is energized.

Function diagrams - Phase failure, under- / overvoltage detection CM-PVE



If all phases (and the neutral) are present with correct voltage, the output relay energizes after the start-up delay t is complete. If the voltage exceeds or falls below the fixed threshold value or if a phase failure occurs, the tripping delay t starts. When timing is complete, the output relay de-energizes. As soon as the voltage returns to the tolerance range, timing of ts starts. When timing is complete, the output relay re-energizes automatically. The yellow LED glows when the output relay is energized.

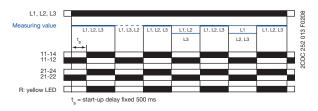
Function diagram - Phase failure detection, phase sequence monitoring CM-PFE



If all phases are present with the correct phase sequence, the output relay energizes after the start-up delay t_s is complete. If a phase failure or a phase sequence error occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. The yellow LED glows when the output relay is energized.

In case of motors which continue running with only two phases, the CM-PFE detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.

Function diagram - Phase failure detection, phase sequence monitoring CM-PFS



If all phases are present with the correct phase sequence, the output relay energizes after the start-up delay to is complete. If a phase failure or a phase sequence error occurs, the output relay de-energizes instantaneous. The yellow LED glows when the output relay is energized.

In case of motors which continue running with only two phases, the CM-PFS detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.

ATTENTION

ral CM-PFS units are placed side by side and the control supply voltage is higher than 415 V, spacing of at least 10 mm has to be kept on the individual units.

Three-phase monitoring relays Function diagrams

CM-PSS.xx, CM-PVS.xx, CM.PAS.xx, CM-MPS.xx, CM-MPN.xx Phase sequence monitoring and phase failure detection

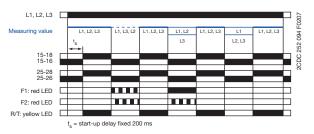
Applying control supply voltage begins the fixed start-up delay $t_{\rm s}$. When $t_{\rm s}$ is complete and all phases are present with correct voltage, the output relays energize and the yellow LED R/T glows.

Phase sequence monitoring

If phase sequence monitoring is activated, the output relays de-energize as soon as a phase sequence error occurs. The fault is displayed by alternated flashing of the LEDs F1 and F2. The output relays re-energize automatically as soon as the phase sequence is correct again.

Phase failure detection

The output relays de-energize instantaneous if a phase failure occurs. The fault is indicated by lightning of LED F1 and flashing of LED F2. The output relays re-energize automatically as soon as the voltage returns to the tolerance range.



CM-MPS.11, CM-MPS.21, CM-MPS.23 Interrupted neutral monitoring

The interruption of the neutral in the main to be monitored is detected by means of phase unbalance evaluation. Determined by the system, in case of unloaded neutral, i.e. symmetrical load between all three phases, it may happen that an interruption of the neutral will not be detected. If the star point is displaced by asymmetrical load in the three-phase main, an interrupted neutral will be detected.

Displacement of the star point



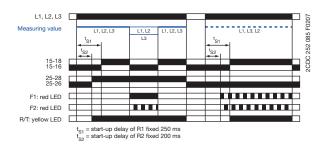
CM-MPS.x3, CM-MPN.x2

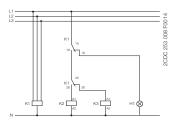
Automatic phase sequence correction

This function can be selected only if phase sequence monitoring is activated \square and operating mode 2x1 c/o (SPDT) contact \square is selected.

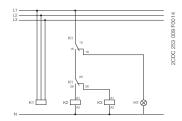
Applying control supply voltage begins the fixed start-up delay $t_{\rm S1}$. When $t_{\rm S1}$ is complete and all phases are present with correct voltage, output relay R1 energizes. Output relay R2 energizes when the fixed start-up delay $t_{\rm S2}$ is complete and all phases are present with correct phase sequence. Output relay R2 remains de-energized if the phase sequence is incorrect. If the voltage to be monitored exceeds or falls below the set threshold values for phase unbalance, over- or undervoltage or if a phase failure occurs, output relay R1 de-energizes and the LEDs F1 and F2 indicate the fault.

Output relay R2 is responsive only to a false phase sequence. In conjunction with a reversing contactor combination, this enables an automatic correction of the rotation direction. See circuit diagrams on the right.

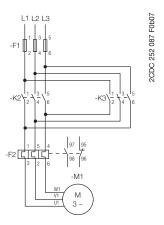




Control circuit diagram (K1 = CM-MPS.23)



Control circuit diagram
(K1 = CM-MPS.43 or CM-MPN.xx)



Power circuit diagram

Three-phase monitoring relays Function diagrams

CM-PSS.xx¹⁾, CM-PVS.xx²⁾, CM-MPS.xx²⁾, CM-MPN.xx²⁾ Over- and undervoltage monitoring [20]

Applying control supply voltage begins the fixed start-up delay $\rm t_s$. When $\rm t_s$ is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the fixed $^{\!\scriptscriptstyle 1)}$ or set $^{\!\scriptscriptstyle 2)}$ threshold value, the output relays de-energize after the set tripping delay $t_{\scriptscriptstyle V}$ is complete. The LED R/T flashes during timing and turns off as soon as the output relays deenergize.

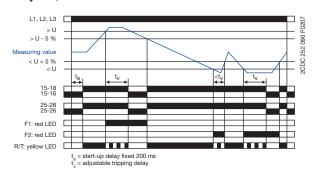
The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 % and the LED R/T glows.

Type of tripping delay = OFF-delay

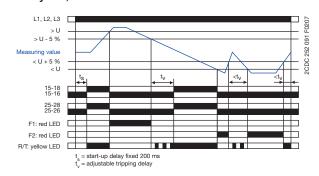
If the voltage to be monitored exceeds or falls below the fixed 1) or set 2) threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize automatically after the set tripping delay $\rm t_v$ is complete. The LED R/T flashes during timing and turns steady when timing is complete.

ON-delay ⊠, 1x2 c/o contacts



OFF-delay ■, 1x2 c/o contacts



CM-MPS.x3, CM-MPN.x2

Over- and undervoltage monitoring

Applying control supply voltage begins the fixed start-up delay $\rm t_s$. When $\rm t_s$ is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize. The yellow LED R/T glows as long as at least one output relay is energized.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the set threshold value, output relay R1 (overvoltage) or output relay R2 (undervoltage) de-energizes after the set tripping delay $\rm t_{v}$ is complete. The LED R/T flashes during timing.

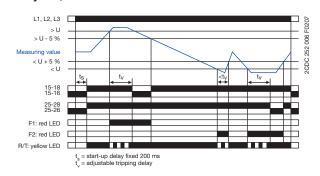
The corresponding output relay re-energizes automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %.

Type of tripping delay = OFF-delay

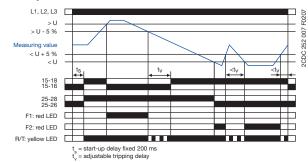
If the voltage to be monitored exceeds or falls below the set threshold value, output relay R1 (overvoltage) or output relay R2 (undervoltage) de-energizes instantaneously.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the corresponding output relay re-energizes automatically after the set tripping delay t_{ν} is complete. The LED R/T flashes during timing.

ON-delay ⊠, 2x1 c/o contact ™



OFF-delay ■, 2x1 c/o contact ≥ delay ■



Three-phase monitoring relays Function diagrams

CM-PAS.xx, CM-MPS.xx, CM-MPN.xx Phase unbalance monitoring

Applying control supply voltage begins the fixed start-up delay t_s. When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays deenergize after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

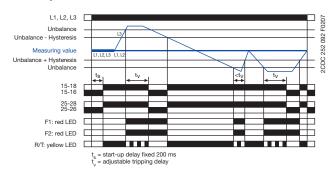
The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 % and the LED R/T glows.

Type of tripping delay = OFF-delay

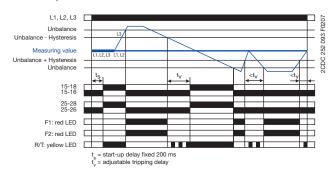
If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 %, the output relays re-energize automatically after the set tripping delay t, is complete. The LED R/T flashes during timing and turns steady when timing is complete.

ON-delay ⊠



OFF-delay



CM-PSS.xx, CM-PSV.xx, CM-PAS.xx, CM-MPS.xx, CM-MPN.xx **LED functions**

| Function | R/T: | F1: | F2: |
|--------------------------------------|------------|--|----------|
| | yellow LED | red LED | red LED |
| Control supply voltage applied, | | - | - |
| output relay energized | | | |
| Tripping delay t _v active | | - | - |
| Phase failure | - | | |
| Phase sequence | - | □□□□ alte alte alte alte alte alte alte alte | ernating |
| Overvoltage | - | | - |
| Undervoltage | - | - | |
| Phase unbalance | - | | |
| Interruption of the neutral | - | | |
| Adjustment error 1) | | | |

1) Possible misadjustments of the front-face operating controls: Overlapping of the threshold values: An overlapping of the threshold values is given, if the threshold value for overvoltage is set to a smaller value than the threshold value for undervoltage.

DIP switch 3 = OFF and DIP switch 4 = ON: Automatic phase sequence correction is activated and selected operating mode is 1x2 c/o contacts DIP switch 2 and 4 = ON: Phase sequence detection is deactivated and the automatic phase sequence correction is actived

CM-PSS.xx, CM-PSV.xx, CM-PAS.xx, CM-MPS.xx, CM-MPN.xx Type of tripping delay

The type of tripping delay \(\square\) can be adjusted via a rotary (CM-PxS.xx) or a DIP switch (CM-MPx.xx).

Switch position ON-delav ≥:

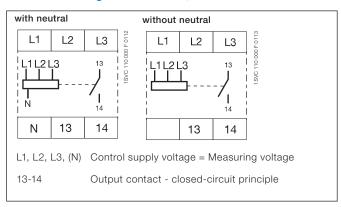
In case of a fault, the de-energizing of the output relays and the respective fault message are suppressed for the adjusted tripping delay t_v.

Switch position OFF-delay ::

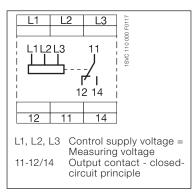
In case of a fault, the output relays de-energize instantaneously and a fault message is displayed and stored for the length of the adjusted tripping delay t_v. Thereby, also momentary undervoltage conditions are recognized.

Three-phase monitoring relays Connection diagrams

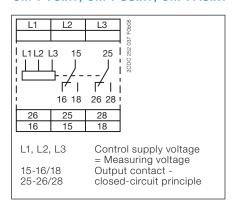
Connection diagrams CM-PBE, CM-PVE



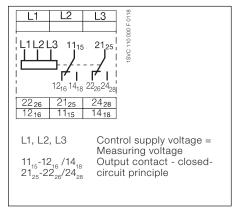
Connection diagram CM-PFE



Connection diagram CM-PVS.x1, CM-PSS.x1, CM-PAS.x1

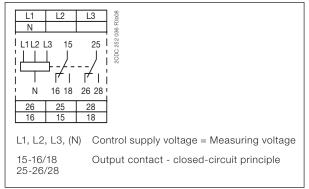


Connection diagram CM-PFS

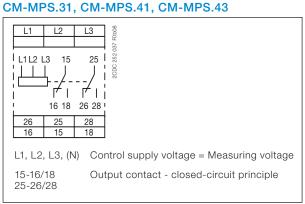


Connection diagram

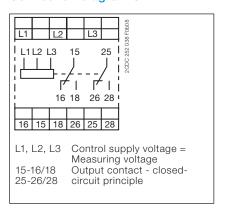
CM-MPS.11, CM-MPS.21, CM-MPS.23



Connection diagram



Connection diagram CM-MPN.x2



Three-phase monitoring relays DIP switches, Rotary switches

Rotary switch "Function" CM-PVS



with phase sequence monitoring



OFF-delay with phase sequence monitoring



ON-delay without phase sequence monitoring



OFF-delay without phase sequence monitoring

Rotary switch "Function" CM-PSS



ON-delay with phase sequence monitoring



with phase sequence monitoring



ON-delay without phase sequence monitoring



OFF-delay without phase sequence monitoring

DIP switch functions CM-MPS.x3 and CM-MPN.x2



1 Timing function

ON ON-delayed OFF OFF-delayed

3 Operating principle of output

ON 2x1 c/o contact OFF 1x2 c/o contact

2 Phase sequence monitoring

ON deactivated OFF activated

4 Phase sequence correction

ON activated OFF deactivated

Output relay R1 is responsive to overvoltage, output relay R2 is responsive to undervoltage. In case of other faults, both output relays react synchronously.

DIP switch functions CM-MPS.x1



1 Timing function ON ON-delayed OFF OFF-delayed

2 Phase sequence monitoring ON deactivated OFF activated

Three-phase monitoring relays Technical data

| Туре | | | CM-PBE 1) | CM-PBE | CM-PVE 1) | CM-PVE | CM-PFE | CM-PFS |
|-------------------------|--|--|--|------------------------------|--|--------------------|--|---|
| | it = measuring circu | | L1-L2-L3-N | L1-L2-L3 | L1-L2-L3-N | L1-L2-L3 | L1- | L2-L3 |
| Rated contro | ol supply voltage U _s | = measuring voltage | 3x380- 440 V AC, 220-240 V AC | 3x380- 440 V AC | 3x320- 460 V AC, 185-265 V AC | 3x320- 460 V AC | 3x208- 440 V AC | 3x200- 500 V AC |
| Power consu | umption | ······ | | | | | approx. 15 \ | /A |
| Rated contro | ol supply voltage U _s | tolerance | -15+15 % | | -15+10 % | | -10+10 % | -15+10 % |
| Rated freque | ency | • | 50/60 Hz | | 50/60 Hz (-10 | O+10 %) | | 50/60 Hz |
| Duty time | *************************************** | • | 100 % | | •••• | | •••••• | •••• |
| Measuring ci | ircuit | • | L1-L2-L3-N | L1-L2-L3 | L1-L2-L3-N | L1-L2-L3 | L1-L2-L3 | •••• |
| Monitoring fu | unctions | phase failure | • | • | • | • | • | • |
| | | phase sequence | - | - | - | - | • | • |
| | ••• | over- / undervoltage | - | - | • | • | - | - |
| | | neutral | | - | • | - | - | - |
| Measuring ra | anges | | 3x380-440 V AC, 220- 240 V AC | 3x380- 440 V AC | 3x320- 460 V AC, 185-265 V AC | 3x320- 460 V AC | 3x208- 440 V AC | 3x200- 500 V AC |
| Thresholds | | U_{min} | 0.6 x UN | | fixed 185 V / 320 V | fixed 320 V | 0.6 x U _N | |
| | | U_{max} | | | fixed 265 V / 460 V | fixed 460 V | | |
| Hysteresis re | elated to the thresho | ld value | fixed 5 % | - 0.05 !!! | fixed 5 % | | - | |
| Measuring v | oltage frequency | | (release value | $\theta = 0.65 \times U_{N}$ | <u> </u> | | 50/60 Hz | |
| Response tir | | | 40 ms | | 80 ms | | 500 ms | |
| | | I supply voltage tolerance | - | | | | ΔU ≤ 0.5 % | • |
| | thin the temperature | | - | ••••• | ΔU ≤ 0.06 % | | | |
| Timing circu | | | <u> </u> | | : | | | |
| Start-up dela | | | fixed 500 ms | (±20 %) | | | fixed 500 m | S |
| Tripping t _v | - 3 | ······ | fixed 150 ms | | at over-/ und | | fixed 500 | <u> </u> |
| | | | (±20 %) | | fixed 500 ms | (±20 %) | ms | |
| | f operational states | D | | | | | | |
| Relay status | | R: yellow LED | Only CM-PFS | out relay energ | | Dhasa | | ···• |
| Fault messaç | ye | F. Ied LED | Only CM-PFS | 5: J LPN8 | ase failure / 1 | I Phase se | equence error | |
| Output circu | iits | | | 1: | 3-14 | | 11-12/14 | 11 ₁₅ -12 ₁₆ / 14 ₁ 21 ₂₅ -22 ₂₆ / 24 |
| Kind of outpo | ut | | 1 n/o contac | t | | | 1 c/o | 2 c/o |
| Operating pr | incinle | | closed-circui | t principle 2) | ···• | | contact | contacts |
| Contact mate | | | AgCdO | - 6 | | ····· | . | AgNi allow, |
| | | | | | ···• | | ··•··· | Cd free |
| | tional voltage U _e | IEC/EN 60947-1 | 250 V | · | . | | | 250 V AC |
| | | imum switching current | - / - | | | | | |
| | vitching voltage | AO 10 / | 250 V AC, 25 | O V DC | | ·•····· | . | |
| (IEC/EN 609 | tional current I _e 47-5-1) | AC-12 (resistive) 230 V AC-15 (inductive) 230 V | 4 A | | | ••••• | | |
| , | - , | DC-12 (resistive) 24 V | 3 A | | . | | ··•··································· | |
| | | DC-12 (resistive) 24 V | 4 A | ••••• | | ••••• | ··•··································· | |
| Mechanical I | lifotimo | DO-13 (Inductive) 24 V | 2 A 30 x 10 ⁶ swit | china cyclos | ··· · | ••••• | ··•········ | ···• |
| | illetime itime (AC-12, 230 V, | 4 Δ) | 0.1 x 10° swit | . . | | • | | |
| | ting to achieve | n/c contact | 10 A fast-act | ing | | | | 6 A fast- acting |
| | ••• | n/o contact | | | | | | |
| | | V (Control Circuit Poting Codo) | B 300, CM-P | FS: B300, pile | ot duty general | purpose (250 | V, 4 A, cos pl | าi 0.75) |
| AC rating | | y (Control Circuit Rating Code) | | | | | | |
| | | max. rated operational voltage | 300 V AC | | | | | |
| AC rating (UL 508) | max. contir | | | | | | | |

¹⁾ Device with neutral monitoring: The external conductor voltage towards the neutral conductor is measured.

²⁾ Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

Three-phase monitoring relays Technical data

| Туре | | CM-PBE 1) | CM-PBE | CM-PVE 1) | CM-PVE | CM-PFE | CM-PFS |
|--|--|-----------------|-------------------|---|-----------------|--|--------------------|
| General data | | | | | | | |
| Dimensions (W x H x D) | | | | x 3.07 x 3.09 in | | | |
| Wojaht | | | | ım (0.89 x 3.07 | x 3.94 in) | | ···• |
| Weight Mounting | | see data shee | | ••••••••••••••••••••••••••••••••••••••• | | | |
| Mounting position | | any | 11 007 13) | •••••••• | | | |
| Degree of protection | housing / terminals | IP50 / IP20 | | ••••••••••••••••••••••••••••••••••••••• | | | |
| Electrical connection | | | | | | | |
| | and with wire end ferrule | 2 x 0.75-1.5 n | nm² (2 x 18-16 | AWG) | | | Same as |
| | | | | , | | ·· · ····· | CM-PSS.31, |
| fine-strand | without wire end ferrule | | , | * | | | see page 2/4 |
| | rigid | 2 x 0.75-1.5 n | nm² (2 x 18-16 | AWG) | | | |
| | | | | | | | |
| Stripping length | | 10 mm (0.39 | n) | ••••••••••••••••••••••••••••••••••••••• | | | Same as |
| Stripping length | | 10 11111 (0.39 | 11) | | | | CM-PSS.31, |
| | | | | | | | see page 2/4 |
| Tightening torque | | 0.6-0.8 Nm | | ••••••••••••••••••••••••••••••••••••••• | | | |
| Environmental data | | | | | | | |
| Ambient temperature range | operation / storage | -20+60 °C / | -40+85 °C | | | | |
| Environmental testing (IEC 68-2-30) | | 24 h cycle tim | | % rel., 96 h | | | - |
| Operational reliability (IEC 68-2-6) | | 6 g | | | | | - |
| Mechanical resistance (IEC 68-2-6) | | 10 g | | | | | - |
| Climatic category | IEC/EN 60721-3-3 | - | ~~ | | | | 3K3 |
| Damp heat, cyclic | IEC/EN 60068-2-30 IEC/EN 60255-21-1 | CM-PFS: 6 x | 24 h cycle, 55 | °C, 95 % RH | | ·· · ····· | Olasa 0 |
| Vibration, sinusoidal Shock | IEC/EN 60255-21-1 | - | | • | | | Class 2 Class 2 |
| Isolation data | IEG/EN 00233-21-2 | - | | | | | : Olass 2 |
| Rated insulation voltage U, | hotwoon ounnly | 400 V | | | | : | |
| (IEC/EN 60947-1, IEC/EN 60664-1) | between supply, measuring and output | 400 V | | | | - | |
| (120/214 000 17 1, 120/214 0000 1 1) | circuits | | | | | | |
| | supply circuit / | - | | ••••••••••••••••••••••••••••••••••••••• | | 600 V | |
| | output circuit | | | | | | |
| | output circuit 1 / | - | | • | | 300 V | |
| ····· | output circuit 2 | | | | | <u>.</u> | , |
| Rated impulse withstand voltage U _{imp} between all isolated circuits | | 4 kV / 1.2 - 50 |) µs | | | ·· . ····· | - |
| (VDE 0110, IEC 664) | supply circuit / output circuit | - | | | | | 6 kV |
| (100 004) | output circuit 1 / | - | | ••••••••••••••••••••••••••••••••••••••• | | | 4 kV |
| | output circuit 2 | | | | | | 7 10 |
| Basic insulation for rated control | supply circuit / output | - | | ••••••••••••••••••••••••••••••••••••••• | | ······································ | 600 V AC |
| supply voltage (IEC/EN 60664-1) | circuit | | | | | | |
| Protective seperation | supply circuit / output | - | | | | | n/a |
| (IEC/EN 61140, EN 50178) Test voltage (routine test) | circuit | 0.5.147.50.11- | 4 | | | ·· · ····· | |
| lest voltage (routine test) | oupply oirquit / | 2.5 kV, 50 Hz | ı min. | •••••• | | | 2.5 kV, 50 |
| | supply circuit / output circuit | - | | | | | Hz, 1 min. |
| | output circuit 1 / | - | | ••••••••••••••••••••••••••••••••••••••• | | | 2.5 kV, 50 |
| | output circuit 2 | | | | | | Hz, 1 min. |
| Pollution degree (IEC/EN 60664-1) | | 3 | | | | | |
| Overvoltage category (IEC/EN 60664-1) |) | III | | | | | |
| Standards | | | | | | | |
| Product standard | | IEC 255-6, EN | N 60255-6, CN | Л-PFS: IEC/EN | 60255-1, IEC | /EN 60255-27 | , EN 50178 |
| Low Voltage Directive | | 2006/95/EC | | | | | |
| EMC Directive | | 2004/108/EC | | | | | |
| RoHS Directive | | CM-PFS: 201 | 1/65/EC | | | | |
| Electromagnetic compatibility | | I EN LOUIS E | | 101000 | | | |
| Interference immunity to | IFO/FN 04000 1 2 | | | N 61000-6-1, E | N 61000-6-2 | | ···• |
| electrostatic discharge radiated, radio-frequency, | IEC/EN 61000-4-2 IEC/EN 61000-4-3 | Level 3 - 6 kV | | 3 V/m (2 GHz) / | 1 \//m /0 7 Cl | ⊣ ¬\ | |
| electromagnetic field | 1EU/EN 01000-4-3 | LEVELS - IU V | /III (I GHZ) / 3 | v/III (2 GH2) / | 1 V/III (2./ GF | 14) | |
| electromagnetic field electrical fast transient / burst | IEC/EN 61000-4-4 | Level 3 - 2 kV | / 5 kHz | •••••••••••• | | | ···• |
| surge | IEC/EN 61000-4-5 | | | | | | ····• |
| conducted disturbances, induced | IEC/EN 61000-4-6 | | | ••••••••••••••••••••••••••••••••••••••• | | | |
| by radio-frequency fields | _ | | | | | | |
| voltage dips, short interruptions | IEC/EN 61000-4-11 | - | | | | | Class 3 |
| and voltage variations | IEO/EN O/OOO : :- | | | | | | |
| harmonics and interharmonics | IEC/EN 61000-4-13 | - EN 01000 0 | 1 OM DEC 5 | 1.01000.0.0.5 | N 01000 0 1 | | Class 3 |
| | | - NI 63000 6 . | 1 1 N/L DEC: E | ハドコロロローピース ト | N 61000-6-4 | | |
| Interference emission high-frequency radiated | IEC/CISPR 22, EN 55022 | EN 61000-6-4 | +, OIVI-I I O. LI | V 01000-0-0, L | 11 01000 0 + | | Class B |

 $^{^{\}scriptsize 1)}$ Device with neutral monitoring: The external conductor voltage towards the neutral conductor is measured.

Three-phase monitoring relays Technical data

| Туре | | CM-PSS.31 | CM-PSS.41 | CM-PVS.31 | CM-PVS.41 | CM-PVS.81 | CM-PAS.31 | CM-PAS.41 |
|---|--|---|--------------------------------|--------------------------------|----------------------------------|--------------------------------|--------------------------------|-------------------------------|
| Input circuit = Measurin | | | | | L1, L2, L3 | | | |
| Rated control supply vo | Itage U _s = measuring voltage | 3x380 V AC | 3x400 V AC | 3x160- 300 V AC | 3x300- 500 V AC | 3x200- 400 V AC | 3x160- 300 V AC | 3x300- 500 V AC |
| Rated control supply vo | Itage U _s tolerance | -15+10 % | <u></u> | | | | | |
| Rated frequency | | 50/60 Hz | • | | | ···· | | .* |
| Frequency range | | 45-65 Hz | | | | ··· | | |
| Typical current / power of | consumption | 25 mA / 18 VA (380 V AC) | 25 mA / 18 VA (400 V AC) | 25 mA / 10 VA (230 V AC) | 25 mA / 18 VA (400 V AC) | 19 mA / 10 VA (300 V AC) | 25 mA / 10 VA (230 V AC) | 25 mA /18 VA (400 V AC) |
| Measuring circuit | | | • | • | L1, L2, L3 | - | • | • |
| Monitoring functions | Phase failure | - | • | | | • | | |
| | Phase sequence | can be switc | hed off | | .i | <u>i</u> | • | |
| | Automatic phase sequence correction | - | - | - | - | - | - | - |
| ***** | Over- / undervoltage | | | • | • | - | - | <u> </u> |
| | Phase unbalance | . - - | | - | | - | • | |
| | Neutral | | | _ | _ | _ | _ | = |
| Measuring range | Overvoltage | | 3x440 V AC | 3x220- 300 V AC | 3x420- 500 V AC | 3x300- 400 V AC | - | - |
| | Undervoltage | 3x342 V AC | 3x360 V AC | 3x160- 230 V AC | 3x300- 380 V AC | 3x210- 300 V AC | - | - |
| | Phase unbalance | - | - | - | - | - | 2-25 % of av | |
| Thresholds | Overvoltage | fixed | | | ithin measurii | | - | - |
| | Undervoltage | fixed | • | adjustable w | ıithin measuriı | ng range | - | - |
| | Phase unbalance (switch-off value) | - | - | - | - | - | adjust. withi range | n meas. |
| Hysteresis related to the threshold value | Over- / undervoltage Phase unbalance | fixed 5 % | · | | | | - fixed 20 % | |
| Rated frequency of the r | measuring signal | 50/60 Hz | | | = | - | ilixeu 20 % | |
| Frequency range of the Maximum measuring cy | cle time | 45-65 Hz 100 ms | | | | | | |
| Accuracy within the tem | control supply voltage tolerance perature range | $\Delta U \le 0.5 \%$ $\Delta U \le 0.06 \%$ | 6 / °C | | | | | |
| Measuring method | | True RMS | | | | | | |
| Timing circuit | | fired COO | | | | | | |
| Start-up delay t _s | ······ | fixed 200 ms | | | | <u>.</u> | | |
| Tripping delay t _v | | ON- or OFF- 0; 0.1-30 s a | delay djustable | | | | ON- delay 0; 0.1-30 s a | ıdjustable |
| Repeat accuracy (const | | - A+ 0 = 0/ | <u> </u> - | | | < ± 0.2 % | | <u>.</u> |
| Accuracy within the tem | control supply voltage tolerance | $\Delta t \le 0.5 \%$ $\Delta t \le 0.06 \%$ | / °C | | | | ••••• | |
| Indication of operational | I states | <u> </u> | <i>.</i> | 1 yellow LED |), 2 red LED's | | | |
| | | Details see for description / | | Details see | operating mod cription / -dia | de and | Details see t description | |
| Output circuits | | · | | 15 | -16/18, 25-26 | /28 | • | |
| Kind of output | | relay, 2 x 1 c | /o contact | | | | | |
| Operating principle | | closed-circu | it principle 1) | | | | | |
| Contact material | 150/FN 00047.4 | AgNi alloy, C | d free | | | ·· · ····· | | |
| Rated operational voltage | | 250 V | · | | | ···•··· | | |
| Minimum switching pow Maximum switching volt | rer tage | 24 V / 10 mA see "Load lir | nit curves" on | page 127 | · . | | | |

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

Three-phase monitoring relays Technical data

| Туре | CM-PSS.31 CM-PSS.41 CM-PVS.31 CM-PVS.41 CM-PVS.81 CM-PAS.31 CM-PAS.4 |
|--|--|
| Rated operational current I AC-12 (resistive) 230 \ | |
| (IEC/EN 60947-5-1) AC-12 (resistive) 230 V | |
| DC-12 (resistive) 24 V | |
| DC-12 (resistive) 24 V | |
| AC rating (UL 508) Utilization category (Contro | |
| Circuit Rating Code | |
| max. rated operational voltage | |
| max. continuous therma | |
| current at B 300 | |
| max. making/breaking | |
| apparent power at B 300 | |
| Mechanical lifetime | 30 x 10 ⁶ switching cycles |
| Electrical lifetime (AC-12, 230 V, 4 A) | 0.1 x 10° switching cycles |
| | t 6 A fast-acting |
| | ot 10 A fast-acting |
| · · · · · · · · · · · · · · · · · · · | ti To A last-acting |
| General data | |
| MTBF | on request |
| Duty time | 100% |
| Dimensions product dimensions | s 22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4.08 in) |
| | is 97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in) |
| Weight | depending on device, see ordering details |
| Mounting | DIN rail (IEC/EN 60715), snap-on mounting without any tool |
| Mounting position | any |
| Minimum distance to other horizonta | |
| units | > 400 V |
| Material of housing | UL 94 V-0 |
| Degree of protection housing / terminals | Is IP50 / IP20 |
| Electrical connection | |
| Wire size | Screw connection technology Easy Connect Technology (Push-in) |
| | |
| fine-strand with(out) wire end | d 1 x 0.5-2.5 mm² (1 x 20-14 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| ferrule | le 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| rigio | d 1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) |
| 9 ' | 2 x 0.5-2.5 mm ² (2 x 20-14 AWG) |
| Stripping length | 8 mm (0.32 in) |
| Tightening torque | 0.6-0.8 Nm (5.31-7.08 lb.in) - |
| Environmental data | |
| Ambient temperature ranges operation / storage | e -25+60 °C / -40+85 °C |
| Damp heat (IEC 60068-2-30) | 55 °C, 6 cycles |
| Climatic category | 3K3 |
| Vibration (sinusoidal) (IEC/EN 60255-21-1) | Class 2 |
| Shock (IEC/EN 60255-21-2) | Class 2 |
| | |
| | Oldoo Z |
| Isolation data | |
| Isolation data Rated insulation input circuit / output circuit | it 600 V |
| Isolation data Rated insulation voltage U _i input circuit / output circuit voltage U _i output circuit 1 / output circuit 2 | iit 600 V 2 300 V |
| Isolation data Rated insulation input circuit / output circuit voltage U, output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit | it 600 V 2 300 V it 6 kV; 1.2/50 μs |
| Isolation data Rated insulation input circuit / output circuit voltage U, output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit | it 600 V 2 300 V it 6 kV; 1.2/50 μs it 4 kV; 1.2/50 μs |
| Isolation data Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit U _{imp} (VDE 0110, IEC/EN 60664) output circuit Input | it 600 V 2 300 V it 6 kV; 1.2/50 µs it 4 kV; 1.2/50 µs 2.5 kV 50 Hz, 1.s |
| Isolation data Rated insulation Input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage Input circuit 2 Input circuit 2 Output circuit 2 Output circuit 3 Output circuit 4 Output circuit 5 Output circuit 6 Output circuit 6 Output circuit 7 Output Circ | it 600 V 2 300 V it 6 kV; 1.2/50 µs it 4 kV; 1.2/50 µs 2.5 kV 50 Hz, 1.s |
| Isolation data Rated insulation Input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage Input circuit 2 Input circuit 2 Output circuit 2 Output circuit 3 Output circuit 4 Output circuit 5 Output circuit 6 Output circuit 6 Output circuit 7 Output Circ | iit 600 V 2 300 V iit 6 kV; 1.2/50 µs iit 4 kV; 1.2/50 µs 2.5 kV, 50 Hz, 1 s iit 600 V |
| Isolation data Rated insulation input circuit / output circuit voltage U, output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 Uimp (VDE 0110, IEC/EN 60664) output circuit 2 Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit | iit 600 V 2 300 V iit 6 kV; 1.2/50 µs iit 4 kV; 1.2/50 µs 2.5 kV, 50 Hz, 1 s iit 600 V |
| Isolation data Rated insulation input circuit / output circuit voltage U, output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit U imp (VDE 0110, IEC/EN 60664) output circuit 2 Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit / routput circuit / output / output circuit / out | iit 600 V 2 300 V iit 6 kV; 1.2/50 µs iit 4 kV; 1.2/50 µs 2.5 kV, 50 Hz, 1 s iit 600 V |
| Isolation data Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit U _{imp} (VDE 0110, IEC/EN 60664) output circuit Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit | it 600 V 2 300 V it 6 kV; 1.2/50 µs it 4 kV; 1.2/50 µs 2.5 kV, 50 Hz, 1 s it 600 V |
| Isolation data Rated insulation voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) | it 600 V 2 300 V (it 6 kV; 1.2/50 µs (it 4 kV; 1.2/50 µs 2.5 kV, 50 Hz, 1 s (600 V 7 7 7 7 7 7 7 7 7 |
| Isolation data Rated insulation output circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards | it 600 V 2 300 V (it 6 kV; 1.2/50 μs (it 4 kV; 1.2/50 μs 2.5 kV, 50 Hz, 1 s (it 600 V (it 4 kV; 1.2/50 μs 2.5 kV, 50 Hz, 1 s (it 600 V (it 4 kV; 1.2/50 μs (it 6 kV; 1.2/50 μs (it |
| Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 input circuit 2 input circuit 3 input circuit 4 input circuit 4 input circuit 5 input circuit 6 input circuit 7 input circuit 7 input circuit 8 input circuit 9 input circuit 9 input circuit 9 input circuit 9 input circuit 1 input circuit 2 input circuit 2 input circuit 3 input circuit 4 | it 600 V 2 300 V (it 6 kV; 1.2/50 μs (it 4 kV; 1.2/50 μs 2.5 kV, 50 Hz, 1 s (600 V 7 7 7 7 7 1 1 1 1 1 |
| Isolation data Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 input circuit 2 input circuit 3 output circuit 4 output circuit 4 output circuit 5 output circuit 6 output circuit 7 output circuit 7 output circuit 8 Basic insulation input circuit 7 output circuit 9 output circuit 9 output circuit 10 output 10 | iit 600 V 2 300 V |
| Isolation data Rated insulation Input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage Input circuit 2 Input circuit 2 Input circuit 3 Output circuit 4 Output circuit 4 Output circuit 5 Output circuit 6 Output circuit 7 Output circuit 7 Output circuit 8 Pasic insulation Input circuit 7 Output circuit 9 Protective separation (VDE 0106 Input circuit 9 Input circuit 1 Output circuit 9 Output circuit 1 Output circuit 2 Output circuit 3 Output circuit 3 Output circuit 3 Output circuit 3 Output circuit 4 Output circuit 4 Output circuit 5 Output circuit 6 Output circuit 6 Output circuit 7 Output circuit 6 Output circuit 7 Output circuit 6 Output circuit 7 | iit 600 V 2 300 V |
| Isolation data Rated insulation output circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive RoHS directive | iit 600 V 2 300 V |
| Isolation data Rated insulation output circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive RoHS directive Electromagnetic compatibility | iit 600 V 2 300 V 300 |
| Isolation data Rated insulation output circuit / output circuit voltage U, output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit 2 Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive RoHS directive Electromagnetic compatibility Interference immunity to | it 600 V 2 300 V 300 V |
| Isolation data Rated insulation output circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit Test voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit Protective separation (VDE 0106 input circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive RoHS directive Electromagnetic compatibility Interference immunity to electrostatic discharge IEC/EN 61000-4-2 | it 600 V 2 300 V 300 V |
| Isolation data Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit 7 Rest voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit 7 Protective separation (VDE 0106 input circuit 9 part 101 and 101/A, IEC/EN 1140) output circuit 9 Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive Electromagnetic compatibility Interference immunity to electrostatic discharge IEC/EN 61000-4-2 radiated, radio-frequency, IEC/EN 61000-4-2 | it 600 V 2 300 V 300 V |
| Rated insulation | it 600 V 2 300 V 300 |
| Isolation data Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit 7 Rest voltage between all isolated circuits (routine test) Basic insulation input circuit / output circuit 7 Protective separation (VDE 0106 input circuit 9 part 101 and 101/A, IEC/EN 1140) output circuit 9 Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive Electromagnetic compatibility Interference immunity to electrostatic discharge IEC/EN 61000-4-2 radiated, radio-frequency, IEC/EN 61000-4-2 | it 600 V 2 300 V 300 |
| Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 input circuit 3 input circuit 3 input circuit 4 input circuit 5 input circuit 6 input circuit 7 input circuit 7 input circuit 7 input circuit 8 input circuit 9 input circuit | it 600 V 2 300 V 300 |
| Isolation data Rated insulation input circuit / output circuit voltage U ₁ output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit 2 Basic insulation input circuits (routine test) Basic insulation input circuit / output circuit part 101 and 101/A, IEC/EN 1140) output circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive RoHS directive Electromagnetic compatibility Interference immunity to electrostatic discharge IEC/EN 61000-4-2 radiated, radio-frequency, electromagnetic field electrical fast transient / burst surge IEC/EN 61000-4-2 | it 600 V 2 300 V 300 V |
| Isolation data Rated insulation input circuit / output circuit voltage U output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 Uimp (VDE 0110, IEC/EN 60664) output circuit 2 Output circuit 3 Output circuit 4 Output circuit 5 Output circuit 6 Output circuit 7 Output circuit 8 Output circuit 9 Output circuit 9 Output circuit 9 Output circuit 1 Output circuit 2 Output circuit 3 Output circuit 2 Output circuit 2 Output circuit 2 Output circuit 3 Output circuit 3 Output circuit 3 Output circuit 4 Output circuit 3 Output circuit 4 Output circuit 3 Output circuit 4 Output circuit 5 Output circuit 6 Output circuit 6 Output circuit 6 Output circuit 7 Output circuit 6 Output circuit 6 Output circuit 7 | it 600 V 2 300 V 300 V |
| Isolation data Rated insulation input circuit / output circuit voltage U output circuit 1 / output circuit 2 Rated impulse withstand voltage input circuit 2 U _{imp} (VDE 0110, IEC/EN 60664) output circuit 2 Basic insulation input circuits (routine test) Basic insulation input circuit / output circuit part 101 and 101/A, IEC/EN 1140) output circuit part 101 and 101/A, IEC/EN 1140) output circuit Pollution degree (VDE 0110, IEC/EN 60664) Overvoltage category (VDE 0110, IEC 60664) Standards Product standard Low Voltage Directive EMC directive RoHS directive Electromagnetic compatibility Interference immunity to electrostatic discharge IEC/EN 61000-4-2 radiated, radio-frequency, electromagnetic field electrical fast transient / burst surge IEC/EN 61000-4-2 EIEC/EN 61000-4-2 EIEC | it 600 V 2 300 V 300 V |
| Isolation data | it 600 V 2 300 V 300 V |
| Isolation data Rated insulation Input circuit / output circuit voltage U Output circuit 1 / output circuit 2 Rated impulse withstand voltage Input circuit 2 Input circuit 2 Input circuit 2 Input circuit 3 Input circuit 4 Output circuit 4 Output circuit 5 Input circuit 6 Input circuit 7 Output circuit 7 Input circuit 8 Input circuit 8 Input circuit 8 Input circuit 9 | it 600 V 2 300 V 300 V |
| Rated insulation | it 600 V 2 300 V 300 V |

Three-phase monitoring relays Technical data

| Туре | | CM-MPS.11 | CM-MPS.21 | CM-MPS.31 | CM-MPS.41 | |
|---|---|--|---|----------------------------------|----------------------------------|--|
| Input circuit = Measuring circuit | | L1, L2, L3, N L1, L2, L3 | | | | |
| Rated control supply voltage U _s = measuring voltage | | 3x90-170 V AC | 3x180-280 V AC | 3x160-300 V AC | 3x300-500 V AC | |
| Rated control supply voltage U _s tolerance | | I-15+10 % | | | | |
| Rated frequency | | 50/60 Hz | | | | |
| Frequency range | | 45-65 Hz | | | | |
| Typical current / power consumption | | 25 mA / 10 VA (115 V AC) | 25 mA / 18 VA (230 V AC) | 25 mA / 10 VA (230 V AC) | 25 mA / 18 VA (400 V AC) | |
| Measuring circuit | | L1, L2 | , L3, N | L1, | L2, L3 | |
| Monitoring functions | Phase failure | | • | • | • | |
| | Phase sequence Automatic phase sequence correction Over- / undervoltage | - | - | | | |
| | 6 | | | • | • | |
| | Phase unbalance | | • | • | • | |
| | Interrupted neutral | • | • | - | - | |
| Measuring range | Undervoltage | 3x120-170 V AC 3x90-130 V AC 2-25 % of average of | 3x240-280 V AC 3x180-220 V AC of phase voltages | 3x220-300 V AC 3x160-230 V AC | 3x420-500 V AC 3x300-380 V AC | |
| Thresholds Overvoltage Undervoltage | | adjustable within measuring range adjustable within measuring range | | | | |
| Hysteresis related to the threshold value | Over- / undervoltage Phase unbalance | | | | | |
| Rated frequency of the measuring signal Frequency range of the measuring signal Maximum measuring cycle time | | 50/60 Hz 45-65 Hz 100 ms | | | | |
| Accuracy within the rated control supply voltage tolerance Accuracy within the temperature range Measuring method | | ΔU ≤ 0.5 % ΔU ≤ 0.06 % / °C True RMS | | | | |
| Timing circuit | | True mivio | | | | |
| Start-up delay t _s | | fixed 200 ms | | | | |
| Tripping delay t, | • | ON- or OFF-delay 0; 0.1-30 s adjustable | | | | |
| 11 0 7 7 | | | | | | |
| Accuracy within the rated control supply voltage tolerance Accuracy within the temperature range Indication of operational states | | Δt ≤ 0.5 % Δt ≤ 0.06 % / °C Details see function description / -diagrams | | | | |
| Output circuits | | 15-16/18, 25-26/28 | | | | |
| Kind of output | | relay, 1 x 2 c/o contacts | | | | |
| Operating principle | | closed-circuit principle 1) | | | | |
| Contact material | | AgNi alloy, Cd free | | | | |
| Rated operational voltage U _e (IEC/EN 60947-1) | | 250 V | | | | |
| Minimum switching power Maximum switching voltage | | 24 V / 10 mA see "Load limit curves" on page 127 | | | | |
| Rated operational current I AC-12 (resistive) 230 V | | 4 A | | | | |
| (IEC/EN 60947-5-1) AC-12 (resistive) 230 V | | | | | | |
| , | DC-12 (resistive) 24 V | 4 A | | | | |
| | DC-13 (inductive) 24 V | 2 A | | | | |
| AC rating (UL 508) | Utilization category (Control Circuit Rating Code) | | | | | |
| | max. rated operational voltage | 300 V AC | | | | |
| | max. continuous thermal current at B 300 max. making/breaking apparent power at B 300 | 5 A 3600/360 VA | | | | |
| Mechanical lifetime | | 30 x 10 ⁶ switching cycles | | | | |
| Electrical lifetime (AC-12, 230 V, 4 A) | | 0.1 x 10 ⁶ switching cycles | | | | |
| Max. fuse rating to achie | 6 A fast-acting | 6 A fast-acting | | | | |
| protection | n/o contact | 10 A fast-acting | | | | |

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

Three-phase monitoring relays Technical data

| Туре | | CM-MPS.11 | CM-MPS.21 | CM-MPS.31 | CM-MPS.41 |
|---|--|--|----------------------|--|---|
| General data | | | | • | • |
| MTBF | | on request | | | |
| Duty time | | 100% | | • | • |
| Dimensions (W x H x D) | product dimensions | 22.5 x 85.6 x 103.7 | mm (0.89 x 3.37 x 4 | .08 in) | • |
| | ackaging dimensions | | * | *************************************** | • |
| Weight | | , | , | Easy Connect Ted | hnology (Push-in) |
| | net weight | depending on devic | | | |
| | gross weight | depending on device | e, see ordering deta | ils | • |
| Mounting | | DIN rail (IEC/EN 607 | 15), snap-on mount | ing without any tool | • |
| Mounting position | ······································ | any | | | • |
| Minimum distance to other units | horizontal | 10 mm (0.39 in) in ca | ase of continuous m | easuring voltages | • |
| | | > 120 V | | | > 400 V |
| Material of housing | | UL 94 V-0 | | | |
| Degree of protection | housing / terminals | IP50 / IP20 | | | |
| Electrical connection | | | | | |
| Wire size | n(out) wire end ferrule | Screw connect | ion technology | Easy Connect Ted 2 x 0.5-1.5 mm ² (2 x | chnology (Push-in) |
| iiie-stialiu witi | Moarl wire end lettule | 2 x 0.5-1.5 mm ² (2 x | 20-14 AWG) | 2 A U.U-1.U IIIII (2) | (20-10 AVVG) |
| | rigid | 1 x 0.5-4 mm ² (1 x 2 | 0-12 AWG) | 2 x 0.5-1.5 mm² (2 x | (20-16 AWG) |
| | | 2 x 0.5-2.5 mm ² (2 x | 20-14 AWG) | | • |
| Stripping length Tightening torque | | 8 mm (0.32 in) 0.6-0.8 Nm (5.31-7.0 |)8 lh in) | : _ | |
| Environmental data | | 0.0-0.0 14111 (0.01-7.0 | 00 10.111) | <u>: </u> | |
| Ambient temperature ranges | operation / storage | -25+60 °C / -40 | +85 °C | | |
| Damp heat (IEC 60068-2-30) | | 55 °C, 6 cycles | | • | |
| Climatic category | | 3K3 | | | |
| Vibration (sinusoidal) (IEC/EN 60255-21-1) Shock (IEC/EN 60255-21-2) | | Class 2 Class 2 | | • | |
| Isolation data | | Oldoo Z | | | |
| | circuit / output circuit | 600 V | | | |
| | uit 1 / output circuit 2 | | | • | |
| Rated impulse withstand voltage U _{imp} | | 6 kV; 1.2/50 μs | | • | • |
| (VDE 0110, IEC/EN 60664) | | 4 kV; 1.2/50 μs | | • | • |
| Test voltage between all isolated circuits (rou | · · | 2.5 kV, 50 Hz, 1 s | | • | |
| | circuit / output circuit | | | • | |
| Protective separation (VDE 0106 part | input circuit / output | | | | |
| 101 and 101/A, IEC/EN 61140) | circuit | yes | | - | |
| Pollution degree (VDE 0110, IEC/EN 60664) | 0.104.1 | 3 | | <u>:</u> | • |
| Overvoltage category (VDE 0110, IEC 60664) | | III | | | |
| Standards | | | | | |
| Product standard | | IEC/EN 60255-1, EN | 1 50178 | ••••• | *************************************** |
| Low Voltage Directive | | 2006/95/EC | | | |
| EMC directive | | 2004/108/EC | | | |
| RoHS directive | • | 2011/65/EC | | | |
| Electromagnetic compatibility | | | | | |
| Interference immunity to | | EN 61000-6-1, EN 6 | | | •••• |
| electrostatic discharge | IEC/EN 61000-4-2 | . | | | |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3 (10 V/m) | | | |
| electrical fast transient / burst | IEC/EN 61000-4-4 | Level 3 (2 kV / 2 kHz | <u></u>) | • | • |
| surge | IEC/EN 61000-4-5 | Level 4 (2 kV L-L) | | • | ••••• |
| conducted disturbances, | IEC/EN 61000-4-6 | Level 3 (10 V) | | | |
| induced by radio-frequency fields harmonics and interharmonics | IEC/EN 61000-4-13 | Class 3 | | | |
| Interference emission | 1LU/LIN 01000-4-13 | EN 61000-6-3, EN 6 | 31000-6-4 | ••••• | |
| | EC/CISPR 22, EN 55022 | Class B | | | |
| high-frequency conducted | C/CISPR 22, EN 55022 | Class B | | | |

Three-phase monitoring relays Technical data

| Туре | CM-MPS.23 | CM-MPS.43 | CM-MPN.52 | CM-MPN.62 | CM-MPN.72 |
|--|-----------------------------|---------------------------|-----------------------------|--|--|
| Input circuit = Measuring circuit | L1, L2, L3, N | | L1, l | L2, L3 | - |
| Rated control supply voltage U _S = measuring voltage | 3x180-280 V AC | 3x300-500 V AC | 3x350-580 V AC | 3x450-720 V AC | 3x530-820 V AC |
| Rated control supply voltage U _s tolerance | -15+10 % | .4 | .4 | .4* | .4.1.7.19 |
| Rated frequency | 50/60/400 Hz | ••••• | 50/60 Hz | ······································ | ····· |
| Frequency range | 45-440 Hz | •••••• | 45-65 Hz | •••••• | •••• |
| Typical current / power consumption | 5 mA / 4 VA (230 V AC) | 5 mA / 4 VA (400 V AC) | 29 mA / 41 VA (480 V AC) | 29 mA / 52 VA (600 V AC) | 29 mA / 59 VA (690 V AC) |
| Measuring circuit | L1, L2, L3, N | | | L2, L3 | |
| Monitoring functions Phase failur Phase sequence Automatic phase sequence correction | 9 ■ | • | • | • | • |
| Phase sequence | e can be switche | ed off | ···· | ····· | ····· |
| | | | | | |
| Over- / undervoltag | | • | | | • |
| Phase unbalance | | • | | • | • |
| Interrupted neutra | | - 400 500 | - 400 500 | - 000 700 | - |
| Measuring range Overvoltage | 3x240-280 V AC | 3x420-500 V AC | 3x480-580 V AC | 3x600-720 V AC | 3x690-820 V AC |
| Undervoltage | 3x180-220 | 3x300-380 | 3x350-460 | 3x450-570 | 3x530-660 |
| Ondervoltage | V AC | V AC | V AC | V AC | V AC |
| Phase unbalance | | | tages | | |
| Thresholds Overvoltage | | nin measuring ra | nae | ······································ | ······································ |
| Undervoltage | e adjustable with | nin measuring ra | nge | ····· | ····· |
| Phase unbalance (switch-off value | adjustable with | nin measuring ra | nge | | |
| Hysteresis related to Over- / undervoltage | elfixed 5 % | | 9 | •••••• | ••••••• |
| the threshold value Phase unbalance | e fixed 20 % | •••••• | •••••• | •••••• | •••• |
| Rated frequency of the measuring signal | 50/60/400 Hz | •••• | 50/60 Hz | •••• | •••• |
| Frequency range of the measuring signal | 45-440 Hz | | 45-65 Hz | | |
| Maximum measuring cycle time | 100 ms | | | | |
| Accuracy within the rated control supply voltage tolerance | Δ U ≤ 0.5 % | | | | |
| Accuracy within the temperature range | ΔU ≤ 0.06 % / | ′ °C | ····· | ····· | ····· |
| Measuring method | True RMS | | | | |
| Timing circuit | | | | | |
| Start-up delay t _s and t _{s2} | fixed 200 ms | | | | |
| Start-up delay t _s , | fixed 250 ms | | | | |
| Tripping delay t, | | elay 0; 0.1-30 s a | diuetable | ····· | ······ |
| | | siay 0, 0.1-00 3 a | | | |
| Accuracy within the rated control supply voltage tolerance | $\Delta t \leq 0.5 \%$ | | | | |
| Accuracy within the temperature range | $\Delta t \leq 0.06 \% /$ | °C | | ······ | ····· |
| Indication of operational states | Details see fun | ction description | | | |
| Output circuits | | | 15-16/18, 25-26/ | 28 | |
| Kind of output | relay, 2 x 1 or | 1 x 2 c/o contact | ts configurable | | |
| Operating principle | | | | · | |
| Contact material | AgNi alloy, Cd 1 250 V | iree | | | |
| Rated operational voltage U _e IEC/EN 60947- | | | | | |
| Minimum switching power | 24 V / 10 mA | h a | - 107 | | |
| Maximum switching voltage | | t curves" on pag | e 12 <i>1</i> | | |
| Rated operational current I _e AC-12 (resistive) 230 \((IEC/EN 60947-5-1) AC-15 (inductive) 230 \((IEC/EN 60 | | ··•···· | | · ···· | · ··· |
| DC-12 (resistive) 24 \(\) | | | | | |
| DC-12 (resistive) 24 V | | | | | |
| AC rating (UL 508) Utilization categor | | | ••••• | •••••• | |
| (Control Circuit Rating Code | | | | | |
| max. rated operational voltage | 300 V AC | | ····· | ····· | ····· |
| max. continuous thermal current at B 300 | | | •••••• | •••••• | |
| max. making/breaking apparent power at B 30 | 3600/360 VA | •••••• | | ······································ | |
| Mechanical lifetime | 30 x 106 switch | ning cycles | | | |
| Electrical lifetime (AC-12, 230 V, 4 A) | 0,1 x 10 ⁶ switc | hing cycles | | | |
| Max. fuse rating to achieve short- n/c contact | | | 10 A fast-actin | g | |
| circuit protection n/o contact | t 10 A fast-actin | g | | | |

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

Three-phase monitoring relays Technical data

| Туре | | CM-MPS.23 | CM-MPS.43 | CM-MPN.52 | CM-MPN.62 | CM-MPN.72 |
|--|---------------------------|---|-------------------|---|------------------|---|
| General data | | • | | • | | - |
| MTBF | | on request | | | | |
| Duty time | | 100% | | | | |
| Dimensions (W x H x D) <u>product din</u> packaging din | | 22.5 x 85.6 x 10 97 x 109 x 30 m | ım (3.82 x 4.29 x | x 1.18 in) | | |
| Weight | | depending on d | | | | |
| Mounting | | DIN rail (IEC/EN | 60715), snap-o | n mounting wit | hout any tool | |
| Mounting position Minimum distance to other units vertical / h | orizontal | any | not nooncory | ••••••••••• | | ••••• |
| Material of housing | Ulizulitai | not necessary / UL 94 V-0 | HOL HECESSALY | *************************************** | | • |
| Degree of protection housing / t | erminals | IP50 / IP20 | | *************************************** | | •••••• |
| Electrical connection | | | | - | | |
| Wire size | | Screw connec | tion technology | Easy C | onnect Technol | ogy (Push-in) |
| fine-strand with(out) wire en | nd ferrule | | | | mm² (2 x 20-16 . | AWG) |
| | | 2 x 0.5-1.5 mm ² | (2 x 20-16 AWG | à) | | |
| | rigid | 1 x 0.5-4 mm ² (| 1 x 20-12 AWG) | 2 x 0.5-1.5 | mm² (2 x 20-16 | AWG) |
| Stripping length | | 2 x 0.5-2.5 mm ² 8 mm (0.32 in) | (2 X 20-14 AVVC | 2) | | |
| Tightening torque | | 0.6-0.8 Nm (5.3 | 1-7.08 lb.in) | • | _ | |
| Environmental data | | | | · | | |
| Ambient temperature ranges operation | / storage | -25+60 °C / -4 | 10+85 °C | | | |
| Damp heat (IEC 60068-2-30) | | 55 °C, 6 cycles | | | | |
| Climatic category | | 3K3 | | | | • |
| Vibration (sinusoidal) (IEC/EN 60255-21-1) | | Class 2 | | | | |
| Shock (IEC/EN 60255-21-2) | | Class 2 | | | | |
| Isolation data | / + + | 0001/ | | : 1000 \/ | | |
| Rated insulation voltage U _i input circuit | circuit | 600 V | | 1000 V | | |
| output circ | | 300 V | | <u>i</u> | | ••••• |
| | | 6 kV; 1.2/50 μs | | 8 kV; 1.2/50 լ | IS | ••••• |
| (VDE 0110, IEC/EN 60664) outp | ut circuit | 4 kV; 1.2/50 μs | | | | |
| Test voltage (routine isolated outpu | t circuits | 2.5 kV, 50 Hz, 1 | S | | | |
| test) between input circuit and isolated outpu | t circuits | 2.5 kV, 50 Hz, 1 | S | 4 kV, 50 Hz, 1 | S | |
| Basic insulation input circuit / outp | | 600 V | | 1000 V | | |
| | t circuit / ut circuit | - | | | | |
| Pollution degree (VDE 0110, IEC/EN 60664) | ut circuit | 3 | | ••••••••••••••••••••••••••••••••••••••• | | ••••• |
| Overvoltage category (VDE 0110, IEC 60664) | | iii | | ••••••••••••••••••••••••••••••••••••••• | | ••••• |
| Standards | | | | - | | |
| Product standard | | IEC/EN 60255-1 | , EN 50178 | | | |
| Low Voltage Directive | | 2006/95/EC | | | | ••••• |
| EMC directive | | 2004/108/EC | | | | |
| RoHS directive | | 2011/65/EC | | | | |
| Electromagnetic compatibility | | EN 04000 0 : - | -N. 04000 0 5 | | | |
| Interference immunity to electrostatic discharge IEC/EN 61 | 1000 4.0 | EN 61000-6-1, E Level 3 (6 kV / 8 | | <u></u> | | |
| electrostatic discharge IEC/EN 61 radiated, radio-frequency, IEC/EN 61 | | | | | | |
| electromagnetic field | | (10 v/111) | | | | |
| electrical fast transient / burst IEC/EN 61 | 000-4-4 | Level 3 (2 kV / 2 | ! kHz) | | | |
| surge IEC/EN 61 | 000-4-5 | | Level 4 (2 kV L- | L) | | |
| conducted disturbances, induced by IEC/EN 61 | 000-4-6 | | | ••••••• | | • |
| radio-frequency fields | | , , | | | | |
| harmonics and interharmonics IEC/EN 610 | 000-4-13 | Class 3 | | | | |
| Interference emission | NI EEOOO | EN 61000-6-3, I | EN 61000-6-4 | | | |
| high-frequency radiated IEC/CISPR 22, E | | | | | | |
| high-frequency conducted IEC/CISPR 22, E | IN 55022 | Ciass B | | | | |

Grid feeding monitoring relays -Voltage and frequency monitoring functions Product group picture



Grid feeding monitoring relays -Voltage and frequency monitoring functions Table of contents

Grid feeding monitoring relays - Voltage and frequency monitoring functions

| Benefits and advantages, operating controls | 2/51 |
|---|------|
| Applications | 2/52 |
| Applications, connection diagram | 2/53 |
| Ordering and selection | 2/54 |
| Technical data - CM-UFD.Mxx | 2/55 |

Grid feeding monitoring relays -Voltage and frequency monitoring functions Benefits and advantages, operating controls

Characteristics for all CM-UFD devices

- Monitoring of voltage and frequency in single- and threephase mains 2-wire, 3-wire or 4-wire
- Over- and undervoltage, 10 minutes average value as well as over- and underfrequency monitoring
- Two-level threshold settings for over-/undervoltage and frequency
- Multiline, backlit LCD display
- All threshold values adjustable as absolute values
- True RMS measuring principle
- High measurement accuracy
- 3 control inputs for remote trip, feedback signal, and external signal
- Interrupted neutral detection
- Error memory for up to 99 entries (incl. cause of error, measured value, relative timestamp)
- Test function
- Password setting protection
- 3 c/o (SPDT) contacts
- LEDs for the indication of operational states

Characteristics CM-UFD.M22

- ROCOF (rate of change of frequency) monitoring, configurable
- Third party certificate confirming accordance with CEI 0-21
- Pre-setting according to CEI 0-21

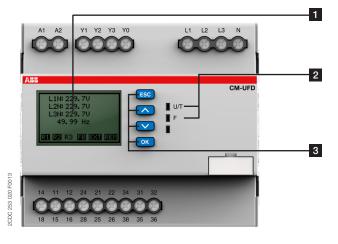
Characteristics CM-UFD.M31

- ROCOF (rate of change of frequency) monitoring and vector shift detection, configurable
- Third party certificate confirming accordance with VDE-AR-N 4105 and BDEW
- Pre-settings according to VDE-AR-N 4105 and BDEW

Characteristics CM-UFD.M33

- ROCOF (rate of change of frequency) monitoring and vector shift detection, configurable
- Factory certificate confirming accordance with Engineering Recommendation G59 Issue 3 - September 2013; Engineering Recommendation G83 Issue 2 - December 2012
- Pre-setting according to G59/3 LV + G83/2 HV
- UL 508, CAN/CSA C22.2 No.14

CM-UFD.Mxx



1 Display

R1 R2 R3 - relay status; in this case R3 is de-energized FB - status feedback loop Y0-Y1; in this case FB is closed EXT - status input external signal; in this case input is closed REM - status remote trip input; in this case input is closed

2 Indication of operational states

U/T: green LED - supply voltage applied / flashing = timing active F: red LED - failure

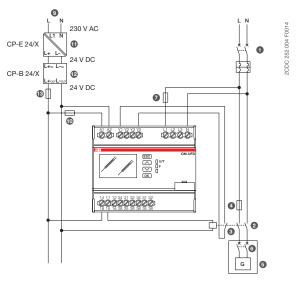
3 Keypad

ESC: escape / return to previous menu

↑: up / value increase V: down / value decrease OK: enter / confirm selection

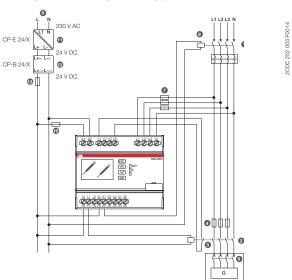
Grid feeding monitoring relays -Voltage and frequency monitoring functions **Applications**

Example of single-phase application CM-UFD.M22



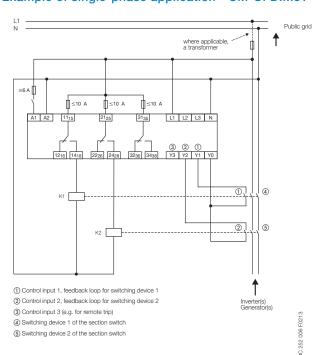
- 1. Main circuit breaker DG or DGL
- 2. DDI: Automatic circuit breaker or contactor equipped with low voltage coil and motor for automatic closure
- 3. Auxiliary contact of DDI, necessary for realizing the feedback function (compulsory for CM-UFD.M22)
- 4. DDI short-circuit protection
- 5. Generator and/or inverter
- 6. Generator (DDG)
- 7. Protection fuse for the measuring circuit of the CM-UFD.M22 (optional)
- 8. Shunt trip coil for feedback function (P>20 kW). This coil can control DG/DGL or

Example of three-phase application CM-UFD.M22

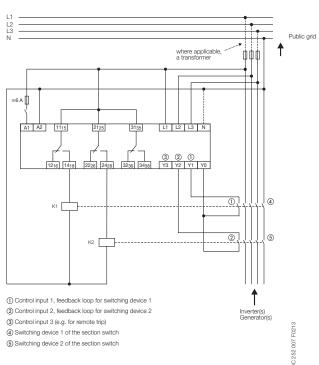


- 9. Control supply voltage for CM-UFD.M22 (SPI) and tripping device (DDI)*
- 10. Device protection fuse for the CM-UFD.M22
- 11. Primary switch mode power supply unit CP-E (230 V AC / 24 V DC) for the buffer module CP-B*
- 12. Ultra-capacitor based buffer module CP-B (24 V DC in/out)
- 13. Wire protection fuse for the output of the buffer module CP-B * in accordance to CEI 0-21 regulation, in case of loss of control supply voltage it's asked to guarantee, at least for 5 seconds, the functionality of the CM-UFD.M22, the operability of the DDI and when present the command coil for operating the redundancy device. This function has to be realized by external buffer or UPS devices.

Example of single-phase application - CM-UFD.M31

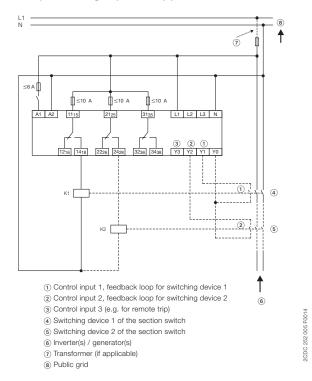


Example of three-phase application - CM-UFD.M31

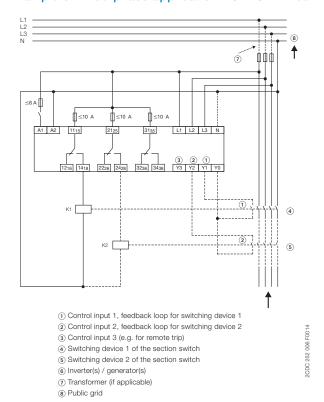


Grid feeding monitoring relays -Voltage and frequency monitoring functions Applications, connection diagram

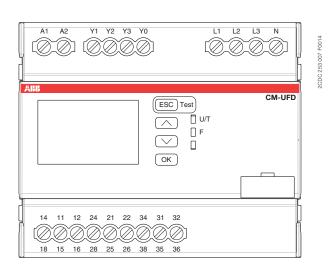
Example of single-phase application - CM-UFD.M33



Example of three-phase application - CM-UFD.M33



Electrical connection - CM-UFD.Mxx



A1-A2 L1, L2, L3, N Y1-Y0 Y2-Y0 Y3-Y0

 11_{15} -12_{16} $/14_{18}$ 21,5-22,6/24,8

31₃₅-32₃₆/34₃₈

Control supply voltage U Measuring inputs

Control input 1: Feedback from switching device 1 Control input 2: Feedback from switching device 2 Control input 3: Remote trip, suppress Y1, suppress Y2, suppress Y1/Y2 or suppress vector shift detection Output relay 1: Relay for tripping switching device 1 of the section switch, closed-circuit principle
Output relay 2: Relay for tripping switching device 2 of the section switch, closed-circuit principle Output relay 3: Closing command for circuit breaker motor, configuration possibilities: closed-circuit principle, open-circuit principle, disabled or synchronous with R1/R2

Grid feeding monitoring relays -Voltage and frequency monitoring functions Ordering and selection



Description

Only reliable and continuous monitoring of a three-phase network guarantees the trouble-free and economic operation of machines and installations.

Ordering details

| Rated control supply voltage = measuring voltage | | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--|-----------|-------------------|----------------|------------------------------|
| 24-240 V AC/DC | CM-UFD.M2 | 2 1SVR560730R3400 | | 0.225 (0.496) |
| 24-240 V AC/DC | CM-UFD.M3 | 1 1SVR560730R3401 | | 0.225 (0.496) |
| 24-240 V AC/DC | CM-UFD.M3 | 3 1SVR560730R3402 | | 0.304 (0.670) |

| Order number | 1SVR560730R3400 | 1SVR560730R3401 | 1SVR560730R3402 |
|---|-----------------|-----------------|-----------------|
| AV. | CM-UFD.M22 | CM-UFD.M31 | CM-UFD.M33 |
| Rated control supply voltage U _s | | | |
| 24-240 V AC/DC | | • | • |
| Standard | | , | |
| VDE AR-N 4105, BDEW G59/3 CEI 0-21 | | • | • |
| Rated frequency | • | | |
| DC or 50/60 Hz | • | • | • |
| Suitable for monitoring | | • | |
| Single-phase mains | - | • | • |
| Three-phase mains | • | • | • |
| Monitoring function | | | |
| Over-/undervoltage | - | • | • |
| Over-/underfrequency | • | • | • |
| ROCOF (rate of change of frequency) | • | • | • |
| 10 minutes average value | • | • | • |
| Vector shift | | • | • |
| Thresholds | adj | adj | adj |

Technical data

Data at Ta = 25 °C and rated values, unless otherwise indicated

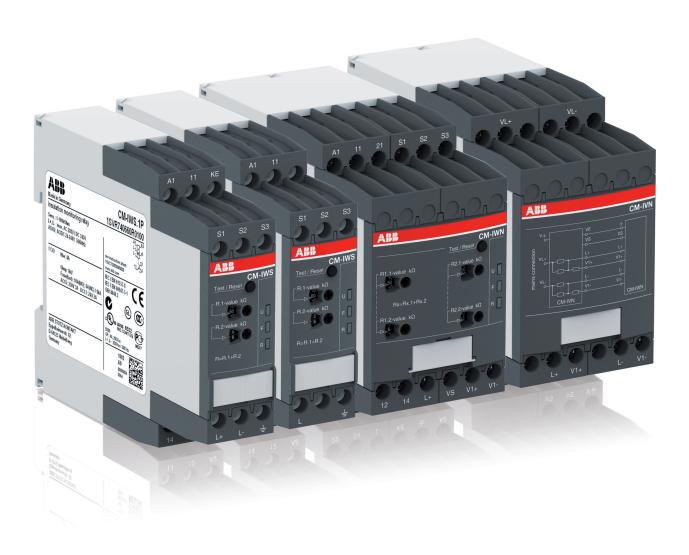
| Туре | | CM-UFD.M22 | CM-UFD.M31 | CM-UFD.M33 | | | |
|---------------------------------|---|--|--|--|--|--|--|
| Input circuit - Supply circuit | | | | | | | |
| Rated control supply voltage U | S | 24-240 V AC/DC | | | | | |
| Rated control supply voltage U | s tolerance | -15+10 % | | | | | |
| Rated frequency | <u> </u> | DC or 50 Hz | ····• | DC or 50/60 Hz | | | |
| Frequency range AC | | 40-60 Hz | | 40-70 Hz | | | |
| Typical current / power consun | | . • | | | | | |
| External fusing (necessary) | 230 V AC | | brooker 6 A with P obere | cteristic or 6 A Class CC | | | |
| External rusing (necessary) | | (acc. to UL-requireme | | Cleristic of 0 A Class CO | | | |
| Power failure buffering time | | | LVFRT (Low Voltage Fau | It Ride Through) | | | |
| Measuring circuit | | | | | | | |
| Monitoring functions | overvoltage 10-min average (>UAV) | adjustable, 1.00-1.30 * U | threshold adjustable, in 0.005 * U steps | 1.000-1.300 * U _n | | | |
| | | in 0.01*U steps | iii 0.005 O _n steps | | | | |
| | overvoltage (>U1) | | threshold adjustable, | 1.000-1.300 * U_ | | | |
| | | 1.00-1.20 * U | in 0.005 * U _n steps | " | | | |
| ····· | overveltage (-119) | in 0.01*U _s steps | throphold adjustable | 1 000 1 200 * 11 | | | |
| | overvoltage (>U2) | - | threshold adjustable, in 0.005 * U steps | " | | | |
| ····· | undervoltage (<u1)< td=""><td></td><td>threshold adjustable,</td><td>0.100-1.000 * U_n</td></u1)<> | | threshold adjustable, | 0.100-1.000 * U _n | | | |
| | | 0.05-1.00 * U _s in 0.01*U _s steps | in 0.005 * U _n steps | | | | |
| | undervoltage (<u2)< td=""><td>adjustable,</td><td>threshold adjustable,</td><td>0.100-1.000 * U</td></u2)<> | adjustable, | threshold adjustable, | 0.100-1.000 * U | | | |
| | 1 11 31 (11) | 0.05-1.00 * U _s | in 0.005 * U _n steps | n | | | |
| | | in 0.01*U _s steps | | | | | |
| | overfrequency (>F1) | adjustable, 50.0-54.0 Hz | threshold adjustable, | 50.00-65.00 Hz | | | |
| | | in 0.1 Hz steps | in 0.01 Hz steps | | | | |
| | underfrequency (<f2)< td=""><td></td><td>threshold adjustable,</td><td>50.00-65.00 Hz</td></f2)<> | | threshold adjustable, | 50.00-65.00 Hz | | | |
| | . , , | 46.0-50.0 Hz | in 0.01 Hz steps | | | | |
| | (E4) | in 0.1 Hz steps | 10 | 45.00.00.00.11- | | | |
| | overfrequency (>F1) | adjustable, 50.0-54.0 Hz | threshold adjustable, in 0.01 Hz steps | 45.00-60.00 Hz | | | |
| | | in 0.1 Hz steps | 111 0.01 112 01000 | | | | |
| | underfrequency (<f2)< td=""><td></td><td>threshold adjustable,</td><td>45.00-60.00 Hz</td></f2)<> | | threshold adjustable, | 45.00-60.00 Hz | | | |
| | | 46.0-50.0 Hz | in 0.01 Hz steps | | | | |
| ····· | ROCOF | in 0.1 Hz steps adjustable, | threshold adjustable, | 0 100-5 000 Hz | | | |
| | 110001 | 0.1-1.0 Hz/s, | in 0.005 Hz steps | 0.100-0.000112 | | | |
| | | in 0.1 Hz/s steps | · | | | | |
| | vector shift | ift threshold adjust | | 2.0-40.0 ° in 0.1 ° steps | | | |
| ······ | interrupted neutral conductor | | ed neutral conductor is | | | | |
| Manauring ranges | voltage (4-wire system L1, L2, L3-N) | selected | | 0-317 V AC | | | |
| Measuring ranges | (3-wire system L1, L2, L3-N) | | | 0-517 V AC | | | |
| ······ | (2-wire system L-N) | | | 0-317 V AC | | | |
| | frequency | 40-60 Hz | | 40-70 Hz | | | |
| Rated frequency of the measur | | 50 Hz | | 50/60 Hz | | | |
| Accuracy of measurements | voltage | | ≤ 0.5 % ± 0.5 V | | | | |
| | requency delay times | ± 20 mHz ≤ 5 % ± 20 ms | ± 20 mHz ≤ 0.1 % ± 20 ms | | | | |
| Accuracy within the temperature | | ΔU ≤ 0.02 %/°C | _ = 0.1 /0 ± 20 1110 | | | | |
| Hysteresis related to the | overvoltage 10-min average | - | adjustable, 0.1-10.0 % | in 0.1 % steps | | | |
| threshold value | overvoltage | 0.95-0.97 * U _s | adjustable, 0.5-10.0 % | in 0.1 % steps | | | |
| | undervoltage | 1.03-1.05 * U _s | adjustable, 0.5-10.0 % | in 0.1 % steps | | | |
| | overfrequency | 0.997-0.999 * f | adjustable, 0.05-4.00 | Hz in 0.01 Hz steps | | | |
| | underfrequency | 1.001-1.003 * f | adjustable, 0.05-4.00 | · · | | | |
| Reaction time acc. CEI 0-21 ch | | CM-UFD.M22: adjusta for: Overvoltage 2, Ur | : | 05 s steps, ±3 % ±20 ms age 2, Overfrequency 1, | | | |
| Measuring cycle | PACAE | 640 ms at 50 Hz | adjustable, 4-50 perio | | | | |
| ivicasuring cycle | AUCUF | 1070 IIIS at 50 FIZ | aujustable, 4-50 pend | us | | | |

| Туре | | CM-UFD.M22 | CM-UFD.M31 | CM-UFD.M33 |
|--|---|----------------------------|---|---|
| Control circuits | | | | |
| Number | | 3 | | • |
| Type of triggering | | volt-free triggering, sigr | nal source Y0 | ••••• |
| unction of the control inputs | Y1-Y0 Control input 1 | | feedback from switchin | g device 1 |
| | | release monitoring | | |
| | | times adjustable | | |
| | Y2-Y0 Control input 2 | External signal | feedback from switchin | a device 2 |
| | Y3-Y0 Control input 3 | | remote trip; suppressio | |
| | | | vector shift detect. | , , |
| lectrical isolation | from supply voltage | yes | 4 | ••••• |
| | from the measuring circuit | | | ••••• |
| | from the relay outputs | yes | | ••••• |
| ax. switching current in the co | ontrol circuit | 6 mA | ••••• | ••••• |
| o-load voltage at the control i | nputs (V0-V1, V2, V3) | 22-26 V DC | | ••••• |
| inimum control pulse length | | 20 ms | | ••••• |
| ax. cable length at the contro | l innuts (unshielded) | 10 m | *************************************** | ••••• |
| | mipato (anomoraca) | 10 111 | | |
| ming functions | | T | : | |
| | grid connection or re-connection after | adjustable, | - | |
| terruption) | | 1.00-600.00 s | | |
| ······································ | | in 0.05 s steps | | |
| estart delay, R1 | | adjustable, | - | |
| | | 0.05-600.00 s | | |
| | | in 0.05 s steps | <u> </u> | ••••• |
| | grid connection or re-connection after | 1 s, fixed | - | |
| terruption) | | | <u> </u> | •••• |
| N-delay, R3 | | adjustable, | - | |
| | | 0.00-10.00 s | | |
| | | in 0.05 s steps | | |
| N-time, R3 | | adjustable, | - | |
| | | 0.05-10.00 s | | |
| | | in 0.05 s steps | | |
| ip window, feedback loop Y1 | | adjustable, | - | ••••• |
| | | 0.05-0.50 s | | |
| | | in 0.05 s steps | | |
| elease window, feedback loop |) Y1 | adjustable, | - | ••••• |
| , | | 0.50-600.00 s | | |
| | | in 0.05 s steps | | |
| ipping delays | | adjustable, | - | ••••• |
| | | 0.05-600.00 s | | ••••• |
| OCOF error time | | in 0.05 s steps | - | |
| witch-on delay (prior to first a | rid connection or reconnection after | - | adjustable, 0.05-600.00 | s in 0.01 s steps |
| terruption) | | | | 2 0 111 010 1 0 0topo |
| ipping delay | overvoltage 10-min average (>Uav) | - | < 3 s | ••••• |
| pping dolay | | | | |
| ······ | overvoltage (>U1, >U2) | - | adjustable, 0.00-600.00 |) s in 0.01 s steps; |
| | undervoltage (<u1, <u2)<="" td=""><td>1</td><td>+50 ms / -0 ms</td><td></td></u1,> | 1 | +50 ms / -0 ms | |
| | overfrequency (>F1, >F2) | | | |
| | underfrequency (<f1, <f2)<="" td=""><td>1</td><td></td><td></td></f1,> | 1 | | |
| ······ | ROCOF | | | • |
| | vector shift | - | < 50 ms | ••••• |
| | interrupted neutral conductor | | ą | ••••• |
| ror time | ROCOF | - | adjustable, 0.5-600.00s | |
| | vector shift | - | adjustable, 0.5-600.00s | |
| ip window (feedback loops Y | | - | adjustable, 0.05-0.50 s | |
| elease window (feedback loor | os Y1-Y0, Y2-Y0) | _ | adjustable, 0.50-600.00 | s in 0.01 s steps |
| me error within the temperatu | ire range | - | Δt ≤ 0.01 % | |
| ser interface - Indication of o | perational states | | | |
| ontrol supply voltage applied | | LED green on / flashing | 1 | |
| ult message | 7 tilling | LED green on | <u>.</u> | • |
| or details see the message on | | 122 100 011 | • · · · · · · · · · · · · · · · · · · · | • |
| | τιτο αισριαχ | I. | | |
| ser interface - Display | | T | | |
| ack light | <u>on</u> | press any button | | |
| | off | | able, 10-600 s (default 10 |) s) |
| perating temperature range o | f the display clearly visible | | | ••••• |
| esolution | | 112 x 64 pixel | ••••• | ••••• |
| splay size | | 36 x 22 mm | | |
| ser interface - Operating elen | nents | | | |
| push-buttons for menu navig | | | | |
| Jack Buttons for mond havige | ation, cotting and ontolling | | | |

| Туре | CM-UFD.M22 | CM-UFD.M31 | CM-UFD.M33 |
|---|---|--|--------------------------|
| Output circuits | | | |
| 21-22/24 (25-26/28 31-32/34 (35-36/38 | 1st c/o (SPDT) contact, 2nd c/o (SPDT) contact 3rd c/o (SPDT) contact, | tripping relay for switc | ching device 2 (DG) |
| Operating principle 11-12/12 21-22/24 31-32/32 | closed-circuit principle open- or closed-circuit principle configurable | closed-circuit principle open-circuit, closed-c synchronous with R1/ | ircuit, disabled or |
| Contact material Rated operational voltage U _e IEC/EN 60947-1 | AgNi alloy, Cd-free 250 V | 300 V | |
| Minimum switching voltage / minimum switching current | 24 V / 10 mA | b | |
| Maximum switching voltage / maximum switching current | see load limit curves | | |
| Rated operational current I AC-12 (resisitive) at 230 \ | | | |
| (IEC/EN 60947-5-1) AC-15 (inductive) at 230 \ | | | |
| DC-12 (resistive) at 24 V DC-13 (inductive) at 24 V | 4 A 2 Δ | | |
| Mechanical lifetime | 30 x 10 ⁶ switching cycle | ns | |
| Electrical lifetime at AC12, 230 V AC, 4 A | 50 x 10 ³ switching cycle | es | |
| Maximum fuse rating to achieve short-circuit protection n/c contact | 10 A fast-acting | 10 A fast-acting or circ characteristic | cuit breaker 10 A with B |
| | | 10 A fast-acting or circ characteristic | cuit breaker 10 A with B |
| Maximum closing current (short time) t < 20 ms | | | |
| $\rm t < 80~ms$ Conventional thermal current I _{,h} IEC/EN 60947-1 | | | |
| MI | 5 A | | |
| General data MTBF | T | | |
| | on request | | |
| Repeat accuracy (constant parameters) | < ±0.5 % | | |
| Duty time | 100 % | | |
| Dimensions (W x H x D) product dimensions | | | |
| | 121 x 99 x 71 mm (4.76 | x 3.90 x 2.80 in) | |
| Weight net weigh gross weigh | 0.306 kg (0.675 lb) 0.360 kg (0.794 lb) | | |
| Material of housing | PA666FR | | |
| Mounting Mounting | | TILOE 7.5 ITILOE 4 | F |
| | DIN rail (IEC/EN 60715) without any tool | TH 35-7.5 and TH 35-1 | 5, snap-on mounting |
| Mounting position | any | | . |
| Minimum distance to other units horizontal / vertica | | | |
| Degree of protection housing / terminals | IP20 | | |
| Electrical connection | | | |
| Wire size fine-strand with wire end ferrulle | | | |
| fine-strand without wire end ferrule | | | |
| rigio | 1 x 0.2-6 mm² (1 x 24-1 | O AWG), 2 x 0.2-1.5 mm | n² (2 x 24-16 AWG) |
| Stripping length | 8 mm (0.31 in) | | |
| Tightening torque | 0.5-0.6 Nm (4.4 -5.3 lb. | in) | |
| Environmental data | | | |
| Ambient temperature ranges operation | -20+60 °C | | |
| storage | -20+80 °C | | |
| Climatic class (EN 50178) | 3K5 (w/o condensation, | w/o icing) | |
| Damp heat, cyclic (IEC/EN 60068-2-30) | 6 x 24 h cycle, 55 °C, 9 | 0, | |
| Vibration, sinusoidal (IEC/EN 60255-21-1) | Class 2 | | |
| | | | |
| Shock (IEC/EN 60255-21-2) | Class 2 | | |

| Туре | | CM-UFD.M22 | CM-UFD.M31 | CM-UFD.M33 | | | | |
|---|-----------------------------------|---|---|---|--|--|--|--|
| Isolation data | | | • | • | | | | |
| | supply/measuring/output circuits | 600 V | | , | | | | |
| (IEC/EN 60947-1, IEC/EN 60664-1) | output 1/output 2/output 3 | 300 V | | •••• | | | | |
| Rated impulse withstand voltage U | supply/measuring/output circuits | 6 kV; 1.2/50 μs | | | | | | |
| (IEC/EN 60947-1, IEC/EN 60664-1) | output 1/output 2/output 3 | | | | | | | |
| Basic insulation acc. rated control | supply/measuring/output circuits | 600 V | | | | | | |
| supply voltage (IEC/EN 60664-1) | output 1/output 2/output 3 | 300 V | | | | | | |
| Protective separation acc. rated | supply/measuring/output circuits | 250 V | | | | | | |
| voltage (IEC/EN 61140) | output 1/output 2/output 3 | | | | | | | |
| Test voltage, routine test | supply/measuring/output circuits | | | | | | | |
| (IEC/EN 60255-5) | output 1/output 2/output 3 | | | | | | | |
| Test voltage, type test (CEI 0-21) | supply/measuring /output circuits | · ' | :- | | | | | |
| rest voltage, type test (OLI O 21) | output 1/output 2/output 3 | L | | | | | | |
| Pollution degree (IEC/EN 60664-1) | Output 1/output 2/output 3 | 3 | <u> </u> | | | | | |
| Overvoltage category (IEC/EN 60664-1) | | | | | | | | |
| | 24 | | | | | | | |
| Overvoltage category according to CEI 0-2 | 2 I | IV | - | | | | | |
| Standard | <u> </u> | 150/51/ 00055 | | | | | | |
| Product standard | | IEC/EN 60255-1 | | | | | | |
| Electrical safety | | - | - | UL 508, CAN/CSA C22.2 No.14 | | | | |
| Application standards | | CEI 0-21: 2012-06 + CEI 0-21; V1: 2012-12 + A70 Terna | VDE-AR-N 4105: 2011-08; BDEW, June 2008 "Technische Richtlinie – Erzeugungsanlagen am Mittelspannungsnetz" including supplementary provisions of January 2013 | Engineering Recommendation G59 Issu 3 - September 2013; Engineering Recommendation G83 Issu 2 - December 2012 | | | | |
| Low Voltage Directive | | 2006/95/EC | | | | | | |
| EMC Directive | | 2004/108/EC | | | | | | |
| RoHS Directive | | 2011/65/EC | | | | | | |
| Electromagnetic compatibility | | | | | | | | |
| Interference immunity to | | IEC/EN 61000-6-1, IEC | C/EN 61000-6-2 | | | | | |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3 (6 kV / 8 kV) | | | | | | |
| radiated, radio-frequency, electrom field | agnetic IEC/EN 61000-4-3 | Level 3, 10 V/m | | | | | | |
| electrical fast transient/burst | IEC/EN 61000-4-4 | Level 3, 2 kV / 5 kHz | | | | | | |
| surge | IEC/EN 61000-4-5 | measuring input 1 kV L-L, 2 kV L-earth | | | | | | |
| conducted disturbances, induced to frequency fields | • | | | | | | | |
| voltage dips, short interruptions an voltage variations | | | | | | | | |
| harmonics and interharmonics | IEC/EN 61000-4-13 | | | | | | | |
| Interference emission | | IEC/EN 61000-6-3, IEC/EN 61000-6-4 | | | | | | |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | Class B | | | | | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B | | | | | | |

Insulation monitoring relays for unearthed supply systems Product group picture



Insulation monitoring relays for unearthed supply systems Table of contents

Insulation monitoring relays for unearthed supply systems

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Insulation monitoring relays for unearthed supply systems Benefits and advantages



Insulation monitoring relays for unearthed pure AC systems:

Characteristics

- For monitoring the insulation resistance of unearthed IT systems:
 - up to $U_n = 400 \text{ V AC}$
- According to IEC/EN 61557-8 "Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC: Equipment for testing, measuring or monitoring of protective measures - Part 8: Insulation monitoring devices for IT systems"
- Rated control supply voltage 24-240 V AC/DC
- Superimposed DC signal
- One measuring range 1–100 k Ω
- Precise adjustment of the threshold value in 1 k Ω steps
- Interrupted wire detection
- Fault storage/latching configurable by control input
- 1 c/o (SPDT) contact, closed-circuit principle
- 22.5 mm [0.89 in] width
- 3 LEDs for status indication





CM-IWS.1

CM-IWN.1

Insulation monitoring relays for unearthed AC, DC or mixed AC/DC systems:

Characteristics

- For monitoring the insulation resistance of unearthed IT systems up to $U_a = 250 \text{ V}$ AC and 300 V DC or $U_a = 400 \text{ V}$ AC and 600 V DC
- According to IEC/EN 61557-8 "Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC: Equipment for testing, measuring or monitoring of protective measures - Part 8: Insulation monitoring devices for IT systems"1)
- CM-IWN.4,5,6: Specifically for applications with high system leakage capacitances, for example in photovoltaic environments
- Rated control supply voltage 24-240 V AC/DC
- Prognostic measuring principle with superimposed square wave signal
- 1 or 2 measuring ranges (1-100 k Ω or 1-100 k Ω + 2-200 k Ω)
- 1 or 2 (configurable) c/o contacts1)
- Precise adjustmemt of the measuring value in 1 or 2 k Ω steps
- (non-volatile) fault storage, configurable latching, interrupted wire protection, open- or closed-circuit principle selectable¹⁾
- 22.5 or 45 mm width
- 3 LEDs for status indication
 - 1) depending on devices

Additional characteristics for CM-IWN.1,4,5,6:

- One (1 x 2 c/o) or two (2 x 1 c/o) threshold values R_m1/R1¹) (final switch-off) and R₂₀2/R2²⁾ (prewarning) configurable³⁾
- Precise adjustment of the threshold values in 1 $k\Omega$ steps (R1) and 2 k Ω steps (R2)
- Interrupted wire detection configurable
- Non-volatile fault storage configurable
- Open- or closed-circuit principle configurable
 - 1) CM-IWN.6 does not meet the requirements of IEC/EN 61557-8 regarding the response time t_a
 - 2) term acc. to IEC/EN 61557-8
 - 3) R2 only active with 2 x 1 c/o configuration

Insulation monitoring relays for unearthed supply systems Benefits and advantages, Applications

Application / monitoring function CM-IWx

The CM-IWx serve to monitor insulation resistance in accordance with IEC 61557-8 in unearthed IT AC systems, IT AC sytems with galvanically connected DC circuits, or unearthed IT DC systems. The insulation resistance between system lines and system earth is measured. If this falls below the adjustable threshold values, the output relay(s) energize or deenergize. The CM-IWS.x can monitor control circuits (singlephase) and main circuits (3-phase). Supply systems with voltages U₂= 0-400 V AC (45-65 Hz), U₂=0-250 V AC (15-400 Hz) or 0-300 V DC can be directly connected. For systems with voltages above 400 V AC the insulation monitoring relay with or without the coupling unit CM-IVN can be used.

Application / monitoring function CM-IWN.x

The CM-IWN.x serves to monitor insulation resistance in accordance with IEC 61557-8 in unearthed IT AC systems, IT AC systems with galvanically connected DC circuits, or unearthed IT DC systems. The insulation resistance between system lines and system earth is measured. If this falls below the adjustable threshold values, the output relays switch into the fault state. The device can monitor control circuits (singlephase) and main circuits (3-phase). Supply systems with voltages U = 0-400 V AC (15-400 Hz) or 0-600 V DC can be directly connected to the measuring inputs and their insulation resistance being monitored. For systems with voltages above 400 V AC and 600 V DC the coupling unit CM-IVN can be used for the expansion of the CM-IWN.x voltage range.

Expansion of assortment for the requirements of decentral eletrical energy sources

ABB's insulation monitoring relays from the CM-IWN range provide higher system leakage capacitances which are necessary especially for solar applications. This expanded product range covers the requirements of decentral eletrical sources (e.g. photovoltaic systems).

The range of system leakage capacitances is 20 - 2000 µF.

Application / monitoring function CM-IVN

The coupling unit CM-IVN is designed to extend the nominal voltage range of the insulation monitoring relay CM-IWN.1 up to 690 V AC and 1000 V DC. The coupling unit can be connected to the system to be monitored by means of the terminals VL+ and VL-. The terminal Vw has to be connected to the earth potential. The terminals L+, V1+, L-, V1-, VS and VE have to be connected to the CM-IWN.1 as shown in the connection diagrams below. Supply systems with voltages U = 0-690 V AC (15-400 Hz) or 0-1000 V DC can be connected.

Measuring principle CM-IWS.2

A superimposed DC measuring signal is used for measurement. From the superimposed DC measuring voltage and its resultant current the value of the insulation resistance of the system to be monitored is calculated.

Measuring principle CM-IWN.x, CM-IWS.1

A pulsating measuring signal is fed into the system to be monitored and the insulation resistance is calculated. This pulsating measuring signal alters its form depending on the insulation resistance and system leakage capacitance. From this altered form the change in the insulation resistance is forecast. When the forecast insulation resistance corresponds to the insulation resistance calculated in the next measurement cycle and is smaller than the set threshold value, the output relay de-energizes. This measuring princiiple is also suitable for the detection of symmetrical insulation faults.









Insulation monitoring relays for unearthed supply systems Operating controls



1 Test and reset button

2 Configuration and setting

Front-face rotary switches for threshold value adjustment:

R.1 for R1 tens figures:

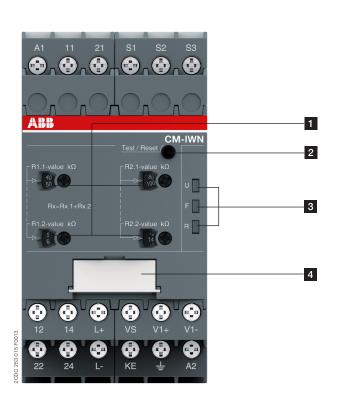
0, 10, 20, 30, 40, 50, 60, 70, 80, 90 $k\Omega$ in ten $k\Omega$ steps R.2 for R1 units figures:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10 $k\Omega$ in one $k\Omega$ steps

3 Indication of operational states

U: green LED - control supply voltage F: red LED - fault message R: yellow LED - relay status

4 Marker label for devices without DIP switches



1 Front-face rotary switches to adjust the threshold value:

R1.1 for R1 tens figure:

0, 10, 20, 30, 40, 50, 60, 70, 80, 90 $k\Omega$ in ten $k\Omega$ steps

R1.2 for R1 units figure:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10 kΩ in one kΩ steps

R2.1 for R2 tens figure:

0, 20, 40, 60, 80, 100, 120, 140, 160, 180 $k\Omega$ in twenty $k\Omega$ steps

R2.2 for R2 units figure:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20 $k\Omega$ in two $k\Omega$ steps

2 Test and reset button

3 Indication of operational states

U: green LED – control supply voltage F1: red LED – fault message F2: yellow LED – relay status

4 DIP switches (see DIP switch functions)

Insulation monitoring relays for unearthed supply systems Insulation monitoring in IT systems

In electricity supply systems, an earthing system defines the electrial potential of the conductors relative to that of the earth's conductive surface. The choice of earthing system has implications for the safety and electromagnetic compatibility of the power supply. Note that regulations for earthing (grounding) systems vary considerably among different countries.

The international standard IEC 60364 distinguishes three families of earthing arrangements, using the two-letter codes TN, TT and IT.

The first letter indicates the connection between earth and the power-supply equipment (generator or transformer):

T: direct connection of a point with earth (Latin: terra)

I: no point is connected with earth (insulation), except perhaps via a high impendance

The second letter indicates the connection between earth and the electrical device being supplied:

T: direct connection of a point with earth

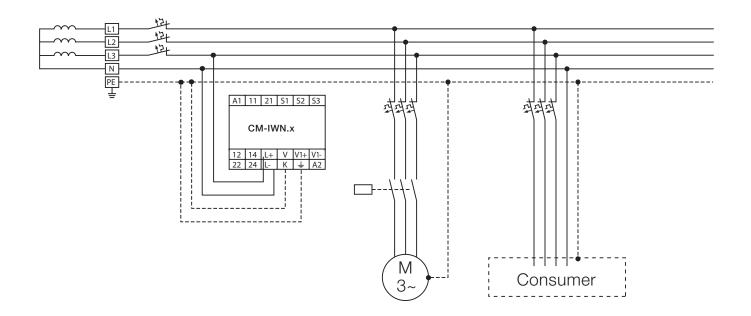
N: direct connection to neutral at the origin of installation, which is connected to the earth

IT supply systems

The IT system is supplied either by an isolation transformer or a voltage source, such as battery or a generator. In this system no active conductor is directly connected to earth potential. The advantage of this is that only a small fault current can flow in case of an insulation fault. This current is essentially caused by the leakage capacitance of the system. The fuse of the system or MCB does not respond, thus maintaining the voltage supply and therefore operation even in case of a phase-to-earth fault.

The high reliability of an IT system is guaranteed thanks to continous insulation monitoring.

The insulation monitoring device recognizes insulation faults as they develop, and immediately reports that the value has fallen below the minimum. This prevents operational interruptions caused by a second more severe insulation fault.



Insulation monitoring relays for unearthed supply systems Selection table

| | er | 0R0200 |)R0200 | 0R0100 | JR0100 | 0R0200 | 0R0200 | 0R0300 | 0R0300 | 0R0400 | 0R0400 | 0R0500 | 0R0500 |
|--|--------------|-----------------|--|-----------------|-----------------|-----------------|-----------------|------------------------|------------------------|------------------------|-----------------|-----------------|-----------------|
| | Order number | 1SVR730670R0200 | 1SVR740670R0200 | 1SVR730660R0100 | 1SVR740660R0100 | 1SVR750660R0200 | 1SVR760660R0200 | 1SVR750660R0300 | 1SVR760660R0300 | 1SVR750660R0400 | 1SVR760660R0400 | 1SVR750660R0500 | 1SVR760660R0500 |
| | Туре | CM-IWS.2S | CM-IWS.2P | CM-IWS.1S | CM-IWS.1P | CM-IWN.1S | CM-IWN.1P | CM-IWN.4S | CM-IWN.4P | CM-IWN.5S | CM-IWN.5P | CM-IWN.6S | CM-IWN.6P |
| Rated control supply voltage U _s | | | | | | | | | | | | | |
| 24 - 240 VAC/DC | | | • | • | | • | | | | • | • | • | • |
| Measuring voltages | | | | | | | | | | | | | |
| 250 V AC (L-PE) | | | | • | • | - | | | | | | | |
| 400 V AC (L-PE) | | | • | | <u>.</u> | | - | • | • | | | | • |
| | | ļ | | | | = 1) | _ 1) | = 1) | _ 1) | _ 1) | = 1) | = 1) | = 1) |
| 690 V AC (L-PE) | | ļ | | _ | | <u>-</u> | - | - | - | <u>-</u> | <u>-</u> | <u>-</u> | - |
| 300 V DC (L-PE) | | | | - | - | | | | | ļ | | | |
| 600 V DC (L-PE) | | | | | ļ | • | - | • | • | • | | • | • |
| 1000 V DC (L-PE) | | | | | | ■¹) | ■ 1) | ■ ¹⁾ | ■ ¹⁾ | ■ ¹⁾ | ■¹) | ■ ¹⁾ | ■ ¹⁾ |
| Measuring range | | | | | | | | | | | | | , |
| 1 - 100 kΩ 2 - 200 kΩ | | • | • | • | • | • | • | • | • | • | • | • | - |
| System leakage capacitance, max. | | , | , | , | , | : | | , | , | , | : | | |
| 10 μF 20 μF | | • | - | • | • | • | - | | | | | | |
| 500 μF | | | | | | | | • | • | | | | |
| 1000 μF | | | | | | | | | | • | = | | |
| 2000 μF | | | | | | | | | | | | • | • |
| Output | | 1 | : | : | : | : | | | : | : | : | : | : - |
| 1 c/o | | | • | • | • | <u> </u> | <u>-</u> | <u>.</u> | <u>.</u> | ļ <u>.</u> | <u> </u> | | _ |
| 1 x 2 c/o or 2 x 1 c/o Operating principle | | | | | | - | • | • | • | - | - | - | • |
| Open-circuit principle | | | • | • | • | | | | | | | | |
| Open- or closed-circuit principle adjus | stable | | | | | | • | • | • | | | • | • |
| Test | | | <u>. </u> | <u> </u> | | - | | | | | - | - | |
| Front-face button or control input | | • | • | • | | • | • | • | • | | • | • | • |
| Reset | | | | | | | | | | | | | |
| Front-face button or control input | | • | • | • | • | • | • | • | • | • | • | • | • |
| Fault storage / latching configurable | | - | - | • | - | • | - | • | - | • | • | • | • |
| Non volatile storage configurable | | - | • | • | - | • | - | - | - | • | • | • | • |
| Interrupted wire detection | | | 4 | 4 | | • | • | • | • | • | • | • | • |
| Threshold values configurable Connection type | | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Push-in terminals | | | _ | | _ | : | _ | | _ | : | _ | : | _ |
| Double-chamber cage connection terr | minals | | • | | • | | • | | | | • | | - |
| | | _ | | | - | <u> </u> | | _ | | | <u> </u> | <u> </u> | |
| " With coupling unit CM-IVN """"" | w vers | | า | | | N.S N.P | | | | | | | |

Insulation monitoring relays for unearthed supply systems Ordering details



CM-IWS.2

Description

The high reliability of an IT system is guaranteed thanks to continuous insulation monitoring. An insulation monitoring device recognizes insulation faults as they develop, and immediately reports that the value has fallen below the minimum. This prevents operational interruption caused by a second, more severe insulation fault.

ABB developed a totally new range of insulation monitors for AC, DC or mixed AC/DC IT Systems up to 690 V AC or 1000 V DC. With only 4 devices most standard applications can be served. Additionally a version for solar applications with increased earth leakage capacitance has been added.



CM-IWS.1

| _ | | | | |
|---------|--------|----------|--------|----|
| O | lerin | ~ ~ | - | ١. |
| V JTC | IPLILI | α | ини | 15 |
| \circ | | 9 4 | l O tu | |

| Rated control supply voltage = measuring voltage | Nominal voltage U _n of the distribution system to be monitored | System leakage capaci- tance, max. | Adjust- ment range of the specified response value R _{an} (threshold) | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---|--|--|--|-----------|-----------------|-------------|------------------------------|
| 04.040.V.AC/DC | 0-250 V AC / | 10 | 1 100 1:0 | CM-IWS.1S | 1SVR730660R0100 | | 0.148 (0.326) |
| 24-240 V AC/DC | 0-300 V DC | 10 μF | 1-100 kΩ | CM-IWS.1P | 1SVR740660R0100 | | 0.137 (0.302) |
| 04.040.1/ AC/DC | 0-400 V AC | 10 | 1 100 1:0 | CM-IWS.2S | 1SVR730670R0200 | | 0.141 (0.311) |
| 24-240 V AC/DC | 0-400 V AC | 10 μF | 1-100 kΩ | CM-IWS.2P | 1SVR740670R0200 | | 0.130 (0.287) |
| 24-240 V AC/DC | 0-400 V AC / | 20 µF | | CM-IWN.1S | 1SVR750660R0200 | | 0.241 (0.531) |
| 24-240 V AG/DG | 0-600 V DC | -600 V DC 20 Pi | | CM-IWN.1P | 1SVR760660R0200 | | 0.217 (0.478) |
| 24-240 V AC/DC | 0-400 V AC / | 500 μF | 1-100 kΩ | CM-IWN.4S | 1SVR750660R0300 | | 0.241 (0.531) |
| 24-240 V AG/DG | 0-600 V DC | 500 μΓ | 2-200 kΩ (activated / | CM-IWN.4P | 1SVR760660R0300 | | 0.217 (0.478) |
| 04.040.V.AC/DC | 0-400 V AC / | 4000F | de-activated by | CM-IWN.5S | 1SVR750660R0400 | | 0.241 (0.531) |
| 24-240 V AC/DC | 0-600 V DC | 1000 μF | DIP-switch) | CM-IWN.5P | 1SVR760660R0400 | | 0.217 (0.478) |
| 24-240 V AC/DC | 0-400 V AC / | 2000 | | CM-IWN.6S | 1SVR750660R0500 | | 0.241 (0.531) |
| | 0-600 V DC | 2000 μF | • | CM-IWN.6P | 1SVR760660R0500 | | 0.217 (0.478) |



CM-IWN.1

| Ordering | details - | Coupling | unit |
|----------|-----------|----------|------|
|----------|-----------|----------|------|

| Rated control supply voltage = measuring voltage | Nominal voltage U _n of the distribution system to be monitored | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--|---|----------|-----------------|-------------|------------------------------|
| Passive device, no control supply | 0-690 V AC / | CM-IVN.S | 1SVR750669R9400 | | 0.179 (0.395) |
| voltage needed | 0-1000 V DC | CM-IVN.P | 1SVR760669R9400 | | 0.165 (0.364) |



CM-IVN

S: screw connection P: push-in / easy connect

Insulation monitoring relays for unearthed supply systems Operating state indication, Connection diagrams, DIP switches

LEDs, status information and fault messages CM-IWN.x

| Operational state | LED U (green) | LED F (red) | LED R (yellow) |
|--|------------------|----------------|-------------------|
| Start-up | ПП | OFF | OFF |
| No fault | | OFF | 1) |
| Prewarning | | ПП | ПП |
| Insulation fault (below threshold value) | | | 1) |
| KE/+ wire interruption | | лл_ | 1) |
| L+/L- wire interruption during system start-up / test function | / MML | л_л_ | 1) |
| System leakage capacitance too high / invalid measurement result | | л_л_ | 1) |
| Internal system fault | 1) | MML | 1) |
| Setting fault 2) | | | |
| Test function | MML | OFF | 1) |
| No fault after fault storage 3) | | 4) | MML |

LEDs, status information and fault messages CM-IWS.x

| Operational state | LED U (green) | LED F (red) | LED R (yellow) |
|--|------------------|----------------|-------------------|
| Start-up | | OFF | OFF |
| No fault | | OFF | |
| Insulation fault (below threshold value) | | П | OFF |
| Invalid measuring result | | 几几 | OFF |
| KE/ - wire interruption (only CM-IWS. ¹⁾ | | ாட | OFF |
| CM-IWS.1: System leakage capacitance too high / invalid measurement result | ллл | | OFF |
| CM-IWS.2: Invalid measurement result | | л_л_ | OFF |
| Internal system fault | OFF | \mathcal{M} | OFF |
| Test function | лллг | OFF | OFF |
| No fault after fault storage 3) | | 4) | лллг |

Connection diagram CM-IWS.2

| A1 | 11 | | 600 |
|-------|-------|----------------------------|--------------------|
| S1 | S2 | S3 |)2 F0 |
| L | ± | 11 7 12 14 | 2CDC 252 102 F0009 |
| L | | Ţ | ı |
| 14 | 12 | A2 | ı |

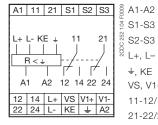
| AI-AZ | Control supply voltage |
|----------|--|
| S1-S3 | Remote test |
| S2-S3 | Remote reset |
| L | Measuring circuit/input, system connection |
| ± | Measuring circuit/input, earth connections |
| 11-19/14 | Output relay closed-circuit principle |

nnection diagram CM-IWS.1

| Connection diagra | | | | | |
|----------------------|----|--------|--|--|--|
| A1 | 11 | KE | | | |
| S1 | S2 | S3 | | | |
| L+ L- I R < A1 | Щ. | 11 | | | |
| L+ | L- | ÷ | | | |
| 14 | 12 | A2 | | | |

8 A1-A2 Control supply voltage Remote test Measuring circuit/input, system connection ±, KE Measuring circuit/input, earth connections Output relay, closed-circuit principle

Connection diagram CM-IWN.1, 4, 5, 6



| ~ | | |
|-----|-------------------|---|
| | S1-S3 | Remote test |
| 252 | S2-S3 | Remote reset |
| 2 | L+, L- | Measuring circuit/input, system connection |
| | - , KE | Measuring circuit/input, earth connections |
| | VS, V1+, V1 | Connections for the coupling unit (if used) |
| | 11-12/14 | Output relay 1, open- or closed-circuit principle |
| | 21-22/24 | Output relay 2, open- or closed-circuit principle |
| | | |

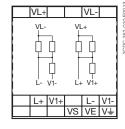
Control supply voltage

Connection diagram CM-IVN

L+ V1+

V1-

VL+



Connection to CM-IWN.x - ± Connection to CM-IWN.x - VS Connection to CM-IWN.x - L+ Connection to CM-IWN.x - V1+ Connection to CM-IWN.x - L-Connection to CM-IWN.x - V1-Measuring circuit / Measuring input Connection to the system Measuring circuit / Measuring input Connection to earth

DIP switches of CM-IWN.1, 4, 5, 6

| Position | 4 | 3 | 2 | 1 | |
|----------|---------|---|---|--------|--|
| ON † | 2x1 c/o | | | closed | |
| OFF | 1x2 c/o | | | open | |

| | ON | OFF (default) |
|---|---|---|
| DIP switch 1 Operating principle of the output relays | Closed-circuit principle If closed-circuit principle is selected, the output relays de- energize in case a fault is occuring. In non-fault state the relays are energized. | Open-circuit principle ☑ If open-circuit principle is selected, the output relays energize in case a fault is occuring. In non-fault state the relays are de-energized. |
| DIP switch 2 Non-volatile fault storage | Fault storage activated (latching) IT If the fault storage function is activated, the output relays remain in tripped position until a reset is done either by the front-face button or by the remote reset connection S2-S3. This function is non-volatile. | Fault storage de-activated (non latching) If the fault storage function is de-activated, the output relays switch back to their original position as soon as the insulation fault no longer exists. |
| DIP switch 3 Interrupted wire detection | Interrupted wire detection activated With this configuration, the CM-IWN.1 monitoring relays the wires connected to + and KE for interruptions. | Interrupted wire detection de-activated M with this configuration the interrupted wire detection is deactivated. |
| DIP switch 4 2 x 1 c/o, 1 x 2 c/o | 2 x 1 c/o (SPDT) contact [3] If operating principle 2 x 1 c/o contact is selected, the output relay R1 (11-12/14) reacts to threshold value R1 (final switch-off) and the output relay R2 (21-22/24) reacts to threshold value R2 (prewarning) | 1 x 2 c/o (SPDT) contacts and for operating principle 1 x 2 c/o contacts is selected, both output relays R1 (11-12/14) and R2 (21-22/24) react synchronously to threshold value R1. Settings of the threshold value R2 have no effect on the operation. |

¹⁾ Depending on the configuration.

²⁾ Possible faulty setting: The threshold value for final switch-off is set at a higher value than the threshold value for prewarning

³ The device has triggered after an insulation fault. The fault has been stored and the insulation resistance has returned to a higher value than the threshold value plus hysteresis.

⁴⁾ Depending on the fault

Insulation monitoring relays for unearthed supply systems Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

| | | CM-IWS.2 | CM-IWS.1 | CM-IWN.1, 4, 5, 6 |
|---|---|---------------------------------------|---|--|
| Input circuit - Supply circuit | | | A1 - A2 | |
| Rated control supply voltage U _s | | 24-240 V AC/DC | | |
| Rated control supply voltage tolerance | | -15+10 % | | |
| Typical current / power consumption | ******************************* | 30 mA / 0.7 VA | 35 mA / 0.9 VA | 55 mA / 1.3 VA |
| | *************************************** | 12 mA / 1.4 VA 12 mA / 2.8 VA | 17 mA / 2.0 VA 14 mA / 3.2 VA | 20 mA / 2.3 VA 15 mA / 3.5 VA |
| Rated frequency f | 200 V AO | DC or 15-400 Hz | : 14 IIIA / 0.2 VA | : 10 111A / 0.0 VA |
| Frequency range AC | ······ | 13.5-440 Hz | | |
| Power failure buffering time | min. | 20 ms | ······································ | • |
| Input circuit - Measuring circuit | | L, ÷ | L+, L-, +, KE | L+, L-, ↓ , KE |
| Monitoring function | | insulation resistance | monitoring of IT systems | (IEC/EN 61557-8) |
| Measuring principle | | superimposed DC | prognostic measuring | |
| Nominal voltage U of the distribution system to be monitored | | voltage 0-400 V AC | superimposed square 0-250 V AC / | 0-400 V AC / |
| Normal voltage on of the distribution system to be monitored | | 0-400 V AO | 0-300 V DC | 0-600 V DC |
| Voltage range of the distribution system to be monitored | ···• | 0-460 V AC | 0-287.5 V AC / | 0-460 V AC / |
| | | (tolerance +15 %) | 0-345 V DC | 0-690 V DC |
| | ···•·································· | F0.0011- | (tolerance +15 %) | (tolerance +15 %) |
| Rated frequency f _N of the distribution system to be monitored | | 50-60 Hz | DC or 15-400 Hz | DC or 15-400 Hz |
| System leakage capacitance C _e | max. | 10 μF | | CM-IWN.1: 20 μF CM-IWN.4: 500 μF CM-IWN.5 1000 μF CM-IWN.6: 2000 μF |
| Tolerance of the rated frequency f _N | | 45-65 Hz | 13.5-440 Hz | 13.5-440 Hz |
| Extraneous DC voltage U _{fg} (when connected to an AC system) | max. | none | 290 V DC | 460 V DC |
| Number of possible response / threshold values | | 1 | | 2 |
| Adjustment range of the specified response value R _{an} | minmax. | 1-100 Ω | | - |
| threshold) | minmax. R1 minmax. R2 | = | | 1-100 k Ω 2-200 k Ω (activated de-activated by DIPswitch) |
| Adjustment resolution | | 1 kΩ | ······································ | |
| | R1 | 1 kΩ | | 1 kΩ |
| Tolerance of the adjusted threshold value / | R2 at 1-10 kΩ R _c | - - | | 2 kΩ |
| Relative percentage uncertainty A | г | | ······································ | _ |
| at -5+45 °C, $U_n = 0$ -115 %, $U_s = 85$ -110 %, f_N , f_s , $C_n = 1 \mu F$ | at 10-100 kΩ R _F | ±6 % | | _ |
| | at 1-15 kΩ R _F | = | | ±1 kΩ* |
| | at 15-200 k Ω R $_{_{ m F}}$ | _ | | ±8 % |
| Hysteresis related to the threshold value | | 25 %; min. 2 kΩ | 110010 | Tare I o |
| nternal impedance Z _i | at 50 Hz | | 100 kΩ | 155 kΩ |
| nternal DC resistance R _i | | 185 kΩ | 115 kΩ | 185 kΩ |
| Measuring voltage U _m | | 15 V | 22 V | 24 V |
| Tolerance of measuring voltage U _m | | +10 % | *************************************** | • |
| Measuring current I | max. | 0.1 mA | 0.3 mA | 0.15 mA |
| Response time t _{an} | | | ···• | |
| | and $C_e = 1 \mu F$ | max. 10 s | ······································ | • |
| DC system or AC system with conne | | | max. 15 s | • |
| Repeat accuracy (constant parameters) | | < 0.1 % of full scale | inax: 10 0 | |
| Accuracy of R _s (measured value) within the rated control supply voltage | ge tolerance | < 0.05 % of full scale | ······································ | • |
| Accuracy of R _a (measured value) within the | at 1-10 kΩ R _e | 5Ω/K | | • |
| appration tomporature range | | 0.05 % / K | | |
| | at 10-100 kΩ R _F | 0.03 % / K | ······································ | - |
| | at 10-200 k Ω R _F | - | | 0.05 % / K |
| Transient overvoltage protection (± - terminal) | | Z-diode | avalanche diode | |
| nput circuit - Control circuits | | | S1 - S2 - S3 | |
| Control inputs - volt free | S1-S3 | remote test | | |
| | S2-S3 | remote reset | | |
| Maximum switching current in the control circuit | | 1 mA | I ft 20 5 pE/ft1 | • |
| Maximum cable length to the control inputs Minimum control pulse length | | 50 m - 100 pF/m [164 ft - 30.5 pF/ft] | | |
| No-load voltage at the control input | ····· | ≤ 24 V ± 5 % | ≤ 24 V DC | |
| ndication of operational states | | | | |
| Control supply voltage | | LED U (green) | | |
| Fault message | | LED F (red) | | • |
| Relay status | | LED R (yellow) | | |

^{*}in combination with CM-IVN $\pm 1.5~\text{k}\Omega$

Insulation monitoring relays for unearthed supply systems Technical data

| | | CM-IWS.2 | CM- | WS.1 | CM-IWN.1, 4, 5, 6 |
|---|--|---|--|---|--|
| Output circuits | | | | | |
| Kind of output | | relay, 1 c/o (SPDT) co | ntact | | 2 x 1 or 1 x 2 c/o (SPDT) contacts configurable |
| Operating principle | | closed-circuit principl | le ¹⁾ | | open- or closed circuit principle ¹⁾ configurable |
| Contact material | ····· | AgNi alloy, Cd free | | | <u>.</u> |
| Rated voltage (VDE 0110, IEC 60947-1) | | 250 V AC / 300 V DC | | *************************************** | • |
| Min. switching voltage / Min. switching current | | 24 V / 10 mA | | | • |
| Max. switching voltage / Max. switching current | | see data sheet | | | |
| Rated operational current I _e (IEC/EN 60947- | AC-12 (resistive) at 230 V | | | *************************************** | • |
| 5-1) | AC-15 (inductive) at 230 V | | | | • |
| | DC-12 (resistive) at 24 V DC-13 (inductive) at 24 V | | ••••• | • | • |
| AC rating (UL 508) | | B 300, pilot duty gene | aral nurnosa | (250 V 4 A | cos d 0 75) |
| AO fating (OE 300) | (Control Circuit Rating Code) | D 500, pilot daty gent | siai puipose | (200 V, 4 A | , σου φ σ.πο) |
| | max. rated operational voltage | 250 V AC | ······ | • | •···· |
| | max. continuous thermal | 4 A | | *************************************** | • |
| | current at B 300 | | | | |
| | max. making/breaking apparent power at B 300 | | | • | |
| Mechanical lifetime | ······ | 30 x 10 ⁶ switching cyc | | | • |
| Electrical lifetime (AC-12, 230 V, 4 A) | - / | 0.1 x 10 ⁶ switching cy | cles | • | • |
| Max. fuse rating to achieve short-circuit protection | | 6 A fast-acting 10 A fast-acting | | | • |
| Conventional thermal current I _{th} (IEC/EN 60947-1) | n/o contact | 4 A | | • | • |
| General data | | 1 | | | |
| Duty time | | 100 % | | | |
| Dimensions (W x H x D) | ····· | | | • | • |
| | product dimension | $(0.89 \times 3.37 \times 4.08 \text{ in})$ | | | 45 x 85.6 x 103.7 mn (0.89 x 3.37 x 4.08 in |
| | packaging dimenesion | | | | 97 x 109 x 30 mm (3.82 x 4.29 x 1.18 in) |
| Weight | net weight | CM-IWS.2P: 0.130 kg (0.287 lb) CM-IWS.2S: 0.141 kg (0.311 lb) | CM-IWS.11 0.137 kg (0 CM-IWS.15 0.148 kg (0 |).302 lb) S: | CM-IWN.xP: 0.217 kg (0.478 lb) CM-IWN.xS: 0.241 kg (0.531 lb) |
| | gross weight | CM-IWS.2P: 0.155 kg (0.342 lb) CM-IWS.2S: | CM-IWS.1I 0.162 kg (0 CM-IWS.1S | 5:).357 lb) S: | CM-IWN.xP: 0.246 kg (0.542 lb) CM-IWN.xS: |
| | | 0.166 kg (0.366 lb) | 0.173 kg (0 | | 0.270 kg (0.595 lb) |
| Mounting | | DIN rail (IEC/EN 6071 | 5), snap-on r | nounting wi | thout any tool |
| Mounting position Minimum distance to other units | tipal | any | ··•··· | • | • |
| Willimum distance to other units | vertical horizontal | . * | not necess | ····· | 10 mm (0.39 in) |
| | Horizontai | at U _n > 240 V | HOL HECES | sai y | at U _n > 400 V |
| Mataglat of harvelen | | UL 94 V-0 | . <u>i</u> | | at 0 _n > 100 v |
| Material of housing | haveled /towning | | | | • |
| Degree of protection | housing / terminal | IP50 / IP20 | | | |
| Electrical connection | | | | : | |
| | | Screw connection ted | cnnology | (Push-in) | nect Technology |
| Wire size | fine-strand with(out) wire end | 1 x 0.5-2.5 mm ² (1 x 2 | 20-14 AWG) | 2 x 0.5-1.5 | mm² (2 x 20-16 AWG) |
| | | 2 x 0.5-1.5 mm ² (2 x 2 1 x 0.5-4 mm ² (1 x 20 | | | mm² (2 x 20-16 AWG) |
| | | 2 x 0.5-2.5 mm ² (2 x 2 | 20-14 AWG) | | |
| Stripping length Tightening torque | | 8 mm (0.32 in) 0.6-0.8 Nm (5.31-7.08 | B lb.in) | | |
| Environmental data | | 1 0.0 0.0 IVIII (0.01-7.00 | , 1.2.111) | | |
| Ambient temperature ranges | operation / storage / transport | -25 ±60 °C/_40 ± 05 | S°C/-40 19 | 5 °C | |
| Climatic category | | 3K5 (no condensation | | | • |
| Damp heat, cyclic | | 6 x 24 h cycle, 55 °C, | | iationij | <u></u> |
| Vibration, sinusoidal | IEC/EN 60255-21-1 | | / | • · · · · · · · · · · · · · · · · · · · | • |
| Shock, half-sine | IEC/EN 60255-21-2 | | •••••• | • | •··· |

Olosed-circuit principle: Output relay(s) de-energize(s) if a fault is occuring Open-circuit principle: Output relay(s) energize(s) if a fault is occuring

Insulation monitoring relays for unearthed supply systems Technical data

| | | CM-IWS.2 | CM-IWS.1 | CM-IWN.1, 4, 5, 6 |
|--|---|--|---|---|
| Isolation data | | | • | • |
| Rated impulse withstand voltage U _{imp} between | supply / measuring circuit | 6 kV | | |
| all isolated circuits | supply / output circuit | 6 kV | ••••••••••••••••••••••••••••••••••••••• | ••••• |
| (IEC/EN 60947-1, IEC/EN 60664-1, VDE 0110-1) | measuring / output circuit | 6 kV | •••••• | ••••• |
| •••• | output 1 / output circuit 2 | | •••••• | 4 kV |
| Pollution degree (IEC/EN 60664-1, VDE 0110-1) | ••••• | 3 | *************************************** | *************************************** |
| Overvoltage category (IEC/EN 60664-1, VDE 0110 | -1) | III | • | • |
| Rated insulation voltage U | supply / measuring circuit | 400 V | 300 V | 600 V |
| (IEC/EN 60947-1, IEC/EN 60664-1, VDE 0110-1) | supply / output circuit | 300 V | *************************************** | *************************************** |
| | supply / measuring circuit | | 300 V | 600 V |
| | output 1 / output circuit 2 | | - | 300 V |
| Basis isolation for rated control supply voltage (IEC/EN 60664-1, VDE 0110-1) | supply / measuring circuit supply / output circuit | 400 V AC / 300 V DC 250 V AC / 300 V DC | 250 V AC / 300 V DC | 400 V AC / 600 V DC |
| | measuring / output circuit | | 250 V AC / 300 V DC | 400 V AC / 600 V DC |
| | | 250 V AC / 300 V DC | <u> </u> | <u></u> |
| Protective separation (IEC/EN 61140) | supply / output circuit | | ••••••••••••••••••••••••••••••••••••••• | *************************************** |
| | supply / measuring circuit | 250 V AC / 250 V DC | • | ••••• |
| | measuring / output circuit | 250 V AC / 250 V DC | | ••••• |
| Test voltage between all isolated circuits, | supply / output circuit | 2.32 kV, 50 Hz, 2 s | <u> </u> | *************************************** |
| routine test (IEC/EN 60255-5, IEC/EN 61010-1) | supply / measuring circuit | | ······································ | • |
| · · · · · · · · · · · · · · · · · · · | measuring / output circuit | 2.2 kV, 50 Hz, 1 s | •••••• | 2.53 kV, 50 Hz, 1 s |
| Standards | - | | | |
| Product standard | | IEC/EN 61557-1, IEC/E | N 61557-8, IEC/EN 602 | 55-1, EN 50178 |
| Other standards | | EN 50178 | | |
| Low Voltage Directive | | 2006/95/EC | | |
| EMC Directive | | 2004/108/EC | | |
| RoHS Directive | | 2011/65/EC | | |
| Electromagnetic compability | | | | |
| Interference immunity to | | IEC/EN 61000-6-1, IEC | C/EN 61000-6-2, IEC/EN | N 61326-2-4 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3, 6 kV / 8 kV | • | • |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3, 10 V/m (1 GHz | z) / 3 V/m (2 GHz) / 1 V/ | m (2.7 GHz) |
| electrical fast transient/burst | IEC/EN 61000-4-4 | Level 3, 2 kV / 5 kHz | • | *************************************** |
| surge | IEC/EN 61000-4-5 | Level 3, installation cla | iss 3, supply circuit and | measuring circuit |
| - | | 1 kV L-L, 2 kV L-earth | | - |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | Level 3, 10 V | | |
| voltage dips, short interruptions and voltage variations | IEC/EN 61000-4-11 | Class 3 | | |
| harmonics and interharmonics | IEC/EN 61000-4-13 | Class 3 | ••••••••••••••••••••••••••••••••••••••• | ••••• |
| Interference emissions | 120,21,01000 4 10 | IEC/EN 61000-6-3, IEC | C/FN 61000-6-4 | • |
| | IEC/CISPR 22, EN 55022 | | 0, 01000 0 1 | • |
| high-frequency radiated | IEC/CISPR 22. EN SSU22 | LUIASS D | | |

Insulation monitoring relays for unearthed supply systems Technical data CM-IVN

| Input circuit - Measuring circuit | VL+, VL-, V+ |
|--|--|
| Function | expansion of the nominal voltage range of the insulation monitoring relay CM-IWN to 690 V AC or 1000 V DC, max. length of connection cable 40 cm |
| Measuring principle | see CM-IWN |
| Nominal voltage U _p of the distribution system to be monitored | 0-690 V AC / 0-1000 V DC |
| Voltage range of the distribution system to be monitored | 0-793.5 V AC / 0-1150 V DC (tolerance +15 %) |
| Rated frequency f _N of the distribution system to be monitored | DC or 15-400 Hz |
| Tolerance of the rated frequency f _N | 13.5-440 Hz |
| System leakage capacitance C _e max. | identical to that of the insulation monitoring relay used |
| Extraneous DC voltage U _{fr} (when max. | • |
| connected to an AC system) | |
| Tolerance of the adjusted threshold value / at 1-15 kΩ R _F Relative percentage uncertainty A at | ±1.5 kΩ |
| -5+ 45 °C, U_n = 0-115 %, U_s = 85-110 %, f_N , f_s , C_e = 1 μF at 15-200 kΩ R_F | ±8 % |
| Internal impedance Z, at 50 Hz | 195 kΩ |
| Internal DC resistance R | 200 kΩ |
| Measuring voltage U_ | 24 V |
| Tolerance of measuring voltage U _m | +10 % |
| Measuring current I | 0.15 mA |
| General data | |
| MTBF | on request |
| Duty time | 100 % |
| Dimensions (W x H x D) | 45 x 78 x 100 mm (1.78 x 3.07 x 3.94 in) |
| | 0.200 kg (0.441 lb) 0.169 kg (0.373 lb) |
| Mounting | DIN rail (IEC/EN 60715), snap-on mounting without any tool |
| Mounting position | any |
| Minimum distance to other units vertical | not necessary |
| | 10 mm (0.39 in) at $U_n > 600 \text{ V}$ |
| Degree of protection | IP50 / IP20 |
| Electrical connection | |
| Wire size fine-strand with(out) wire end ferrule | 2 x 0.75-2.5 mm ² (2 x 18-14 AWG) |
| | 2 x 0.5-4 mm ² (2 x 20-12 AWG) |
| Stripping length | 7 mm (0.28 in) |
| Tightening torque | 0.6-0.8 Nm (5.31-7.08 lb.in) |
| Max. length of connection cable to CM-IWN | 40 cm |
| Environmental data | 05 00 00 / 40 05 00 / 40 05 00 |
| Ambient temperature ranges operation / storage / transport Climatic category IEC/EN 60721-3-3 | -25+60 °C / -40+85 °C / -40+85 °C 3K5 (no condensation, no ice formation) |
| Damp heat, cyclic IEC/EN 60068-2-30 | 6 x 24 h cycle, 55 °C, 95 % RH |
| Vibration, sinusoidal IEC/EN 60255-21-1 | |
| Shock, half-sine IEC/EN 60255-21-2 | Class 2 |
| Isolation data | Tour |
| Rated impulse withstand voltage U _{imp} between all input circuit / PE isolated circuits | 8 KV |
| (IEC/EN 60947-1, IEC/EN 60664-1,VDE 0110-1) | |
| Pollution degree (IEC/EN 60664-1, VDE 0110-1) | 3 |
| Overvoltage category (IEC/EN 60664-1, VDE 0110-1) | |
| Rated insulation voltage U _i input circuit / PE (IEC/EN 60947-1, IEC/EN 60664-1,VDE 0110-1) | 1000 V |
| | [2.2 LV/ 50 Hz d o |
| Test voltage between all isolated circuits, routine test input circuit / PE (IEC/EN 60255-5, IEC/EN 61010-1) | 3.3 kV, 50 Hz, 1 s |
| Standards | |
| Product standard | IEC/EN 61557-1, IEC/EN 61557-8, IEC/EN 60255-1, EN 50178 |
| Other standards | EN 50178 |
| Low Voltage Directive | 2006/95/EC |
| EMC Directive RoHS Directive | 2004/108/EC |
| Electromagnetic compability | 2011/65/EC |
| Interference immunity to | IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61326-2-4 |
| | Level 3, 6 kV / 8 kV |
| radiated, radio-frequency, IEC/EN 61000-4-3 | Level 3, 10 V/m (1 GHz) / 3 V/m (2 GHz) / 1 V/m (2.7 GHz) |
| electromagnetic field | |
| ••••••••••••••••••••••••••••••••••••••• | Level 3, 2 kV / 5 kHz Level 3, installation class 3, supply circuit |
| | and measuring circuit 1 kV L-L, 2 kV L-earth |
| conducted disturbances, induced by IEC/EN 61000-4-6 | |
| radio-frequency fields | Lavel 0 |
| voltage dips, short interruptions and IEC/EN 61000-4-11 voltage variations | Level 3 |
| harmonics and interharmonics IEC/EN 61000-4-13 | Level 3 |
| Interference emission | IEC/EN 61000-6-3, IEC/EN 61000-6-4 |
| high-frequency radiated IEC/CISPR 22, EN 50022 | |
| high-frequency conducted IEC/CISPR 22, EN 50022 | Olass B |

Motor load monitoring relays Product picture



Motor load monitoring relays Table of contents

Motor load monitoring relays

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Motor load monitoring relays Fields of application

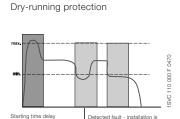
The motor load monitor relay monitors the load states of single-phase and three-phase asynchronous motors. The evaluation of the phase angle between current and voltage allows a very precise monitoring of the load states. Compared with other conventional measuring principles

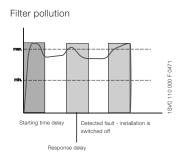
Main applications

- Pump monitoring
 - Dry-running protection (underload)
 - Closed valves (overload)
 - Pipe break (overload)
- Heating, air-conditioning, ventilation
 - Monitoring of filter pollution
 - V-belt breakage (underload)
 - Closed shutters/valves (overload)
 - Air ventilating volume
- Agitating machines
 - High consistency within the tank (overload)
 - Pollution of the tank (overload)
- Transport/Conveyance
 - Congested conveyor belts (overload)
 - Jamming of belts (overload)
 - Material accumulation in spiral conveyors (overload)
 - Lifting platforms
- Machine installation
 - Wear of tools, e.g. worn saw blades in circular saws, etc. (overload)
 - Tool breakage (underload)
 - V-belt drives (breakage underload)

(e.g. pressure transducers, current measurement), $\cos\phi$ monitoring is a more precise and economical alternative. The motor is used as a sensor for its own load status.

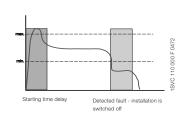
Pump control

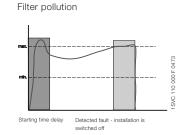




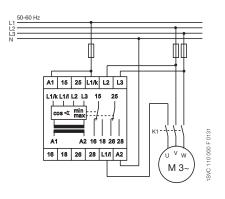
Ventilator monitoring

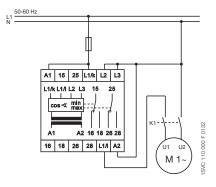
V-belt monitoring

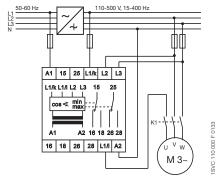


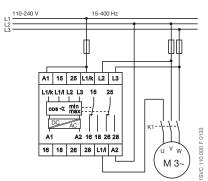


Wiring examples (for motor currents ≤ 20 A)

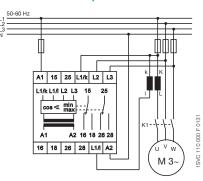


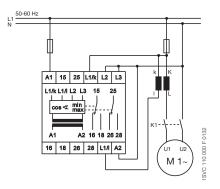






Wiring examples (for motor currents \geq 20 A)





Motor load monitoring relays Ordering details



Description

The motor load monitor CM-LWN monitors the load of single-phase and three-phase asynchronous motors. The evaluation of the phase angle between current and voltage (cos φ monitoring) allows a very precise monitoring of the load status.

Ordering details

| Rated control supply voltage = measuring voltage | Current range | Туре | Order code | Price | Weight (1 pce) |
|--|---------------|--------|-----------------|-------|-------------------|
| | | | | 1 pce | kg (lb) |
| 24-240 V AC/DC | | | 1SVR450335R0000 | | 0.30 (0.66) |
| 110-130 V AC | * | | 1SVR450330R0000 | | 0.30 (0.66) |
| 220-240 V AC | 0.5-5 A | CM-LWN | 1SVR450331R0000 | | 0.30 (0.66) |
| 380-440 V AC | | | 1SVR450332R0000 | | 0.30 (0.66) |
| 480-500 V AC | | | 1SVR450334R0000 | | 0.30 (0.66) |
| 24-240 V AC/DC | 2-20 A | | 1SVR450335R0100 | | 0.30 (0.66) |
| 110-130 V AC | | | 1SVR450330R0100 | | 0.30 (0.66) |
| 220-240 V AC | | | 1SVR450331R0100 | | 0.30 (0.66) |
| 380-440 V AC | | | 1SVR450332R0100 | | 0.30 (0.66) |
| 480-500 V AC | | | 1SVR450334R0100 | | 0.30 (0.66) |

Current transformers "Ordering details - CM-CT current transformers" on page 131"

Characteristics

- Pump monitoring
- Under- and overload monitoring $\cos \varphi$ in one unit
- Adjustable starting delay 0.3-30 s
- Direct measurement of currents up to 20 A
- Adjustable response time delay 0.2-2 s
- Single-phase or three-phase monitoring
- 2 x 1 c/o contact, closed-circuit principle
- 3 LEDs for status indication



- 1 Starting delay "Time S"
- 2 Response delay "Time R"
- 3 Threshold for load limit cos ϕ_{max}
- 4 Threshold for load limit $\cos \phi_{min}$
- 5 Reset button
- 6 Indication of operational states

U: green LED - control supply voltage $\mbox{cos}\;\phi_{\mbox{\scriptsize max}}\mbox{: red LED}-\mbox{cos}\;\phi_{\mbox{\scriptsize max}}\;\mbox{exceeded}$ $\mbox{cos}\;\phi_{\mbox{\scriptsize min}}\mbox{: red LED}$ – below $\mbox{cos}\;\phi_{\mbox{\scriptsize min}}$

7 Marker label

Motor load monitoring relays Technical information

The CM-LWN module monitors the load status of inductive loads.

The primary application is the monitoring of single- or three-phase asynchronous motors (squirrel cage) under varying load conditions. The measuring principle is based on the evaluation of the phase shift (φ) between the voltage and the current in one

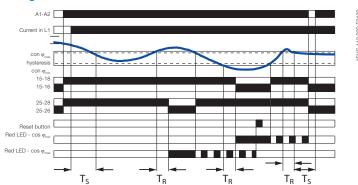
The phase difference is nearly inversely proportional to the load. Therefore, cos φ, measured relatively from 0 to 1, measures the relationship of effective power to apparent power. A value towards 0 indicates low load and a value towards 1 indicates

Threshold values can be set individually for $\cos\phi_{max}$ and $\cos\phi_{min}$ If the set threshold value is reached, a LED lights up and the relay is de-energized.

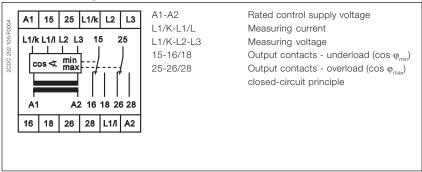
If cos φ returns to the acceptable limits (taking into account the hysteresis), the relay is reset to its original state and the LED flashes permanently to indicate the occurrence of the trip event. This message can be deleted using the reset button or by switching off the supply.

A time delay (Time S) of 0.3 to 30 s can be set for the starting phase of the motor. It is also possible to set a response delay time (Time R) of 0.2 to 2 s to suppress unwanted tripping due to unavoidable short load changes during normal operation. To guarantee correct operation of the response delay (Time R), the adjusted value for $\cos \phi_{max}$ has to be higher than the value for $\cos \varphi_{min}$ plus the hysteresis. Consequently, the overload and underload indication must not be active at the same time. Due to the internal electrical isolation of the supply circuit and the measuring circuit, it is also possible to use the device in systems with different supply voltages.

Function diagram - CM-LWN



Connection diagram CM-LWN



Motor load monitoring relays Technical data

| Туре | CM-LWN |
|---|--|
| Input circuit - Supply circuit | A1-A2 |
| Rated control supply voltage U_s - power A1-A2 consumption A1-A2 | 24-240 V AC/DC approx. 8.4 VA/W 110-130 V AC approx. 3.6 VA |
| A1-A2 | 220-240 V AC approx. 3.6 VA |
| A1-A2 | 380-440 V AC approx. 3.6 VA |
| A1-A2 | 480-500 V AC approx. 3.6 VA |
| Rated control supply voltage U _s tolerance | -15 %+10 % |
| Rated frequency AC versions | 50-60 Hz |
| AC/DC versions | 15-400 Hz or DC |
| Duty time | 100 % |
| Measuring circuit Monitoring function | L1/L-L1/K-L2-L3 Motor load monitoring by cos φ |
| <u> </u> | |
| Voltage range L1/K-L2-L3 | 110-500 V AC single-phase or three-phase |
| Current range L1/L-L1/K Permissible overload of current input | 0.5-5 A version 2-20 A version 25 A for 3 s 100 A for 3 s |
| Thresholds | cos φ _{min} and cos φ _{max} adjustable from 0 to 1 |
| Hysteresis (related to phase angle φ in °) | 4° |
| Frequency of measuring voltage | 15-400 Hz |
| Response time | 300 ms |
| Timing circuits | indication of over- and undervoltage fault |
| Start-up time (Time S) | 0.3-30 s, adjustable |
| Response delay (Time R) Accuracy within the rated control supply voltage tolerance | 0.2-2 s, adjustable |
| Accuracy within the rated control supply voltage tolerance | $\Delta t \leq 0.5\%$ |
| Accuracy within the temperature range | $\Delta t \le 0.06 \% / °C$ |
| Indication of operational states Control supply voltage | U: green LED |
| below cos ϕ_{min} | cos φ _{min} : red LED |
| $\cos \phi_{\text{min}}$ $\cos \phi_{\text{min}}$ | cos ϕ_{min} red LED |
| *************************************** | 15-16/18, 25-26/28 |
| Output circuits | / |
| Kind of output Operational principle | 2 x 1 c/o contact closed-circuit principle ¹⁾ |
| Contact material | AgCdO |
| Rated voltage (VDE 0110, IEC 664-1, IEC 947-1) | 250 V |
| Max. switching voltage | 400 V AC, 300 V DC |
| Rated operational current I _e (IEC/EN 60947-1) AC-12 (resistive) 230 V | [4 A |
| AC-15 (inductive) 230 V DC-12 (resistive) 24 V | 1 A A |
| DC-12 (resistive) 24 V DC-13 (inductive) 24 V | 0.4 |
| | |
| max. rated operational voltage | 300 V AC |
| | |
| max. making/breaking apparent power at B 300 | 3600/360 VA 30 x 10 ⁶ switching cycles |
| Mechanical lifetime Electrical lifetime at AC-12, 230 V, 4 A | 1.0.1 x 10° switching cycles |
| Max. fuse rating to achieve short-circuit n/c / n/o contact | 10 A fast-acting / 10 A fast-acting |
| protection | To relate dotting representations |
| General data | |
| Dimensions (W x H x D) | 45 mm x 78 mm x 100 mm (1.77 inch x 3.07 inch x 3.94 inch) |
| Mounting position | lany |
| Degree of protection housing / terminals | |
| Ambient temperature range operation / storage Mounting | -25+65 °C / -40+85 °C DIN rail (IEC/EN 60715) |
| Electrical connection | DINTAI (ILO/ LIV 007 10) |
| Wire size fine-strand with wire end ferrule | 2 x 2.5 mm ² (2 x 14 AWG) |
| Standards | |
| Product standard | IEC 255-6, EN 60255-6 |
| Low Voltage Directive | 2006/95/EC |
| EMC Directive | 2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC |
| Electromagnetic compatibility | EN 61000-6-2, EN 61000-6-4 |
| | Level 3 (6 kV / 8 kV) |
| radiated, radio-frequency, electromagnetic field IEC/EN 61000-4-3 electrical fast transient / burst IEC/EN 61000-4-4 | Level 3 (10 V/m) Level 3 (2 kV / 5 kHz) |
| surge IEC/EN 61000-4-4 | |
| conducted disturbances, induced by radio-frequency fieldsIEC/EN 61000-4-6 | |
| | |
| | [5 g |
| Mechanical resistance (IEC 68-2-6) | 10 g |
| Mechanical resistance (IEC 68-2-6) Environmental testing (IEC 68-2-30) | 5 g 10 g 24 h cycle time, 55 °C, 93 % rel., 96 h |
| Mechanical resistance (IEC 68-2-6) Environmental testing (IEC 68-2-30) Isolation data | 10 g |
| Mechanical resistance (IEC 68-2-6) Environmental testing (IEC 68-2-30) Isolation data Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5) | 10 g 24 h cycle time, 55 °C, 93 % rel., 96 h |
| Mechanical resistance (IEC 68-2-6) Environmental testing (IEC 68-2-30) Isolation data Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5) Rated insulation voltage between supply-, measuring- and output circuit | 10 g |
| Mechanical resistance (IEC 68-2-6) Environmental testing (IEC 68-2-30) Isolation data Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5) Rated insulation voltage between supply-, measuring- and output circuit Rated impulse withstand voltage between all isolated circuits | 10 g |
| Mechanical resistance (IEC 68-2-6) Environmental testing (IEC 68-2-30) Isolation data Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5) Rated insulation voltage between supply-, measuring- and output circuit | 10 g |

¹⁾ Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold. Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

Motor control and protection Product group picture



Motor control and protection Table of contents

Motor control and protection

| Benefits and advantages | 2/81 |
|-------------------------|------|
| Technical data | 2/82 |

Motor control and protection Benefits and advantages

UMC100.3 is a flexible, modular and expandable motor management system for constant-speed low-voltage range motors. It's most important tasks include motor protection, prevention of plant standstills and the reduction of down time. This is made possible by early information relating to possible motor problems which avoids unplanned plant standstills. Even if a motor trips, quick diagnosis of the cause of the fault serves to reduce downtime.

UMC100.3 combines in a very compact unit:

Motor protection

- Overload, underload
- Overvoltage, undervoltage
- Blocked rotor, low / high current
- Phase failure, imbalance, phase sequence
- Earth leakage
- Thermistor protection
- Limitation of starts per time
- One single version with integrated measuring system covers the rated motor current from 0.24 to 63 A

Motor control

- Integrated and easy to parametrize motor starter functions like direct, reverse, star-delta,...
- Additionally free programmable logic for application specific control functions
- Expansion modules DX111, DX122 for more I/Os
- Expansion modules VI150, VI155 for 3-phase voltage measuring
- Analog and temperature module Al111

Motor diagnostics

- Quick and comprehensive access to all relevant data via fieldbus and/or operator panel
- Current, thermal load
- Phase voltages
- Power factor
- Energy

Further information

UMC Catalog 2CDC 190 022 C0206 UMC Brochure 2CDC 135 011 B0203

Communication

- Communication-independent basic device
- Freely selectable fieldbus protocol with FieldBusPlug
- Profibus DP
- DeviceNet
- Modbus RTU
- Ethernet Modbus TCP
- Profinet

Typical application segments

- Oil & gas
- Cement
- Paper
- Mining
- Steel
- Chemical industry

Motor control and protection Technical data



Basic device UMC100.3

| Main power | |
|--------------------------|--|
| Voltage | max 1000 V AC |
| Frequency | 4565 Hz |
| Rated motor current | 0.2463 A, without accessories Higher currents with external transformer |
| Tripping classes | 5E, 10E, 20E, 30E, 40E in accordance with EN/IEC 60947-4-1 |
| Short-circuit protection | Separate fuse on network side |
| Control unit | |
| Supply voltage | 24 V DC, 110-240 V AC/DC |
| Inputs | 6 digital inputs 24 V DC 1 PTC input |
| Outputs | 3 digital relay outputs 1 digital transistor output |

Expansion modules

The UMC100.3 can be expanded with maximum 4 expanstion modules: One digital expansion module DX111 or DX122, one module VI150 or VI155 and 2 analog modules Al111.

Communication takes place via a simple two-wire line. The maximum distance allowed between the UMC100.3 and the expansion module is 3 m.



Digital expansion modules DX111 / DX122

Expands the UMC100.3 to include additional digital inputs and outputs and an analog output

| Supply voltage | 24 V DC |
|----------------|--|
| Inputs | DX111: 8 digital inputs 24 V DC DX122 8 digital inputs 110/230 V AC |
| Outputs | 4 digital relay outputs 1 analog output, 0/420 mA, / 010 V configurable |

Voltage modules VI150/VI155

Voltage modules for determining phase voltages, power factor (cos j), active power, apparent power, energy, harmonic content (THD)

VI150 for use in grounded networks VI155 for use in grounded and ungrounded networks



| Supply voltage | 24 V DC |
|---------------------|------------------------|
| Voltage inputs | L1, L2, L3 |
| Rated voltage range | 150 690 V AC |
| Outputs | 1 digital relay output |

Analog module Al111
Expand the UMC100.3 with analog and temperature inputs

| Supply voltage | 24 V DC |
|----------------|--|
| Inputs | 0-10 V, 0/4-20 mA PT100, PT1000, 2- or 3-wire connection KTY83, KTY84, NTC |

Motor control and protection Technical data



Ethernet communication interfaces

Mounted in the MCC cable chamber; connection of 1 to 4 motor controllers UMC100.3 via simple cables

| MTQ22 | for Modbus TCP |
|-------|-----------------|
| PNQ22 | for Profinet IO |



Fieldbus communication interfaces
Can be mounted direct on the UMC100.3 or separate in the cable chamber of the MCC.
Connection for standard fieldbus cables with 9-pole Sub-D (Profibus DP) or terminal blocks

| PDP32 | for Profibus DP |
|-------|-----------------|
| DNP31 | for DeviceNet |
| MRP31 | for Modbus RTU |



CEM11 earth leakage sensors
Summation current transformer for connecting to a digital input Mounting with bracket on DIN busbar or wall

| CEM11-FBP.20 | 80 – 1.700 mA | 20 mm Ø |
|---------------|-----------------|----------|
| CEM11-FBP.35 | 100 – 3.400 mA | 35 mm Ø |
| CEM11-FBP.60 | 120 – 6.800 mA | 60 mm Ø |
| CEM11-FBP.120 | 300 – 13.600 mA | 120 mm Ø |



Current transformer CT4L / CT5L

Only required for rated motor currents >63 A

Linear transformer, 3-phase with terminal block, designed for connecting leads Cu 2.5 mm²



UMC100-PAN control panel
Installation on the device or on the switching cabinet door Graphics-enabled and backlit display, 3 LEDs for status indication Freely configurable error messages

USB port for PC connection

Multilingual: German, English, French, Italian, Polish, Portuguese, Spanish, Russian

Thermistor motor protection relays Product group picture



Thermistor motor protection relays Table of contents

Thermistor motor protection relays

| Benefits and advantages, Applications | 2/87 |
|---|------|
| Operating controls | 2/88 |
| Selection table CM-MSS range | 2/89 |
| Ordering details | 2/90 |
| Ordering details - PTC temperature sensors C011 | 2/91 |
| Technical data | 2/92 |
| Connection diagrams | 2/95 |
| Circuit diagram | 2/96 |

Thermistor motor protection relays Benefits and advantages, Applications

The thermistor motor protection relays of the CM-MSx range protect motors with PTC sensors against high temperature. These sensors are incorporated in the motor windings thus measuring the motor heat directly.

Direct temperature measuring

Generally, motor damages caused by overload or overheating situations can be prevented in different ways. Compared to the indirect temperature measuring which monitors the motor current, the temperature inside the motor can be measured by direct temperature measuring.

This enables direct control and evaluation of the following operating conditions like:

- Heavy duty starting
- Increased switching frequency
- Single phase operation
- Phase unbalance
- High ambient temperature
- Insufficient cooling
- Breaking operation

Therefore the consequences from overheating like abrasion as well as electrical failures can be prevented.

The direct measuring principle is carried out by a combination of the thermistor motor protection relay and 3 PTC sensors which are installed directly in the motor by the manufacturer. Those 3 PTC sensors are placed directly at the thermal hotspots, the motor windings.

Monitoring the motor

The thermistor motor protection relay measures the resistance of the PTC sensors which reflects the internal motor temperature permanently.

If the temperature in the motor windings rises excessively and reaches the nominal response temperature (NRT), the thermistor motor protection relay detects this situation and the output relay switches off.

By doing so the motor contactor gets triggered and switches off the motor.

CM-MSS functionality video



Characteristics CM-MSS¹⁾

- Different types of contacts available
 - 1 x 2 c/o (SPDT) contacts
 - 2 x 1 c/o (SPDT) contact
 - 1 n/o and 1 n/c contact
- 1 or 2 measuring circuits
- Different types of reset functions
 - Automatic
 - Manual
 - Remote
- Rated control supply voltages
 - 24 V AC/DC
 - 24-240 V AC/DC
 - 110-130 V AC, 220-240 V AC
- Approvals / Marks
 - (**(**)

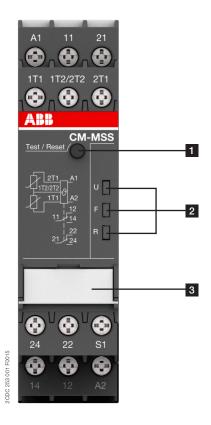
Features 1)

- Additional functions:
 - Dynamic interrupted wire detection
 - Short-circuit monitoring of the sensor circuit
 - Non-volatile fault storage
 - Single or sum evaluation
- Easy configuration via DIP switches
- LEDs to distinguish between different failure causes
- Screw connection technology or Easy Connect Technology available
- Test/Reset button available
 - ¹⁾ Depending on device the characteristics vary, for detailled overview see "Selection table CM-MSx range" on page 89.

Characteristics CM-MSE

- Auto reset
- Connection of several sensors (max. 6 sensors connected in series)
- Monitoring of bimetals
- 1 n/o contact
- Excellenct cost / performance ratio

Thermistor motor protection relays Operating controls



1 Test / Reset button

Reset - only possible if measured value < switch-on resistance

2 Indication of operational states with LEDs

U: green LED - Status indication of control supply voltage Γ

Control supply voltage applied

F: red LED - Fault message

R: yellow LED - Status indication of the output relay

3 Marker label / DIP switches (depending on device) e.g.

Single evaluation 2 x 1 c/o (SPDT) contact

Accumulative evaluation 1 x 2 c/o (SPDT) contacts

M Short-circuit detection de-activated

Short-circuit detection activated

■ Non-volatile fault storage activated

Mon-volatile fault storage de-activated

LEDs, status information and fault messages CM-MSS

| Operational state | U: green LED | F: red LED | R: yellow LED |
|---|--------------|-------------|---------------|
| Absence of control supply voltage | OFF | OFF | OFF |
| No fault | | OFF | |
| Short circuit | | | OFF |
| Interrupted wire | | | OFF |
| Measuring circuit 1: Overtemperature | | | OFF |
| Measuring circuit 2: Overtemperature | | ПП | OFF |
| Test function | nnn | OFF | OFF |
| Fault rectified but not confirmed | | 1) | $\Pi\Pi\Pi$ |
| Change of configuration not confirmed | | OFF | \mathcal{M} |
| Control supply voltage not within the tolerance range | nnn | | OFF |
| Internal fault 2) | OFF | ПП | |
| Internal fault 2) | | $\Pi\Pi\Pi$ | $\Pi\Pi\Pi$ |

¹⁾ Depending on the fault with the highest priority

In case of several faults, the fault with the higher priority is shown. The reset can be made after rectification and confirmation of the last fault.

²⁾ Restart the device. If after restart the same fault is indicated, replace the device.

Thermistor motor protection relays Selection table CM-MSx range

| | Order code | 1SVR550800R9300 | 1SVR550801R9300 | 1SVR740720R1400 | 1SVR730720R1400 | 1SVR740700R0100 | 1SVR730700R0100 | 1SVR740700R2100 | 1SVR730700R2100 | 1SVR740722R1400 | 1SVR730722R1400 | 1SVR740700R0200 | 1SVR730700R0200 | 1SVR740700R2200 | 1SVR730700R2200 | 1SVR740712R1400 | 1SVR730712R1400 | 1SVR740712R0200 | 1SVR730712R0200 | 1SVR740712R2200 | 1SVR730712R2200 | 1SVR740712R1200 | 1SVR730712R1200 | 1SVR740712R1300 | 1SVR730712R1300 |
|---|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | Type CM-MSF | CM-MSE | CM-MSE | CM-MSS.11P | CM-MSS.11S | CM-MSS.12P | CM-MSS.12S | CM-MSS.13P | CM-MSS.13S | CM-MSS.21P | CM-MSS.21S | CM-MSS.22P | CM-MSS.22S | CM-MSS.23P | CM-MSS.23S | CM-MSS.31P | CM-MSS.31S | CM-MSS.32P | CM-MSS.32S | CM-MSS.33P | CM-MSS.33S | CM-MSS.41P | CM-MSS.41S | CM-MSS.51P | CM-MSS.51S |
| Characteristics | | | , | , | , | , | , | , | | , | , | | | | , | , | , | | | | , | , | , — | , | , |
| ATEX approval | | | | | | . . | | . . | <u>.</u> | | • | <u>.</u> | <u> </u> | <u>.</u> | <u>.</u> | | • | | | | - | • | • | | |
| Number of sensor circuits | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| Single or accumulative evaluation | | | | . . | . . | . . | <u>.</u> | . <u>ļ</u> | <u>.</u> | <u> </u> | . . | ļ | ļ | <u> </u> | <u>.</u> | ļ | ļ | ļ | <u> </u> | <u>.</u> | ļ | | | • | |
| Number of LEDs | | | | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Contacts | | | , | , | , | , | , | , | | , | , | , | , | | | , | , | | | | , | , | , — | , | |
| 1 c/o (SPDT) contact | | | | | . . | • | • | • | • | <u>.</u> | . . | <u>.</u> | ļ | <u>.</u> | <u>.</u> | ļ | ļ | ļ | <u>.</u> | <u>.</u> | <u>.</u> | | | | <u> </u> |
| 2 c/o (SPDT) contacts | | | | | . . | | <u>.</u> | . . | ļ | <u> </u> | | • | | • | • | ļ | ļ | | | • | • | • | • | . <u>ļ</u> | ļl |
| 1 n/o | - | | | | | | | ļ | ļ | ļ | | ļ | ļ | ļ | <u>.</u> | | ļ | ļ | <u> </u> | ļ | ļ | | | ļ | ļl |
| 1 n/c and 1 n/o | | | | | • | ļ | | . . | <u>.</u> | • | • | <u> </u> | <u> </u> | <u>.</u> | <u> </u> | • | • | ļ | <u> </u> | <u>.</u> | <u> </u> | | .ļ | | ļļ |
| 2 x 1 c/o or 1 x 2 c/o contacts, configurable | | | - | | i | į | | 1 | | | | | 1 | | | i | | | | | | <u> </u> | | • | • |
| Reset | | | - | , | | | - | : | ; | , | - | : | : | : | | | : | : | , | | , | - | - | , | |
| Manual | | | | | | | | . . | <u>.</u> | <u>.</u> | | | | | • | • | | | | • | | | | | |
| Remote | | | | | | | ļ | . . | | <u> </u> | | • | | | • | • | • | | | • | • | • | | | |
| Auto | - | | | • | • | • | • | • | • | • | • | ■ ¹⁾ | 1) | ■ ¹⁾ | ■ ¹⁾ | ■ ¹⁾ | ■ ¹⁾ | 1) | ■ ¹⁾ | ■ ¹⁾ | 1) | ■ ¹⁾ | ■ ¹⁾ | 2) | ■ 2) |
| Test button | | | | | | | | | | | | | | | | • | • | - | • | • | • | • | • | • | • |
| Functions | | -,- | - | , | , | , | | | | , | , | , | | | , | , | , | | , | | , | , | - | , | , |
| Short-circuit detection | | | | | . . | | ļ | . . | ļ | • | • | ļ | <u> </u> | | <u>.</u> | • | | • | | • | • | | | | <u>.</u> |
| Short-circuit detection, configurable | | | | | . . | . . | ļ | . . | ļ | ļ | | ļ | ļ | <u>.</u> | <u>.</u> | ļ | ļ | ļ | <u> </u> | ļ | ļ | • | | | |
| Dynamic interrupted wire detection | | | | • | • | . . | <u>.</u> | . <u>.</u> | <u>.</u> | • | • | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | • | • | | | • | • | • | | | |
| Non-volatile fault storage | | | | | • | | | . . | ļ | • | • | ļ | ļ | ļ | <u>.</u> | • | | ļ | ļ | <u>.</u> | ļ | | | | <u>.</u> |
| Non-volatile fault storage, configurable | | | | | | | | | | | | | | | | | | | | | | • | • | • | |
| Rated control supply voltage U _s | | | , | , | , | , | , | , | , | , | , | , | , | , | | , | , | , | , | , | , | , — | , — | , | , |
| 24 V AC | | l | | | . . | . . | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | . . | <u> </u> | <u> </u> | <u>.</u> | <u>.</u> | <u> </u> | <u> </u> | <u> </u> | <u>į</u> | <u>.</u> | <u>.</u> | | | <u>.</u> | <u>.</u> |
| 110-130 V AC | | | | | | | <u>.</u> | <u>.</u> | <u>.</u> | <u> </u> | | <u> </u> | <u> </u> | <u>.</u> | <u>.</u> | <u>.</u> | <u> </u> | <u> </u> | <u> </u> | <u>.</u> | <u> </u> | | | | <u>.</u> |
| 220-240 V AC | | | | | . . | . . | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | . . | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | <u>į</u> | <u>.</u> |
| 24-240 V AC/DC | | | | • | • | . . | <u>.</u> | <u>.</u> | <u>.</u> | • | • | <u>.</u> | <u> </u> | <u>.</u> | <u>.</u> | • | • | <u> </u> | <u> </u> | <u>.</u> | <u> </u> | • | • | • | • |
| 24 V AC/DC | | | <u>.</u> į | <u>.</u> į | <u>.</u> | • | • | <u>.</u> | <u>.</u> | <u> </u> | <u>.</u> | • | • | <u> </u> | <u>.</u> | ļ | <u> </u> | • | • | <u>.</u> | <u> </u> | <u>.</u> | <u> </u> | <u>.</u> | <u>.</u> |
| 110-130 V AC, 220-240 V AC | | | | | 1 | <u> </u> | | • | • | | 1 | | | • | • | 1 | | | | • | • | | | 1 | |
| Connection type | | | , | | | , | , | , | | | | , | , | | | | , | , | | | | | | , | , |
| Push-in terminals | | | | • | | • | | • | <u>.</u> | • | | | <u> </u> | • | <u>.</u> | • | <u>.</u> | | <u>.</u> | • | <u>.</u> | • | | • | <u>.</u> |
| Double-chamber cage connection terminals | | | | | • | | • | | • | | • | | • | | • | | • | | • | | • | | • | | • |

¹⁾ For automatic reset, connect terminals S1 to T2. ²⁾ For automatic reset, connect terminals S1 to 1T2/2T2.

Thermistor motor protection relays Ordering details

Description

Ordering details CM-MSx

The thermistor motor protection relays CM-MSx are used to control motors equipped with PTC temperature sensors. The PTC temperature sensors are incorporated in the motor windings to measure the motor heating. This enables direct control and evaluation of various operating conditions. Depending on the products also ATEX approvals for use in hazardous areas are availabe.

ABB also offers PTC temperature sensors C011 (according to DIN 44081) which are suitable for embedding in motor windings.



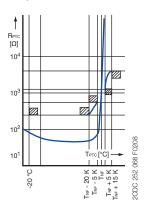
CM-MSS.51S

| Rated control supply voltage | | Function | Type | Order code | Price | Weight (1 pce) |
|-------------------------------|---------------|--|------------|-----------------|-------|-------------------|
| | | | | | 1 pce | kg (lb) |
| 24 V AC | | | CM-MSE | 1SVR550805R9300 | | 0.11 (0.24) |
| 110-130 V AC | 1 n/o | Autoreset | CM-MSE | 1SVR550800R9300 | | 0.11 (0.24) |
| 220-240 V AC | • | | CM-MSE | 1SVR550801R9300 | | 0.11 (0.24) |
| | 1 = /2 1 = /2 | Autoreset, dynamic interrupted wire detection, | CM-MSS.11P | 1SVR740720R1400 | | 0.119 (0.263) |
| 24-240 V AC/DC | I n/c, I n/o | non-volatile fault storage, ATEX approval | CM-MSS.11S | 1SVR730720R1400 | | 0.127 (0.280) |
| | | | CM-MSS.12P | 1SVR740700R0100 | | 0.105 (0.231) |
| 24 V AC/DC | 1 c/o (SPDT) | Autoreset | CM-MSS.12S | 1SVR730700R0100 | | 0.113 (0.249) |
| | <u></u> | | CM-MSS.13P | 1SVR740700R2100 | | 0.147 |
| 110-130 V AC, 220-240 V AC | 1 c/o (SPDT) | Autoreset | CM-MSS.13S | 1SVR730700R2100 | | (0.324) 0.155 |
| | | Autoreset, dynamic | CM-MSS.21P | 1SVR740722R1400 | | (0.342) 0.118 |
| 24-240 V AC/DC | 1 n/c. 1 n/o | interrupted wire detection, non-volatile fault storage, | | | | (0.260) |
| 212101710720 | , | short-circuit detection, ATEX approval | CM-MSS.21S | 1SVR730722R1400 | | 0.126 (0.278) |
| 04.1/ AC/DC | 0 a/a (CDDT) | Auto monuel ou remete recet | CM-MSS.22P | 1SVR740700R0200 | | 0.121 (0.267) |
| 24 V AC/DC 2 c/o (SPDT) | 2 C/0 (SPDT) | Auto, manual or remote reset | CM-MSS.22S | 1SVR730700R0200 | | 0.132 (0.291) |
| 110-130 V AC, | 2 c/o (SPDT) | Auto, manual or remote reset | CM-MSS.23P | 1SVR740700R2200 | | 0.163 (0.359) |
| 220-240 V AC | 2 0/0 (01 D1) | Auto, manual or remote reset | CM-MSS.23S | 1SVR730700R2200 | | 0.174 (0.384) |
| 24-240 V AC/DC | 1 n/o 1 n/o | Auto, manual or remote reset, dynamic interrupted wire detection, non-volatile fault | CM-MSS.31P | 1SVR740712R1400 | | 0.120 (0.265) |
| 24-240 V AO/DO | 111/6, 111/0 | storage, short-circuit detection, ATEX approval | CM-MSS.31S | 1SVR730712R1400 | | 0.128 (0.282) |
| 04.1/ AC/DC | 0 a/a (CDDT) | | CM-MSS.32P | 1SVR740712R0200 | | 0.120 (0.265) |
| 24 V AC/DC | 2 c/o (SPDT) | Auto, manual or remote reset, dynamic interrupted | CM-MSS.32S | 1SVR730712R0200 | | 0.130 (0.287) |
| 110-130 V AC, | 2 c/o (SPDT) | wire detection, short-circuit detection, ATEX approval | CM-MSS.33P | 1SVR740712R2200 | | 0.162 (0.357) |
| 220-240 V AC | 2 0,0 (0. 2.) | | CM-MSS.33S | 1SVR730712R2200 | | 0.172 (0.379) |
| | | Auto, manual or remote reset, dynamic interrupted wire | CM-MSS.41P | 1SVR740712R1200 | | 0.130 (0.287) |
| 0.000VA0/7-7 | 2 c/o (SPDT) | detection, non-volatile fault storage, short-circuit detection, ATEX approval | CM-MSS.41S | 1SVR730712R1200 | | 0.141 (0.311) |
| 24-240 V AC/DC | 2x1 c/o or, | Auto, manual or remote reset, dynamic interrupted wire detection, non-volatile fault | CM-MSS.51P | 1SVR740712R1300 | | 0.135 (0.298) |
| | 1x2 c/o | storage, short-circuit detection, accumulative evaluation, ATEX approval | CM-MSS.51S | 1SVR730712R1300 | | 0.145 (0.320) |

Thermistor motor protection relays Ordering details - PTC temperature sensors C011



Temperature sensor characteristics



- 1) Temperature sensor C011, standard version acc. to DIN 44081
- ²⁾ Triple temperature sensor C011-3

Description

The PTC temperature sensors (temperature-dependent with positive temperature coefficient) are selected by the manufacturer of the motor depending on:

- the motor insulation class according to IEC/EN 60034-11,
- the special characteristics of the motor, such as the conductor cross-section of the windings, the permissible overload factor etc.
- special conditions prescribed by the user, such as the permissible ambient temperature, risks resulting from locked rotor, extent of permitted overload etc.

One temperature sensor must be embedded in each phase winding. For instance, in case of three-phase squirrel cage motors, three sensors are embedded in the stator windings. For pole-changing motors with one winding (Dahlander connection), 3 sensors are also sufficient. Pole-changing motors with two windings, however, require The sensors are suitable for embedding in motor windings with rated operating voltages of up to 600 V AC. Conductor length: 500 mm per sensor. A 14 V varistor can be connected in parallel to protect the sensors from overvoltage. Due to their characteristics, the thermistor motor protection relays can also be used with PTC temperature sensors of other manufacturers which comply with DIN 44 081 and DIN 44 082 6 sensors.

If an additional warning is required before the motor is switched off, separate sensors for a correspondingly lower temperature must be embedded in the winding. They have to be connected to a second control unit.

Ordering details

| Rated response temperature T _{NE} | Color coding | Туре | Order code | Price | Weight (1 pce) |
|--|--------------|--------------------------|-----------------|-------|-------------------|
| - INF | | | | 1 pce | kg (lb) |
| 70 °C | white-brown | C011-701) | GHC0110003R0001 | | 0.02 (0.044) |
| 80 °C | white-white | C011-80 ¹⁾ | GHC0110003R0002 | | 0.02 (0.044) |
| 90 °C | green-green | C011-90 ¹⁾ | GHC0110003R0003 | | 0.02 (0.044) |
| 100 °C | red-red | C011-100 ¹⁾ | GHC0110003R0004 | | 0.02 (0.044) |
| 110 °C | brown-brown | C011-110 ¹⁾ | GHC0110003R0005 | | 0.02 (0.044) |
| 120 °C | gray-gray | C011-120 ¹⁾ | GHC0110003R0006 | | 0.02 (0.044) |
| 130 °C | blue-blue | C011-130 ¹⁾ | GHC0110003R0007 | | 0.02 (0.044) |
| 140 °C | white-blue | C011-140 ¹⁾ | GHC0110003R0011 | | 0.02 (0.044) |
| 150 °C | black-black | C011-150 ¹⁾ | GHC0110003R0008 | | 0.02 (0.044) |
| 160 °C | blue-red | C011-160 ¹⁾ | GHC0110003R0009 | | 0.02 (0.044) |
| 170 °C | white-green | C011-170 ¹⁾ | GHC0110003R0010 | | 0.02 (0.044) |
| 150 °C | black-black | C011-3-150 ²⁾ | GHC0110033R0008 | | 0.05 (0.11) |

Technical data

| Characteristic data | Sensor type C011 |
|--|---------------------------|
| Cold-state resistance | 50 -100 Ω at 25 °C |
| Warm-state resistance \pm 5 up to 6 K of rated response temperature $T_{\rm NF}$ | 10 000 Ω |
| Thermal time constant, sensor open 1) | <5s |
| Permitted ambient temperature | +180 °C |

| Rated response tempera- | PTC resistance R | PTC resistance R2) at PTC temperatures of: | | | | | |
|---|--------------------------------|--|--------------------------|------------------------|--|--|--|
| ture \pm tolerance $T_{_{ m NF}} \pm \Delta T_{_{ m NF}}$ | from -20 °C to T _{NF} | T_{NF} - ΔT_{NF} | $T_{NF} + \Delta T_{NF}$ | T _{NF} + 15 K | | | |
| | - 20 K | (UPTC \leq 2.5 V) | (UPTC \leq 2.5 V) | (UPTC ≤ 7.5 V) | | | |
| 70 ±5 °C | | ≤ 570 Ω | ≥ 570 Ω | | | | |
| 80 ±5 °C | | ≥ 370 Ω | ≥ 370 Ω | - | | | |
| 90 ±5 °C | | | ≥ 1330 Ω | | | | |
| 100 ±5 °C | | | | | | | |
| 110 ±5 °C | | | | | | | |
| 120 ±5 °C | ≤ 100 Ω | ≤ 550 Ω | | ≥ 4000 Ω | | | |
| 130 ±5 °C | | ≥ 550 12 | ≥ 1000 12 | ≥ 4000 1 2 | | | |
| 140 ±5 °C | | | | | | | |
| 150 ±5 °C | | F | | | | | |
| 160 ±5 °C | | | | | | | |
| 170 ±7 °C | | ≤ 570 Ω | ≥ 570 Ω | - | | | |

¹⁾ Not embedded in windings.

²⁾ For triple temperature sensor take values x 3

Thermistor motor protection relays Technical data

Technical data

Data at $T_a = 25$ °C and rated values, unless otherwise indicated

| Supply circuit - Input circuit | CM-MSS.x1 | CM-MSS.x2 | CM-MSS.x3 |
|---|-----------------------------------|---|--|
| Rated control supply voltage U _s A1-A2 | 24-240 V AC/DC | 24 V AC/DC | 220-240 V AC |
| A2-A3 | - | - | 110-130 V AC |
| Rated control supply voltage U _s tolerance | -15+10 % | | |
| Rated frequency | 15-400 Hz | 50-60 Hz | |
| Electrical insulation between supply circuit and measuring circuit | yes | no | yes |
| Power failure buffering time | 20 ms | | |
| Supply circuit - Measuring circuit / Sensor circuit | | | |
| Number of circuits | 1 (CM-MSS.51: 2) | | |
| Sensor type | PTC type A (DIN/EN | 44081, DIN/EN 44082) | |
| Max. total resistance of sensors connected in series, cold state | < 750 Ω | • | |
| Overtemperature switch-off resistance (relay de-energizes) | 2.83 kΩ ± 1% (CM-N | MSS.12 /.13 /.22 /.23: 2.7 | kΩ ± 5%) |
| monitoring switch-on resistance (relay energizes) | | ······································ | |
| Maximum voltage in sensor circuit 1.33 k Ω | | | |
| | 3.7 V | | |
| ∞ kΩ | | | ······································ |
| Maximum current in sensor circuit | 3.7 mA | | |
| Maximum sensor cable length | | n ² , 2 x 400 m at 2.5 mm ² | ······································ |
| Accuracy within the rated control supply voltage tolerance | 0.50 % (CM-MSS.12 | <u>.</u> | |
| Accuracy within the temperature range | | 12 /.13 /.22 /.23: 0.5 %/K |) |
| Repeat accuracy (constant parameters) | on request | ······································ | |
| Reaction time of the safety function | < 100 ms | | |
| Hardware fault tolerance (HFT) | 0 | | |
| Control circuit | I | | |
| Control function | see Selection table | CM-MSx range" on page | 89 |
| Maximum no-load voltage | 5.5 V | om mox range on page | |
| Max. current | | /.13 /.22 /.23: 1.2 mA) | ······································ |
| Maximum cable length | • | n ² , 2 x 400 m at 2.5 mm ² | 2 |
| Indication of operational states | 2 x 100 111 at 0.70 1111 | 11 , 2 x 400 111 at 2.0 111111 | |
| <u> </u> | LED green | | |
| | LED yellow | | ······································ |
| | LED red | | |
| Output circuit | 1 | | |
| Kind of output | see Selection table | CM-MSx range" on page | 2 89 |
| Operating principle | closed-circuit princip | | , 00 |
| Contact material | AgNi alloy, Cd free | | |
| Rated operational voltage U _s (IEC/EN 60947-1) | 250 V AC | | |
| Minimum switching voltage / Minimum switching current | 24 V / 10 mA | | |
| Maximum switching voltage / Maximum switching current | see data sheet | ······································ | |
| | 4 A | ······································ | |
| (IEC/EN 60947-5-1) AC-15 (inductive) at 230 V | | | |
| DC-12 (resistive) at 24 V | ····· | | |
| DC-13 (inductive) at 24 V | | ······································ | |
| AC Rating (UL 508) utilization category (Control Circuit Rating Code) | B 300 | | |
| maximum rated operational voltage | 250 V AC | | |
| maximum continuous thermal current at B 300 | 4 A | | |
| maximum making/breaking apparent power at B 300 | 3600/360 VA | | |
| Mechanical lifetime | 30 x 10 ⁶ switching cy | rcles | |
| | | | |
| Electrical lifetime at AC12, 230 V AC, 4 A | 0.1 x 10 ⁶ switching c | · | |
| Maximum fuse rating to achieve short-circuit n/c contact protection | 10 A fast-acting (CM | -MSS.12, CM-MSS.13, C | M-MSS.51: 6 A) |
| protection p/o contact | 10 A fast-acting | | |

Thermistor motor protection relays Technical data - CM-MSS

| General data | | | | | | | |
|---|--|--|---|--|--|--|--|
| MTBF | | on request | | | | | |
| Duty time | | 100 % | | | | | |
| Dimensions (W x H x D) | product dimensions | 22.5 x 85.6 x 103.7 mm (0.89 x 3.37 x 4.08 in) | | | | | |
| | packaging dimensions | 97 x 109 x 30 mm (3.82 x 4.29 x 1.1 | 8 in) | | | | |
| Weight | | see "Ordering details" on page 90 | | | | | |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mo | ounting without any tool | | | | |
| Mounting position | | any | | | | | |
| Minimum distance to other uni | ts vertical | 10 mm (0.394 in) if switching curren | t > 2 A | | | | |
| | horizontal | 10 mm (0.394 in) if switching curren | t > 2 A | | | | |
| Material of housing | | UL 94 V-0 | | | | | |
| Degree of protection | housing | IP50 | | | | | |
| | terminals | IP20 | | | | | |
| Electrical connection | | Screw connection technology | Easy Connect Technology (push-in | | | | |
| Wire size | fine-strand with(out) wire end ferrule | 1 x 0.5-2.5 mm ² (1 x 20-14 AWG) 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) | 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) | | | | |
| | rigid | 1 x 0.5-4 mm ² (1 x 20-12 AWG) 2 x 0.5-2.5 mm2 (2 x 20-14 AWG) | 2 x 0.5-1.5 mm ² (2 x 20-16 AWG) | | | | |
| Stripping length | ······································ | 8 mm (0.32 in) | <u>.</u> | | | | |
| Tightening torque | | 0.6-0.8 Nm (5.31-7.08 lb.in) | - | | | | |
| Wire end ferrule | | according to DIN 46228-1-A, | | | | | |
| ona ioriaio | | DIN 46228-4-E | | | | | |
| Environmental data | | | · | | | | |
| Ambient temperature ranges | operation | -25 °C+60 °C | | | | | |
| | storage | • | | | | | |
| Damp heat, cyclic (IEC/EN 600 | | 6 x 24 h cycle, 55 °C, 95 % RH | | | | | |
| Climatic category (IEC/EN 607 | | 3K5 (no condensation, no ice formation) | | | | | |
| Vibration, sinusoidal (IEC/EN 6 | | Class 2 | | | | | |
| Shock (IEC/EN 60255-21-2) | 3255 2 / | Class 2 | | | | | |
| Isolation data | | 2.000 = | | | | | |
| Rated insulation voltage | Supply circuit / Measuring circuit ¹⁾ | 200 V AC (CM MSS v2: p/o) | | | | | |
| U. (IEC/EN 60947-1, | Supply circuit / Output circuits | | | | | | |
| IEC/EN 60664-1) | Measuring circuit / Output circuits | | | | | | |
| | Output circuit 1 / Output circuit 2 | • | | | | | |
| Rated impulse | Supply circuit / Measuring circuit ¹⁾ | • | | | | | |
| Rated impulse withstand voltage | Supply circuit / Measuring circuit Supply circuit / Output circuits | | | | | | |
| U _{imp} (IEC/EN 60947-1, | Measuring circuit ¹⁾ / Output circuits | l | ····· | | | | |
| EC/EN 60664-1) | | | | | | | |
| Pagia inquiation | Output circuit 1 / Output circuit 2 | • | ····· | | | | |
| Basic insulation (IEC/EN 60664-1) | Supply circuit / Measuring circuit ¹⁾ | | ····· | | | | |
| / | Supply circuit / Output circuits | • | | | | | |
| | Measuring circuit ¹⁾ / Output circuits | • | | | | | |
| Toot voltage routing toot | Output circuit 1 / Output circuit 2 | 300 V AC | n/o) | | | | |
| Test voltage, routine test (IEC/EN 60255-27) | Supply circuit / Measuring circuit ¹⁾ | 2.5 kV, 50 Hz, 1 min. (CM-MSS.x2: | II/aj | | | | |
| | Supply circuit / Output circuits | · · · · · · · · · · · · · · · · · · · | | | | | |
| Took valtage tur ++ | Measuring circuit ¹⁾ / Output circuits | · · · · · · · · · · · · · · · · · · · | | | | | |
| Test voltage, type test (IEC/EN 60255-27) | Supply circuit / Measuring circuit ¹⁾ | 6 kV / 1.2 - 50 μs (CM-MSS.x2: n/a) | | | | | |
| | Supply circuit / Output circuits | | | | | | |
| | Measuring circuit ¹⁾ / Output circuits | · · · · · · · · · · · · · · · · · · · | | | | | |
| D11 | Output circuit 1 / Output circuit 2 | | | | | | |
| Protective separation (IEC/EN 61140, | Supply circuit / Measuring circuit ¹⁾ | yes, up to 300 V | <u>.</u> | | | | |
| IEC/EN 50178) | Supply circuit / Output circuits | yes (CM-MSS.x2: n/a) | | | | | |
| · | Measuring circuit ¹⁾ / Output circuits | yes | | | | | |
| | Output circuit 1 / Output circuit 2 | no | | | | | |
| Pollution degree (IEC/EN 6066 | | 3 | | | | | |

 $^{^{1)}}$ Potential of measuring circuit = Potential of control circuit

Thermistor motor protection relays Technical data - CM-MSS

| Standards | | |
|---|------------------------|---|
| Product standard | | IEC/EN 60255-1; IEC/EN 60947-8 |
| ow Voltage Directive | | 2006/95/EC |
| EMC directive | | 2004/108/EC |
| ATEX directive | | 94/9/EC (only ATEX variants "Selection table CM-MSx range" on page 89) |
| RoHS directive | | 2011/65/EC |
| Electromagnetic compatibility | | |
| nterference immunity to | | IEC/EN 61000-6-1, IEC/EN 61000-6-2 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3, 6 kV contact discharge, 8 kV air discharge |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3, 10 V/m (1 GHz), 3 V/m (2 GHz), 1 V/m (2.7 GHz) |
| electrical fast transient / burst | IEC/EN 61000-4-4 | Level 3, 2 kV / 5 kHz |
| surge | IEC/EN 61000-4-5 | Level 3, Installation class 3, supply circuit and measuring circuit 1 kV L-L, 2 kV L-N |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | Level 3, 0.15-80 MHz, 10 V, 80 % AM (1kHz) |
| voltage dips, short interruptions and voltage variations | IEC/EN 61000-4-11 | Class 3 |
| harmonics and interharmonics | IEC/EN 61000-4-13 | Class 3 |
| Additional interference immunity accord 00255-1 (reference on EN 60255-26_20 | | |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | 10 V/m (80 MHz - 3 GHz) |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | 10 V at stated frequencies |
| damped oscillatory waves | IEC/EN 61000-4-18 | Signal lines, symmetric coupling: 1 kV peak voltage Power supply, asymmetric coupling: 2.5 kV peak voltage |
| nterference emissions | | IEC/EN 61000-6-3, IEC/EN 61000-6-4 |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B |
| high-frequency radiated | Germanischer Lloyd | increased requirements in the emergency call frequency band |

Thermistor motor protection relays Technical data - CM-MSE

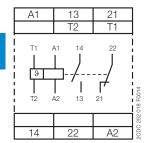
Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

| Supply circuit - Input circuit | | CM-MSE |
|---|--|---|
| Rated control supply voltage U ₂ power consumption | 1SVR550805R9300 | 24 V AC approx. 1.5 A |
| | 1SVR550800R9300 | 110-130 V AC approx. 1.5 A |
| | | 220-240 V AC approx. 1.5 A |
| Datadarahal | 13711330801119300 | -15+10 % |
| Rated control supply voltage U _s tolerance | | |
| Rated frequency | | 50-60 Hz |
| Measuring circuit | | |
| Monitoring function Number of sensor circuits | T1-T2 | temperature monitoring by means of PTC sensors |
| Sensor circuit | | |
| Temperature threshold (relay de-energizes) | | 2.7-3.7 kΩ |
| Temperature hysteresis (relay energizes) | | 1.7-2.3 kΩ |
| Short-circuit threshold (relay de-energizes) | | <18 Ω |
| Short-circuit hysteresis (relay energizes) | | >45 Ω |
| Maximum total resistance of sensors connected in serie | | ≤1.5 kΩ 2 x 100 m at 0.75 mm², 2 x 400 m at 2.5 mm² |
| Maximum sensor cable length for short-circuit detection Response time | 1 | < 100 ms |
| Output circuit | | (100 1113 |
| Kind of output | 12 14 | 1 n/o contact |
| · | | |
| Operational principle | | closed-circuit principle (output relay de-energizes if the measured value exceeds/drops below the adjusted threshold) |
| Contact material | | AgCdO |
| Rated voltage VDE 0110 | , IEC 664-1, IEC 60947-1 | 250 V |
| Maximum switching voltage | | 250 V |
| Rated operating current I (IEC/EN 60947-5-1) | AC-12 (resistive) at 230 V | 4 A |
| | C-15 (inductive) at 230 V DC-12 (resistive) at 24 V | 3 A |
| | DC-12 (resistive) at 24 V | 4 A 2 A |
| AC Rating (UL 508) utilization category (Cor | ntrol Circuit Rating Code) | B 300 |
| maximum | rated operational voltage | 300 V AC |
| maximum continuous | thermal current at B 300 | 5 A |
| | ng apparent power at B 300 | 3600/360 VA |
| Mechanical lifetime Electrical lifetime | ot AC12, 220 V AC, 4 A | 30 x 10 ^s switching cycles 0.1 x 10 ^s switching cycles |
| Maximum fuse rating to achieve short-circuit | n/c contact | 10 A fast-acting |
| protection | | 10 A fast-acting |
| General data | .,, -, -, -, -, -, -, -, -, -, -, -, -, - | |
| Dimensions (W x H x D) | | 22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in) |
| Duty time | | 100 % |
| Weight | | approx. 0.11 kg (0.24 lb) |
| Mounting position | L / A 1 1 - 1 - 1 - 1 - 1 | any |
| Degree of protection Ambient temperature range | housing / terminals | -20+60 °C |
| Ambient temperature range | storage | -20+85 °C |
| Mounting | Storage | DIN rail (IEC/EN 60715) |
| Electrical connection | | |
| | and with wire end ferrule | 2 x 1.5 mm ² (2 x 16 AWG) |
| fine strand | without wire end ferrule | 2 x 0.75-1.5 mm² (2 x 18-16 AWG) |
| | | 2 x 1-1.5 mm² (2 x 18-16 AWG) |
| Stripping length | | 2 x 0.75-1.5 mm² (2 x 18-16 AWG) |
| Tightening torque | | 0.6-0.8 Nm (5.31-7.08 lb.in) |
| Standards | | |
| Product standard | | IEC 255-6, EN 60255-6 |
| Low Voltage Directive | | 2006/95/EC 2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC |
| EMC Directive Electromagnetic compatibility | | 2004/100/EO, 31/203/EEO, 32/31/EEO, 33/00/EEO, 33/01/EEO |
| electronagnetic compatibility | IEC/EN 61000 4 0 | Level 3 (6 kV / 8 kV) |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-2 | |
| electrical fast transient /burst | | Level 3 (2 kV / 5 kHz) |
| surge | IEC/EN 61000-4-5 | |
| conducted disturbances, induced by radio- | IEC/EN 61000-4-6 | |
| frequency fields | | 6 g |
| Operational reliability (IEC 68-2-6) Resistance to vibration (IEC 68-2-6) | ·······• | 6 g |
| | | 10 g 24 h cycle time, 55 °C, 93 % rel., 96 h |
| Environmental testing (IEC 68-2-30) | | 24 II Gygle tillie, 33 G, 93 % fel., 90 fl |
| Electromagnetic compatibility | | |
| Rated voltage between supply, measuring and output c | ircuit | 250 V |
| Rated impulse withstand voltage between all isolated ci Test voltage between all isolated circuits | rcuits | 4 kV / 1.2 - 50 μs 2.5 kV, 50 Hz, 1 min. |
| Pollution degree | | 3 |
| Overvoltage category | | |
| | | - |

Thermistor motor protection relays Connection diagrams

CM-MSS.11, CM-MSS.21



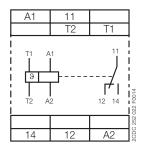
A1 - A2 Control supply voltage

13 - 14 n/o contact

21 - 22 n/c contact

T1 - T2 Measuring circuit

CM-MSS.12

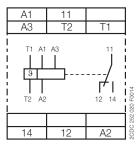


A1 – A2 Control supply voltage

11 - 12/14 c/o contact

T1 - T2 Measuring circuit

CM-MSS.13



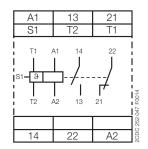
A1 – A2 Control supply voltage 220-240 V AC

A2 – A3 Control supply voltage 110-130 V AC

11 - 12/14 c/o contact

T1 - T2 Measuring circuit

CM-MSS.31



A1 – A2 Control supply voltage

13 – 14 n/o contact

21 - 22 n/c contact

S1 – T2 Automatic reset

(jumpered)

T1 - T2 Measuring circuit

CM-MSS.22, CM-MSS.32, CM-MSS.41

| A1 | 11 | 21 | |
|------|-------|--------|--------------------|
| | T2 | T1 | |
| S1-9 | A1 11 | 21 | 2CDC 252 019 F0014 |
| 24 | 22 | S1 | 252 |
| 14 | 12 | A2 | CDC |

A1 – A2 Control supply voltage 24 V AC/DC

11 – 12/14 1st c/o (SPDT) contact

21 - 22/24 2nd c/o (SPDT)

contact

S1 – T2 Automatic reset (jumpered)

T1 – T2 Measuring circuit

CM-MSS.23, CM-MSS.33

| A1 | 11 | 21 | |
|-------|----|-----------|-------------------|
| A3 | T2 | T1 | |
| T1 A1 | 12 | 11 21 | CDC 252 021 F0014 |
| 24 | 22 | S1 | 252 (|
| 14 | 12 | A2 | SDC |

A1 – A2 Control supply voltage 220-240 V AC

A2 – A3 Control supply voltage 110-130

V AC

11 - 12/14 1st c/o (SPDT) contact

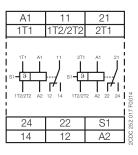
21 - 22/24 2nd c/o (SPDT)

contact

S1 – T2 Automatic reset (jumpered)

T1 – T2 Measuring circuit

CM-MSS.51



A1 – A2 Control

supply voltage 220-240 V AC

11 - 12/14 1st c/o (SPDT)

contact

21 - 22/24 2nd c/o (SPDT)

contact

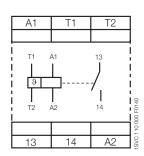
S1 – 1T2/2T2 Automatic reset

(jumpered)

1T1 - 1T2/2T2 Measuring circuit 1

2T1 - 1T2/2T2 Measuring circuit 2

CM-MSE



A1 – A2 Control supply voltage

24 V AC Sensor circuit

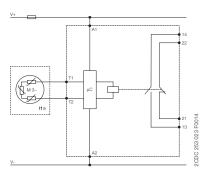
T1-T2 Sensor circuit

13-14 Output contact -

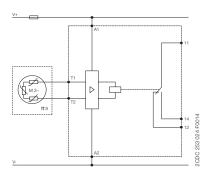
Output contact -Closed circuit principle

Thermistor motor protection relays Circuit diagram

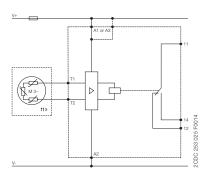
CM-MSS.11, CM-MSS.21



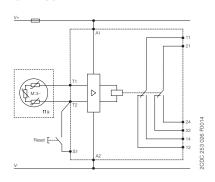
CM-MSS.12



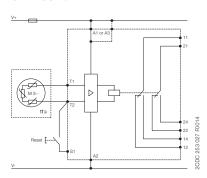
CM-MSS.13



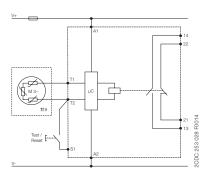
CM-MSS.22



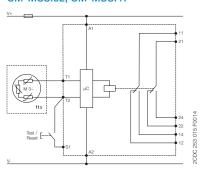
CM-MSS.23



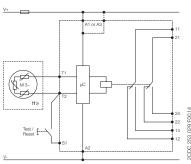
CM-MSS.31



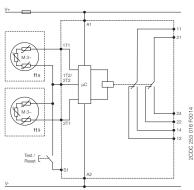
CM-MSS.32, CM-MSS.41



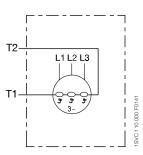
CM-MSS.33



CM-MSS.51



CM-MSE



Temperature monitoring relays Product group picture



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Temperature monitoring relays Benefits and advantages, Applications

Overview

The temperature monitoring relays can be used for temperature measurement in solid, liquid and gaseous media. The temperature is acquired by the sensor in the medium, evaluated by the device and monitored to determine whether it is within an operating range (range monitoring function) or has exceeded or fallen below a threshold.

Characteristics CM-TCS

- Adjustable sensor type: PT100
- Functionality like overtemperature monitoring, undertemperature monitoring, temperature window monitoring
- All configurations and adjustments by front-face operating elements
- Precise adjustment with direct reading scales
- One or two threshold values
- Hysteresis 2...20 % adjustable
- Operating temperature range -40...+60 °C
- 1 x 2 c/o or 2 x 1 c/o configurable
- Open- or closed-circuit principle configurable
- Short-circuit monitoring and interrupted wire detection
- 22.5 mm (0.89 in) width
- LEDs for status indication

Functional description

The temperature monitoring relays CM-TCS monitor overtemperature, undertemperature, or temperatures between two threshold values (window monitoring) with PT100 sensor. As soon as the temperature falls below or exceeds the threshold value the output relays change their positions according to the configured functionality and the front-face LEDs display the current status. Regardless of the selected configuration, the device is monitoring its measuring circuit for interrupted wires or short-circuits.

Characteristics C512 + C513

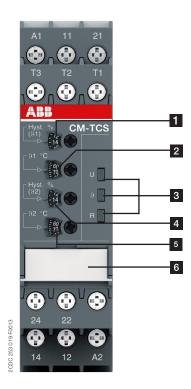
- Adjustable sensor types: PT100, PT1000, KTY83, KTY84, NTC-B57227-K333-A1
- Measuring principle for 2-wire and 3-wire sensors
- Temperature monitor for 1-3 sensor circuits
- Adjustable over-, undertemperature monitoring or range monitoring function
- 2 thresholds
- Hysteresis for both thresholds (1-99 Kelvin)
- Adjustable time delay from 0-999 s affects to both thresh-
- Storage function selectable via external signal (Y1-Y2)
- Non volatile storage of parameter settings
- 1 n/o (for wire-break and short-circuit detection) and 2 c/o
- Multifunctional digital display
- 3 LEDs for status indication
- Open- or closed-circuit principle selectable
- 45 mm wide housing with 24 terminals

C512

- Temperature monitor for 1 sensor circuit

- Temperature monitor for 1-3 sensor circuits
- In the 3-sensor version the status of the single sensors is displayed if the temperature exceeds or falls below the threshold. This way it can be easily determined which one of the connected sensors has exceeded or dropped below either one or both threshold values.

Temperature monitoring relays Operating controls



- 1 Adjustment of the hysteresis for threshold value 91
- 2 Adjustment of the threshold value 91
- 3 Indication of operational states

U: green LED – status indication of control supply voltage 9: red LED – fault message, state of measuring input R: yellow LED – status indication of the output relays

- 4 Adjustment of the hysteresis for threshold value 92
- 5 Adjustment of the threshold value 92
- 6 DIP switch functions / marker label (on page 2/104)
 - Overtemperature monitoring

 - Temperature window monitoring activated
 - ™ Temperature window monitoring de-activated
 - Closed-circuit principle
 - Open-circuit principle
 - 2 x 1 c/o (SPDT) contact
 - 1 x 2 c/o (SPDT) contacts

Temperature monitoring relays Selection

| | Order number | 1SVR 730 740 R9100 | 1SVR 740 740 R9100 | 1SVR 730 740 R0100 | 1SVR 740 740 R0100 | 1SVR 730 740 R9200 | 1SVR 740 740 R9200 | 1SVR 730 740 R0200 | 1SVR 740 740 R0200 | 1SVR 730 740 R9300 | 1SVR 740 740 R9300 | 1SVR 730 740 R0300 | 1SVR 740 740 R0300 | 1SAR 700 100 R0005 | 1SAR 700 100 R0010 | 1SAR 700 110 R0010 |
|---|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | Type | CM-TCS.21S | CM-TCS.21P | CM-TCS.11S | CM-TCS.11P | CM-TCS.22S | CM-TCS.22P | CM-TCS.12S | CM-TCS.12P | CM-TCS.23S | CM-TCS.23P | CM-TCS.13S | CM-TCS.13P | C512-24 | C512-W | C513-W |
| Rated control supply voltage U _s | | | , | , | , | , | , | , | , | , | , | , | , , | , | , | , |
| 24 V AC/DC | | | • | | | • | • | | <u>.</u> | • | • | <u>.</u> | | | | |
| 24-240 V AC/DC | | | | • | • | | | • | • | | | • | • | | • | • |
| Technology | | | , | , | | , | , | | | , | | , | | , | , | , |
| analogue | | • | • | • | • | • | • | • | • | • | • | • | - | <u>.</u> | <u>.</u> | ļ |
| digital | | | | | | | | | | | | | | • | • | • |
| Sensor circuits (2 or 3 wire) | | | , | , | | , | | | , | , | | , | , , | , | , | , , |
| number of temperature sensors | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| number of thresholds | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |
| Sensor type | | | | | | | | | | • | | | | | | |
| PT100 | | | • | • | • | • | • | • | • | • | | - | • | | - | • |
| PT100, KTY83, KTY84, NTC, PT1000 | | | | | | | | | | | | | | • | • | • |
| Measuring temperature range | | | | • | | • | | | • | | | | | | | |
| -50+50 °C | | • | • | • | • | | | | | | | | | | | |
| 0+100 °C | | | | | | • | • | • | • | | | | | | | |
| 0+200 °C | | | | | | | | | | • | | | • | | | |
| -50+500 °C | | | | | | | | | | ! | | | | | | • |
| Monitoring function | | | : | | | - | - | : | - | : | - | - | · | - | : | |
| overtemperature | | • | • | • | • | | • | • | | | | | • | | | • |
| undertemperature | | • | • | • | • | • | • | • | • | • | • | | • | | | • |
| window temperature | | • | • | • | • | • | • | • | • | • | | • | • | | • | • |
| Operating principle | | | | | - | : | | - | : | : | - | | · · · | | | ـــــــ |
| open or closed principle | | | • | • | • | • | | • | • | • | | | - | | • | • |
| Output contacts | | | _ | | _ | _ | | _ | _ | _ | _ | | | | | _ |
| n/o | | | | | | | | | | | | | | 1 | 1 | 1 |
| C/O | | 2 | 2 | _ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

Temperature monitoring relays Ordering details

Description

Acquisition, messaging and regulation of temperatures of solid, liquid and gaseous media in processes and machines via PT100, PT1000, KTY83, KTY84 or NTC sensors.

ABB offers different temperature monitoring relays to meet the needs of your application:

Ordering details - Temperature monitoring relays PT100 sensors, 2 or 3 wire connection, 2 thresholds adjustable

| Rated control supply voltage | Measuring range | Type | Order code | Price | Weight (1 pce) |
|------------------------------|-----------------|------------|-----------------|-------|-------------------|
| | | | | 1 pce | kg (lb) |
| | -50+50 °C | CM-TCS.11S | 1SVR730740R0100 | | 0.151 (0.333) |
| | -30+30 C | CM-TCS.11P | 1SVR740740R0100 | | 0.140 (0.309) |
| 24-240 V AC/DC | 0+100 °C | CM-TCS.12S | 1SVR730740R0200 | | 0.151 (0.333) |
| 24-240 V AO/DO | 0+100 0 | CM-TCS.12P | 1SVR740740R0200 | | 0.140 (0.309) |
| | 0+200 °C | CM-TCS.13S | 1SVR730740R0300 | | 0.151 (0.333) |
| | | CM-TCS.13P | 1SVR740740R0300 | | 0.140 (0.309) |
| | -50+50 °C | CM-TCS.21S | 1SVR730740R9100 | | 0.138 (0.304) |
| | | CM-TCS.21P | 1SVR740740R9100 | | 0.127 (0.280) |
| 24 V AC/DC | 0+100 °C | CM-TCS.22S | 1SVR730740R9200 | | 0.138 (0.304) |
| | U+100 °C | CM-TCS.22P | 1SVR740740R9200 | | 0.127 (0.280) |
| | 0 .000 %0 | CM-TCS.23S | 1SVR730740R9300 | | 0.138 (0.304) |
| | 0+200 °C | CM-TCS.23P | 1SVR740740R9300 | | 0.127 (0.280) |





C512, C513

Ordering details - Temperature monitoring relays C51x range with display and digital setup

| J | | 3 | | - 1 | 3 |
|------------------------------|-----------------|--------------------|-----------------|-------|-------------------|
| Rated control supply voltage | Measuring range | Type ²⁾ | Order code | Price | Weight (1 pce) |
| | | | | 1 pce | kg (lb) |
| 24 V AC/DC | | C512-24 | 1SAR700100R0005 | | 0.32 (0.71) |
| 24-240 V AC/DC | -50+500 °C 1) | C512-W | 1SAR700100R0010 | | 0.33 (0.73) |
| 24-240 V AC/DC | | C513-W | 1SAR700110R0010 | | 0.34 (0.75) |
| | | | | | |

 $^{\mbox{\tiny 1)}}\mbox{The measuring range depends on the used sensor type:$

PT100: -50...+500 °C PT1000: -50...+500 °C NTC: +80...+160 °C

(Typ Siemens Matsushita B57272-A333-A1 - 100 °C: 1.8 k Ω , 25 °C: 32.762 k Ω)

KTY84: -40...+300 °C KTY83: -50...+175 °C

Ordering details - Replaceable cover marking for digital devices

| oracining actano | replaceable cover marking for digital devices | | | | | | | | |
|------------------|---|--------|-----------------|-----------------|------------------------------|--|--|--|--|
| Use for | Language | Туре | Order code | Price 5 pces | Weight (1 pce) kg (lb) | | | | |
| C512 | German | C512-D | 1SVR700101R0100 | | | | | | |
| C512 | English | C512-E | 1SVR700102R0100 | | | | | | |
| C513 | German | C513-D | 1SVR700111R0100 | | | | | | |
| C513 | English | C513-E | 1SVR700112R0100 | | | | | | |

Temperature monitoring relays Function diagrams

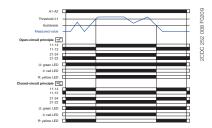
CM-TCS - Overtemperature monitoring, 1 x 2 c/o contacts was

With this configuration, settings via 92 have no influence on the operating function (92 disabled).

Open-circuit principle:

If the measured value is correct, the output relays remain de-energized when control supply voltage is applied. If the measured value exceeds the adjusted threshold value ϑ 1, the output relays energize. If the measured value drops again below the adjusted threshold value §1 minus the adjusted hysteresis, the output relays de-energize. Closed-circuit principle:

The behavior is inverse to the one with open-circuit principle.



Overtemperature monitoring, 2 x 1 c/o contact

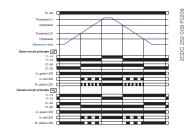
Open-circuit principle:

If the measured value is correct, the output relays remain de-energized when control supply voltage is applied. If the measured value exceeds the adjusted threshold value $\vartheta 2$, output relay R2 (prewarning) energizes. If the measured value exceeds the adjusted threshold value \$1, output relay R1 (final switch-off) energizes.

If the measured value drops again below the adjusted threshold value 91 minus the adjusted hysteresis, output relay R1 (final switch-off) de-energizes. If the measured value drops below the adjusted threshold value $\vartheta 2$ minus the adjusted hysteresis, output relay R2 (prewarning) de-energizes.

Closed-circuit principle:

The behavior is inverse to the one with open-circuit principle.



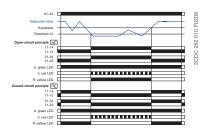
Undertemperature monitoring, 1 x 2 c/o contacts [120]

With this configuration, settings via 91 have no influence on the operating function (91 disabled).

Open-circuit principle:

If the measured value is correct, the output relays remain de-energized when control supply voltage is applied. If the measured value drops below the adjusted threshold value 92, the output relays energize. If the measured value exceeds again the adjusted threshold value 92 plus the adjusted hysteresis, the output relays de-energize. Closed-circuit principle:

The behavior is inverse to the one with open-circuit principle.



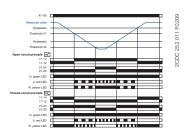
Undertemperature monitoring, 2 x 1 c/o contact

If the measured value is correct, the output relays remain de-energized when control supply voltage is applied. If the measured value drops below the adjusted threshold value 91, output relay R1 (prewarning) energizes. If the measured value drops below the adjusted threshold value $\vartheta 2$, output relay R2 (final switch-off) energizes.

If the measured value exceeds again the adjusted threshold value 92 plus the adjusted hysteresis, output relay R2 (final switch-off) de-energizes. If the measured value exceeds the adjusted threshold value ϑ 1 plus the adjusted hysteresis, output relay R1 (prewarning) de-energizes.

Closed-circuit principle:

The behavior is inverse to the one with open-circuit principle.



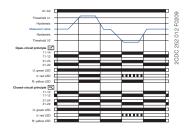
Temperature window monitoring, 1 x 2 c/o contacts was

Open-circuit principle:

If the measured value is correct, the output relays remain de-energized when control supply voltage is applied. If the measured value exceeds the adjusted threshold value $\vartheta 1$ or drops below the adjusted threshold value $\vartheta 2$, the output relays energize. If the measured value drops again below the adjusted threshold value \$1 minus the adjusted hysteresis or exceeds again the adjusted threshold value 92 plus the adjusted hysteresis, the output relays deenergize.

Closed-circuit principle:

The behavior is inverse to the one with open-circuit principle.



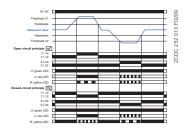
Temperature window monitoring, 2 x 1 c/o contact

If the measured value is correct, the output relays remain de-energized when control supply voltage is applied. If the measured value exceeds the adjusted threshold value 91 or drops below the adjusted threshold value 92, output relay R1 (> 91) or R2 (< 92) respectively energizes.

If the measured value drops again below the adjusted threshold value $\vartheta 1$ minus the adjusted hysteresis or exceeds again the adjusted threshold value 92 plus the adjusted hysteresis, output relay R1 (>91) or R2 (<92) respectively deenergizes.

Closed-circuit principle:

The behavior is inverse to the one with open-circuit principle.

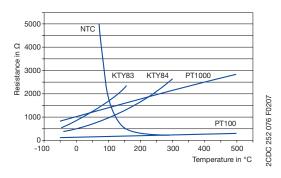


Temperature monitoring relays Overview, Functional description and diagrams

Functional description Digital tripping devices

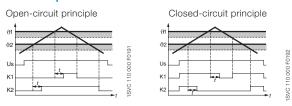
Once the temperature has reached the set threshold of $\upsilon 1$, output relay K1 changes its switching state after the set time delay t has elapsed (K2 reacts in the same way for $\upsilon 2$).

Characteristic curves of resistance sensors

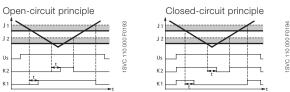


Function diagrams

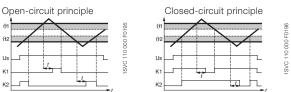
Overtemperature - C512/C513



Undertemperature - C512/C513

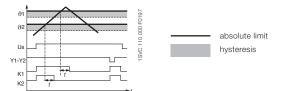


Range monitoring - C512/C513



Function principle with storage function - C512/C513

using overtemperature with closed-circuit principle as an example



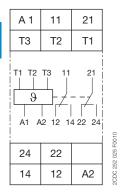
DIP switches CM-TCS

| Position | 4 | 3 | 2 | 1 |
|----------|---------|--------|--------------|----------------|
| ON † | 2x1 c/o | closed | 3 | / 9 |
| OFF | 1x2 c/o | open | \mathbb{X} | 3 |

| | ON | OFF (default) |
|---|---|--|
| DIP switch 1 Monitoring principle | Overtemperature monitoring If overtemperature monitoring is selected, the CM-TCS recognizes temperatures above the selected threshold and trips the output relay according to the selected operating principle. | Undertemperature monitoring Important If undertemperature monitoring is selected, the CM-TCS recognizes temperatures below the selected threshold and trips the output relay according to the selected operating principle. |
| DIP switch 2 Temperature window monitoring | Temperature window monitoring activated if temperature window monitoring is selected, the CM-TCS monitors over- and undertemperature. If temperature window monitoring is activated, DIP switch 1 is disabled. | Temperature window monitoring de-activated 🔀 Temperature window monitoring is de-selected. |
| DIP switch 3 Operating principle of the output relays | Closed-circuit principle If closed-circuit principle is selected, the output relays are energized. They de-energize if a fault is occuring. | Open-circuit principle If open-circuit principle is selected, the output relays are deenergized. They energize if a fault is occuring. |
| DIP switch 4 2 x 1 c/o contact, 1 x 2 c/o contacts | 2×1 c/o (SPDT) contact $^{\mbox{\scriptsize 21-00}}$ If operating principle 2×1 c/o contact is selected, the output relay R1 (11-12/14) reacts to threshold value $\vartheta1$ and the output relay R2 (21-22/24) reacts to threshold value $\vartheta2.$ | 1 x 2 c/o (SPDT) contacts \(\frac{1\text{1\text{2\text{co}}}}{1\text{f operating principle 1 x 2 c/o contacts is selected, both output relays R1 (11-12/14) and R2 (21-22/24) react synchronously to one threshold value. Overtemperature monitoring: Settings of the threshold value \(\frac{9}{2} \) have no effect on the operation. Undertemperature monitoring: Settings of the threshold values \(\frac{9}{2} \) have no effect on the operation. |

Temperature monitoring relays Connection diagrams, Resistance thermometer sensors

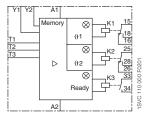
Connection diagrams



CM-TCS

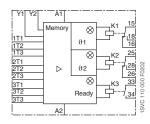
A1-A2 Control supply voltage 11-12/14 Output relay R1 21-22/24 Output relay R2

T1, T2, T3 Measuring input, connection PT100



C512

| A1-A2 | Rated control supp |
|----------|--------------------|
| | voltage |
| 15-16/18 | Output contacts |
| 25-26/28 | |
| 33-34 | |
| T1-T3 | Sensor connection |
| Y1-Y2 | Connection for |
| | storage bridge |



C513

| A1-A2 | Rated control suppy voltage |
|----------|-----------------------------|
| 15-16/18 | Output contacts |
| 25-26/28 | |
| 33-34 | |
| 1T1-1T3 | Sensor connection 1 |
| 2T1-2T3 | Sensor connection 2 |
| 3T1-3T3 | Sensor connection 3 |
| Y1-Y2 | Connection for |

storage bridge

Connection of resistance thermometer sensors

2-wire measurement

When using 2-wire temperature sensors the sensor resistance and the wire resistance are added together.

The resulting systematic errors must be taken into account when adjusting the tripping device. PT100

A jumper must be connected between the terminals T2 and T3.

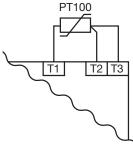
The following table can be used for PT100 sensors to determine the temperature errors caused by the line length.

When using resistance sensors with two-wire connection a bridge must be inserted between terminals T2 and T3.

3-wire measurement

To minimize the influence of the wire resistance, a three-wire connection is usually used. By means of the additional wire

two measuring circuits are created. One of these two circuits is used for reference. This way, the tripping device can calculate and take into account the wire resistance automatically.



Error caused by the line

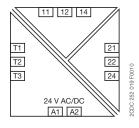
The error resulting from the line resistance amounts to approx. 2.5 Kelvin/Ohm. If the resistance of the line is not known and it is not possible to measure it, the error caused by the line can be estimated using the following table.

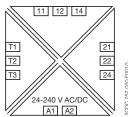
Temperature error

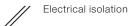
(depending on the line length and conductor cross section for PT100 sensors at an ambient temperature of 20 °C, in K)

| Line length in m | Wire size mm ² | | | | |
|------------------|---------------------------|------|------|------|--|
| | 0.50 | 0.75 | 1 | 1.5 | |
| 0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 10 | 1.8 | 1.2 | 0.9 | 0.6 | |
| 25 | 4.5 | 3.0 | 2.3 | 1.5 | |
| 50 | 9.0 | 6.0 | 4.5 | 3.0 | |
| 75 | 13.6 | 9.0 | 6.8 | 4.5 | |
| 100 | 18.1 | 12.1 | 9.0 | 6.0 | |
| 200 | 36.3 | 24.2 | 18.1 | 12.1 | |
| 500 | 91.6 | 60.8 | 45.5 | 30.2 | |

Electrical isolation







Protective searation acc. to IEC/EN 61140; EN 50178

Temperature monitoring relays Technical data - CM-TCS.xx

| Туре | CM-TCS.11/12/13 | CM-TCS.21/22/23 |
|--|---|--|
| Input circuit | | |
| Rated control supply voltage U _s A1-A2 | 24-240 V AC/DC | 24 V AC/DC |
| Rated control supply voltage U tolerance | -15+10 % | |
| 3 | 33 mA / 0.8 VA | 18 mA / 0.45 VA |
| | 12.5 mA / 1.5 VA | n/a |
| | 13 mA / 2.9 VA | n/a |
| | 15-400 Hz | 50/60 Hz |
| | 13.5-440 Hz | 45-65 Hz |
| Measuring circuit | 20 ms | T2, T3 |
| Sensor type | PT100 | 12, 13 |
| | yes, jumper between T2-T3 | |
| | yes, use terminal T1, T2, T3 | |
| Monitoring function | overtemperature, undertemperature | or window monitoring |
| | -50+50 °C | |
| range CM-TCS.x2 | 0+100 °C 0+200 °C | |
| Number of possible thresholds | 2 | |
| Tolerance of the adjusted threshold value | typ. ±5 % of the range end value | |
| Hysteresis related to the threshold value | 2-20 % of threshold value, min. 1 °C | |
| Measuring principle | continuous current | |
| Typical current in the sensor circuit | 0.8 mA | |
| Maximum current in sensor circuit | 0.9 mA | |
| Interrupted wire detection Short-circuit detection | yes, indicated via LED status yes, indicated via LED status | |
| Accuracy within the rated control supply voltage tolerance | < 0.2 °C / or < 0.01 %/K | |
| Accuracy within the temperature range | < 0.2 °C / or < 0.01 %/K | |
| Repeat accuracy (constant parameters) | < 0.2 % of full scale | |
| Maximum measuring cycle | 320 ms | |
| Output circuit | | |
| Kind of output | 2 x 1 or 1 x 2 c/o (SPDT) contacts co | |
| Operating principle Contact material | open- or closed-circuit principle con AgNi alloy, Cd free | figurable " |
| Rated operational voltage (IEC/EN 60947-1) | 250 V AC / 300 V DC | |
| Minimum switching voltage / Minimum switching current | 24 V / 10 mA | |
| Maximum switching voltage / Maximum switching current | see 'Load limit curves' | |
| Rated operating current I AC-12 (resistive) 230 V | | |
| (IEC/EN 60947-1-5) AC-15 (inductive 230 V | | |
| DC-12 (resistive) 24 V DC-13 (inductive) 24 V | 4 A 2 Δ | |
| AC Rating (UL508) utilization category | B 300, pilot duty general purpose (2 | 50 V 4 A cos α 0.75) |
| maximum rated operational voltage | 250 V AC | 55 t,, 555 ¥ 51.5/ |
| maximum continuous thermal current at B 300 | 4 A | |
| maximum making/breaking apparent power at | | |
| Mechanical lifetime B 300 | 30 x 10 ⁶ switching cycles | |
| Electrical lifetime (AC-12, 230 V, 4 A) | 0.1 x 10 ⁶ switching cycles | |
| Maximum fuse rating to achieve short-circuit n/c contact | 6 A fast-acting | |
| protection n/o contact | 10 A fast-acting | |
| Conventional thermal current I _{th} acc. IEC/EN 60947-1 | 4 A | |
| General data | | |
| Dimensions (W x H x D) | 22.5 x 85.6 x 103.7 mm (0.89 x 3.37 | x 4.08 in) |
| Mounting position | any | |
| Well-lik Old Too | Screw connection technology | Easy Connect Technology (push-in) |
| | 0.151 kg (0.333 lb) 0.138 kg (0.304 lb) | 0.140 kg (0.309 lb) 0.127 kg (0.280 lb) |
| | 0.138 kg (0.304 lb) 0.176 kg (0.388 lb) | 0.127 kg (0.280 lb) 0.165 kg (0.364 lb) |
| | 0.176 kg (0.366 lb) | 0.152 kg (0.335 lb) |
| Degree of protection enclosure / | IP50 / IP20 | |
| terminals | | |
| Ambient temperature range operation | | |
| storage/transport Mounting | -40+85 °C DIN rail (IEC/EN 60715), snap-on mo | unting without any tool |
| woulding | Dirivitati (160/614 00/ 10), Shap-011 1110 | unting without any tool |

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

Temperature monitoring relays Technical data - CM-TCS.xx

| Туре | | CM-TCS.11/12/13 | CM-TCS.21/22/23 |
|---|---|---|---|
| Electrical connection | | | |
| Wire size fine-strand without wire end ferrule | 22, 24 | Screw connection technology 1 x 0.5-2.5 mm² (1 x 20-14 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) 1 x 0.2-2.5 mm² (1 x 24-14 AWG) 2 x 0.2-1.5 mm² (2 x 24-16 AWG) | Easy Connect Technology (Push-in) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) connection with lever 2 x 0.2-1.5 mm² (2 x 24-16 AWG) connection with lever |
| fine-strand with wire end ferrule | 22, 24 | 1 x 0.5-2.5 mm² (1 x 20-14 AWG) 2 x 0.5-1.5 mm² (2 x 20-16 AWG) 1 x 0.2-2.5 mm² (1 x 24-14 AWG) 2 x 0.2-1.5 mm² (2 x 24-16 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) connection: push-in 2 x 0.2-1.5 mm² (2 x 24-16 AWG) insulated ferrule (DIN 46228-4-E): connection: push-in ferrule (DIN 46228-1-A): < 0.5 mm², connection with lever ≥ 0.5 mm², connection: push-in |
| rigic | 22, 24 | 1 x 0.5-4 mm² (1 x 20-12 AWG) 2 x 0.5-2.5 mm² (2 x 20-14 AWG) 1 x 0.2-4 mm² (1 x 24-12 AWG) 2 x 0.2-2.5 mm² (2 x 24-14 AWG) | 2 x 0.5-1.5 mm² (2 x 20-16 AWG) connection: push-in 2 x 0.2-1.5 mm² (2 x 24-16 AWG) < 0.5 mm², connection with lever ≥ 0.5 mm², connection: push-in |
| Stripping length Tightening torque | | 8 mm (0.32 in) 0.5 Nm (4.43 lb.in) 0.6 - 0.8 Nm (5.31 - 7.08 lb.in) | - |
| Standards | | | |
| Product standard Low Voltage Directive EMC Directive RoHS Directive | | IEC/EN 60255-1, IEC/EN 60255-27, E 2006/95/EC 2004/108/EC 2011/65/EC | N 50178 |
| Environmental data | | 1 40 0000/40 0500/40 0500 | |
| Ambient temperature ranges Climatic category Damp heat, cyclic Vibration, sinusoidal Shock | operation/storage/ transport | -40+60°C/-40+85°C/-40+85°C 3K5 (no condensation, no ice formati 6 x 24 h cycle, 55 °C, 95 % RH Class 2 Class 2 | on) |
| Isolation data | | 1 2 2 2 2 | |
| Rated impulse withstand voltage | supply circuit / measuring circuit | | - |
| $\rm U_{imp}$ between all isolated circuits (IEC/EN 60947-1, IEC/EN 60664-1) | supply circuit / output circuits measuring circuit / output circuits output circuit 1 / output circuit 2 | 4 kV 4 kV 4 kV | |
| Pollution degree (IEC/EN 60664-1) Overvoltage category (IEC/EN 60664-1) Rated insulation voltage U (IEC/EN 60947-1, IEC/EN 60664-1) | supply circuit / measuring circuit supply circuit / output circuits measuring circuit / output circuits output circuit 1 / output circuit 2 | 300 V 300 V 300 V | [- |
| Basis isolation for rated control supply voltage (IEC/EN 60664-1) | supply circuit / measuring circuit supply circuit / output circuits measuring circuit / output circuits output circuit 1 / output circuit 2 | 250 V AC / 300 V DC 250 V AC / 300 V DC 250 V AC / 300 V DC | |
| Protective separation (IEC/EN 61140, EN 50178) Test voltage between all isolated circuits, routine test (IEC/EN 60255-5, | supply circuit / measuring circuit supply circuit / output circuits measuring circuit / output circuits supply circuit / measuring circuit supply circuit / output circuits | 250 V AC / 300 V DC 250 V AC / 300 V DC 2.0 kV, 50 Hz, 1 s | 250 V AC / 250 V DC 250 V AC / 250 V DC - |
| Test voltage between all isolated circuits, type test (IEC/EN 60255-5) | supply circuit / output circuits measuring circuit / output circuits supply circuit / measuring circuit supply circuit / output circuits measuring circuit / output circuits | 2.0 kV, 50 Hz, 1 s 4.0 kV, 50 Hz, 1 s 4.0 kV, 50 Hz, 1 s | - |
| Electromagnetic compatibility | measuring enealt / output elicuits | T.O KV, JOTIZ, 1 5 | |
| Interference immunity to electrostatic discharge radiated, radio-frequency, electromagnetic field | | IEC/EN 61000-6-1, IEC/EN 61000-6- Level 3, 6 kV / 8 kV Level 3, 10 V/m (1 GHz) / 3 V/m (2 GF | |
| electrical fast transient/burst surge | IEC/EN 61000-4-4 IEC/EN 61000-4-5 | 14/1 00440 | rcuit and measuring circuit 1 kV L-L, 2 |
| conducted disturbances, induced by radio-frequency fields voltage dips, short interruptions and | IEC/EN 61000-4-6 | | |
| voltage variations harmonics and interharmonics | IEC/EN 61000-4-13 | Class 3 | |
| Interference emission high-frequency radiated high-frequency conducted | IEC/CISPR 22, EN 55022 IEC/CISPR 22, EN 55022 | EN 61000-6-3, EN 61000-6-4 Class B Class B | |

Temperature monitoring relays Technical data - C51x

| Туре | C512 C513 |
|--|---|
| Input circuit | · |
| Rated control supply voltage U A1 | 1-A2 24 V AC/DC - |
| A1- | 1-A2 24-240 V AC/DC |
| Power consumption | AC < 7 VA DC < 4 W |
| Date de control de con | |
| Rated control supply voltage U _s tolerance | -15+10 % |
| Rated frequency | AC |
| Sensor circuit | |
| Sensor type | PT100, PT1000, KTY83, KTY84, NTC |
| | T100 typ. 1 mA |
| PT1000, KTY83, KTY84, N Wire-break detection | yes (not for NTC) |
| Short-circuit detection | yes |
| 3-wire connection | yes (2-wire connection of sensors with terminals T2 and T3 bridged) |
| Measuring circuit | |
| Setting accuracy at T _a = 20 °C (T ₂₀) | $< \pm 2 \text{ K} \pm 1 \text{ digit}$ |
| Accuracy within the temperature range | 0.05 °C / °C deviation from T |
| Response time | 500 ms |
| Hysteresis settings temperatur | |
| temperatur | |
| Tripping delay | 0-999 s |
| Output circuit | |
| Kind of output | 2 c/o + 1n/o 2 c/o + 1 n/o |
| Rated operating current I _e (IEC/EN 60947-1-5) AC-12 (resistive) 23 | |
| AC-15 (inductive) 23 | |
| DC-12 (resistive) 2 DC-13 (inductive) 2 | |
| Mechanical lifetime | 30 x 10 ⁶ switching cycles |
| Electrical lifetime (AC-15 at 3 A) | 0.1 x 10 ⁵ switching cycles |
| Max. fuse rating to achieve short-circuit protection | 4 A, operating class gL/gG |
| General data | |
| Dimensions (W x H x D) | 45 x 105.9 x 86 mm (1.77 x 4.17 x 3.39 in) |
| Tightening torque | 0.8-1.2 Nm |
| Mounting position | any |
| Degree of protection enclosure / termin | |
| Ambient temperature range operat | |
| Mounting | rage -40+80 °C DIN rail (IEC/EN 60715) |
| Electrical connection | DINTAII (IEO/EN 00713) |
| | rigid 1 x 4 mm² (1 x 12 AWG), 2 x 2.5 mm² (2 x 14 AWG) |
| fine strand with wire and for | rigia 1 x 4 mm² (1 x 12 AWG), 2 x 2.5 mm² (2 x 14 AWG) errule 1 x 2.5 mm² (1 x 14 AWG), 2 x 1.5 mm² (2 x 16 AWG) |
| Standards | 511010 1 x 2.0 11111 1 x 14 AVVO), 2 x 1.0 11111 (2 x 10 AVVO) |
| Environmental conditions | IEC 60721-3-3 |
| Low Voltage Directive | IEC 60947-5-1, VDE 0660 |
| Electromagnetic compatibility Interference immu | ······································ |
| Interferenece emiss | |
| Vibration resistance (IEC 68-2-6) | 5-26 Hz / 0.75 mm |
| Shock resistance (IEC 68-2-27) | 15 g / 11 ms |
| Isolation data | |
| Rated insulation voltage | 300 V AC |
| Pollution degree | 3 |

Liquid level monitors and controls Product group picture



Liquid level monitors and controls Table of contents

Liquid level monitors and controls

| Benefits and advantages | 2/111 |
|--------------------------------|-------|
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Liquid level monitors and controls Benefits and advantages

CM-ENE MIN/MAX

- Monitoring of pump systems for dry running (ENE MIN) and overflow (ENE MAX)
- Connection of 2 electrodes possible at C and MIN/MAX
- 3 supply voltage versions
- Optimal price/performance ratio
- 1 n/o contact: Open-circuit principle for CM-ENE MIN, Closed-circuit principle for CM-ENE MAX
- LED for status indication

CM-ENS

- Monitoring and control of liquid levels (when draining or filling liquids in tanks)
- Monitoring and control of mixture ratios (conductivity of liquids)
- Adjustable response sensitivity 5-100 k Ω
- 4 supply voltage versions 24-240 V AC
- Version with protective separation acc. to VDE 0160 🛳
- Cascadable
- 1 c/o contact or 1 n/o and 1 n/c contact
- 2 LEDs for status indication

CM-ENS UP/DOWN

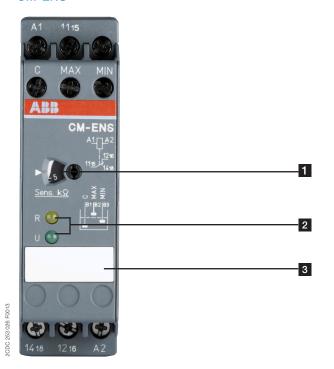
- Monitoring and control of liquid levels
- Selectable function "fill" or "drain"
- Adjustable response sensitivity 5-100 kΩ
- Cascadable
- 1 c/o contact
- 2 LEDs for status indication

CM-ENN

- Monitoring and control of liquid levels (when emptying or filling liquids in tanks)
- Monitoring and control of mixture ratios (conductivity of liquids)
- 3 response sensitivities from 250 Ω 500 k Ω in one unit
- 5 supply voltage versions 24 V AC/DC 415 V AC
- Selectable ON- or OFF-delay 0.1-10 s
- 2 c/o contacts
- 2 LEDs for status indication

Liquid level monitors and controls Operating controls

CM-ENS



- 1 "Sens." sensitivity potentiometer for adjusting the response sensitivity
- 2 Indication of operational states

R: yellow LED - relay status U: green LED -control supply voltage

3 Marker label

CM-ENN



- 1 "Function." function selector switch:
 - "UP"- fill
 - "DOWN" drain
- 2 "Sens." potentiometer for adjusting the response sensitivity
- 3 Indication of operational states

R: MIN/MAX: yellow LED - relay status MIN/MAX

U: green LED - control supply voltage R AL1: yellow LED - relay status AL1

R AL2: yellow LED - relay status AL2

4 Marker label

Liquid level monitors and controls Ordering details

Description

ABB's liquid level monitoring relays for regulation and control of liquid levels and ratios of mixtures of conductive fluids.

The assortment includes single function and multifunction monitoring relays which can be used for overflow and dry-running protection, for filling and draining applications, for max and min alarm or any combination of such functions. Furthermore a wide range of accessories is available





 $^{^{\}mbox{\tiny 1)}}$ Version with protective separation acc. to VDE 0160, 1 n/o, 1 n/c



CM-ENE MIN



CM-ENE MAX



CM-ENS



CM-ENN

Liquid level monitors are

| Suitable for | | Not suitable for | |
|----------------|--------------------|-------------------------|----------------------|
| spring water | acids, bases | chemically pure water | ethylene glycol |
| drinking water | liquid fertilizers | fuel | concentrated alcohol |
| sea water | milk, beer, coffee | oils | paraffin |
| sewage | non-concentrated | explosive areas (liquid | lacquers |

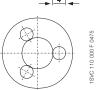
Liquid level monitors and controls Ordering details - Accessories

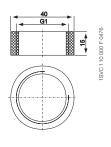
Compact support CM-KH-3 for 3 bar electrodes

- Ideally suited for use with liquid level relays CM-ENS and CM-ENN
- Wire connection by screw terminals
- Pull relief by M16 screwed cable glands
- Temperature range up to 90 °C
- Food safe material (PPH)
- Screw-in electrodes (M4 thread)
- Distance plate (CM-AH-3) and locking nut (CM-GM-1) optionally available as an accessory



spanner size 36 counter nut CM-GM-1 distance plate CM-AH-3





| Technical | data | compact | support |
|------------------|------|---------|---------|
| | | | |

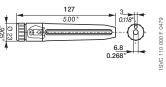
Type of mounting: G 1* thread
Mounting position: arry
Enclosure material: PPH
Sealing: NBR 70
Temperature range: 90 °C max.
Pressure: 10 bar max. (60 °C)

| Description | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|--------------------------------------|---------|-----------------|-------|------------|---------------------------|
| Compact support for 3 bar electrodes | CM-KH-3 | 1SVR450056R6000 | | | 0.06 (0.132) |
| Distance plate for 3 bar electrodes | CM-AH-3 | 1SVR450056R7000 | | 1 | 0.06 (0.132) |
| Counter nut for 1" thread | CM-GM-1 | 1SVR450056R8000 | | | 0.06 (0.132) |

Screw-in bar electrodes for compact support CM-KH-3 Suspension electrode CM-HE



Stael electrode (X14CrMoS17) with sleeve (Hostalen GC 7260) suitable up to 60°C max.

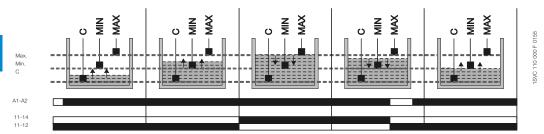


During project engineering the compatibility of the electrode material with the medium to be supervised is to be examined!

| Lenght | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|---------|------------|-----------------|-------|------------|---------------------------|
| 300 mm | CM-SE-300 | 1SVR450056R0000 | | | 0.08 (0.176) |
| 600 mm | CM-SE-600 | 1SVR450056R0100 | | | 0.08 (0.176) |
| 1000 mm | CM-SE-1000 | 1SVR450056R0200 | | ' | 0.08 (0.176) |
| CM-HE | CM-HE | 1SVR402902R0000 | | | 0.08 (0.176) |

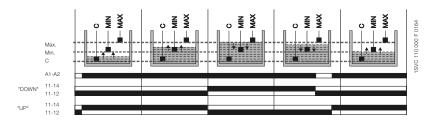
Liquid level monitors and controls Function diagrams

Function diagram - CM-ENS



The CM-ENS monitors levels of conductive liquids and is used for example for liquid level control in pump systems. It can be used for filling or draining tanks for example. It is also suitable for monitoring the conductivity of liquids. The measuring principle is based on the resistance change sensed by single-pole electrodes. After the supply voltage is applied to the terminals A1 and A2, the output relay is de-energized. The probes must be connected to C, MAX, MIN. The output relay energizes if the liquid exceeds the maximum level (C and MAX wet) and de-energizes if the liquid level is below the minimum level (MAX and MIN dry). Basedau m on the measuring circuit there will be a response delay of approx. 250 ms at maximum sensitivity. Different levels in one tank can be controlled by up to 5 CM-ENS without interfering with each other.

Function diagram - CM-ENS UP/DOWN



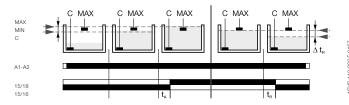
The CM-ENS UP/DOWN monitors levels of conductive liquids and other media, and is used e.g. for liquid level control in pump systems.

The measuring principle is based on the resistance change sensed by single-pole electrodes. The output relay functions fill (UP) or drain (DOWN) can be selected on a front-face selector switch. If the "UP" function is selected, the output relay is energized until the MAX electrode becomes wet. Then it is de-energized and not re-energized until the MIN electrode becomes dry. If the "DOWN" function is selected, the output relay is energized as soon as the MAX electrode becomes wet. It remains energized until the liquid level has dropped below the MIN electrode. The electrodes can be connected to more than one CM-ENS unit without interference.

Liquid level monitors and controls Function diagrams

Function diagrams - CM-ENN

Circuit with 2 electrodes



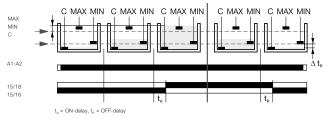
for liquid level monitoring in pump control systems, for dry-running protection of submersible pumps or overflow monitoring of tanks. It is also suitable for conductivity monitoring of liquids. The measuring principle is based on the resistance change sensed by single-pole electrodes (wet or dry). Instead of electrodes, other sensors or transducers can also be used if their

The CM-ENN monitors levels of conductive liquids and is used for example

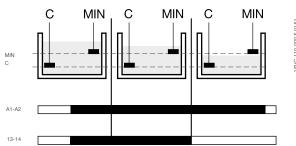
output quantities are different resistance values. The measuring, output and supply circuits are electrically isolated for potential separation and to prevent

Due to the integrated ON- or OFF-delay, it is possible to set up time-dependent liquid controls using only two electrodes (C, MAX). Different liquid levels in one tank can be controlled by up to 5 CM-ENN (AC version) without mutual

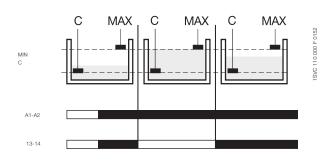
Circuit with 3 electrodes



Function diagram - CM-ENE MIN



Function diagram CM-ENE MAX



The liquid level relays CM-ENE MIN and CM-ENE MAX are used to monitor levels of conductive liquids, for example in pump control systems for dryrunning or overflow monitoring.

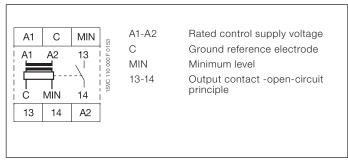
The measuring principle is based on the occurring resistance change when moisting single-pole electrodes. The single-pole electrodes (see also section Accessories) are connected to the terminals C and MIN or MAX.

If the supply voltage is applied to A1-A2 and the electrodes are wet, the output relay of the CM-ENE MIN is energized and the output relay of the CM-ENE MAX is de-energized.

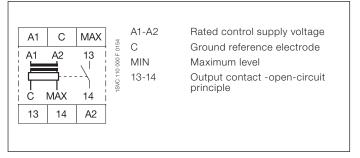
The output relay of the CM-ENE MIN de-energizes if the electrodes are no longer wet. The output relay of the CM-ENE MAX energizes if the electrodes are no longer wet.

Liquid level monitors and controls Connection diagrams

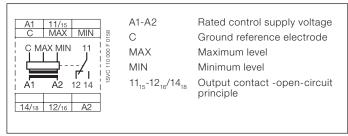
Connection diagram CM-ENE MIN



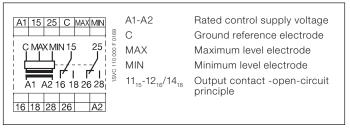
Connection diagram CM-ENE MAX



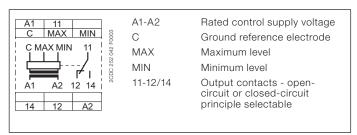
Connection diagram CM-ENS



Connection diagram CM-ENN

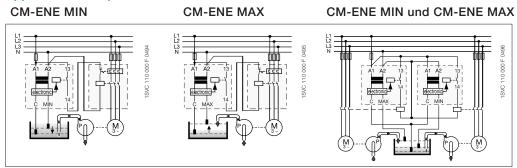


Connection diagram CM-ENS UP/DOWN

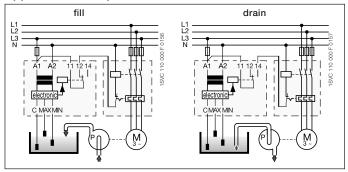


Liquid level monitors and controls Application examples

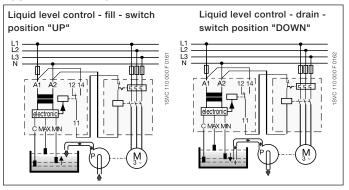
Application examples CM-ENE MIN/MAX



Application examples CM-ENS

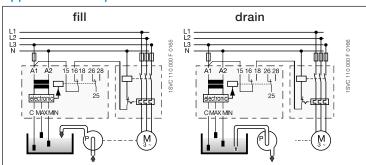


Application examples CM-ENS UP/DOWN



Liquid level monitors and controls Application examples

Application examples CM-ENN



For commissioning, set both potentiometers (response sensitivity = R value and ON-delay = time value) to the minimum value (5) and select a suitable resistance range (sector). After all electrodes have been wetted by the liquid being monitored, turn the sensitivity potentiometer towards maximum value (100) until the relay energizes. If the relay does not energize, select a higher Ω value (sector) on the device and proceed as before. Then it has to be checked if the relay de-energizes properly as soon as the electrodes C and MIN are no longer wet. Liquid levels higher than the maximum level electrode can be obtained by setting an ON-delay (TA = 0.1...10 s).

Liquid levels lower than the minimum level electrode can be obtained by setting an OFF-delay time (TR = 0.1...10 s), e.g. for emptying tanks.

Liquid level monitors and controls Technical data

| Туре | CM-ENE MIN | CM-ENE MAX |
|--|--|--|
| Supply circuit | | - |
| | 24 V AC | approx. 1.5 VA |
| | 110-130 V AC | approx. 1.2 VA |
| | 220-240 V AC | approx. 1.4 VA |
| Rated control supply voltage U _s tolerance | -15+15 % | |
| Rated frequency | 50-60 Hz | |
| Duty time | 100 % | |
| Measuring circuit | | C, MAX-C |
| Monitoring function | dry-running protection | overflow protection |
| Response sensitivity | 0-100 kΩ, not adjustable | : overnow protection |
| Maximum electrode voltage | 30 V AC | |
| Maximum electrode voltage Maximum electrode current | 1.5 mA | |
| Electrode supply line max. cable capacity | | ·····• |
| max. cable length | | ·····• |
| Timing circuit | | |
| Time delay | - | |
| Tripping delay | fixed approx. 200 ms | |
| Indication of operational states | | |
| Output relay energized | R: yellow LED | |
| Output circuits | | 13-14 |
| Kind of output | 1 n/o contact | |
| Operational principle 1) | open-circuit principle | closed-circuit principle |
| Contact material | AgCdO | |
| Rated operational voltage U (IEC/EN 60947-1) | 250 V | |
| Mininimum switching voltage / minimum switching current | - / - | |
| Maximum switching voltage | 250 V | |
| Rated operational current I AC-12 (resistive) 230 V | 4 A | ····• |
| (IEC/EN 60947-5-1) AC-15 (inductive) 230 V | 3 A | ·····• |
| DC-12 (resistive) 24 V | | <u>.</u> |
| DC-12 (resistive) 24 V DC-13 (inductive) 24 V | | |
| AC rating (UL 508) Utilization category (Control Circuit Rating Code) | 2 A | ·····• |
| | | ·····• |
| max. rated operational voltage max. continuous thermal current at B 300 | 5 A | |
| max. making/breaking apparent power at B 300 | 3600/360 VA | |
| Mechanical lifetime | 30 x 10 ⁶ switching cycles | |
| Electrical lifetime (AC-12, 230 V, 4 A) | 0.3 x 10° switching cycles | ·····• |
| Max. fuse rating to achieve short-circuit n/c contact | | ·····• |
| protection n/o contact | | ·····• |
| General data | , | |
| Dimensions (W x H x D) | 22.5 x 78 x 78.5 mm (0.89 x 3.07 x | 3.09 in) |
| Mounting position | any | |
| Degree of protection enclosure / terminals | | ·····• |
| Ambient temperature range operation / storage | | ·····• |
| Mounting | DIN rail (IEC/EN 60715) | ······································ |
| Electrical connection | | |
| | 2 x 0.75-1.5 mm ² (2 x 18-16 AWG) | |
| fine-strand without wire-end ferrule | 2 x 1-1.5 mm ² (2 x 18-16 AWG) | |
| rigid | 2 x 0.75-1.5 mm ² (2 x 18-16 AWG) | |
| Stripping length | 10 mm (0.39 inch) | |
| Tightening torque | 0.6-0.8 Nm | |
| Standards | | |
| Product standard | IEC 255-6, EN 60255-6 | |
| Low Voltage Directive | 2006/95/EC | |
| EMC Directive | 2004/108/EC | |
| Electromagnetic compatibility | EN 61000-6 | -2, EN 61000-6-4 |
| | Level 3 (6 kV / 8 kV) | |
| radiated, radio-frequency, electromagnetic field IEC/EN 61000-4-3 | 4 | |
| ······································ | Level 3 (2 kV / 5 kHz) | |
| surge IEC/EN 61000-4-5 | | ····· |
| conducted disturbances, induced by radio- IEC/EN 61000-4-6 | Level 3 (10 V) | |
| frequency fields | | |
| Resistance to vibration (IEC 68-2-6) | 6 g | |
| Mechanical resistance (IEC 68-2-6) | 10 g | |
| Isolation data | 050.1/ | |
| Rat. insulation volt. betw. supply, meas. & output circuit (VDE 0110, IEC 60947) | 250 V | |
| Rated impulse withstand voltage between all isolated circuits | 4 kV / 1.2-50 μs | |
| (VDE 0110, IEC 664) | 0.5 10/ 50 H= 1!- | |
| Test voltage between all isolated circuits | 2.5 kV, 50 Hz, 1 min. | |
| Pollution category (VDE 0110, IEC 664, IEC 255-5) | 3 / C | |
| Overvoltage category (VDE 0110, IEC 664, IEC 255-5) | III / C | |
| Environmental testing (IEC 68-2-30) | 24 h cycle time, 55 °C, 93 % rel., 96 | |

Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold. Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

Liquid level monitors and controls Technical data

| Туре | CM-ENS | CM ENS UP/DOWN |
|--|--|---|
| Supply circuit | | • |
| power consumption A1-A1-A1- | A2 24 V AC A2 110-130 V AC approx. 1.5 VA A2 220-240 V AC approx. 1.5 VA A2 380-415 V AC approx. 1.5 VA | 24 V AC 110-130 V AC approx. 4 VA 220-240 V AC approx. 4 VA |
| Rated control supply voltage U _s tolerance | -15+10 % | |
| Rated frequency Duty time | 50-60 Hz 100 % | |
| Measuring circuit | | AX-MIN-C |
| Monitoring function Response sensitivity Maximum electrode voltage | liquid level control 5-100 kΩ, adjustable 30 V AC | |
| Maximum electrode voltage Maximum electrode current | 1 mA | |
| Electrode supply line max. cable capac max. cable len | city 10 nF | |
| Timing circuit | , , , , , , , , , , , , , , , , , , , | |
| Time delay | - | |
| Tripping delay Indication of operational states | approx. 250 ms | |
| Control supply voltage | U: green LED | |
| Output relay energized | R MAX/MIN: yellow LED | |
| Alarm relay AL1 Alarm relay AL2 | - | R AL1: yellow LED R AL2: yellow LED |
| Output circuits | 11-12/1 | 4, 21-22, 31-32 |
| Kind of output | 1 c/o contact, 1 n/o + 1 n/c conta | act 2) |
| Operational principle ¹⁾ | open-circuit principle | open- and closed-circuit principle |
| Contact material Rated operational voltage U (IEC/EN 60947) | AgCdo '-1) 250 V | |
| Minimum switching voltage / minimum switching current | - / - | |
| Maximum switching voltage | 250 V | |
| Rated operational current I _e (IEC/EN 60947-5-1) AC-12 (resistive) 23 | | |
| AC-15 (inductive) 23 DC-12 (resistive) 2: | | |
| DC-13 (inductive) 2 | 4 V 2 A | |
| AC rating (UL 508) Utilization category (Control Circuit Rating Co | de) B 300 | |
| max. rated operational volta max. continuous thermal current at B 3 | | |
| max. making/breaking apparent power at B 3 | 00 3600/360 VA | |
| Mechanical lifetime Electrical lifetime (AC-12, 230 V, 4 A) | 30 x 106 switching cycles 0.3 x 106 switching cycles | |
| Max. fuse rating to achieve short-circuit protection n/c / n/o cont | | 10 A fast-acting / 10 A fast-acting |
| General data | | |
| Dimensions (W x H x D) Mounting position | 22.5 x 70 x 100 mm (0.89 x 3.07 any | x 3.94 in) |
| Degree of protection enclosure / termin | | |
| Ambient temperature range operation / stora | | |
| Mounting Electrical connection | DIN rail (IEC/EN 60715) | |
| | ule 2 x 2.5 mm2 (2 x 14 AWG) | |
| Standards Draduat at a total dard | IFO OFF C EN COOFF C | |
| Product standard Low Voltage Directive | IEC 255-6, EN 60255-6 2006/95/EC | |
| EMC Directive | 2004/108/EC | |
| Electromagnetic compatibility | 10/01/1/01/2 | <u>-</u> |
| | 4-2 Level 3 (6 kV / 8kV) 4-3 Level 3 (10 V/m) | |
| | 1-4 Level 3 (10 V/III) 1-4 Level 3 (2 kV / 5 kHz) | |
| | 1-5 Level 4 (2 kV L-L) | |
| frequency fields | 1-6 Level 3 (10 V) | |
| Resistance to vibration (IEC 68-2-6) | 4 g | |
| Mechanical resistance (IEC 68-2-6) Isolation data | 6 g | |
| Rated insulation voltage between supply, measuring and output circui | t 250 V | |
| (VDE 0110, IEC 60947) Rated impulse withstand voltage between all isolated circuits (VDE0 110, IEC 664) | 4 kV / 1.2 - 50 μs | |
| Test voltage between all isolated circuits | 2,5 kV, 50 Hz, 1 min. | |
| Pollution category (VDE 0110, IEC 664, IEC 255-5) Overvoltage category (VDE 0110, IEC 664, IEC 255-5) | 3 / C III / C | |
| Environmental testing (IEC 68-2-30) | 24 h cycle time, 55 °C, 93 % rel., | 96 h |
| | | |

¹⁾ Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold. Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

²⁾ 1SVR 430 851 R1300 (version with safe isolation)

Liquid level monitors and controls Technical data

| Type | CM-ENN |
|---|--|
| Supply circuit | |
| | -A2 24 V AC |
| consumption A1 | -A2 110-130 V AC approx. 2.5 VA |
| | -A2 220-240 V AC approx. 3 VA -A2 24-240 V AC/DC approx. 2 VA/W |
| Rated control supply voltage U _s tolerance | -A2 24-240 V AC/DC approx. 2 VA/W |
| | |
| Rated frequency | 50-60 Hz oder DC 100 % |
| Duty time Measuring circuit | MAX-MIN-C |
| Monitoring function | liquid level control |
| Response sensitivity | adjustable |
| | 250 Ω - 5 k Ω 2.5-50 k Ω 25-500 k Ω |
| Maximum electrode voltage | 20 V AC |
| Maximum electrode current | 8 mA 2 mA 0.5 mA |
| Electrode supply line max. cable capa | |
| Timing circuit max. cable ler | Igiii 1000 III |
| Time delay | 0.1-10 s, adjustable, ON- or OFF-delay |
| Indication of operational states | |
| Control supply voltage | U: green LED |
| Output relay energized | R: yellow LED |
| Output circuits | 15-16/18, 25-26/28 |
| Kind of output Operational principle 1) | 2 c/o contacts |
| Contact material | closed-circuit principle AgCdO |
| Rated operational voltage U _g IEC/EN 6094 | |
| Minimum switching voltage / minimum switching current | -/- |
| Maximum switching voltage / minimum switching current Maximum switching voltage | - / - 400 V |
| Rated operational current I _e (IEC/EN 60947- AC-12 (resistive) 23 | |
| 5-1) AC-15 (inductive) 20 | 30 V 3 A |
| DC-12 (resistive) 2 | 24 V 5 A |
| DC-13 (inductive) 2 | |
| AC rating (UL 508) Utilization category (Control Circuit Rating Co | ode) B 300 |
| AC rating (UL 508) Utilization category (Control Circuit Hating Cimax, rated operational volt max, continuous thermal current at R. | age 300 V AC |
| max. continuous thermal current at B max. making/breaking apparent power at B | 000 070 |
| Mechanical lifetime | 30 x 10 ⁶ switching cycles |
| Electrical lifetime (AC-12, 230 V, 4 A) | 0.1 x 10 ⁶ switching cycles |
| Max. fuse rating to achieve short-circuit n/c / n/o con- | tact 4 A fast-acting / 6 A fast-acting |
| protection | |
| General data | 45 · · 70 · · 400 · · · · · (4.77 · · 0.07 · · 0.04 · · ·) |
| Diemensions (W X H X D) Mounting position | 45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in) |
| Degree of protection enclosure / termin | nals IP50 / IP20 |
| Ambient temperature range operation / stor | age -25+65 °C / -40+85 °C |
| Mounting | age -25+65 °C / -40+85 °C DIN rail (IEC/EN 60715) |
| Electrical connection | |
| | rule 2 x 2.5 mm ² (2 x 14 AWG) |
| Standards Draduct standard | IFO OFF O FN COOFF O |
| Product standard Low Voltage Directive | IEC 255-6, EN 60255-6 2006/95/EC |
| EMC Directive | 2004/108/EC |
| Electromagnetic compatibility | - |
| | 4-2 Level 3 (6 kV / 8kV) |
| radiated, radio-frequency, electromagnetic field IEC/EN 61000- | 4-3 Level 3 (10 V/m) |
| | 4-4 Level 3 (2 kV / 5 kHz) |
| | 4-5 Level 4 (2 kV L-L) |
| · · · · · · · · · · · · · · · · · · · | 4-6 Level 3 (10 V) |
| frequency fields Resistance to vibration (IEC 68-2-6) | 5 g |
| Mechanical resistance (IEC 68-2-6) | 10 g |
| Isolation data | |
| Rated insulation voltage between supply, measuring and output circ | cuit 500 V |
| (VDF 0110 JFC 60947) | |
| Rated impulse withstand voltage between all isolated circuits (VDE 0110, IEC 664) | 4 kV / 1.2 - 50 μs |
| Test voltage between all isolated circuits | 2,5 kV, 50 Hz, 1 min. |
| Pollution category (VDE 0110, IEC 664, IEC 255-5) Overvoltage category (VDE 0110, IEC 664, IEC 255-5) | 3 / C III / C |
| Environmental testing (IEC 68-2-30) | 24 h cycle time, 55 °C, 93 % rel., 96 h |
| | |

¹⁾Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold. Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

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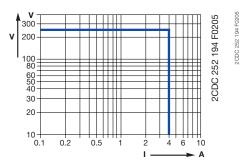
General technical data, Accessories, Current transformers

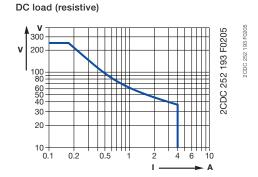
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General technical data, Accessories, Current transformers Technical diagrams - CM-range

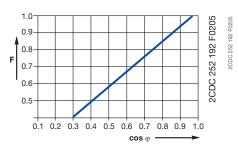
Load limit curves

CM-S (22.5 mm), CM-E (22.5 mm), CM-UFD.M22 AC load (resistive)

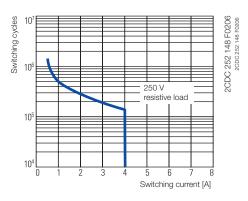




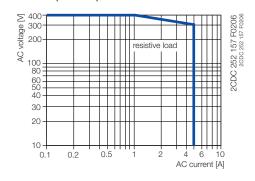
Derating factor F for inductive AC load



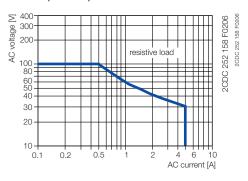
Contact lifetime



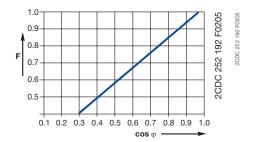
CM-N (45 mm) AC load (resistive)



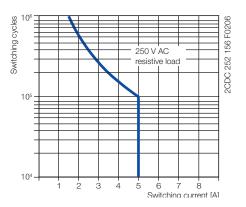
DC load (resistive)



Derating factor F for inductive AC load

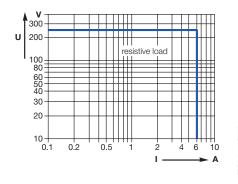


Contact lifetime

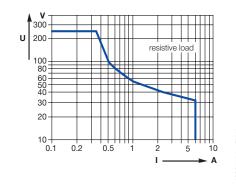


General technical data, Accessories, Current transformers Technical diagrams - CM-range

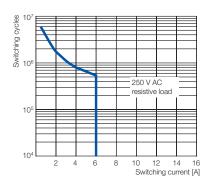
Load limit curves CM-UFD.M21



AC load (resistive)



DC load (resistive)

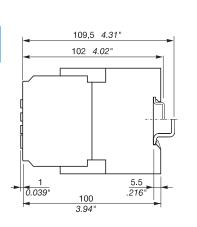


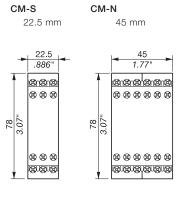
Contact lifetime

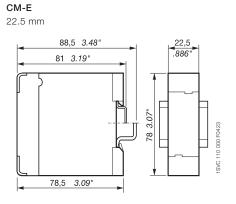
General technical data, Accessories, Current transformers Dimensional drawings

Measuring and monitoring relays CM range old housing

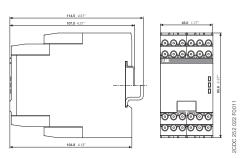
Dimensions in mm



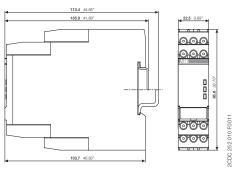




Measuring and monitoring relays CM range new housing

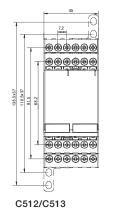


CM-xxN 1SVR 750 xxx xxx, 1SVR 760 xxx xxx 45 mm

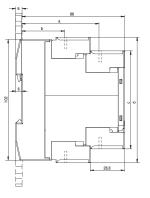


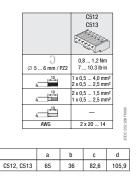
CM-xxS 1SVR 730 xxx xxx, 1SVR 740 xxx xxx 22.5 mm

Temperature monitoring relays

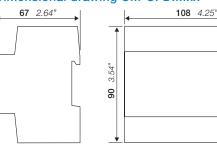


45 mm



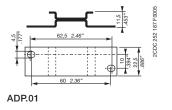


Dimensional drawing CM-UFD.Mxx

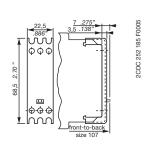


General technical data, Accessories, Current transformers Ordering details - CM-range accessories

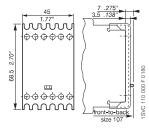
Accessories







Sealable cover COV.01



Sealable cover COV.02

| Descrip- tion | For type | Width in mm | for devices | Type | Order code | Price pce | Pkg qty | Weight (1 pce) g (oz) |
|-----------------------|------------------------------------|----------------|-------------------------|--------|-----------------|--------------|------------|-----------------------------|
| Adapter | CM-S CM-S.S/P | 22.5 | | ADP.01 | 1SVR430029R0100 | | 1 | 18.4 (0.65) |
| for screw mounting | CM-N CM-N.S/P | 45 | | ADP.02 | 1SVR440029R0100 | | 1 | 36.7 (1.30) |
| | CM-S, CM-N CM-S.S/P CM-N.S/P | | without DIP switches | MAR.01 | 1SVR366017R0100 | | 10 | 0.19 (0.007) |
| Marker label | CM-S, CM-N | | with DIP switches | MAR.02 | 1SVR430043R0000 | | 10 | 0.13 (0.005) |
| | CM-S.S/P CM-N.S/P | | with DIP switches | MAR.12 | 1SVR730006R0000 | | 10 | 0.152 (0.335) |
| | CM-S | 22.5 | | COV.01 | 1SVR430005R0100 | | 1 | 5.2 (0.18) |
| Sealable | CM-N | 45 | | COV.02 | 1SVR440005R0100 | | 1 | 7.7 (0.27) |
| transparent cover | CM-S.S/P | 22.5 | | COV.11 | 1SVR730005R0100 | | 1 | 4.0 (0.129) |
| | CM-N.S/P | 45 | | COV 12 | 1SVR750005R0100 | | 1 | 7 (0.247) |

General technical data, Accessories, Current transformers Ordering details - CM-CT current transformers

CM-CT



with mounted accessories



CM-CT-A mounted on DIN rail

Plug-in current transformers CM-CT

- Without primary conductor though with foot angle, insulating protective cap and bar fastening screws
- Primary / rated current from 50 A to 600 A
- Secondary current of 1 A or 5 A
- Class 1

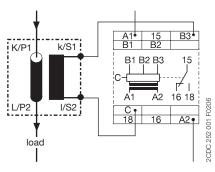
Ordering details

| Rated primary current | Secondary current | Burden class | Туре | Order code | Price pce | Weight (1 pce) g (oz) |
|-----------------------|--------------------------------------|--------------|-------------|-----------------|--------------|-----------------------------|
| 50 A | | 1 VA / 1 | CM-CT 50/1 | 1SVR450116R1000 | | 0.31 (0.683) |
| 75 A | | 1.5 VA / 1 | CM-CT 75/1 | 1SVR450116R1100 | | 0.31 (0.683) |
| 100 A | | 2.5 VA / 1 | CM-CT 100/1 | 1SVR450116R1200 | | 0.276 (0.608) |
| 150 A | | 2.5 VA / 1 | CM-CT 150/1 | 1SVR450116R1300 | | 0.32 (0.705) |
| 200 A | 1 A | 2.5 VA / 1 | CM-CT 200/1 | 1SVR450116R1400 | | 0.222 (0.489) |
| 300 A | | 5 VA / 1 | CM-CT 300/1 | 1SVR450117R1100 | | 0.29 (0.639) |
| 400 A | | 5 VA / 1 | CM-CT 400/1 | 1SVR450117R1200 | | 0.27 (0.595) |
| 500 A | | 5 VA / 1 | CM-CT 500/1 | 1SVR450117R1300 | | 0.29 (0.639) |
| 600 A | | 5 VA / 1 | CM-CT 600/1 | 1SVR450117R1400 | | 0.24 (0.529) |
| 50 A | | 1 VA / 1 | CM-CT 50/5 | 1SVR450116R5000 | | 0.3 (0.661) |
| 75 A | | 1.5 VA / 1 | CM-CT 75/5 | 1SVR450116R5100 | | 0.31 (0.683) |
| 100 A | | 2.5 VA / 1 | CM-CT 100/5 | 1SVR450116R5200 | | 0.31 (0.683) |
| 150 A | | 2.5 VA / 1 | CM-CT 150/5 | 1SVR450116R5300 | | 0.28 (0.617) |
| 200 A | 5 A | 5 VA / 1 | CM-CT 200/5 | 1SVR450116R5400 | | 0.29 (0.639) |
| 300 A | Ī | 5 VA / 1 | CM-CT 300/5 | 1SVR450117R5100 | | 0.252 (0.556) |
| 400 A | Ī | 5 VA / 1 | CM-CT 400/5 | 1SVR450117R5200 | | 0.26 (0.573) |
| 500 A | 5 VA / 1 CM-CT 500/5 1SVR450117R5300 | | | | | 0.208 (0.459) |
| 600 A | Ī | 5 VA / 1 | CM-CT 600/5 | 1SVR450117R5400 | | 0.21 (0.463) |

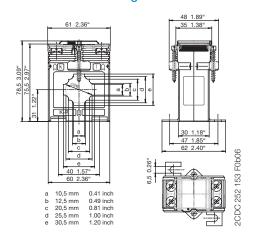
Ordering details - Accessories

| Description | Туре | Order code | | Weight |
|---|---------|-----------------|---------|--------------|
| | | | : | (1 pce) |
| | | | 10 pces | g (oz) |
| Snap-on fastener for DIN rail mounting of CM-CT | CM-CT A | 1SVR450118R1000 | | 0.009 (0.02) |

Operating principle / circuit diagram



Dimensional drawing



Primary switch mode power supplies Product group picture



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Primary switch mode power supplies Overview

Modern power supply units are a vital component in most areas of energy management and automation technology. ABB as your global partner in these areas pays the utmost attention to the resulting requirements. Innovation is the key to a substantial enlargement of our power supply product program:

The CP-D range of power supply units in MDRC design (modular DIN rail components) fits into all domestic installation and distribution panels.

CP-E

The CP-E range offers enhanced functionality while the number of different types has been considerably reduced. Now all power supply units can be operated at an ambient temperature of up to +70 °C.

CP-T

The CP-T range of three-phase power supply units is ABB's youngest member of the power supply family.

CP-S

The CP-S range is ABB's standard range, a high-end power supply unit optimised for serial applications.

CP-C

The CP-C range's pluggable function modules adapt these power supply units exactly to your application's needs. Of course, all ABB power supply units feature primary switch mode technology – environmentally sound and cost-efficiency. This represents the highest level of innovative industrial elec-

Application manual

For today's applications, e.g. in control engineering, it is essential to make the right decision regarding the selection and planning of the power supply unit. Incorrect dimensioning or incorrect connection of a power supply unit can seriously affect the safety and/or availability of the entire installation. ABB's "Power Supply Units" application manual provides a general overview of switch mode power supply units, thus helping you to choose the ideal power supply unit and avoid problems during engineering and commissioning. The manual generally shows and explains the fundamental characteristics of and the differences between power supply units, and provides a detailed introduction to the ABB product range on the basis of the selection criteria. Finally, it describes and explains application examples for engineering.

The manual is available in English and German.

English Version: 2CDC 114 048 M0203 German Version: 2CDC 114 048 M0103

Primary switch mode power supplies Approvals and marks

| ■ existi □ pend | | CP-D | | | | | | | | | | | |
|--------------------|---|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|---------|--|--|--|--|--|
| Approv | als | CP-D 12/0.83 | CP-D 12/2.1 | CP-D 24/0.42 | CP-D 24/1.3 | CP-D 24/2.5 | CP-D 24/4.2 | CP-D RU | | | | | |
| c(UL) us | UL 508, CAN/CSA C22.2 No.107.1 | ■ ¹⁾ | = ¹⁾ | | | | | | |
| c 711 'us | UL 1310, CAN/CSA C22.2 No.223 (Class 2 Power Supply) | ■ 1) | ■ ¹⁾ | ■ ¹⁾ | 1) | = 1) | | | | | | | |
| c 91 2 us | UL 60950, CAN/CSA C22.2 No.60950 | ■ ¹⁾ | = 1) | ■ ¹⁾ | ■ ¹⁾ | ■ ¹⁾ | ■ ¹⁾ | | | | | | |
| CB scheme | CB Scheme | ■ ¹⁾ | = 1) | ■ ¹⁾ | = 1) | = 1) | = 1) | | | | | | |
| ERC | EAC | = 1) | = 1) | = 1) | ■ ¹⁾ | ■ ¹⁾ | = 1) | | | | | | |
| ((() | CCC | ■ 1) | = 1) | = 1) | ■ ¹⁾ | ■ ¹⁾ | ■ ¹⁾ | | | | | | |
| Marks | | | | | | | | | | | | | |
| C€ | CE | - | - | - | • | - | - | • | | | | | |
| <u>&</u> | C-Tick | - | - | - | - | - | - | • | | | | | |

| ■ existi □ pend | | CP-E | | | | | | | | | | | | | | | CP-T | | | | | | | | | |
|--------------------|---|------------------------|-------------|--------------|--------------|------------------------|-------------|------------------------|--------------|------------------------|------------------------|--------------|-------------|--------------|--|--------|------------------------|--------------|------------------------|--------------|--|-------------|--------------|------------------------|--|--|
| Approv | als | CP-E 5/3.0 | CP-E 12/2.5 | CP-E 12/10.0 | CP-E 24/0.75 | CP-E 24/1.25 | CP-E 24/2.5 | CP-E 24/5.0 | CP-E 24/10.0 | CP-E 24/20.0 | CP-E 48/0.62 | CP-E 48/1.25 | CP-E 48/5.0 | CP-E 48/10.0 | | CP-RUD | CP-T 24/5.0 | CP-T 24/10.0 | CP-T 24/20.0 | CP-T 24/40.0 | | CP-T 48/5.0 | CP-T 48/10.0 | CP-T 48/20.0 | | |
| c UL) US | UL 508, CAN/CSA C22.2 No.107.1 | ■ ¹⁾ | = 1) | = 1) | = 1) | ■ ¹⁾ | = 1) | ■ ¹⁾ | = 1) | = ¹⁾ | ■ ¹⁾ | ■ 1) | = 1) | = 1) | | | ■ ¹⁾ | = 1) | = 1) | ■ 1) | | ■ 1) | = 1) | = 1) | | |
| c 91 2 us | UL 1310, CAN/CSA C22.2 No.223 (Class 2 Power Supply) | | - | | | • | | | | | | | | | | | | | | | | | | | | |
| c 91 .us | ANSI/ISA-12.12 (Class I, Div. 2, hazardous locations) CAN/CSA C22.2 No. 213 | • | • | • | • | • | • | • | • | • | • | • | • | • | | | - | • | - | - | | • | • | • | | |
| c 91 2'us | UL 60950, CAN/CSA C22.2 No.60950 | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | ■ ¹⁾ | = 1) | = 1) | = 1) | = 1) | | | ■ ¹⁾ | = 1) | ■ ¹⁾ | = 1) | | = 1) | = 1) | ■ ¹⁾ | | |
| ERE | EAC | - | - | - | - | - | - | - | - | - | - | - | - | - | | | | - | - | - | | - | - | • | | |
| ((() | ccc | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | = 1) | | | | | | | | | | | | |
| ©QC | GB4943, GB9254, GB17625.1 | | | | | | | | | | | | | | | | | • | - | - | | - | • | | | |
| Marks | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C€ | CE | - | - | - | - | - | - | - | • | - | - | - | - | • | | - | • | • | • | - | | - | • | • | | |
| & | C-Tick | • | • | • | • | • | - | • | • | • | • | • | - | - | | • | | _ | | | | | | | | |

| | existing pending | | | 6 | | (| CP-C | ; | | (| CP-A | Α | | CF | P-B | |
|----------------|--|------------------------|------------------------|------------------------|------------------------|--------------|--------------|---|---------|------------------------|------------------------|---|-------------|--------------|--------------|------------|
| Approv | vals | CP-S 24/5.0 | CP-S 24/10.0 | CP-S 24/20.0 | CP-C 24/5.0 | CP-C 24/10.0 | CP-C 24/20.0 | | CP-C MM | CP-A RU | CP-A CM | | CP-B 24/3.0 | CP-B 24/10.0 | CP-B 24/20.0 | CP-B EXT.2 |
| cUL) US | UL 508, CAN/CSA C22.2 No.107.1 | ■ ¹⁾ | ■ ¹⁾ | = ¹⁾ | ■ ¹⁾ | = 1) | = 1) | | | | | | • | • | • | |
| c UL us | UL 1604 (Class I, Div. 2, hazardous locations), CAN/CSA C22.2 No.213 | ■ 1) | = 1) | = 1) | ■ 1) | = 1) | = 1) | | | | | | | | | |
| c 91 0s | UL 60950, CAN/CSA C22.2 No.60950 | ■ 1) | = 1) | ■ ¹⁾ | ■ 1) | = 1) | = 1) | | | ■ ¹⁾ | ■ ¹⁾ | | | | | |
| ERE | EAC | | - | - | | - | - | | • | - | | | - | - | • | • |
| CB schere | CB scheme | • | - | | - | | | | | - | - | | | | | |
| Marks | | | | | | | | | | | | | | | | |
| C€ | CE | • | • | • | - | - | • | | • | - | - | | - | • | • | • |
| ◬ | C-Tick | • | - | - | - | - | - | | - | - | | | | | | |

 $^{^{\}rm 1)}$ Approvals refer to the rated input voltage $U_{\rm in}.$

Primary switch mode power supplies Selection table - Single-phase

| | | Order number | 1SVR427041R1000 | 1SVR427043R1200 | 1SVR427041R0000 | 1SVR427043R0100 | 1SVR427044R0200 | 1SVR427045R0400 | | 1SVR427033R3000 | 1SVR427032R1000 | 1SVR427035R1000 | 1SVR427030R0000 | 1SVR427031R0000 | 1SVR427032R0000 | 1SVR427034R0000 | 1SVR427035R0000 | 1SVR427036R0000 | 1SVR427030R2000 | 1SVR427031R2000 | 1SVR427034R0000 | 1SVR427035R2000 | 1SVR427014R0000 | 1SVR427015R0100 | 1SVR427016R0100 | 1SVR427024R0000 | 1SVR427025R0000 | 1SVR427026R0000 |
|-----------------|---|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | | | | <u> </u> | | | | | | | | | Sing | | | е | | | | | | 0.0 | | , , | 20. | |
| | | 5 V DO | | ; | | CP-I | ر : : | | | _ : | | | | | | CF | '-E | , | ; | : : | | | | CP- | S | • | CP-C | j |
| Rated output v | oltage . | 5 V DC 12 V DC | | | | <u>.</u> | ļ <u>i</u> | | | • | | • | | | | <u>.</u> | | <u>.</u> | <u>.</u> | <u> </u> | | | | | | | | |
| | | 24 V DC | | | • | | | • | | | | - | • | | • | | • | • | ļ | | | | | • | | | • | |
| | | 48 V DC | | | | ļ | ŀ <u></u> ⊦ | | | | | | | . | | | | | | | | • | | | | | <u>-</u> | <u>-</u> |
| Rated output of | | 0.42 A | | | | - | | - | | ÷ | - | | | | | | | - | - | | _ | | | | | | | - |
| Hated output o | current | 0.625 A | | | | . | †····† | | | | | | | | | <u>.</u> | | | | <u> </u> | | | | | | · | <u>.</u> | |
| | | 0.75 A | | | | | | | | | | | • | | | <u>.</u> | | | | | | | | | | | | |
| | | 0.83 A | • | | | . | † † | **** | | *** | ***** | | | | | . | | | . | : : | | | | | | | | |
| | • | 1.25 A | † | | | | i i | | | | | | | • | | | | | | • | | | | | | | | |
| | • | 1.3 A | İ | | | • | ī | | | 1 | | | | | | | | | | | | | | | | | | |
| | | 2.1 A | Ī | • | | Ī | Ī İ | | | | | | | | | <u> </u> | | | Ī | | | | | | | | | |
| | | 2.5 A | | | | | • | | | | • | | | | • | | | | | | | | | | | | | |
| | | 3 A | | | | | | | | • | | | | | | | | | | | | | | | | | | |
| | | 4.2 A | | | | <u>.</u> | <u> </u> | • | | | | | | | | <u>.</u> | | | <u>.</u> | <u> </u> | | | | | | | | |
| | | 5 A | | | | ļ | <u> </u> | | | | | | | | | • | | <u>.</u> | | <u>.</u> | | | • | | | • | | |
| | | 10 A | | <u>.</u> | | <u> </u> | <u>į … į</u> | | | | | • | | | ļ | <u> </u> | • | ļ | ļ | <u> </u> | | • | | • | | <u>.</u> | • | <u> </u> |
| | | 20 A | | | | _ | | | | _ | | | | | | | | • | | | | | | | - | - | | - |
| Rated output p | oower | 10 W | | <u>.</u> | • | <u>.</u> | <u> </u> | | | | | | | | ļ | <u>.</u> | | <u>.</u> | <u>.</u> | <u> </u> | | | | | | <u>.</u> | | |
| | | 15 W 18 W | ļ | ļ | | ļ | ļļ | | | • | | | | | ļ | . | | ļ | ļ | ļ | | | | | | | ļ | <u>.</u> |
| | | 30 W | ļ | | | | ļļ | | | | | | - | | | <u>.</u> | | | | | | | | | | ļ | | |
| | | 60 W | ļ | | | | | | | | | | | - | | <u>.</u> | | | • | • | | | | | | | | |
| | | 100 W | | <u> </u> | | <u> </u> | ∤ | | | | | | | | | <u>:</u> | | <u>.</u> | | | | | | | | . . | <u>.</u> | - |
| | | 120 W | ļ | | | | ļ <u>i</u> | | | | | • | | | | • | | | | | | | | | | | | |
| | | 240 W | | | | <u>.</u> | <u> </u> | | | | | | | | | <u> </u> | • | | <u>.</u> | | | | | • | | | | |
| | | 480 W | | | | <u>.</u> | | | | | | | | | | <u>.</u> | | | | | | • | | | | | ! | |
| Rated input | 100 | - 240 V AC | • | | • | | • | | - | • | • | | • | • | | | | | | • | | | | | | | | |
| voltage | | AC auto select | | | | | †····† | ••••• | | **** | | • | | | | • | • | | | | • | | | | | | | |
| · · | 115 | - 230 V AC | | | | | i i | | | | | | | | | | | • | | | | • | | | | | | |
| | 110 | - 240 V AC | | | | | | | | | | | | | | | | | | | | | • | | | • | • | - |
| | | - 120 V AC | | | | | Ī | | | | | | | | | | | | | | | | | • | - | | | |
| | | - 240 V AC | | | | | | | | | | | | | | | | | | | | | | • | - | | | |
| DC input | | - 370 V DC | • | • | • | • | • | - | | • | | | • | | | | | • | į | | | • | | | | | | |
| voltage range | *************************************** | - 375 V DC | ļ | <u>.</u> | . | <u>.</u> | <u>į</u> į | | | | • | | | • | • | <u>.</u> | | . | • | • | | | | | | <u>.</u> | <u>.</u> | <u>.</u> |
| | | - 370 V DC | ļ | | | ļ | ļļ | | | | | • | | | | • | • | | ļ | | | | | | | ļ | | |
| | 100 | - 350 V DC | ļ | <u>.</u> | | <u>.</u> | ļļ | | | | | | | | | <u>.</u> | | <u>.</u> | <u>.</u> | <u></u> | | | | | | • | • | • |
| | | - 350 V DC erve design | | | | | | | | _ | | | | | | _ | | | | | | | _ | - | - | - | _ | _ |
| Features | | output voltage | ļ | _ | | _ | | _ | | _ | | _ | _ | <u>.</u> | _ | | _ | _ | _ | _ | | _ | | • | - | | - | |
| | | d input fuse | | - | _ | | | - | | - | - | | | - | - | | - | - | | | <u>=</u> | = | | | | | = | = |
| | | rcuit stable | | - | - | - | | - | | - | - | - | - | - | - | - | - | - | - | - | <u></u> | - | | - | - | | - | - |
| | | behavior (U/I) | | - | _ | - | | | | | - | - | | | - | - | _ | _ | - | | | _ | | - | _ | | - | - |
| | Fold back ber | | ļ <u>-</u> | ļ | | ļ | 1-1 | | | • | | | • | | - | <u> </u> | | ļ <u>-</u> | ļ | - | | | | - | - | <u> </u> | | |
| | | or correction | ····· | | | <u>.</u> | t····t | | | | | pas | | | | กลร | pas | act | . | | pas | act | | | | act | act | act |
| | | emp. rating | • | | • | | | • | | • | • | Pas ■ | • | • | • | = | = | ■ | | • | = | ■ | • | • | • | . act | a ∪t | ■ |
| | -25°C (-40 | °C) to 70°C | ļ | <u>.</u> | | <u>.</u> | <u>ļ</u> | | | | | | | | | <u>.</u> | | <u>;</u> | <u>.</u> | | | | | | | <u>.</u> | <u>.</u> | <u>.</u> |
| | | connection | | ļ | | ļ | ļį | | | • | • | 3 | - | • | • | 3 | 3 | 3 | • | • | | 3 | 5 | 5 | 5 | 5 | 5 | 5 |
| | Serial | connection | - | • | • | • | • | • | | • | • | 2 | • | • | • | 2 | 2 | 2 | • | • | 2 | 2 | - | • | • | • | • | • |

Primary switch mode power supplies Selection table - Three-phase, CP-ASI

| | Order number | 1SVR427054R0000 | 1SVR427055R0000 | 1SVR427056R0000 | 1SVR427057R0000 | 1SVR427054R2000 | 0 1SVR427055R2000 | 1SVR427056R2000 | | 1SVR427090R0280 | 1SVR427090R0400 | 1SVR427095R0400 | 1SVR427090R0800 |
|------------------------|-----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|-----------------|----------|-----------------|-----------------|-----------------|-----------------|
| | | | | | | P-T | | | | | CP. | ASI | |
| | 041//50 | _ | - | - | | | | · | | | 01 | AOI | |
| Rated output v | oltage 24 V DC | | • | • | • | <u>.</u> | <u>.</u> | <u>.</u> | | ļ <u>.</u> | | | |
| | 30.5 V DC | ļ | ļ | ļ | | <u>.</u> | <u>.</u> | ļ | ļ | | • | • | • |
| | 48 V DC | | | | | • | • | • | | | | | |
| Rated output of | eurrent 2.8 A | ļ | . | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | ļ | <u>.</u> | • | | . | <u>.</u> |
| | 3 A | | <u>.</u> | <u>.</u> | | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | ļ | - | - | |
| | 5 A | = | <u>.</u> | | | • | | <u>.</u> | <u>.</u> | <u> </u> | | | |
| | 8 A | | | | | | | | | | | | • |
| | 10 A | 1 | • | | | | • | | | | | | |
| | 20 A | | | • | | | | • | | | | | |
| | 40 A | | | | • | | | | | | | | |
| Rated output p | ower 85 W | | | | | | | | | • | | | |
| riatoa oatpar p | 120 W | • | | | | | | | | | | | |
| | 122 W | | | | | | | | | | • | • | |
| | 240 W | | • | | | • | | | | | | | |
| | 244 W | | ! | | | | | ! | <u>.</u> | | | | |
| | 480 W | | | • | | | | <u>†</u> | | ····· | | | |
| | 960 W | | | | | <u> </u> | | | <u>.</u> | | | | |
| Detect to see | 85-132 V AC, 184-264 V AC | | - | - | - | - | - | : | | | | | |
| Rated input voltage | , | | <u>.</u> | <u>.</u> | | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | ļ | | | |
| voitage | 3 x 400 - 800 V AC | • | • | • | • | - | • | - | | | | | |
| DC innut | 18-32.4 V DC | | - | | | | - | - | _ | | | • | |
| DC input voltage range | | | <u>.</u> | | | <u>.</u> | <u>.</u> | <u>.</u> | <u>.</u> | | | | |
| voitage range | 480 - 820 V DC | - | • | • | • | - | - | - | | | | | |
| Features | Adjustable output voltage | | | | | | | | - | | | | |
| reatures | Integrated input fuse | | | | | | | | | | | | |
| | Short circuit stable | | | • | | | | | | ļ | | | |
| | Fold forward behavior (U/I) | - | | - | | _ | _ | ! | <u>.</u> | ļ | | | |
| | Fold back behavior (hiccup) | | | | | - | | | | ļ | | | |
| | Power factor correction | ļ . | . | <u> </u> | - | - | | <u> </u> | | ļ | | | <u> </u> |
| | Ambient temp. rating | ļ <u>.</u> | | - | | | | | <u>.</u> | ļ | | | |
| | -25°C (-40°C) to 70°C | • | • | • | • | • | • | • | | | | | |
| | Serial connection | ····· | 2 | 2 | 2 | 2 | 2 | 2 | | ····· | | | |
| | Suited for AS-Interfaces | · | | | | | | | | | • | • | • |
| | 24.104 101 710 1110114069 | | | | | | | | | _ | _ | _ | |

CP-D range Product group picture



CP-D range Table of contents

CP-D range

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|-------------------------|------|
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CP-D range Benefits and advantages

Characteristics

- Output voltages 12 V, 24 V DC
- Adjustable output voltages (devices > 10 W)
- Output currents 0.42 A / 0.83 A / 1.3 A / 2.1 A / 2.5 A / 4.2 A
- Power range 10 W, 30 W, 60 W, 100 W
- Wide range input 100-240 V AC (90-264 V AC, 120-375 V DC)
- High efficiency of up to 89 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -40 °C...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic (fold-forward behaviour at overload no switch-off)
- LEDs for status indication
- Light-grey housing in RAL 7035
- Approvals / Marks (depending on device, partly pending): c⊕us, c**PL**us, [ff], ⋘ / C €, ፟

Benefits

Width and structural form ①

With their width between 18 to 90 mm only, the CP-D range switch mode power supplies are ideally suited for installation in distribution panels.

Wide range input ②

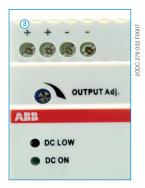
Optimised for world-wide applications: The CP-D power supplies can be supplied with 90-264 V AC or 120-375 V DC.

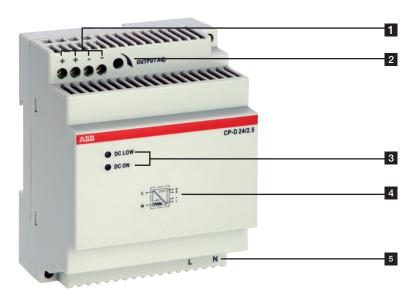
Adjustable output voltage 3

The CP-D range types > 10 W feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.









- 1 OUTPUT ++/--: terminals output
- 2 INPUT L, N: terminals input
- 3 Indication of operational states

DC ON: green LED - output voltage applied DC LOW: red LED - output voltage too low

- 4 Circuit diagram
- 5 OUTPUT Adjust: potentiometer adjustment of output voltage

CP-D range Ordering details



CP-D 12/0.83, CP-D 24/0.42



CP-D 12/2.1, CP-D 24/1.3



CP-D 24/2.5

Description

The CP-D range of modular power supply units in MDRC design (modular DIN rail components) is ideally suited for installation in distribution panels. This range offers devices with output voltages of 12 V DC and 24 V DC at output currents of 0.42 A to 4.2 A. Thanks to a high thermal efficiency corresponding to low power and heat dissipation, the devices can be operated without forced cooling. All devices feature the U/I output characteristic (fold forward behaviour). All power supply units in the CP-D range are approved according to all relevant international standards.

Ordering details

| Input voltage range | Rated output voltage / | Туре | Order code | Price | Weight (1 pce) |
|---------------------------|------------------------|--------------|-----------------|-------|-------------------|
| | current | | | 1 pce | kg (lb) |
| 90-264 V AC/ 120-375 V DC | 12 V DC / 0.83 A | CP-D 12/0.83 | 1SVR427041R1000 | | 0.06 (0.13) |
| 90-264 V AC/ 120-375 V DC | 12 V DC / 2.1 A | CP-D 12/2.1 | 1SVR427043R1200 | | 0.19 (0.41) |
| 90-264 V AC/ 120-375 V DC | 24 V DC / 0.42 A | CP-D 24/0.42 | 1SVR427041R0000 | | 0.06 (0.13) |
| 90-264 V AC/ 120-375 V DC | 24 V DC / 1.3 A | CP-D 24/1.3 | 1SVR427043R0100 | | 0.19 (0.41) |
| 90-264 V AC/ 120-375 V DC | 24 V DC / 2.5 A | CP-D 24/2.5 | 1SVR427044R0200 | | 0.25 (0.56) |
| 90-264 V AC/ 120-375 V DC | 24 V DC / 4.2 A | CP-D 24/4.2 | 1SVR427045R0400 | | 0.32 (0.71) |

Data at $\rm T_a = 25~^{\circ}C,~U_{in} = 230~V~AC$ and rated values, unless otherwise indicated

| Туре | CP-D 12/0.83 | CP-D 12/2.1 |
|--|------------------------------------|----------------------------|
| Input circuit - supply circuit | | L, N |
| Rated input voltage U _{in} | 100-240 V AC | |
| Input voltage range | 90-264 V AC / 120-375 V DC | |
| Frequency range AC | 47-63 Hz | |
| | 200 mA / 12.68 W | 502 mA / 31.14 W |
| | 128.3 mA / 13.01 W | 277 mA / 31.2 W |
| nrush current limiting at 230 V AC | 30 A (max. 3 ms) | 50 A (max. 3 ms) |
| Power failure buffering time | min. 30 ms | <u>.</u> |
| nternal input fuse | 1 A slow-acting / 250 V AC | 2 A slow-acting / 250 V AC |
| Power factor correction (PFC) | no | <u>.</u> |
| ndication of operational states | | |
| Dutput voltage DC ON: green LED | : output voltage applied | |
| DC LOW: red LED | | ····· |
| Dutput circuit | +, - | ++, |
| Rated output voltage | 12 V DC | : ''' |
| Tolerance of the output voltage | ±1 % | |
| Adjustment range of the output voltage | - | 12-14 V DC |
| Rated output power | 10 W | 25 W |
| Rated output current I, $T_a \le 60 ^{\circ}\text{C}$ | | 2.1 A |
| Derating of the output current $60 ^{\circ}\text{C} < \text{T}_a \le 70 ^{\circ}\text{C}$ | 2.5 %/°C | 2.17 |
| Maximum load change statical | may 1 % | |
| loviation | may 1 % | |
| change of output voltage within the input voltage range of output voltage range of output voltage range of output voltage within the input voltage range of output voltage within the input | |
| | < 1 ms 1000 ms | |
| voltage | | |
| Rise time at rated load | | |
| Residual ripple and switching peaks BW = 20 MHz | 50 mV | |
| Parallel connection | yes, using CP-D RU | |
| Series connection | yes, to increase voltage | |
| Resistance to reverse feed | 18 V / 1 s | |
| Output circuit - No-load, overload and short-circuit behaviour | | |
| Characteristic curve of output | U/I characteristic curve | |
| Short-circuit protection | continuous short-circuit stability | |
| Short-circuit behaviour | continuation with output power lim | niting |
| Current limiting at short circuit | typ. 1.4 A | typ. 5.9 A |
| Overload protection | output power limiting | <u>i.</u> |
| Overvoltage protection | 15-16.5 V DC | |
| No-load protection | continuous no-load stability | |
| Starting of capacitive loads | unlimited | |
| General data | 1 | |
| Efficiency | typ. 78 % | typ. 82 % |
| Duty time | 100 % | 175. 02 70 |
| Dimensions (W x H x D) | 18 x 91 x 57.5 mm | 53 x 91 x 57.5 mm |
| INTERIORIS (VV ATTA D) | (0.71 x 3.58 x 2.26 in) | (2.09 x 3.58 x 2.26 in) |
| Veight | 0.066 kg (0.13 lb) | 0.196 kg (0.41 lb) |
| Material of housing | plastic | |
| Vounting | DIN rail (IEC/EN 60715), snap-on r | nounting without any tool |
| Mounting position | horizontal | |
| Minimum distance to other units horizontal / vertical | 25 mm / 25 mm (0.98 in / 0.98 in) | |
| Degree of protection housing / terminals | IP20 / IP20 | |
| Protection class | | |

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-D 12/0.83 | CP-D 12/2.1 |
|--|---------------------------------|---|-------------------------------------|
| Electrical connection - Input circuit / Output | | | |
| Wire size fir | ne-strand with wire end ferrule | | 0.2-2.5 mm ² (24-14 AWG) |
| Ctringing Inpath | rigid | 0.2-2.5 mm² (26-12 AWG) | 0.2-2.5 mm ² (24-12 AWG) |
| Stripping length Tightening torque | | 4-5 mm (0.16-0.2 in) 0.6 Nm (5 lb.in) | 7 mm (0.28 in) 0.7 Nm (6 lb.in) |
| | | 0.6 14111 (5 16.111) | 0.7 Niii (6 ib.iii) |
| Environmental data | a manuation | -40+70 °C | |
| Ambient temperature range | | -40+60 °C | |
| | | -40+85 °C | |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | storage | -40+65 C 4 x 24 cycles, 40 °C, 95 % RH | |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 50 m/s ² , 10 Hz - 2 kHz | |
| Shock (half-sine) (IEC/EN 60068-2-27) | | 40 m/s², 22 ms | |
| | | 40 11/5 , 22 11/5 | |
| Isolation data Rated insulation voltage U | input circuit / output circuit | 21/40 | |
| Pollution degree | input circuit / output circuit | 2 | |
| Overvoltage category (UL/IEC/EN 60950-1) | | | |
| | | II . | |
| Standards Product standard | | EN 61204 | |
| Low Voltage Directive | | 2006/95/EC | |
| EMC Directive | | 2004/108/EC | |
| Electrical safety | | UL 508, UL 60950-1, EN 60950-1 | |
| Protective low voltage | | SELV (EN 60950-1) | |
| - | | SELV (EIN 00930-1) | |
| Electromagnetic compatibility Interference immunity to | | EN 61000-6-2 | |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 4 (4 kV / 8 kV) | Level 4 (4 kV / 15 kV) |
| radiated, radio-frequency, electromagnetic fi | | , | |
| electrical fast transient/burst | IEC/EN 61000-4-3 | , , | |
| Surge | IEC/EN 61000-4-4 | , , | |
| conducted disturbances, induced by radio- | IEC/EN 61000-4-5 | , , | |
| frequency fields | IEG/EIN 01000-4-0 | , , | |
| Interference emission | | EN 61000-6-3 | |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B | |

"Approvals and marks" on page 3/4.

Data at $\rm T_a = 25~^{\circ}C,~U_{in} = 230~V~AC$ and rated values, unless otherwise indicated

| Туре | CP-D 24/0.42 | CP-D 24/1.3 | CP-D 24/2.5 | CP-D 24/4.2 |
|---|--------------------------------|---|---|--|
| Input circuit - supply circuit | 01 22 1/0112 | : | , N | 01 02 17 112 |
| Rated input voltage U. | 100-240 V AC | | , | |
| Input voltage range | 90-264 V AC /120 |)-375 V DC | ••••• | |
| Frequency range AC | 47-63 Hz | • | | ······································ |
| | 184 mA / 11.62 W | 600 mA / 37.92 W | 1120 mA / 69.3 W | 1800 mA / 117.3 W |
| | 120.6 mA / 12 W | 344 mA / 38.16 W | 660 mA / 70.1 W | 900 mA / 114.4 W |
| Inrush current limiting at 230 V AC | 30 A (max. 3 ms) | 50 A (max. 3 ms) | 60 A (max. 3 ms) | i |
| Power failure buffering time | min. 30 ms | <u> </u> | min. 60 ms | • |
| Internal input fuse | | 2 A slow-acting / | <u>i</u> | 3.15 A slow-acting |
| Power factor correction (PFC) | / 250 V AC no | 250 V AC | • | / 250 V AC |
| Indication of operational states | 110 | | | |
| Output voltage DC ON: green LED | : output v | oltage applied | | |
| DC LOW: red LED | | oltage too low | ···· | |
| Output circuit | | | | ·, |
| Rated output voltage | 24 V DC | , - | *** | , |
| Tolerance of the output voltage | ±1 % | | · • • • • • • • • • • • • • • • • • • • | |
| Adjustment range of the output voltage | - | 24-28 V DC | • | • |
| Rated output power | 10 W | 30 W | 60 W | 100 W |
| Rated output current I _r | T ₂ ≤ 60 °C: 0.42 A | T ≤ 60 °C: 1.3 A | Tੂ ≤ 55 °C: 2.5 A | T ≤ 60 °C: 4.2 A |
| Derating of the output current | CL CL | Ci. | | L L |
| | 2.5 %/°C ** | 2.5 %/°C ^a | 55 °C < T _a ≤ 70 °C: 2.5 %/°C | 2.5 %/°C ^a |
| Maximum load change statical deviation | max. I % | • | • | • |
| deviation change of output voltage within the input voltage range | max. 1 % | *************************************** | | |
| Control time | < 1 ms 1000 ms | • | ••••• | |
| Starting time after applying the supply voltage at I | 1 | • | ••••• | |
| Rise time at rated load Residual ripple and switching peaks BW = 20 MHz | | • | ····· | |
| | 1 | וור | • | |
| Parallel connection Series connection | yes, using CP-D f | | | |
| Resistance to reverse feed | 35 V / 1 s | | | |
| | 00 7 1 8 | | | |
| Output circuit - No-load, overload and short-circuit behaviour Characteristic curve of output | U/I characteristic | CUIVA | | |
| Short-circuit protection | continuous short- | *************************************** | • | • |
| Short-circuit behaviour | oontinuction with | output nower limit | ina | |
| Current limiting at short circuit | typ. 0.78 A | typ. 4.2 A | typ. 6.05 A | typ. 11.5 A |
| Overload protection | output power limi | tina | 176. 0.00 / 1 | (3)p |
| Overvoltage protection | 30-33 V DC | 9 | | |
| No-load protection | continuous no-lo | • | · · · · · · · · · · · · · · · · · · · | |
| Starting of capacitive loads | unlimited | • | • | |
| General data | | | | |
| Efficiency | typ. 80 % | typ. 83 % | typ. 86 % | typ. 89 % |
| Duty time | 100 % | <u> </u> | <u></u> | <u> </u> |
| Dimensions (W x H x D) | 18 x 91 x 57.5 mm | | 71 x 91 x 57.5 mm | 89.9 x 91 x 57,5 mm |
| | (0.71 x 3.58 x 2.26 in) | (2.09 x 3.58 x 2.26 in) | (2.80 x 3.58 x 2.26 in) | (3.54 x 3.58 x 2.26 in) |
| Weight | 0.066 kg (0.13 lb) | | 0.252 kg (0.55 lb) | 0.386 kg / (0.72 lb) |
| Material of housing | plastic | <u>i</u> | | <u>i</u> |
| Mounting | DIN rail (IEC/EN 6 | | ounting without any | / tool |
| Mounting position | horizontal | | | |
| Minimum distance to other units horizontal / vertical | 25 mm / 25 mm (| 0.98 in / 0.98 in) | | |
| Degree of protection housing / terminals | IP20 / IP20 | <u>.</u> | | |
| Protection class | II | | | |
| | I . | | | |

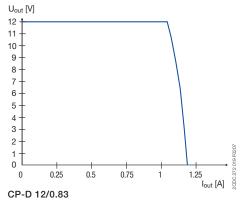
Data at $\rm T_a = 25~^{\circ}C,~U_{in} = 230~V~AC$ and rated values, unless otherwise indicated

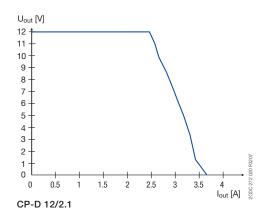
| Туре | | CP-D 24/0.42 | CP-D 24/1.3 | CP-D 24/2.5 | CP-D 24/4.2 |
|---|--|--|---|------------------|--|
| Electrical connection - Input circuit / Output circ | | | | | • |
| Wire size fine-str | and with wire end ferrule | (24-16 AWG) | 0.2-2.5 mm² (24- | , | |
| | rigid | 0.2-2.5 mm ² (26-12 AWG) | 0.2-2.5 mm ² (24- | 12 AWG) | |
| Stripping length | | 4-5 mm (0.16-0.2 | in) | 7 mm (0.28 in) | ······································ |
| Tightening torque | ······································ | 0.6 Nm (5 lb.in) | | 0.7 Nm (6 lb.in) | ······································ |
| Environmental data | | L | | - i | |
| Ambient temperature range | operation | -40+70 °C | | | |
| | rated load | -40+60 °C | • | -40+55 °C | -40+60 °C |
| | storage | -40+85 °C | ••••• | | |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | | 4 x 24 cycles, 40 | °C, 95 % RH | . * | ······································ |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 50 m/s², 10 Hz - 2 | 2 kHz | | ······································ |
| Shock (half-sine) (IEC/EN 60068-2-27) | ···• | 40 m/s², 22 ms | • | | ······································ |
| Isolation data | | | | | |
| Rated insulation voltage U _i in | out circuit / output circuit | 3 kV AC | | 4 kV AC | 3 kV AC |
| Pollution degree | | 2 | • | | |
| Overvoltage category (UL/IEC/EN 60950-1) | | 11 | • | | |
| Standards | | | | | |
| Product standard | | EN 61204 | | | |
| Low Voltage Directive | | 2006/95/EC | • | | |
| EMC Direcitve | | 2004/108/EC | • | | |
| Electrical safety | | UL 508, UL 6095 | 0-1, EN 60950-1 | | |
| Protective low voltage | | SELV (EN 60950- | 1) | . * | |
| Electromagnetic compatibility | | L | | | |
| nterference immunity to | | EN 61000-6-2 | | | |
| electrostatic discharge | IEC/EN 61000-4-2 | | Level 4 (4 kV / 15 kV) | | Level 4 (4 kV / 8 kV) |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3 (10 V/m) | | | •••• |
| electrical fast transient/burst | IEC/EN 61000-4-4 | Level 4 (4 kV) | | | •••••• |
| surge | IEC/EN 61000-4-5 | , , , | • | | |
| conducted disturbances, induced by radio- frequency fields | IEC/EN 61000-4-6 | , , | | | |
| Interference emission | | EN 61000-6-3 | | | ···· |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | | | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B | | | |

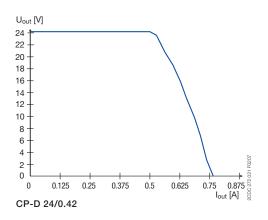
[&]quot;Approvals and marks" on page 3/4.

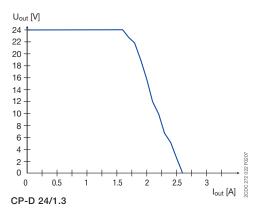
CP-D range Technical diagrams

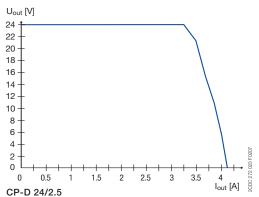
Characteristic curve of output at Ta = 25 °C

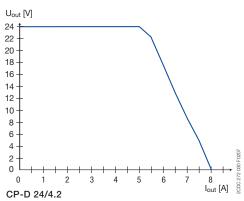




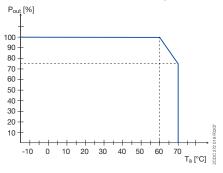


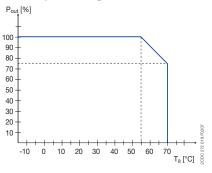






Characteristic curve of temperature at rated output voltage

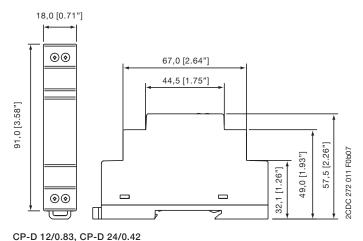


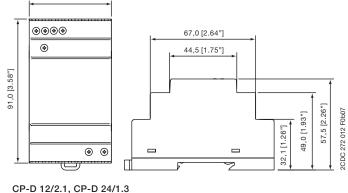


CP-D except CP-D 24/2.5 CP-D 24/2.5

CP-D range Dimensional drawings

Dimensional drawings dimensions in mm

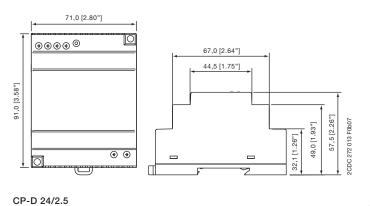


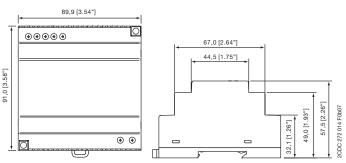


53,0 [2.09"]

CP-D 24/4.2

GF-D 12/0.63, GF-D 24/0.42





01 5 2472.0

CP-E range Product group picture



CP-E range Table of contents

CP-E range

| Product group picture | 3/17 |
|--|------|
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| Ordering details | 3/20 |
| Technical data | 3/21 |
| Technical diagrams, Wiring instructions | 3/29 |
| Technical diagrams, Dimensional drawings | 3/30 |

CP-E range Benefits and advantages

Characteristics

- Output voltages 5 V, 12 V, 24 V, 48 V DC
- Adjustable output voltages
- Output currents 0.625 A / 0.75 A / 1.25 A / 2.5 A / 3 A / 5 A / 10 A / 20 A
- Power range 15 W, 18 W, 30 W, 60 W, 120 W, 240 W, 480 W
- High efficiency of up to 90 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -40...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic curve on devices > 18 W (fold-forward behaviour at overload - no switch-off)
- Redundancy units offering true redundancy
- LED(s) for status indication
 - Signalling output/contact for output voltage OK Transistor on 24 V devices > 18 W and < 120 W
 - Solid-state on 24 V devices ≥ 120 W
- Approvals / Marks (depending on device, partly pending):
- c⊕us, c¶us, [ff[, @ / C €, &

Benefits

Signalling output/contact ①

The CP-E range 24 V devices > 18 W offer an output/contact for monitoring of the output voltage and remote diagnosis.

Wide range input ②

Optimised for world-wide applications: The CP-E power supplies can be supplied within a wide range of AC or DC voltage.

Adjustable output voltage ③

The CP-E range types feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.

Redundancy units 4

For decoupling of parallelized power supply units \leq 40 V. Thus, true redundancy can be achieved.

Further information about redundancy unit on page 51.











- 1 INPUT L, N, PE: terminals input
- 2 Circuit diagram
- 3 single/parallel: sliding switch adjustment of single or parallel operation
- 4 Indication of operational states

DC ON: green LED - green LED - output voltage OK DC LOW: red LED - output voltage too low

5 OUTPUT L+, L+, L-, L-: terminals - output
6 OUTPUT Adjust: potentiometer - adjustment of output voltage

CP-E range Ordering details

Description

This range offers types with output voltages from 5 V DC to 48 V DC at output currents of 0.625 A to 20 A. The high thermal efficiency of up to 90 %, corresponding to very low power and heat dissipation, allows operation without forced cooling. The functionality has been enhanced while the number of different types has been considerably reduced.

Of course all power supplies of the CP-E range are approved in accordance with all relevant international standards.



CP-E 24/0.75

Ordering details - CP-E < 100 W

| Input voltage range | Rated output voltage / current | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---|--------------------------------|--------------|-----------------|----------------|------------------------------|
| | | | | 1 pce | , , , |
| 90-264 V AC / 120-375 V DC | 5 V DC / 3 A | CP-E 5/3.0 | 1SVR427033R3000 | | 0.15 (0.33) |
| 85-264 V AC / 90-375 V DC | 12 V DC / 2.5 A | CP-E 12/2.5 | 1SVR427032R1000 | | 0.29 (0.64) |
| 90-132 V AC, 180-264 V AC / 210-375 V DC | 12 V DC / 10 A | CP-E 12/10.0 | 1SVR427035R1000 | | 1.00 (2.20) |
| 90-264 V AC / 120-375 V DC | 24 V DC / 0.75 A | CP-E 24/0.75 | 1SVR427030R0000 | | 0.15 (0.33) |
| 85-264 V AC / 90-375 V DC | 24 V DC / 1.25 A | CP-E 24/1.25 | 1SVR427031R0000 | | 0.29 (0.64) |
| 85-264 V AC / 90-375 V DC | 24 V DC / 2.5 A | CP-E 24/2.5 | 1SVR427032R0000 | | 0.36 (0.79) |



CP-E 12/2.5

| 000000 | |
|---|--------------------|
| AEE CP-E 435.4 | |
| , | OCTO 971 098 F0008 |
| (A) (A) (A) (A) (A) (A) (A) (A) (A) (A) | 9000 |

CP-E 48/5.0

Ordering details - CP-E M 120 W

| Input voltage range | Rated output voltage / current | Туре | Order code | Price | Weight (1 pce) |
|---|--------------------------------|--------------|-----------------|-------|-------------------|
| | voltage / current | | | 1 pce | kg (lb) |
| 90-132 V AC, 180-264 V AC / 210-375 V DC | 24 V DC / 5 A | CP-E 24/5.0 | 1SVR427034R0000 | | 1.00 (2.20) |
| 90-132 V AC, 180-264 V AC / 210-375 V DC | 24 V DC / 10 A | CP-E 24/10.0 | 1SVR427035R0000 | | 1.36 (3.01) |
| 90-264 V AC / 120-375 V DC | 24 V DC / 20 A | CP-E 24/20.0 | 1SVR427036R0000 | | 1.90 (4.18) |
| 85-264 V AC / 90-375 V DC | 48 V DC / 0.625 A | CP-E 48/0.62 | 1SVR427030R2000 | | 0.29 (0.64) |
| 85-264 V AC / 90-375 V DC | 48 V DC / 1.25 A | CP-E 48/1.25 | 1SVR427031R2000 | | 0.36 (0.79) |
| 90-132 V AC, 180-264 V AC / 210-375 V DC | 48 V DC / 5 A | CP-E 48/5.0 | 1SVR427034R2000 | | 1.36 (3.01) |
| 90-264 V AC / 120-375 V DC | 48 V DC / 10 A | CP-E 48/10.0 | 1SVR427035R2000 | | 1.90 (4.19) |

Data at $\rm T_a = 25~^{\circ}\rm C,~U_{in} = 230~\rm V~AC$ and rated values, unless otherwise indicated

| Туре | | CP-E 5/3.0 | CP-E 12/2.5 | CP-E 12/10.0 |
|---|--|--|------------------------------------|---|
| Input circuit | | 0. 20,0.0 | L, N | 0. 2.12,1010 |
| Rated input voltage U _{in} | | 100-240 V AC | | 115 / 230 V AC |
| | | | | auto select |
| Input voltage range | | 90-264 V AC / 120-375 V DC | 85-264 V AC / 90-375 V DC | 90-132 V AC, 180-264 V AC / 210-375 V DC |
| Frequency range AC | ••••• | 47-63 Hz | <u>.</u> | |
| Typical input current | at 115 V AC | 335 mA | 560 mA | 2.2 A |
| | at 230 V AC | 210 mA | 330 mA | 0.83 A |
| Typical power consumption | | 19.8 W | 35.9 W | 143 W |
| Inrush current limiting | at 115 V AC | 10 A (max. 3 ms) | 20 A (max. 3 ms) | 24 A (max. 5 ms) |
| Ç . | at 230 V AC | 18 A (max. 3 ms) | 40 A (max. 3 ms) | 48 A (max. 5 ms) |
| Discharge current | input / output | | <u> </u> | |
| | input / PE | | • | ••••• |
| Power failure buffering time | at 115 V AC | | min. 20 ms | min. 25 ms |
| . over randre samering time | at 230 V AC | | min. 30 ms | min. 30 ms |
| Internal input fuse | ut 200 v 710 | 2 A slow-acting / 250 V | : | 3.15 A slow-acting / |
| | | A0 | 250 V AC | |
| Power factor correction (PFC) | | no | | yes, passive, 0.7 |
| Indication of operational states | | | | |
| Output voltage | green LED | | OUTPUT OK: 5 : | OUTPUT OK: \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ |
| | red LED | output voltage OK | output voltage OK | output voltage OK OUTPUT LOW: : |
| | Ted LED | output voltage too low | - | output voltage too low |
| Output circuit | | L+,L- | L+, L- | +, L-, L- |
| Rated output voltage | | 5 V DC | 12 V DC | |
| Tolerance of the output voltage | ••••• | 0+1 % | <u></u> | •••••• |
| Adjustment range of the output voltage | | 4.5-5.75 V DC | 12-14 V DC | 11.4-14.5 V DC |
| Rated output power | ••••• | 15 W | 30 W | 120 W |
| Rated output current I, | T ₋ ≤ 60 °C | 3.0 A | 2.5 A | 10 A |
| Derating of the output current | 60 °C < T _a ≤ 70 °C | 2.5 %/°C | 2.5 %/°C | . <u>l</u> |
| | oad change statical | | ±0.5 % | ±1 % (single mode) ±5 % (parallel mode) |
| change of outpu | it voltage within the input voltage range | ±1 % | ±0.5 % | ±0.5 % |
| Control time | | < 2 ms | • | • |
| Starting time after applying the supply voltage | at I _, | max. 1 s | • | • |
| | with 3500 μF | - | max. 2 s | - |
| | with 7000 μF | max. 1.5 s | - | max. 1.5 s |
| Rise time | at rated load | max. 150 ms | <u>.</u> | · } |
| | with 3500 μF | - | max. 500 ms | - |
| | with 7000 μF | max. 500 ms | - | max. 500 ms |
| Fall time | | max. 150 ms | <u> </u> | |
| Residual ripple and switching peaks | BW = 20 MHz | 50 mV | • | · |
| Parallel connection | | yes, to enable redunda | ncy | configurable, to increase power,up to 3 devices, min. 0.1 - max. 0.9 |
| Series connection | | yes, to increase voltage | | yes, to increase voltage, max. 2 devices |
| Resistance to reverse feed | ••••• | 1 s - max. 7.5 V DC | 1 s - max.18 V DC | max. 18 V DC |
| Output circuit - No-load, overload and short-circuit be | haviour | 1 | | • |
| Characteristic curve of output | | Hiccup-mode | U/I characteristic curve | } |
| orial actorical carro or carpar | | | <u> </u> | |
| Short-circuit protection | ••••• | continuous short-circui | t proof | |
| · | | continuous short-circui Hiccup-mode | | ıt power limiting |
| Short-circuit protection Short-circuit behaviour | | Hiccup-mode | t proof continuation with outpu | ut power limiting |
| Short-circuit protection | | | continuation with outpu | ut power limiting |

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

| · | | T | * | ž | |
|---|-------------------------------|--|---|--|--|
| Туре | | CP-E 5/3.0 | CP-E 12/2.5 | CP-E 12/10.0 | |
| General data | | T. = 14/ | | | |
| Power dissipation | | typ. 5 W | typ. 5.6 W | typ. 24 W | |
| Efficiency Duty time | | typ. 75 % typ. 84 % typ. 84 % | | | |
| | | 100 % | | | |
| Dimensions (W x H x D) | | 22.5 x 90 x 114 mm (0.89 x 3.54 x 4.49 in) | 40.5 x 90 x 114 mm (1.59 x 3.54 x 4.49 in) | 63.2 x 123.6 x 123.6 mi (2.49 x 4.87 x 4.87 in) | |
| Weight | | 0.144 kg (0.317 lb) | 0.287 kg (0.633 lb) | 0.888 kg (1.958 lb) | |
| Material of housing | | Plastic Metal | | | |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mounting without any tool | | | |
| Mounting position | | horizontal | | | |
| Minimum distance to other units | horizontal / vertical | , | | | |
| Degree of protection | housing / terminals | IP20 / IP20 | | | |
| Protection class | | | | | |
| Electrical connection - input circuit / output circ | | | | - | |
| Wire size fine-s | trand with wire end ferrule | 0.2-2.5 mm ² (24-14 AV | VG) | 0.2-4 mm ² (24-11 AWG) | |
| fine-strai | nd without wire end ferrule | | | 0.2-6 mm² (24-10 AWG | |
| | rigid | | | | |
| Stripping length | | 6 mm (0.24 in) | | 8 mm (0.31 in) | |
| Tightening torque | input / output | 0.6 Nm (5 lb.in) | | 1.0 Nm (9 lb.in) / 0.62 Nm (5.5 lb.in) | |
| Environmental data | | | | ; 0.02 MIII (3.3 ID.III) | |
| Ambient temperature range | operation | -20+70 °C | -40+70 °C | -35+70 °C | |
| · | rated load | -20+60 °C | -40+60 °C | -35+60 °C | |
| | storage | -20+85 °C | -40+85 °C | -40+85 °C | |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | | 95 RH, % without condensation | | | |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis | | | |
| Shock (half-sine) (IEC/EN 60068-2-27) | | 15 G, 11 ms, 3 axes, 6 faces, 3 times for each face | | | |
| Isolation data | | | | | |
| Rated insulation voltage U _i i | nput circuit / output circuit | 3 kV AC | | | |
| | | 1.5 kV AC | | | |
| | | | 0.5 kV AC; 0.71 kV DC | | |
| Pollution degree | | 2 | ····• | ····•································· | |
| Overvoltage category (UL/IEC/EN 60950-1) | | II | ···· | | |
| Standards | | | | | |
| Product standard | | EN 61204-3 | | | |
| _ow Voltage Directive | | 2006/95/EC | | | |
| EMC directive | | 2004/108/EC | | | |
| RoHS directive | | 2011/65/EC | | | |
| Electrical safety | | EN 60950-1, | EN 60950-1, UL 60950 | 0-1, UL 508, | |
| Protective low voltage | | UL 60950-1, UL 508 SELV (EN 60950) | EN 61558-1, EN 61558 | 3-2-17; EN 60204-1 | |
| Electromagnetic compatibility | | | | | |
| Interference immunity to | | IEC/EN 61000-6-2 | | | |
| electrostatic discharge | IEC/EN 61000-4-2 | 4-2 Level 4 (air discharge 15 kV / contact discharge 8 kV) | | e 8 kV) | |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | , , , | | | |
| electrical fast transient/burst | IEC/EN 61000-4-4 | 4 Level 4 (4 kV / 2,5 kHz) Level 4 (4 kV / 5 kHz) | | | |
| surge | | 5 L-L Level 3 (2 kV) / L-PE Level 4 (4 kV) | | | |
| conducted disturbances, induced by radio- frequency fields | IEC/EN 61000-4-6 | Level 3 (10 V) | | | |
| power frequency magnetic fields | IEC/EN 61000-4-8 | B Level 4 (30 A/m) | | | |
| voltage dips, short interruptions and voltage variations | IEC/EN 61000-4-11 | interruptions: >95 % 5 | | | |
| Interference emission | IEO/OIODD OO EN EEOOO | IEC/EN 61000-6-3 | | | |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | L | | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B | | | |
| limits for harmonic current emissions | IEC/EN 61000-3-2 | Class D | Class A | Class D | |

"Approvals and marks" on page 3/4.

Data at Ta = 25 °C, Uin = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-E 24/0.75 | CP-E 24/1.25 | CP-E 24/2.5 | |
|---|--|---|------------------------------|---------------------|--|
| Input circuit | | | L, N | | |
| Rated input voltage U _{in} | | 100-240 V AC | | | |
| Input voltage range | | 90-264 V AC / 120-375 V DC | 85-264 V AC / 90-375 V DC | | |
| Frequency range AC | | 47-63 Hz | · i. | ······ | |
| Typical input current | at 115 V AC | 335 mA | 560 mA | 1060 mA | |
| | at 230 V AC | 210 mA | 330 mA | 590 mA | |
| Typical power consumption | ······ | 22.8 W | 36.7 W | 69.2 W | |
| Inrush current limiting | at 115 V AC | 10 A (max. 3 ms) | 20 A (max. 3 ms) | 20 A (max. 3 ms) | |
| Ç | at 230 V AC | 18 A (max. 3 ms) | 40 A (max. 3 ms) | 40 A (max. 3 ms) | |
| Discharge current | input / output | L | | <u>i</u> | |
| | input / PE | 3.5 mA | ••••• | | |
| Power failure buffering time | at 115 V AC | | min. 20 ms | | |
| | at 230 V AC | min. 75 ms | min. 30 ms | | |
| nternal input fuse | a. 200 V / 10 | 2 A slow-acting / 250 V | . [| | |
| Power factor correction (PFC) | | no | | | |
| Indication of operational states | | 110 | | | |
| Output voltage | green LED | OK: | OUTPUT OK: 5 | · output voltage OV | |
| Output voitage | | output voltage OK | OUTFUT UK. 1 | output voltage OK | |
| | red LED | LOW: T: output voltage too low | - | - | |
| Dutput circuit | | L+,L- | L+, L+, L-, L- | | |
| Rated output voltage | | 24 V DC | | | |
| Tolerance of the output voltage | | 0 +1 % | | | |
| Adjustment range of the output voltage | | 21.6-28.8 V DC | 24-28 V DC | | |
| Rated output power | | 18 W | 30 W | 60 W | |
| Rated output current I _r | T _a ≤ 60 °C | | 1.25 A | 2.5 A | |
| Derating of the output current | 60 °C < T _a ≤ 70 °C | 2.5 %/°C | · i | ····· i····· | |
| Signalling output for output voltage OK | DC OK | - | transistor | | |
| Maximum deviation with | load change statical | ±2 % | ±0.5 % | ••••• | |
| change of output voltage within the input voltage range | | | ±0.5 % | | |
| Control time | | < 2 ms | | | |
| Starting time after applying the supply volta | | max. 1 s | | | |
| | with 3500 μF | - | max. 2 s | - | |
| | with 7000 μF | max. 1.5 s | - | max. 1.5 s | |
| Rise time | at rated load | max. 150 ms | · i. | ····· | |
| | with 3500 μF | - | max. 500 ms | - | |
| | with 7000 μF | max. 500 ms | - | max. 500 ms | |
| Fall time | ······································ | max. 150 ms | · i. | ·····i······ | |
| Residual ripple and switching peaks | BW = 20 MHz | | | | |
| Parallel connection Series connection | | yes, to enable redundancy yes, to increase voltage | | | |
| Resistance to reverse feed | | 1 s - max. 35 V DC | | | |
| Output circuit - No-load, overload and shor | t-circuit behaviour | I lia avia mana di- | 11/1 alaqua st-ut-tt- | | |
| Characteristic curve of output | | Hiccup-mode | U/I characteristic curve | | |
| Short-circuit protection | | continuous short-circui | it proof | | |
| Short-circuit behaviour | | Hiccup-mode | continuation with out | out power limiting | |
| Overload protection | | output power limiting | | | |
| No-load protection | | continuous no-load sta | | | |
| Starting of capacitive loads | | 7000 μF | 3500 μF | 7000 μF | |

Data at Ta = 25 $^{\circ}$ C, Uin = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-E 24/0.75 | CP-E 24/1.25 | CP-E 24/2.5 |
|--|--|--|---|---|
| General data | | | | • |
| Power dissipation | | typ. 4.45 W | typ. 5.5 W | typ. 8.8 W |
| Efficiency | ······································ | typ. 77 % | typ. 86 % | typ. 89 % |
| Duty time | | 100 % | | |
| Dimensions (W x H x D) | | 22.5 x 90 x 114 mm (0.89 x 3.54 x 4.49 in) | 40.5 x 90 x 114 mm (1.59 x 3.54 x 4.49 in) |) |
| Weight | | 0.143 kg (0.315 lb) | 0.270 kg (0.60 lb) | 0.331 kg (0.73 lb) |
| Material of housing | ······································ | Plastic | <u> </u> | <u></u> |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mounting without any tool | | |
| Mounting position | | horizontal | | |
| Minimum distance to other units | horizontal / vertical | | | |
| Degree of protection | housing / terminals | | ······································ | <u>.</u> |
| Protection class | | T | | ·····• |
| Electrical connection - input circuit / output | circuit | | | |
| | ne-strand with wire end ferrule | 0.2-2.5 mm² (24-14 AW | (G) | |
| | strand without wire end ferrule | (= | | |
| | rigid | | | |
| Stripping length | rigia | 6 mm (0.24 in) | | |
| Tightening torque | input / output | 0.6 Nm (5 lb.in) | | <u>.</u> |
| Environmental data | mpat / Gatput | (() | | |
| Ambient temperature range | oneration | -20+70 °C | -40+70 °C | |
| go.ataro rango | · · | -20+60 °C | -40+60 °C | ····• |
| | | -20+85 °C | -40+85 °C | |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | Storage | 95 % RH, without cond | | |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | ······································ | 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis | | |
| Shock (half-sine) (IEC/EN 60068-2-27) | | 15 G, 11 ms, 3 axes, 6 faces, 3 times for each face | | |
| Isolation data | | 13 G, 11 1115, 3 axes, 0 | | - Iace |
| Rated insulation voltage U | input circuit / output circuit | 3 KV AC | | |
| | input / PE | | | ·····• |
| <u></u> | · · · · · · · · · · · · · · · · · · · | 0.5 kV AC; 0.71 kV DC | | |
| Pollution degree | Output / T L | 2 | | |
| Overvoltage category (UL/IEC/EN 60950-1) | | | | |
| Standards | | | | |
| Product standard | | EN 61204-3 | | |
| Low Voltage Directive | | 2006/95/EC | | |
| EMC directive | | 2004/108/EC | | |
| RoHS directive | | 2011/65/EC | | <u>.</u> |
| Electrical safety | | EN 50178, EN 60950-1, UL 60950-1, UL 508 | EN 60950-1, UL 6095 EN 61558-2-17; EN 6 | 50-1, UL 508, EN 61558- 0204-1 |
| Protective low voltage | | SELV (EN 60950) | | *************************************** |
| Electromagnetic compatibility | | J = 1 (L14 00000) | | |
| Interference immunity to | | IEC/EN 61000-6-2 | | |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 4 (air discharge 1 | 5 kV / contact dischar | ne 8 kV) |
| radiated, radio-frequency, electromagnetic fi | | I | o kv / contact discriation | |
| electrical fast transient/burst | | Level 4 (4 kV / 2.5 kHz) | 1 evel 4 (4 kV/ / 5 kHz) | |
| | | L-L Level 3 (2 kV) / L-Pl | | |
| surge conducted disturbances, induced by radio- frequency fields | IEC/EN 61000-4-6 | | _ LGVGI 4 (4 KV) | <u></u> |
| power frequency magnetic fields | IEC/EN 61000-4-8 | Level 4 (30 A/m) | | |
| voltage dips, short interruptions and voltage variations | | dip: >95 % 10 ms / >30 | 0 % 500 ms, interruptio | ns: >95 % 5000 ms |
| Interference emission | | IEC/EN 61000-6-3 | | |
| | IEC/CISDD 22 EN 55022 | | | |
| high frequency conducted | IEC/CISPR 22, EN 55022 IEC/CISPR 22, EN 55022 | | | |
| high-frequency conducted | | [| Closs A | <u>.</u> |
| limits for harmonic current emissions | IEC/EN 61000-3-2 | Class D | Class A | |

"Approvals and marks" on page 3/4.

Data at Ta = 25 °C, Uin = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-E 24/5.0 | CP-E 24/10.0 | CP-E 24/20.0 |
|---|--|--|---------------------------|----------------------------------|
| Input circuit | | 2. 22.70.0 | L, N | 3. 22//2010 |
| Rated input voltage U _{in} | | 115 / 230 V AC auto s | | 115-230 V AC |
| Input voltage range | | 90-132 V AC, | 90-132 V AC, | 90-264 V AC, |
| | | 180-264 V AC / 210-375 V DC | 180-264 V AC / | 120-375 V DC |
| Frequency range AC | | 47-63 Hz | 210-375 V DC | |
| Typical input current | at 115 V AC | L | 4.0 A | 4.9 A |
| | at 230 V AC | | 1.55 A | 2.5 A |
| Typical power consumption | G. 200 T. 10 | 140 W | 270 W | 539 W |
| Inrush current limiting | at 115 V AC | L | 30 A (max. 5 ms) | 25 A (max. 5 ms) |
| | at 230 V AC | , , | 60 A (max. 5 ms) | 50 A (max. 5 ms) |
| Discharge current | input / output | , , , | | |
| | input / PE | | | |
| Power failure buffering time | at 115 V AC | | | |
| | at 230 V AC | | | |
| Internal input fuse | ut 200 v 710 | 3.15 A slow-acting / | 6.3 A slow-acting / | 10 A slow-acting / |
| mternar input ruse | | 250 V AC | 250 V AC | 250 V AC |
| Power factor correction (PFC) | | yes, passive, 0.7 | <u>i</u> | yes, active |
| | | | | 115 V AC: 0.99 230 V AC: 0.97 |
| Indication of operational states | | | | 230 V AG. 0.91 |
| Output voltage | areen LED | OUTPUT OK: J | 1: output voltage OK | |
| | red LED | OUTPUT LOW: | : output voltage too lo | . |
| Output circuit | .00 223 | 0011 01 2000.1 | L+, L+, L-, L- | vv |
| Rated output voltage | | 24 V DC | L+, L+, L-, L- | |
| Tolerance of the output voltage | | 0+1 % | | |
| Adjustment range of the output voltage | | 22.5-28.5 V DC | | |
| Rated output power | | 120 W | 240 W | 480 W |
| Rated output current I, | T _a ≤ 60 °C | | 10 A | |
| | $T_a \le 50^{\circ} \text{C}$ | | 10 A | 20 A |
| Derating of the output current | $T_a \leq 33^{\circ} \text{ C}$ $60 \text{ °C} < T_a \leq 70 \text{ °C}$ | 2.5.0/./00 | | 20 A |
| berating of the output current | $55 ^{\circ}\text{C} < \text{T}_{a} \le 70 ^{\circ}\text{C}$ | 2.5 %/°C | | |
| Signalling contact for output voltage OK | | | / DC 0 2 A) | 2.0 /0/ 0 |
| Minimum fuse rating to achieve short-circuit protection | | solid-state (max. 60 V DC, 0.3 A) ≥ 60 V DC, ≤ 0.3 A fast-acting | | |
| | | · · | • | |
| | out voltage within | ±1 % (single mode), ±5 % (parallel mode) ±0.5 % | | |
| the inc | out voltage vitilit | ±0.5 /6 | | |
| Control time | | < 2 ms | ••••• | |
| Starting time after applying the supply voltage | at I _r | max. 1 s | | |
| ••• | with 3500 μF | max. 1.5 s | - | - |
| ••• | with 7000 μF | - | max. 1.5 s | i |
| Rise time | at rated load | max. 150 ms | | |
| | with 3500 μF | max. 500 ms | - | - |
| | with 7000 μF | - | max. 500 ms | ····· i ······ |
| Fall time | | max. 150 ms | <u>i</u> | ·····• |
| Residual ripple and switching peaks | BW = 20 MHz | 50 mV | 100 mV | |
| Parallel connection | | | ase power, up to 3 device | es, min. 0.1 lr - max. 0.9 |
| Series connection | | yes, to increase volta | | |
| Resistance to reverse feed | | max. 35 V DC | | |
| Output circuit - No-load, overload and short-circuit beha | viour | 1 | | <u> </u> |
| Characteristic curve of output | | U/I characteristic cur | ve | |
| Short-circuit protection | | continuous short-circuit proof | | |
| Short-circuit behaviour | | continuation with output power limiting | | |
| Overload protection | | | | |
| No-load protection | | output power limiting continuous no-load s | tability | |
| Starting of capacitive loads | | 3500 µF | 7000 µF | |
| otal alignor oupdoint o loado | | 0000 M | . 000 рі | |

Data at Ta = 25 $^{\circ}$ C, Uin = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-E 24/5.0 | CP-E 24/10.0 | CP-E 24/20.0 |
|--|---------------------------------------|--|---|---|
| General data | | | | |
| Power dissipation | I | typ. 20 W | typ. 35 W | typ. 63 W |
| Efficiency | | typ. 86 % | typ. 89 % | typ. 89 % |
| Duty time | | 100 % | • | |
| Dimensions (W x H x D) | | 63.2 x 123.6 x 123.6 mm (2.49 x 4.87 x 4.87 in) | (3.27 x 4.87 x 4.87 in) | 175 x 123.6 x 123.6 mm (6.89 x 4.87 x 4.87 in) |
| Weight | | 0.882 kg (1.945 lb) | 1.334 kg (2.941 lb) | 1.850 kg (4.079 lb) |
| Material of housing | | Metal | <u> </u> | <u>i</u> |
| Mounting | | DIN rail (IEC/EN 60715), snap-on mounting without any tool | | |
| Mounting position | | horizontal | • | |
| Minimum distance to other units horizontal | / vertical | 25 mm / 25 mm (0.98 in | n / 0.98 in) | |
| Degree of protection housing / t | terminals | IP20 / IP20 | • | |
| Protection class | | | • | |
| Electrical connection - input circuit / output circuit | | | | |
| | nd ferrule | 0.2-4 mm² (24-11 AWG) | | |
| | | i 0.2-6 mm² (24-10 AWG) | | |
| Stripping length | | 8 mm (0.31 in) | • | |
| Tightening torque input | t / output | 1.0 Nm (9 lb.in) / 0.62 N | lm (5.5 lb.in) | ····• |
| Environmental data | | | | |
| | peration | -35+70 °C | -40+70 °C | |
| ra | ated load | -35+60 °C | -40+60 °C | -40+55 °C |
| | storage | -40+85 °C | -40+85 °C | <u>i</u> |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | | 95 %RH, without conde | ensation | . |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis | | |
| Shock (half-sine) (IEC/EN 60068-2-27) | | 15 G, 11 ms, 3 axes, 6 faces, 3 times for each face | | |
| Isolation data | | ,,, | | |
| Rated insulation voltage U, input circuit / outp | ut circuit | 3 kV AC | | |
| | | 1.5 kV AC | | |
| | · · · · · · · · · · · · · · · · · · · | 0.5 kV AC; 0.71 kV DC | • | |
| signalling con | | | | |
| Pollution degree | | 2 | | . |
| Overvoltage category (UL/IEC/EN 60950-1) | | II | • | |
| Standards | | II | | |
| | | EN 01004 0 | | |
| Product standard | | EN 61204-3 | | . |
| Low Voltage Directive | | 2006/95/EC | | |
| EMC directive | | 2004/108/EC | • | |
| RoHS directive | | 2011/65/EC | | EN OJEGO O JE TI |
| Electrical safety | | EN 60950-1, UL 60950- 60204-1 | -1, UL 508, EN 61558-1 | , EN 61558-2-17; EN |
| Protective low voltage | | SELV (EN 60950) | | |
| Electromagnetic compatibility | | · · · · · · · · · · · · · · · · · · · | | |
| Interference immunity to | | IEC/EN 61000-6-2 | | |
| · · | | Level 4 (air discharge 15 | 5 kV / contact dischard | e 8 kV) |
| | | Level 3 (10 V/m) | | / |
| field | | | · | . |
| | | Level 4 (4 kV / 5 kHz) | : | :) |
| | l | L-L Level 3 (2 kV) / L-PE | Level 4 (4 kV) | |
| | 1000-4-6 | Level 3 (10 V) | | |
| frequency fields power frequency magnetic fields IEC/EN 61 | 1000-4-8 | Level 4 (30 A/m) | | <u>.</u> |
| power frequency magnetic fields IEC/EN 61000-4-8 voltage dips, short interruptions and voltage IEC/EN 61000-4-11 | | Level 4 (30 A/III) | | |
| variations | 000-4-11 | interruptions: >95 % 50 | | |
| | | IEC/EN 61000-6-3 | | |
| Interference emission | | | | . |
| Interference emission high-frequency radiated IEC/CISPR 22, E | N 55022 | Class B | • | |
| | | Class B Class B | | |

"Approvals and marks" on page 3/4.

Data at Ta = 25 °C, Uin = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-E 48/0.62 | CP-E 48/1.25 | CP-E 48/5.0 | CP-E 48/10.0 | | |
|---|---|-------------------------------|---|---|---|--|--|
| Input circuit | | | L, | , N | _ | | |
| Rated input voltage U _{in} | | 100-240 V AC | | 115 / 230 V AC auto select | 115-230 V AC | | |
| Input voltage range | | 85-264 V AC / 90-375 V DC | | 90-132 V AC, 180-264 V AC / 210-375 V DC | 90-264 V AC, 120-375 V DC | | |
| Frequency range AC | | 47-63 Hz | - | | | | |
| Typical input current | at 115 V AC | 560 mA | 1060 mA | 4.0 A | 4.9 A | | |
| | at 230 V AC | 330 mA | 590 mA | 1.55 A | 2.5 A | | |
| Typical power consumption | | 35.7 W | 69.0 W | 267 W | 528 W | | |
| Inrush current limiting | at 115 V AC | | | 30 A (max. 5 ms) | | | |
| | at 230 V AC | L | ; | 60 A (max. 5 ms) | · | | |
| Discharge current | input / output | | 40 A (IIIax. 3 III5) | 00 A (max. 5 ms) | SU A (IIIAX. S III | | |
| Discharge current | input / PE | 0.25 mA | • | • | | | |
| | | | . | * ······ | ····· | | |
| Power failure buffering time | at 115 V AC | min. 20 ms | *************************************** | min. 25 ms | min. 25 ms | | |
| | at 230 V AC | min. 30 ms | | | | | |
| Internal input fuse | | 2 A slow-acting / 250 V AC | | 6.3 A slow- acting / 250 V AC | 10 A slow- acting / 250 V AC | | |
| Power factor correction (PFC) | | no | | yes, passive, 0.7 | | | |
| Indication of operational states | | | | <u>:</u> | 230 V AC: 0.97 | | |
| Output voltage | aroon LED | I | | | | | |
| Output voltage | *************************************** | OUTPUT OK: J | l: output volta | | | | |
| | red LED | - | - | OUTPUT LOW: I output voltage to | | | |
| Output circuit | | | i | ·, L-, L- | O IOW | | |
| Rated output voltage | | 40 V DC | шт, шт | , L-, L- | | | |
| Tolerance of the output voltage | 1 0 | | | 48 V DC | | | |
| Adjustment range of the output voltage | | 0+1 % | • | | | | |
| | | 48-55 V DC | | 47-56 V DC | , | | |
| Rated output power | | 30 W | 60 W | 240 W | 480 W | | |
| Rated output current I _r | T _a ≤ 60 °C | 0.625 A | 1.25 A | 5 A | - | | |
| | T _a ≤ 55 °C | - | - | - | 10 A | | |
| Derating of the output current | 60 °C < T _a ≤ 70 °C | 2.5 %/°C | <u>-</u> | <u></u> | - | | |
| | 55 °C < T _a ≤ 70 °C | | | _ | 2.5 %/°C | | |
| Signalling output for output voltage OK | DC OK | | _ | | | | |
| Maximum deviation with | load change statical | - | L | ±1 % (single mod | 0) | | |
| Maximum deviation with | load change statical | ±0.5 % | | ±1 % (single mode) ±5 % (parallel mode) | | | |
| chang | e of output voltage within | ±0.5 % | • | ±0.5 % | | | |
| | the input voltage range | ļ | | ±0.5 % | | | |
| Control time | | < 2 ms | *************************************** | *************************************** | *************************************** | | |
| Starting time after applying the supply voltage | at I, | max. 1 s | | | | | |
| | with 3500 μF | max. 2 s | - | - | - | | |
| | with 7000 μF | - | max. 1.5 s | max. 1.5 s | • | | |
| Rise time | at rated load | max. 150 ms | <u></u> | <u></u> | • | | |
| | with 3500 μF | max. 500 ms | | | _ | | |
| | with 7000 μF | 111000 1110 | max. 500 ms | max. 500 ms | <u> </u> | | |
| Fall time | | | 111ax. 500 1115 | Illax. Journs | | | |
| | BW = 20 MHz | max. 150 ms | | | | | |
| Residual ripple and switching peaks | DVV = ZU IVIHZ | 50 mV | *************************************** | 100 mV | • | | |
| Parallel connection | | yes, to enable redundancy | | configurable, to increase power, up to 3 devices, min. 0.1 I, - max. 0.9 I, | | | |
| Series connection | | yes, to increase v | oltage | yes, to increase v max. 2 devices | oltage, | | |
| Resistance to reverse feed | 1 s - max. 63 V DC | | | | | | |
| Output circuit - No-load, overload and short-circ | cuit behaviour | 1 | | | | | |
| Characteristic curve of output | | U/I characteristic | curve | | | | |
| Short-circuit protection | | continuous short- | • | • | • | | |
| Short-circuit behaviour | | | * | ina | | | |
| | | ····· | output power limit | iriy | | | |
| Overload protection | | output power limi | • | • | | | |
| No-load protection | | continuous no-loa | *************************************** | ····· | , | | |
| Starting of capacitive loads | | 3500 µF | 7000 μF | unlimited | 7000 μF | | |

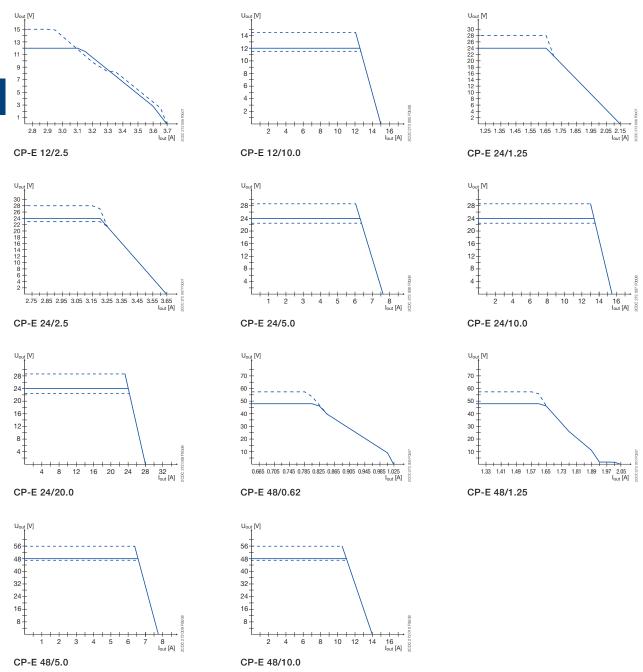
Data at Ta = 25 °C, Uin = 230 V AC and rated values, unless otherwise indicated

| Туре | | CP-E 48/0.62 | CP-E 48/1.25 | CP-E 48/5.0 | CP-E 48/10.0 |
|---|---|--|---|---|---|
| General data | | | | | |
| Power dissipation | | typ. 4.9 W | typ. 7.8 W | typ. 32 W | typ. 60 W |
| Efficiency | • | | typ. 89 % | typ. 90 % | ••••• |
| Duty time | | 100 % | | • | |
| Dimensions (W x H x D) | | | | | 175 x 123.6 x |
| | | 40.5 x 90 x 114 m (1.59 x 3.54 x 4.49 | | 123.6 mm (3.27 x 4.87 x | 123.6 mm (6.89 x 4.87 x |
| | | (1.09 x 3.04 x 4.48 | 2 11 1) | 1 97 in) | 4.87 in) |
| Weight | | 0.264 kg (0.582 lb) | 0.316 kg (0.697 lb) | 1.322 kg (2.915 lb) | |
| Material of housing | | Plastic | | Metal | |
| Mounting | | L | 0715) snan-on mo | ounting without any | / tool |
| Mounting position | | horizontal | 07 10), 311ap 011 1110 | January Without any | , 1001 |
| Minimum distance to other units | horizontal / vertical | | 0.00 in / 0.00 in) | . • | * |
| | | 25 mm / 25 mm (0 | 7.98 m / 0.98 m) | ••••• | • |
| Degree of protection | housing / terminals | IP/20 / IP20 | | | • |
| Protection class | | I | | | |
| Electrical connection - input circuit / | | | | | |
| Wire size | fine-strand with wire end ferrule | | | 0.2-4 mm ² (24-11 | AWG) |
| | fine-strand without wire end ferrule | 0.2-2.5 mm ² (24-1 | 4 AWG) | 0.0.0 2.04.40 | A)A(O) |
| | rigid | 1 | | 0.2-6 mm ² (24-10 | AVVG) |
| Stripping length | | 6 mm (0.24 in) | | 8 mm (0.31 in) | • · · · · · · · · · · · · · · · · · · · |
| Tightening torque | input / output | 0.6 Nm (5 lb.in) | | 1.0 Nm (9 lb.in) / (| 0 62 Nm (5 5 lh i |
| Environmental data | | 0.0 (4111 (0 10.111) | | ; 1.0 IVIII (8 ID.III) / (| U.UL 14111 (U.U ID.II |
| Ambient temperature range | operation | 70.00 | | | |
| Ambient temperature range | *************************************** | -40+70 °C | | | F |
| rated load | | | | | -40+55 °C |
| | storage | -40+85 °C | | . ••••• | • |
| Damp heat (cyclic) (IEC/EN 60068-2-3 | | 95 % RH, without | condensation | | |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min. for each axis | | | |
| Shock (half-sine) (IEC/EN 60068-2-27 |) | 15 G, 11 ms, 3 ax | es, 6 faces, 3 time | es for each face | |
| Isolation data | | | | | |
| Rated insulation voltage U | input circuit / output circuit | 3 kV AC | | | |
| | | 1.5 kV AC | | ••••• | • |
| | | 0.5 kV AC; 0.71 kV | | . • • • • • • • • • • • • • • • • • • • | • |
| Pollution degree | · | 2 | , 50 | ••••• | *************************************** |
| Overvoltage category (UL/IEC/EN 609 | 350-1) | | | | • |
| Standards | | II | | | |
| | | T | | | |
| Product standard | | EN 61204-3 | | | * |
| Low Voltage Directive | | 2006/95/EC | | . ••••• | • |
| EMC directive | | 2004/108/EC | | | |
| RoHS directive | | 2011/65/EC | | | |
| Electrical safety | • | EN 60950-1, UL 609 | 950-1, UL 508, EN 6 | 31558-1, EN 61558-2- | 17; EN 60204-1 |
| Protective low voltage | | SELV (EN 60950) | | . • | *************************************** |
| Electromagnetic compatibility | | (=::::::::::) | | | |
| Interference immunity to | | IEC/EN 61000-6-2 | | | |
| electrostatic discharge | IEC/EN 61000-4-2 | | • · · · · · · · · · · · · · · · · · · · | ot diapharas 9 14/ | • |
| radiated, radio-frequency, electromag | | Level 4 (air discha | rge 15 KV / Contac | of discharge 8 kV) | <u>.</u> |
| radiated, radio-frequency, electroffiag field | TIELIC IEC/EN 61000-4-3 | Level 3 (10 V/m) | | | |
| electrical fast transient/burst | IEC/EN 61000-4-4 | 1 1 4 /4 13/ / 5 1 | | 1 1 4 (4 13/ / 0 / | - 1.11_\ |
| | IEC/EN 61000-4-5 | Level 4 (4 kV / 5 k | • | Level 4 (4 kV / 2.5 |) KIIZ) |
| surge | | L-L Level 3 (2 kV) | / L-PE Level 4 (4 k | .V) | • |
| conducted disturbances, induced by | radio- IEC/EN 61000-4-6 | Level 3 (10 V/m) | | | |
| trequency fields | IEC/EN 61000-4-8 | | • | ••••• | • |
| | IEU/EN N 1001-4-8 | Level 4 (30 A/m) | | | • |
| power frequency magnetic fields | | | | :t | 0/ 5000 mg |
| power frequency magnetic fields voltage dips, short interruptions and v | | dip: >95 % 10 ms | / >30 % 500 ms, | interruptions: >95 | 70 3000 IIIS |
| power frequency magnetic fields voltage dips, short interruptions and v variations | | dip: >95 % 10 ms | • | Interruptions: >95 | 76 3000 IIIS |
| frequency fields power frequency magnetic fields voltage dips, short interruptions and variations Interference emission high-frequency radiated | | | • | interruptions: >95 | 70 3000 IIIS |
| power frequency magnetic fields voltage dips, short interruptions and v variations Interference emission | voltage IEC/EN 61000-4-11 | IEC/EN 61000-6-0 | • | Interruptions: >95 | 70 3000 IIIS |

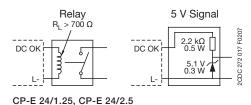
"Approvals and marks" on page 3/4.

CP-E range Technical diagrams, Wiring instructions

Output curve at T_a = 25 °C



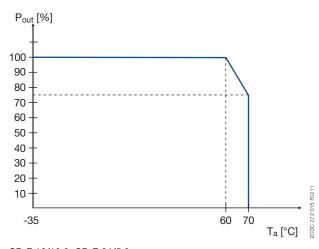
Wiring instructions



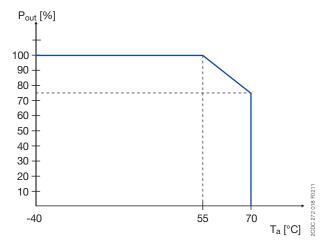
CP-E range

Technical diagrams, Dimensional drawings

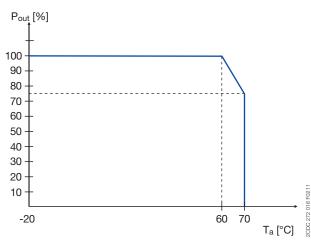
Temperature behaviour at T_a = 25 °C



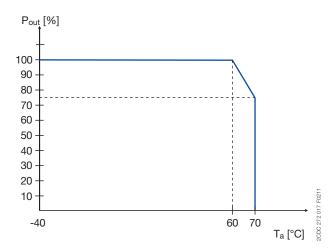
CP-E 12/10.0, CP-E 24/5.0



CP-E 24/20.0, CP-E 48/10.0

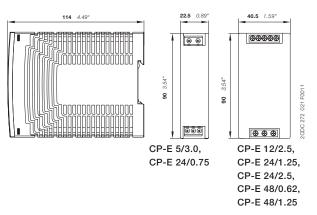


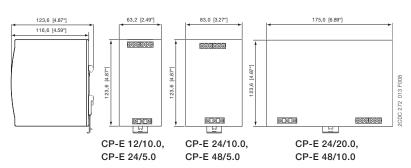
CP-E 5/3.0, CP-E 24/0.75



CP-E 12/2.5, CP-E 24/1.25, CP-E 48/0.62, CP-E 24/2.5, CP-E 48/1.25, CP-E 24/10.0, CP-E 48/5.0

Dimensional drawings dimensions in mm





CP-T range Product group picture



CP-T range Table of contents

CP-T range

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| Benefits and advantages | 3/33 |
| Ordering details | 3/34 |
| Technical data | 3/35 |
| Technical diagrams, Dimensional drawings | 3/39 |
| Technical diagrams | 3/40 |

CP-T range Benefits and advantages

Characteristics

- Rated output voltages 24 V, 48 V DC
- Output voltage adjustable via front-face rotary potentiometer "OUTPUT Adjust"
- Rated output currents 5 A, 10 A, 20 A, 40 A
- Rated output powers 120 W, 240 W, 480 W, 960 W
- Three-phase operation (see derating note)
- Two-phase operation (25 % derating possible, see derating note)
- Supply range 3 x 400-500 V AC (3 x 340-575 V AC, 480-820 V DC)
- Typical efficiency of 93 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -40...+70 °C 1)
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- Redundancy unit CP-A RU offering true redundancy, available as accessory
- LEDs for status indication
- Signalling contact "13-14" (solid state) for output voltage
- Approvals / marks (depending on device, partly pending):
- ω, c**π**us, [Π, @ / C€, &

^{1) 480} W variants: -30...+70°C





4 6 7

Benefits

Signalling output ①

The devices of the CP-T series offer a solid state output for function monitoring and remote diagnostics.

Wide input range

Wide range input optimized for world-wide applications: The CP-T power supplies can be used in 340 - 575 V AC or 480 - 820 V DC supply systems.

Adjustable output voltage ②

The CP-T range feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line lenath.

- 1 Circuit diagram
- 2 Indication of operational states

DC ON: green LED - green LED - output voltage OK DC LOW: red LED - output voltage too low

- 3 single/parallel: sliding switch adjustment of single or parallel operation
- 4 Configuration of single or parallel operation
- 5 Signalling contact

OUTPUT 13-14: terminals - signalling contact A solid-state output indicates the error-free operation of the output voltage.

- 6 OUTPUT L+, L+, L-, L-: terminals output
- 7 INPUT L1, L2, L3, PE: terminals input

CP-T range Ordering details



CP-T 24/5.0



CP-T 24/10.0, CP-T 48/5.0



CP-T 24/20.0, CP-T 48/10.0

Description

The CP-T range of three-phase power supply units is the youngest member of ABB's power supply family. In terms of design and functionality, the new range perfectly supplements the existing products and extends the range appropriately. The devices can be supplied with a threephase voltage as well as with two-phase mains. Here, ABB offers power supply units with 24 V DC and 48 V DC outputs with 5 A, 10 A, 20 A and 40 A and efficiency of up to 92 %. As in the case of all products, they are designed for an ambient temperature of up to 70 °C. All products can be supplied within an AC supply voltage range between 340 to 575 V AC and a DC supply voltage range between 480 to 820 V DC.

Ordering details

| Input voltage range | Rated output voltage / current | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|-----------------------------|--------------------------------|--------------|-----------------|----------------|------------------------------|
| 340-575 V AC / 480-820 V DC | 24 V DC / 5 A | CP-T 24/5.0 | 1SVR427054R0000 | | 0.80 (1.77) |
| 340-575 V AC / 480-820 V DC | 24 V DC / 10 A | CP-T 24/10.0 | 1SVR427055R0000 | | 1.05 (2.31) |
| 340-575 V AC / 480-820 V DC | 24 V DC / 20 A | CP-T 24/20.0 | 1SVR427056R0000 | | 1.75 (3.86) |
| 340-575 V AC / 480-820 V DC | 24 V DC / 40 A | CP-T 24/40.0 | 1SVR427057R0000 | | 3.20 (7.05) |
| 340-575 V AC / 480-820 V DC | 48 V DC / 5 A | CP-T 48/5.0 | 1SVR427054R2000 | | 1.05 (2.31) |
| 340-575 V AC / 480-820 V DC | 48 V DC / 10 A | CP-T 48/10.0 | 1SVR427055R2000 | | 1.75 (3.86) |
| 340-575 V AC / 480-820 V DC | 48 V DC / 20 A | CP-T 48/20.0 | 1SVR427056R2000 | | 3.40 (7.50) |

Data at Ta = 25 °C, $\rm U_{in}$ = 3 x 400 V AC and rated values, unless otherwise indicated

| Туре | CP-T 24/5.0 | CP-T 24/10.0 | CP-T 24/20.0 | CP-T 24/40.0 | |
|--|-------------------|---|---|--|--|
| Input circuit | | L1, | L2, L3 | | |
| Rated input voltage U _{in} | 3 x 400-500 V A | С | | | |
| Input voltage range | 340-575 V AC | *************************************** | ••••• | *************************************** | |
| | 480-820 V DC | ••••• | ••••• | ••••• | |
| Frequency range AC | 47-63 Hz | • | • | • | |
| Typical input current | 0.36 A | 0.65 A | 1.1 A | 1.72 A | |
| Typical power consumption | 135 W | 270 W | 538 W | 1058 W | |
| Inrush current limiting | 10 A | 20 A | | 30 A | |
| Power failure buffering time | min. 20 ms | | •••••• | min. 15 ms | |
| Internal input fuse per phase | 2 A / 600 V AC | . • | T 3.15 A / 500 V AC | T 5 A / 500 V AC | |
| Recommended backup fuse | 3 pole miniature | circuit breaker AB | B Type S203 | 1 | |
| Power factor correction (PFC) | Yes, passive | • | ••••• | • | |
| Discharge current towards PE | < 3.5 mA | | •••••• | • | |
| input / output | < 0.25 mA | . • | | • | |
| Indication of operational states | | | | | |
| Output voltage OUTPUT OK: green LED | output voltage C | K | | | |
| OUTPUT LOW: red LED | output voltage to | oo low | | • | |
| Output circuit | | L+, L- | +, L-, L- | | |
| Rated output voltage | 24 V DC | | · · | | |
| Tolerance of the output voltage | 0+1 % | ••••• | | • | |
| Adjustment range of the output voltage | 22.5-28.5 V DC | | • | • | |
| Rated output power | 120 W | 240 W | 480 W | 960 W | |
| Rated output current I, T _s ≤ 60 °C | 5 A | 10 A | 20 A | 40 A | |
| Derating of the output current $60 ^{\circ}\text{C} < \text{T}_{a} \le 70 ^{\circ}\text{C}$ | | | | 3.5 %/°C | |
| Signalling contact 13-14 | solid state (max. | 60 V DC, 0.3 A) | • | <u>i</u> | |
| familiar describer as OV | 17.6-19.4 V | | | • | |
| Insulation voltage | 500 V DC | . • | | • | |
| | ≥ 60 V DC, ≤ 0. | 3 A fast-acting | | • | |
| Maximum deviation with load change statical | | | | | |
| - | - | ±5 % (parallel mo | | • | |
| change of output voltage | ± 0.5 % | . i | | • | |
| within the input voltage range | | | | | |
| | L | | | | |
| the augustus and augustus and augustus and augustus and augustus and augustus and augustus and augustus and augustus and augustus and augustus | max. 1 s | | | | |
| νιιι 3500 με | | | | * | |
| | | | | | |
| | max. 500 ms | | | | |
| Fall time | max. 150 ms | | | | |
| Residual ripple and switching peaks BW = 20 MHz | . | | | 80 mV | |
| Parallel connection | not supported | to 2 devices, mir | ncrease power, up n. 0.1 I _r - max 0.9 I _r) | to increase power, up to 2 devices, min. 0.1 I _r - max. 0.9 I _r use active current balancing | |
| Series connection | not supported | yes, to increase | voltage, max. 2 dev | rices | |
| Resistance to reverse feed | approx. 35 V | . <u>i</u> | · <u>····</u> | • | |
| Output circuit - No-load, overload and short-circuit behaviour | 1 | | | | |
| Characteristic curve of output | combined U/I ch | aracteristic curve | U/I- or Hiccup- mode adjustable | hiccup / fold back behavior | |
| Short-circuit protection | continuous shor | t-circuit proof | <u>i</u> | <u>i</u> | |
| Short-circuit behaviour | current limiting | · | | • | |
| Overload protection | hiccup mode | ••••• | | • | |
| No-load protection | continuous no-lo | ad stability | | • | |
| Overtemperature protection | . | · •···· | erature went down | • | |
| Starting of capacitive loads | 3500 µF | 7000 µF | 7000 µF | 7000 µF | |
| | h. | : m. | i m. | m. | |

Data at Ta = 25 °C, $\rm U_{in}$ = 3 x 400 V AC and rated values, unless otherwise indicated

| Туре | | CP-T 24/5.0 | CP-T 24/10.0 | CP-T 24/20.0 | CP-T 24/40.0 | | |
|---|--|---|---|---|--|--|--|
| General data | | | | _ | | | |
| Efficiency | | typ. 89 % | typ. 90 % | | typ. 92 % | | |
| Duty time Dimensions (W x H x D) | | 100% 74.3 x 124 x 118.8 mm (2.92 x 4.88 x 4.68 in) | 89 x 124 x 118.8 mm (3.5 x 4.88 x 4.68 in) | 150 x 124 x 118.8 mm (5.91 x 4.88 x 4.68 in) | 275.8 x 124 x 118.8 mm (10.86 x 4.88 x 4.68 in) | | |
| Weight | | 0.78 kg (1.72 lb) | 1.045 kg (2.30 lb) | 1.657 kg (3.653 lb) | 3.275 kg (7.220 lb) | | |
| Material of housing | | Metal | 60715), snap-on m | | | | |
| Mounting Mounting position | | horizontal | 507 15), snap-on m | ounting without an | <u>y</u> 1001 | | |
| Minimum distance to other units Degree of protection Protection class | horizontal / vertical housing / terminals | cal 25 mm / 25 mm (0.98 in / 0.98 in) | | | | | |
| Electrical connection - input circuit | | | | | | | |
| Wire size | fine-strand with wire end ferrule | , | , | | | | |
| | fine-strand without wire end ferrule | 0.2-6 mm ² (24-10 | AWG) | • | | | |
| | rigid | 0.2-6 mm ² (24-10 | AWG) | | • | | |
| Stripping length | | 8 mm (0.31 in) | | | • | | |
| Tightening torque Environmental data | input / output | 1 Nm (9 lb.in) / 0 | .6 Nm (5.5 lb.in) | | 1 Nm (9 lb.in) / 1.8 Nm (15.6 lb.in) | | |
| Ambient temperature range | operation | -40+70 °C | | -30+70 °C | -40+70 °C | | |
| | · | d -40+60 °C -30+60 °C | | | -40+60 °C | | |
| | storage | <u></u> | | | 10100 | | |
| Damp heat (cyclic) (IEC/EN 60068-2- | | 95 % without co | ndensation | • | •···· | | |
| Vibration (sinusoidal) (IEC/EN 60068- | | | | V 7 avec 60 min / | | | |
| Shock (half-sine) (IEC/EN 60068-2-2) | | 2 g, 10-500 Hz, 2G, each along X, Y, Z axes 60 min / cycle 15 g, 11 ms, 3 axes, 6 faces, 3 times for each face | | | | | |
| | 1) | 15 g, 11 ms, 5 a | | S IOI EACII IACE | | | |
| Isolation data Rated insulation voltage U | input circuit / output circuit | 2 1// 1/0 | | | | | |
| hated insulation voltage O _i | · | 1.5 kV AC | | | | | |
| | • | 0.5 kV AC; 0.71 k | | ••••• | • | | |
| | | | (V DC | | *************************************** | | |
| | signalling output / PE | 4 | | | | | |
| Pollution degree | | 2 | | | | | |
| Standards | | TEN 04004 0 | | | | | |
| Product standard | • | EN 61204-3 | | | • | | |
| Low Voltage Directive | | 2006/95/EC | | | • | | |
| EMC directive | | 2004/108/EC | | • | • | | |
| RoHS directive | | 2011/65/EC | | • | *************************************** | | |
| Electrical safety | | , | 0950-1, UL 508, EN 6 | 31558-1, EN 61558-2 | -17; EN 60204-1 | | |
| Protective low voltage | | SELV | | | | | |
| Electromagnetic compatibility | | | | | | | |
| Interference immunity to | | IEC/EN 61000-6 | | | | | |
| electrostatic discharge | IEC/EN 61000-4-2 | 1 | arge 15 kV / conta | ct discharge 8 kV) | | | |
| radiated, radio-frequency, electroma | | , , , | | | | | |
| electrical fast transient/burst | IEC/EN 61000-4-4 | (4 kV / 2.5 kHz) | Level 4 (4 kV / 5 l | • | | | |
| surge | IEC/EN 61000-4-5 | 1 |) / L-PE Level 4 (4 k | (V) | | | |
| conducted disturbances, induced by frequency fields power frequency magnetic fields | radio- IEC/EN 61000-4-6 IEC/EN 61000-4-8 | , , , | | | | | |
| voltage dips, short interruptions and variations | | | ms / >30 % 0.5 ms | s, interruptions: >9 | 5 % 250 ms | | |
| | | IEC/EN 61000-6 | _? | | • | | |
| Interference emission | IEC/CISPR 22, EN 55022 | | -0 | | | | |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | L | | | | | |
| high-frequency conducted | | | | • | • | | |
| limits for harmonic current emissions | IEC/EN 61000-3-2 | Class A | | | | | |

"Approvals and marks" on page 3/4.

Data at Ta = 25 °C, Uin = 3×400 V AC and rated values, unless otherwise indicated

| Туре | | CP-T 48/5.0 | CP-T 48/10.0 | CP-T 48/20.0 | |
|---|---|---|---|---|--|
| Input circuit | | | L1, L2, L3 | • | |
| Rated input voltage U _{in} | | 3 x 400-500 V AC | | | |
| Input voltage range | | 340-575 V AC | | | |
| | | 480-820 V DC | | | |
| Frequency range AC | | 47-63 Hz | • | | |
| Typical input current | | 0.65 A | 1.1 A | 1.72 A | |
| Typical power consumption | | 264 W | 535 W | 1050 W | |
| Inrush current limiting | ••••• | 20 A | • | 30 A | |
| Power failure buffering time | | min. 20 ms | • | min. 15 ms | |
| Internal input fuse | per phase | 2 A / 600 V AC | T3.15 A / 500 V AC | T 5 A / 500 V AC | |
| Power factor correction (PFC) | | yes, passive | *************************************** | | |
| Discharge current | towards PE | | | | |
| | input / output | < 0.25 mA | • | • | |
| Indication of operational states | | | | | |
| Output voltage | OUTPUT OK: green LED | | | | |
| | OUTPUT LOW: red LED | output voltage too lo | W | | |
| Output circuit | | | L+, L+, L-, L- | | |
| Rated output voltage | | 48 V DC | | | |
| Tolerance of the output voltage | | 0+1 % | | | |
| Adjustment range of the output voltage | | 47-56 V DC | | | |
| Rated output power | | 240 W | 480 W | 960 W | |
| Rated output current I _r | T _a ≤ 60 °C | | 10 A | 20 A | |
| Derating of the output current | 60 °C < T _a ≤ 70 °C | | | | |
| Maximum deviation with | load change statical | statical ±1 % (single mode) | | | |
| | | ± 5 % (parallel mode) | | | |
| change of | output voltage within the input voltage range | ±0.5 % | | | |
| Control time | at rated load | < 2 ms | | •••• | |
| Starting time after applying the supply voltage | at I _r | max. 1 s | | | |
| | with 7000 μF | max. 1.5 s | | | |
| Rise time | | max. 150 ms | • | • | |
| | with 7000 μF | max. 500 ms | •••• | •••• | |
| Fall time | •••••• | max. 150 ms | ••••• | | |
| Residual ripple and switching peaks | BW = 20 MHz | 100 mV | | 80 mV | |
| Parallel connection | | configurable, to incre power, up to 2 device min. 0.1 I, - max 0.9 I, | es, | to increase power, up to 2 devices, min. 0.1 I, - max. 0.9 I, use active current balancing | |
| Series connection | | yes, to increase volta | ge, max. 2 devices | | |
| Resistance to reverse feed | | approx. 35 V | approx. 63 V | approx. 63 V | |
| Output circuit - No-load, overload and short-circ | cuit behaviour | | | | |
| Characteristic curve of output | | combined U/I and hiccup mode | U/I or hiccup mode, configurable | hiccup mode / fold back behavior | |
| Short-circuit protection | | continuous short-circ | uit proof | | |
| Short-circuit behaviour | | current limiting | | | |
| Overload protection | ••••• | hiccup mode | | | |
| No-load protection | | continuous no-load s | tability | | |
| Over temperature protection | | yes, automatic recovery after temperature went down | | | |
| Over temperature protection | | 1 * ' | | | |

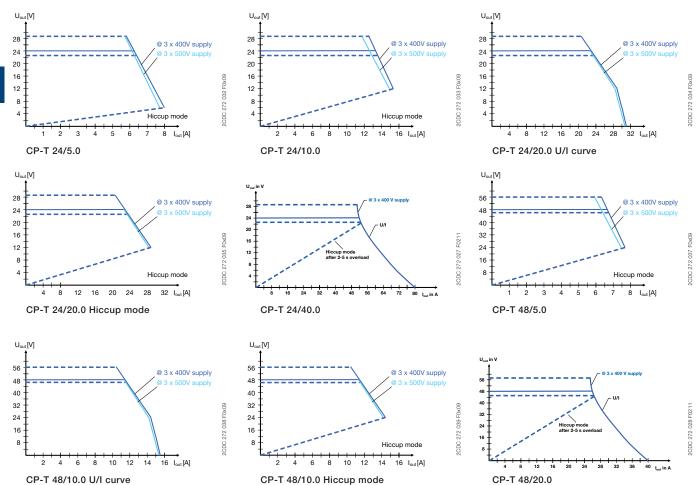
Data at Ta = 25 $^{\circ}$ C, Uin = 3 x 400 V AC and rated values, unless otherwise indicated

| Туре | | CP-T 48/5.0 | CP-T 48/10.0 | CP-T 48/20.0 |
|---|--|---|---|---|
| General data | | | | |
| Efficiency | | typ. 91 % | | typ. 93 % |
| Duty time | | 100% | | |
| Dimensions (W x H x D) | | 89 x 124 x 118.8 mm (3.5 x 4.88 x 4.68 in) | 150 x 124 x 118.8 mm (5.91 x 4.88 x 4.68 in) | 275.8 x 124 x 118.8 mi (10.86 x 4.88 x 4.68 in |
| Weight | ····· | 1.045 kg (2.30 lb) | 1.657 kg (3.653 lb) | 3.275 kg (7.22 lb) |
| Material of housing | | Metal | ···• | |
| Mounting | ···· | DIN rail (IEC EN 60715) |), snap-on mounting with | out any tool |
| Mounting position | ······ | horizontal | | |
| Minimum distance to other units | horizontal / vertical | 25 mm / 25 mm (0.98 i | n / 0.98 in) | |
| Degree of protection | housing / terminals | | ·· · ································· | |
| Protection class | | | | |
| Electrical connection - input circuit / output | circuit | | | |
| | ne-strand with wire end ferrule | 0 2-4 mm² (24-11 AWG | 3) | 0.2-4 mm ² (24-11 |
| | | · | | AWG) / 0.5-10 mm ² (20-8 AWG) |
| fine-s | strand without wire end ferrule | 0.2-6 mm ² (24-10 AWG | à) | |
| | rigid | | | |
| Stripping length | ······································ | 8 mm (0.31 in) | | |
| Tightening torque | input / output | 1 Nm (9 lb.in) / 0.6 Nm | (5.5 lb.in) | 1 Nm (9 lb.in) / 1.8 Nm (15.6 lb.in) |
| Environmental data | | | | |
| Ambient temperature range | | -40+70 °C | -30+70 °C | -40+70 °C |
| | | -40+60 °C | -30+60 °C | -40+60 °C |
| _ | storage | -40+85 °C | -40+85 °C | -40+85 °C |
| Damp heat (cyclic) (IEC/EN 60068-2-30) | 95 % without condensation | | | |
| Vibration (sinusoidal) (IEC/EN 60068-2-6) | | 10-500 Hz, 2G, each a | llong X, Y, Z axes 6 min / | cycle |
| Shock (half-sine) (IEC/EN 60068-2-27) | | 15G, 11 ms, 3 axes, 6 | Faces, 3 times for each f | ace |
| Isolation data | | | | |
| Rated insulation voltage U _i | input circuit / output circuit | | | |
| | • | 1.5 kV AC | | ••••• |
| | output / PE | 0.5 kV AC; 0.71 kV DC | | •••••• |
| Pollution degree | •••• | 2 | | ••••• |
| Standards | | | | |
| Product standard | | EN 61204-3 | | |
| Low Voltage Directive | | 2006/95/EC | ······································ | ······································ |
| EMC directive | | 2004/108/EC | | |
| RoHS directive | | 2011/65/EC | | ···• |
| Electrical safety | | EN 60950-1, UL 60950 EN 60204-1 |)-1, UL 508, EN 61558-1, | EN 61558-2-16; |
| Protective low voltage | | SELV | | |
| Electromagnetic compatibility | | | | |
| Interference immunity to | | IEC/EN 61000-6-2 | | |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 4 (air discharge 1 | 15 kV / contact discharge | 8 kV) |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | | | |
| electrical fast transient/burst | | Level 4 (4 kV / 5 kHz) | | |
| surge | | L-L Level 3 (2 kV) / L-P | E Level 4 (4 kV) | |
| conducted disturbances, induced by radio- frequency fields | IEC/EN 61000-4-6 | | | |
| power frequency magnetic fields | IEC/EN 61000-4-8 | , , | | |
| voltage dips, short interruptions and voltage variations | IEC/EN 61000-4-11 | dips: >95 % 0.5 ms / > interruptions: >95 % 28 | | |
| Interference emission | | IEC/EN 61000-6-3 | | |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | Class B | | |
| 9 - 1 7 | | L | | |

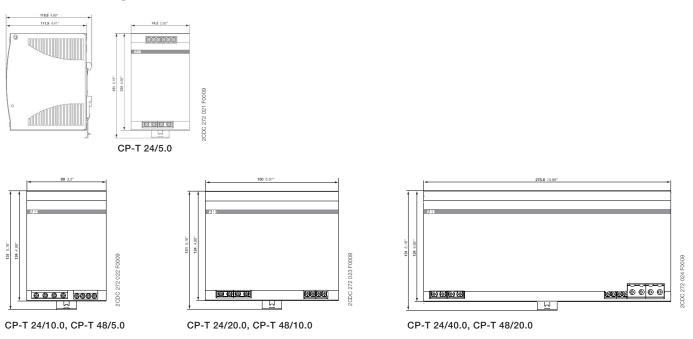
"Approvals and marks" on page 3/4.

CP-T range Technical diagrams, Dimensional drawings

Technical diagrams, dimensions in mm Output curve at $T_a = 25$ °C

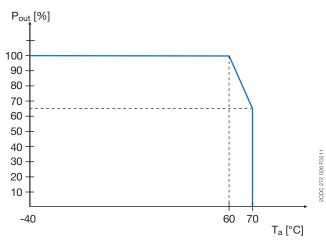


Dimensional drawings dimensions in mm

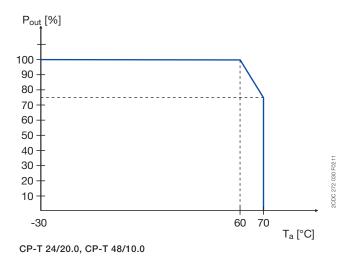


CP-T range Technical diagrams

Temperature curve at rated load



CP-T 24/40.0, CP-T 48/20.0



Pout [%] 100 90 80 70 60 50 40 2CDC 272 025 F0211 30 20 10 -40 60 70 T_a [°C]

CP-T 24/5.0, CP-T 24/10.0, CP-T 48/5.0

CP-S and CP-C Product group picture



CP-S and CP-C Table of contents

CP-S and CP-C range

| Product group picture | 3/41 |
|--|------|
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| Technical data | 3/46 |
| Technical diagrams, Dimensional drawings | 3/50 |
| | |

CP-S and CP-C Benefits and advantages

Characteristics

CP-S and CP-C range

- Output current 5 A, 10 A and 20 A
- Integrated power reserve of up to 50 %
- 5 A and 10 A devices with pluggable connecting terminals
- Approvals / marks (depending on device, partly pending)

CP-S range

- 10 A and 20 A device with front-face selector switch to adjust rated input voltage range:
 110-120 V AC or 220-240 V AC
- Output voltage fixed at 24 V DC
- Parallel operation for redundancy

CP-C range

- Wide range input 110-240 V AC (85-264 V AC, 100-350 V DC)
- Output voltage adjustable within a range of 22-28 V DC
- Parallel operation for increased capacity and redundancy
- Power factor correction (PFC) acc. to EN 61000-3-2
- Function module pluggable onto the front side

Messaging module CP-C MM:

- LED for status indication
- Relay outputs "Input OK" and "Output OK"
- REMOTE ON/OFF function to switch on and off the power supply externally
- Output voltage monitoring is only possible in decoupled parallel operation

Benefits

Integrated power reserve ①

The new CP-S and CP-C range power supplies feature an integrated power reserve of up to 50 %. No oversized electricity supply is needed, especially under heavy load conditions.

Pluggable connecting terminals ②

Extended flexibility in operation due to pluggable connecting terminals (this feature is not offered on all devices).

Adjustable output voltage 3

The CP-C range types feature a continuously adjustable output voltage from 22 to 28 V. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by long line length.

Pluggable function modules (4)

The CP-C range power supplies can be equipped with pluggable modules to add additional functions (e.g. messaging module). Thus, the power supplies can be ideally adapted to the relevant application.









CP-S and CP-C Operating control



- 1 OUTPUT L+, L-: terminals output
- 2 Indication of operational states
 OUTPUT OK: green LED output voltage OK
- 3 OUTPUT Adj.: rotary potentiometer adjustment of output voltage
- 4 Circuit diagram
- 5 INPUT L, N, PE: terminals input



- 1 OUTPUT L+, L-: terminals output
- 2 Indication of operational states

OUTPUT OK: green LED - output voltage OK

- 3 Circuit diagram
- 4 INPUT L, N, PE: terminals input

CP-S and CP-C Ordering details

CP-S 24/5.0



CP-S 24/20.0



CP-C 24/10.0

Description

The power supply units in the CP-S and CP-C range are ABB's high-end solutions. Designed with an integrated 50 % power reserve and an efficiency of approximately 89 % these are the perfect products for all complex, highly reliable applications. All the devices cover the U-I output characteristic and are built with thermal protection which switches off in case of overheating. In particular, the devices of the CP-C range feature a much broader functionality, including active power factor correction and pluggable function modules.

These products are designed to trip MCB's in the 24 V DC output circuit. Coordination tables are available.

Ordering details - CP-S

| Input voltage range | Rated output voltage / current | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---|--------------------------------|--------------|-----------------|----------------|------------------------------|
| 85-264 V AC / 110-350 V DC | 24 V DC / 5 A | CP-S 24/5.0 | 1SVR427014R0000 | | 0.96 (2.11) |
| 85-132 V AC, 184-264 V AC / 220-350 V DC | 24 V DC / 10 A | CP-S 24/10.0 | 1SVR427015R0100 | | 1.07 (2.35) |
| 85-132 V AC, 184-264 V AC / 220-350 V DC | 24 V DC / 20 A | CP-S 24/20.0 | 1SVR427016R0100 | | 2.83 (6.23) |

Ordering details - CP-C

| Input voltage range | Rated output voltage / current | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|----------------------------|--------------------------------|--------------|-----------------|----------------|------------------------------|
| 85-264 V AC / 110-350 V DC | 24 V DC / 5 A | CP-C 24/5.0 | 1SVR427024R0000 | | 0.96 (2.11) |
| 85-264 V AC / 110-350 V DC | 24 V DC / 10 A | CP-C 24/10.0 | 1SVR427025R0000 | | 1.34 (2.95) |
| 85-264 V AC / 110-350 V DC | 24 V DC / 20 A | CP-C 24/20.0 | 1SVR427026R0000 | | 3.15 (6.94) |

| Description | Туре | | Weight (1 pce) kg (lb) |
|--|---------|-----------------|------------------------------|
| Messaging module for CP-C range power supplies | CP-C MM | 1SVR427081R0000 | 0.065 (0.14) |

CP-S and CP-C Technical data

Data at $T_a = 25$ °C, $U_{in} = 230$ V AC and rated values, unless otherwise indicated

| a ' III | o and rated values, unless other | | 00.00440.0 | 00.004/00.0 |
|--|--|--|--|--|
| Туре | | CP-C 24/5.0 | CP-C 24/10.0 | CP-C 24/20.0 |
| | | CP-S 24/5.0 | CP-S 24/10.0 | CP-S 24/20.0 |
| Input circuit - supply circuit | | | L, N | |
| Rated input voltage U _{in} | | 110-240 V AC | | . * |
| | CP-S switch position 115 | 110-240 V AC | 110-120 V AC | |
| | switch position 230 | | 220-240 V AC | . * |
| Input voltage range | | 85-264 V AC / 100-350 | | |
| | CP-S switch position 115 | 85-264 V AC / 100- | 85-132 V AC | · •······ |
| | switch position 230 | | 184-264 V AC / 220-35 | 50 V DC 1) |
| Frequency range AC | | 47-63 Hz | | |
| Typical input current | CP-S and CP-C at 110-240 V AC CP-S at 110-120 V AC | 2.2-1.2 A | 2.6-1.2 A 4.2-4.0 A | 5.5-2.5 A 9.0-8.0 A |
| | CP-S at 110-120 V AC | _ | 2.4-2.2 A | 4.5-4.0 A |
| Typ. power consumption | 01 -0 at 220-240 V AO | 135 W | 269 W | 538 W |
| Inrush current limiting / I²t (cold start) | CP-C | < 23 A / approx. | < 33 A / approx. 0.2 A ² s | < 40 A / approx. 1.9 A ² s |
| , , | CP-S | 0.9 A ² s | < 40 A / approx. 1.8 A ² s | < 70 A / approx. 8 A ² s |
| Power failure buffering time | ······································ | min. 100 ms | min. 40 ms | min. 40 ms |
| Transient overvoltage protection | ······································ | varistors | | |
| Internal input fuse (apparatus protection | on, not accessible) | 4 A (slow-acting) | 6.3 A (slow-acting) | 12 A (fast-acting) |
| Power factor correction (PFC) | | yes, active | | |
| ` ′ | CP-S | | | |
| Indication of operational states | | | | |
| Output voltage | OUTPUT OK: green LED | ☐ : output voltage | OK | |
| Output circuit | | | short-circuit, no-load an | d overload proof |
| Rated output voltage | | 24 V DC | | - |
| Tolerance of the output voltage | CP-C | | | |
| | | -1+5 % | | |
| Adjustment range of the output | | 22-28 V DC, default se | tting 24 V ±0.5 % | |
| voltage | CP-S | | | |
| Rated output power | | 120 W | 240 W | 480 W |
| Rated output current | T _a ≤ 60 °C | | 10 A | 20 A |
| Peak output current (power reserve) | $T_a \le 40 ^{\circ}C$ | typ. ≤ 7.25 A | typ. ≤ 12.25 A | typ. ≤ 22.5 A |
| Derating | | 2.5 % per Kelvin tempe | erature increase | |
| | CP-C load change statical 10-90 % | typ. < ±0.05 % | | |
| | CP-S load change statical 10-90 % | | | |
| | load change dynamical 10-90 % change of the input voltage of ±10 % | typ. < ±3 % | | |
| Control time | ondings of the input voltage of ±10 /0 | typ. < 1 ms | | |
| Starting time after applying | CP-C | | < 200 ms | typ. < 200 ms |
| supply voltage " | CP-S | | < 250 ms | typ. < 300 ms |
| Rise time 10-90 % | CP-C | typ. < 30 ms | typ. < 4 ms | typ. < 12 ms |
| | CP-S | | typ. < 5 ms | typ. < 15 ms |
| Residual ripple and switching peaks | | typ. < 50 mV _{pp} | | |
| Parallel connection | ······································ | . | enable redundancy and | to increase |
| | | power, current not sym | metrical (CP-S only redu | ndancy) |
| Series connection | ······································ | yes, to increase voltage | e, for decoupling refer to | the application manual |
| Resistance to reverse feed | ······································ | approx. 35 V DC | . <u>.</u> | |
| Output circuit - No-load, overload and | I short-circuit behaviour | | U/I- and I/T-characteris | tic curves |
| Characteristic curve of output | | U/I characteristic curve | | |
| Current limiting at short circuit | | approx. 11 A | approx. 19 A | approx. 25 A |
| Short-circuit protection | | continuous short-circu | t stability | |
| Overload protection | | thermal protection | | . * |
| Starting of capacitive loads | | unlimited | | |
| General data | | tun a 1F M | tun z 00 M | itum « FO M |
| Power dissipation Efficiency | ······································ | typ. < 15 W typ. 89 % | typ. < 29 W | typ. < 58 W |
| Discharge current for PE | | typ. 69 % < 3.5 mA | | . • |
| MTBF | CP-C | 500.000 h | | . • |
| | | 350.000 h | | |
| Dimensions (W x H x D) | | 56.5 (60 2)) x 130 x 135.5 | 90 (93.5 2)) x 130 x 135.5 | 200 (203.5 2)) x 130 x 135.5 |
| | | mm (2.22 (2.36 2)) x 5.12 x | mm (3.54 (3.68 2)) x 5.12 x | mm (7.87 (8.01 2)) x 5.12 x |
| Woight | CP-C | 5.35 in) | 5.35 in) | 5.35 in) |
| Weight | CP-C | approx. 0.96 kg (2.12 lb) | approx. 1.34 kg (2.95 lb) approx. 1.07 kg (2.36 lb) | approx. 3.15 kg (6.94 lb) approx. 2.83 kg (6.23 lb) |
| Minimum diatanga to other units | | 10 mm / 80 mm (0.39 ii | | approx. 2.00 kg (0.23 lb) |
| Minimum distance to other units Degree of protection | housing / terminals | | 117 0.10 111) | |
| Material of housing | housing / terminals | aluminium / zinc-coate | d sheet steel | |
| | 110401114 011011 / 00401 | La.a.iiiiiaiii / Ziiio ooalo | S. 0 | . * |
| | | | | |
| Protection class (EN 61140) Mounting Mounting position | | I DIN rail (IEC/EN 60715) horizontal | , snap-on mounting | |

CP-S and CP-C Technical data

Data at $\rm T_a = 25~^{\circ}C,~U_{in} = 230~V~AC$ and rated values, unless otherwise indicated

| Type | | | CP-C 24/5.0 | CP-C 24/10.0 | CP-C 24/20.0 |
|--|--|---|---|-------------------------|---|
| | | | CP-S 24/5.0 | CP-S 24/10.0 | CP-S 24/20.0 |
| Electrical connection - Input circuit | | | 3) | 3) | - |
| Wire size | fine-strand with w e-strand without w | | 0.2-2.5 mm² (24-14 AWC | . S) | 2.5-10 mm² (14-8 AWG) 0.5-10 mm² (20-8 AWG) 0.5-16 mm² (20-6 AWG) |
| Stripping length | <u>.</u> | rigiu | 7 mm (0.28 in) | | 12 mm (0.47 in) |
| Tightening torque | | | 0.4 Nm | • | 1.2-1.5 Nm |
| Electrical connection - Output circuit | | | 3) | 3) | - |
| Wire size | fine-strand with w e-strand without w | | 0.12-2.5 mm² (26-14 AW | : (G) | 2.5-10 mm ² (14-8 AWG) 0.5-10 mm ² (20-8 AWG) 0.5-16 mm ² (20-6 AWG) |
| Stripping length | | IIgiu | 8 mm (0.31 in) | • | 12 mm (0,47 in) |
| Tightening torque | | | 0.4 Nm | • | 1.2-1.5 Nm |
| Environmental data | | | 0.4 14111 | | 1.2-1.5 1111 |
| Ambient temperature range | | operation | -25+70 °C | | |
| | | | 0+60 °C (without dera | itina) | |
| | | storage | . | · 3/ | |
| Damp heat (IEC/EN 60068-2-3) | ····· | | 93 % at +40 °C, no con- | densation | ······• |
| Climatic category (IEC/EN 60721) | | • | 3K3 | | |
| Vibration (IEC/EN 60068-2-6) | | • | | • | |
| Shock (IEC/EN 60068-2-27) | | | | | |
| Isolation data | | | I | | |
| Rated insulation voltage U, between all isolated circuits | | input / output | 300 V | | |
| (IEC/EN 60950-1; EN 50178) | • | input / PE | 300 V | • | ••••• |
| | • | output / PE | 50 V | • | ······• |
| Rated impulse withstand voltage U _{imp} betv circuits (IEC/EN 60950-1; EN 50178) | veen all isolated | input / output | 4 kV; 1.2/50 μs | • | •••••• |
| circuits (IEC/EN 60950-1; EN 50178) | • | input / PE | 2.5 kV; 1.2/50 μs | | |
| | | output / PE | 500 V; 1.2/50 μs | • | •••••• |
| Power-frequency withstand voltage test (to | est voltage) | | 1.5 kV AC / 3.0 kV AC | | |
| (routine test / type test) | | | 1.5 kV AC / 3.0 kV AC | | |
| | | output / PE | 500 V DC / 500 V DC | | |
| Pollution degree (IEC/EN 60950-1; EN 501 | | | 2 | | |
| Overvoltage category (IEC/EN 60950-1; El | V 50178) | | II | | |
| Standards | | | | | |
| Product standard | | ••••• | IEC/EN 61204 | ••••• | ·····. |
| Low Voltage Directive | | | 2006/95/EC | • | |
| EMC Directive | | | 2004/108/EC | | . |
| Electrical safety | | • | EN 50178, EN 60950, U | L 60950, UL 508 | ······• |
| Protective low voltage | | | SELV (EN 60950) | | |
| Electromagnetic compatibility | | | IEO/EN 04000 0 0 | | |
| Interference immunity to | | /FN 04000 4.0 | IEC/EN 61000-6-2 | • | ······• |
| electrostatic discharge | | | Level 4 (8 kV / 15 kV) | • | ······ |
| radiated, radio-frequency, electromagnetic electrical fast transient / burst | | /EN 61000-4-3 /EN 61000-4-4 | Level 3 (10 V/m) | | |
| | | | | | matrical\ |
| surge conducted disturbances, induced by radio frequency fields | | /EN 61000-4-5 /EN 61000-4-6 | Level 4 (2 kV symmetric Level 3 (10 V) | ai, ievei 3 - 3 KV asym | metricai) |
| Interference emission | ····· | | IEC/EN 61000-6-3 | | |
| high-frequency radiated | IEC/CISPR | R 22; EN 55022 | | • | ······ •···· |
| high-frequency conducted | IEC/CISPR | ····· | L | • | |

 $^{^{\}mbox{\tiny 1)}}$ at U > 264 V use additionally an appropriate external fuse

"Approvals and marks" on page 3/4.

²⁾ with lateral screw

 $^{^{\}mbox{\tiny 3)}}$ pluggable connecting terminals, actuate only when power is off

CP-S and CP-C Technical data

Data at $\rm T_a = 25~^{\circ}C,~U_{in} = 230~V~AC$ and rated values, unless otherwise indicated

| | CP-C MM |
|---|--|
| | |
| | 110-240 V AC / 100-350 V DC |
| | 70-264 V AC / 80-350 V DC |
| | 2.5 VA / 1.5 W |
| | |
| D | volt-free triggering |
| Remote OFF | remote off |
| | $R \le 1 k\Omega$ |
| | $R \ge 10 \text{ k}\Omega$ |
| | typ. 1 mA (200 mA for 200 μs) |
| | 25 m - 100 pF/m |
| | powered by the input circuit of the power supply unit |
| | undervoltage monitoring of input voltage of the power supply unit |
| ······································ | 85 V AC / 90 V DC |
| • | AC: typ8 % / DC -30 % |
| ······································ | -5 % at AC and DC |
| •••••• | typ. < 50 ms |
| | powered by the output circuit of the power supply unit |
| | undervoltage monitoring of output voltage of the power supply |
| ······································ | unit 20 V DC |
| ······································ | typ. 5 % |
| ······································ | ±1 % |
| ······································ | |
| | typ. < 10 ms |
| DEMOTE OFF. Supply LED | DEMOTE OFFI invok D < 41.0 |
| | |
| | : relay "INPUT OK" energized |
| OUTPUT OK: green LED | : relay "OUTPUT OK" energized |
| | 11-12/14, 21-22/24 |
| | relays, 2 x 1 c/o contacts |
| | closed-circuit principle |
| | AgNi |
| | 250 V |
| ······································ | 24 V / 10 mA |
| 10 10 (reciptive) at 000 V | 250 V / 1 A |
| ······································ | |
| | |
| | |
| DC-13 (inductive) at 24 V | |
| ······································ | 30 x 10 ⁶ switching cycles 0.1 x 10 ⁶ switching cycles |
| | L |
| | <u> </u> |
| n/o contact | Z A, gL |
| | 100 % |
| ······ | 100 % 56.5 x 54 x 24 mm (2.22 x 2.13 x 0.94 in) |
| ······ | <u> </u> |
| | |
| housing / townsin - ! - | 0.065 kg (0.14 lb) |
| housing / terminals | IP20 / IP20 |
| housing / terminals | IP20 / IP20 Plastic |
| housing / terminals | IP20 / IP20 Plastic II |
| housing / terminals | IP20 / IP20 Plastic II snap-on mounting, without any tool |
| housing / terminals | IP20 / IP20 Plastic II |
| | IP20 / IP20 Plastic II snap-on mounting, without any tool |
| and with wire end ferrule | IP20 / IP20 Plastic II snap-on mounting, without any tool |
| and with wire end ferrule without wire end ferrule | IP20 / IP20 Plastic II snap-on mounting, without any tool plugged onto the power supply unit 0.2-2.5 mm² (24-14 AWG) |
| and with wire end ferrule | IP20 / IP20 Plastic II snap-on mounting, without any tool plugged onto the power supply unit |
| | Remote OFF REMOTE OFF: green LED Input OK: green LED OUTPUT OK: green LED AC-12 (resistive) at 230 V AC-15 (inductive) at 230 V DC-13 (inductive) at 24 V on/c contact n/o contact |

CP-S and CP-C Technical data

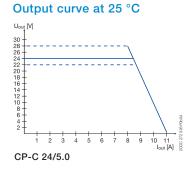
Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

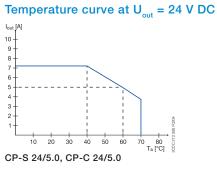
| Туре | | CP-C MM |
|--|--|---|
| Environmental data | | |
| Ambient temperature range | operation | -25+70 °C |
| | storage | -40+85 °C |
| Damp heat (IEC/EN 60068-2-3) | | 93 % at +40 °C, no condensation |
| Climatic category (IEC/EN 60721) | ••••• | 3K3 |
| Vibration (IEC/EN 60068-2-6) | • | |
| Shock (IEC/EN 60068-2-27) | ••••• | |
| Isolation data | | |
| Rated insulation voltage U, (IEC/EN 60974-1, EN 50178, V | /DE 0160) | 250 V |
| Protective separation (EN 50178, EN 60950) supply / mea outputs | ······································ | yes |
| Rated impulse withstand voltage U _{imp} between all isolated 0110) | d circuits (IEC 664, VDE | 4 kV; 1.2/50 μs |
| Test voltage between all circuits (type test) | | 2.5 kV AC |
| Pollution degree (EN 60950) | | 2 |
| Overvoltage category (EN 60950) | | II |
| Standards | | |
| Product standard | | IEC/EN 61204 |
| _ow Voltage Directive | | 2006/95/EC |
| EMC Directive | | 2004/108/EC |
| Electrical safety | | EN 50178, EN 60950, UL 60950, UL 508 |
| Elektromagnetic compatibility | | |
| Interference immunity to | | IEC/EN 61000-6-2 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3 and 4 (6 kV / 8 kV) |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3 (10 V/m) |
| electrical fast transient / burst | IEC/EN 61000-4-4 | Level 4 and 2 (4 kV power input / 1 kV control input) |
| surge | IEC/EN 61000-4-5 | Level 3 and 2 (4 kV symmetrical power input / 1 kV control input) |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | Level (10 V) |
| Interference emission | | IEC/EN 61000-6-3 |
| high-frequency radiated | IEC/CISPR 22; EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22; EN 55022 | Class B |

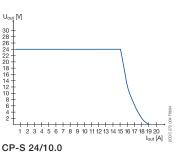
"Approvals and marks" on page 3/4.

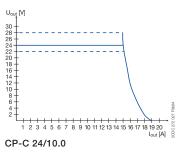
CP-S and CP-C Technical diagrams, Dimensional drawings

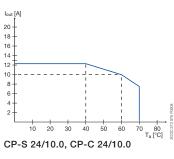
Technical diagrams

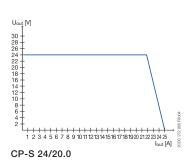


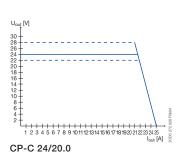


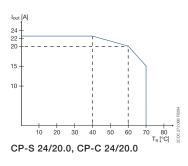




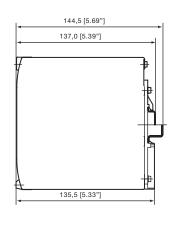


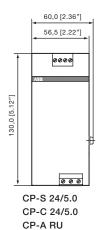


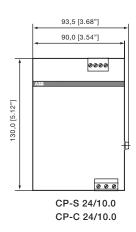


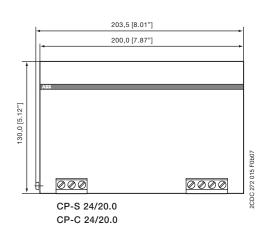


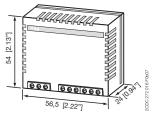
Dimensional drawings dimensions in mm











CP-C MM

Redundancy units Ordering details



CP-A RU + CP-A CM



CP-A RU



CP-RUD



CP-D RU

Ordering details

| Description | suitable for decoupling of two CP-24 V DC power supply units or suitable for decoupling of CP-E power supply units | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--|--|---------|-----------------|----------------|------------------------------|
| 2 inputs each up to 20 A and 1 output up to 40 A | ≤ 40 V and ≥ 5 A | CP-A RU | 1SVR427071R0000 | | 0.89 (1.96) |
| Control module for CP-A RU redundancy units | - | CP-A CM | 1SVR427075R0000 | | 0.063 (0.14) |
| 2 inputs each up to 2.5 A and 1 output up to 5 A | ≤ 35 V and < 5 A | CP-RUD | 1SVR423418R9000 | | 0.15 (0.33) |

Ordering details - CP-D RU for decoupling of two CP-D power supply units

| ordering detaile or brite for decoupling or the or b perior cappity and | | | | | | |
|---|---------------------|--------------------------------|---------|-----------------|--|------------------------------|
| Input voltage range | Rated input current | Rated output voltage / current | Туре | Order code | | Weight (1 pce) kg (lb) |
| 9-35 V DC | 2 x 5 A | 24 V DC / 1 x 10 A | CP-D RU | 1SVR427049R0000 | | 0.075 (0.165) |

| Туре | | CP-A RU | CP-A RU |
|---|--|---|--|
| | | | in combination with CP-A CM |
| Input circuit - Supply circuit | | | -/ -, +/ -) |
| Rated input voltage U _{in} | | 24 V DC | |
| Input voltage range per channel | | 10-28 V DC | 13-28 V DC |
| Rated input current lin per channel | | 1-20 A | |
| Maximum input current per channel | | 30 A for 300 s | |
| Transient overvoltage protection | | yes | (, , (,) |
| Output circuit | | | (++/) |
| Rated output voltage U _{out} | | 24 V DC | |
| Voltage drop Rated output current I | | typ. 0.6 V, max. 0.9 V 1-40 A | |
| Output ratings per channel | T 60 °C | 10-28 V DC / 40 A | 13-28 V DC / 40 A |
| Output ratings per chariner | T _a = 00 °C | 10-28 V DC / 40 A | 13-28 V DC / 40 A |
| Derating | | 2.5 % per Kelvin temperature inci | |
| Peak output current | 00 0 \ I _a = 10 0 | 60 A for 300 s | case |
| Resistance to reverse feed | | < 40 V | |
| General data | | \ \ +0 \ \ | |
| Dimensions (W x H x D) | | 56.5 (60 ¹⁾) x 130 x 135.5 mm; (2.2 | 22 (2.36 ¹⁾) x 5 12 x 5 35 in) |
| Weight | ······································ | 0.89 kg (1.96 lb) | |
| Minimum distance to other units | horizontal / vertical | 10 mm / 50 mm (0.39 in / 1.97 in) | |
| Degree of protection | housing / terminals | | ······ |
| | | aluminium / zinc-coated sheet ste | |
| Protection class | nodeling enemy cover | | |
| Mounting | ······································ | DIN rail (IEC/EN 60715) | ····· |
| Mounting position | ······································ | horizontal | ······ |
| Electrical connection - Input circuit / Output circuit | | | |
| <u> </u> | with wire end ferrule | 2.5-10 mm ² (14-8 AWG) | |
| fine-strand with | hout wire end ferrule | 0.5-10 mm² (20-8 AWG) | |
| | rigid | 0.5-16 mm² (20-6 AWG) | |
| Stripping length | - | 12 mm (0.47 in) | |
| Tightening torque | •••••• | 1.2-1.5 Nm | |
| Environmental data | | | |
| Ambient temperature range | operation | -25+70 °C | |
| | rated load | -25+60 °C (without derating) | |
| | storage | | |
| Damp heat (IEC/EN 60068-2-3) | | 93 % at 40 °C, no condensation | |
| Climatic category (IEC/EN 60721) | | 3K3 | |
| Vibration (IEC/EN 60068-2-6) | | | |
| Shock (IEC/EN 60068-2-27) | | | |
| Isolation data | | | |
| | ut / output / housing | 500 V AC (routine test) | |
| Pollution degree (EN 50178) | | 2 | |
| Standards | | | |
| Product standard | | IEC/EN 61204 | |
| Low Voltage Directive | | 2006/95/EC | |
| EMC Directive | | 2004/108/EC | |
| Electrical safety | | EN 50178, EN 60950, UL 60950, | UL 508 |
| Electromagnetic compatibility | | UEO/EN 04000 0 - | |
| Interference immunity to | IEO/EN 0103-3 | IEC/EN 61000-6-2 | |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3 (air discharge ±8 kV, cont | act discharge ±6 kV) |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | | |
| electrical fast transient / burst | IEC/EN 61000-4-4 | | |
| surge | IEC/EN 61000-4-5 | | |
| conducted disturbances, induced by radio- frequency fields | IEC/EN 61000-4-6 | Level 3 (10 V) | |
| Interference emission | | IEC/EN 61000-6-3 | |
| • | DISPR 22 / EN 55022 | Class B | |
| | | | |
| | SISPR 22 / EN 55022 | Class B | |

"Approvals and marks" on page 3/4.

¹⁾ incl. lateral screw
2) This device is designed for connection to a safety extra-low voltage source. If no safety extra-low voltage is used at the input side, the lateral screw can be used for grounding of the housing (protection class I).

| Туре | CP-A CM |
|---|---|
| Input circuit - Supply circuit | |
| Rated input voltage U | 24 V DC |
| Input voltage range | 13-28 V DC |
| Rated input current at rated sense load and 24 V DC | |
| | approx. 1 W |
| Measuring circuit | 11-12/14, 21-22/24 |
| Monitoring function | undervoltage monitoring |
| Measuring voltage | rated operational voltage |
| Thresholds | 14-28 V |
| Hysteresis, related to the threshold value | fix: 3-5 % |
| Accuracy, tolerance | 10 % of full-scale value |
| Maximum measuring cycle | 6 ms |
| Indication of operational states | 01115 |
| | |
| · | Y |
| Status of input 2 IN 2: green LED | y i i l |
| Output status OUT: green LED | L: U _{OUT} > 3 V = no faults present |
| Output circuit | +, +, - |
| Kind of output | relays, 2 x 1 c/o contact |
| Contact material | AgNi |
| Operating principle | closed-circuit principle |
| Rated operational voltage U _e (IEC/EN 60947-1, VDE 0110) | 250 V |
| Minimum switching voltage / Minimum switching current | 24 V / 10 mA |
| Maximum switching voltage / Maximum switching current | 250 V / 1 A |
| Rated operational current I AC-12 (resistive) at 230 V | |
| (IEC/EN 60947-5-1) AC-15 (inductive) at 230 V | |
| DC-12 (resistive) at 24 V | 1 A |
| DC-13 (inductive) at 24 V | 1 A |
| Mechanical lifetime | 30 x 10 ⁶ switching cycles |
| Electrical lifetime | 0.1 x 10 ⁶ switching cycles |
| Rating according UL 508 General purpose (GP) 250 V AC | |
| Maximum fuse rating to achieve n/o contact | 2 A al |
| short-circuit protection n/c contact | |
| Sense output (+, +, -) | 1 SVR 427 075 R0000 |
| Sense output voltage | 13-28 V DC |
| Sense output voltage | 0.1 A |
| Maximum fuse rating | For applications acc. UL the sense output shall be provided |
| Maximum ruse rating | with a listed DC fuse 3 A |
| General data | |
| Duty time | 100 % |
| Dimensions (W x H x D, when mounted) | 56.5 x 54 x 24 mm (2.22 x 2.13 x 0.94 in) |
| Material of housing | plastic |
| Weight | 0.063 kg (0.14 lb) |
| Degree of protection housing / terminals | • |
| Protection class | 207 20 |
| Mounting | snap-on mounting, without any tool |
| Mounting position | plugged onto the redundancy unit CP-A RU |
| Electrical conection | plugged onto the redundancy drift or -A 110 |
| Wire size fine-strand with wire end ferrule | |
| fine-strand with wire end ferrule | 0.2-2.5 mm ² (24-14 AWG) |
| | 0.2-4 mm² (24-12 AWG) |
| Stripping length | 7.5 mm (0.3 in) |
| Stripping length Tightening torque | 0.4-0.6 Nm |
| | 0.4-0.0 NIII |
| Rated insulation voltage U, (IEC/EN 60947-1, EN 50178, VDE 0160) | 250 V |
| | |
| Rated impulse withstand voltage U _{imp} (type test) between all circuits (IEC 664, VDE 0110) | 2.5 kV |
| Power-frequency withstand voltage test (routine test) between all circuits | 1.2 kV AC |
| Protective separation (EN 50178) between input and output | • |
| <u> </u> | yes 2 |
| Pollution degree Overvoltage estagery | <u>2</u> |
| Overvoltage category | II |
| Environmental data | 25 .70 %C |
| Ambient temperature range operation | • |
| Storage | |
| Damp heat (IEC/EN 60068-2-3) | 93 %at 40 °C, no condensation |
| Climatic category (IEC/EN 60721) | 3K3 |
| Vibration (IEC/EN 60068-2-6) | |
| Shock (IEC/EN 60068-2-27) | |

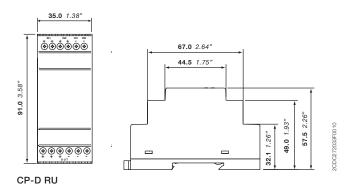
| Туре | | CP-RUD |
|--|---|--|
| Input circuit - Supply circuit | | A: U1+/-U ; B: U2+/-U |
| Rated input voltage Uin | | 24 V DC |
| Input voltage range | ······································ | 5-35 V DC |
| Rated input current I per channel | ······································ | 0.5-2.5 A |
| Maximum input current per channel | ······································ | 10 A for 300 s |
| Transient overvoltage protection | ······································ | no |
| Output circuit | | L+, L+, L+, L-, L-, L- |
| Rated output voltage U _{out} | | 24 V DC |
| Voltage drop | ······································ | typ. 0.6 V, max. 0.7 V |
| Rated output current I _{out} | ······································ | 0.5-5 A |
| Peak output current | ······································ | 20 A for 150 s |
| Resistance to reverse feed | ······································ | < 35 V |
| General data | | |
| Dimensions (W x H x D) | | 22.5 x 78 x 100 mm (0.89 x 3.07 x 4.02 in) |
| Weight | | 0.135 kg (0.30 lb) |
| Minimum distance to other units | horizontal / vertical | 10 mm / 10 mm (0.39 in / 0.39 in) |
| Degree of protection | housing / terminals | |
| Material of housing | housing shell / cover | plastic / plastic |
| Protection class | • | - |
| Mounting | | DIN rail (IEC/EN 60715) |
| Mounting position | | horizontal |
| Electrical connection - Input circuit / Output circuit | | |
| Wire size fine-strar | nd with wire end ferrule | 2 x 0.75-2.5 mm ² (2 x 18-14 AWG) |
| fine-strand v | vithout wire end ferrule | |
| | rigid | 2 x 0.5-4 mm² (2 x 20-12 AWG) |
| Stripping length | ••••••••••••••••••••••••••••••••••••••• | 7 mm (0.28 in) |
| Tightening torque | ••••••••••••••••••••••••••••••••••••••• | 0.6-0.8 Nm |
| Environmental data | | |
| Ambient temperature range | | -20+60 °C |
| | | -20+60 °C -40+85 °C |
| Damp heat (IEC/EN 60068-2-3) | otorago | 93 % at 40 °C, no condensation |
| Climatic category (IEC/EN 60721) | ······································ | - |
| Vibration (IEC/EN 60068-2-6) | ······································ | |
| Shock (IEC/EN 60068-2-27) | | |
| Isolation data | | |
| | nput / output / housing | - |
| Pollution degree (EN 50178) | | 2 |
| Standards | | |
| Product standard | | |
| Low Voltage Directive | | 2006/95/EC |
| EMC Directive | ······ | 2004/108/EC |
| Electrical safety | | EN 50178 |
| Electromagnetic compatibility | | |
| Interference immunity to | ······ | IEC/EN 61000-6-2 |
| electrostatic discharge | IEC/EN 61000-4-2 | |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | |
| electrical fast transient/burst | IEC/EN 61000-4-4 | |
| surge | IEC/EN 61000-4-5 | |
| conducted disturbances, induced by radio- | IEC/EN 61000-4-6 | Level 3 (10 V) |
| frequency fields Interference emission | | IEC/EN 61000-6-3 |
| high-frequency radiated | IEC/CISPR 22 / EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22 / EN 55022 | Class B |
| | 120/0101 11 22 / 211 00022 | 0,000 5 |

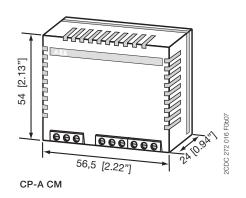
¹⁾ incl. lateral screw

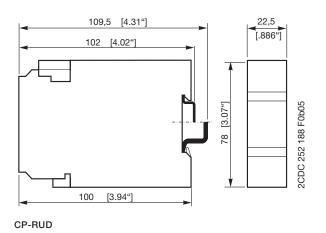
²⁾ This device is designed for connection to a safety extra-low voltage source. If no safety extra-low voltage is used at the input side, the lateral screw can be used for grounding of the housing (protection class I).

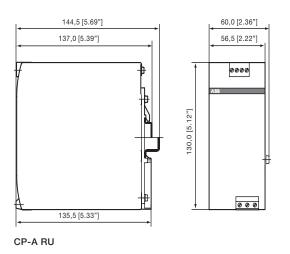
| Туре | | CP-D RU |
|--|--|--|
| Input circuit - Supply circuit | | IN 1 + + -, IN 2 + + - |
| Rated input voltage U _{in} | | 24 V DC |
| Input voltage range | • | 9-35 V DC |
| Rated input current I _{in} per channel | | 5 A |
| Maximum input current per channel | | 10 A for 300 s |
| Transient overvoltage protection | - | no |
| Output circuit | | OUT + + +, |
| Rated output voltage U _{out} | | 24 V DC |
| Voltage drop | | typ. 0.5 V |
| Rated output current I _{out} | - | 10 A |
| Resistance to reverse feed | | < 35 V |
| General data | | |
| MTBF | | on request |
| Duty time | • | 100 % |
| Dimensions (W x H x D) | product dimensions | |
| | | 134 x 94 x 48 mm (5.28 x 3.70 x 1.89 in) |
| Weight | _ | 0.075 kg (0.165 lb) |
| | gross weight | 0.130 kg (0.286 lb) |
| Material of housing | | plastic |
| Mounting | | DIN rail, snap-on mounting without any tool |
| Mounting position | - | horizontal |
| Minimum distance to other units | horizontal / vertical | 25 mm (0.98 in) / 25 mm (0.98 in) |
| Electrical connection - Input circuit / Output cir | cuit | |
| Wire size f | ine-strand with (out)wire end ferrule | 0.2-2.5 mm ² (24-14 AWG) |
| | rigid | 0.2-2.5 mm ² (24-12 AWG) |
| Stripping length | | 7.0 mm (0.28 in) |
| Tightening torque | | 0.67 Nm (6 lb.in) |
| Environmental data | | |
| Ambient temperature range | operation | -40+70 °C |
| | storage | -40+85 °C |
| Relative humidity | RH at 40 °C | 20-95 %, no condensation |
| Vibration (IEC/EN 60068-2-6) | | Mounting by rail: 10-500 Hz, 2 G, along X, Y, Z each axis, 60 min for each axis |
| Shock (IEC/EN 60068-2-27) | | 15 G, 11 ms, 3 axis, 6 faces, 3 times for each face |
| Standards | | |
| Product standard | | IEC/EN 61204-3 |
| Low Voltage Directive | | 2006/95/EC |
| EMC Directive | | 2004/108/EC |
| RoHS Directive | | 2011/65/EC |
| Electromagnetic compatibility | | T |
| Interference immunity to | | EN 55024 |
| electrostatic discharge | IEC/EN 61000-4-2 | Level 3, air discharge 8 kV, contact discharge 4 kV |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3, 10 V/m |
| electrical fast transient/burst | IEC/EN 61000-4-4 | Level 3, 2 kV / 5 kHz |
| conducted disturbances, induced by radio-frequ | uency fields IEC/EN 61000-4-6 | Level 3, 10 V |
| Interference emission | ······································ | EN 55022 |
| high-frequency radiated | IEC/CISPR 22 / EN 55022 | Class B |
| high-frequency conducted | IEC/CISPR 22 / EN 55022 | Class B |

Redundancy units Dimensional drawings









CP-ASI range Product group picture



CP-ASI range Table of contents

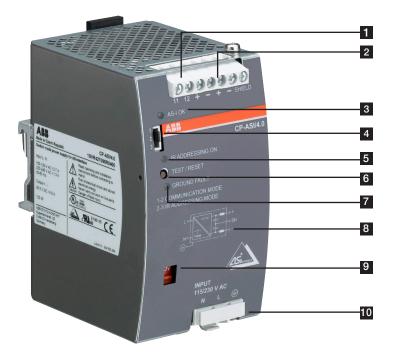
CP-ASI

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CP-ASI range Benefits and advantages

Characterics

- Rated output voltage 30.5 V DC for ASI-bus
- Rated output current up to 8.0 A
- High efficiency of up to 92 % $^{\mbox{\tiny 1)}}$
- Infrared addressing mode 2)
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -10...70 °C ³⁾
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- Tool-free mounting on DIN rail as well as demounting
- LEDs for the indication of operational states
- - 2) Except CP-ASI/4.0 DC/DC
 - ³⁾ Ambient temperature range CP-ASI/4.0 DC/DC -25...70°C
 - $^{\mbox{\tiny 4)}}$ Approvals are related to rated input voltage $\mbox{U}_{\mbox{\tiny in}}$



- 1 Output +, -, +, -, SHIELD: output terminals
- 2 Signalling contact 11-12: ground fault signalling terminals
- 3 Indication of operational states

AS-I OK: green LED - output voltage OK

- 4 Configuration of operation mode Jumper
- 5 Indication of operational states

IR ADDRESSING ON: red LED - infrared addressing mode active

- 6 Test and reset button
- 7 Indication of operational states

GROUND FAULT: red LED - ground fault detected

- 8 Circuit diagram
- Input voltage selector Adjustment of input voltage Input L, N, PE: input terminals

CP-ASI range Ordering details



CP-ASI/2.8



CP-ASI/4.0 DC/DC



CP-ASI/4.0



CP-ASI/8.0

Description

The CP-ASI power supply range is specifically designed with integrated data decoupling for the supply of AS-Interface systems.

Up to 62 slaves (binary I/O devices) can be supplied with a single two-conductor cable. The configurable IR addressing mode allows the easy assign of new ID addresses by means of an external infrared programming unit.

Ordering details

| Input Voltage Range | Rated Output Voltage | Rated Output Current | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---------------------------|----------------------------|----------------------------|------------------|-----------------|----------------|------------------------------|
| 85-132 V AC, 184-264 V AC | 30.5 V DC | 2.8 A | CP-ASI/2.8 | 1SVR427090R0280 | | 0.495 (1.091) |
| 85-132 V AC, 184-264 V AC | 30.5 V DC | 4.0 A | CP-ASI/4.0 | 1SVR427090R0400 | | 0.653 (1.440) |
| 18-32.4 V DC | 30.5 V DC | 4.0 A | CP-ASI/4.0 DC/DC | 1SVR427095R0400 | | 0.488 (1.076) |
| 85-132 V AC, 184-264 V AC | 30.5 V DC | 8.0 A | CP-ASI/8.0 | 1SVR427090R0800 | | 0.897 (1.978) |

Data at T_a = 25 °C, U_{in} = 230 V AC and rated values, unless otherwise indicated

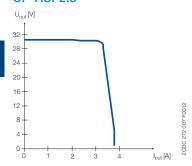
| Туре | CP-ASI/2.8 | CP-ASI/4.0 | CP-ASI/8.0 | CP-ASI/4.0 DC/DC | | | |
|--|--|--|--|--|--|--|--|
| Input circuit - Supply circuit | | <u>L</u> | ., N | 041/00 | | | |
| Rated input voltage U _{in} switch position 115 | . - 5 V 100-120 V AC | | | 24 V DC | | | |
| switch position 230 |) V 220-240 V AC | | | - | | | |
| nput voltage range | - | | | 18.0-32.4 V DC | | | |
| switch position 115 switch position 230 | | : 184-264 V AC / | 184-264 V AC | - | | | |
| Switch position 200 | J V 104-204 V AC | 240-300 V DC | 104-204 V AO | | | | |
| Frequency range AC | 47-63 Hz | <u>k</u> | | | | | |
| Typical input current | - | 1074 | | 5.6 A | | | |
| switch position 115 switch position 230 | | 2.7 A 1.3 A | 6.0 A 2.8 A | _ | | | |
| Allowed voltage between input and earth (ground) | | C: max. 60 V DC / 42.4 | | <u>i</u> | | | |
| Allowed input ripple voltage | CP-ASI/4.0 DC/D | CP-ASI/4.0 DC/DC: max. 5 Vpp, 47 Hz - 40 kHz - max. 36.0 V DC | | | | | |
| Continuous input voltage with no damage to the DC/DC converter Turn-on voltage | - | - | | | | | |
| Shut-down voltage | | | | typ. 17.5 V DC typ. 14.0 V DC | | | |
| ŭ | - | ····· | | typ. 35 V DC | | | |
| Typical power consumption | 94 W | 135 W | 261 W | 132 W | | | |
| Inrush current limiting / I²t (cold start) | < 20 A (132 V AC) approx. 1.5 A ² /s |) / < 44.7 A (120 V AC) / approx. 3.7 A ² /s | < 12 A (100 V AC) / approx. 1.0 A ² /s | < 1.8 A / approx. 1.0 A ² /s | | | |
| | | c) / < 49.3 A (132 V AC) | | | | | |
| | approx. 1.8 A ² /s | / approx. 4.6 A ² /s | approx. 1.5 A ² /s | | | | |
| | - | < 49.7 A (230 V AC) / approx. 2.5 A ² /s | < 24 A (220 V AC) / approx. 1.4 A ² /s | - | | | |
| | - | < 57.5 A (264 V AC) | < 27 A (240 V AC) / | - | | | |
| Diagharga gurrant tawarda DE | < 3.5 mA | / approx. 3.3 A ² /s | approx. 1.6 A ² /s | | | | |
| Discharge current towards PE Power failure buffering time | < 3.5 MA - | | | max. 0.5 ms | | | |
| at 115 V / | AC min. 35 ms | min. 40 ms | min. 20 ms | - | | | |
| at 230 V / Transient overvoltage protection | | ······• | min. 30 ms | | | | |
| Reverse input polarity protection | | varistors CP-ASI/4.0 DC/DC: included, unit does not start at reversed polarity | | | | | |
| Internal input fuse | | 3.15 A slow acting / | | 10 A slow acting | | | |
| [| 250 V AC | 250 V AC | 250 V AC | | | | |
| External fusing (not necessary, but recommended) | 10 A with B chara | ith C characteristic min | | - | | | |
| Power factor correction (PFC) at 115 V | AC 0.58 | | 0.53 | - | | | |
| at 230 V / | AC 0.53 | | 0.48 | = | | | |
| Indication of operational states Output voltage AS-I (| OK LED green | | | | | | |
| IR addressing mode IR ADDRESSING (| ON LED red | | | - | | | |
| Overload OVERLO | AD | LED red | | - | | | |
| Output circuit | +,- | | | | | | |
| Rated output voltage Rated output power | 30.5 V DC 85 W | 122 W | 244 W | 122 W | | | |
| Tolerance of the output voltage | ± 3 % | 122 VV | ; <u></u> | 1 1 L L VV | | | |
| Adjustment range of the output voltage | - | - | - | | | | |
| | °C 2.8 A | 4.0 A | 8.0 A | 4.0 A | | | |
| Derating of the output current $60 ^{\circ}\text{C} < T_a \leq 70$ | | | | | | | |
| Signalling contact for ground fault Control time | CP-ASI/4.0: max. < 2 ms | CP-ASI/4.0: max. 25 V AC or 60 V DC, 0.5 A | | | | | |
| Starting time after applying the supply voltage | max. 400 ms | max. 700 ms | max. 500 ms | max. 1 s (typ. 650 ms) | | | |
| Rise time | max. 100 ms | | | - | | | |
| at rated lo with 5 r | F | | | typ. 100 ms | | | |
| Residual ripple BW = 500 k | Hz tvp. < 50 mV | | • | typ. 200 ms | | | |
| Switching peaks BW = 20 M | | ······ | | | | | |
| Output circuit - No-load, overload and short-circuit behavior | PP PP | | | | | | |
| Characteristic curve of output | U/I characteristic | curve | Combined U/I | U/I characteristic | | | |
| • | | | characteristic | curve | | | |
| | | | curve and hiccup | | | | |
| Short-circuit protection | continuous short- | continuous short-circuit stability temporary short- | | | | | |
| | | circuit stability continuation with output power limiting | | continuous short- circuit stability | | | |
| 01 1 2 21 1 2 | continuation with | output power limiting | = | continuation with output power | | | |
| Short-circuit behaviour | | | · | : Jacpar POWOI | | | |
| | | | | limiting | | | |
| Current limiting at short circuit min / m | | 4.2 A / 6.5 A | 12 A / 25 A (max. 5 s) | 5.0 A / 9.0 A | | | |
| Current limiting at short circuit min / m | output power limi | iting | temporary output | 5.0 A / 9.0 A output power | | | |
| Current limiting at short circuit min / m Överload protection Overtemperature, overload and short circuit behaviour | output power limi | iting < I < 12 A continuous curre | temporary output power limiting ent for 2-5 s. afterwards sa | 5.0 A / 9.0 A output power limiting fety switch-off | | | |
| Short-circuit behaviour Current limiting at short circuit min / m Overload protection Overtemperature, overload and short circuit behaviour Overtemperature protection | output power limi | | temporary output power limiting ent for 2-5 s. afterwards sa | 5.0 A 7 9.0 A output power limiting fetv switch-off | | | |

| Туре | | CP-ASI/2.8 | CP-ASI/4.0 | CP-ASI/8.0 | CP-ASI/4.0 DC/DC |
|---|--|---|--|--|--|
| General data | | | | | |
| MTBF | | on request | | | |
| Power dissipation | • | typ. < 9.1 W (230 V AC, 2.8 A) | typ. < 13.5 W (230 V AC, 4.0 A) | typ. < 21.2 W (230 V AC, 8.0 A) | typ. < 12.7 W (24 V DC, 4.0 A) |
| Efficiency | | typ. 90.5 % | typ. 90 % | typ. 92.0 % | typ. 90.5 % |
| Duty time Dimensions (W x H x D) | product dimensions | 100 % 49 x 131 x 107 mm | : 73 x 131 x 107 mm | 91 x 131 x 107 mm | 40 x 131 x 107 mm |
| | packaging dimensions | (1.93 x 5.16 x 4.21 in) | | (3.58 x 5.16 x 4.21 in) | |
| | packaging aimendione | | | (5.94 x 4.72 x 5.51 in) | |
| Weight | net weight gross weight | 0.495 kg (1.019 lb) 0.568 kg (1.252 lb) | 0.653 kg (1.440 lb) 0.750 kg (1.653 lb) | 0.897 kg (1.997 lb) 1.015 kg (2.238 lb) | 0.488 kg (1.076 lb) 0.750 kg (1.287 lb) |
| Material of housing | | metal | | | |
| Mounting Mounting position | | DIN rail (IEC/EN 60) horizontal | 715), snap-on mounti | ng without any tool | |
| Minimum distance to other units Degree of protection Protection class | horizontal / vertical housing / terminals | 15 mm / 25 mm (0.5 | | | |
| Electrical connection | | | | | |
| Wire size fine-str | and with wire end ferrule | 0.5-4 mm ² (20-12 A | WG) | | |
| fine-stra | and without wire end ferrule rigid | 0.5-4 mm² (20-12 A 0.5-6 mm² (20-10 A | | | |
| Stripping length | ngia | 7 mm (0.28 in) | | | |
| Tightening torque | | 0.8 Nm (7.08 lb.in) | | | |
| Environmental data | | | | | |
| Ambient temperature range | operation rated load | -10+70 °C -10+60 °C | | | -25+70 °C -25+60 °C |
| | storage | | | | -40+85 °C |
| Vibration (sinusoidal) | | 2-17.8 Hz, amplitud | e ± 1.6 mm | ······································ | |
| (IEC/EN 60068-2-6) | sinusoidal (IEC/EN 60068-2-6) | 17.8 Hz - 500 Hz, 2 | g | | |
| Shock (half-sine) (IEC/EN 60068-2-27) | random (IEC 60068-2-64) | 2-800 Hz 0.5 s ² (s ³) | | ···• | |
| Isolation data | | 10 9 (0 1113), 10 9 (1 | 1 1113) | | |
| | input circuit / output circuit | 300 V | | | 50 V |
| (IEC/EN 60950-1, EN 50178) | input / PE | 300 V | | ····· | 50 V |
| | output / PE | | | | •••• |
| | shield / output shield / PE | 50 V 50 V | | ···• | |
| Rated impulse withstand voltage U _{imp} | input / output | 6 kV 1.2/50 µs | | | 1.5 kV 1.2/50 µs |
| (EN 50178) | input / PE | 4 kV 1.2/50 μs | | | 0.8 kV 1.2/50 μs |
| Power-frequency withstand voltage | output / PE | 500 V 1.2/50 μs 2.5 kV AC / 3.0 kV / | Λ <u>.</u> | | 500 V 1.2/50 μs 1.5 kV AC / |
| test (test voltage) (routine test / | input / output | 2.3 KV AO / 3.0 KV / | 40 | | 1.5 kV AC / |
| type test) | input / PE | 2.5 kV AC / 2.5 kV / | AC . | | 1.5 kV AC / |
| | outout / DE | 500 V AC / 500 V A | | | 1.5 kV AC |
| Pollution degree (IEC/EN 60950-1) | output / PE | 2 | .C | | |
| Overvoltage category (UL/IEC/EN 6098 | | II (IEC/EN 60950-1) | | ······ | |
| | output | II (IEC/EN 60950-1), | , II (EN 50178) | | |
| Standards | | 0000/05/50 | | | |
| Low Voltage Directive EMC directive | | 2006/95/EC 2004/108/EC | | | |
| RoHS directive | | 2011/65/EC | | | |
| Electrical safety | | IEC/EN 60950-1 | | | |
| Protective low voltage | | SELV (IEC/EN 6095 | 0-1), PELV | | |
| Electromagnetic compatibility | | IEC/EN 61000 6 0 | | | |
| Interference immunity to electrostatic discharge | IEC/EN 61000-4-2 | IEC/EN 61000-6-2 Level 4 (8 kV / 15 k) | V) | ······ | |
| radiated, radio-frequency, | IEC/EN 61000-4-3 | `` | , | | |
| electromagnetic field | | ` ′ | | | |
| electrical fast transient/burst | IEC/EN 61000-4-4 | | * * | | input circuit: Level 3 (2 kV) |
| | | output circuit: Leve | l 3 (2 kV) | | output circuit: Level 2 (1 kV) |
| surge | IEC/EN 61000-4-5 | input circuit: L-L Le | vel 3 (2 kV) / L-PE Le | vel 4 (4 kV) | input circuit: L-L Level 2 (1 kV) / L-PE Level 3 (2 kV) |
| | | output circuit: Leve | l 1 (0.5 kV) | | output circuit: |
| conducted disturbances, induced by radio-frequency fields | IEC/EN 61000-4-6 | Level 3 (10 V, 150 k | Hz - 80 MHz) | | Level 1 (0.5 kV) Level 3 (10 V, 150 kHz - 80 MHz) |
| voltage dips, short interruptions and voltag variations | IEC/EN 61000-4-11 | Class 3 | | | . NI IZ - OU WIFIZ) |
| Interference emission | | IEC/EN 61000-6-3 | | IEC/EN 61000-6-4 | IEC/EN 61000-6-3 |
| high-frequency radiated | IEC/CISPR 22, EN 55022 | Class B | | | |
| high-frequency conducted | IEC/CISPR 22, EN 55022 | | ·· · ····· | | |
| limits for harmonic current emissions | IEC/EN 61000-3-2 | Class A | | ; - | : = |

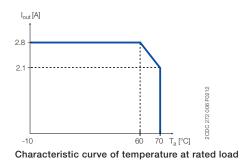
CP-ASI range Technical diagrams

Characteristic curve at T_a = 25 °C

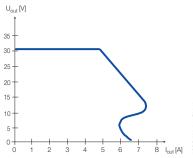
CP-ASI 2.8



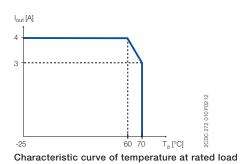
Output behaviour



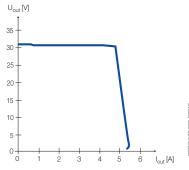
CP-ASI 4.0 DC/DC



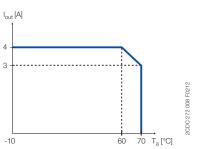
Output behaviour



CP-ASI 4.0

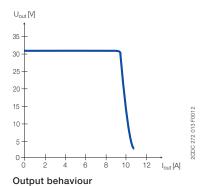


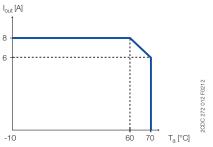
Output behaviour



Characteristic curve of temperature at rated load

CP-ASI 8.0



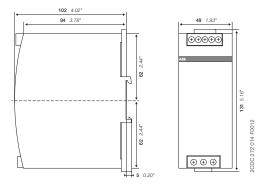


Characteristic curve of temperature at rated load

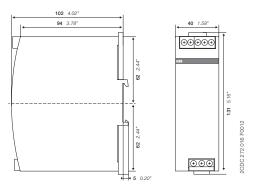
CP-ASI range Dimensional drawings

Dimensions in mm/inch

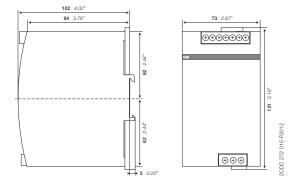
CP-ASI 2.8



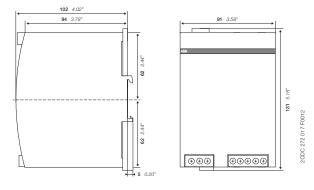
CP-ASI 4.0 DC/DC



CP-ASI 4.0



CP-ASI 8.0



CP-B range Product group picture



CP-B range Table of contents

CP-B

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| Technical data | 3/72 |
| | |

CP-B range Benefits and advantages

Power supply systems have to be highly reliable in most areas of energy management and automation technology. Often batteries are used for supporting the supply system in case of mains failures. Batteries have limited lifetimes depending on environmental parameters and have to be maintained regularly, which causes efforts and costs.

Using the latest ultra-capacitor technology, ABB offers an innovative and completely maintenance free new product for buffering the 24 V DC supply in case of interrupted mains on the primary side of the switch mode power supply.

The CP-B range is an ultra-capacitor buffer energy storage for power supply units which ensures a short term uninterrupted power supply system. In case of a power loss, the energy stored in the capacitor guarantees that the load is continually provided up to several hundred seconds depending on the load current.

Characteristics

- 3 buffer modules for buffering 24 V DC: CP-B 24/3.0 (3 A / 1 kWs1) CP-B 24/10.0 (10 A / 10 kWs1)) CP-B 24/20.0 (20 A / 8 kWs1)
- CP-B 24/3.0 and CP-B 24/20.0 expandable with additional extension module(s) CP-B EXT.2 (2 kWs1))
- LEDs for status indication
- Relay contacts for status messaging
- Very high backup times (e.g. with CP-B 24/10.0 up to 8 minutes at 1 A load current)
- Short charging times
- High efficiency, higher than 90%
- Wide temperature range
- DIN rail mountable, compact housing

Advantages in comparison to battery buffers:

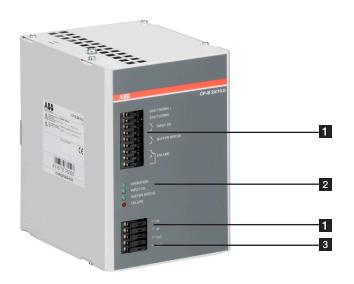
- Maintenance free
- No deep discharge
- Temperature resistant
- (UL508, CSA22.2 No 14), [HI approvals

¹⁾ internal energy buffer

| | | CP-B 24/3.0 | CP-B 24/10.0 | CP-B 24/20.0 | CP-B EXT.2 |
|------------------------------|-------|-----------------|-----------------|-----------------|-----------------|
| Order code | | 1SVR427060R0300 | 1SVR427060R1000 | 1SVR427060R2000 | 1SVR427065R0000 |
| Rated input voltage | | 24 V DC | 24 V DC | 24 V DC | · – |
| Rated current | | 3 A DC | 10 A DC | 20 A DC | 3 A DC |
| Energy storage (min.) | | 1.000 Ws | 10.000 Ws | 8.000 Ws | 2.000 Ws |
| Typical charging time | 100 % | 65 s | 134 s | 135 s | |
| at load current | 0 % | 56 s | 82 s | 62 s | |
| Typical | 100 % | 13 s | 38 s | 15 s | |
| buffering time ¹⁾ | 50 % | 28 s | 76 s | 30 s | |
| at load current | 25 % | 66 s | 140 s | 60 s | |
| • | 10 % | 148 s | 380 s | 150 s | |

¹⁾ buffering time ≈

current x output voltage



1 Input terminals

SHUT-DOWN+, SHUT-DOWN-: Input signal terminals INPUT OK, BUFFER STATUS, FAILURE: Signalling contact – terminals L_{IN} , L_{IN} : Input voltage terminals

2 Indication of operational states

OPERATION: Buffer module in operation (standby or buffering) INPUT OK: Input voltage applied

3 Output terminals

 $L+_{\mbox{\scriptsize OUT}},\,L-_{\mbox{\scriptsize OUT}},\,L-_{\mbox{\scriptsize OUT}}$: Output voltage terminals

energy storage x 0.9

CP-B range Ordering details



CP-B 24/3.0



CP-B 24/10.0



Description

Ultra capacitor based buffer units of the CP-B range offer highest reliability also in harsh enivronment. Due to the ultra-cap based technology the units are maintenance free, there will be no deep discharge and these products offer a very wide operational ambient temperature

CP-B range buffer units are an excellent solution to avoid voltage drops, for example in solar applications.

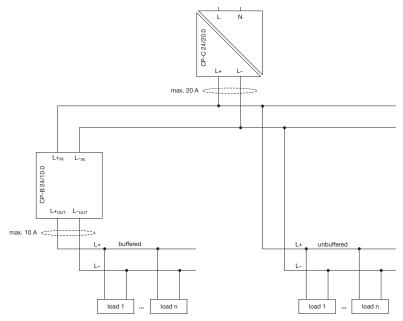
Ordering details

| Rated input voltage | Rated current | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---------------------|---------------|--------------|-----------------|----------------|------------------------------|
| 24 V DC | 3 A DC | CP-B 24/3.0 | 1SVR427060R0300 | | 0.55 (1.21) |
| | 10 A DC | CP-B 24/10.0 | 1SVR427060R1000 | | 2.10 (4.63) |
| | 20 A DC | CP-B 24/20.0 | 1SVR427060R2000 | | 2.20 (4.85) |

Ordering details - Extension unit for CP-B 24/3.0 and CP-B 24/20.0

| Rated voltage | Voltage range | Туре | | Price 1 pce | Weight (1 pce) kg (lb) |
|---------------|---------------|------------|-----------------|----------------|------------------------------|
| 24 V DC | 0-26.4 V DC | CP-B EXT.2 | 1SVR427065R0000 | | 1.00 (2.20) |

Example of application



CP-B range Technical data

| Туре | | CP-B 24/3.0 | CP-B 24/10.0 | CP-B 24/20.0 |
|---|--|--|---|--|
| Input circuit - Supply circuit | | | L+ _{IN} L- _{IN} | • |
| Rated input voltage U _{in} | | 24 V DC | | |
| Input voltage range | | 23.7-26.4 V DC | 23.9-27 V DC | 23.4-27.4 V DC |
| Minimum charging potential | | 23.7 V DC | 23.9 V DC | 23.4 V DC |
| Rated input current | | 3 A DC | 10 A DC | 20 A DC |
| Inrush current limiting | | 50 A / 1 ms | 35 A / 2 ms | 35 A / 2 ms |
| Transient overvoltage protection | | suppressor diode | varistor / suppressor diode | varistor / suppressor diode |
| Internal input fuse (apparatus protection, not accessit | ole) | 4 A slow acting | 15 A (FK2) | 30 A (FK2) |
| Internal fuse capacitors circuit (not accessible) | | | 25 A (FK2) | |
| Kind of input | SHUT-DOWN | - | control input | control input |
| | rated voltage | - | 24 V DC | 24 V DC |
| Output circuit | voltage range | - | 6-45 V DC | 6-45 V DC |
| Rated output power | | 69 W | L + _{оит} L - _{оит} L - _{оит} | 480 W |
| Rated output voltage Uout | ······································ | 24 V DC | : 240 VV | : 400 VV |
| Output voltage (buffer mode) | | 23.0 V DC | 23.2 V DC | 23.2 V DC |
| Tolerance of the output voltage | | +210 % | . = 9:= 1 = 9 | |
| Rated output current Ir | Ta m 60 °C | 3 A DC | 10 A DC | 20 A DC |
| Peak output current (fully loaded capacitors required) | Ta m 60 °C | 6 A DC (min. 1.5 s) | 20 A DC (10 A power supply + 10 A CP-B, min. 1.5 s) | 40 A DC (min. 1.5 s) |
| Control of limiting current | | - | 10.3 A DC ±0.1A | - |
| Shut-down if limiting current is exceeded Short-circuit protection (only via external fuse) | | no continuous chart -! | after 1.5 s | - |
| Internal output fuse (not accessible) | | no continuous short-cir | 15 A (FK2) | |
| Required external fuse | | 3.15 A slow acting | 10 A slow acting | 25 A slow acting |
| Current limiting at output circuit | | - | 1.051.2 x l _r | - |
| Breaking capacity of output circuit | t= 2.5 ms | - | 24 V DC, 10 A | - |
| Power failure buffering time 1) | | load-dependent, min. 13 s at 100 % load | load-dependent, min. 38 s at 100 % load | load-dependent, min. 15 s at 100 % load |
| Overload protection | | thermal protection | | <u> </u> |
| Kind of output | INPUT OK | n/o contact | • | |
| | BUFFER STATUS | - | n/o contact | • |
| **** | FAILURE | - | c/o contact | |
| Contact material | ······································ | Ag + Au-clad | | |
| Minimum switching voltage / Minimum switching curre | ent | 5 V DC / 1 mA | | |
| Maximum switching voltage / Maximum switching cur Mechanical lifetime | rent | 50 V AC / 1.0 A, 30 V D | | |
| Electrical lifetime | ••••• | 0.1 x 106 switching cycle | | • |
| Maximum fuse rating to achieve short-circuit protection | n/o or n/c contact | 1.0 A AC / 0.5 A DC | | |
| General data | | 7.14/ | . 00 141 | . 40 141 |
| Maximum internal power consumption Power consumption with unloaded output | ······································ | 7 W 0.75 W | 20 W 3 W | 40 W 1.6 W |
| Energy storage (min.) | ······································ | 1000 Ws | 10000 Ws | 8000 Ws |
| Typical charging time at load current | 100 % | 65 s | 134 s | 135 s |
| | | 56 s | 82 s | 62 s |
| Typical buffering time at load current ¹⁾ | 100 % 50 % | 13 s | 38 s 76 s | 15 s 30 s |
| | 25 % | 66 s | 140 s | 60 s |
| | 10 % | 148 s | 380 s | 150 s |
| Efficiency | | greater than 90 % | | |
| Dimensions (W x H x D) | product dimensions | 60 x 99 x 120 mm (2.36 x 3.90 x 4.72 in) | 116 x 170 x 147 mm (4.57 x 6.69 x 5.79 in) | 84 x 197 x 213 mm (3.31 x 7.76 x 8.39 in) |
| Weight Material | net weight cover / housing shell | 0.55 kg (1.21 lb) | 2.1 kg (4.63 lb) | 2.2 kg (4.85 lb) |
| Mounting | cover / nousing sneii | steel sheet powdered DIN rail (IEC/EN 60715) | snap-on mounting withou | out any tool |
| Mounting position | ······································ | horizontal | chap on mounting with | at any tool |
| Minimum distance to other units | horizontal | not necessary | | |
| | vertical | 40 mm (1.58 in) | | 80 mm (3.15 in) |
| Pollution degree | | 2 | | |
| Degree of protection | housing / terminal | IP20 | | |
| Protection class (IEC/EN 61140) | | | on: power supply fulfills o | lass III) |
| Electrical connection - Input circuit / Output circuit | | pull spring terminals | pull spring terminals | pluggable screw type terminals |
| Wire size fine-strand with | (out) wire end ferrule | 0.08-1.0 mm² (28-18 AWG) | 0.08-1.5 mm² (28-18 AWG) | 0.2-4.0 mm² (24-12 AWG) |
| | rigid | 0.08-1.5 mm² | 0.08-4.0 mm² | 0.2-6.0 mm² |
| | | (28-16 AWG) | (28-16 AWG) | (24-10 AWG) |
| Stripping length | | 6.0 mm (0.24 in) | | 7.0 mm (0.28 in) |

CP-B range

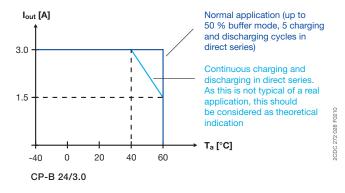
Technical data, Technical diagrams

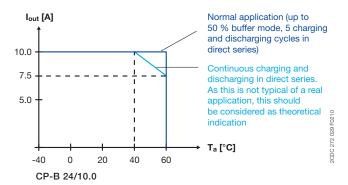
| Туре | CP-B 24/3.0 | CP-B 24/10.0 | CP-B 24/20.0 | |
|---|-------------------|------------------------------------|-------------------------|--------------------------------------|
| Input circuit - Supply circuit | | L+ _{IN} L- _{IN} | • | |
| Signalling circuit | | | | |
| Wire size fine-strand with | | 0.08-1.0 mm ² (28-18 AW | | 0.14-1.0 mm ² (26-16 AWG) |
| | rigid | 0.08-1.5 mm ² (28-16 AW | /G) | 0.14-1.5 mm ² (28-16 AWG) |
| Stripping length | | 6.0 mm (0.24 in) | | 7.0 mm (0.28 in) |
| Environmental data | | T | | T |
| Ambient temperature | operation | | | -20+60 °C |
| | storage | -40+60 °C | | -20+60 °C |
| Standards | | | | |
| Product standard | | EN 50178 | | |
| Low Voltage Directive | ······ | 2006/95/EC | | |
| EMC Directive | | 2004/108/EC | | |
| RoHS Directive | | 2011/65/EC | | |
| Electrical safety | | EN 50178, EN 60950, UL 508 | | |
| Electromagnetic compatibility | | | | |
| Interference immunity to | | IEC/EN 61000-6-1, IEC/ | EN 61000-6-2 | |
| electrostatic discharge | | Level 3, 6 kV / 8 kV | | |
| radiated, radio-frequency, electromagnetic field | IEC/EN 61000-4-3 | Level 3, 10 V/m (27-1000 | 0 MHz) / Level 2, 3 V/m | n (1400-2700 MHz) |
| electrical fast transient/burst | IEC/EN 61000-4-4 | Level 3, 2(1) kV / 5 kHz | | |
| surge | IEC/EN 61000-4-5 | Level 1, 0.5 kV | | |
| conducted disturbances, induced by radio- frequency fields | IEC/EN 61000-4-6 | Level 3, 10 V (150 kHz-8 | 30 MHz) | |
| voltage dips, short interruptions and voltage variations | IEC/EN 61000-4-11 | buffered by ultra-capac | tors | |
| Interference emission | | EN 61000-6-3, EN 6100 | 0-6-4 | |
| high-frequency radiated | DIN EN 55011 | B/C1 | | |
| high-frequency conducted | DIN EN 55011 | B/C1 | | |

[&]quot;Approvals and marks" on page 3/4.

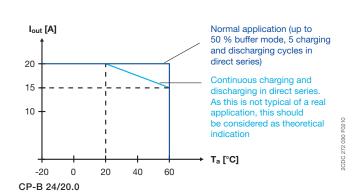
Technical diagrams

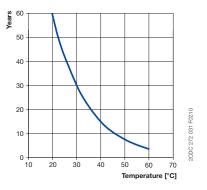






Caracteristic curve of the temperature at rated load



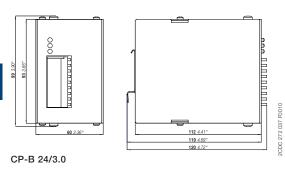


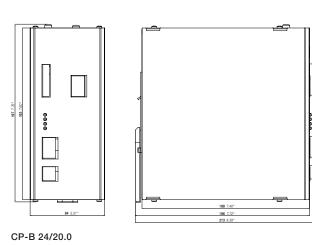
Capacitor's life span over temperature

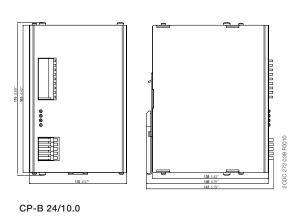
 $^{^{1)}}$ buffering time \approx $\frac{\text{energy storage x 0.9}}{\text{load current x output voltage}}$

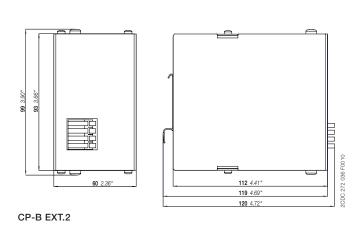
CP-B range Dimensional drawings

Dimensions in mm and inches









CP-B range Technical data

Data at T_a = 25 °C and rated values, unless otherwise indicated

| Туре | CP-B EXT 2.0 |
|---|--|
| Extension circuit | EXT+ EXT+ EXT- EXT- |
| Rated voltage | 24 V DC |
| Voltage range | 0-26.4 V DC |
| Rated current | 3 A DC |
| nternal input fuse (apparatus protection, not accessible) | 4 A slow acting (PTC) |
| Short-circuit protection | via internal 3 A fuse |
| Overload protection | only in combination with CP-B 24/3.0 or CP-B 24/20.0 |
| Indication of operational states | · · |
| | status information and fault messages of the buffer module |
| General data | apply |
| Power consumption without load | 0.5 W |
| Energy storage (min.) | 2000 Ws |
| | dimensions 60 x 99 x 120 mm (2.36 x 3.90 x 4.72 in) |
| | dimensions 85 x 220 x 170 mm (3.35 x 8.66 x 6.69 in) |
| | GITTER SIONS 85 X 220 X 170 MM (3.35 X 8.00 X 0.09 M) |
| Weight | net weight 1.00 kg (0.20 lb) |
| | ousing shell steel sheet powdered |
| Mounting | DIN rail (IEC/EN 60715), snap-on mounting without any tool |
| Mounting position | horizontal |
| Minimum distance to other units | horizontal not necessary |
| | vertical 40 mm (1.58 in) |
| Pollution degree | 2 |
| Degree of protection housin | g / terminal IP20 |
| Protection class (IEC/EN 61140) | III SELV / PELV (condition: power supply fulfills class III) |
| Electrical connection - Extension circuit | |
| | end ferrule 0.08-1.0 mm² (28-18 AWG) |
| | rigid 0.08-1.5 mm² (28-16 AWG) |
| Stripping length | 6.0 mm (0.24 in) |
| Signalling circuit | 0.0 111111 (0.24 111) |
| | end ferrule 0.08-1.0 mm² (28-18 AWG) |
| wino dizo | |
| Stripping length | rigid 0.08-1.5 mm² (28-16 AWG) |
| | 6.0 mm (0.24 in) |
| Environmental data | anaustica I i a a a a |
| Ambient temperature | operation -40+60 °C |
| | storage -40+60 °C |
| Vibration, sinusoidal based on IEC/EN | , |
| Shock, half-sine based on IEC/EN | 60068-2-27 15 g, 11 ms, 3 axes, 6 faces, 3 times for each face |
| Standards | |
| Product standard | EN 50178 |
| Low Voltage Directive | 2006/95/EC |
| MC Directive | 2004/108/EC |
| RoHS Directive | 2011/65/EC |
| Electrical safety | EN 50178, EN 60950, UL 508 |
| Electromagnetic compatibility | |
| nterference immunity to | IEC/EN 61000-6-1, IEC/EN 61000-6-2 |
| 5 | 61000-4-2 Level 3, 6 kV / 8 kV |
| adiated, radio-frequency, electromagnetic field IEC/EN | 61000-4-3 Level 3, 10 V/m (27-1000 MHz) / Level 2, 3 V/m (1400-2700 MHz) |
| electrical fast transient/burst IEC/EN | 61000-4-4 Level 3, 2(1) kV / 5 kHz |
| surge IEC/EN | 61000-4-5 Level 1, 0.5 kV |
| conducted disturbances, induced by radio-frequency IEC/EN | 61000-4-6 Level 3, 10 V (150 kHz-80 MHz) |
| ields | 61000-4-11 buffered by ultra-capacitors |
| orage dips, short interruptions and voltage variations IEC/EN | |
| nterference emission | EN 61000-6-3, EN 61000-6-4 |
| nigh-frequency radiated DII | N EN 55011 B/C1 |
| nigh-frequency conducted DII | N EN 55011 B/C1 |

"Approvals and marks" on page 3/4.

Electronic protection devices EPD24 Product group picture



Electronic protection devices EPD24 Table of contents

Electronic protection devices EPD24

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Electronic protection devices EPD24 Ordering details



EPD24-TB-101-3A

The protection devices EPD24 extend the ABB product range of Modular DIN rail components by electronic overcurrent protection modules for selective protection of 24 V DC load circuits.

This protection is achieved by a combination of active electronic current limitation in the case of a short circuit and an overload deactivation from 1.1 x l_x upwards.

If a fault occurs in a load circuit, the protection device EPD24 will detect this rapidly and reliably, disable the power output transistor and hence interrupt the current flow in the defective circuit. The maximum possible overcurrent is always limited to 1.3...1.8 times the selected rated current. An activation of capacitive loads up to 20,000 µF is possible, deactivation only occurring in the case of overloads or short circuits. Selective deactivation of the defective current circuit means undefined error states and a complete system stop are prevented.

Features

- Selective load protection, one electronic tripping characteristic.
- Active current limitation for safe connection of capacitive loads up to 20,000 μF and on overload/short circuit.
- Current ratings 0.5 A...12 A.
- Reliable overload disconnection with 1.1 x I_N
- Manual ON/OFF button
- Clear status and failure indication through LED and integrated auxiliary contact.
- Integral fail-safe element adjusted to current rating.
- Width per unit only 12.5 mm.
- Rail mounting
- Ease of wiring through busbar LINE+ and 0 V as well as signal bars.
- UL- and CSA-approvals allow international use of the devices.

Ordering details

| Ratedcurrent I _N | bbn 40 16779 EAN | Туре | Order code | Price | Pkg qty | Weight (1 pce) |
|-----------------------------|------------------|-------------------|-----------------|-------|------------|-------------------|
| Α | | | | | qıy | kg (lb) |
| 0.5 | 829960 | EPD24-TB-101-0.5A | 2CDE601101R2905 | | 4 | 0.065 (1.433) |
| 1 | 829984 | EPD24-TB-101-1A | 2CDE601101R2001 | | 4 | 0.065 (1.433) |
| 2 | 830003 | EPD24-TB-101-2A | 2CDE601101R2002 | | 4 | 0.065 (1.433) |
| 3 | 830027 | EPD24-TB-101-3A | 2CDE601101R2003 | | 4 | 0.065 (1.433) |
| 4 | 830041 | EPD24-TB-101-4A | 2CDE601101R2004 | | 4 | 0.065 (1.433) |
| 6 | 830065 | EPD24-TB-101-6A | 2CDE601101R2006 | | 4 | 0.065 (1.433) |
| 8 | 830089 | EPD24-TB-101-8A | 2CDE601101R2008 | | 4 | 0.065 (1.433) |
| 10 | 830102 | EPD24-TB-101-10A | 2CDE601101R2010 | | 4 | 0.065 (1.433) |
| 12 | 830126 | EPD24-TB-101-12A | 2CDE601101R2012 | | 4 | 0.065 (1.433) |

Ordering details

| | bbn 40 16779 EAN | Туре | Order code | : | Pkg qty | Weight (1 pce) kg (lb) |
|---|---------------------|-----------|-----------------|---|------------|------------------------------|
| Busbars for LINE+ and 0 V, grey insulation, length 500 mm ¹⁾ | 830140 | EPD-BB500 | 2CDE605100R0500 | | 10 | 0.2 (0.441) |
| Signal Bars for aux. contacts, grey insulation, length 21 mm | 830164 | EPD-SB21 | 2CDE605200R0021 | | 10 | 0.4 (0.882) |

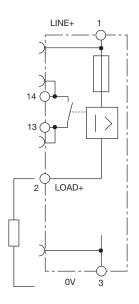
¹⁾ Max. load with one line entry Imax = 50 A (recommended: mid line entry) Max. load with two line entries Imax = 63 A

Electronic protection devices EPD24 Technical data

Wiring diagramm

EPD24-TB-101 without signal input with signal output F (Single signal, N/O)

Operating condition: 13-14 closed Fault condition: 13-14 open



| Operating data | |
|---------------------------------------|--|
| Operating voltage U _B | 24 V DC (1832 V) |
| Current rating I _N | fixed current ratings: 0.5, 1, 2, 3, 4, 6, 8, 10, 12 A |
| Closed current I | ON condition: typically 2030 mA depending on signal output |
| Staus indication by means of | Green: unit is ON load circuit / Power-MOSFET is switched on Orange: |
| | in the event of overload or short circuit until electronic disconnection |
| | Red: unit electronically disconnected load circuit/Power-MOSFET OFF undervoltage (U _B < 8 V) after switch-on till the end of the delay period |
| | OFF: manually switched off or device is dead |
| | potential-free auxiliary contact F |
| | ON/OFF/ condition of switch |
| Load circuit | |
| Load output | Power-MOSFET switching output (high slide switch) |
| Overload disconnection | typically 1.1 x I _N (1.051.35 x I _N) |
| Short-circuit current I _k | active current limitation |
| Trip time | see time/current characteristics |
| For electronic disconnection | typically 3 s at I_{Load} > 1.1 x I_{N} typically 100 ms3 s at I_{Load} > 1.8 x I_{N} (or 1.5 x I_{N} /1.3 x I_{N} ,) |
| Temperature disconnection | internal temperature monitoring with electronic disconnection |
| Low voltage monitoring load output | with hysteresis, no reset required: load »OFF« at U _B < 8 V |
| Starting delay t _{Start} | typically 0.5 sec after every switch-on and after applying U _B |
| Disconnection of load circuit | electronic disconnection |
| Free-wheeling circuit | suitable external free-wheeling circuit to be used with inductive load |
| Several load outputs must not be conn | ected in parallel |
| Signal output | |
| Electrical data | potential-free auxiliary contact max. 30 V DC/0.5 A, min. 10 V DC/10 mA |
| ON condition LED green | voltage \mathbf{U}_{B} applied, switch is in ON position no overload, no short circuit |
| OFF condition LED off | device switched off (switch is in OFF position) no voltage U _{в.} applied |
| Fault condition LED orange | overload condition $> 1.1 \times I_N$ up to electronic disconnection |
| Fault condition LED red | electronic disconnection upon overload or short circuit Device switched off with control signal (switch is in ON position) |
| Aux. contact | single signal, make contact contact open, terminal 13-14 |
| Fault | signal output fault conditions no operating voltage U _B ON/OFF switch is in OFF position red LED lighted (electronic disconnection) |

Electronic protection devices EPD24 Technical data

| General data | |
|--|---|
| Fail-Safe element | backup fuse for EPD24 not required because of the integral redundant fail-safe element |
| Housing material | moulded |
| Mounting | symmetrical rail to EN 50022-35x7.5 |
| Ambient temperature | 0+50 °C (without condensation, see EN 60204-1) |
| Storage temperature | -20+70 °C |
| Humidity | 96 hrs/95 % RH/40 °C to IEC 60068-2-78, test Cab. climate class 3K3 to EN 60721 |
| Vibration | 3 g, test to IEC 60068-2-6 test Fc |
| Degree of protection | housing: IP20 DIN 40050 terminals: IP20 DIN 40050 |
| EMC (EMC directive, CE logo) | emission: EN 61000-6-3 susceptibility: EN 61000-6-2 |
| Isolations coordination (IEC 60934) | 0.5 kV/pollution degree 2 reinforced insulation in operating area |
| Dielectric strength | max. 32 V DC (load circuit) |
| Isolation resistance (OFF condition) | n/a, only electronic disconnection |
| Approvals/Declarations of conformity | UL 2367 Solid State Overcurrent Protectors UL 1604, (class I, division 2, groups A, B, C, D) UL 508 CSA C22.2 No. 213 (class I, division 2) CSA C22.2 No. 142 CE logo |
| Dimensions (B x H x T) | 12.5 x 80 x 83 mm |
| Weight | approx. 65 g |
| Terminals | Line+/LOAD+/0V |
| Screw terminals | M4 |
| Max. cable cross section flexible with wire end ferrule w/wo plastic sleeve | 0.5 – 10 mm² |
| Multi-lead connection (2 identical cables) rigid/flexible | 0.5 – 4 mm² |
| Flexible with wire end ferrule without plastic sleeve | 0.5 – 2.5 mm² |
| Flexible with TWIN wire end ferrule with plastic sleeve | 0.5 – 6 mm ² |
| Wire stripping length | 10 mm |
| Tightening torque (EN 60934) | 1.5 – 1.8 Nm |
| Terminals | aux. contacts |
| Screw terminals | M3 |
| Max. cable cross section flexible with wire end ferrule w/wo plastic sleeve | 0.25 - 2.5 mm² |
| Wire stripping length | 8 mm |
| Tightening torque (EN 60934) | 0.5 Nm |

| Table 1: voltage | drop, current limitation, ma | x. load current | | |
|------------------|-----------------------------------|------------------------|------------------------------|------------------------------|
| current rating | typically voltage drop | active current | max. load current at | 100 % ON duty |
| I _N | U _{on} at I _n | limitation (typically) | T _{ambient} = 40 °C | T _{ambient} = 40 °C |
| 0.5 A | 70 mV | 1.8 x I _N | 0.5 A | 0.5 A |
| 1 A | 80 mV | 1.8 x I _N | 1 A | 1 A |
| 2 A | 130 mV | 1.8 x I _N | 2 A | 2 A |
| 3 A | 80 mV | 1.8 x I _N | 3 A | 3 A |
| 4 A | 100 mV | 1.8 x I _N | 4 A | 4 A |
| 6 A | 130 mV | 1.8 x I _N | 6 A | 5 A |
| 8 A | 120 mV | 1.5 x I _N | 8 A | 7 A |
| 10 A | 150 mV | 1.5 x I _N | 10 A | 9 A |
| 12 A | 180 mV | 1.3 x l, | 12 A | 10.8 A |

Attention: when mounted side-by-side without convection the ERD24 should not carry more than 80 % of its rated load with 100 % ON duty due to thermal effects.

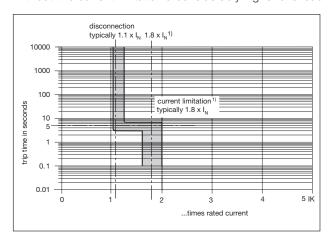
Electronic protection devices EPD24 Technical information

Time/Current characteristic curve (Tambient = 25 °C)

The trip time is typically 3 s in the range between 1.1 and 1.8 x I_{N}^{-1}

Electronic current limitation occurs at typically 1.8 x $I_N^{(1)}$ which means that under all overload conditions (independent of the power supply and the resistance of the load circuit) the max. overload before disconnection will not exceed 1.8 x $I_N^{(1)}$ times the current rating. Trip time is between 100 ms and 3 sec (depending on overload or at short circuit).

Without this current limitation a considerably higher overload current would flow in the event of an overload or short circuit.



Maximum cable lenghts

EPD24 reliably trips from 0 Ω up to max. circuit resistance R_{max}.

Calculation of R_{max}

| Selected rating I _N (A) | 3 | 6 |
|---|------|------|
| Operating voltage $\rm U_{\rm S}$ (V DC) (= 80 % of 24 V) $^{\rm 2)}$ | 19.2 | 19.2 |
| Trip current $I_{ab} = 1.25 \times I_{N}$ (A) (EPD24 trips after 3 s) | 3.75 | 7.50 |
| $R_{max}(\Omega) = (U_{B}/I_{ab}) - 0.050$ | 5.07 | 2.51 |

²⁾ Voltage drop of EPD24 and tolerance of trip point (typically 1.1 x I_N = 1.05 ... 1.35 x I_N) have been taken into account

Selection table for the incoming cable lengths with different cable cross-sections

| Cable cross section A (mm²) | 0.14 | 0.25 | 0.34 | 0.5 | 0.75 | 1.00 | 1.50 |
|--------------------------------------|------------|------------------------------|----------------------------|--------|-------|--------|------|
| Cable length L (m) (= single length) | cable resi | stance $(\Omega) = (\rho_0)$ | x 2 x L) / A ³⁾ | •••••• | | •••••• | |
| 5 | 1.27 | 0.71 | 0.52 | 0.36 | 0.24 | 0.18 | 0.12 |
| 10 | 2.54 | 1.42 | 1.05 | 0.71 | 0.47 | 0.36 | 0.24 |
| 15 | 3.81 | 2.14 | 1.57 | 1.07 | 0.71 | 0.53 | 0.36 |
| 20 | 5.09 | 2.85 | 2.09 | 1.42 | 0.95 | 0.71 | 0.47 |
| 25 | 6.36 | 3.56 | 2.62 | 1.78 | 1.19 | 0.89 | 0.59 |
| 30 | 7.63 | 4.27 | 3.14 | 2.14 | 1.42 | 1.07 | 0.71 |
| 35 | 8.90 | 4.98 | 3.66 | 2.49 | 1.66 | 1.25 | 0.83 |
| 40 | 10.17 | 5.70 | 4.19 | 2.85 | 1.90 | 1.42 | 0.95 |
| 45 | 11.44 | 6.41 | 4.71 | 3.20 | 2.14 | 1.60 | 1.07 |
| 50 | 12.71 | 7.12 | 5.24 | 3.56 | 2.37 | 1.78 | 1.19 |
| 75 | 19.07 | 10.68 | 7.85 | 5.34 | 3.56 | 2.67 | 1.78 |
| 100 | 25.34 | 14.24 | 10.47 | 7.12 | 4.75 | 3.56 | 2.37 |
| 125 | 31.79 | 17.80 | 13.09 | 8.90 | 5.93 | 4.45 | 2.97 |
| 150 | 38.14 | 21.36 | 15.71 | 10.68 | 7.12 | 5.34 | 3.56 |
| 175 | 44.50 | 24.92 | 18.32 | 12.46 | 8.31 | 6.23 | 4.15 |
| 200 | 50.86 | 28.48 | 20.94 | 14.24 | 9.49 | 7.12 | 4.75 |
| 225 | 57.21 | 32.04 | 23.56 | 16.02 | 10.68 | 8.01 | 5.34 |
| 250 | 63.57 | 35.60 | 26.18 | 17.80 | 11.87 | 8.90 | 5.93 |
| | | | | | | | |

³⁾ Resistivity of copper $\rho 0 = 0.0178 (\Omega \times mm^2)/m$ Example 1: max. length for 1.5 mm2 and 3 A: 214 m Example 2: max. length for 1.5 mm2 and 6 A: 106 m

Example 3: mixed wiring: (Control cabinet --- sensor/actuator level) R1 = 40 m for 1.5 mm^2 and R2 = 5 m for 0.25 mm^2 : R1 = 0.95 Ω , R2 = 0.71 Ω , total (R1 + R2) = 1.66 Ω

 $^{^{1)}}$ Current limitation typically 1.8 x I $_{\rm N}$ at I $_{\rm N}$ = 0.5 A...6 A Current limitation typically 1.5 x I $_{\rm N}$ at I $_{\rm N}$ = 8 A or 10 A Current limitation typically 1.3 x I_N at $I_N = 12$ A

Electronic protection devices EPD24 Approvals, Safety instructions

Please note

The user must ensure that the cable cross sections of the relevant load circuit are suitable for the current rating of the EPD24 used. Automatic start-up of machinery after shut down must be prevented (Machinery Directive 98/37/EG and EN 60204-1). In the event of a short circuit or overload the load circuit will be disconnected electronically by the EPD24.

Information on UL approvals/CSA approvals



UL1604

UL File # E 339238



CSA C22.2 No. 213 (Class I, Division 2)

CSA File # 2305929

Operating Temperature Code T5

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only **WARNING:**
- Exposure to some chemicals may degrade the sealing properties of materials used in the following device: relay Sealant Material:
 - Generic Name: Modified diglycidyl ether of bisphenol A
 - Supplier: Fine Polymers Corporation
 - Type: Epi Fine 4616L-160PK
- Casing Material:
 - Generic Name: Liquid Crystal Polymer
 - Supplier: Sumitomo Chemical
 - Type: E4008, E4009, or E6008

RECOMMENDATION:

- Periodically inspect the device named above for any degradation of properties and replace if degradation is found

WARNING - EXPLOSION HAZARD:

- Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous
- Substitution of any components may impair suitability for Class I, Division 2



UL2367

Non-hazardous use - UL File # E 339236



UL 508

Non-hazardous use - UL File # E 149922



CSA C22.2 No. 14

CSA C22.2 No. 142 - CSA File # E 2305929

Class 2

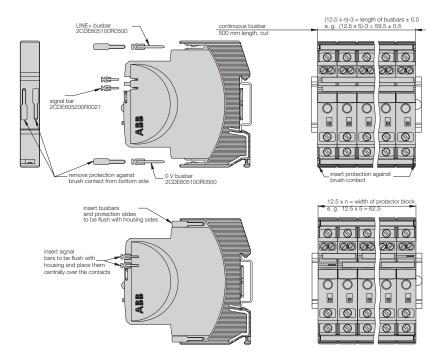
Meets requirement for Class 2 current limitation (EPD24 ... -0,5 A/1 A/2 A/3 A)

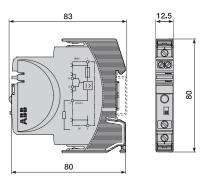
Electronic protection devices EPD24 Installation guidelines

The EPD24 features an integral power distribution system.

The following wiring modes are possible with various pluggable current and signal busbars:

- LINE+ (24 V DC)
- 0 V
 - Caution: The electronic devices EPD24 require a 0 V connection
- Auxiliary contacts





Mounting procedure

Before wiring insert busbars into protector block. A maximum of 10 connection cycles are permissible using connecting busbars.

Recommendation

After 10 units the busbars should be interrupted and receive a new entry live.

Table of length for busbars

(Order code 2CDE605100R0500)

| (0.000,000,000,000,000,000,000,000,000,0 | *************************************** | | | | | | | | | | | |
|--|---|------|----|------|----|------|----|-------|-----|--|--|--|
| No. of units | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | |
| Length of busbar (mm) ± 0.5 mm | 22 | 34.5 | 47 | 59.5 | 72 | 84.5 | 97 | 109.5 | 122 | | | |

Analog signal converters Product group picture



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Analog signal converters Overview

Applications for analog signal processing and correct solution using CC-E and CC-U converters

Nearly every process includes a control system that receives data by means of analog signals and then evaluates the data and sets the respective parameters correspondingly. When transmitting analog signals numerous problems may arise which can disturb or even block an ideal behavior of the

Below we have listed some processing problems together with the respective solutions to solve these problems:

Signal conversion

Sometimes the available signals cannot be processed by the controller or the actuator. In this case, signal converters are required to convert the input signal (or different input signals) to the desired output signal.

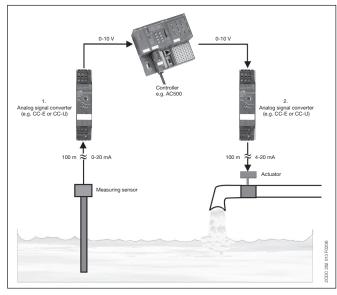
Signal amplification

If long lines or high burdens have to be operated, it may be necessary to amplify the signal. CC analog signal converters require only low input power and provide high output power. Thus, there are no restrictions for the converter's position on the line, i.e. it can be used

- for signal refreshing (1) at the end of the line (low input)
- or for signal amplification (2) at the beginning of the line (high output power).

Signal filtering

Particularly on long lines or in rough industrial environments the signals are exposed to high electromagnetic interferences. The frequency of the coupled interference signals may be in the range of the common mains frequency (50 Hz) or even much higher (in case of frequency converters). According to the specific requirements, analog signal converters are available which provide reliable suppression of those interferences by means of an input low-pass filter.



Signal separation

Protection against overvoltage

The increased use of micro-electronics make controls much more sensitive against overvoltages, resulting from lightning discharges or switching processes. Suppression diodes are incorporated in the input of the CC analog signal converters which enable the converters to arrest overvoltages with low energy level (resulting from switching processes) by themselves. The products furthermore provide electrical isolation between input, output and supply circuit for protection of the controller connected to the output.

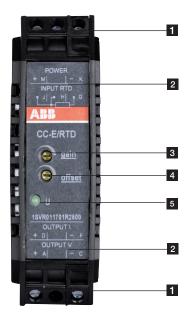
Protection against ground loops If components are used which refer to ground, the measuring signals can be falsified by a so-called ground loop. In this case, certain parts of the signal are transmitted via earth and not via the analog transmission line, thus causing incorrect evaluation of the signal. The electrical isolation between the input and the output disconnects these ground loops and thus enables correct signal transmission.

existing

▲ existing for some devices □ nendina

| п реп | 29 | | | | | | | | | | | | | | |
|------------|---|----------|----------|----------|-----------|----------|----------|-----------|----------|---------|----------|--------|----------------------------|--------|--------|
| Approv | als | CC-E/STD | CC-E I/I | CC-U/STD | CC-U/STDR | CC-E/RTD | CC-U/RTD | CC-U/RTDR | CC-E/TC | CC-U/TC | CC-U/TCR | CC-E/I | CC-E I _{AC} /ILPO | CC-U/I | CC-U/V |
| c UL us | UL 508, CAN/CSA C22.2 No.14 | | | | • | • | | • | | | • | | | • | • |
| c UL us | UL 1604 (Class I, Div 2, hazardous locations), CAN/CSA C22.2 No.213 | A | | • | | A | • | | A | • | | • | | • | • |
| CB | CB scheme | | | | | | | | | | | | | | |
| (1) | CCC | | | | • | | | - | | | - | | | | |
| Marks | | | | | | | | | | | | | | | |
| CE | CE | • | • | • | • | - | • | • | • | • | • | - | | • | - |
| C | C-Tick | • | | | • | • | | • | • | | • | • | | • | • |

Analog signal converters - CC-E range Benefits and advantages



- 1 Terminals M, K, J, H, G
- 2 Terminal explanation
- 3 Adjustment of gain
- 4 Adjustment of offset
- 5 Indication of operational states

U - control supply voltage applied

CC-E range

- Universally configurable devices and single-function
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation
- Unambiguous and clear connecting terminal markings

Conversion, measurement and separation of

- Standard signals (0-5 V, 0-10 V, 0-20 mA, 4-20 mA)
- Temperature signals of RTD sensors (PT 100)
- Thermocouple signals (types J and K)
- Current measurement signals (0-5 A, 0-20 A AC/DC)

Characteristics of single-function devices

- No adjustment or balancing necessary.

Characteristics of universal devices

- The required input and output ranges can be configured by means of directly accessible DIP switches positioned on
- Gain adjustment of ±5 % by means of an adjustment potentiometer on the front-side
- Offset adjustment of ±5 % by means of adjustment potentiometers on the front-side

CC-E/STD analog signal converter with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/STD)
- 2x10 single-function devices
- "Plug and Work", no adjustment of single-function devices required

CC-E/TC analog signal converter for thermocouple signals of the types J and K with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/TC)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required
- Integrated cold-junction compensation

CC-E I /c/ILPO measuring converter without auxiliary power for sinusoidal currents 0-1 A, 0-5 A, output 4-20

- Measuring converter for sinusoidal currents (0-1 A, 0-5 A)
- Measuring range selection by front-face sliding switch
- 4-20 mA output current in proportion to input current
- no additional power supply required

CC-E/RTD temperature signal converter for RTD sensors, linearized with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/RTD)
- 2x12 single-function devices
- Plug and Work", no adjustment of single-function devices required
- Temperature signal converter for PT100 sensors
- 2- or 3-wire connection

CC-E/I measuring converter for current signals 0-5 A, 0-20 A, AC/DC with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/I)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Loop-powered current/current isolator without external power supply for analog current signals of 0-20 mA and 4-20 mA

- Electrical isolation between input and output
- Very low internal voltage drop ≤ 2.5 V
- Available with one or two independent channels
- Width only 18 mm (1 and 2 channels)

Analog signal converters - CC-E range Ordering details - Standard signal converters





CC-E V/V



CC-E I/I-2

| Ordering | details | Standard | signal | converters | |
|----------|---------|------------------------------|--------|------------|---|
| | | | | | ľ |

| Supply voltage range | Input signal | Output signal | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|-------------------------|--|------------------------------------|---|-----------------|------------------|------------------------------|
| | 0-5 V, 0-10 V, 0-20 mA, 4-20 mA | 0-5 V, 0-10 V, 0-20 mA, 4-20 mA | CC-E/STD ¹⁾ | 1SVR011700R0000 | · | 0.088 (0.194) |
| | | 0-10 V | CC-E V/V | 1SVR011710R2100 | | 0.083 (0.183) |
| | 0-10 V | 0-20 mA | CC-E V/I | 1SVR011711R1600 | | 0.084 (0.185) |
| | | 4-20 mA | CC-E V/I | 1SVR011712R1700 | | 0.084 (0.187) |
| | | 0-10 V | CC-E I/V | 1SVR011713R1000 | | 0.082 (0.181) |
| 24 V DC | 0-20 mA | 0-20 mA | CC-E I/I | 1SVR011714R1100 | | 0.084 (0.187) |
| | | 4-20 mA | CC-E I/I | 1SVR011715R1200 | | 0.084 (0.185) |
| | | 0-10 V | CC-E I/V | 1SVR011716R1300 | | 0.084 |
| | 4-20 mA | 0-20 mA | CC-E I/I | 1SVR011717R1400 | | (0.185) |
| 24 V DC | | 4-20 mA | CC-E I/I | 1SVR011718R2500 | | 0.084 (0.187) |
| | -10+10 V | -10+10 V | CC-E V/V | 1SVR011719R2600 | | 0.082 (0.181) |
| | O-10 V O-20 mA 0-10 V O-20 mA 0-10 V 4-20 mA 0-10 V 4-20 mA 0-10 V 4-20 mA 0-10 V 1-10+10 V 0-5 V, 0-10 V, 0-20 mA 4-20 mA 0-10 V 0-10 V 0-10 V 0-10 V 0-10 V 0-20 mA 4-20 mA 0-10 V 0-10 V 0-10 V 0-10 V 0-10 V 0-20 mA 4-20 mA 4-20 mA 4-20 mA 4-20 mA | 0-5 V, 0-10 V, 0-20 mA, 4-20 mA | CC-E/STD | 1SVR011705R2100 | | 0.090 (0.198) |
| | | 0-10 V | CC-E V/V | 1SVR011720R2300 | | 0.096 (0.212) |
| | 0-10 V | 0-20 mA | CC-E V/I | 1SVR011721R1000 | | 0.087 (0.192) |
| | | 4-20 mA | CC-E/STD ¹⁾ 1SVR011700R00000 CC-E V/V 1SVR011710R2100 CC-E V/I 1SVR011711R1600 CC-E V/I 1SVR011712R1700 CC-E I/V 1SVR011713R1000 CC-E I/I 1SVR011714R1100 CC-E I/I 1SVR011715R1200 CC-E I/V 1SVR011716R1300 CC-E I/I 1SVR011717R1400 CC-E I/I 1SVR011717R1400 CC-E I/I 1SVR011719R2600 CC-E V/V 1SVR011705R2100 CC-E V/V 1SVR011720R2300 | | 0.091 (0.200) | |
| 110-240 V AC | | 0-10 V | CC-E V/V | | | 0.091 (0.200) |
| | 0-20 mA | 0-20 mA | CC-E I/I | | | 0.088 |
| voltage range | | 4-20 mA | CC-E I/I | | | (0.194) |
| | | 0-10 V | CC-E V/V | | | 0.096 (0.212) |
| | 4-20 mA | 0-20 mA | CC-E I/I | 1SVR011727R1600 | | 0.087 (0.192) |
| | | 4-20 mA | CC-E I/I | 1SVR011728R2700 | | 0.088 (0.194) |
| | -10+10 V | -10+10 V | CC-E V/V | 1SVR011729R2000 | | 0.086 (0.190) |
| 110-240 V AC | 0-20 mA, | 0.00 mA 4.00 mA | CC-E I/I-1 ²⁾ | 1SVR010200R1600 | | 0.038 (0.084) |
| | 4-20 mA | 0-20 mA, 4-20 mA | CC-E I/I-2 ²⁾ | 1SVR010201R0300 | | 0.044 (0.097) |

¹⁾ **1** 1604 Class I, Div.2 (universal device) 2 CC-E-I/I-1 has 1 channel, CC-E-I/I-2 has 2 channels

Analog signal converters - CC-E range Ordering details - RTD converters



Ordering details - RTD converters Supply voltage range Weight Input signal **Output signal** Type Order code (1 pce)

| - Tonago rango | | | | | 1 pce | kg (lb) |
|----------------|------------------|-----------------------------|------------------------|---|------------------|------------------|
| | refer to table | 0-10 V, 0-20 mA, 4-20 mA | CC-E/RTD ¹⁾ | 1SVR011701R2500 | | 0.091 (0.200) |
| | | 0-10 V | CC-E RTD/V | 1SVR011730R2500 | | 0.084 (0.185) |
| | PT100 0100 °C | 0-20 mA | CC-E RTD/I | 1SVR011731R1200 | | 0.086 |
| | | 4-20 mA | CC-E RTD/I | 1SVR011732R1300 | | (0.190) |
| | PT100 | 0-10 V | CC-E RTD/V | 1SVR011733R1400 | | 0.083 (0.183) |
| | | 0-20 mA | CC-E RTD/I | 1SVR011734R1500 | | 0.084 (0.185) |
| 24 V DC | | 4-20 mA | CC-E RTD/I | 1SVR011735R1600 | | 0.084 (0.187) |
| | | 0-10 V | CC-E RTD/V | 1SVR011736R1700 | | 0.084 (0.185) |
| | | 0-20 mA | CC-E RTD/I | 1SVR011737R1000 | | 0.084 (0.187) |
| | | 4-20 mA | CC-E RTD/I | 1SVR011738R2100 | | 0.101 |
| | | 0-10 V | CC-E RTD/V | 1SVR011739R2200 | | 0.084 (0.185) |
| | | 0-20 mA | CC-E RTD/I | 1SVR011740R0700 | | 0.084 |
| | | 4-20 mA | CC-E RTD/I | 1SVR011741R2400 | | (0.187) |
| | refer to table | 0-10 V, 0-20 mA, 4-20 mA | CC-E/RTD | 1SVR011706R2200 | | 0.093 (0.205) |
| | | 0-10 V | CC-E RTD/V | 1SVR011788R2400 | | 0.086 (0.190) |
| | | 0-20 mA | CC-E RTD/I | 1SVR011789R2500 | | 0.088 (0.194) |
| | | 4-20 mA | CC-E RTD/I | 1SVR011790R2200 | | 0.089 (0.196) |
| | | 0-10 V | CC-E RTD/V | E/RTD ¹⁾ 1SVR011701R2500 E RTD/V 1SVR011730R2500 E RTD/I 1SVR011731R1200 E RTD/I 1SVR011732R1300 E RTD/V 1SVR011733R1400 E RTD/I 1SVR011734R1500 E RTD/I 1SVR011735R1600 E RTD/I 1SVR011736R1700 E RTD/I 1SVR011737R1000 E RTD/I 1SVR011739R2200 E RTD/I 1SVR011740R0700 E RTD/I 1SVR011740R0700 E RTD/I 1SVR011740R0700 E RTD/I 1SVR011798R2500 E RTD/I 1SVR011799R1100 E RTD/I 1SVR011799R1100 E RTD/I 1SVR011793R1100 E RTD/I 1SVR011794R1200 E RTD/I 1SVR011794R1200 E RTD/I 1SVR011794R1200 E RTD/I 1SVR011795R1300 E RTD/I 1SVR011796R1400 E RTD/I 1SVR011796R1400 E RTD/I 1SVR011797R1500 E RTD/I 1SVR011798R2600 | 0.087 (0.192) | |
| | | 0-20 mA | CC-E RTD/I | 1SVR011792R1000 | | 0.089 |
| 110-240 V AC | | 4-20 mA | CC-E RTD/I | 1 | | (0.196) |
| | | 0-10 V | CC-E RTD/V | | | 0.087 (0.192) |
| | | 0-20 mA | CC-E RTD/I | 1SVR011795R1300 | | 0.089 |
| | | 4-20 mA | CC-E RTD/I | | | (0.196) |
| | | 0-10 V | CC-E RTD/V | | | 0.086 (0.190) |
| | | 0-20 mA | CC-E RTD/I | 1SVR011798R2600 | | 0.089 (0.196) |
| | | 4-20 mA | CC-E RTD/I | 1SVR011799R2700 | | 0.088 (0.194) |

¹⁾ B 1604 Class I, Div.2 (universal device)

Analog signal converters - CC-E range Ordering details - Thermocouple converters



CC-E TC

Ordering details - Thermocouple Converters

| Supply voltage range | Input signal | Output signal | Туре | Order code | Price | Weight (1 pce) |
|-------------------------------|-------------------------------|-----------------------------|-----------------------|-----------------|-------|-------------------|
| | | | | | 1 pce | kg (lb) |
| | thermocouple types J and K | 0-10 V, 0-20 mA, 4-20 mA | CC-E/TC ¹⁾ | 1SVR011702R2600 | | 0.089 (0.196) |
| | | 0-10 V | CC-E TC/V | 1SVR011750R0100 | | 0.087 (0.192) |
| Supply voltage range 24 V DC | type J 0600 °C | 0-20 mA | CC-E TC/I | 1SVR011751R2600 | | 0.084 (0.187) |
| | | 4-20 mA | CC-E TC/I | 1SVR011752R2700 | | 0.102 |
| | | 0-10 V | CC-E TC/V | 1SVR011753R2000 | | 0.084 |
| | type K 01000 °C | 0-20 mA | CC-E TC/I | 1SVR011754R2100 | | (0.185) |
| | | 4-20 mA | CC-E TC/I | 1SVR011755R2200 | | 0.086 (0.190) |
| | thermocouple types J and K | 0-10 V, 0-20 mA, 4-20 mA | CC-E/TC | 1SVR011707R2300 | | 0.088 (0.194) |
| | | 0-10 V | CC-E TC/V | 1SVR011760R0300 | | 0.084 (0.187) |
| | type J 0600 °C | 0-20 mA | CC-E TC/I | 1SVR011761R2000 | | 0.088 (0.194) |
| 110-240 V AC | | 4-20 mA | CC-E TC/I | 1SVR011762R2100 | | 0.1 (0.220) |
| | | 0-10 V | CC-E TC/V | 1SVR011763R2200 | | 0.086 (0.190) |
| | type K 01000 °C | 0-20 mA | CC-E TC/I | 1SVR011764R2300 | | 0.088 (0.194) |
| | | 4-20 mA | CC-E TC/I | 1SVR011765R2400 | | 0.086 (0.190) |

¹⁾ B 1604 Class I, Div.2 (universal device)

(0.115)

Analog signal converters - CC-E range Ordering details - Measuring converters



| Supply | Input signal | Output signal | Type | Order code | Price | Weight |
|---------------|-------------------------|-----------------------------|---------------------------|--|-------|--------------------|
| voltage range | | | | | 1 pce | (1 pce) kg (lb) |
| | 0-5 A, 0-20 A, AC/DC | 0-10 V, 0-20 mA, 4-20 mA | CC-E/I ¹⁾ | 1SVR011703R2700 | | 0.096 (0.212) |
| | 0-5 A, 0-20 A, | 0-10 V | CC-E I _{AC} /V | 1SVR011770R0500 | | 0.090 (0.198) |
| | AC | 0-20 mA | CC-E I _{AC} /I | 1SVR011771R2200 | | 0.092 |
| 24 V DC | | 4-20 mA | CC-E I _{AC} /I | 1SVR011772R2300 | | (0.203) |
| | | 0-10 V | CC-E I _{DC} /V | 1SVR011773R2400 | | 0.092 (0.207) |
| | 0-5 A, 0-20 A, DC | 0-20 mA | CC-E I _{DC} /I | 1SVR011774R2500 | | 0.091 (0.200) |
| | | 4-20 mA | CC-E I _{DC} /I | 1 pce 1 SVR011703R2700 V 1SVR011770R0500 1 SVR011771R2200 1 SVR011772R2300 V 1SVR011773R2400 1 SVR011774R2500 1 SVR011775R2600 1 SVR011708R0400 V 1SVR011780R1100 1 SVR011781R0600 1 SVR011782R0700 1 SVR011783R0000 V 1SVR011783R0000 V 1SVR011783R00000 | 0.093 (0.205) |
| | 0-5 A, 0-20 A, AC/DC | 0-10 V, 0-20 mA, 4-20 mA | CC-E/I | 1SVR011708R0400 | | 0.099 (0.218) |
| | | 0-10 V | CC-E I _{AC} /V | 1SVR011780R1100 | | 0.092 (0.203) |
| | 0-5 A, 0-20 A, AC | 0-20 mA | CC-E I _{AC} /I | 1SVR011781R0600 | | 0.092 (0.207) |
| 110-240 V AC | | 4-20 mA | CC-E I _{AC} /I | 1SVR011782R0700 | | 0.095 (0.209) |
| | 0-5 A, 0-20 A, | 0-10 V | CC-E I _{DC} /V | 1SVR011783R0000 | | 0.093 (0.205) |
| | DC | 0-20 mA | CC-E I _{DC} /I | 1SVR011784R0100 | | 0.095 |
| | | 4-20 mA | CC-E I _{DC} /I | 1SVR011785R1100 | | (0.209) |
| loop powered | 0-1 A. 0-5 A. AC | 4-20 mA | CC-E I/ILPO ²⁾ | 1SVR010203R0500 | | 0.052 |

^{1) 🕲 1604} Class I, Div.2 (universal device)

0-1 A, 0-5 A, AC 4-20 mA

loop powered

CC-E I_{AC}/ILPO²⁾ 1SVR010203R0500

²⁾ for sinusoidal currents

Analog signal converters - CC-E range DIP switch settings, Dimensional drawings

CC-E/STD, CC-E x/x (universal devices)

| 1 | 0.1.1 | | | , | Sw | itch | 1 | | | |
|--------|--------|---|---|---|----|------|---|---|---|-----|
| Input | Output | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| | 05 V | | | | | | | | | |
| 0.51/ | 010 V | | | | | | | | | |
| 05 V | 020 mA | | | | | | | | | |
| | 420 mA | | | | | | | | | |
| | 05 V | | | | Ш | Ш | | Ш | | |
| 0 401/ | 010 V | | | | Ш | Ш | | | | |
| 010 V | 020 mA | | | | Ш | Ш | | | | |
| | 420 mA | | | | Ш | Ш | | | Ш | |
| | 05 V | Ш | | | Ш | | | Ш | | 7 |
| 0.004 | 010 V | | | | Ш | | Ш | | | 000 |
| 020 mA | 020 mA | | | | Ш | | | | | |
| | 420 mA | | | | Ш | | | | Ш | 3 |
| | 05 V | | Ш | | | | | | | 2 |
| 4 00 4 | 010 V | | | | | | | | | 3 |
| 420 mA | 020 mA | | | | | | | | | 000 |
| | 420 mA | | | | | | | | | (|

| | F0204 |
|-------|-------|
| | 2 002 |
| egend | 282 |
| ON | 8 |
| OFF | 2C |

CC-E/RTD

| la a d | 0 | Switch | | | | | |
|----------------|---------|--------|---|---|---|---|---|
| Input | Output | | 2 | 3 | 4 | 5 | 6 |
| | 010 V | | | | | | |
| 0100 °C | 0-20 mA | | | | | | |
| 0 | 4-20 mA | | | | | | |
| 0300 °C | 0-10 V | | | | | Г | |
| | 0-20 mA | | | | | | |
| | 4-20 mA | | | Ш | | Ш | |
| | 0-10 V | | | | | | |
| 0500 °C | 0-20 mA | | Ш | Ш | | | |
| | 4-20 mA | | | | | | |
| | 0-10 V | | | | | | |
| -50+50 °C | 0-20 mA | Ш | | | | Г | |
| | 4-20 mA | | | | | | |
| | 0-10 V | | | | | | |
| -50+250 °C | 0-20 mA | | | | | | |
| | 4-20 mA | | | | | | |
| | 0-10 V | | | | | Г | |
| -50+450 °C | 0-20 mA | | | | | | |
| | 4-20 mA | | | | | | |
| High fail safe | | | | | | | |
| Low fail safe | | | | | | | |

| | | i |
|------|--------------|-----|
| | | . : |
| Γ | Legend | 1 |
| - [1 | ON | |
| ſ | OFF | 1 : |
| | no influence | |

CC-E/TC

| | 0 1 1 | | (| Sw | itcł | 1 | | |
|------------------|--------|---|---|----|------|---|---|-------|
| Input | Output | 1 | 2 | 3 | 4 | 5 | 6 | |
| TO I | 010 V | | Ш | | | | | × |
| TC-J: 0600 °C | 020 mA | | | | | | | FOSOR |
| 0600 C | 420 mA | | Ш | | | | | 7 F(|
| TC-K: | 010 V | Ш | | | | | | 200 |
| 01000 °C | 020 mA | Ш | | | | | | 282 (|
| 01000 °C | 420 mA | Ш | | | | | | Š |
| High fail safe | | | | | | | | טטטכ |
| Low fail safe | | | | | | | | 5 |

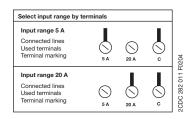
| | - 003 F020 |
|--------------|---------------|
| Legend | 282 (|
| ON | 3 |
| OFF | |
| no influence | S |

CC-E/I

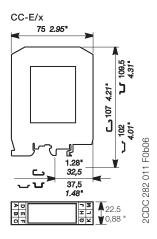
| | Output | | Switch | | | n | | 8 |
|--------|----------|---|--------|---|---|---|---|--------------------|
| Input | | | 2 | 3 | 4 | 5 | 6 | کور |
| I - DC | 010 V | Ш | | | | | | 2CDC 282 005 E0208 |
| I - AC | 010 V | | | | | | |) |
| I - DC | 020 mA | | | | | | | 35 (|
| I - AC | 020 IIIA | | | | | | | 6 |
| I - DC | 420 mA | | | | | | | 2 |
| I - AC | 420 MA | | | | | | | 20 |



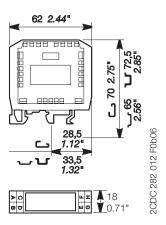
Input range selection - CC-E/I



Dimensional drawings

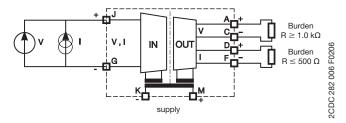


CC-E I_{AC}/ILPO, CC-E I/I

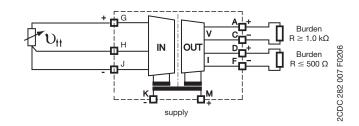


Analog signal converters - CC-E range Wiring instructions

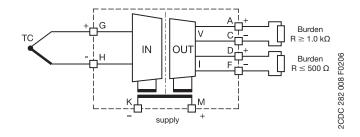
CC-E/STD, CC-E x/x (universal devices)



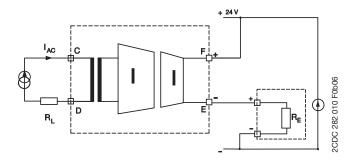
CC-E/RTD



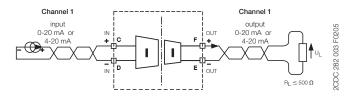
CC-E/TC



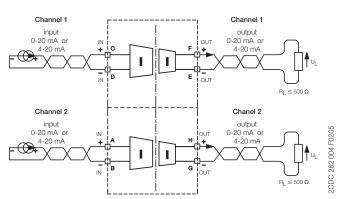
CC-E I_{AC}/ILPO



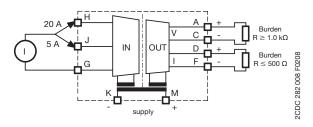
CC-E I/I-1



CC-E I/I-2



CC-E I/I



Analog signal converters - CC-E range Technical data

| Туре | CC-E/STI | D / CC-E x/x | CC-E/RTD 3) | CC-E/TC |
|---|---------------|--|---|-------------------------|
| Input circuits - Analog inputs J-G- | H Current | Voltage | Temperature sensors | Thermocouples |
| | | | | (IEC 584-1 and 2) |
| Input signal | Standa | rd signals | PT100 | TC.K, TC.J |
| Rated input range | 020 mA | | -50+500 °C | TC.K: 01000 °C, |
| , | | 010 V / | | TC.J: 0600 °C |
| Limitation of input signals | +55 mA | -10+10 V ± 11 V | <u>.</u> | |
| Influence of line resistance | - | <u>:</u> v | < 0.01 %/Ω | < 0.5 % / 100 Ω |
| Gain adjustment range | ± 5 % (univ | versal devices | s) | |
| Offset adjustment range | | versal devices | | |
| Input impedance | 50 Ω | 1 ΜΩ | <u>-</u> | - |
| Suppression at 50 Hz | - | ···· · ······ | - | > 35 dB |
| Common-mode rejection | - | ••••• | 100 dB | <u>.</u> |
| Output circuits - Analog outputs D-F, A- | | | rrent | Voltage |
| Output signal | 0-20 mA, 4 | 1-20 mA | | 0-5 V, 0-10 V |
| Output burden | ≤ 500 Ω | | | ≥1.0 KΩ |
| Accuracy 1) | ± 0.5 % of | full-scale | | |
| Residual ripple | < 0.5 % | | | |
| Response time | 200 µs | •••• | 10 ms | |
| Transmission frequency | 2 kHz | • | 80 Hz | 2 Hz (up to -3 dB) |
| Reaction to input circuit interruption | | | High fail safe: Output vo | Itage > 115 % of |
| | | | measuring range 2) | |
| | | | Low fail safe: Output vo | oltage < -0.6 V, output |
| Supply circuits K- | N/I | DC versions | current = 0 mA | AC versions |
| Supply voltage | 24 V DC | DO VEISIONS | • | 110-240 V AC - 50/60 Hz |
| Supply voltage tolerance | -15+15 % | ······································ | ••••• | -15+10 % |
| Power consumption | 1.5 W typ. | ć . | · - | 1.5 VA typ. |
| Indication of operational states | , | | | |
| Rated control supply voltage U _s | U: green L | ED | | |
| General data | | | | |
| Ambient temperature rangeoperation / storage | 0+60 °C | / -20+80 °C | | |
| Temperature coefficient | ± 500 ppm | n/°C | | |
| Degree of protection (DIN 40050) | IP20 | | . ************************************* | ••••• |
| Mounting position | ventilation | slots on top a | and bottom | |
| Mounting | DIN rail (IE | C/EN 60715), | snap-on mounting | |
| Electrical connection | | | | |
| | | (24-12 AWG) | | |
| fine-strand with(out) wire end ferru | le 0.2-2.5 mn | n² (24-14 AWC | <u>3)</u> | |
| Stripping length | 0.5 Nm (4. | 3 inch) | | |
| Tightening torque Electromagnetic compatibility | U.5 NIII (4.4 | 4 (0.11) | | |
| Interference immunity | EN 61000- | .6-2 | | |
| electrostatic discharge (ESD) IEC/EN 61000-4 | | | • | |
| electromagnetic field(HF radiation IEC/EN 61000-4 | -3 10 V/m | | • | |
| resistance) | | ···· | | |
| fast transients (Burst) IEC/EN 61000-4 | | | | |
| powerful impulses (Surge) IEC/EN 61000-4 | | kV | ••••• | |
| HF line emission IEC/EN 61000-4 | | ···• | | |
| Interference emission EN 61000-6 Isolation data | -4 Class B | | | |
| Test voltage between all isolated circuits | 2.5 kV AC | | | |
| Rated insulation voltage | - KV AO | | ;_ | |
| Tatoa modiation voltago | | | : | : |

¹⁾ Includes non-linearity and factory setting, influenced by supply voltage and output load.

Approvals see "Overview" on page 4/3

²⁾ Only -/RTD and -/TC: Single-function devices respond with Low fail safe to input signal interruptions.

³⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

Analog signal converters - CC-E range Technical data

| Туре | CC-E I/I-1 / CC-E I/I-2 |
|---|--|
| Input circuits - Analog inputs | Current |
| Input current I _{IN} | 0-20 mA, 4-20 mA |
| Min. input current | < 100 μΑ |
| Max. input current | 50 mA ¹⁾ (V _{IN} < 18 V) |
| Input voltage U _{IN} | $< 2.5 \text{ V} + (I_{\text{IN}} \times R_{\text{I}})$ |
| Input voltage drop U | · · · · · · · · · · · · · · · · · · · |
| | $< 2.5 \text{ V} (20 \text{ mA}, \text{RL} = 0 \Omega)$ |
| Max. input voltage Output circuits | [18 V ¹⁾ (I _{IN} < 50 mA) |
| Output current I _{out} | 0-20 mA, 4-20 mA |
| Output load R ₁ | 0-500 Ω |
| Output voltage U _{OUT} | I _{out} x RL |
| Residual ripple | |
| Response time (0-100 %) | < 20 mV _{pp} (500 Ω, 20 mA) |
| Response time (0-100 %) | < 15 ms (0-500 Ω, 20 mA), < 5 ms (500 q, 20 mA, 25 °C) |
| Accuracy | ≤ 0.1 % of full-scale (20 mA) |
| Load influence (0-500 Ω) | $\leq \pm 0.05 \% / 100 \Omega$ |
| | $\leq -0.1 \% / 100 \Omega (25 °C)$ |
| General data | |
| Width of the enclosure | 18 mm |
| Weight 1 channe | approx. 0.037 kg (0.082 (0.181) lb) approx. 0.044 (0.097) kg (0.097 lb) |
| Mounting position | any |
| Degree of protection enclosure / terminals | IP20 / IP20 |
| Ambient temperature range operation / storage | e-25+60 °C / -40+85 °C |
| Temperature coefficient | < ±50 ppm / °C |
| Mounting | DIN rail (IEC/EN 60715) |
| Electrical connection Wire size rigic | 1 0.2-4 mm² (24-12 AWG) |
| fine-strand with(out) wire end ferrule | e 0.2-2.5 mm² (24-14 AWG) |
| Stripping length | 7 mm (0,28 inch) |
| Tightening torque | 0.5 Nm (4.4 lb.in) |
| Standards | JEN 50470 |
| Product standard | EN 50178 2006/95/EC |
| Low Voltage Directive EMC Directive | 2006/95/EC 2004/108/EC |
| Electromagnetic compatibility | 2004/100/20 |
| Interference immunity | EN 61000-6-2 |
| electrostatic discharge (ESD) EN 61000-4-2 | Level 3 (±6 kV / ±8 kV) |
| electromagnetic field (HF radiation EN 61000-4-3 | 3 10 V/m |
| resistance) | Level 3 (±2 kV / 5 kH) |
| | Level 3 (±2 kV / 5 kn) ±2 kV / ±1 kV |
| HF line emission EN 61000-4-6 | |
| magnetic fields EN 61000-4-8 | 30 A/m |
| Interference emission | EN 61000-6-4 |
| Radiated noise EN 55011 | |
| Operational reliability (EN 68-2-6) Mechanical resistance (EN 68-2-6) | 4 g 10 g |
| Environmental testing (IEC 68-2-30 Db) | 10 9 |
| Isolation data | 12 0,0.0,00 0,00 /0 10.1,00 /1 |
| Insulation voltage input / output | 500 V _{off} / 50 Hz |
| Insulation voltage between channels | 5 kV _{eff} 50 Hz (device with 2 channels) |
| Pollution category | 2 |
| Overvoltage category | <u> II </u> |

 $^{^{\}rm p}$ The input parameters have to be limited to the indicated maximum values. Approvals see "Overview" on page 4/3

Analog signal converters - CC-E range Technical data

| Туре | CC-E/I | | CC-E I _{AC} /ILPO |
|--|-----------------------------------|---|--|
| | | Ģ-H | C-D |
| Input circuits - Analog inputs | AC current | DC current | 2 meas. ranges selectable |
| Rated input range | 0-5 A / 0-20 A | 0-5 A / 0-20 A | 0-1 A / 0-5 A / sinusoidal |
| Measuring frequency | | • | 50/60 Hz |
| Overload capacity of inputs input range 1 | 10 x I _{Nom} (50 A) for | max. 1 s | 10 x I _{Nom} (50 A) for max. 2 s |
| input range 2 | 10 x I _{Nom} (200 A) for | or max. 1 s | 10 x I _{Nom} (200 A) for max. 2 s |
| Gain adjustment range | ±5 % (universal de | evices) | :- Nom. \ / |
| Offset adjustment range | ±5 % (universal de | | ;= |
| Input impedance / resistance | 5A : 65 mΩ | 20 A : 2.5 mΩ | 5 m Ω |
| Output circuits - Analog outputs | D-F Current | A-C Voltage | F-E passive current output in pro- |
| | | · | |
| Output signal | 0-20 mA / | | portion to input current |
| Output signal | 4-20 mA | 0-10 V | 4-20 mA |
| Output burden / load | 14-20 IIIA | | 12 V DC: 150 Ω . |
| Output burden / load | ≤ 500 Ω | ≥ 1.0 Ω | 24 V DC: 750 Ω |
| | _ 000 12 | _ 1.0 12 | 30 V DC: 1050 Ω |
| Accuracy 1) | ± 2 % of full-scale | ; | ••••••••••••••••••••••••••••••••••••••• |
| Offset adjustment range | ±5 % (universal de | ************************************ | ± 5 % |
| Gain adjustment range | ±5 % (universal de | | ± 5 % ± 20 % |
| Residual ripple | < 0.5 % | • | |
| Response time | 0.5 s | | 0.6 s |
| Transmission frequency | DC or 50/60 Hz | *************************************** | AC: 50/60 Hz |
| Reaction to input circuit interruption | Low fail safe: outp | out voltage | |
| | < 200 mV, output current < 400 μA | | |
| Supply circuits K-M | DC versions | AC versions | |
| Supply voltage | 24 V DC | 110-240 V AC 50/60 Hz | 12-30 V DC |
| Supply voltage tolerance | -15+15 % | -15+10 % | |
| , | | · | - |
| Power consumption Indication of operational states | typ 1.5 W | typ 1.5 VA | <u>:-</u> |
| Supply voltage | U: green LED | | <u> </u> |
| General data | Jo. green LLD | | <u>:-</u> |
| Ambient temperature rangeoperation / storage | 0+60 °C / -20 | +80 °C | -20+60 °C / -40+80 °C |
| | ± 500 ppm/°C | | 300 ppm/°C |
| Temperature coefficient Degree of protection (DIN 40050) | IP20 | • | |
| Mounting position | ventilation slots or | n top and bottom | |
| Mounting | | 0715), snap-on mo | ounting |
| Electrical connection | | | |
| Wire size rigid | 0.2-4 mm ² (24-12 | AWG) | |
| fine-strand with(out) wire end ferrule | 0.2-2.5 mm ² (24-1 | 4 AWG) | |
| Stripping length | 7 mm (0.28 inch) | • | |
| Tightening torque | 0.5 Nm (4.4 lb.in) | | |
| Electromagnetic compatibility | 1 | | |
| Interference immunity | EN 61000-6-2 | * · · · · · · · · · · · · · · · · · · · | |
| electrostatic discharge (ESD) IEC/EN 61000-4-2 | | 8 KV) | |
| electromagnetic field (HF radiation resistance) IEC/EN 61000-4-3 | | Lat IX | |
| fast transients (Burst) IEC/EN 61000-4-4 | Level 3 (±2 KV / 5 | <u>K□)</u> | |
| powerful impulses (Surge) IEC/EN 61000-4-5 | ±∠ KV / ±1 KV | • | |
| HF line emission IEC/EN 61000-4-6 | | *************************************** | |
| Interference emission EN 61000-6-4 | JUIASS B | | |
| Test voltage (between all isolated circuits) | 2.5 kV AC | | |
| Rated insulation voltage | 12.0 KV AU | • | 250 V AC |
| nated insulation voltage | | | :200 V /\O |

 $^{^{\}rm tj}$ Includes non-linearity and factory setting, influenced by supply voltage and output load. Approvals see "Overview" on page 4/3

Analog signal converters - CC-U range Overview

CC-U range

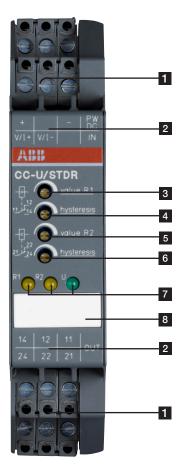
- 8 different standard signal outputs on one device
- Input and output side universally configurable
- Also available with 2 threshold relay outputs
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation
- Plug-in connecting terminals, unambiguously and clearly marked

Conversion, measurement and separation of

- Standard signals
- Signals of RTD sensors (PT10, PT100, PT1000)
- Thermocouple signals
- TRMS values of currents and voltages

Characteristics

- The required input and output ranges can be configured for all devices by means of directly accessible DIP switches positioned on the side.
- Due to the wide input range of the gain and offset stages all input signals between the minimum and the maximum input value can be universally converted to all common output signals.
- Devices for DC or AC (50/60 Hz) supply available.



- 1 Terminals +, V/I+, V/I-, PW DC, IN, -
- 2 Terminal explanation
- 3 Adjustment of resistance value R1
- 4 Adjustment of hysteresis
- 5 Adjustment of resistance value R2
- 6 Adjustment of hysteresis
- 7 Indication of operational states

R1 yellow LED - resistance value R1 R2 yellow LED - resistance value R2 U green LED - supply voltage

8 Marker label

Analog signal converters - CC-U range Overview

CC-U/STD universal signal converter with 3-way electrical isolation

- More than 120 configurations possible
- Configurable output signal response on input voltage signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- Very fast signal transmission enables use in control systems

CC-U/STDR universal signal converter for standard signals, with 2 threshold relay outputs and with 3-way electrical isolation

- Standard signal converter with 7 setting ranges
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relavs
- Plug-in connecting terminals for inputs, outputs and supply

CC-U/RTD universal signal converter for PT10, PT100, PT1000 temperature sensors (acc. to IEC 751 and JIS C 16041), linearized with 3-way electrical isolation)

- Configurable output signal response on input signal interruption (low / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

CC-U/RTDR universal signal converter for temperature and resistance signals, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for PT100 signals (5 ranges up to 800 °C) and variable resistances from 0-380 Ω
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

CC-U/TC universal signal converter for thermocouples with 3-way electrical isolation

- Temperature signal converter for thermo-couples of the types K, J, T, S, E, N, R, B
- Continuously adjustable voltage signal input 0-10 mV and 0-50 mV
- Differential temperature meas. possible (see "Wiring instructions" on page 20)
- Configurable output signal response on input signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- Cold-junction compensation selectable

CC-U/TCR universal signal converter for thermocouples, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for thermocouples of the types K, J, T, S
- 2 threshold relay outputs with one change-over contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply
- Integrated cold-junction compensation

CC-U/V universal measuring converter for RMS values of 0-600 V, with 3-way electrical isolation

- RMS converter for voltage signals up to 600 V of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

CC-U/I universal measuring converter for RMS values of 0-1 A and 0-5 A, with 3-way electrical isolation

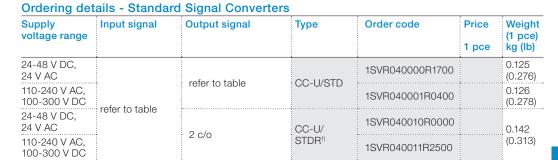
- RMS converter for current signals up to 1 A and up to 5 A of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

¹⁾ Japanese standard

Analog signal converters - CC-U range Ordering details



CC-U/STDR







| Supply voltage range | Input signal | Output signal | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|-------------------------------|----------------|----------------|-------------------------|-----------------|----------------|------------------------------|
| 24-48 V DC, 24 V AC | | rofor to table | CC-U/RTD | 1SVR040002R0500 | | 0.126 (0.278) |
| 110-240 V AC, 100-300 V DC | rofor to toblo | refer to table | CC-U/RTD | 1SVR040003R0600 | | 0.128 (0.282) |
| 24-48 V DC, 24 V AC | refer to table | 0 / | CC-U/RTDR ¹⁾ | 1SVR040012R2600 | | 0.146 (0.322) |
| 110-240 V AC, 100-300 V DC | | 2 c/o | OO-U/RTDR* | 1SVR040013R2700 | | 0.148 (0.326) |



CC-U/TC

| Ordering det | ails - Thermoc | ouple Converters |
|--------------|----------------|------------------|
| Supply | Input signal | Output signal |

| Supply voltage range | Input signal | Output signal | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) | |
|-------------------------------|--------------------------|---------------|------------------------------|-----------------|-----------------|------------------------------|------------------|
| 24-48 V DC, 24 V AC | | refer t | refer to table | er to table | 1SVR040004R0700 | | 0.130 (0.287) |
| 110-240 V AC, 100-300 V DC | rofor to toblo | | CC-U/TC | 1SVR040005R0000 | | 0.128 (0.282) | |
| 24-48 V DC, 24 V AC | 24 V AC 110-240 V AC, | 2.0/0 | CC LI/TCD1) | 1SVR040014R2000 | | 0.145 | |
| 110-240 V AC, 100-300 V DC | | 2 6/0 | 2 c/o CC-U/TCR ¹⁾ | | | (0.320) | |



CC-U/I

Ordering details - Measuring Converters

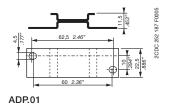
| Supply voltage range | Input signal | Output signal | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|-------------------------------|----------------|-------------------------|----------------------|-----------------|----------------|------------------------------|
| 24-48 V DC, 24 V AC | | | 00 11(12) | 1SVR040006R0100 | | 0.128 (0.282) |
| 110-240 V AC, 100-300 V DC | vofov to toble | to table refer to table | CC-U/I ²⁾ | 1SVR040007R0200 | | 0.127 (0.280) |
| 24-48 V DC, 24 V AC | reier to table | | CC 11/1/3) | 1SVR040008R1300 | | 0.128 |
| 110-240 V AC, 100-300 V DC | | | CC-U/V ³⁾ | 1SVR040009R1400 | | (0.282) |

¹⁾ with relay output

²⁾ for current RMS values

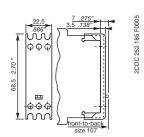
³⁾ for voltage RMS values

Analog signal converters - CC-U range Ordering details - Accessories



| For type | Width in mm | Туре | Order code | Price | Pkg qty | Weight (1 pce) g (oz) |
|----------|-------------|--------|-----------------|-------|------------|-----------------------------|
| CC-U | 22.5 | ADP.01 | 1SVR430029R0100 | | 1 | 18.4 (0.65) |
| CC-U | | MAR.01 | 1SVR366017R0100 | | 10 | 0.19 (0.007) |
| CC-U | 22.5 | COV.01 | 1SVR430005R0100 | | 1 | 5.2 (0.18) |





Sealable cover - COV.01

*) Detection of input signal interruptions: If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

Analog signal converters - CC-U range DIP switch settings

CC-U/STD

| Input | Г | | S | wit | ch | 1 | | | 0-1- | Coarse |
|-------------------|---|---|---|-----|----|---|---|---|------|--------|
| Input | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Gain | Type |
| Potentiometer | | | | | | | | | 0 | 0 |
| 050 mV | | | | | | | | | AD | С |
| 0100 mV | | | | | | | | | 45 | 5 |
| 0250 mV | | | | | | | | | 01 | 1 |
| 0500 mV | | L | | | | | | | 79 | 8 |
| 01 V | | L | | | | | | | 34 | 3 |
| 02.5 V | | L | | | | | | | 0 | 0 |
| 05 V | | | L | | | | | | 57 | 6 |
| 010 V | | | L | | | | | | 2 | 2 |
| 15 V | L | | | | | Щ | | | 79 | 8 |
| 2 10 V | | | | | | Ш | | | 24 | 3 |
| -10+10 V | | | | L | | | | | 0 | 0 |
| 0125 mV | | | | | | | | | 34 | 3 |
| 08 V | | | L | | | L | | | 34 | 3 |
| -22.5+22.5 mV | L | | L | Ш | | Ш | | | BF | D |
| -11+11 V | | | L | ╚ | | Ш | | | 0 | 0 |
| 2.57.5 V | | | | | | | | | 57 | 6 |
| 3.339.99 V | | | L | | | | | | 34 | 4 |
| 100 V | | | L | | | | | | 2 | 2 |
| 1000 mV | L | | | | | | | | 45 | 5 |
| 01 mA | | | | | | | | | AD | В |
| 020 mA | | L | | | | | | | 24 | 3 |
| 420 mA | | L | | | L | Ш | | | 45 | 4 |
| 1050 mA | | L | | | | | | | 01 | 1 |
| 204 mA | | | | Ш | | | | | 45 | 4 |
| 200 mA | | | | Ш | | | | | 42 | 3 |
| -0.45+0.45 mA | | | | | | | | | BF | D |
| -55+55 mA | | | | | | | | | 46 | 5 |
| High fail safe *) | | | | | | | | | - | - |
| Low faile safe *) | | | | L | | | | Ш | - | |
| No fail safe *) | | | Г | 1 | | | | | - | |

*) Detection of input voltage signal interruptions:

If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

If "No fail safe" is configured, input signal interruptions are not detected.

| Output | | | wit | | | |
|--------------|---|---|-----|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 05 V | | | | П | | Г |
| 010 V | | | | П | Ш | Г |
| 15 V | | | | | | |
| 210 V | | | | | | |
| -10+10 V | | | | | | |
| -5+5 V | | | | | | |
| -100 V | | | | | | |
| -50 V | | | | | | |
| 06.66 V | | | | | | |
| -10+3.33 V | | | | | | |
| -5+1.66 V | | | | | Ш | |
| 08 V | | | | | | |
| 04 V | | | | | | |
| -102 V | | | | | | |
| -51 V | Ĺ | | | | | |
| 1.256.25 V | | | | L | | |
| -7.5+2.5 V | | | | | | |
| -3.75+1.25 V | | | | | Ш | |
| 1.668.33 V | L | | | | Ш | |
| -6.66+6.66 V | | | | | | |
| -3.33+3.33 V | | | | | ш | |
| -80 V | | | | | | |
| -40 V | | | | | | |
| 01 mA | | | | | | |
| 020 mA | | | | | | L |
| 420 mA | | | | | | L |
| 010 mA | | | | L | | ш |
| 00.5 mA | | | | | | _ |
| 013.33 mA | | | | | ш | _ |
| 0666 µA | | | L | L | Ш | L |
| 016 mA | | | | | | |
| 0800 μΑ | | | | | | |
| 08 mA | | | | | | Ш |
| 0400 μΑ | | | | L | | _ |
| 2.512.5 mA | | L | | L | | |
| 125625 µA | | Ĺ | | L | | Ĺ |
| 3.3316.66 mA | | | L | L | | |
| 166833 µA | | | | | | L |
| 0.21 mA | L | | | | L | L |
| 210 mA | L | | | | | |
| 100500 μΑ | | | | | | |

| | F0204 |
|-----------|-------|
| | . 6 |
| egend | 282 |
| ON | 52 |
| OFF | 8 |
| influence | 2C |

CC-U/STDR with relay output

| Input | П | | Sw | itch | 1 | |
|--------------------------|---|---|----|------|---|---|
| liiput | 1 | 2 | 3 | 4 | 5 | 6 |
| 010 V | П | П | | | | П |
| 05 V | L | | | | | П |
| 01 V | П | Ш | | Г | Г | П |
| -10+10 V | П | П | | Г | Г | П |
| 15 V | | | | | | |
| 020 mA | | Ш | | | | |
| 420 mA | | L | | | | |
| Output | | | | | | |
| Closed-circuit principle | | | | | | |
| Open-circuit principle | | | | | | Г |

| | 282 003 F020 ² |
|--------------|---------------------------|
| Legend | 22 |
| ON | |
| OFF | 8 |
| no influence | SCI |
| | |

CC-U/RTD

| lı lı | nput | | S | wit | ch | 1 | | Switch 2 | | | | | | Gain |
|---------------|------------|---|---|-----|----|---|---|----------|---|---|---|---|---|-----------------------|
| Type | | | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | Coarse |
| | | | | | | | | | | | Ш | | | F |
| Type | | L | | | E | | | | | | | | | |
| | | | | | | | | | | | ┖ | | | D |
| PT10 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | В |
| | | | | | | | | | | | | | | Α |
| | | | | | | | | | | | | | | 9 |
| | | Ш | | Г | Г | | | | | | П | | | 9 8 F E B A 9 9 3 2 1 |
| | | Г | Ш | Г | Г | Г | | | | | Г | П | | |
| | | Г | | Г | Г | Г | | | | | П | | | E |
| | | Г | | Г | Г | Г | | | Г | | Г | | | В |
| | | Г | | Г | Г | Г | | | Г | | Г | | | A |
| DTIOO | 090 °C | Г | | Г | Г | Г | | | Г | | Г | | | 9 |
| P1100 | 0100 °C | Г | | | | П | | | Г | | П | | | 8 |
| | | | | | | | | | | | | | | |
| | | Г | Ш | Г | Г | | | | | | П | | | |
| | | | Ш | Г | Г | Г | | | | | Г | | | 1 |
| | 0500 °C | Г | Ш | Г | Г | Г | | | | | П | | | 0 |
| | 010 °C | Г | П | L | Г | Г | | Г | Г | Г | Г | | | 8 |
| | 020 °C | Г | П | | Г | Г | | Г | Г | Г | Г | | | 3 |
| | 030 °C | Г | П | | Г | Г | | Г | Г | Г | Г | | | 2 |
| PT1000 | 040 °C | Г | | | Г | Г | | Г | Г | Г | Г | П | | 1 |
| PT1000 030 °C | 0 | | | | | | | | | | | | | |
| | 060 °C | | | | | | | | | | | | | 0 |
| | il safe *) | | | | | | | | | | | L | | - |
| High fa | il safe *) | | | | | | | | | | | | | - |

| _ | | |
|---|--------------------|--|
| | | |
| | | |
| | | |
| | _ | |
| | 2CDC 282 023 F0203 | |
| | 023 | |
| | 282 | |
| | 8 | |
| | 1 (1) | |
| | | |

| Output | | S | Wil | ch | 3 | | | 4 |
|----------|---|---|-----|----|---|---|--------------|--------------------|
| output | 1 | 2 | 3 | 4 | 5 | 6 | | 2CDC 282 003 F0204 |
| 05 V | | | | | | | | 2 |
| 010 V | | | | | L | | | 8 |
| 15 V | L | | | | L | | Legend | 5 |
| 210 V | L | L | | | Г | Г | ON | 28 |
| 0+10 V | | | | | | | OFF | 8 |
| -5+5 V | | | | Ш | L | | no influence | Ι Ω |
| -100 V | | | | | | | | |
| -50 V | | | Ш | Ш | L | | | |
|)6.66 V | | | | | | | | |
|)+3.33 V | | | | | | | | |
| +1.66 V | | | | | L | | | |
| 08 V | П | L | | | Г | Г | | |
| 04 V | П | L | | П | L | Г | | |
| 102 V | П | Ш | | Ш | Г | Г | | |
| -51 V | т | 1 | | 1 | | Г | | |

CC-U/RTDR with relay output

| | | | Sw | itc | h | | 1 |
|--------------------------|---|---|----|-----|---|---|----|
| Input PT100 | 1 | 2 | 3 | 4 | 5 | 6 | |
| 0100 °C | | Г | П | Г | Г | Г | |
| 0200 °C | | | Г | | | | ١, |
| 0400 °C | | | Ш | | | | |
| 0600 °C | | | | | | | Ŀ |
| 0800 °C | | | | | | | L |
| Output | | | | | | | |
| Closed-circuit principle | | | | | | | L |
| Open-circuit principle | | Г | Г | | | | |



Analog signal converters - CC-U range DIP switch settings

CC-U/V

| Output | Г | | Sw | | | |
|--------------|---|-----|----|---|----|----|
| | 1 | 12 | 13 | 4 | 15 | 16 |
| 05 V | | | | | | |
| 010 V | Г | П | П | П | Ш | Г |
| 15 V | | | | Г | | Г |
| 210 V | | | | | | Г |
| -10+10 V | Г | Г | Г | Ш | г | Г |
| -5+5 V | Г | П | П | | | Г |
| -100 V | Г | | | | Г | Г |
| -50 V | Г | П | | | | Г |
| 06.66 V | Г | | | | | Г |
| -10+3.33 V | Г | | Г | | г | Г |
| -5+1.66 V | Т | | Г | | | Т |
| 08 V | Г | | | П | | Г |
| 04 V | Г | | | Т | | Г |
| -102 V | Г | | Ĺ | | Г | Г |
| -51 V | Г | | | | | Г |
| 1.256.25 V | | Г | | Т | | Т |
| -7.5+2.5 V | | | | | г | Т |
| -3.75+1.25 V | | г | | | | Т |
| 1.668.33 V | | | Г | | | Г |
| -6.66+6.66 V | | | Г | | г | Г |
| -3.33+3.33 V | П | | Г | | | Т |
| -80 V | | | | | Г | Т |
| -40 V | | | İ | | | Г |
| 01 mA | Г | Г | | | | Г |
| 020 mA | Г | Т | Г | П | | |
| 420 mA | П | | | Т | Т | |
| 010 mA | Г | | | | | |
| 00.5 mA | Г | Т | | Т | | Г |
| 013.33 mA | Г | | Г | | | |
| 0666 µA | Г | | Г | П | | Г |
| 016 mA | Т | | | Т | Г | |
| 0800 μΑ | Г | | | | | Т |
| 08 mA | Г | П | ĺ | Т | | |
| 0400 μA | Г | | | | | Г |
| 2.512.5 mA | | | | П | | |
| 125625 µA | П | г | | Т | | Т |
| 3.3316.66 mA | | | | Т | | |
| 166833 μA | | П | Г | Т | | Г |
| 0.21 mA | | | | Г | T | Т |
| 210 mA | | | j_ | Т | | |
| 100500 μA | | i i | Ì | т | | т |

Legend
ON
OFF
no influence

CC-U/TC

| Output | Г | | | tch | | |
|--------------|---|---|---|---------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 05 V | | | | | | |
| 010 V | | | | | | |
| 15 V | | | | | | |
| 210 V | | | Ш | | | |
| -10+10 V | | | | | | |
| -5+5 V | | | | | | |
| -100 V | | | Ш | Ш | | |
| -50 V | | | | ш | | Ш |
| 06.66 V | | | | _ | | |
| -10+3.33 V | | | | | | |
| -5+1.66 V | | | L | | | |
| 08 V | | | Ш | | | |
| 04 V | | | Ш | | L | |
| -102 V | | | | | | Ш |
| -51 V | | | | | | Ш |
| 1.256.25 V | Ш | | | _ | | Ш |
| -7.5+2.5 V | | | ш | | | |
| -3.75+1.25 V | | | | | | |
| 1.668.33 V | | | | | | |
| -6.66+6.66 V | | | | | L | Ш |
| -3.33+3.33 V | | | | | L | |
| -80 V | | | | | _ | Ш |
| -40 V | | | | | | Ш |
| 01 mA | | L | | ┖ | | Ш |
| 020 mA | | L | L | | | Ш |
| 420 mA | | | ш | | | ш |
| 010 mA | | | | | | |
| 00.5 mA | | | ш | | | Ш |
| 013.33 mA | | | | | | Ш |
| 0666 μA | | | L | | | Ш |
| 016 mA | L | | | ┖ | L | Ш |
| 0800 μΑ | L | | | ╙ | L | Ш |
| 08 mA | L | | | ╙ | L | |
| 0400 μΑ | L | | | \perp | L | Ш |
| 2.512.5 mA | | | | | L | Ш |
| 125625 μA | | L | | | | ╚ |
| 3.3316.66 mA | | | | | L | |
| 166833 μA | | | L | | | Ш |
| 0.21 mA | | | | L | Ĺ | Ш |
| 210 mA | Ĺ | | | ╙ | L | |
| 100500 μA | | | | L | | Ш |

| | Input | | | Switch 1 | | | | | | Switch 2 | | | | | | |
|-------------------|--------------|---|---|----------|---|---|---|---|---|----------|---|---|---|--|--|--|
| Type | Range | | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | | | |
| | 0-100900 °C | Г | ╙ | Г | L | Г | | | | П | П | | Г | | | |
| K | 0-2501350 °C | Г | ╙ | Г | L | Г | | | | П | П | ш | Г | | | |
| J | 0-100750 °C | ш | Г | Г | Г | Г | Г | | | П | П | | Г | | | |
| - | 0-100400 °C | Г | | | Г | Г | Г | | | | П | | Г | | | |
| Т | -150-0400 °C | Г | | | Г | Г | Г | | | | | П | Г | | | |
| S | 0-2501550 °C | Г | | | Г | | | Г | | | | | Г | | | |
| _ | 0-100700 °C | Г | | | | П | | | | | | | Г | | | |
| E | 0-2001000 °C | П | | | | | | | | | | | Г | | | |
| | 0-100650 °C | П | | | | | | | | | | | Г | | | |
| N | 0-2001300 °C | Г | | | Г | | | | | | | | Г | | | |
| R | 0-2501350 °C | Г | | | | | | | | Г | П | | Г | | | |
| n | 0-4501700 °C | Г | | | | | | Г | | Г | П | | Г | | | |
| В | 0-7001750 °C | Г | | | | | | Г | Г | Г | П | | Г | | | |
| | 0-210 mV | Г | | | | | | Г | Г | | | | Г | | | |
| mV | 0-1050 mV | Г | | | | | | Г | | | | | Г | | | |
| Low fail safe *) | | | | П | П | П | | Г | | | П | | | | | |
| High fail safe *) | | | | | | | | | | | | | Г | | | |

*) Detection of input signal interruptions:

If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

CC-U/I

| Output | | | SW | ILC | П | | |
|--------------|---|---|----|-----|---|----|--|
| | 1 | 2 | 3 | 4 | 5 | 16 | |
| 05 V | | | | | | П | |
| 010 V | П | Г | Г | Г | | П | |
| 15 V | | | | | | П | |
| 210 V | | | | Г | Г | П | |
| -10+10 V | | | Г | | | П | |
| -5+5 V | Т | П | Г | | | П | |
| -100 V | П | | | | П | П | |
| -50 V | Г | Г | | | | П | |
| 06.66 V | Г | Ш | Г | Г | | П | |
| -10+3.33 V | П | | П | | П | П | |
| -5+1.66 V | Г | | Г | | | П | |
| 08 V | | | | Г | | П | |
| 04 V | Г | | | Г | | П | |
| -102 V | | | | | | | |
| -51 V | Г | | | | | П | |
| 1.256.25 V | Ш | | L | | L | П | |
| -7.5+2.5 V | Ш | | L | L | П | П | |
| -3.75+1.25 V | | | | | | | |
| 1.668.33 V | L | Ш | | | L | | |
| -6.66+6.66 V | Ш | Ш | | L | L | | |
| -3.33+3.33 V | | | L | L | | Ш | |
| -80 V | | | L | | ┖ | Ш | |
| -40 V | | ш | L | _ | L | Ш | |
| 01 mA | | | | | | Ш | |
| 020 mA | L | L | L | L | L | ш | |
| 420 mA | | | | | _ | Ш | |
| 010 mA | | | L | L | ш | _ | |
| 00.5 mA | L | L | L | | L | Ш | |
| 013.33 mA | ╙ | 븯 | L | L | L | _ | |
| 0666 µA | ╙ | Н | | L | | ш | |
| 016 mA | ╙ | Щ | L | | ╙ | _ | |
| 0800 μΑ | ╙ | Н | L | L | _ | ш | |
| 08 mA | ╙ | Ш | L | | L | _ | |
| 0400 μA | _ | ш | H | L | H | ш | |
| 2.512.5 mA | | ╙ | Ŀ | L | | | |
| 125625 μA | H | _ | | L | H | | |
| 3.3316.66 mA | H | | L | L | | | |
| 166833 μA | | | _ | H | | Н | |
| 0.21 mA | H | | H | H | L | | |
| 210 mA | | | H | L | | | |
| 100500 μA | | | | _ | | Ш | |

Legend ON OFF

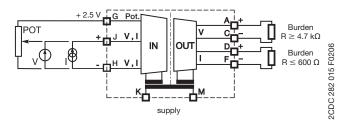
CC-U/TCR with relay output

| | | _ | | | | | _ | |
|-------|---------------------|---|---|----|-----|---|---|-----|
| | Input | | | Sw | itc | h | | |
| Type | Range | 1 | 2 | 3 | 4 | 5 | 6 | |
| | 0240 °C | П | П | | | | П | |
| J | 0480 °C | П | | | | | | |
| | 01200 °C | | | | | | | |
| | 0250 °C | | | | | | | |
| K | 0500 °C | | | | | | | |
| | 01350 °C | | Т | | | Г | | |
| | -150+120 °C | | Т | | | | П | |
| Т | 0220 °C | | Г | П | | Г | П | |
| | 0400 °C | | Г | | | Г | П | |
| | 0210 °C | П | | | | | | |
| s | 0380 °C | | | | | | | 1 8 |
| 3 | 0860 °C | | | ì | | | | |
| | 01550 °C | | | | | | | 1 8 |
| | Output | | | | | | | |
| Close | d-circuit principle | | | | | Г | | 1 6 |
| Open | -circuit principle | | П | | | П | П | 1 8 |

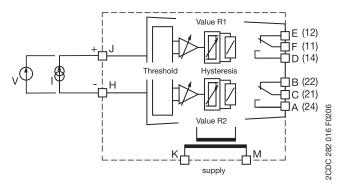
egend
ON
OFF
Dinfluence

Analog signal converters - CC-U range Wiring instructions

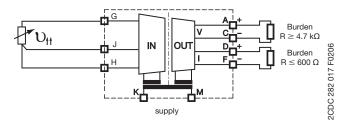
CC-U/STD



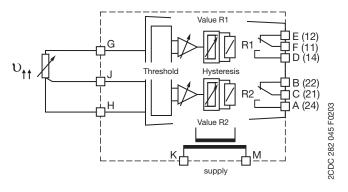
CC-U/STDR with relay output



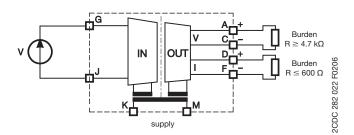
CC-U/RTD



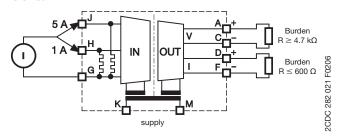
CC-U/RTDR with relay output



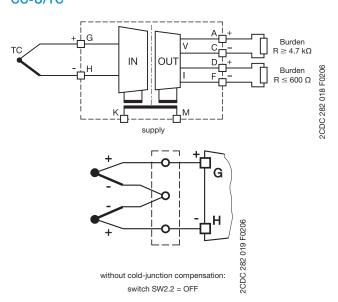
CC-U/V



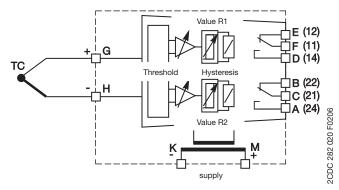
CC-U/I



CC-U/TC



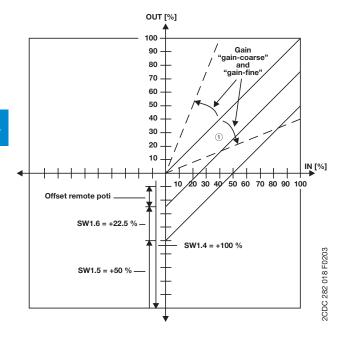
CC-U/TCR with relay output



Analog signal converters - CC-U range Technical information

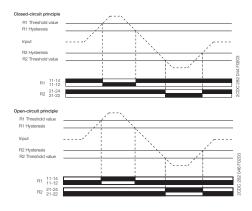
CC-U/STD

Adjustment range



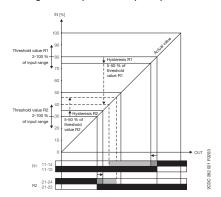
CC-U/STDR with relay output

Function diagrams



Switching points

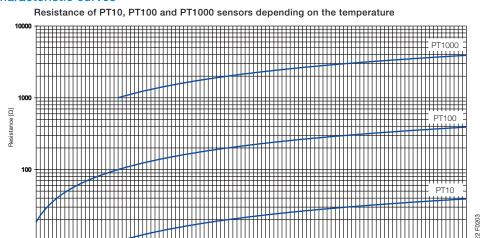
Switching points of the output relay depending on the input range, configuration open-circuit principle



Analog signal converters - CC-U range Technical information

CC-U/RTD

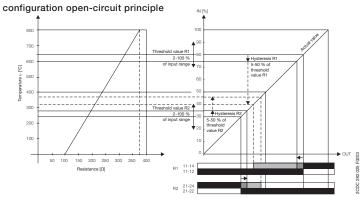
Characteristic curves



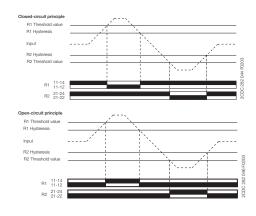
CC-U/RTDR with relay output

Switching points

Switching points of the output relay depending on the input range,



Function diagrams

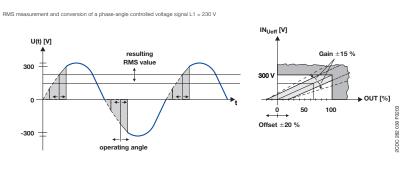


CC-U/V

Input range selection

| Selecting input range by | Switch | |
|--------------------------|----------|---------------|
| front-face rotary switch | position | |
| 0100 V | 1 | 4 |
| 0150 V | 2 | 020 |
| 0250 V | 3 | Ē |
| 0300 V | 4 | 5 |
| 0400 V | 5 | 282 012 F0204 |
| 0450 V | 6 | 5 |
| 0550 V | 7 | ODC |
| 0600 V | 8 | Ö |

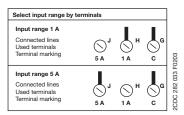
Example of application



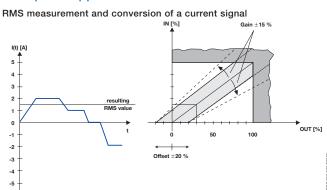
Analog signal converters - CC-U range Technical information

CC-U/I

Input range selection

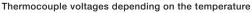


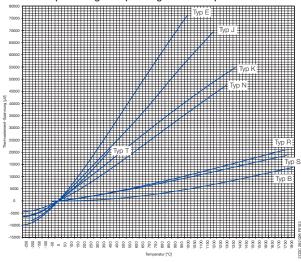
Example of application



CC-U/TC

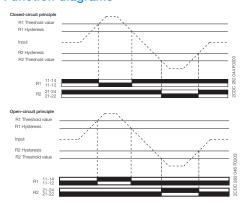
Characteristic curve





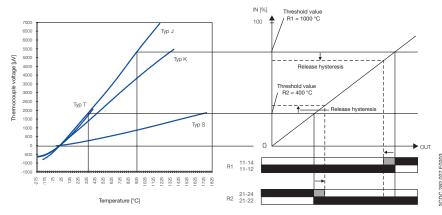
CC-U/TCR with relay output

Function diagrams



Switching points

Switching points of the output relay depending on the input range, configuration open-circuit principle



Analog signal converters - CC-U range Technical data

| Туре | | CC-U/STE |) | CC-U/RTD 3) | CC-U/TC | | | | |
|--|---|--------------|---------------------|---|---------------------------|--|--|--|--|
| Input circuits - Analog inputs J-G- | H Current | Voltage | Potentio- | Temperature sen- | Thermocouples | | | | |
| | | | meter | sors | (IEC 584-1 and 2) | | | | |
| Input signal | | 0-100 mV | | PT10, PT100, | TC.K TC.J | | | | |
| | 4-20 mA | | -1 MΩ ²⁾ | PT1000 | TC.T TC.S | | | | |
| | 10-50 mA 0-1 mA | 1-5 V | | (IEL 751 and JICC | TC.E TC.N TC.R TC.B | | | | |
| | 0-1 ma | 0-10 V | | 1604) | 10.R 10.B | | | | |
| | | 2-10 V | | | | | | | |
| | | ± 10 V | | | | | | | |
| Limitation of input signals | ± 55 mA | ± 11 V | | - | - | | | | |
| Rated input range | - | - | - | Max. temperature | refer to | | | | |
| | | | | adjustable: | temperature | | | | |
| | | | | 6-60 °C for PT1000 50-500 °C for PT100 | specs. of individual | | | | |
| | | | | 500-850 °C for PT10 | | | | | |
| Influence of line resistance | - | - | - | 0.015 °C/Ω | < 0.01 % / 100 Ω | | | | |
| Gain adjustment range | 0.9- | 45 mV - | - | see DIP switch setti | 4 | | | | |
| (universal devices) | 110 mA | | | | 9= | | | | |
| Offset adjustment range (universal devices) | -137.5+ | -62.5 % | ···· | ± 5 % | ± 10 % | | | | |
| Input impedance | for differ | ent ranges | •••••• | = | = | | | | |
| without detection of input signal interruption | 51 Ω | 6 ΜΩ | 3 G Ω | - | - | | | | |
| with detection of input signal interruption | 51 Ω | 3.5 MΩ | 9.5 G Ω | = | = | | | | |
| Suppression at 50 Hz | | - | - | - | > 40 dB | | | | |
| Common-mode rejection | | i - | i - | 120 dB | 105 dB | | | | |
| Output circuits - Analog outputs D-F, A- | | Cu | rrent | 120 02 | Voltage | | | | |
| Output signal | 🛊 | , 4-20 mA | | 0-5 V 1-5 V | /, 0-10 V, 2-10 V, ± 10 V | | | | |
| | | · | | | | | | | |
| Output burden | ≤ 600 Ω | | | ≥ 4.7 KΩ | | | | | |
| Accuracy 1) | ±0.1 % 0 | f full-scale | | | ±0.1 % of full-scale | | | | |
| Residual ripple | - | | · •• | < 0.15 % | = | | | | |
| Response time | 200 µs | | | 10 ms | 200 ms | | | | |
| Transmission frequency | 1 kHz | | | 80 Hz | 2 Hz (to -3 dB) | | | | |
| Supply circuits K- | 🚣 | . | ersions | | AC versions | | | | |
| Rated supply voltage | 24-48 V | | | 110-240 \ | | | | | |
| Supply voltage range | 24-48 V DC / 24 V AC 110-240 V AC / 100-300 V | | | | | | | | |
| Supply voltage tolerance | DC: -15 | .+15 % | | AC: -15 | +10 % | | | | |
| Rated frequency | 0 Hz or 50/60 Hz | | | | | | | | |
| Power consumption | 2 W at 24 V DC 4.5 VA at 230 V AC | | | | | | | | |
| Indication of operational states | | | | | | | | | |
| Supply voltage | U: green | LED | | | | | | | |
| General data | ' | | | | | | | | |
| Ambient temperature rangeoperation / storage | -20+60 | °C / -40 | +80 °C | | | | | | |
| Temperature coefficient | ±150 ppr | m/°C | | ±250 ppm/°C | ±200 ppm/°C at | | | | |
| ' | | | | | min. offset | | | | |
| | | | | | ±400 ppm/°C at | | | | |
| Mounting position | any | | | <u>:</u> | max. offset | | | | |
| Mounting position | DIN rail /IF | -C/FN 6071 | 5) snan-on | mounting / screw moun | ting with adapter | | | | |
| Mounting Electrical connection | DITATION (IL | | -,, σπαρ-011 I | | g with adapter | | | | |
| | d nlug-con | nector with | screw tor | minals 0.2-2.5 mm² (2 | 24-12 Δ\MG\ | | | | |
| | | | | minals 0.2-2.5 mm ² (2 | | | | | |
| fine-strand with(out) wire end ferru | 7 mm (0. | . | I SOIEW LEIT | ais 0.2-2.0 IIIIII (2 | 12 AVVU) | | | | |
| Stripping length | 1 | . | ••••• | ••••• | ••••• | | | | |
| Tightening torque | 0.4 Nm (| 3.5 ID.IN) | | | | | | | |
| Electromagnetic compatibility | EN 0100 | 0.00 | | | | | | | |
| Interference immunity | EN 6100 | . | | | | | | | |
| electrostatic discharge (ESD) IEC/EN 61000-4 | | ±6 kV / ±8 | KV) | | | | | | |
| electromagnetic field (HF radiation resistance) IEC/EN 61000-4 | | | | ·•···· | ······ | | | | |
| fast transients (Burst) IEC/EN 61000-4 | | ±2 kV / 5 k | H) | | | | | | |
| powerful impulses (Surge) IEC/EN 61000-4 | | | | | | | | | |
| HF line emission IEC/EN 61000-4 | 6 10 V | | | | | | | | |
| Interference emission EN 61000-6 | 4 Class B | | | | | | | | |
| Isolation data | | | | | | | | | |
| Isolation test (between all isolated circuits) | 1.5 kV | | | | | | | | |
| Test voltage (between all isolated circuits) | 1.5 kV / 8 | 50 Hz | | | | | | | |
| . 33t . 3.taga (battivaan an laalataa ah alita) | 1.010 | 00112 | | | | | | | |

 $^{^{\}mbox{\tiny 1)}}$ Includes non-linearity and factory setting, influenced by supply voltage and output load.

 $^{^{2)}}$ Detection of an input signal break (fail safe) and resistance > 10 k Ω results in a linearity of ± 0.2 %.

³⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

Approvals see "Overview" on page 4/3

Analog signal converters - CC-U range Technical data

| Туре | | | | /STDR | CC-U/RTDR 1) | CC-U/TCR | | | | | | |
|-------------------------------|---|--------------|---------------------------|------------------------|---|------------------------|--|--|--|--|--|--|
| Input circuits - Analog input | s | J-H | Current | Voltage | Temperature sensors | Thermocouples | | | | | | |
| | | | | | | (IEC 584-1 and 2 | | | | | | |
| Measuring signal / input rang | ge | | 0-20 mA | 0-1 V / | PT100 | TC.K, TC.J | | | | | | |
| | | | 4-20 mA | 1-5 V 0-10 / | | TC.T, TC.S | | | | | | |
| | | | | ±10 V | | | | | | | | |
| Input resistance | | | approx. | approx. | | | | | | | | |
| Adjustable threshold | | | 50 Ω 2-100 % of | 1.5 MΩ selected inp | i out range | | | | | | | |
| Adjustable hysteresis | | | 5-50 % of | | | | | | | | | |
| Repeat accuracy (constant p | parameters) | | ±0.5 % of f | . . | | | | | | | | |
| Output circuits - Relay outp | | D-F, B-C-A | | | | | | | | | | |
| Rated switching voltage | uto E-L | J-1, D-0-A | 250 V AC | | | | | | | | | |
| Rated switching current | AC-12 (resist | Hiva) 230 V | 4 A | | •••••• | | | | | | | |
| nated switching current | AC-12 (lesist | | 3 A | | | | | | | | | |
| | DC-12 (resi | | 4 A | | | | | | | | | |
| | DC-12 (resi | | | | | | | | | | | |
| AC rating | Utilization category (Control Circuit R | | B 300 | | | . | | | | | | |
| (UL 508) | max. rated operation | nal voltage | | | | ···• | | | | | | |
| . , | max. continuous thermal currer | | | | | | | | | | | |
| | | | ~ | | | | | | | | | |
| Minimum quitching valtage | max. making/breaking apparent pow | ver at B 300 | 12 V | * / t | | | | | | | | |
| Minimum switching voltage | ' nower | | 10 mA / 0.6 | 3 \/Δ (\Λ/) | · • · · · · · · · · · · · · · · · · · · | . | | | | | | |
| Minimum switching current / | power | | 10 ms | | · • · · · · · · · · · · · · · · · · · · | | | | | | | |
| Response time | | | | vitching cycl | | | | | | | | |
| Mechanical lifetime | at AC 10 | 000 \/ 4 A | | itching cycle | . . | | | | | | | |
| Electrical lifetime | at AO-12, | 230 V, 4 A | 0.1 10110. 30 | DC version | | AC versions | | | | | | |
| Supply circuits | | K-M | 24-48 V D0 | | 110-240 V | | | | | | | |
| Rated supply voltage | | | 24-48 V DC | | | AC / 100-300 V DC | | | | | | |
| Supply voltage range | | | DC: -15+ | | AC: -15+ | | | | | | | |
| Supply voltage tolerance | | | 0 Hz or 50 | . . | AU: -10+ | -1U 70 | | | | | | |
| Rated frequency | | | 2 W at 24 \ | | 4.5 VA at 2 | 000 V AC | | | | | | |
| Power consumption | | | 2 W at 24 V | / DC | 4.5 VA at a | 230 V AC | | | | | | |
| Indication of operational sta | ites | | III. auga a III | | | | | | | | | |
| Supply voltage | | | U: green LI | | llIED | | | | | | | |
| 1st / 2nd output relay energi | zed | | RI: yellow | LED / R2: ye | IIOW LED | | | | | | | |
| General data | | | 00 000 | 0 / 4000 | .00 | | | | | | | |
| Ambient temperature range | operation | n / storage | I | C / -40+80 | 1 10 | ···• | | | | | | |
| Temperature coefficient | | | ±300 ppm/ | | | . | | | | | | |
| Mounting position | | | any | /ENLCO745\ | non on mounting / | ounting with a deater | | | | | | |
| Mounting | | | rail (IEC | /⊑IN OU/ 15), S | nap-on mounting / screw m | louriting with adapter | | | | | | |
| Electrical connection | | | nlug san: | otor with | row torminals 0.0.0.5 | m2 (0.4 ±0, A\A\O\ | | | | | | |
| Wire size | E L - 0 / 0 / | | L.: | | rew terminals 0.2-2.5 mr | | | | | | | |
| Otologologo Ingrati | fine-strand with(out) wire | ena terrule | L.: | | rew terminals 0.2-2.5 mr | 11 (24-12 AVVG) | | | | | | |
| Stripping length | | | 7 mm (0.28 | . . | · • · · · · · · · · · · · · · · · · · · | . | | | | | | |
| Tightening torque | | | 0.4 Nm (3. | (ווו.מו כ | | | | | | | | |
| Electromagnetic compatibil | ity | | EN 64000 | 6.0 | | | | | | | | |
| Interference immunity | D) | | EN 61000- | | · • · · · · · · · · · · · · · · · · · · | <u>.</u> | | | | | | |
| electrostatic discharge (ES | | 61000-4-2 | 1 | kV / ±8 kV) | · •····· | | | | | | | |
| electromagnetic field (HF r | ······································ | 61000-4-3 | 10 V/m | 13775 | | | | | | | | |
| fast transients (Burst) | ······································ | 61000-4-4 | Level 3 (±2 | | | | | | | | | |
| powerful impulses (Surge) | | 61000-4-5 | ±2 kV / ±1 | KV | | | | | | | | |
| HF line emission | | 61000-4-6 | 10 V | | | <u>.</u> | | | | | | |
| Interference emission | EN | 61000-6-4 | Class B | | | | | | | | | |
| Isolation data | | | lo = · · · | | | | | | | | | |
| Insulation voltage (between | | | 2.5 kV | | | | | | | | | |
| Test voltage (between all iso | 1 1 1 1 1 1 1 | | 2.5 kV | | | | | | | | | |

 $^{^{\}rm 1)}$ When connecting a 2-wire sensor, the terminals J and H have to be jumpered. Approvals see "Overview" on page 4/3

Analog signal converters - CC-U range Technical data

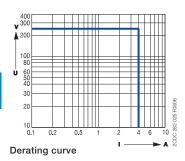
| Туре | | CC-U/I | CC-U/V | | | | | | |
|--|---------------------------|--|---|--|--|--|--|--|--|
| Input circuits - Analog inputs | J-G-H | any current signals, | any voltage signals, | | | | | | |
| | | RMS measurement | RMS measurement | | | | | | |
| Rated input range | | 0-1 A 0-5 A | 0-100 V, 0-150V, 0-250 V 0-300 V, 0-400 V, 0-450 V 0-550 V, 0-600 V | | | | | | |
| Measuring frequency | | 0-600 Hz | | | | | | | |
| Overload capacity of inputs | input range 1 | 10 x I _{Nom} (10 A) for max. 2 s | - | | | | | | |
| | input range 2 | | - | | | | | | |
| Gain adjustment range | | ±15 % | ······· | | | | | | |
| Offset adjustment range | ••••• | ±20 % | | | | | | | |
| Input impedance / resistance | | 1A: 60 mΩ, | > 800 kΩ | | | | | | |
| Output circuits - Analog outputs | D-F, A-C | 5 A: 12 mΩ Current | Voltage | | | | | | |
| Output signal | , - | 0-20 mA, 4-20 mA | 0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V | | | | | | |
| Output load | | ≤ 600 Ω | ≥ 4.7 KΩ | | | | | | |
| Accuracy ¹⁾ | | ±0.5 % of full-scale | <u>i</u> | | | | | | |
| Temperature coefficient | | ±250 ppm/°C max. | ±300 ppm/°C max. | | | | | | |
| Residual ripple | | < 0.15 % | ; · · · · · · · · · · · · · · · · · · · | | | | | | |
| Response time | | 150 ms | | | | | | | |
| Supply circuits | K-M | DC versions | AC versions | | | | | | |
| Rated supply voltage | IX-IVI | 24-48 V DC | 110-240 V AC | | | | | | |
| Supply voltage Supply voltage | <u>.</u> | 24-48 V DC, 24 V AC | 110-240 V AC, 100-300 V DC | | | | | | |
| | | DC: -15+15 % | AC: -15+10 % | | | | | | |
| Supply voltage tolerance | | 0 Hz or 50/60 Hz | 710. 10110 70 | | | | | | |
| Rated frequency | | 2 W at 24 V DC | 4.5 VA at 230 V AC | | | | | | |
| Power consumption | | 2 W at 24 V DO | 4.5 VA at 250 V AO | | | | | | |
| Indication of operational states | | U: green LED | | | | | | | |
| Supply voltage | | O. green LED | | | | | | | |
| General data | | -20+60 °C / -40+80 °C | | | | | | | |
| Ambient temperature range | operation / storage | <u> </u> | | | | | | | |
| Mounting position | | any DIN rail (IEC/EN 60715), snap-on mounting / screw mounting with adapter | | | | | | | |
| Mounting | | DIN Tall (IEO/EN 00/13), Shap-on me | Junting / Screw mounting with adapter | | | | | | |
| Electrical connection | of act at | plug-connector with screw termi | nals 0.2-2.5 mm2 (24.12 AWG) | | | | | | |
| Wire size | | • | | | | | | | |
| | ith(out) wire end ferrule | 7 mm (0.28 inch) | mais 0.2-2.5 mm2 (24-12 AVVG) | | | | | | |
| Stripping length | ····· | | | | | | | | |
| Tightening torque | | 0.4 Nm (3.5 lb.in) | | | | | | | |
| Standards | | | | | | | | | |
| Product standard | | - | . | | | | | | |
| Low Voltage directive | | 2006/95/EC | . | | | | | | |
| EMC directive | | 2004/108/EC | | | | | | | |
| RoHS directive | | 2011/65/EC | | | | | | | |
| Electromagnetic compatibility | | | | | | | | | |
| Interference immunity | <u>.</u> | EN 61000-6-2 | | | | | | | |
| electrostatic discharge (ESD) | IEC/EN 61000-4-2 | Level 3 (±6 kV / ±8 kV) | | | | | | | |
| electromagnetic field (HF radiation resistance) | IEC/EN 61000-4-3 | 10 V/m | | | | | | | |
| fast transients (Burst) | IEC/EN 61000-4-4 | Level 3 (±2 kV / 5 kH) | | | | | | | |
| powerful impulses (Surge) | IEC/EN 61000-4-5 | ±2 kV / ±1 kV | | | | | | | |
| HF line emission | IEC/EN 61000-4-6 | 10 V | | | | | | | |
| Interference emission | EN 61000-6-4 | Class B | | | | | | | |
| Isolation data | | | | | | | | | |
| Insulation voltage (between all isolated circuits) | | 1.5 kV | | | | | | | |
| Test voltage (between all isolated circuits) | | 1.5 kV / 50 Hz | | | | | | | |

¹⁾ Includes non-linearity and factory setting, influenced by supply voltage and output load. Approvals see "Overview" on page 4/3

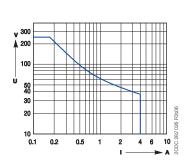
Analog signal converters - CC-U range Technical diagr., Connection diagr., Dimensional drawings

Technical diagrams Load limit curves CC-U/xxR

Resistive AC load

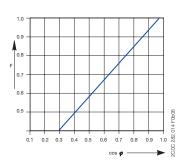


Resistive DC load

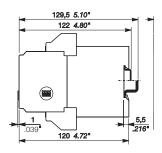


Connection diagram CC-U/x Width 22.5 mm (0.89 in)

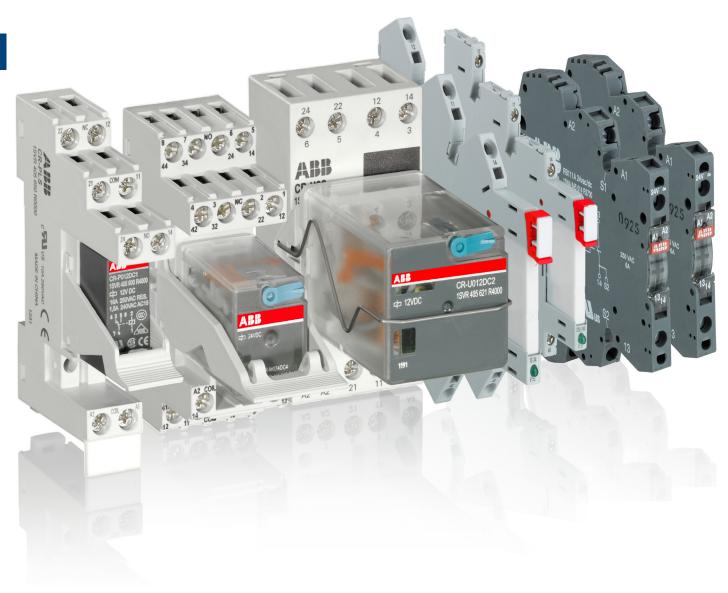




CC-U/x , CC-U/xR



Interface relays and optocouplers Product group picture

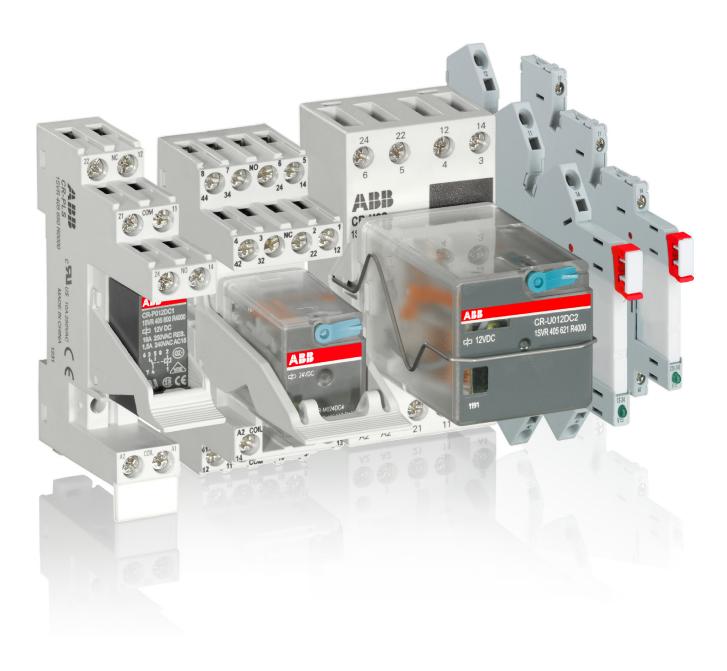


Interface relays and optocouplers Table of contents

Interface Relays and Optocouplers

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| Ordering details - CR-P range | 5/9 |
| Ordering details - CR-M range | 5/10 |
| Ordering details CR-P/M functional modules | 5/13 |
| Ordering details - CR-U range | 5/14 |
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| Technical data - Sockets for CR-P and CR-M | 5/19 |
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Pluggable interface relays Product group picture



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Pluggable interface relays

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| Ordering details - CR-U range | 5/14 |
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| Technical data - CR-S range sockets | 5/22 |
| Load limit curves | 5/23 |
| Connection diagrams | 5/24 |
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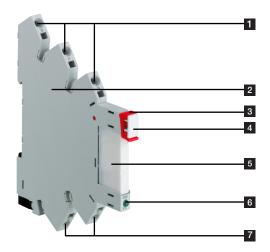
Pluggable interface relays Benefits and advantages

Slim relays CR-S

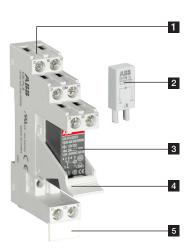
- Standard slim relays (5 mm), sockets (6.2 mm) and acces-
- Combination of 9 different rated control supply voltages
 - DC versions: 5 V, 12 V, 24 V
 - AC/DC versions: 12 V, 24 V, 48 V, 60 V, 110 V, 230 V
- Output: 1 c/o (SPDT) contacts (6 A), standard and goldplated contacts
- Cadmium-free contact material
- All sockets with LED
- Screw and spring connection terminals
- Jumper bar (red, black, blue), marker and separator available as accessories

Pluggable pcb relays CR-P

- 9 different coil voltages
 - DC versions: 12 V, 24 V, 48 V, 110 V
 - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts:
 - 1 c/o contact (16 A) or
 - 2 c/o contacts (8 A) optionally equipped with gold contacts
- Logical or standard sockets
- Cadmium-free contact material
- Width of socket: 15,5 mm
- Pluggable function modules
 - Reverse polarity protection/Free wheeling diode
 - LED indication
 - RC elements
 - Overvoltage protection



- 1 Output contacts
- 2 Socket
- 3 Relay holder
- 4 Marker
- 5 Interface relay
- 6 LED green: Control supply voltage applied
- Control supply voltage



- 1 Socket
- 2 Pluggable function module
- 3 Interface relay
- 4 Holder
- 5 Marker label

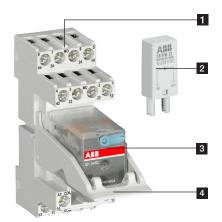
Pluggable interface relays Benefits and advantages

Pluggable miniature relays CR-M

- 2 different coil voltages
 - DC versions: 12 V, 24 V, 48 V, 60 V, 110 V, 125 V, 220 V
 - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts
 - 2 c/o contacts (12 A) or
 - 3 c/o contacts (10 A) or
 - 4 c/o contacts (6 A) optionally equipped with gold contacts, LED and free wheeling diode
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Logical or standard sockets
- Cadmium-free contact material
- Width on socket: 27 mm
- Pluggable function modules
 - Reverse polarity protection/Free wheeling diode
 - LED indication
 - RC elements
 - Overvoltage protection

Pluggable universal relays CR-U

- 12 different coil voltages
 - DC versions: 12 V, 24 V, 48 V, 110 V, 125 V, 220 V
 - AC versions: 24 V, 48 V, 60 V, 110 V, 120 V, 230 V
- Output contacts
 - 2 c/o contacts (10 A) or
 - 3 c/o contacts (10 A)
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Cadmium-free contact material
- Width on socket: 38 mm
- Pluggable function modules
 - Reverse polarity protection/Free wheeling diode
 - LED indication
 - RC elements
 - Overvoltage protection
 - Multifunction time module



- 1 Socket
- 2 Pluggable function module
- 3 Interface relay
- 4 Holder



- 1 Socket
- 2 Pluggable function module
- 3 Interface relay
- 4 Holder

Pluggable interface relays Approvals and marks

Kind of connecting terminals

Kinds of sockets

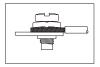
Standard sockets - Position of connecting terminals: Coil connection (A1-A2) on lower socket side, contact connections (n/o and n/c contacts) on the lower and upper socket side.

Logical sockets - Position of connecting terminals: Coil connection (A1-A2) on lower socket side, all contact connections (common contacts, n/o and n/c contacts) on upper socket side.

Details see connection diagrams







Screw type

Spring type

Fork type

Approvals and marks

| existingpending | | | Relays | | | | Sockets | | | | | | | Modi | ules |
|--|---------------------|------------|--------|-------------|-------------|--|-----------------|------------------------|--------|-----------------|--------|----------------|--------|--------|------------------------|
| Appro | vals | CR-S | CR-P | CR-M | CR-U | | CR-S sockets | CR-PLS CR-PSS | CR-PLC | CR-ML CR-MSS | CR-MSF | CR-US CR-UE | CR-USM | CR-P/M | CR-U |
| 712 | ANSI/UL 508 | • | • | • | • | | • | • | | • | | | | • | 6) |
| c % | CAN/CSA C22.2 No.14 | • | • | • | | | • | ■ ¹⁾ | | = 2) | • | 3) | • | • | ■ ⁶⁾ |
| ® | CAN/CSA C22.2 No.14 | • | • | • | • | | • | | | | | | | | |
| <u> </u> | VDE | 8) | • | 4) | • | | 8) | | | | | | | | |
| ERE | EAC | • | - | • | • | | • | • | | • | | • | • | • | • |
| Linear Li | Lloyds Register | | | 5) | • | | | | | | | | | | |
| (1) | CCC | | • | - | • | | | | | | | | | | |
| ©© | CQC | • | | | | | | | | | | | | | |
| ⊛ | RMRS | | • | a 7) | = 7) | | • | • | • | • | • | • | • | | |
| Marks | | | | | | | , | | | | | | | | |
| C€ | CE | • | • | • | • | | - | • | | • | | • | • | | • |

¹⁾ except CR-PLSx

²⁾ except CR-M...LC

³⁾ except CR-U3E

⁴⁾ except 125 V DC devices

⁵⁾ only devices with 4 c/o contacts

⁶⁾ except CR-U61D, CR-U61DV

⁷⁾ except 60 V and 125 V devices

⁸⁾ only relays and sockets with screw terminals

Pluggable interface relays Ordering details - CR-S range



CR-S

RS, SS = screw connection type RZ, SZ = spring connection type

Description

The pluggable interface relays of the CR-S Range are used for electrical isolation, amplification and signal matching between the electronic controlling, e.g. PLC, iPC or field bus systems and the sensor / actuator level. The CR-S Range combines the flexibility of a modular system and the ability of switching high currents on a small footprint thus can be used in applications where space saving is essential.

Ordering details - CR-S range pluggable interface relays

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|------------------------------|--|--------------------|---------------|-----------------|-------|------------|------------------------------|
| 5 V DC | 1 c/o (SPDT) standard contacts | | CR-S005VDC1R | 1SVR405501R1010 | | 4.7 | itg (ib) |
| 12 V DC | | | CR-S012VDC1R | 1SVR405501R2010 | | | 0.005 |
| 24 V DC | | 250 V, 6 A | CR-S024VDC1R | 1SVR405501R3010 | | 10 | 0.005 |
| 48 V DC | | | CR-S048VDC1R | 1SVR405501R4010 | | | (0.011) |
| 60 V DC | · | : | CR-S060VDC1R | 1SVR405501R5010 | | | |
| 5 V DC | *************************************** | | CR-S005VDC1RG | 1SVR405501R1020 | | | |
| 12 V DC | 1 c/o (SPDT) gold plated contacts | 12 V. | CR-S012VDC1RG | 1SVR405501R2020 | | | 0.005 |
| 24 V DC | | 250 mA | CR-S024VDC1RG | 1SVR405501R3020 | | 10 | 0.005 |
| 48 V DC | | (3W) ¹⁾ | CR-S048VDC1RG | 1SVR405501R4020 | | | (0.011) |
| 60 V DC | | | CR-S060VDC1RG | 1SVR405501R5020 | | | |

Ordering details - CR-S range complete interface relays (relay + socket)

| Rated control | Outputs | Contact | Type | Order code | Price | Pka | Weight | |
|----------------|--------------------------------|---------------------------------------|------------------|-----------------|-----------------|-----|--------------------|---------|
| supply voltage | · | ratings | | | | qty | (1 pce) kg (lb) | |
| 24 V AC/DC | | | CR-S024VADC1CRS | 1SVR405541R3110 | | | | |
| | 1 c/o | | CR-S024VADC1CRZ | 1SVR405541R3210 | | | | |
| 110 V AC/DC | (SPDT) standard contacts | 250 V. | CR-S110VADC1CRS | 1SVR405541R6110 | | 10 | 0.03 | |
| TTU V AC/DC | | standard | 6 A | CR-S110VADC1CRZ | 1SVR405541R6210 | | 10 | (0.066) |
| 230 V AC/DC | | | CR-S230VADC1CRS | 1SVR405541R7110 | | | | |
| 230 V AG/DG | | | CR-S230VADC1CRZ | 1SVR405541R7210 | | | | |
| 24 V AC/DC | | | CR-S024VADC1CRGS | 1SVR405541R3120 | | | : | |
| 24 V AC/DC | 1 c/o | | CR-S024VADC1CRGZ | 1SVR405541R3220 | | | | |
| 110 V AC/DC | (SPDT) | 12 V, | CR-S110VADC1CRGS | 1SVR405541R6120 | | 10 | 0.03 | |
| TTO V AC/DC | gold plated contacts | 12 V, 250 mA (3W) ¹⁾ | CR-S110VADC1CRGZ | 1SVR405541R6220 | | 10 | (0.066) | |
| 230 V AC/DC | | (011) | CR-S230VADC1CRGS | 1SVR405541R7120 | | | | |
| | | | CR-S230VADC1CRGZ | 1SVR405541R7220 | | | | |

¹⁾ If specified maximum values exceeded, the gold plating is destroyed. The maximum values of the standard contacts are then

Ordering details - CR-S range sockets

| Rated control supply voltage | Connection type | Туре | Order code | Price | Pkg | Weight (1 pce) |
|------------------------------|-----------------|--------------------|-----------------|-------|-----|-------------------|
| | | | | | qty | kg (lb) |
| 6-24 V DC | Screw | CR-S006/024VDC1SS | 1SVR405521R1100 | | | |
| | Spring | CR-S006/024VDC1SZ | 1SVR405521R1200 | | | 0.025 (0.055) |
| 12-24 V AC/DC | Screw | CR-S012/024VADC1SS | 1SVR405521R3100 | | | |
| | Spring | CR-S012/024VADC1SZ | 1SVR405521R3200 | | | |
| 48-60 | Screw | CR-S048/060VADC1SS | 1SVR405521R5100 | | | |
| V AC/DC | Spring | CR-S048/060VADC1SZ | 1SVR405521R5200 | | 10 | |
| 110-125 | Screw | CR-S110/125VADC1SS | 1SVR405521R6100 | | | |
| V AC/DC | Spring | CR-S110/125VADC1SZ | 1SVR405521R6200 | | | |
| 220-240 V AC/DC | Screw | CR-S220/240VADC1SS | 1SVR405521R7100 | | | |
| | Spring | CR-S220/240VADC1SZ | 1SVR405521R7200 | | | |

Ordering details - CR-S range accessories

| Version | Type | Order code | Price | Pkg | Weight |
|---------------------------------|----------------|-----------------|-------|-----|--------------------|
| | | | | qty | (1 pce) kg (lb) |
| Jumper bar 20 pole, blue color | CR-SJB20-BLUE | 1SVR405598R0700 | | | |
| Jumper bar 20 pole, red color | CR-SJB20-RED | 1SVR405598R0800 | | 10 | 0.008 (0.018) |
| Jumper bar 20 pole, black color | CR-SJB20-BLACK | 1SVR405598R0900 | | | |
| Marker block | CR-SM | 1SNB041391R0610 | | 10 | 0.0036 (0.0079) |
| Separator | CR-SSEP | 1SVR405599R0000 | | 10 | 0.012 (0.026) |

Pluggable interface relays Ordering details - CR-P range



Ordering details - CR-P range

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg | Weight (1 pce) |
|------------------------------|--------------|-----------------|------------|-----------------|-------|-----|-------------------|
| | | | | | | qty | kg (lb) |
| 12 V DC | | | CR-P012DC1 | 1SVR405600R4000 | | | |
| 24 V DC | | | CR-P024DC1 | 1SVR405600R1000 | | | |
| 48 V DC | | | CR-P048DC1 | 1SVR405600R6000 | | | |
| 110 V DC | | | CR-P110DC1 | 1SVR405600R8000 | | | |
| 24 V AC | 1 c/o (SPDT) | 250 V, 16 A | CR-P024AC1 | 1SVR405600R0000 | | 10 | 0.014 (0.031) |
| 48 V AC | | | CR-P048AC1 | 1SVR405600R5000 | | | (0.001) |
| 110 V AC | | | CR-P110AC1 | 1SVR405600R7000 | | | |
| 120 V AC | | | CR-P120AC1 | 1SVR405600R2000 | | | |
| 230 V AC | | | CR-P230AC1 | 1SVR405600R3000 | | | |
| 12 V DC | | | CR-P012DC2 | 1SVR405601R4000 | | | |
| 24 V DC | | | CR-P024DC2 | 1SVR405601R1000 | | | |
| 48 V DC | | | CR-P048DC2 | 1SVR405601R6000 | | | |
| 110 V DC | | | CR-P110DC2 | 1SVR405601R8000 | | | |
| 24 V AC | 2 c/o (SPDT) | 250 V, 8 A | CR-P024AC2 | 1SVR405601R0000 | | 10 | 0.014 (0.031) |
| 48 V AC | | | CR-P048AC2 | 1SVR405601R5000 | | - | (3.301) |
| 110 V AC | | | CR-P110AC2 | 1SVR405601R7000 | | | |
| 120 V AC | | | CR-P120AC2 | 1SVR405601R2000 | | | |
| 230 V AC | | | CR-P230AC2 | 1SVR405601R3000 | | - | |

Ordering details - CR-P range with gold contacts

| ordering detaile of a range with gold contacts | | | | | | | | | | |
|--|--------------|-----------------|-------------|-----------------|-------|-----|-------------------|--|--|--|
| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | | Weight (1 pce) | | | |
| | | | | | | qty | kg (lb) | | | |
| 24 V DC | | 250 V, 8 A | CR-P024DC2 | 1SVR405606R1000 | | 10 | 0.014 (0.031) | | | |
| 24 V AC | 2 c/o (SPDT) | | CR-P024AC2G | 1SVR405606R0000 | | | | | | |
| 110 V AC | gold contact | | CR-P110AC2G | 1SVR405606R7000 | | | | | | |
| 230 V AC | | | CR-P230AC2G | 1SVR405606R3000 | | | | | | |





Ordering details - Accessories

| Version | Connection terminal | Туре | Order code | Price | Pkg | Weight (1 pce) |
|--|---------------------|---------|-----------------|-------|-----|--------------------|
| | | | | | qty | kg (lb) |
| Logical socket with protective separation | screw | CR-PLS | 1SVR405650R0000 | | | 0.045 (0.099) |
| Logical socket | screw | CR-PLSx | 1SVR405650R0100 | | 10 | 0.043 (0.095) |
| | spring | CR-PLC | 1SVR405650R0200 | | 10 | 0.042 (0.093) |
| Standard socket | screw | CR-PSS | 1SVR405650R1000 | | | 0.038 (0.084) |
| Plastic holder for socket | | CR-PH | 1SVR405659R0000 | | 10 | 0.002 (0.004) |
| Jumper bar for sockets with screw connection | | CR-PJ | 1SVR405658R5000 | | 10 | 0.018 (0.040) |
| Marker | | CR-PM | 1SVR405658R0000 | | 10 | 0.0002 (0.0004) |

Pluggable interface relays Ordering details - CR-M range



Ordering details - CR-M range without LED

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg | Weight (1 pce) |
|------------------------------|--|------------------------|------------|-----------------|-------|-----|-------------------|
| | | | | | | qty | kg (lb) |
| 12 V DC | | | CR-M012DC2 | 1SVR405611R4000 | | | |
| 24 V DC | | | CR-M024DC2 | 1SVR405611R1000 | | | |
| 48 V DC | | | CR-M048DC2 | 1SVR405611R6000 | | | |
| 60 V DC | | | CR-M060DC2 | 1SVR405611R4200 | | | |
| 110 V DC | | | CR-M110DC2 | 1SVR405611R8000 | | | |
| 125 V DC | | | CR-M125DC2 | 1SVR405611R8200 | | | 0.033 |
| 220 V DC | 2 c/o (SPDT) | 250 V, 12 A | CR-M220DC2 | 1SVR405611R9000 | | 10 | (0.073) |
| 24 V AC | • | | CR-M024AC2 | 1SVR405611R0000 | | | |
| 48 V AC | • | | CR-M048AC2 | 1SVR405611R5000 | | | |
| 110 V AC | . * | | CR-M110AC2 | 1SVR405611R7000 | | | 7 |
| 120 V AC | | | CR-M120AC2 | 1SVR405611R2000 | | | |
| 230 V AC | • | | CR-M230AC2 | 1SVR405611R3000 | | | |
| 12 V DC | | | CR-M012DC3 | 1SVR405612R4000 | | | |
| 24 V DC | | | CR-M024DC3 | 1SVR405612R1000 | | | |
| 48 V DC | | | CR-M048DC3 | 1SVR405612R6000 | | | |
| 60 V DC | | | CR-M060DC3 | 1SVR405612R4200 | | | |
| 110 V DC | | | CR-M110DC3 | 1SVR405612R8000 | | | 0.033 (0.073) |
| 125 V DC | | c/o (SPDT) 250 V, 10 A | CR-M125DC3 | 1SVR405612R8200 | | | |
| 220 V DC | 3 c/o (SPDT) | | CR-M220DC3 | 1SVR405612R9000 | | 10 | |
| 24 V AC | | | CR-M024AC3 | 1SVR405612R0000 | | | |
| 48 V AC | | | CR-M048AC3 | 1SVR405612R5000 | | | |
| 60 V AC | | | CR-M060AC3 | 1SVR405612R5200 | | | |
| 110 V AC | | | CR-M110AC3 | 1SVR405612R7000 | | | |
| 120 V AC | | | CR-M120AC3 | 1SVR405612R2000 | | | |
| 230 V AC | | | CR-M230AC3 | 1SVR405612R3000 | | | : |
| 12 V DC | | | CR-M012DC4 | 1SVR405613R4000 | | | |
| 24 V DC | | | CR-M024DC4 | 1SVR405613R1000 | | | |
| 48 V DC | | | CR-M048DC4 | 1SVR405613R6000 | | | |
| 60 V DC | | | CR-M060DC4 | 1SVR405613R4200 | | | : |
| 110 V DC | | | CR-M110DC4 | 1SVR405613R8000 | | | |
| 125 V DC | 4 o/o (CDDT) | 050 \/ 6 ^ | CR-M125DC4 | 1SVR405613R8200 | | 10 | 0.033 |
| 220 V DC | 4 c/o (SPDT) | 250 V, 6 A | CR-M220DC4 | 1SVR405613R9000 | | 10 | (0.073) |
| 24 V AC | | : | CR-M024AC4 | 1SVR405613R0000 | | | : |
| 48 V AC | | | CR-M048AC4 | 1SVR405613R5000 | | | |
| 110 V AC | | | CR-M110AC4 | 1SVR405613R7000 | | | |
| 120 V AC | | | CR-M120AC4 | 1SVR405613R2000 | | | : |
| 230 V AC | ************************************** | | CR-M230AC4 | 1SVR405613R3000 | | | |

Pluggable interface relays Ordering details - CR-M range



CR-M

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg | Weight (1 pce) |
|------------------------------|--------------|-----------------|-------------|-----------------|-------|-----|-------------------|
| | | | | | | qty | kg (lb) |
| 12 V DC | | | CR-M012DC2L | 1SVR405611R4100 | | | |
| 24 V DC | | | CR-M024DC2L | 1SVR405611R1100 | | | |
| 48 V DC | | | CR-M048DC2L | 1SVR405611R6100 | | | 0.033 (0.073) |
| 60 V DC | | | CR-M060DC2L | 1SVR405611R4300 | | | |
| 110 V DC | | | CR-M110DC2L | 1SVR405611R8100 | | | |
| 125 V DC | | 250 V, | CR-M125DC2L | 1SVR405611R8300 | | | |
| 220 V DC | 2 c/o (SPDT) | 12 A | CR-M220DC2L | 1SVR405611R9100 | | 10 | |
| 24 V AC | | | CR-M024AC2L | 1SVR405611R0100 | | | |
| 48 V AC | | | CR-M048AC2L | 1SVR405611R5100 | | | |
| 110 V AC | | | CR-M110AC2L | 1SVR405611R7100 | | | : |
| 120 V AC | | | CR-M120AC2L | 1SVR405611R2100 | | | |
| 230 V AC | | | CR-M230AC2L | 1SVR405611R3100 | | | |
| 12 V DC | | | CR-M012DC3L | 1SVR405612R4100 | | | |
| 24 V DC | | | CR-M024DC3L | 1SVR405612R1100 | | | |
| 48 V DC | ** | | CR-M048DC3L | 1SVR405612R6100 | | | |
| 60 V DC | | | CR-M060DC3L | 1SVR405612R4300 | | | |
| 110 V DC | | 250 V, 10 A | CR-M110DC3L | 1SVR405612R8100 | | | |
| 125 V DC | | | CR-M125DC3L | 1SVR405612R8300 | | | 0.033 |
| 220 V DC | 3 c/o (SPDT) | | CR-M220DC3L | 1SVR405612R9100 | | 10 | (0.073) |
| 24 V AC | | | CR-M024AC3L | 1SVR405612R0100 | | | |
| 48 V AC | | | CR-M048AC3L | 1SVR405612R5100 | | | |
| 110 V AC | | | CR-M110AC3L | 1SVR405612R7100 | | | |
| 120 V AC | | | CR-M120AC3L | 1SVR405612R2100 | | • | |
| 230 V AC | | | CR-M230AC3L | 1SVR405612R3100 | | | - |
| 12 V DC | | | CR-M012DC4L | 1SVR405613R4100 | | | |
| 24 V DC | | | CR-M024DC4L | 1SVR405613R1100 | | | |
| 48 V DC | | | CR-M048DC4L | 1SVR405613R6100 | | • | |
| 60 V DC | | | CR-M060DC4L | 1SVR405613R4300 | | | |
| 110 V DC | | | CR-M110DC4L | 1SVR405613R8100 | | | |
| 125 V DC | | | CR-M125DC4L | 1SVR405613R8300 | | | 0.033 |
| 220 V DC | 4 c/o (SPDT) | 250 V, 6 A | CR-M220DC4L | 1SVR405613R9100 | | 10 | (0.073) |
| 24 V AC | - | | CR-M024AC4L | 1SVR405613R0100 | | | |
| 48 V AC | | | CR-M048AC4L | 1SVR405613R5100 | | | |
| 110 V AC | | | CR-M110AC4L | 1SVR405613R7100 | | • | |
| 120 V AC | | | CR-M120AC4L | 1SVR405613R2100 | | • | |
| 230 V AC | | | CR-M230AC4L | 1SVR405613R3100 | | • | : |

Ordering details - CR-M range with LED and free-wheeling diode

| ordering details of the range with EED and need wheeling drode | | | | | | | | | | |
|--|--------------|-----------------|--------------|-----------------|--|----|------------------------------|--|--|--|
| Rated control supply voltage | | Contact ratings | Туре | Order code | | | Weight (1 pce) kg (lb) | | | |
| 24 V DC | 4 c/o (SPDT) | 250 V, 6 A | CR-M024DC4LD | 1SVR405614R1100 | | 10 | 0.033 (0.073) | | | |

Ordering details - CR-M range with gold contacts

| Ordering detaile of the range with gold contacte | | | | | | | | | | |
|--|---------------|-----------------|-------------|-----------------|-------|----|------------------------------|--|--|--|
| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | | Weight (1 pce) kg (lb) | | | |
| 24 V DC | | 250 V, 6 A | CR-M024DC4G | 1SVR405618R1000 | | 10 | 0.033 (0.073) | | | |
| 24 V AC | 4 - /- (ODDT) | | CR-M024AC4G | 1SVR405618R0000 | | | | | | |
| 110 V AC | 4 c/o (SPDT) | | CR-M110AC4G | 1SVR405618R7000 | | | | | | |
| 230 V AC | | | CR-M230AC4G | 1SVR405618R3000 | | | | | | |

Pluggable interface relays Ordering details - CR-M range



Ordering details - CR-M range with gold contacts and LED

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg | Weight (1 pce) |
|------------------------------|--------------|-----------------|--------------|-----------------|-------|-----|-------------------|
| | | | | | | qty | kg (lb) |
| 12 V DC | | | CR-M012DC4LG | 1SVR405618R4100 | | | 0.033 (0.073) |
| 24 V DC | | | CR-M024DC4LG | 1SVR405618R1100 | | | |
| 48 V DC | | | CR-M048DC4LG | 1SVR405618R6100 | | 10 | |
| 60 V DC | | | CR-M060DC4LG | 1SVR405618R4300 | | | |
| 110 V DC | | | CR-M110DC4LG | 1SVR405618R8100 | | | |
| 125 V DC | 4 / (000) | 250 V / | CR-M125DC4LG | 1SVR405618R8300 | | | |
| 220 V DC | 4 c/o (SPDT) | 6 A | CR-M220DC4LG | 1SVR405618R9100 | | | |
| 24 V AC | | | CR-M024AC4LG | 1SVR405618R0100 | | | |
| 48 V AC | | | CR-M048AC4LG | 1SVR405618R5100 | | | |
| 110 V AC | • | | CR-M110AC4LG | 1SVR405618R7100 | | 10 | 0.033 |
| 120 V AC | • | | CR-M120AC4LG | 1SVR405618R2100 | | | (0.073) |
| 230 V AC | · · | | CR-M230AC4LG | 1SVR405618R3100 | | | |

Ordering details - CR-M range with gold contacts, LED and free-wheeling diode

| Rated control supply voltage | i e | Contact ratings | Туре | Order code | Price | | Weight (1 pce) kg (lb) |
|------------------------------|--------------|------------------|---------------|-----------------|-------|----|------------------------------|
| 12 V DC | 4 / (ODDT) | CR-M012DC4LDG 1S | | 1SVR405618R4400 | | 10 | 0.033 |
| 24 V DC | 4 c/o (SPDT) | | CR-M024DC4LDG | 1SVR405618R1400 | | 10 | (0.073) |





Ordering details - Accessories

| Version | Connection terminal | Type | Order code | Price | Pkg | Weight (1 pce) |
|--|---------------------|---------|-----------------|-------|-----|-------------------|
| | | | | | qty | kg (lb) |
| Logical socket for 2 c/o | | CR-M2LS | 1SVR405651R1100 | | | 0.055 (0.121) |
| Logical socket for 3 c/o | screw | CR-M3LS | 1SVR405651R2100 | | 10 | 0.062 (0.137) |
| Logical socket for 2/4 c/o | | CR-M4LS | 1SVR405651R3100 | | | 0.066 (0.146) |
| Logical socket for 2 c/o | | CR-M2LC | 1SVR405651R1200 | | 10 | 0.065 (0.143) |
| Logical socket for 2/4 c/o | spring | CR-M4LC | 1SVR405651R3200 | 10 | | 0.066 (0.146) |
| Standard socket for 2 c/o | | CR-M2SS | 1SVR405651R1000 | | | 0.066 (0.146) |
| Standard socket for 3 c/o | screw | CR-M3SS | 1SVR405651R2000 | | 10 | 0.068 (0.150) |
| Standard socket for 2/4 c/o | | CR-M4SS | 1SVR405651R3000 | | | 0.070 (0.154) |
| Standard socket for 2 c/o | | CR-M2SF | 1SVR405651R1300 | | 10 | 0.040 (0.088) |
| Standard socket for 2/4 c/o | fork type | CR-M4SF | 1SVR405651R3300 | | 10 | 0.048 (0.106) |
| Plastic holder | | CR-MH | 1SVR405659R1000 | | 10 | 0.003 (0.007) |
| Metal holder | | CR-MH1 | 1SVR405659R1100 | | 10 | 0.0005 (0.001) |
| Jumper bar for sockets with screw connection | | CR-MJ | 1SVR405658R6000 | | 10 | 0.029 (0.064) |
| Marker | | CR-MM | 1SVR405658R1000 | | 10 | 0.0005 (0.001) |

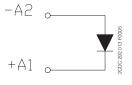
Pluggable interface relays Ordering details CR-P/M functional modules



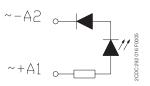
CR-P/M ...

| Rated control supply voltage | Description | Version | Type | Order code | Price | Pkg | Weight (1 pce) |
|--------------------------------------|---|-------------------------------------|-------------------------|-----------------|---------|---------|-------------------|
| | | | | | | qty | kg (lb) |
| 6-220 V DC | Diode - Reverse polarity protection/free wheeling diode | A1+, A2- | CR-P/M 22 | 1SVR405651R0000 | | 10 | 0.003 (0.007) |
| 6-24 V DC | | red, A1+, A2- | CR-P/M 42 | 1SVR405652R0000 | | | |
| 0-24 V DO | Diode and | green, A1+, A2- | CR-P/M 42V | 1SVR405652R1000 | | | |
| 24-60 V DC | LED - Reverse polarity | red, A1+, A2- | CR-P/M 42B | 1SVR405652R4000 | | 10 | 0.003 |
| 24-00 V DC | protection/free | green, A1+, A2- | CR-P/M 42BV | 1SVR405652R4100 | | 10 | (0.007) |
| 110-230 V DC | wheeling diode | red, A1+, A2- | CR-P/M 42C | 1SVR405652R9000 | | | |
| 110-230 V DC | | green, A1+, A2- | CR-P/M 42CV | 1SVR405652R9100 | | | |
| 6-24 V AC/DC | | | CR-P/M 52B | 1SVR405653R0000 | | | |
| 24-60 V AC/DC | Spark | | CR-P/M 52D | 1SVR405653R4000 | | 10 | 0.003 |
| 110-230 V AC/DC | quenching | uenching CR-P/M 52C 1SVR405653R1000 | | 10 | (0.007) | | |
| 6-24 V AC/DC | | red, for DC A1+, A2- | CR-P/M 62 | 1SVR405654R0000 | | | |
| 0-24 V AO/DO | | green, for DC A1+, A2- | CR-P/M 62V | 1SVR405654R1000 | | | |
| 24-60 V AC/DC | Diode, LED and AC/DC reverse polarity | red, for DC A1+, A2- | CR-P/M 62E | 1SVR405654R4000 | | 10 | 0.003 |
| | protection | green, for DC A1+, A2- | CR-P/M 62EV | 1SVR405654R4100 | | | (0.007) |
| 110 V DC | | red, for DC A1+, A2- | CR-P/M 92 | 1SVR405654R0100 | | | |
| 110-230 V AC | | green, for DC A1+, A2- | CR-P/M 92V | 1SVR405654R1100 | | | |
| 6-24 V AC/DC | | red, for DC A1+, A2- | CR-P/M 62C | 1SVR405655R0000 | | | |
| | | green, for DC A1+, A2- | CR-P/M 62CV | 1SVR405655R1000 | | | |
| 24-60 V AC/DC | Varistor and LED | red, for DC A1+, A2- | CR-P/M 62D | 1SVR405655R4000 | | 10 | 0.003 |
| 24-60 V AC/DC Overvoltage protection | green, for DC A1+, A2- | CR-P/M 62DV | 1SVR405655R4100 | | 10 | (0.007) | |
| 110 V DC | | | red, for DC A1+, A2- | | | | |
| 110-230 V AC | green, for DC A1+, A2- CR-P/M 92CV 1SVR405655R1100 | | | | | | |
| 24 V AC | | | CR-P/M 72 | 1SVR405656R0000 | | | 0.000 |
| 115 V AC | Overvoltage protection | | CR-P/M 72A | 1SVR405656R1000 | | 10 | (0.002 |
| 230 V AC | F. 0.000.0 | | CR-P/M 82 | 1SVR405656R2000 | | | (0.004) |

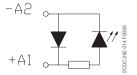
Connection diagrams



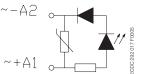
CR-P/M 22



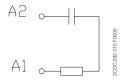
CR-P/M 62E, CR-P/M 62, CR-P/M 92, CR-P/M 62V, CR-P/M 62EV, CR-P/M 92V



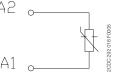
CR-P/M 42, CR-P/M 42B, CR-P/M 42C, CR-P/M 42V, CR-P/M 42BV, CR-P/M 42CV



CR-P/M 62C, CR-P/M 62D, CR-P/M 92C, CR-P/M 62CV, CR-P/M 72A, CR-P/M 62DV CR-P/M 92CV



CR-P/M 52B, CR-P/M 52C CR-P/M 52D,



CR-P/M 82 CR-P/M 72,

Pluggable interface relays Ordering details - CR-U range



Description

Interface relays are widely used in various industrial applications:

As an interface they link the electronic controlling, e.g. PLC (programmable logic controller), PC or field bus systems, to the sensor / actuator level. Here, they take on various functions: Switching of AC or DC loads with different resistive, inductive and capacitive parts, switching voltages from a few mV up to 250 V, switching currents from a few mA up to 16 A, amplification of weak control signals, electrical isolation of control and load circuits, and signal multiplying. In contrast to electronic switching devices, interface relays don't use additional internal protective circuits and thus are overload-proof against short-time variations like current or voltage peaks.

Ordering details - CR-U range without LED

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|------------------------------|--------------|-----------------|------------|-----------------|-------|------------|------------------------------|
| 12 V DC | | | CR-U012DC2 | 1SVR405621R4000 | | | |
| 24 V DC | ÷ | • | CR-U024DC2 | 1SVR405621R1000 | | | |
| 48 V DC | • | | CR-U048DC2 | 1SVR405621R6000 | | • | |
| 110 V DC | | | CR-U110DC2 | 1SVR405621R8000 | | | |
| 220 V DC | 0 / (ODDT) | 0501/ 40 4 | CR-U220DC2 | 1SVR405621R9000 | | | 0.083 |
| 24 V AC | 2 c/o (SPDT) | 250 V, 10 A | CR-U024AC2 | 1SVR405621R0000 | | 10 | (0.183) |
| 48 V AC | Ī | - | CR-U048AC2 | 1SVR405621R5000 | | | |
| 110 V AC | 1 | | CR-U110AC2 | 1SVR405621R7000 | | | |
| 120 V AC | : | | CR-U120AC2 | 1SVR405621R2000 | | | |
| 230 V AC | | | CR-U230AC2 | 1SVR405621R3000 | | | |
| 12 V DC | | | CR-U012DC3 | 1SVR405622R4000 | | | |
| 24 V DC | | | CR-U024DC3 | 1SVR405622R1000 | | | |
| 48 V DC | | | CR-U048DC3 | 1SVR405622R6000 | | | |
| 110 V DC | | | CR-U110DC3 | 1SVR405622R8000 | | | |
| 125 V DC | | | CR-U125DC3 | 1SVR405622R8200 | | | |
| 220 V DC | 3 c/o (SPDT) | 250 V, 10 A | CR-U220DC3 | 1SVR405622R9000 | | 10 | 0.083 |
| 24 V AC | 3 0/0 (3PD1) | 230 V, 10 A | CR-U024AC3 | 1SVR405622R0000 | | 10 | (0.183) |
| 48 V AC | | | CR-U048AC3 | 1SVR405622R5000 | | | : |
| 60 V AC | | | CR-U060AC3 | 1SVR405622R5200 | | | |
| 110 V AC | | | CR-U110AC3 | 1SVR405622R7000 | | | |
| 120 V AC | | | CR-U120AC3 | 1SVR405622R2000 | | | |
| 230 V AC | | | CR-U230AC3 | 1SVR405622R3000 | | | |

Ordering details - CR-U range with LED

| Rated control supply voltage | Outputs | Contact ratings | Туре | Order code | Price | Pkg | Weight (1 pce) |
|------------------------------|--------------|-----------------|-------------|-----------------|-------|-----|----------------|
| 117 | | | | | | qty | kg (lb) |
| 12 V DC | | | CR-U012DC2L | 1SVR405621R4100 | | | |
| 24 V DC | | | CR-U024DC2L | 1SVR405621R1100 | | | |
| 48 V DC | | | CR-U048DC2L | 1SVR405621R6100 | | | |
| 110 V DC | | | CR-U110DC2L | 1SVR405621R8100 | | | |
| 220 V DC | 2 c/o (SPDT) | 250 V, 10 A | CR-U220DC2L | 1SVR405621R9100 | | 10 | 0.083 |
| 24 V AC | 2 6/0 (3FD1) | 200 V, 10 A | CR-U024AC2L | 1SVR405621R0100 | | 10 | (0.183) |
| 48 V AC | | | CR-U048AC2L | 1SVR405621R5100 | | | |
| 110 V AC | | | CR-U110AC2L | 1SVR405621R7100 | | | |
| 120 V AC | | | CR-U120AC2L | 1SVR405621R2100 | | | |
| 230 V AC | | | CR-U230AC2L | 1SVR405621R3100 | | | |
| 12 V DC | | | CR-U012DC3L | 1SVR405622R4100 | | | |
| 24 V DC | | | CR-U024DC3L | 1SVR405622R1100 | | | |
| 48 V DC | | | CR-U048DC3L | 1SVR405622R6100 | | | |
| 110 V DC | | | CR-U110DC3L | 1SVR405622R8100 | | | |
| 220 V DC | 2 a/a (CDDT) | 050 \/ 10 A | CR-U220DC3L | 1SVR405622R9100 | | 10 | 0.083 |
| 24 V AC | 3 c/o (SPDT) | 250 V, 10 A | CR-U024AC3L | 1SVR405622R0100 | | 10 | (0.183) |
| 48 V AC | <i>†</i> | | CR-U048AC3L | 1SVR405622R5100 | | | |
| 110 V AC | | | CR-U110AC3L | 1SVR405622R7100 | | | |
| 120 V AC | | | CR-U120AC3L | 1SVR405622R2100 | | | |
| 230 V AC | T : | | CR-U230AC3L | 1SVR405622R3100 | | | |



| Version | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|-----------------------------|---------|-----------------|-------|------------|------------------------------|
| Socket for 2 c/o and module | CR-U2S | 1SVR405670R0000 | | | |
| Socket for 3 c/o and module | CR-U3S | 1SVR405660R0000 | | | |
| Socket for 3 c/o | CR-U3E | 1SVR405660R0100 | | | |
| Socket small for 2 c/o | CR-U2SM | 1SVR405670R1100 | | 10 | |
| Socket small for 3 c/o | CR-U3SM | 1SVR405660R1100 | | | |
| Holder for CR-U socket | CR-UH | 1SVR405669R0000 | | | |



Pluggable interface relays Ordering details - CR-U accessories

Rated control

supply voltage

Ordering details - CR-U range (all products stocked)

Version

Description



CR-U...

| | | | | | qty | kg (lb) | |
|--------------------|---|--|-------------------------|-----------------|-----------------|------------------|--|
| 6-220 V DC | Diode - Reverse polarity protection/ free wheeling diode | A1+, A2- | CR-U 21 | 1SVR405661R0000 | 10 | 0.007 (0.015) | |
| 6-24 V DC | | red, A1+, A2- | CR-U 41 | 1SVR405662R0000 | | | |
| 0-24 V DC | Diode and LED - Reverse | green, A1+, A2- | CR-U 41V | 1SVR405662R1000 | | | |
| 24-60 V DC | polarity | red, A1+, A2- | CR-U 41B | 1SVR405662R4000 | 10 | 0.007 | |
| 24-00 V DO | protection/ free wheeling | green, A1+, A2- | CR-U 41BV | 1SVR405662R4100 | 10 | (0.015) | |
| 110 V DC | diode | red, A1+, A2- | CR-U 41C | 1SVR405662R9000 | | | |
| 110 V DO | | green, A1+, A2- | CR-U 41CV | 1SVR405662R9100 | | | |
| 6-24 V AC/DC | | | CR-U 51B | 1SVR405663R0000 | | | |
| 24-60 V AC/DC | Spark quen- | | CR-U 51D | 1SVR405663R4000 | 10 | 0.007 | |
| 110-230 V AC/DC | ching | | CR-U 51C | 1SVR405663R1000 | | (0.015) | |
| 6-24 V AC/DC | | red, for DC A1+, A2- | CR-U 61 | 1SVR405664R0000 | | | |
| 0-24 V AO/DO | 24-60 V AC/DC Diode and | green, for DC A1+, A2- | CR-U 61V | 1SVR405664R1000 | | | |
| 24-60 V AC/DC | | | | 1SVR405664R4000 | 10 | 0.007 | |
| 21 00 1710/20 | LED | green, for DC A1+, A2- | CR-U 61EV | 1SVR405664R4100 | | (0.015) | |
| 110 V DC 110- | | | red, for DC A1+, A2- | CR-U 91 | 1SVR405664R0100 | | |
| 230 V AC | | green, for DC A1+, A2- | CR-U 91V | 1SVR405664R1100 | | | |
| 6-24 V AC/DC | | red, for DC A1+, A2- | CR-U 61C | 1SVR405665R0000 | | | |
| | | green, for DC A1+, A2- | CR-U 61CV | 1SVR405665R1000 | | | |
| 24-60 V AC/DC | Varistor and LED | red, for DC A1+, A2- | CR-U 61D | 1SVR405665R4000 | 10 | 0.007 | |
| | Overvoltage protection | green, for DC A1+, A2- | CR-U 61DV | 1SVR405665R4100 | | (0.015) | |
| 110 V DC 110- | | red, for DC A1+, A2- | CR-U 91C | 1SVR405665R0100 | | | |
| 230 V AC | | green, for DC A1+, A2- | CR-U 91CV | 1SVR405665R1100 | | | |
| 24 V AC | Overvoltage | | CR-U 71 | 1SVR405666R0000 | | 0.007 | |
| 115 V AC | protection, | | CR-U 71A | 1SVR405666R1000 | 10 | 0.007 (0.015) | |
| 230 V AC | varisiur | | CR-U 81 | 1SVR405666R2000 | | | |
| 24-240 V AC/DC | Multifunction time module | pluggable onto CR-U2S and CR-U3S | CR-U T | 1SVR405667R0000 | 10 | 0.014 (0.031) | |

Order code

Price

Weight

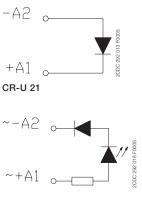
(1 pce)



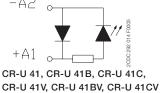
Connection diagrams

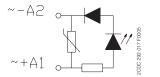
____ A2 ___

All CR-U modules can be plugged onto sockets CR-U2S and CR-U3S.

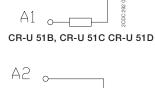


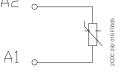






CR-U 61C, CR-U 61CV, CR-U 61D, CR-U 61DV, CR-U 91C, CR-U 91CV





CR-U 71, CR-U 71A, CR-U 81

Pluggable interface relays Technical data - CR-P, CR-M, CR-U

Input circuit - coil data CR-P range

| a de la companya de l | Rated control supply voltage U _s | Rated frequency | Make voltage (at 20 °C) | Maximum- voltage (at 55 °C) | Break voltage | Rated power | Coil resistance (at 20 °C) | Tolerance of coil resistance |
|--|---|--------------------------|-------------------------|-----------------------------------|--|--------------------------|----------------------------------|------------------------------|
| DC coils | 12 V DC | - | 8.4 V DC | 30.6 V DC | ≥ 0.1 U _s | 0.4-0.48 W | 360 Ω | ± 10% |
| | 24 V DC 48 V DC | - | 16.8 V DC 33.6 V DC | 61.2 V DC 122.4 V DC | ≥ 0.1 U _s ≥ 0.1 U _s | 0.4-0.48 W 0.4-0.48 W | 1440 Ω 5700 Ω | ± 10% ± 10% |
| | 110 V DC | - | 77 V DC | 280 V DC | ≥ 0.1 U _s | 0.4-0.48 W | 25200 Ω | ± 10% |
| AC coils | 24 V AC 48 V AC | 50 / 60 Hz 50 / 60 Hz | 19.2 V AC 38.4 V AC | 28.8 V AC 57.6 V AC | ≥ 0.15 U _s ≥ 0.15 U _s | 0.75 VA 0.75 VA | 400 Ω 1550 Ω | ± 10% ± 10% |
| | 110 V AC | 50 / 60 Hz | 88 V AC | 132 V AC | ≥ 0.15 U _s | 0.75 VA | 8900 Ω | ± 10% |
| | 120 V AC 230 V AC | 50 / 60 Hz 50 / 60 Hz | 96 V AC 184 V AC | 144 V AC 276 V AC | \geq 0.15 U _s \geq 0.15 U _s | 0.75 VA 0.75 VA | 10200 Ω 38500 Ω | ± 10% ± 10% |

CR-M range

| Carl | Rated control supply voltage U _s | Rated frequency | Make voltage (at 20 °C) | Maximum voltage (at 55 °C) | Break voltage | Rated power | Coil resistance (at 20 °C) | Tolerance of coil resistance |
|----------|---|-----------------|----------------------------|----------------------------------|----------------------|-------------|----------------------------|------------------------------|
| DC coils | 12 V DC | - | 9.6 V DC | 13.2 V DC | ≥ 0.1 U _s | 0.9 W | 160 Ω | ± 10% |
| | 24 V DC | - | 19.2 DC | 26.4 V DC | ≥ 0.1 U _s | 0.9 W | 640 Ω | ± 10% |
| | 48 V DC | - | 38.4 V DC | 52.8 V DC | ≥ 0.1 U _s | 0.9 W | 2600 Ω | ± 10% |
| | 60 V DC | - | 48 V DC | 66 V DC | ≥ 0.1 U _s | 0.9 W | 4000 Ω | ± 10% |
| | 110 V DC | - | 88 V DC | 121 V DC | ≥ 0.1 U _s | 0.9 W | 13600 Ω | ± 10% |
| | 125 V DC | - | 100 V DC | 137.5 V DC | ≥ 0.1 U _s | 0.9 W | 16000 Ω | ± 10% |
| | 220 V DC | - | 176 V DC | 242 V DC | ≥ 0.1 U _s | 0.9 W | 54000 Ω | ± 10% |
| AC coils | 24 V AC | 50 / 60 Hz | 19.2 V AC | 26.4 V AC | ≥ 0.2 U _s | 1.6 VA | 158 Ω | ± 10% |
| | 48 V AC | 50 / 60 Hz | 38.4 V AC | 52.8 V AC | ≥ 0.2 U _s | 1.6 VA | 640 Ω | ± 10% |
| | 60 V AC | 50 / 60 Hz | 48 V AC | 66 V AC | ≥ 0.2 U _s | 1.6 VA | 930 Ω | ± 10% |
| | 110 V AC | 50 / 60 Hz | 88 V AC | 121 V AC | ≥ 0.2 U _s | 1.6 VA | 3450 Ω | ± 10% |
| | 120 V AC | 50 / 60 Hz | 96 V AC | 132 V AC | ≥ 0.2 U _s | 1.6 VA | 3770 Ω | ± 10% |
| | 230 V AC | 50 / 60 Hz | 184 V AC | 253 V AC | ≥ 0.2 U _s | 1.6 VA | 16100 Ω | ± 10% |

CR-U range

| | Rated control supply voltage U _s | Rated frequency | Make voltage (at 20 °C) | Maximum voltage (at 55 °C) | Break voltage | Rated power | Coil re- sistance (at 20 °C) | Tolerance of coil resistance |
|----------|---|-----------------|----------------------------|----------------------------------|-----------------------|----------------------------------|------------------------------------|------------------------------|
| DC coils | 12 V DC | - | 9.6 V DC | 13.2 V DC | ≥ 0.1 Us | 1.5 W | 110 Ω | ± 10 % |
| | 24 V DC | - | 19.2 V DC | 26.4 V DC | ≥ 0.1 Us | 1.5 W | 430 Ω | ± 10 % |
| | 48 V DC | - | 38.4 V DC | 52.8 V DC | ≥ 0.1 Us | 1.5 W | 1750 Ω | ± 10 % |
| | 110 V DC | - | 88.0 V DC | 121.0 V DC | ≥ 0.1 Us | 1.5 W | 9200 Ω | ± 10 % |
| | 125 V DC | - | 100 V DC | 137.5 V DC | ≥ 0.1 Us | 1.5 W | 11000 Ω | ± 10 % |
| | 220 V DC | - | 176.0 V DC | 242.0 V DC | ≥ 0.1 Us | 1.5 W | 37000 Ω | ± 10 % |
| AC coils | 24 V AC | 50 / 60 Hz | 19.2 V AC | 26.4 V AC | ≥ 0.15 U _s | 2.8 VA (50 Hz) 2.5 VA (60 Hz) | 75 Ω | ± 10 % |
| | 48 V AC | 50 / 60 Hz | 38.4 V AC | 52.8 V AC | ≥ 0.15 U _s | 2.8 VA (50 Hz) 2.5 VA (60 Hz) | 305 Ω | ± 10 % |
| | 60 V AC | 50 / 60 Hz | 48.0 V AC | 66.0 V AC | ≥ 0.15 U _s | 2.8 VA (50 Hz) 2.5 VA (60 Hz) | 475 Ω | ± 10 % |
| | 110 V AC | 50 / 60 Hz | 88.0 V AC | 121.0 V AC | ≥ 0.15 U _s | 2.8 VA (50 Hz) 2.5 VA (60 Hz) | 1700 Ω | ± 10 % |
| | 120 V AC | 50 / 60 Hz | 96.0 V AC | 132.0 V AC | ≥ 0.15 U _s | 2.8 VA (50 Hz) 2.5 VA (60 Hz) | 1910 Ω | ± 10 % |
| | 230 V AC | 50 / 60 Hz | 184.0 V AC | 253.0 V AC | ≥ 0.15 U _s | 2.8 VA (50 Hz) 2.5 VA (60 Hz) | 7080 Ω | ± 10 % |

Pluggable interface relays Technical data - CR-P, CR-M, CR-U

| Туре | | CR-P1 | CR-P2 | CR-M2 | CR-M3 | CR-M4 | CR-U2 | CR-U3 |
|--|--|--------------------------------------|--|-----------------------------|----------------------------------|--|--|----------------------------------|
| Output circuit | (s) | 11-12/14 | 11-12/14 21-22/24 | 11-12/14 21-22/24 | 11-12/14 21-22/24 31-32/34 | 11-12/14 21-22/24 31-32/34 41-42/44 | 11-12/14 31-32/34 | 11-12/14 21-22/24 31-32/34 |
| Kind of output | | Relay, 1 c/o | Relay, 2 c/o | Relay, 2 c/o | Relay, 3 c/o | Relay, 4 c/o | Relay, 2 c/o | Relay, 3 c/o |
| Contact mater | ial | AgNi | AgNi AgNi/Au 5 µm | AgNi | AgNi | AgNi AgNi/Au 5 µm | AgNi | |
| Rated operational | voltage U _e (VDE 0110, IEC 60947-1) | 250 V | | ., | | | , | |
| Minimum swite | ching voltage | 5 V | | 10 V (AgNi); 5 | 5 V (AgNi/Au) | | 10 V | |
| Maximum swit | tching voltage DC | 300 V DC | | 250 V DC | | | , | |
| | AC | 440 V AC | | 250 V AC | | | 440 V AC | |
| Minimum swite | | 5 mA (AgNi), 2 | mA (AgNi/Au) | 5 mA (AgNi) | 5 mA (AgNi) | 2 mA (AgNi/Au) | 5 mA | |
| Rated free air | thermal current I _{th} | 16 A | 8 A | 12 A | 10 A | 6 A | 10 A | |
| Rated | AC-12 (resistive) 230 V AC-15 (inductive) 230 V | | 8 A | 12 A | 10 A | 6 A 1 A | 10 A 1.5 A | |
| operational current | AC-15 (inductive) 230 V AC-15 (inductive) 120 V | | 1.5 A | 1.5 A | 1.5 A | 1.5 A | 3 A | |
| (IEC 60947- | DC-12 (resistive) 24 V | 16 A | 8 A | 12 A | 10 A | 6 A | 10 A | |
| 5-1) | DC-13 (inductive) 24 V | 2.5 A | 2 A | 2.5 A | 2.5 A | 2 A | 2 A | |
| | DC-13 (inductive) 120 V DC-13 (inductive) 250 V | | | ••••• | | | | |
| AC rating | Utilization category (pilot duty) | † | | | ·· ·· ····· | | | |
| (UL 508) | (Contact rating code designation) | B300 | | B300 | | | B300 | |
| (OL 300) | max. rated operational voltage Max. continuous thermal current | 300 V AC | | 300 V AC | : | <u>.</u> | 300 V AC | |
| | at utilization category | 5 A | | 5 A | 5 A | 2.5 A | 5 A | |
| | Max. making / breaking apparent power at utilization category | 3600 / 360 V | 'A | 3600 / 360 V | ′A | 1800 / 180 VA | 3600/360 VA | |
| | Utilization category (resistive) (CSA22.2 No.14) | 16 A, 250 V AC | 8 A, 250 V AC | | 6 A, 250 V AC 10 A, 150 V AC | 5 A, 250 V AC 10 A, 150 V AC | 10 A, 250 V A single-phase | |
| DC rating * (UL 508; | Utilization category (pilot duty) (Contact rating code designation) | R300 | ···· | | | | ···· | |
| NEMA ICS-5) | Max. rated operational voltage | 300 V DC | ···•· | | ·· · | | | |
| | Max. continuous thermal current at utilization category | 1 A | | | | | | |
| | Max. making / breaking apparent power at utilization category | 28 VA | | | | | | |
| | Utilization category (resistive) (CSA22.2 No.14) | - | 10 A, 24 V DC | - | | 10 A, 28 V DC | | |
| | king (inrush) current | 30 A | 15 A | 24 A | 20 A | 12 A | 20 A | |
| Minimum swite | ching power | 0.3 W (AgNi), 0.0 | 05 W (AgNi/Au) | 0.3 W (AgNi), | 0.1 W (AgNi/A | u) | 0.3 W | |
| Maximum swit (breaking) pov | | 4000 VA | 2000 VA | 3000 VA | 2500 VA | 1500 VA | 2500 VA | |
| Contact resist | ance | ≤ 100 mΩ | | | | | | |
| Maximum ope | rating rated load AC-1 | 600 switching | g cycles/h | 1200 switchii | ng cycles/h | | | |
| frequency | without load | 72000 switch | ning cycles/h | 18000 switch | ning cycles/h | | 12000 switch | ing cycles/h |
| Mechanical life | etime | > 3 x 10 ⁷ swit | tching cycles | > 2 x 10 ⁷ swi | tching cycles | | | |
| Electrical lifetii | | > 0.7 x 10 ⁵ | > 105 | > 10 ⁵ switching | ng cycles | : | 105 11 1 | |
| | (resistive) | switching cycles (16 A, 250 V) | switching cycles (8 A, 250 V) | (12 A, 250 V) | (10 A, 250 V) | (6 A, 250 V) | > 10 ⁵ switchi (12 A, 250 V) | |
| | COS φ | see reduction | ····· | . <u></u> | | | | |
| Response time | | typ. 7 ms | ······ | typ. 13 ms (D | OC),10 ms (AC) | | typ. 18 ms (C | OC), 12 ms (AC) |
| Release time | | typ. 3 ms | ·· * ····· | typ. 3 ms (DC | C), 8 ms (AC) | | typ. 7 ms (D0 | C), 10 ms (AC) |
| Isolation data | | 1 | | | | | | , , , |
| Rated insulation | on voltage | 400 V AC | | 250 V AC | | | | |
| Insulation clas | | C250 / B400 | | C250 / B250 | | | C250 | |
| Rated | between coil and contacts | 5 kV AC | | 2.5 kV AC | | | | |
| impulse | between open contacts | 1 kV AC | ······································ | 1.5 kV AC | ····· | | | |
| withstand voltage U | | 1 10 710 | 251/10 | | | > 2 1// 1/0 | 2 14/ 40 | |
| voltage U _{imp} between c/o (SPDT) contacts Clearance between coil and contacts | | - - 10 mana | 2.5 kV AC | 2.5 kV AC | | ≥ 2 kV AC | 2 kV AC | |
| | ······································ | ≥ 10 mm | | ≥ 2.5 mm | | ≥ 1.6 mm | ≥ 3 mm | |
| | ancebetween coil and contacts | ≥ 10 mm | | ≥ 4 mm | | ≥ 3.2 mm | ≥ 4.2 mm | |
| Overvoltage c | | | ·· · ····· | | | | | |
| Pollution degre | 66 | 3 | | 3 | | 2 | 3 | |

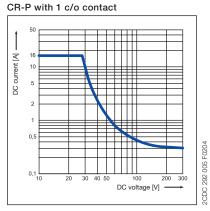
^{*} Those ratings are based on different type tests but they are not covered by the cULus or CSA approvals.

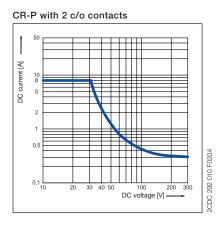
Pluggable interface relays Technical data, load limit curves - CR-P, CR-M, CR-U

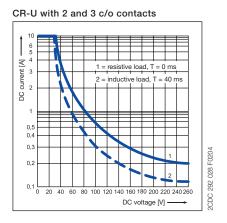
| Туре | | CR-P1 | CR-P2 | CR-M2 | CR-M3 | CR-M4 | CR-U2 | CR-U3 | | | |
|-------------------------------------|-------------|---|--------|---|-------|-------|-------------------|-------|--|--|--|
| General data | | • | • | • | • | | • | | | | |
| Dimensions (W x H x D) when mounted | | 12.7 x 29 x 15.7 mm | | 21.2 x 27.5 x 35.6 mm | | | 35 x 35 x 54.4 mm | | | | |
| Weight | | 14 g (0.031 lb) | | 35 g (0.077 lb) | | | 83 g (0.18 lb) | | | | |
| Mounting | • | on socket (see accessories) | | | | | | | | | |
| Mounting position | | any | | | | | | | | | |
| Degree of protection | | IP 67 | •••••• | IP 40 | • | • | •••• | | | | |
| Electrical connection | | | | | | | | | | | |
| Connection | | by socket | | | | | | | | | |
| Environmental data | | | | | | | | | | | |
| Ambient temperature range | operation | DC: -40+85 °; AC: -40+70 °C | | DC: -40+70 °; AC: -40+55 °C | | | | | | | |
| | storage | -40 +85 °C | | | | | | | | | |
| Vibration resistance 10-150 | n/o contact | 10 g | | 5 g | | | 5 g | | | | |
| Hz | n/c contact | 10 g | 5 g | 5 g | | | 5 g | | | | |
| Shock resistance | n/o contact | 30 g | 20 g | 10 g | | | 10 g | | | | |
| | n/c contact | 30 g 20 g | | 5 g | | | 10 g | | | | |
| Standards | | | | | | | | | | | |
| Product standard | | IEC/EN 60255-23, IEC/EN 60664-1, IEC/EN 61810-1 | | IEC/EN 60255-23, IEC/EN 60810-1, IEC/EN 61810-7 | | | IEC/EN 60255 | 5-1 | | | |
| Low Voltage Directive | | 2006/95/EC | •••••• | • | ••••• | • | •••• | ••••• | | | |

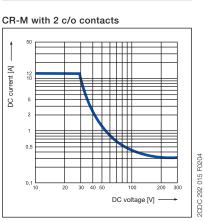
Approvals see page 5/6.

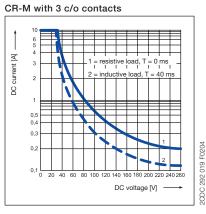
Load limit curves - Maximum switching power at resistive DC load

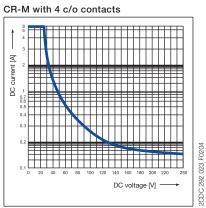












Pluggable interface relays Technical data - Sockets for CR-P and CR-M

| Output circ | cuits | CR-PLS | CR-PLS(x) | CR-PSS | CR-PLC | CR-MxLS | CR-MxSS | CR-MxSF | CR-MxLC |
|---------------------------|--|---|---|---|---|---|---|---|--------------------------------|
| Output circ | | 11-12/14, 21-2 | 22/24 | | 11-12/14, 21-22/24, | | | | |
| Number of | | 2 | | | | 2, 3 or 4 | | 2 or 4 | |
| Rated volta | 0 | 250 V AC | 300 V AC | 250 V AC | | 250 V AC | | | 300 V AC |
| Rated curre | ent | 2 x 10 A ¹⁾ | 2 x 12 A ¹⁾ | 2 x 10 A ¹⁾ | | 7 A | | | 10 A |
| General da | nta | | | | | | | | |
| Dimensions module (L x | s without holder and x W x H) | 76 x 15.8 x 62 mm (2.992 x 0.622 x 2.441 in) | 78.5 x 15.5 x 61 mm (3.011 x 0.610 x 2.402 in) | 76 x 15.8 x 42.8 mm (2.992 x 0.622 x 1.685 in) | 97.5 x 16.3 x 45.2 mm (3.839 x 0.642 x 1.780 in) | 75 x 27.2 x 60.8 mm (2.952 x 1.071 x 2.394 in) | 75.2 x 27.2 x 42.6 mm (2.961 x 1.071 x 1.677 in) | 66.7 x 30.3 x 29 mm (2.626 x 1.193 x 1.142 in) | |
| Degree of p | orotection terminals | IP 20 B (EN 6 | 0529) | | <u>i</u> | | <u>i.</u> | | 4 |
| Temperatu | | -40+70 °C | | -40+70 °C | | -40+70 °C | ••••• | | -25+85 °C |
| · oporata | storage | -40+70 °C | -40+85 °C | -40+70 °C | | -40+70 °C | ····· | | |
| Connection | | screw connection | | | spring connection | screw connection | | fork type screw | spring connection |
| Maximum r connecting | number of wires per terminal | 2 | | | 2 (one per connection point) | 2 | | - | 2 (one per connection point) |
| Wire size | rigid | 2 x 2.5 n | | | | 2 x 2.5 mm ² (| x 2.5 mm² (2 x 14 AWG) 2 x 1.5 mm | | 0.2 - 1.5 mm ² |
| | | | 2 x 2.5 mm² (2 x 14 AWG) | | | (2 x 1 | | (2 x 16 AWG) | (24 x 16 AWG) |
| | with wire end ferule | 2 x 1.5 mm ² (2 | 2 x 16 AWG) | | 1 | 2 x 1.5 mm ² (| 2 x 16 AWG) | | |
| Stripping le | ength | - | | ••••• | •••• | 7 mm (0.28 ir | | - | - |
| Tightening | torque | 0.6 Nm | 0.8 Nm | 0.6 Nm | | 0.6 Nm (5.31 | lb.in) | | |
| Maximum | with 0.2 mm ² | _ | | - | 10 N | _ | - | - | 10 N |
| clamping | with 1.5 mm ² | | - | - | 40 N | - | - | - | 40 N |
| force | with wire end ferrule | | =:::::::::::::::::::::::::::::::::::::: | | | <u>i</u> - | <u>i</u> - | | > 40 N |
| Mounting Material | | DIN rail (IEC/E | | ·· · ····· | ·· · ····· | PA 6+GF - V2 | ······································ | ·· · ···· | |
| Materiai | contacts | PA 6+GF - V2 | | | | CuZn33 | | | ••••• |
| | contact surface | | 5 u tippod | 5 u Nii | | 5 μ Ni | ······································ | 6 μ Ni | 5 μ tinned |
| | terminals | 8 u Ni | 5 μ tinned 8 μ galvanized | 8 u Ni | XCrNi Steel | 8 µ Ni | | :0 µ 1 v 1 | CCSC |
| | combi screw M3 | 18.8 Steel 5u Ni | | | - 8.8 Steel, 5µ Ni | | Ni | ······ | - |
| Isolation da | | , - <u></u> | | | | <u> </u> | | | • |
| Insulation v | /oltage | > 5 kV | > 3 kV | > 5 kV | | > 3 kV | | > 4 kV | |
| Isolation be contacts | etween coil and | EN 61984 | • | | VDE 0106 / 101 | EN 61984 | | - | DIN EN 61140, VDE 0140-1 |
| Clearance | earance and creepage distance EN 61984 | | | DIN EN 60664-1 | EN 61984 DIN EN 60664 | | | | |
| Standards | | | | | | _ | | | |
| Products s | | EN 61984 | | ····· | ····· | EN 61984 | ······ | <u>-</u> | - |
| Low Voltag | | 2006/95/EC | | | | 2006/95/EC | | | |
| EMC Direct | tive | - | | | | 2004/108/EC | | | |

 $^{^{1)}}$ Loads >10 A (>12 A for CR-PLSx) require jumpering of terminal 11 with 21, 12 with 22, and 14 with 24

Pluggable interface relays Technical data - Sockets for CR-U

| Output circuits | CR-U2S | CR-U3S | CR-U3E | CR-UxSM |
|--|--|----------------------------|----------------------------|--|
| Output circuits | 11-12/14, 21-22/24, | • | · | • |
| Number of poles | 2 | 3 | | 2 or 3 |
| Rated voltage | 250 V AC | | 300 V AC | 250 V |
| Rated current | 10 A | | ······ | · · · · · · · · · · · · · · · · · · · |
| General data | | | | |
| Dimensions without holder and | 75.3 x 37.3 x 26 mm | 75.3 x 38.1 x 26 mm | 70 x 38 x 26 mm | 61.8 x 38.1 x 26 mm |
| module (L x W x H) | (2.965 x 1.469 x 1.024 in) | (2.965 x 1.500 x 1.024 in) | (2.756 x 1.496 x 1.024 in) | (2.756 x 1.500 x 1.024 in) |
| Degree of protection terminals | IP 20 B (EN 60529) | | | |
| Degree of protection terminals Temperature range operation | -40+70 °C | • | -40+85 °C | -40+70 °C |
| storage | I-40+70 °C | •••• | -40+85 °C | -40+70 °C |
| Wire size rigid | 2 x 2.5 mm ² (2 x 14 AWG) | •••• | ••••• | |
| fine-strand | 2 x 2.5 mm ² (2 x 14 AWG) 2 x 1.5 mm ² (2 x 16 AWG) | | | |
| with wire end ferule | 2 x 1.5 mm ² (2 x 16 AWG) | • | | ······································ |
| Tightoning torque | O C NIm | •••• | 0.8 Nm | 0.6 Nm |
| Mounting | DIN rail (IEC/EN 60715) | • | • | • |
| Material socket | PA 6+GF - V2 | ••••• | | ······································ |
| contacts | CuZn33 | •••• | | ••••••• |
| contact surface | 16 H NII | • | | 3 μ Ni |
| tarminale | R u Ni | | 8 u galvanized | 3 μ Ni 10 μ Ni |
| combi screw M3 | 8.8 Steel, 5µ Ni | | | Steel, 8 µ Ni |
| Isolation data | | | | |
| Insulation voltage | > 2 kV | | | |
| Isolation between coil and | EN 61984 | • | | ······ |
| contacts | | | | |
| Clearance and creepage distance | EN 61984 | ······ | | |
| Standards | | | | |
| Products standard | EN 61984: 2001 | | | |
| Low Voltage Directive | 2006/95/EC | | | |

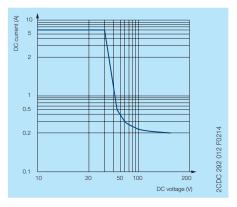
Pluggable interface relays Technical data - CR-S range

| | Rated control supply voltage U _s | Make voltage (at 23 °C) | Maxium voltage (at 55 °C) | Break vo | oltage | Rated power | Coil resistance (at 23 °C) | Tolerance of coil resistance | |
|--|---|--|---|--|--|--|----------------------------------|------------------------------|--|
| CR-S005VDC1R(G) | 5 V DC | 3.75 V DC | 7.5 V DC | 0.25 V D | C | 170 mW | 147 Ω | ± 10 % | |
| CR-S012VDC1R(G) | 12 V DC | 9 V DC | 18 V DC | 0.6 V DC |)) | 170 mW | 848 Ω | ± 10 % | |
| CR-S024VDC1R(G) | 24 V DC | 18 V DC | 36 V DC | 1.2 V DC | } | 170 mW | 3390 Ω | ± 15 % | |
| CR-S048VDC1R(G) | 48 V DC | 36 V DC | 72 V DC | 2.4 V DC | } | 210 mW | 10600 Ω | ± 15 % | |
| CR-S060VDC1R(G) | 60 V DC | 45 V DC | 90 V DC | 3 V DC | | 210 mW | 16600 Ω | ± 15 % | |
| . , | | | 100.20 | | | | 10000 11 | | |
| Dutput circuits Dutput circuits Cind of output Contact material Rated operational volta Minimum switching volt Maximum switching cur Rated free air thermal care | age tage rent urrent I _{th} | 5-1) AC AC AC | C12 (resistive) C15 (inductive) C15 (inductive) C12 (resistive) | 230 V 230 V 120 V 24 V | 250 V 12 V D 400 V 100 m 5 A 6 A 1.5 A | SPDT) D ₂ / AgSnO ₂ /Au AC | mA (AgSnO ₂ /Au) | | |
| AC rating (UL 508; NEN DC rating (UL 508; NEN Maximum making (inrus | MA ICS-5) | DC DC Uti (Cont Uti | 212 (resistive) 213 (inductive) 213 (inductive) 213 (inductive) dization category act rating code of act rating code of | 24 V 120 V 250 V (pilot duty) lesignation) (pilot duty) | 1 A (0.22 A (0.11 A (0.300 (0.300) (0.300) (0.300) | 240 V AC | | | |
| Minimum switching pov | | | | | 100 mA/12 V (AgSnO ₂) / 50 mW (AgSnO ₂ /Au) | | | | |
| Maximum switching (br Contact resistance | eaking) power | | AC | 1 (resistive) | 1500 VA, 250 V AC 100 mΩ (at 1 A/ 6 V DC) | | | | |
| Maximum operating frequency rated load A | | | | | 360 sv | witching cycles/h | l | | |
| Mechanical lifetime | | | V | vithout load | | switching cycles switching cycle | | | |
| Electrical lifetime | | ······································ | AC | 1 (resistive) |) (n/c) 3 x 10 ⁴ switching cycles (at +85 °C) | | | | |
| Response time | | | | ······ | (n/o) 1 x 10 ⁴ switching cycles (at +85 °C) | | | | |
| Release time | | ······································ | | | 4 ms | | | | |
| solation data | | | | | 1050.17 | 10 | | | |
| Rated insulation voltage Rated impulse withstand | voltage U | <u>.</u> | between coil a | and contacts | 250 V | | | | |
| | imp | ••••• | | en contacts | | | | | |
| Clearance | | | between coil a | and contacts | 5.5 mr | n (0.217 in) | | | |
| Creepage distance Overvoltage category | | | between coil a | and contacts | 8 mm (0.315 in) III | | | | |
| Pollution degree | | | | | 2 | | | | |
| General data Dimensions (W x H x D) | | | | | 28 x 5 | x 15 mm (1.102 x | 0.196 x 0.590 in |) | |
| Weight | | | | ······ | 5 g (0.0 | 011 lb) | | | |
| Mounting Mounting position | | ······ | | | on soc | ket | | | |
| Degree of protection | | | | | RT II ai | nd RT III | | | |
| lectrical connection | | | | | | - | | | |
| Connection | | | | | by soc | ket | | | |
| Environmental data | ngo | | | operation | 10 1 | 05 °C | | | |
| Ambient temperature ra /ibration resistance (10 | | | | operation storage n/o contact | 0+40 | | A | | |
| Shock resistance n/o cont | | | | | tt 10 Hz to 55 Hz 1mm DA tt Functional 49 m/s² / Destructive 980 m/s² | | | | |
| Ctondord- | | | | n/c contact | Functi | onal 49 m/s² / De | estructive 980 m | /S ² | |
| Standards Product standard | | | | | IEC 61 | 810 ₋ 1 | | | |
| | | | | | 11E(7, t) I | O I U = I | | | |

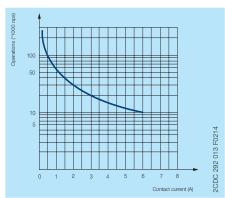
Pluggable interface relays Technical data - CR-S range sockets

| CR-S 6-24 V | CR-S 12-24 V | CR-S 48-60 V | CR-S 110-125 V | CR-S 220-240 V |
|--------------------------------|--|---|--|---|
| 6-24 V DC | 2-24 V AC/DC | 48-60 V AC/DC | 110-125 V AC/DC | 220-240 V AC/DC |
| (0.8-1.2) U | (0.8-1.1) U | ····· i ······· | - | ··· · ································ |
| 11-29 mA | 11-16 mA | 3.6-4.5 mA | 3.6 mA | 3.6 mA |
| 8 ms | ····· | | ···· | |
| 4 ms | ••••• | • | ••••• | ••••• |
| green LED | ••••• | ••••• | ••••• | ••••• |
| yes | •••••• | ••••• | | •••••• |
| | | | | |
| 11-12/14 | | | | |
| 1 | | ····· | | |
| | | | | |
| | | | | |
| | | | | |
| 88.3 x 6.3 x 70. | .9 mm (3.476 x 0.24 | 8 x 2.789 in) | | |
| Degree of prote | ection (EN 60529) IF | 20 (terminals) | <u>.</u> | |
| | | | -40+55 °C | |
| | | | | |
| Screw | . | ····• | . | ······································ |
| 2 | | | | |
| d 1 x 2.5 mm ² (1) | x 14 AWG) ; 2 x 1.5 | mm² (2 x 16 AWG) | . | |
| d 1 x 2.5 mm ² (1 x | x 14 AWG); 2 x 1.5 r | mm² (2 x 16 AWG) | . | |
| e 1 x 2.5 mm ² (1 x | x 14 AWG); 2 x 1.0 r | nm² (2 x 18 AWG) | | |
| 0.5 Nm (4.426 lt | b.in) | ····• | . | ······································ |
| | | ·····• | . | |
| DIN rail | ·····• | ····• | | |
| | ·····• | ·····• | ····• | |
| | | ····• | | |
| ls Cu7n40 3 u Ni | ·····• | ·····• | ···• | ······································ |
| | | | ······································ | |
| al | | | | |
| 88.3 x 6.3 x 70. | 9 mm (3.476 x 0.24 | 8 x 2.789 in) | | |
| Degree of prote | | | | ••••• |
| n -40+70 °C | | ••••• | -40+55 °C | ••••• |
| e 0+40 °C | | | | |
| Spring | | . | | |
| 1 | | ·····• | . | |
| | | d and with wire end | ferule | |
| 7 mm (0.276 in) | . | | | |
| DIN rail | | ····• | • | |
| PA6 +GF-V2 | ·····• | ·····• | . | ······································ |
| | | <u>.</u> | <u>.</u> | |
| | | | | |
| 3 000001 | | | | |
| 5000 V AC | | | , | |
| 1000 ΜΩ | ······• | ·····• | ····• | |
| IEC/EN 61984 | | | | |
| | | | | |
| | | | | |
| IEC/EN 61984: 2006/95/EC | 2001 | | | |
| | 6-24 V DC (0.8-1.2) U _η 11-29 mA 8 ms 4 ms green LED yes 111-12/14 1 250 V AC 6 A 11 88.3 × 6.3 × 70. Degree of prote n1 -40+70 °C ge 0+40 °C Screw 2 id 1 × 2.5 mm² (1. d 2 × 2. d 3 × 2. d 2 | 6-24 V DC (0.8-1.2) U _n (0.8-1.1) U _n 11-29 mA 11-16 mA 8 ms 4 ms green LED yes 11-12/14 1 250 V AC 6 A II 88.3 x 6.3 x 70.9 mm (3.476 x 0.24 Degree of protection (EN 60529) IF 11-40+70 °C 12-10 0+40 °C Screw 2 11 1 x 2.5 mm² (1 x 14 AWG); 2 x 1.5 r 12 1 x 2.5 mm² (1 x 14 AWG); 2 x 1.5 r 13 1 x 2.5 mm² (1 x 14 AWG); 2 x 1.0 r 0.5 Nm (4.426 lb.in) 7 mm (0.276 in) DIN rail 18 8.3 x 6.3 x 70.9 mm (3.476 x 0.24 Degree of protection (EN 60529) IF 10 0.5 Nm (4.426 lb.in) 11 x 2.5 mm² (1 x 14 AWG); 2 x 1.0 r 12 x 1.0 r 13 Fe 14 x 2.5 mm² (1 x 14 AWG); 2 x 1.0 r 15 x 2.5 mm² (1 x 14 AWG); 2 x 1.0 r 16 x 2.5 mm² (1 x 14 AWG); 2 x 1.0 r 17 mm (0.276 in) DIN rail 18 8.3 x 6.3 x 70.9 mm (3.476 x 0.24 Degree of protection (EN 60529) IF 10 -40+70 °C 10 0+40 °C Spring 1 2.5 mm² (14 AWG) rigid, fine-strand 7 mm (0.276 in) DIN rail 18 EPA6 +GF-V2 19 0+40 °C Spring 1 2.5 mm² (14 AWG) rigid, fine-strand 7 mm (0.276 in) DIN rail 19 EPA6 +GF-V2 10 040 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 11 0+40 °C Spring 12 0+40 °C Spring 13 I 0+40 °C Spring 14 0+70 °C 15 0+40 °C Spring 15 0+40 °C Spring 16 0+40 °C Spring 17 0+40 °C Spring 18 0+40 °C Spring 19 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 11 0+40 °C Spring 12 0+40 °C Spring 13 0+40 °C Spring 14 0+70 °C 15 0+40 °C Spring 15 0+40 °C Spring 16 0+40 °C Spring 17 0+40 °C Spring 18 0+40 °C Spring 19 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 11 0+40 °C Spring 12 0+40 °C Spring 13 0+40 °C Spring 14 0+70 °C 15 0+40 °C Spring 16 0+40 °C Spring 17 0+40 °C Spring 18 0+40 °C Spring 19 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 10 0+40 °C Spring 1 | 6-24 V DC | 6-24 V DC |

Load limit curves - Max. DC load breaking capacity

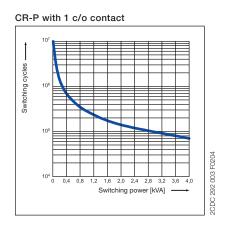


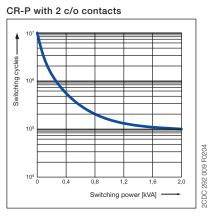
Endurance curve

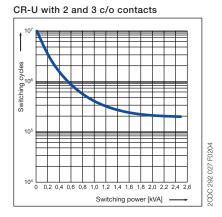


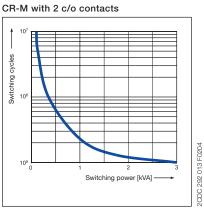
Pluggable interface relays Load limit curves

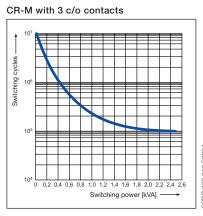
Load limit curves - Electrical lifetime at resistive AC load

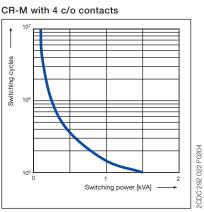




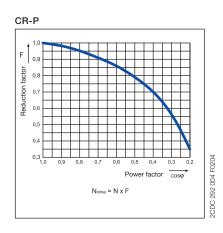


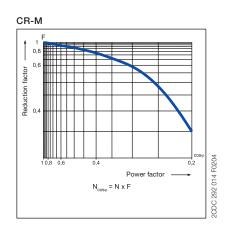


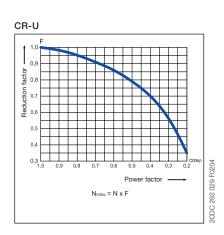




Reduction factor F at inductive AC load

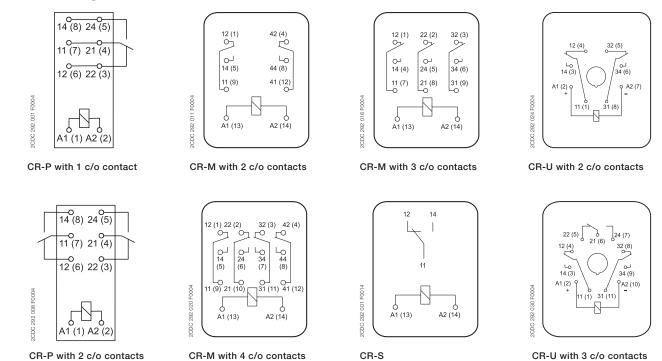




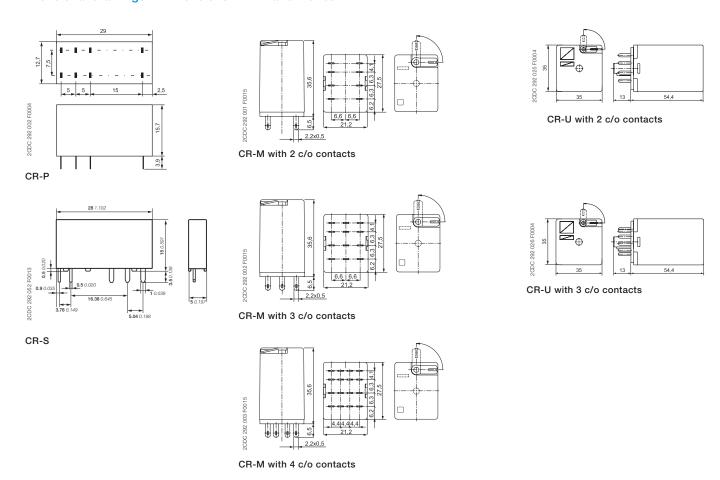


Pluggable interface relays Connection diagrams

Connection diagrams

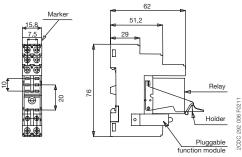


Dimensional drawings Dimensions in mm and inches

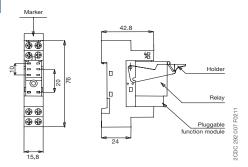


Pluggable interface relays Dimensional drawings

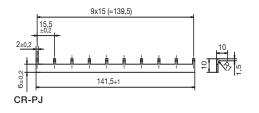
Dimensions in mm and inches

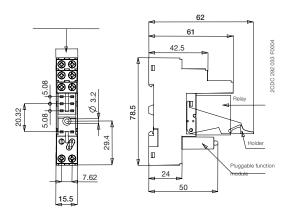


CR-PLS - screw connection

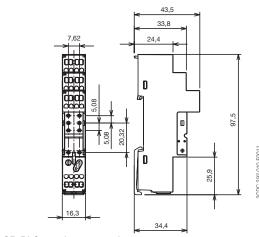


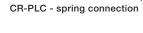
CR-PSS - screw connection

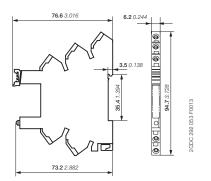




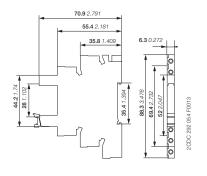
CR-PLSx - screw connection



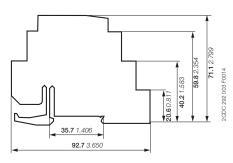




Spring socket for CR-S range interface relays

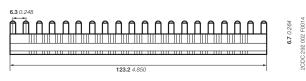


Screw socket for CR-S range interface relays



Separator for CR-S

Jumper



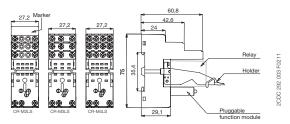
Jumper bar CR-S

246.8

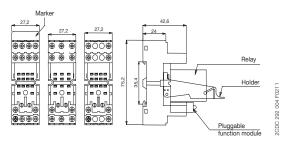
CR-MJ

Pluggable interface relays Dimensional drawings

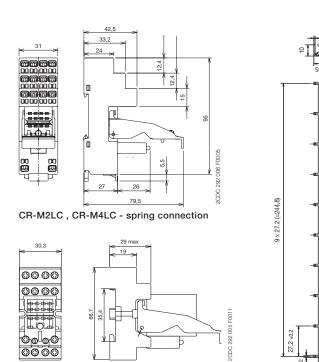
Dimensions in mm and inches



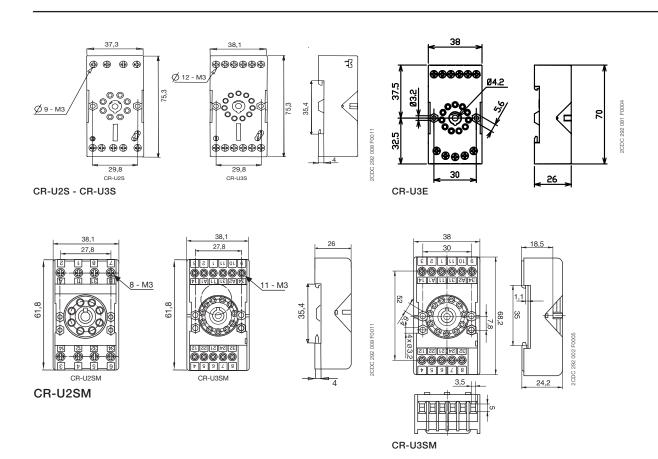
CR-M2LS - CR-M3LS - CR-M4LS - screw connection



CR-M2SS - CR-M3SS - CR-M4SS - screw connection



CR-MxSF - screw connection



Interface relays and optocouplers R600 range Product group picture



Interface relays and optocouplers R600 range Table of contents

Interface relays and optocouplers R600 range

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Interface relays and optocouplers R600 range Benefits and advantages



DC 291 024

R600 series

Standard range in screw clamp or spring clamp versions

- Spacing: 6 mm or 12 mm

- Wire size: 2.5 mm² (4 mm² solid wire)

- Contact type: 1 NO, 1 NC, 1 SPDT, 1 DPDT from

1 mA to 8 A / 250 V

In today's automation systems, PLCs are the core of industry. They link sensors and actuators to the process, which are connected to the PLC via conventional wires.

However these PLCs are not completely isolated from the industrial environment, hence over voltage picks and transient currents can affect their operating functions. And additionally, their application field is often limited to 24 VDC / 100 mA. So, with the aim to adapt application voltage and/or current and provide as well the right electrical isolation to the PLC, it is recommended to install per I/O the right interface providing both voltage-current level adaptation and isolation protection. This interfacing is possible thanks to ABB's relays and optocouplers ranges, which offer wide adaptation in both voltage (from 5 to 400 V) and current (from 10-7 to 16 A) as well as high isolation between input and output from 2 to 4 KV.

Interface relays and optocouplers R600 range Type designators

| SERIES | CODE | NB OF RELAYS | CONTACT TYPE | NB OF CONTACTS PER RELAY | PARTICULARITIES |
|-------------------|-------|--------------|--------------|-----------------------------|-----------------|
| R600 screw type 📫 | R/B | | | | |
| R600 spring type | R/B/R | | | | |
| | | 1 | 012 | 12 | None / A / R |

Description of contact types

1 Normally Open 1 NO 1 Change Over or Single Pole Double Through **Features**

None Input voltage DC Input voltage AC/DC

RC circuit protection:



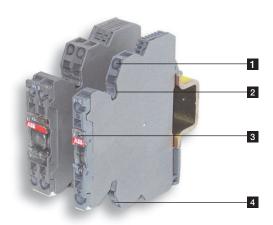
- Increases relay contacts life

Interface relays R600 range Benefits and advantages

Characteristics

- Standard range available with screw or spring-type terminals
- 8 different rated control supply voltages: DC versions: 5 V, 12 V, 24 V
 - AC/DC versions: 24 V, 48-60 V, 115 V, 230 V, 60-230 V
- Output: 1 n/c contact, 1 n/o contact, 1 c/o (SPDT) contact, 2 c/o (SPDT) contacts
- Devices with output contacts protected by built in RC circuit, which result in increased contact life
- Devices with leakage current protection on the input side
- Available with visible or covered switch on the front of the unit, for the configuration of manual or automatic actuation
- With connection for jumper bar, except 2 c/o devices and some discontinued devices
- Width: 6 mm (0.236 in) or 12 mm (0.472 in)
- LED for the indication of the operational state
- Accessories: Jumper bars, separator end section
- Approvals / Marks

c Sus III Lloyds (pending) / C €



- 1 Input Control supply voltage
- 2 Jumper bar connection
- 3 Indication of operational states (green LED)
- 4 Output

Excellent adaption and conversion of digital signals



Interface relays R600 range Benefits and advantages

Interface relays are electromechanic and electronic input and output modules for electrical isolation, levelling, noise suppression or signal amplification between control unit and process.

Boxed interface relays are used for electrical isolation, amplification and signal matching between the electronic controlling, e.g. PLC (programmable logic controller), PC or field bus systems and the sensor / actuator level. The compact design and different connection terminal possibilities optimize your panel installation.

Increased contact life

The contacts of some devices are proteced by built in RC-circuits which result in increased contact life.



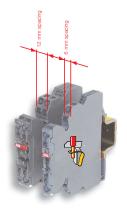
Variety of connections

R600 relays and optocouplers are available with both screw terminals or spring terminals.



Space safing

With a width of only 6 mm or 12 mm the compact design safes space in each cabinet.

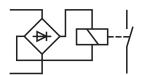


Functioning status

Functioning display through a green LED.



Only one part number AC/DC



Measurement & Test

Holes for holding DIA. 2 mm test plugs to simplify any measurement or test.



Interface relays R600 range Selection

| | Order number | 1SNA645034R2300 | 1SNA645036R2500 | 1SNA645534R2500 | 1SNA645536R2700 | 1SNA645073R0000 | 1SNA645035R2400 | 1SNA645075R0000 | 1SNA645575R0000 | 1SNA645535R2600 | 1SNA645573R0000 | 1SNA645019R0400 | 1SNA645519R0600 | 1SNA645014R2700 | 1SNA645018R0300 | 1SNA645514R2100 | 1SNA645001R0300 | 1SNA645005R0700 | 1SNA645501R0500 | 1SNA645505R0100 | 1SNA645012R2500 | 1SNA645512R2700 | 1SNA645071R0000 | 1SNA645571R0000 | 1SNA645072R0000 | 1SNA645572R0000 | 1SNA645002R0400 | 1SNA645006R0000 | 1SNA645502R0600 | 1SNA645506R0200 | 1SNA645040R1500 | 1SNA645540R1700 | | |
|-----------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------|----------------------|------------------|-------------------|-------------------|------------------|------------------|-------------------|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------|---------------------|----------------------|----------------------|---------------------|----------------------|----------------|--|
| | Orde | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | 1SNA | | |
| | | RB 121-5VDC | RB 121-5VDC | RBR 121-5VDC | RBR 121-5VDC | RB121-12VDC | RB121-12VDC | RB121-AU-12VDC | RBR121-AU-12VDC | RBR121-12VDC | RBR121-12VDC 1 | RB 101AR-24VAC/DC 1 | RBR 101AR-24VAC/DC 1 | RB 111A-24VAC/DC | RB 111AR-24VAC/DC | RBR 111A-24VAC/DC | RB 121A-24VAC/DC | RB 121A-24VAC/DC | RBR 121A-24VAC/DC | RBR 121A-24VAC/DC | RB 122A-24VAC/DC | /AC/DC | RB121-24VDC | RBR121-24VDC | RB121-AU-24VDC | 1SNA645572R0000 | RB 121A-48-60VAC/DC | RB 121A-48-60VAC/DC | RBR 121A-48-60VAC/DC | RBR 121A-48-60VAC/DC | RB 122A-48-60VAC/DC | RBR 122A-48-60VAC/DC | | |
| | Type | RB 1 | RB 1 | RBR | RBR | RB1 | RB1 | RB1 | RBR | RBR | RBR | RB 1 | RBR | RB 1 | RB 1 | RBR | RB 1 | RB 1 | RBR | RBR | RB 1 | RBR | RB1 | RBR | RB1, | 1SN | RB 1 | RB 1 | RBR | RBR | RB 1 | RBR | | |
| Input voltage | | | | _ | _ | | | _ | _ | _ | | | - | - | | _ | _ | _ | | _ | _ | | | | | _ | _ | _ | _ | _ | | _ | _ | |
| 5 V DC | | • | • | • | • | ļ | <u>.</u> | <u>.</u> | | ļ <u>.</u> | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 V DC | | ļ | | <u> </u> | ļļ | • | • | • | • | - | | <u>.</u> | | ļ | | | | | | | | | | | | | | | | | | | ļ | |
| 24 V DC | | ļ | | ļļ | | ļļ | <u> </u> | ļ | | ļļ | | - | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | | , | | | | ļ | |
| 48-60 V DC | | ļ | | ļļ | | ļļ | ļ | <u>.</u> | | ļļ | | ļ | | <u>.</u> | | | | | | | | | | | | , | • | • | • | • | • | • | ļ | |
| 115 V DC | | ļ | | ļļ | | ļ | ļi | ļi | | ļ | <u>.</u> | ļ | | <u>.</u> | | | | | | | | | | | | , | | | | | | | <u></u> | |
| 230 V DC | | ļ | | ļļ | ļļ | ļ | <u>.</u> | <u>.</u> | | ļ | | ļ | | <u>.</u> | | | | | | | | | | | | | | | | | | | <u>.</u> | |
| 60-230 V DC | | ļ | | <u> </u> | ļļ | ļļ | <u> </u> | ļ | | ļļ | | <u>.</u> | | ļ | | | | | | | | | | | | | | | | | | | ļ | |
| 24 V AC | | ļ | | ļļ | | ļļ | ļ | ļļ | | ļļ | | - | • | • | • | • | • | • | • | • | • | • | | | | | | | | | | | ļļ | |
| 48-60 V AC | | ļ | | | | | | ļļ | | | | ļ | | | | | | | | | | | | | | | • | • | • | • | • | • | ļļ | |
| 115 V AC | | | | ļ | <u>.</u> | ļ | ļ | <u>.</u> | | <u>.</u> | įi | <u>.</u> | | <u>.</u> | | | | | | | | | | | | , | | į <u>į</u> | | , | | į | ļļ | |
| 230 V AC | | | | <u>.</u> | | <u>.</u> | <u>.</u> | <u>.</u> | | <u> </u> | | <u>.</u> | | <u>.</u> | | | | | | | | | | | | | | | | | | | <u></u> | |
| 60-230 V AC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Output rating | | | , | , | , | , | , | , | , | , , | , | , | , | , | , | | | | | | | | | | | | | , | | | , | , | , , | |
| 10 mA - 6 A | | • | | - | | • | • | <u>.</u> | | • | | • | • | • | • | • | - | | • | | | | • | • | | | • | | • | | | | ļļ | |
| 1 mA - 6 A | | | • | <u>.</u> | • | | | • | • | <u>.</u> | • | <u>.</u> | | <u>.</u> | | | | • | | • | | | | | • | • | | • | | • | | | i | |
| 1 mA - 8 A | | | | | | | | | | | | | | | | | | | | | • | • | | | | | | | | | • | • | | |
| Output contacts | is | | | | | | | | | , | | | | | | | | | | | | | , | | | | | | | | | | | |
| c/o | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | Ī | | | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | | |
| n/o | | | | | | | | | | | | | | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | |
| n/c | | | | | | | | | | | <u> </u> | 1 | 1 | | | | | | | | | | | | | | | | | | | | | |
| Terminal type | | | _ | | | | | | | | | | | | | | | | | | | | | | | | | | | _ | | | | |
| Screw | | • | • | | | • | • | • | | | | - | | • | • | | • | • | | | • | | • | | • | | • | • | | | • | | | |
| Spring | | | | • | • | | | | • | • | • | | • | : | | • | | | • | • | | • | | • | | • | | | | • | | • | : : | |

Interface relays R600 range Selection

| 1SNA645003R0500 | 1SNA645007R0100 | 1SNA645046R0700 | 1SNA645503R0700 | 1SNA645507R0300 | 1SNA645546R0100 | 1SNA645041R0200 | 1SNA645541R0400 | 1SNA645016R2100 | 1SNA645017R2200 | 1SNA645004R0400 | 1SNA645008R1200 | 1SNA645011R2400 | 1SNA645504R0000 | 1SNA645508R1400 | 1SNA645511R2600 | 1SNA645013R2600 | 1SNA645513R2000 | 1SNA645020R0100 | 1SNA645520R0300 |
|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|-------------------|--------------------|-------------------|--------------------|
| RB 121A-115VAC/DC | RB 121A-115VAC/DC | RB 121AR-115VAC/DC | RBR 121A-115VAC/DC | RBR 121A-115VAC/DC | RBR 121AR-115VAC/DC | RB 122A-115VAC/DC | RBR 122A-115VAC/DC | RB 111A-115VAC/DC | RB 111A-230VAC/DC | RB 121A-230VAC/DC | RB 121A-230VAC/DC | RB 121AR-230VAC/DC | RBR 121A-230VAC/DC | RBR 121A-230VAC/DC | RBR 121AR-230VAC/DC | RB 122A-230VAC/DC | RBR 122A-230VAC/DC | RB 121A 60-230VUC | RBR 121A 60-230VUC |
| | | | | | | | | | | | | | | | | | | | |
| • | • | • | • | • | • | • | • | | | • | • | • | • | • | • | • | • | - | • |
| • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | - | • |

Interface relays R600 range Ordering details



R600 - 6 mm





Ordering details - 1 n/c contact: 250 V, 10 mA - 6 A (high level), width 12 mm

| | Particularities and connection type | | Туре | Order code | qty | Weight (1 pce) kg (lb) |
|------------|-------------------------------------|---|-------------------|-----------------|-----|------------------------------|
| | RC circuit parallel to | 4 | RB101AR-24VAC/DC | 1SNA645019R0400 | | 0.04 |
| 24 V AC/DC | contact on output side | ₩ | RBR101AR-24VAC/DC | 1SNA645519R0600 | 5 | (0.088) |

Ordering details - 1 n/o contact: 250 V, 10 mA - 6 A (high level) width 6 mm

| | Particularities and connection type | | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|-------------|-------------------------------------|----------|------------------|-----------------|-------|------------|------------------------------|
| 24 V AC/DC | | ♣ | RB111A-24VAC/DC | 1SNA645014R2700 | | | |
| 115 V AC/DC | | ♣ | RB111A-115VAC/DC | 1SNA645016R2100 | | | 0.02 |
| 230 V AC/DC | | ♣ | RB111A-230VAC/DC | 1SNA645017R2200 | | 10 | (0.044) |
| 24 V AC/DC | | ₩ | RBR111A-24VAC/DC | 1SNA645514R2100 | | | |

Ordering details - 1 n/o contact: 250 V, 10 mA - 6 A (high level), width 12 mm

| Rated control supply voltage connection type | | | Туре | Order code | qty | Weight (1 pce) kg (lb) |
|--|------------------------|---|-------------------|-----------------|---------|------------------------------|
| 24 V AC/DC | RC circuit parallel to | ቆ | RB111AR-24VAC/DC | 1SNA645018R0300 | _ | 0.04 |
| 24 V AU/DC | contact on output side | ₩ | RBR111AR-24VAC/DC | 1SNA645518R0500 | 5 | (0.088) |

Ordering details - 1 c/o (SPDT) contact: 250 V, 1 mA - 6 A (low level), width 6 mm

| | Particularities and connection type | | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|---------------|-------------------------------------|---|--------------------|-----------------|-------|------------|------------------------------|
| 5 V DC | A1-A2 polarized | 4 | RB121-5VDC | 1SNA645036R2500 | | | |
| 12 V DC | | 4 | RB121-AU-12VDC | 1SNA645075R0000 | | | |
| 24 V DC | | 4 | RB121-AU-24VDC | 1SNA645072R0000 | | | |
| 24 V AC/DC | | 4 | RB121A-24VAC/DC | 1SNA645005R0700 | | | |
| 48-60 V AC/DC | | 4 | RB121A-48-60VAC/DC | 1SNA645006R0000 | | | |
| 115 V AC/DC | | 4 | RB121A-115VAC/DC | 1SNA645007R0100 | | | |
| 230 V AC/DC | | 4 | RB121A-230VAC/DC | 1SNA645008R1200 | | 10 | 0.02 |
| 5 V DC | A1-A2 polarized | * | RBR121-5VDC | 1SNA645536R2700 | | 10 | (0.044) |
| 12 V DC | | ₩ | RBR121-AU-12VDC | 1SNA645575R0000 | | | : |
| 24 V DC | | ₩ | RBR121-AU-24VDC | 1SNA645572R0000 | | | |
| 24 V AC/DC | | ₩ | RBR121A-24VAC/DC | 1SNA645505R0100 | | | |
| 48-60 V AC/DC | | ₩ | RBR121A-48-60VUC | 1SNA645506R0200 | | | |
| 115 V AC/DC | | * | RBR121A-115VAC/DC | 1SNA645507R0300 | | | |
| 230 V AC/DC | | * | RBR121A-230VAC/DC | 1SNA645508R1400 | | | |

Interface relays R600 range Ordering details



R600 - 12 mm



screw terminals



spring terminals

Ordering details - 1 c/o (SPDT) contact; 250 V. 10 mA - 6 A (high level), width 6 mm

| Rated control supply voltage | Particularities a connection type | | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|------------------------------|-----------------------------------|----|--------------------|-----------------|-------|------------|------------------------------|
| 5 V DC | A1-A2 polarized | 4 | RB121-5VDC | 1SNA645034R2300 | | | |
| 12 V DC | A1-A2 polarized | -₫ | RB121-12VDC | 1SNA645035R2400 | | | |
| 12 V DC | | 4 | RB121-12VDC | 1SNA645073R0000 | | | |
| 24 V DC | | 4 | RB121-24VDC | 1SNA645071R0000 | | | |
| 24 V AC/DC | | 4 | RB121A-24VAC/DC | 1SNA645001R0300 | | | |
| 48-60 V AC/DC | | | RB121A-48-60VAC/DC | 1SNA645002R0400 | | | |
| 115 V AC/DC | | | RB121A-115VAC/DC | 1SNA645003R0500 | | | |
| 230 V AC/DC | | 4 | RB121A-230VAC/DC | 1SNA645004R0400 | | 40 | 0.02 |
| 5 V DC | A1-A2 polarized | ₩ | RBR121-5VDC | 1SNA645534R2500 | | 10 | (0.044) |
| 12 V DC | A1-A2 polarized | ₩ | RBR121-12VDC | 1SNA645535R2600 | | | |
| 12 V DC | | ₫, | RBR121-12VDC | 1SNA645573R0000 | | | |
| 24 V DC | | ∜ | RBR121-24VDC | 1SNA645571R0000 | | | |
| 24 V AC/DC | | ₩ | RBR121A-24VAC/DC | 1SNA645501R0500 | | | |
| 48-60 V AC/DC | | ₩ | RBR121A-48-60VUC | 1SNA645502R0600 | | | |
| 115 V AC/DC | | 4 | RBR121A-115VAC/DC | 1SNA645503R0700 | | | |
| 230 V AC/DC | | ₫, | RBR121A-230VAC/DC | 1SNA645504R0000 | | | |

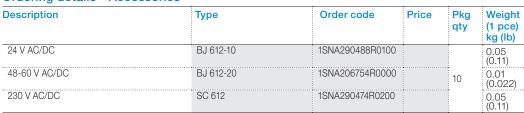
Ordering details - 1 c/o (SPDT) contact: 250 V, 10 mA - 6 A (high level), width 12 mm

| | Particularities and connection type | | Type | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|----------------|-------------------------------------|----------|--------------------|-----------------|-------|------------|------------------------------|
| 60-230 V AC/DC | = | <i></i> | RB121A-60-230VUC | 1SNA645020R0100 | | | |
| 115 V AC/DC | Leakage current | å | RB121AR-115VAC/DC | 1SNA645046R0700 | | | |
| 230 V AC/DC | protection, input side | Å | RB121AR-230VAC/DC | 1SNA645011R2400 | | | 0.04 |
| 60-230 V AC/DC | 4 | 8 | RBR121A-60-230VUC | 1SNA645520R0300 | | | (0.088) |
| 115 V AC/DC | Leakage current | W | RBR121AR-115VAC/DC | 1SNA645546R0100 | | | |
| 230 V AC/DC | protection, input side | b | RBR121AR-230VAC/DC | 1SNA645511R2600 | | | |

Ordering details - 2 c/o (SPDT) contacts: 250 V, 1 mA - 8 A (low level), width 12 mm

| Rated control supply voltage | Connection type | Type | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|------------------------------|-----------------|--------------------|-----------------|-------|------------|------------------------------|
| 24 V AC/DC | <u>.</u> å | RB122A-24VAC/DC | 1SNA645012R2500 | | | |
| 48-60 V AC/DC | . å | RB122A-48-60VAC/DC | 1SNA645040R1500 | | | |
| 115 V AC/DC | _å | RB122A-115VAC/DC | 1SNA645041R0200 | | | |
| 230 V AC/DC | _å | RB122A-230VAC/DC | 1SNA645013R2600 | | _ | 0.04 |
| 24 V AC/DC | 4 | RBR122A-24VAC/DC | 1SNA645512R2700 | | 5 | (0.088) |
| 48-60 V AC/DC | 4 | RBR122A-48-60VUC | 1SNA645540R1700 | | | į |
| 115 V AC/DC | 4 | RBR122A-115VAC/DC | 1SNA645541R0400 | | | • |
| 230 V AC/DC | 4 | RBR122A-230VAC/DC | 1SNA645513R2000 | | | • |

Ordering details - Accessories





Interface relays R600 range Connection diagrams

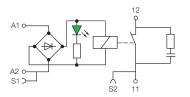
 11-12
 n/c contact

 13-14
 n/o contact

 11-12/14
 1st c/o contact

 21-22/24
 2nd c/o contact

A1-A2 Control supply voltage
 S1 Connection for jumper bar (input side)
 S2 Connection for jumper bar (output side)

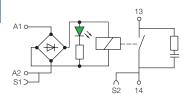


XDC 292 030 F

A1 0 13 NA2 0 S1 D NA2

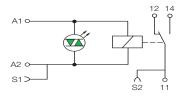
RB/RBR 111 A - 48/60/115/230 V AC/DC

RB/RBR 101 AR



A2 0 S1 > S2 11

RB/RBR 111 A - 24 V AC/DC



RB/RBR 111 AR



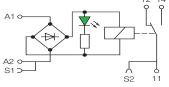
RB/RBR 121

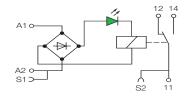
- 5 V DC, A1-A2 polarized

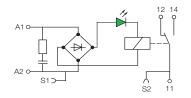
- 12 V DC, A1-A2 polarized, i.e. only: 1SNA645035R2400, 1SNA645535R2600

RB/RBR 121 (AU) - 12/24 V DC, except:

1SNA645035R2400, 1SNA645535R2600 see connection diagram RB...121-5VDC



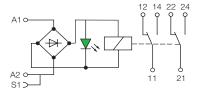


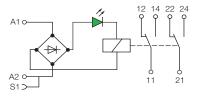


RB/RBR 121 A - 24 V AC/DC

RB/RBR 121 A - 48/60/115/230 V AC/DC

RB/RBR 121 AR





RB/RBR 122 A - 115/230 V AC/DC

RB/RB 122 A - 24/48/60 V AC/DC

Interface relays R600 range Technical data

| | | | RB 111A | high level | |
|---|--|----------------------|--|---------------------------------------|-----------------|
| Input circuit | 1 | | | | |
| Rated control supply voltage U _s | 24 V AC/DC | 48 V AC/DC | 60 V AC/I | DC 115 V AC/DC | 230 V AC/DC |
| tolerance AC | -15 %, +20 % -/+ 10 % | | | · · · · · · · · · · · · · · · · · · · | -15 %, +10 % |
| Rated frequency Typical power consumption | 50/60 Hz 0.24 W | 0.34 W | 0.54 W | 0.46 W | 0.8 W |
| Typical current Drop-out voltage Indication of operational states green LED | 10 mA 4.5 V | 7 mA 8 V | 9 mA 8 V | 4 mA 17 V | 3.5 mA 27 V |
| Output circuit | 1 L: CONTROL | supply voltage appli | iea | | |
| - | relay, 1 n/o cont | act | | | |
| Minimum switching voltage Maximum switching voltage Minimum switching current | 12 V 250 V AC 10 mA | | | | |
| Rated free air thermal current I _{th} | 6 A | | | | |
| Rated operational AC-12 (resistive) 230 V current AC-15 (inductive) 230 V | 6 A | | ······ | | |
| (IEC/EN 60947-5-1) AC-15 (inductive) 120 V | 3 A | | | | |
| DC-12 (resistive) 24 V | | | ······ | | |
| DC-13 (inductive) 24 V DC-13 (inductive) 120 V | | | ······································ | | |
| DC-13 (inductive) 230 V | | | | ••••• | |
| AC rating Utilization category (pilot duty) (UL 508; NEMA ICS-5) | B300 | | | | |
| DC rating (UL 508; NEMA ICS-5) Utilization category (pilot duty) | R300 | | | | |
| Minimum switching power | 0.6 W / 0.6 VA | | | | |
| Mechanical lifetime Electrical lifetime at AC-15 | 1 x 10 ⁷ switching 1 x 10 ⁵ switching | | | | |
| Response time | 5 ms | 5 ms | 5 ms | 6 ms | 7 ms |
| Release time | 8 ms | 8 ms | 8 ms | 15 ms | 15 ms |
| Dimensions and weight | F | RB 111 A high level | · | RBR 111 A | high level |
| Weight net weight | 0.02 kg (0.044 lb | 0) | : | | |
| Dimension product dimension | 6 x 70 x 75 mm (| (0.236 x 2.76 x 2.95 | in) | 6 x 75 x 75 mm (0.236 x 2 | 2.95 x 2.95 in) |
| · · · · · · · · · · · · · · · · · · · | | • | | | |

Interface relays R600 range Technical data

| | RB 111AR high level | RB 101AR high level |
|---|---|---|
| Input circuit | | |
| Rated control supply voltage U _s | 24 V AC/DC | |
| Rated control supply voltage U_ DC | -15 %, +20 % | ······································ |
| | -/+ 10 % | ····· |
| Rated frequency | 50/60 Hz | |
| Typical power consumption | 0.24 W | |
| Typical current | 10 mA | |
| Drop-out voltage | 4.5 V | |
| Indication of operational states green LED | : control supply voltage applied | |
| Output circuit | | |
| Kind of output 11-12 | | relay, 1 n/c contact |
| 13-14 | relay, 1 n/o contact | - |
| Rated operational voltage U _e (IEC/EN 60947-1) | 250 V AC | |
| Minimum switching voltage | 12 V | |
| Maximum switching voltage | 250 V AC | |
| Minimum switching current | 10 mA | |
| Rated free air thermal current I _{th} | 6 A | |
| Rated operational AC-12 (resistive) 230 V | | |
| | 1.5 A | |
| | 3 A | |
| DC-12 (resistive) 24 V | | |
| DC-13 (inductive) 24 V DC-13 (inductive) 120 V | | |
| DC-13 (inductive) 120 V | | |
| AC rating Utilization category (pilot duty) | | |
| (UL 508; | 2000 | |
| NEMA ICS-5) | | |
| DC rating Utilization category (pilot duty) | R300 | ······································ |
| (UL 508; | | |
| NEMA ICS-5) | | |
| Minimum switching power | 0.6 W / 0.6 VA | |
| Mechanical lifetime | 1 x 10 ⁷ switching cycles | |
| | 1 x 10 ⁵ switching cycles | |
| Response time Release time | 5 ms 8 ms | |
| Dimensions and weight | RB 111AR / RB 101AR high level | RBR 111A / RBR 111AR high level |
| | 0.03 kg (0.066 lb) | non IIIA/ non IIIAn Iligii level |
| | 12 x 70 x 75 mm (0.472 x 2.76 x 2.95 in) | 12 x 75 x 75 mm (0.472 x 2.95 x 2.95 in) |
| Dimension product dimension | 12 × 10 × 13 HIIII (0.412 × 2.10 × 2.93 HI) | 12 A 10 A 10 HIIII (0.412 X 2.80 X 2.80 HI) |

Interface relays R600 range Technical data

| | | | RB 12 | 21 / RB 121A | high level | | |
|---|---------------------|---|-----------------|---------------|--|-----------------------|----------------|
| Input circuit | | | | | | | |
| Rated control supply voltage U _s | 5 V DC | 12 V DC | 24 V AC/DC | 48 V AC/DC | 60 V AC/DC | 115 V AC/DC | 230 V AC/DC |
| Rated control supply voltage U _s DC | -15 %, | +20 % | . | | | 2 | -15 %, +10 % |
| tolerance AC | - | | -/+ 10 % | | ···· | | |
| Rated frequency | _ | | 50/60 Hz | ···• | ···• | ···• | |
| Typical power consumption | 0.2 W | 0.2 W | 0.24 W | 0.33 W | 0.54 W | 0.46 W | 0.8 W |
| Typical current Drop-out voltage | 40 mA | 16 mA 2.2 V | 10 mA 4.5 V | 7 mA 8 V | 9 mA 8 V | 4 mA 17 V | 3.5 mA 27 V |
| Indication of operational states green LED | | 7: control supply | | O V | O V | : 17 V | 21 V |
| | 1 | t. Control supply | voitage applied | | | | |
| Output circuit | luster e | 1 - /- (ODDT) t | | | | | |
| Kind of output 11-12/14 Rated operational voltage U _e (IEC/EN 60947-1) | 250 V | l c/o (SPDT) conta AC | acı | | ····· | ···· | |
| Minimum switching voltage | 12 V | | ······ | | ···· | ····· | |
| Maximum switching voltage | 250 V | AC | ······ | ···• | ···• | ····• | |
| Minimum switching current | 10 mA | | | | ···• | ···• | |
| Rated free air thermal current I _{th} | 6 A | | | | | | |
| Rated operational AC-12 (resistive) 230 V | 6 A | | | | | * | ••••• |
| current AC-15 (inductive) 230 V (IEC/EN 60947-5-1) AC-15 (inductive) 120 V | 1.5 A | ······ | | | ···• | ··· · ···· | |
| DC-12 (resistive) 24 V | 4 | ······ | ······ | ······ | ···•·································· | ···•··· | ••••• |
| DC-12 (resistive) 24 V | | •••••• | | | ···• | ···• | •••••• |
| DC-13 (inductive) 120 V | * | ••••• | | | ···• | ···• | •••••• |
| DC-13 (inductive) 230 V | 0.1 A | ••••• | •••••••••• | | •••• | ••••• | ••••• |
| AC rating Utilization category (pilot duty) | B300 | *************************************** | | | •••• | * | • |
| (UL 508; | | | | | | | |
| NEMA ICS-5) | D000 | | | | ···• | ···• | |
| DC rating Utilization category (pilot duty) (UL 508; | R300 | | | | | | |
| NEMA ICS-5) | | | | | | | |
| Minimum switching power | 0.6 W | / 0.6 VA | | | ···· | | |
| Mechanical lifetime | 1 x 107 | switching cycles | ············· | | ····• | ····• | ••••• |
| Electrical lifetime at AC-15 | 1 x 10 ⁵ | switching cycles | | | ···· | ···· | |
| Response time | 5 ms | 5 ms | 5 ms | 5 ms | 5 ms | 6 ms | 7 ms |
| Release time | 8 ms | 8 ms | 8 ms | 8 ms | 8 ms | 15 ms | 16 ms |
| Dimensions and weight | | RB 121 / RB 121/ | A high level | | RBR 121 / RBF | R 121 A high lev | el |
| Weight net weight | | | 0.70 0.05 !- \ | 107575 | /0.000 | 0.05 !-> | ••••• |
| Dimension product dimension | 16 х 70 | x /5 mm (0.236 x | 2.76 X 2.95 In) | 0 X /5 X /5 r | nm (0.236 x 2.9 | 95 x 2.95 in) | |

Interface relays R600 range Technical data

| | | | RB 12 | 21 / RB 121A | low level | | |
|--|-------------------------|--|--------------------|-----------------------|----------------------|------------------------|--------------|
| Input circuit | | | | | | | |
| Rated control supply voltage U _s | 5 V DC | 12 V DC | 24 V AC/DC | 48 V AC/DC | 60 V AC/DC | 115 V AC/DC | 230 V AC/DC |
| Rated control supply voltage U DC | -15 %, +20 | 0 % | ····· i | | | ··· · ····· | -15 %, +10 % |
| Rated control supply voltage U _s DC tolerance AC | - | | -/+ 10 % | | | | • |
| Rated frequency | _ | | 50/60 Hz | ··•··· | | , | |
| Typical power consumption | 0.2 W | 0.2 W | 0.24 W | 0.33 W | 0.54 W | 0.46 W | 0.8 W |
| Typical current | 40 mA | 16 mA | 10 mA | 7 mA | 9 mA | 4 mA | 3.5 mA |
| Drop-out voltage Indication of operational states green LED | 1.2 V | 2.2 V | 4.5 V | 8 V | 8 V | 17 V | 27 V |
| |] I: C | ontrol supply vo | oitage applied | | | | |
| Output circuit | | | | | | | |
| Kind of output 11-12/14 Rated operational voltage U _e (IEC/EN 60947-1) | relay, 1 c/ 250 V AC | o (SPDT) contac | t | | | | |
| Minimum switching voltage | 5 V | | ······ | | | | |
| Maximum switching voltage | 250 V AC | | ······ | . | . | | |
| Minimum switching current | 1 mA | | ····· | | | | |
| Rated free air thermal current I _{th} | 6 A | | | | | | |
| Rated operational AC-12 (resistive) 230 V | | | | ····· | ···· | | |
| | 1.5 A | | | | | | |
| IEC/EN 60947-5-1) AC-15 (inductive) 120 V | | | | | | | |
| DC-12 (resistive) 24 V | | | ·····• | ·· · ····· | ·· · ···· | ···• | |
| DC-13 (inductive) 24 V DC-13 (inductive) 120 V | | | ·····• | ·· · ····· | ·· · ····· | | |
| DC-13 (Inductive) 120 V | | ······································ | ·····• | ·· · ····· | ··•···· | | ••••• |
| AC rating Utilization category (pilot duty) | B300 | | | ·· * ····· | •••••• | | •••••• |
| UL 508; NEMA ICS-5) | 2000 | | | | | | |
| OC rating Utilization category (pilot duty) /UL 508; NEMA ICS-5) | R300 | | | | | | |
| Minimum switching power | 0.05 W / 0 | 0.05 VA | •••••• | ·· · ····· | ••••• | | •••••• |
| Mechanical lifetime | 1 x 10 ⁷ sw | ritching cycles | ······ | | | | |
| Electrical lifetime at AC-15 | 1 x 10 ⁵ sw | ritching cycles | | | | | |
| Response time | 5 ms | 5 ms | 5 ms | 5 ms | 5 ms | 6 ms | 7 ms |
| Release time | 8 ms | 8 ms | 8 ms | 8 ms | 8 ms | 15 ms | 16 ms |
| Dimensions and weight | | 3 121 / RB 121A | low level | | RBR 121 / RBI | R 121 A low lev | el |
| Veight net weight | | | | | | | |
| Dimension product dimension | 6 x 70 x 7 | 5 mm (0.236 x 2 | 2.76 x 2.95 in) | 6 x 75 x 75 m | nm (0.236 x 2.9 | 95 x 2.95 in) | |

Interface relays R600 range Technical data

| | | | RB 121Al | R high level | | |
|--|-------------------------------|--|--|---|---|------------------------|
| Input circuit | | | | | | |
| Rated control supply voltage U _s | 115 V AC/DC | 23 | 30 V AC/DC | | | |
| Rated control supply voltage U _s DC | -20%, +15% | -10 | 0%, +15% | | | |
| tolerance AC | | | | | | |
| Rated frequency | 50/60 Hz 2 W | . 0 | O \A/ | | | |
| Typical power consumption Typical current | ∠ vv 18 mA | | 8 W 2 mA | | | |
| Drop-out voltage | 17 V | 27 | 7 V | | ••••• | |
| Indication of operational states green LED | ☐ : control s | upply voltage appli | ied | | ••••• | |
| Output circuit | | | | | | |
| Kind of output 11-12/14 | |) contact | | | | |
| Rated operational voltage U _e (IEC/EN 60947-1) | 250 V AC | | | | | |
| Minimum switching voltage | 12 V | | | | | |
| Maximum switching voltage | 250 V AC 10 mA | | | | | |
| Minimum switching current Rated free air thermal current I _{sh} | 6 A | | | | | |
| Rated operational AC-12 (resistive) 230 V | L | ······································ | | | | |
| current AC-15 (inductive) 230 V | | ······································ | | | | |
| (IEC/EN 60947-5-1) AC-15 (inductive) 120 V | | • | | | | |
| DC-12 (resistive) 24 V | | | | | | |
| DC-13 (inductive) 24 V DC-13 (inductive) 120 V | | | | | | |
| DC-13 (inductive) 120 V | | ······································ | | | · • · · · · · · · · · · · · · · · · · · | |
| AC rating Utilization category (pilot duty) | | | | | ••••• | |
| (UL 508; NEMA ICS-5) | | | | | | |
| DC rating Utilization category (pilot duty) (UL 508; NEMA ICS-5) | R300 | | | | | |
| Minimum switching power | 0.6 W / 0.6 VA | | | | | |
| Mechanical lifetime | 1 x 10 ⁷ switching | | | | | |
| Electrical lifetime at AC-15 | 1 x 10 ⁵ switching | | | | | |
| Response time Release time | 6 ms 15 ms | | ms 3 ms | | | |
| Dimensions and weight | 10 1110 | RB 121AR hig | | | RBR | 121AR high level |
| | 0.03 kg (0.066 lb) | TID TETATION | 91110101 | | - Hon | 1217 ti Tingiri 10 (0) |
| Dimension product dimension | | 0.472 x 2.76 x 2.95 | ō in) | | 12 x 75 x 7 (0.472 x 2.9 | '5 mm 95 x 2.95 in) |
| Technical data | | | DD 400/ | N I a continue I | | |
| | | | RB 122 <i>F</i> | A low level | | |
| Input circuit | 041/40/00 | . 40.1/ AO/DO | : 00 \/ \0 // | DO :445.V | A O /D O | : 000 V AO /DO |
| Rated control supply voltage U _s | 24 V AC/DC | 48 V AC/DC | 60 V AC/I | DC 115 V | AC/DC | 230 V AC/DC |
| tolerance AC | | . | ······································ | | | -15 %, +10 % |
| Rated frequency | 50/60 Hz 0.48 W | 0.62 W | 0.96 W | 0.58 \ | Λ/ | 1.15 W |
| Typical power consumption Typical current | 20 mA | 0.62 W 13 mA | 16 mA | 0.58 v 5 mA | / V | 5 mA |
| Drop-out | 5.4 V | 8.8 V | 8.8 V V | 20 V | | 10 V |
| Indication of operational states green LED | ☐ : control s | upply voltage appli | | | | |
| Output circuit | | | | | | |
| Kind of output 11-12/14 | ↓ | | | •••• | | |
| 21-22/24 Rated operational voltage U _e (IEC/EN 60947-1) | 250 V AC | DT) contact | | | | |
| Minimum switching voltage | 5 V | | | • | | |
| Maximum switching voltage Minimum switching current | 250 V DC - 250 V 1 mA | AU | | • · · · · · · · · · · · · · · · · · · · | | |
| Rated free air thermal current I | 1 MA 8 A | | | • | | |
| Rated operational AC-12 (resistive) 230 V | 8 A | | ······································ | <u> </u> | | |
| current (IEC/EN 60947-5-1) DC-12 (resistive) 24 V | 8 A | | | <u> </u> | | |
| Minimum switching power | 5 mW / 5 mVA | ····• | | • | | |
| Mechanical lifetime | 2 x 10 ⁷ switching | cycles | | | | |
| Electrical lifetime at AC-15 | 1 x 105 switching | cycles | | | | |
| Response time | 6 ms | 10 ms 14 ms | 10 ms 14 ms | 6 ms | | 6 ms |
| Release time Dimensions and weight | 10 ms | B 122A low level | ; 14 IIIS | 15 ms | RBR 122A lo | 15 ms |
| | 0.03 kg (0.066 lb) | 122A IOW IEVEL | | | 1DU 1554 10 | W ICVEI |
| Dimension product dimension | | 0.472 x 2.76 x 2.95 | 5 in) | 12 x 75 x 75 mm | า (0.472 x 2.9 | 95 x 2.95 in) |
| | | | , | | , | |

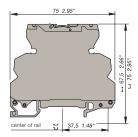
Interface relays R600 range General technical data

| | | RB | RBR |
|--|------------------------|---|-------------------------|
| General data | - | | |
| Material of housing | | UL 94 V0 | |
| Mounting | •••••• | DIN Rail | |
| Degree of protection | housing / terminals | IP20 NEMA1 | |
| Electrical connection | | Screw terminal | Spring-type terminal |
| Wire size fi | ne-stranded rigid | 0.22-2.5 mm² (24-14 AWG) 0.2-4 mm² (24-12 AWG) | 0.2-2.5 mm² (24-14 AWG) |
| Stripping length | | 19 mm / 0.354 in | |
| Tightening torque | | 0.4-0.6 Nm (3.5-5.3 lb.in) | |
| Environmental data | | | |
| Ambient temperature ranges | storage | -40+80 °C | |
| | operation | -20+70 °C | |
| Isolation data | | | |
| Rated insulation voltage U _i (IEC/EN 60 EN 50178) | 950-1, | 4000 V RMS | |
| | | 4000 V RMS (RB122A: 3800 V RMS, RB111AR: 3 | 3500 V RMS) |
| voltage U _{imp} (EN 50178) shock | coil / output | 4000 V RMS | |
| out | put / output | 1000 V RMS | |

Interface relays R600 range Dimensional drawings, Load limit curves

All interface relays of R600 range

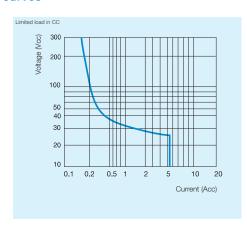




Screw clamp module

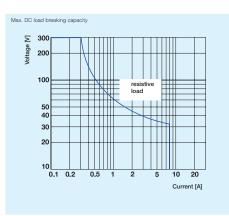
Spring clamp module

Load limit curves



Versions with 1 n/o, 1 n/c or 1 c/o contact

| 24 V 6 A 6 A 1 3 A 110/120 V 0,3 A 6 A 0.2 A 3 A | | 12 DC-13 AC-15 | AC-12 | AC-15 |
|---|-----------|----------------|-------|-------|
| 110/120 V 0,3 A 6 A 0.2 A 3 A | 24 V | 1 3 A | 6 A | 3 A |
| | 110/120 V | 0.2 A 3 A | 6 A | 3 A |
| 220/230 V 0.2 A 6 A 0.1 A 3 A | 220/230 V | 0.1 A 3 A | 6 A | 3 A |



Versions with 2 c/o contacts

Optocouplers R600 range Selection

| | Order number | 1SNA645047R0000 | 1SNA645547R0200 | 1SNA645021R2600 | 1SNA645521R2000 | 1SNA645049R1200 | 1SNA645549R1400 | 1SNA645022R2700 | 1SNA645522R2100 | 1SNA645050R1700 | 1SNA645550R1100 | 1SNA645051R0400 | 1SNA645025R2200 | 1SNA645024R2100 | 1SNA645551R0600 | 1SNA645525R2400 | 1SNA645524R2300 | 1SNA645053R0600 | 1SNA645553R0000 | 1SNA645054R0700 | 1SNA645058R1300 | 1SNA645554R0100 | 1SNA645558R1500 | 1SNA645026R2300 | 1SNA645059R1400 | 1SNA645526R2500 | 1SNA645559R1600 | 1SNA645027R2400 | 1SNA645029R0600 | 1SNA645527R2600 | 1SNA645529R0000 | |
|----------------|--------------|-------------------|--------------------|-----------------|------------------|-----------------------|------------------------|-------------------------|--------------------------|-------------------|--------------------|-----------------|--------------------|-----------------|------------------|---------------------|------------------|-----------------------|------------------------|---------------------|---------------------|----------------------|----------------------|---------------------|---------------------|----------------------|----------------------|-----------------|-----------------|------------------|------------------|----------|
| | Ord | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | 1SN/ | |
| | | | | | | | | 0 | 8 | | | | | | | | | | ပ္ | | | | | | | | | | | | | |
| | | | O | | | 2/00 | OBRIC 0100 48-60VAC/DC | OBIC 0100 115-230VAC/DC | OBRIC 0100 115-230VAC/DC | O | 2 | | 2 | | () |)/DC | () | OBOC 1000-48-60VAC/DC | OBROC 1000-48-60VAC/DC |)Q |)Q(| C/DC | C/DC | 200 |) DC | OBROC 1000-230VAC/DC | OBROC 5000-230VAC/DC | | | | 0 | |
| | | 2VDC | OBRIC 0100 5-12VDC | DC | VDC | OBIC 0100 48-60VAC/DC | %09-s | -230V | 5-230 | OBOC 1000-5-12VDC | OBROC 1000-5-12VDC | VDC | OBOC 1500-24VAC/DC | NDC | OBROC 1000-24VDC | OBROC 1500-24VAC/DC | OBROC 5000-24VDC | %09-8 | 18-60 | OBOC 1000-115VAC/DC | OBOC 5000-115VAC/DC | OBROC 1000-115VAC/DC | OBROC 5000-115VAC/DC | OBOC 1000-230VAC/DC | OBOC 5000-230VAC/DC | 230VA | 230VA | VDC | VDC | OBROA 1000-24VDC | OBROA 2000-24VDC | |
| | | 0 5-12 | 00 5- | 0 24V | 00 24 | 0 48- | 00 48 | 0 115 | 00 11 | -9-00 | -000 | 00-24 | 00-24 | 00-2 | 7-000 | 200-5 | 000 | 00-48 | 7-000 | 00-11 | 00-11 | -000 | -000 | 00-23 | 00-23 | 7-000 | 000 | 20-54 | 00-24 | 2-000 | 000-5 | |
| | e | OBIC 0100 5-12VDC | 3IC 01 | OBIC 0100 24VDC | OBRIC 0100 24VDC | C 010 | 3IC 01 | C 010 | 3IC 01 | JC 10 | 30C 1 | OBOC 1000-24VDC | JC 15 | OBOC 5000-24VDC | 30C 1 | 30C 1 | 30C 5 | OC 10 | 30C 1 | OC 10 | C 50 | 30C 1 | 30C 5 | OC 10 |)C 50 | 30C 1 | 30C 5 | OBOA 1000-24VDC | OBOA 2000-24VDC | 30A 1 | 30A 2 | |
| | Туре | OBI | OBF | OBI | 9B | OBI | JB OB | OBI | JB OB | OBC | OBF | OBC | OBC | OBC | OBF | OBF | 9B | OBC | 9B | OBC | OBC | OBF | OBF | OBC | OBC | OBF | OBF | OBC | OBC | JB | OBF | <u> </u> |
| Input voltage | | | | | | | | : | | | | | | | | | | | | | | | | | | : | | | | | - | : |
| 5-12 V DC | | = | • | | | | | | | - | - | | | | | | | | | | | | | | | | | | | | | <u>.</u> |
| 24 V DC | | ļ | ļ | • | • | | | ļ | | ļ | | • | - | • | • | = | - | | | | | | | , | | ļ | ļ | • | • | • | • | <u>.</u> |
| 48-60 V DC | | | | ļ | | - | • | | | | | | | | | | | • | - | | | | | | | | ļi | | | ļ | | <u>.</u> |
| 115-230 V DC | | | | | | | | • | • | | | | | | | | | | | | | | | | | <u>.</u> | <u>.</u> | | | ļļ | | <u>.</u> |
| 115 V DC | | | | | | | | | | | | | | | | | | | | - | • | • | • | | | | <u>.</u> | | | <u> </u> | | <u>.</u> |
| 230 V DC | | | | <u>.</u> | | | | • | • | <u>.</u> | | | | | | | | | | | | | | • | • | • | • | | | <u> </u> | | <u>.</u> |
| 24 V AC | | | | | | | | <u>.</u> | | | | | - | | | - | | | | | | | | , | | <u>.</u> | | | | | | <u>.</u> |
| 48-60 V AC | | | | | | • | • | | | | | | | | | | | • | • | | | | : : : : | | | <u>.</u> | | | | | | <u>.</u> |
| 115-230 V AC | | | | | | | | • | • | | | | | | | | | | | | | | | | | | | | | | | |
| 115 V AC | | | | | | | | | | | | | | | | | | | | - | • | • | - | | | | | | | | | |
| 230 V AC | | | | | | | | | | | | | | | | | | | | | | | | • | • | • | • | | | | | |
| Output rating | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 mA | | | - | • | - | • | • | • | • | | | | | | | | | | | | | | | | | | | | | | | |
| 2 A | | | | | | | | | | • | • | • | • | | • | • | | • | • | • | | - | | • | | • | | | • | | • | |
| 5 A | | | | | | | | | | | | | | • | | | • | | | | • | | • | | • | | • | | | | | |
| 1 A | | | | | | | | | | | | | | | | | | | | | | | | | | | | • | | • | | |
| Output voltage | | | | | | | | | | | | | | | | | | • | | | | | | _ | | - | | | | | | |
| 58 V DC | | - | • | • | - | • | • | • | • | • | • | - | - | - | • | • | • | - | • | • | • | • | • | • | • | • | • | | | | | |
| 230 V AC | | | | | | | | | | | | | | | | | | • | | | | | | , | | | | | • | | • | |
| 400 V AC | | | | | | | | | | | | | | | | | | • | | | | | <u>.</u> | | | <u>.</u> | | • | | • | [| |
| Terminal type | | | نـــــ | | : | : | | : | : | : | | : | | | | | : | | | | | | | | | | | | | | | - |
| Screw | | - | | • | | • | | • | | • | | • | - | • | | | | - | | • | • | | | • | • | | | • | • | | | |
| Spring | | | • | | | | • | | • | | • | | | | | • | | ••••••• | • | | | - | • | | | - | | | | - | | |

Optocouplers R600 range Selection

| 1SNA645061R0600 | 1SNA645561R0000 | 1SNA645062R0700 | 1SNA645562R0100 | 1SNA645028R0500 | 1SNA645528R0700 |
|---------------------------------------|--|-------------------------------------|--------------------------------------|-------------------------------------|----------------------|
| OBOA 1000-48-60VAC/DC 1SNA645061R0600 | OBROA 1000-48-60VAC/DC 1SNA645561R0000 | OBOA 1000-115VAC/DC 1SNA645062R0700 | OBROA 1000-115VAC/DC 1SNA645562R0100 | OBOA 1000-230VAC/DC 1SNA645028R0500 | OBROA 1000-230VAC/DC |
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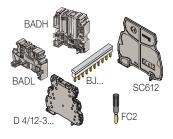
Optocouplers R600 range Ordering details



Ordering details - R600 range

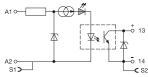
| R600 Optocoupler | | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|--|------------|--------------------------|-----------------|-------|------------|------------------------------|
| | ቆ | OBIC 0100-5-12VDC | 1SNA645047R0000 | | | |
| 0-1 | 4 | OBIC 0100-24VDC | 1SNA645021R2600 | | 40 | 0.02 |
| Optocoupler module 100 mA/DC | ቆ | OBIC 0100-48-60VAC/DC | 1SNA645049R1200 | | 10 | (0.44) |
| | ቆ | OBIC 0100-115-230VAC/DC | 1SNA645022R2700 | | : • | |
| | \$ | OBRIC 0100-5-12VDC | 1SNA645547R0200 | | | |
| Onto a sure la mara alcela 400 and A /DO | 4 | OBRIC 0100-24VDC | 1SNA645521R2000 | | 40 | 0.02 |
| Optocoupler module 100 mA/DC | * | OBRIC 0100-48-60VAC/DC | 1SNA645549R1400 | | 10 | (0.44) |
| | 4 | OBRIC 0100-115-230VAC/DC | 1SNA645522R2100 | | | |
| | ቆ | OBOC 1000-5-12VDC | 1SNA645050R1700 | | | |
| | ᠕ | OBOC 1000-24VDC | 1SNA645051R0400 | | | |
| 0.1 | ቆ | OBOC 1500-24VAC/DC | 1SNA645025R2200 | | | 0.02 |
| Optocoupler module 2 A/DC | 4 | OBOC 1000-48-60VAC/DC | 1SNA645053R0600 | | 10 | (0.44) |
| | 4 | OBOC 1000-115VAC/DC | 1SNA645054R0700 | | | |
| | 4 | OBOC 1000-230VAC/DC | 1SNA645026R2300 | | | |
| | \$ | OBROC 1000-5-12VDC | 1SNA645550R1100 | | | |
| | \$ | OBROC 1000-24VDC | 1SNA645551R0600 | | | |
| optocoupler module 2 A/DC | 4 | OBROC 1500-24VAC/DC | 1SNA645525R2400 | | | 0.02 |
| Optocoupler module 2 A/DC | 4 | OBROC 1000-48-60VAC/DC | 1SNA645553R0000 | | 10 | (0.44) |
| | 4 | OBROC 1000-115VAC/DC | 1SNA645554R0100 | | | |
| | \$ | OBROC 1000-230VAC/DC | 1SNA645526R2500 | | | |
| | ቆ | OBOC 5000-24VDC | 1SNA645024R2100 | | | |
| Optocoupler module 5 A/DC | ቆ | OBOC 5000-115VAC/DC | 1SNA645058R1300 | | 10 | 0.02 (0.44) |
| | ᠕ | OBOC 5000-230VAC/DC | 1SNA645059R1400 | | | (0.44) |
| | \$ | OBROC 5000-24VDC | 1SNA645524R2300 | | | |
| Optocoupler module 5 A/DC | \$ | OBROC 5000-115VAC/DC | 1SNA645558R1500 | | 10 | 0.02 (0.44) |
| | 4 | OBROC 5000-230VAC/DC | 1SNA645559R1600 | | | (0.44) |
| | ᠕ | OBOA 1000-24VDC | 1SNA645027R2400 | | | |
| Optocoupler module 1 A/AC | ቆ | OBOA 1000-48-60VAC/DC | 1SNA645061R0600 | | | 0.03 |
| 6 mm spacing | 4 | OBOA 1000-115VAC/DC | 1SNA645062R0700 | | 10 | (0.066) |
| | 4 | OBOA 1000-230VAC/DC | 1SNA645028R0500 | | | |
| Optocoupler module 2 A/AC 12 mm spacing | ₄ ħ | OBOA 2000-24VDC | 1SNA645029R0600 | | 5 | 0.03 (0.066) |
| | * | OBROA 1000-24VDC | 1SNA645527R2600 | | | |
| Optocoupler module 1 A/AC | 4 | OBROA 1000-48-60VAC/DC | 1SNA645561R0000 | | 10 | 0.03 |
| 6 mm spacing | 4 | OBROA 1000-115VAC/DC | 1SNA645562R0100 | | IU | (0.066) |
| | \$ | OBROA 1000-230VAC/DC | 1SNA645528R0700 | | | |
| Optocoupler module 2 A/AC 12 mm spacing | 4 | OBROA 2000-24VDC | 1SNA645529R0000 | | 5 | 0.03 (0.066) |



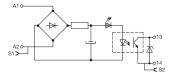


| Accessories | Туре | Order code | Price | Pkg qty | Weight (1 pce) kg (lb) |
|--------------------------|--------------|-----------------|-------|------------|------------------------------|
| | BADH V0 | 1SNA116900R2700 |) | 50 | |
| End section | BADL V0 | 1SNA399903R020 |) | 50 | |
| | BAM2 V0 | 1SNA399967R0100 |) | 50 | |
| Seperator end section | SC 612 | 1SNA290474R0200 |) | 10 | |
| Divisible shunt 10 poles | BJ 612-10 | 1SNA290488R0100 |) | 10 | |
| Divisible shunt 20 poles | BJ 612-20 | 1SNA206754R0000 |) | 10 | |
| Test plug DIA. 2 mm | FC2 | 1SNA645531R2200 |) | 10 | |
| Marking method | RC65 / RC610 | see marking | | | |

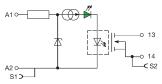
Optocouplers R600 range Connection diagrams



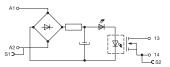
OB...IC 0100 - 5-12 V DC 115-230 V AC/DC



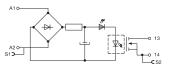
OB...IC 0100 24 V DC 24-48-60 V AC/DC



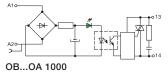
OB...OC 1000 - 5-12 V DC



OB...OC 1500 - 24 V AC/DC OB...OC 1000 24 V DC 48-60-115-230 V AC/DC



OB...OC 5000 24 V DC 24-48-60-115-230 V AC/DC



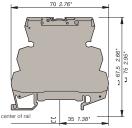
24 V DC 48-60-115-230 V AC/DC OB...OA 2000 - 24 V DC

Optocouplers R600 range Technical data

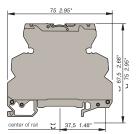
Optocoupler: 5 to 58 V DC output / 100 mA - 6 mm 0.236" spacing

| | | | | | OBIC 0100 | | | | | | |
|--|-------------------|-----------|---|---|------------|---------------|-----------------|--------------------|--|--|--|
| Relay characteristics coil | | | | | | | | | | | |
| Input voltage: +20%, -15% on DC; 10%, - | 10% on AC | 5 V DC - | 12 V DC | 24 V DC | 48 V AC/D0 | 60 V AC/DC | 115 V AC/DC | 230 V AC/DC | | | |
| Frequency | | | | | 50 / 60 Hz | | | | | | |
| Input current AC/DC | | 5 mA | 9 mA | 4 mA | 4 mA | 5 mA | 7 mA / 16 mA | 11.5 mA / 25 mA | | | |
| Pull-in voltage at Is=100% | | 4 V | • | 15 V | 25 V | | 60 V AC / 7 | 70 V DC | | | |
| Switching time C / O | | 10 µs / 5 | 00 µs | | | | | | | | |
| Operating frequency | | 1000 Hz | | | 5 ms / 20 | ms | 5 ms / 15 ms | | | | |
| Permissible leakage current | | | | | 20 Hz | | | | | | |
| Output | | 0.9 mA | | 1 mA | 0.9 mA | | 1.6 mA | | | | |
| Output voltage | | 4.5 to 58 | V DC | | | | | | | | |
| Output current min. | | 1 mA | | | | | | | | | |
| Output current max. | | 100 mA | | | | | | | | | |
| Output leakage current at U _{max} | | < 50 μΑ | | | | | | | | | |
| Residual voltage at I max and | typical | 1 V | | | | | | | | | |
| U rated | max | 1.3 V | | | | | | | | | |
| Frequency on inductive load | | | | | | | | ···•··· | | | |
| Isolation Input / Output | input / Output | 2500 V R | RMS | <u>.</u> | | | • | | | | |
| Temperature | storage | -40+80 | · · · · · · · • · · · · · · · · · · · · | <u>.</u> | | ···· | | | | | |
| | operating | -20+70 | °C 1) | | + | | | | | | |
| Other characteristics | | | Sci | rew clamp | | Spring | g clamp | | | | |
| Body material | grey | UL 94 V0 |) | | | | | | | | |
| | Solid wire | 0.2 - 4 m | ım² (24-12 AV | /G) | 0.2-2.5 mr | m² (24-12 AWG | à) | | | | |
| Wire size | Stranded wire | | 5 mm² (24-12 | | | | | | | | |
| Rated wire size | | 2.5 mm² (| (12 AWG) | • | | | | | | | |
| Wire stripping length | | 9 mm (0. | 354 in) | *************************************** | • | • | •••• | ••••• | | | |
| Recommended screwdriver | | 3.5 mm (| 0.137 in) | | ••••• | | ••••• | ••••• | | | |
| Protection | | IP20 NEN | ЛА1 | • | ••••• | | •• | •••••• | | | |
| Recommended torque | | 0.4-0.6 N | lm (3.5-5.3 lk | o.in) | •••••• | ····· | •••••• | ••••• | | | |

¹⁾ Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



Screw clamp module



Spring clamp module

Optocouplers R600 range Technical data

Optocoupler: 5 to 58 V DC output / 2 A - 6 mm 0.236" spacing

| | · | | OBOC 0 | 100 | OBOC 1500 | | OB(| OC 1000 | |
|--|---|-----------------------|---------------|-------------------|----------------|---------------------------------------|----------------|-------------------|-----------------|
| Relay characteristics coil | | | | | | | | | |
| Input voltage: +20%, -15% on D on AC | C; 10%, -10% | 5 V DC - | 12 V DC | 24 V DC | 24 V AC/ DC | 48 V AC/ DC | 60 V AC/ DC | 115 V AC/ DC | 230 V AC/ DC |
| Frequency | | | | | 50 / 60 Hz | | | | |
| Input current | | 5 mA | 9 mA | 4 mA | 6.3 mA | 4 mA | 5.1 mA | 4.2 mA | 4 mA |
| Pull-in voltage at Is=100% | | 4 V | • | 15 V | 15 V | 27 V | | 50 V | 80 V |
| Switching time C / O | | 15 µs / 25 | 60 μs | 30 μs / 400 μs | 1 ms / 7 ms | 5 ms / 20 | ms | 500 μs / 10 ms | 1 ms / 15 ms |
| Operating frequency | | 2000 Hz | | 1000 Hz | 60 Hz | 20 Hz | | | |
| Permissible leakage current | | 1 mA | | 0.8 mA | 0.9 mA | 1 mA | | 0.3 mA | |
| Output | | | | | | | | | |
| Output voltage | | 4.5 to 58 | V DC | | | | | | |
| Output current min. | | 1 mA | | | | | . | . | |
| Output current max. | | 2 A | | | | ···· | | | |
| Output leakage current at U _{max} | | < 50 μΑ | | | | · · · · · · · · · · · · · · · · · · · | | | |
| Residual voltage at I max and | typical | 0.1 V | | | | ···• | | ···• | |
| U rated | max | 0.5 V | | | | ···• | | | |
| Frequency on inductive load | <u>.</u> | | ·····• | <u>.</u> | . | . | . | ···• | |
| Isolation Input / Output | input / Output | | . | | | . | . | . | |
| Temperature | | -40+80 | . | | | ···• | | | |
| · | operating | -20+70 | | | | | | | |
| Other characteristics | | | Scr | ew clamp | | | Sprin | ig clamp | |
| Body material | *************************************** | UL 94 V0 | | <u>.</u> | . | ···• | | | |
| Wire size | Solid wire | 0.2 - 4 mr | m² (24-12 AV | VG) | | 0.2-2.5 mr | n² (24-12 AW) | G) | |
| VVII 0 3120 | Stranded wire | 0.22 - 2.5 | mm² (24-12 | AWG) | | | . | . | |
| Rated wire size | | 2.5 mm ² (| 12 AWG) | | | | | | |
| Wire stripping length | | 9 mm (0.3 | 354 in) | | | | | | |
| Recommended screwdriver | | 3.5 mm (C |).137 in) | | | | | | |
| Protection | | IP20 NEM | IA1 | | •••• | ••••• | •••• | •••• | ••••• |
| Recommended torque | • | 0.4-0.6 N | m (3.5-5.3 lb | o.in) | •••• | | | | |

¹⁾ Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



Screw clamp module

Spring clamp module

Optocouplers R600 range Technical data

Optocoupler: 5 to 58 V DC output / 5 A - 6 mm 0.236" spacing

| | | | OB OC 5000 | | | | | |
|--|----------------|----------------------------|----------------|-------------|--|--|--|--|
| Input | | , | | | | | | |
| Input voltage | | 24 V DC | 115 V AC/DC | 230 V AC/DC | | | | |
| Frequency | • | | 50 / 60 Hz | 50 / 60 Hz | | | | |
| Input current | | 5.4 mA | 4.2 mA | 4 mA | | | | |
| Pull-in voltage at Is=100% | | 12 V | 50 V | 80 V | | | | |
| Switching time C / O | | 30 μs / 400 μs | 500 μs / 10 ms | 1ms / 15 ms | | | | |
| Operating frequency | | 1000 Hz | 50 Hz | 35 Hz | | | | |
| Permissible leakage current | | 0.8 mA | 0.3 mA | 0.3 mA | | | | |
| Output | | | | | | | | |
| Output voltage | | 4.5- 58 V DC | | | | | | |
| Output current min. | | 1 mA | | | | | | |
| Output current max. | | 5 A | | | | | | |
| Output leakage current at U _{max} . | | < 50 μΑ | | | | | | |
| Residual voltage at I max and | typical | • | | | | | | |
| U rated | max | 0.5 V | | | | | | |
| Frequency on inductive load | <u>.</u> | See Note 1 | | | | | | |
| Isolation Input / Output | input / Output | 2500 V RMS | | | | | | |
| Temperature | | | | | | | | |
| Ambient temperature | | -40+80 °C | | | | | | |
| | operating | See derating curve | | | | | | |
| Other characteristics | | | | | | | | |
| Body material | grey | UL 94 V0 | | | | | | |
| Wire size | Solid wire | 0.2 - 4 mm² (24-12 AWG) | | | | | | |
| wire size | Stranded wire | 0.22 - 2.5 mm² (24-12 AWG | à) | | | | | |
| Rated wire size | • | 2.5 mm² (12 AWG) | | | | | | |
| Wire stripping length | | 10 mm (0.394 in) | | | | | | |
| Recommended screwdriver | | 3.5 mm (0.137 in) | | | | | | |
| Protection | | IP20 NEMA1 | | | | | | |
| Recommended torque | | 0.4-0.6 Nm (3.5-5.3 lb.in) | | | | | | |



Screw clamp module



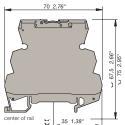
Spring clamp module

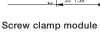
Optocouplers R600 range Technical data

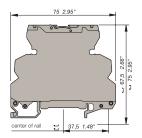
Optocoupler: 24 to 400 V AC output / 1 A or 2 A max. - 6 mm or 12 mm spacing

| | | | | OBOA 1000 |) | | OBOA 2000 |
|---|---|----------------------------|--------------|------------|-----------------------------|----------------|------------------|
| Relay characteristics coil | | | | | | | |
| Input voltage: +20%, -15% on DC; 10% | , -10% on AC | 24 V DC | 48 V AC/DC | 60 V AC/DC | 115 V AC/DC | 230 V AC/DC | 24 V DC |
| Frequency | • | | 50/60 Hz | | ····· | | |
| Input current | | 3.6 mA | 4.3 mA | 5.5 mA | 4.15 mA | 4.6 mA | 3.6 mA |
| Pull-in voltage at Is=100% | • | 14 V | 15 V | 18 V | 60 V | 135 V | 14 V |
| Switching time C / O | | 150 μs / 1 ms | 3 ms / 30 ms | | 2.2 ms / 18 ms | 2.5 ms / 25 ms | 150 μs / 1 ms |
| Operating frequency | • | 500 Hz | 20 Hz | | 25 Hz | 20 Hz | 500 Hz |
| Permissible leakage current | | 1 mA | | | | | |
| Output | | | | | | | |
| Output voltage | | 24-400 V AC | | | | | 10-230 V AC |
| Frequency | | 50/60 Hz | | | | | |
| Output current min. | | 25 mA | | | | | |
| Output current max. | | 1 A | | | | | 2 A |
| Output leakage current at U _{max.} | | < 0.50 mA | | | | | |
| Residual voltage at I max and | typical | 1 V | ···· | ····· | | | |
| U rated | max | 1.6 V | <u>.</u> | ·····• | ·····• | | ···•······ |
| Frequency on inductive load | | | <u>.</u> | | ····· | | <u>.</u> |
| Isolation Input / Output | input / Output | | <u>.</u> | ····· | ····· - | | <u>.</u> |
| Temperature | | -40+80 °C | ···· | | | | |
| | operating | -20+70 °C 1) | | | | | |
| Other characteristics | | | Screw clamp |) | | Spring clamp | |
| Body material | grey | UL 94 V0 | ···· | ·····• | | | |
| Wire size | Solid wire | 0.2 - 4 mm² (24 | -12 AWG) | | 0.2-2.5 mm ² (24 | -12 AWG) | |
| WITE SIZE | Stranded wire | 0.22 - 2.5 mm ² | (24-12 AWG) | | | | |
| Rated wire size | | 2.5 mm² (12 AW | /G) | | | | |
| Wire stripping length | | 9 mm (0.354 in) | | | | | |
| Recommended screwdriver | | 3.5 mm (0.137 i | n) | ••••• | ••••• | | |
| Protection | *************************************** | IP20 NEMA1 | ••••••• | ••••• | ••••• | ••••• | ••••• |
| Recommended torque | • | 0.4-0.6 Nm (3.5 | i-5.3 lb.in) | ••••• | •••• | ••••• | •••• |

¹⁾ Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.







Spring clamp module

Logic relays Product group picture



Logic relays Table of contents

Logic relays

| Logic relays | 6/1 |
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| Product group picture | 6/1 |
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Logic relays System overview

Concept

CL range logic relays are suitable for small and mediumsized control tasks and are able to substitute logic wiring in a quick and simple manner.

They can be used for applications in control as well as for timing functions, e.g.

- in buildings, lighting systems, air-conditioning systems, general control functions,
- in small machines and systems or
- as stand-alone control module for small applications.

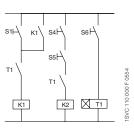
Steps to the application of CL range

- CL range can be used easily, rapidly and comfortably without any time-consuming planning and programming.
- The user can discover the advantages and the benefit of these logic relays in no time at all.
- CL range provides for the control statements according to a simple circuit diagram.
- Setup, storage, simulation and documentation are performed using the compact and user-friendly CL-SOFT software (CL-LAS.PS002).

Software characteristics (CL-SOFT)

- Display on a PC monitor according to IEC, ANSI
- Different languages to choose from
- Easy installation on all Microsoft WindowsTM operating systems

Logic links instead of wiring



Documentation (download from the internet)

Logic relay manual: 1SVC440795M0100 Remote display manual: 1SVC440795M2100 Display system manual: 1SVC440795M1100

Technical data overview

Logic relays

- 8 or 12 digital inputs
- 4 or 6 digital relay outputs
- optionally with 4 or 8 transistor outputs
- 128 rungs
- 3 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 2 or 4 analog inputs (not 100-240 V AC version)
- power flow display for checking the circuit diagram (devices with display)
- expansions for local or remote level
- enclosure color RAL 7035
- DIN rail mounting

Display system

- useable as compact HMI logic relay
- fully graphic, backlit display module
- 12 digital inputs
- 4 digital relay outputs
- optionally with 4 transistor outputs
- 256 rungs
- 4 contacts as n/o or n/c contacts in series plus 1 coil
- optionally with 4 analog inputs (not 100-240 V AC ver-
- networking-compatible via CL-NET
- front panel mounting
- expansion for local

Remote display

- Remote display up to a distance of 5 m
- Illustration of text and status displays
- Remote adjustment via keypad
- Front panel mounting

Software

- 16 timing relays 0.01-99:59 h
- 16 counting relays for up-, down counting
- 8 weekly timer, 8 annual timers
- 16 analog value comparators
- 16 freely editable display texts
- 32 markers or auxiliary relays

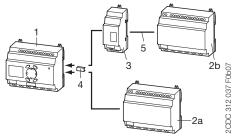
Logic relays System overview

Logic relays

Stand alone Expandable 6. 8b 6.8b 2CDC 312 001 F0b08

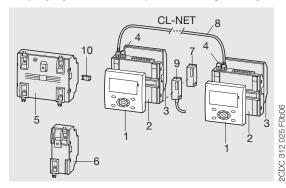
- 1a Logic relay CL-LS..
- Expandable logic relay CL-LM.. 1b
- Power supply CP-D... 2
- 3 I/O expansion CL-LER.., CL-LET.. for logic relays CL-LM..
- Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM.. 4
- 5 Memory module CL-LAS.MD003 for logic relays CL-LS.., CL-LM..
- 6 Connecting cable CL-LAS.TK001, CL-LAS.TK002 to connect PC
- CL-LINK plug CL-LAS.TK011
 - to connect expansion to logic relays CL-LM..
- 8a Remote display connection module CL-LDC.S..
- 8b Connecting cable CL-LAD.TK007
 - to connect a remote displays to a logic relay
- 9 Display module CL-LDD..

Expansion of logic relays*



- Logic relay CL-LM..
- 2 I/O expansion CL-LER.., CL-LET..
 - 2a local expansion
 - 2b remote expansion
- 3 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
- 4 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
- up to 30 m
 - * max. 1 expansion per logic relay

Display system → Compact HMI logic relay



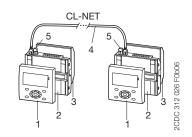
- Display module CL-LDD..
- 2 Display base module CL-LDC.LN..
- 3 Display I/O module CL-LDR.., CL-LDT..
- 4 Termination resistor CL-LAD.TK009
- 5 I/O expansion CL-LER.., CL-LET..
- 6 Coupler unit CL-LEC.. for remote expansion
- Memory module CL-LAD.MD004 for display base module
- 8 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
- Connecting cable CL-LAD.TK001, CL-LAD.TK011 to connect PC
- CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
- e.g. door of switchgear cabinet

Stand alone with I/O module



- Display CL-LDD..
- Remote display connection module CL-LDC.S.. incl. connecting cable
- Display base module CL-LDC.L..

Communication via CL-NET



- Display CL-LDD...
- 2 Display base module CL-LDC.LN.. for CL-NET
- 3 Display I/O module CL-LDR.., CL-LDT..
- 4 Connecting cable CL-LAD.TK002. CL-LAD.TK003, CL-LAD.TK004
- 5 Termination resistor CL-LAD.TK009

Logic relays Approvals and marks

| ■ exis | _ | Logic | relay | /S | | Expa | nsion | s | Displ | ay sy | stem | | | Acces | sories |
|--|--|--------|--------|--------|--------|--------|--------|--------|--------|------------|------------|--------|---|------------|------------|
| Appro | ovals | CL-LSR | CL-LST | CL-LMR | CL-LMT | CL-LER | CL-LET | CL-LEC | CL-LDD | CL-LDC | CL-LDR | CL-LDT | | CL-LAS | CL-LAD |
| (l) | UL | • | • | • | • | | • | • | • | • | | | | 1) | 2) |
| ® | CAN/CSA C22.2 No.14 | - | | • | • | | - | • | • | • | | | | 1) | 2) |
| ® | CAN/CSA C22.2 No.213 (hazardous locations) | - | - | - | • | - | - | - | • | - | • | • | | 1) | 2) |
| (i) | GL | - | | • | • | | | | • | 3) | 4) | • | | | |
| ERE | EAC | | | | | | | | | | | | | | |
| Llouds Register Total America | Lloyds Register | - | | • | • | | | | • | 3) | 4) | • | | | |
| Mark | s | , | | | | , | | | | , | , | , | , | | |
| CE | CE | | | • | • | | • | • | • | | | | | • | • |
| C | C-Tick | | | | | | | | | | | | | | |

¹⁾ not for: CL-LAS-PS002, CL-LAS.TD001, CL-LAS.FD001, CL-LAS.TK002, CL-LAS.TK011 ²⁾ not for: CL-LAD.TK006, CL-LAD.TK011, CL-LAD.FD002 ³⁾ not for: CL-LDC.SDC2, CL-LDC.SAC2, CL-LDC.LAC2, CL-LDC.LNAC2 ⁴⁾ not for: CL-LDR.16AC2

Logic relays

Ordering details - Stand alone logic relays



CL-LSR



CL-LST

Ordering details - Logic relays stand alone

| Rated operational voltage | Display + Keypad | Timer | Input / Output | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---------------------------|------------------------|-------|----------------------------|----------------|-----------------|----------------|------------------------------|
| 041/40 | • | • | | CL-LSR.C12AC1 | 1SVR440712R0300 | | |
| 24 V AC | | • | | CL-LSR.CX12AC1 | 1SVR440712R0200 | | |
| 100-240 V AC | • | | | CL-LSR.12AC2 | 1SVR440713R0100 | | |
| | • | • | | CL-LSR.C12AC2 | 1SVR440713R0300 | | |
| | | • | 8 inputs / 4 relay outputs | CL-LSR.CX12AC2 | 1SVR440713R0200 | | 0.20 (0.44 |
| 40.V/DO | • | • | | CL-LSR.C12DC1 | 1SVR440710R0300 | | |
| 12 V DC | | • | | CL-LSR.CX12DC1 | 1SVR440710R0200 | | |
| ••••• | • | | | CL-LSR.12DC2 | 1SVR440711R0100 | | |
| 24 V DC | | • | | CL-LSR.C12DC2 | 1SVR440711R0300 | | |
| | | • | | CL-LSR.CX12DC2 | 1SVR440711R0200 | | |
| 24 V DC | • | • | 8 inputs / 4 transistor | CL-LST.C12DC2 | 1SVR440711R1300 | | |
| | | • | outputs | CL-LST.CX12DC2 | 1SVR440711R1200 | | |



CL-LDD.K

| Rated opera- tional voltage | Description | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--------------------------------|---|-------------|-----------------|----------------|------------------------------|
| - | Graphic display 132 x 64 pixel | CL-LDD.XK | 1SVR440839R4500 | | 0.14 (0.30) |
| - | Graphic display 132 x 64 pixel, with keypad | CL-LDD.K | 1SVR440839R4400 | | 0.13 (0.29) |
| 24 V DC | Module to displace the dis- play from the logic relay, incl. | CL-LDC.SDC2 | 1SVR440841R0000 | | 0.16 (0.36) |
| 100-240 V AC | connecting cable CL-LAD. TK007, 5m, lenght adaptable | CL-LDC.SAC2 | 1SVR440843R0000 | | 0.16 (0.36) |



Logic relays

Ordering details - Expandable logic relays





CL-LER



CL-LEC

| (| Orc | ler | ing | deta | ails | - | Logi | С | rela | ys | expand | labl | е |
|---|-----|-----|-----|------|------|---|------|---|------|----|--------|------|---|
| | | | | | | | | | | | | | |

| Rated operational voltage | Display + Keypad | Timer | Input / Output | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---------------------------|------------------------|-------|----------------------|----------------|-----------------|----------------|---------------------------|
| 041/40 | • | • | | CL-LMR.C18AC1 | 1SVR440722R0300 | | |
| 24 V AC | | • | • | CL-LMR.CX18AC1 | 1SVR440722R0200 | | |
| 400 040 \/ 40 | | | 12 inputs | CL-LMR.C18AC2 | 1SVR440723R0300 | | Ī |
| 100-240 V AC | ′ | • | | CL-LMR.CX18AC2 | 1SVR440723R0200 | | 0.26 (0.70) |
| 12 V DC | • | • | / 6 relay outputs | CL-LMR.C18DC1 | 1SVR440720R0300 | | 0.36 (0.79) |
| 12 V DC | | • | outputo | CL-LMR.CX18DC1 | 1SVR440720R0200 | | |
| 24 V DC | • | • | • • • | CL-LMR.C18DC2 | 1SVR440721R0300 | | |
| 24 V DC | | • | | CL-LMR.CX18DC2 | 1SVR440721R0200 | | |
| 24 V DC | • | • | 12 inputs, | CL-LMT.C20DC2 | 1SVR440721R1300 | | 0.06 (0.70) |
| | | • | 8 transistor outputs | CL-LMT.CX20DC2 | 1SVR440721R1200 | | 0.36 (0.79) |

| Ordering detail | · · | :_ | | T | |
|---------------------------|---|--------------|-----------------|----------------|---------------------------|
| Rated operational voltage | Description | Type | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
| = | 2 relay outputs | CL-LER.20 | 1SVR440709R5000 | | 0.07 (0.15) |
| 100-240 V AC | 1 | CL-LER.18AC2 | 1SVR440723R0000 | | 0.26 (0.57) |
| 24 V DC | ÷12 inputs, 6 relay outputs | CL-LER.18DC2 | 1SVR440721R0000 | | 0.22 (0.49) |
| 24 V DC | 12 inputs, 8 transistor outputs | CL-LET.20DC2 | 1SVR440721R1000 | | 0.21 (0.46) |
| - | Coupler unit for remote expansion with a distance of up to 30 m | CL-LEC.CI000 | 1SVR440709R0000 | | 0.07 (0.15) |

Logic relays Ordering details



CL-LAS.PS002



CL-LAS.TK001



CL-LAS.MD003

Ordering details - CL-LA

| Description | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|--|----------------|-----------------|----------------|------------------------------|
| Software for programming and control of CL range devices. Installation CD-ROM for Microsoft WindowsTM. | CL-LAS.PS002 | 1SVR440799R8000 | | 0.10 (0.21) |
| Memory module for logic relays Memory size: 32 kB | CL-LAS.MD003 | 1SVR440799R7000 | | 0.02 (0.04 |
| Cable with serial interface to connect PC and logic relay. Length: 2 m | CL-LAS.TK001 | 1SVR440799R6000 | | 0.10 (0.22) |
| Cable with USB interface to connect PC and logic relay. Length: 2 m | CL-LAS.TK002 | 1SVR440799R6100 | | 0.06 (0.13) |
| Cable for point-to-point connection of remote- display connection module and logic relay, length: 5m, adaptable | CL-LAD.TK007 | 1SVR440899R6600 | | 0.20 (0.44) |
| Fixing brackets for screw mounting of logic relay, expansion, display base module | CL-LAS.FD001 | 1SVR440799R5000 | | 0.01 (0.01) |
| Spare plug (CL-LINK) for connection of logic relay to expansion | CL-LAS.TK011 | 1SVR440799R5100 | | 0.10 (0.22) |
| Primary switch mode power supplies, Rated input voltage: 100-240 V AC Rated output voltage/current: 24 V DC / 0.42 A | CP-D 24/0.421) | 1SVR427041R0000 | | 0.06 (0.13) |
| Primary switch mode power supplies, Rated input voltage: 100-240 V AC Rated output voltage/current: 24 V DC / 1.3 A | CP-D 24/1.32) | 1SVR427043R0100 | | 0.19 (0.41) |

 $^{^{1)}}$ replaces CL-LAS.SD001, technical data see chapter "Primary switch mode power supplies" $^{2)}$ replaces CL-LAS.SD002, technical data see chapter "Primary switch mode power supplies"

Logic relays

Ordering details - Display systems



CL-LDD.K



CL-LDC.LN..



CL-LAD.MD004



CL-LAD.TK001



CL-LAD.TK002

Ordering details - Display systems

| Rated opera- tional voltage | Description | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) | |
|--------------------------------|---|--------------|-----------------|----------------|------------------------------|--|
| - | Display module Graphic display 132 x 64 pixel | CL-LDD.XK | 1SVR440839R4500 | | 0.14 (0.30) | |
| - | Display module Graphic display 132 x 64 pixel, with keypad | CL-LDD.K | 1SVR440839R4400 | | 0.13 (0.29) | |
| 24 V DC | Display base module CPU / | CL-LDC.LDC2 | 1SVR440821R0000 | | 0.40 (0.00) | |
| 100-240 V AC | power supply | CL-LDC.LAC2 | 1SVR440823R0000 | | 0.16 (0.36) | |
| 24 V DC | Display base module CPU / power supply, | CL-LDC.LNDC2 | 1SVR440821R1000 | | 0.47 (0.00) | |
| 100-240 V AC | networking-compatible (CL-NET) | CL-LDC.LNAC2 | 1SVR440823R1000 | | 0.17 (0.38) | |
| 100-240 V AC | Display I/O module | CL-LDR.16AC2 | 1SVR440853R0000 | | 0.17 (0.00) | |
| 24 V DC | 12 inputs, 4 relay outputs | CL-LDR.16DC2 | 1SVR440851R0000 | | 0.17 (0.38) | |
| 24 V DC | Display I/O module 12 inputs, 4 relay outputs, 1 analog output | CL-LDR.17DC2 | 1SVR440851R2000 | | 0.17 (0.38) | |
| 24 V DC | Display I/O module 12 inputs, 4 transistor outputs | CL-LDT.16DC2 | 1SVR440851R1000 | | 0.14 (0.30) | |
| 24 V DC | Display I/O module 12 inputs, 4 transistor out- puts, 1 analog output | CL-LDT.17DC2 | 1SVR440851R3000 | | 0.14 (0.30) | |

Ordering details - CL-LAD.

| Description | Туре | Order code | Price 1 pce | Weight (1 pce) kg (lb) |
|---|--------------|-----------------|----------------|------------------------------|
| Memory module for display base modules Memory size: 256 kB | CL-LAD.MD004 | 1SVR440899R7000 | | 0.02 (0.03) |
| Cable with serial interface to connect PC and display base module | CL-LAD.TK001 | 1SVR440899R6000 | | 0.11 (0.23) |
| Cable with USB interface to connect PC and display base module | CL-LAD.TK011 | 1SVR440899R6700 | | |
| Network cable (CL-NET) to connect 2 display base modules Length: 0.3 m | CL-LAD.TK002 | 1SVR440899R6100 | | 0.05 (0.12) |
| Network cable (CL-NET) to connect 2 display base modules Length: 0.8 m | CL-LAD.TK003 | 1SVR440899R6200 | | 0.07 (0.14) |
| Network cable (CL-NET) to connect 2 display base modules Length: 1.5 m | CL-LAD.TK004 | 1SVR440899R6300 | | 0.08 (0.18) |
| Cable for point-to-point connection of remote display connection modules and display base module, length adaptable, Length: 5 m | CL-LAD.TK005 | 1SVR440899R6400 | | 0.20 (0.44) |
| Cable for point-to-point connection of 2 display base modules, length adaptable. Length: 5 m | CL-LAD.TK006 | 1SVR440899R6500 | | 0.12 (0.26) |
| Termination resistor, content: 2 pieces | CL-LAD.TK009 | 1SVR440899R6900 | | 0.01 (0.02) |
| Protective cover, transparent, for harsh envi- ronmental conditions and application in the food industry | CL-LAD.FD001 | 1SVR440899R1000 | | 0.03 (0.07) |
| Protective cover, transparent and sealable | CL-LAD.FD011 | 1SVR440899R2000 | | 0.03 (0.07) |
| Assembly tool for mounting of display modules | CL-LAD.FD002 | 1SVR440899R3000 | | |

Logic relays Technical data

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | CL-LSR.C12DC1 | CL-LSR12DC2 CL-LST.C12DC2 | CL-LSR.C12AC1 | CL-LSR12AC2 |
|--|------------------------------|--------------------------------|----------------|--------------------|
| Input circuit - supply circuit | | - OL-LO1.O12DO2 | : | - : |
| Rated operational voltage U | 12 V DC | 24 V DC | 24 V AC | 100-240 V AC |
| Rated operational voltage tolerance | -15+30 % | -15+20 % | -15+10 % | <u>i</u> |
| Operational voltage range | 10.2-15.6 V DC | 20.4-28.8 V DC | 20.4-26.4 V AC | 85-264 V AC |
| Rated frequency | 0 Hz | •••• | 50/60 Hz | ••••• |
| Rated frequency tolerance | _ | | ±5 % | |
| Residual ripple | ≤ 5 % | | _ | |
| | typ. 140 mA | | - | - |
| at 24 V DC at 24 V AC | | typ. 80 mA | | |
| at 24 V AC at 115/120 V AC (60 Hz | / - - | :- | typ. 200 mA | typ. 40 mA |
| at 130/240 V AC (50 Hz | - | | | typ. 20 mA |
| Power failure buffering (IEC/EN 61131-2) | 10 ms | <u>.</u> | - 20 ms | |
| Power dissipation at 12 V DC | typ. 2 W | - | - | - |
| at 24 V DC | - | typ. 2 W | | - |
| at 24 V AC | | - | typ 5 VA | - |
| at 115/120 V AC | | - | | typ. 5 VA |
| at 230/240 V AC | - | | = | typ. 5 VA |
| Туре | CL-LMR.C18DC1 | CL-LMR.C18DC2 CL-LMT.C20DC2 | CL-LMR.C18AC1 | CL-LMR.C18AC2 |
| Input circuit - supply circuit | | | | |
| Rated operational voltage U _e | 12 V DC | 24 V DC | 24 V AC | 100-240 V AC |
| Rated operational voltage tolerance | -15+30 % | -15+20 % | -15+10 % | |
| Operational voltage range | 10.2-15.6 V DC | 20.4-28.8 V DC | 20.4-26.4 V AC | 85-264 V AC |
| Rated frequency | 0 Hz | | 50/60 Hz | |
| Rated frequency tolerance | - | <u>.</u> | ±5 % | |
| Residual ripple | ≤ 5 % | ···· ; | | ····· ! |
| Input current at 12 V DC at 24 V DC | typ. 200 mA | - tup 140 mA | | - |
| at 24 V DC | | typ. 140 mA | typ. 300 mA | :- :_ |
| at 115/120 V AC (60 Hz | _ | | | typ. 70 mA |
| at 230/240 V AC (50 Hz | - | | | typ. 35 mA |
| Power failure buffering (IEC/EN 61131-2) | 10 ms | <u>:</u> | 20 ms | , |
| Power dissipation at 12 V DC | typ. 3.5 W | - | - | - |
| at 24 V DC | ; - | typ. 3.5 W | = | - |
| at 24 V AC | - | _ | typ. 7 VA | _ |
| at 115/120 V AC | | | - | typ. 10 VA |
| at 230/240 V AC | • | - | = | typ. 10 VA |
| Туре | CL-LER.18DC2 CL-LET.20DC2 | CL-LER.18AC2 | | |
| Input circuit - supply circuit | | | | |
| Rated operational voltage U | 24 V DC | 100-240 V AC | | |
| Rated operational voltage tolerance | I-15+20 % | -15+10 % | | |
| Operational voltage tolerance | 20.4-28.8 V DC | 85-264 V AC | | |
| Rated frequency | 0 Hz | 50/60 Hz | | |
| Rated frequency tolerance | - | ±5 % | | |
| Residual ripple | ≤ 5 % | - | | |
| Input current at 24 V DC | typ. 140 mA | - | | |
| at 115/120 V AC (60 Hz | - | typ. 70 mA | : | |
| at 230/240 V AC (50 Hz | - | typ. 35 mA | | |
| Power failure buffering (IEC/EN 61131-2) | 10 ms | 20 ms | | |
| | typ. 3.4 W | | | <u> </u> |
| at 115/120 V AC | | typ. 10 VA | | |
| at 230/240 V AC | , - | typ. 10 VA | | |

Logic relays Technical data

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LSR.C12DC1 | CL-LSR12DC2 CL-LST.C12DC2 | CL-LSR.C12AC1 | CL-LSR.C12AC2 | |
|---------------------------------|---|-------------------------------|------------------------------|--|--------------------------------------|--|
| Input circuit - Digital in | puts | 12 V DC | 24 V DC | 24 V AC | 115 / 230 V AC | |
| Number | • | 8 | | <u>:</u> | : | |
| Inputs can be used as a | analog inputs | 8 2 (I7, I8) | | | - | |
| Indication of operationa | | LCD-Display (if existin | g) | | | |
| Electrical isolation | from voltage supply between digital inputs | | | | | |
| | from the outputs | | ······ • ····· | | | |
| Rated operational | · •··································· | | 24 V DC | 24 V AC | | |
| voltage Ü _e | U _e on "0" signal | 4 V DC (I1-I8) | < 5 V DC (I1-I8) | 0-6 V AC (sinusoidal) | 0-40 V AC (sinusoidal) | |
| | U on "1" signal | 8 V DC (I1-I8) | > 15 V DC (I1-I6), | > 9.5 V DC, | 79-264 V AC | |
| | 6 - | | > 8 V DC (I7, I8) | 14-26.4 V AC | (sinusoidal) | |
| | | | | (sinusoidal) (I1-I6), | | |
| | | | | > 7 V AC (sinusoidal) (I7,I8) | | |
| Rated frequency | | = | <u>i</u> | 50-60 Hz | ·i | |
| Input current | | 3.3 mA (at 12 V DC, | 3.3 mA (at 24 V DC, | 4 mA | 6x0.25 mA | |
| on "1" signal | | 11-16), | 16-17), | (at 24 V AC, 50 Hz, I1-I6), | | |
| | | 1.1 mA (at 12 V DC, 17, 18) | 2.2 mA (at 24 V DC, 17, 18) | 2 mA (at 24 V AC, 50 Hz, 17,18), | 11-16), 6×0.5 m/ | |
| | | 17, 10) | 17, 10) | 2 mA (at 24 V DC, 17, 18) | | |
| | | | | , , , , , | l1-l6) | |
| | | | | | 2x4 mA | |
| | | | | | (at 115 V AC, 60 Hz, 17, 18), | |
| | | | | | 2x6 mA | |
| | | | | | (at 230 V AC, 50 Hz, | |
| | | | | | 17, 18) | |
| Time delay from "0" to "1" | debounce ON | 20 ms typ. 0.3 ms (I1-I6), | typ. 0,25 ms (I1-I8) | 80 ms (at 50 Hz), 66 2/3 20 ms (at 50 Hz), 16 2/3 | | |
| nom "o to "r | | typ. 0.35 ms (17, 18) | typ. 0,25 ms (m-16) | 20 His (at 50 Hz), 10 2/3 | ilis (at 60 Fiz) | |
| Time delay | debounce ON | | ······ | 80 ms (at 50 Hz), | 80 ms (at 50 Hz, I1-I6), | |
| from "1" to "0" | | | | 66 2/3 ms (at 60 Hz) | 66 2/3 ms (at 60 Hz, | |
| | | | | | 11-16) 160 ms (at 50 Hz, 17, 18), | |
| | | | | | 150 ms (at 60 Hz, 17, 18) | |
| | debounce OFF | typ. 0.3 ms (I1-I6), | - | 20 ms (at 50 Hz), | 20 ms (at 50 Hz, I1-I6), | |
| | | typ. 0.15 ms (I7, I8) | | 16 2/3 ms (at 60 Hz) | 16 2/3 ms (at 60 Hz, | |
| | | | | | 11-16) 100 ms (at 50 Hz, I7. I8), | |
| | | | | | 100 ms (at 60 Hz, 17, 18) | |
| Cable length (unshielde | | 100 m | | - | - | |
| Maximum cable length | per input | = | | 40 m | 40 m (I1-I6), | |
| Frequency counter | Number | 0 (10 14) | ····· | | 100 m (I7, I8) | |
| rrequericy counter | counting frequency | | ·····• | | <u>-</u> | |
| | pulse shape | square-wave | ••••• | - | - | |
| | pulse / pause ratio | 1:1 | | | - | |
| Rapid counter inputs | Number | | | | - | |
| | counting frequency pulse shape | | | | ; = !_ | |
| | pulse / pause ratio | 1:1 | | - | - | |
| Cable length (shielded) | | < 20 m | | - | - | |
| Input circuit - Analog in | nputs | | | | | |
| Number | | 2 (17, 18) | | | - | |
| Electrical isolation | from voltage supply from the digital inputs | | ·····• | | = | |
| | from the outputs | | | | :- !- | |
| | from PC interface, | | ••••• | | - | |
| memory | | | | | | |
| mo | module, CL-NET, CL-LINK | | | | | |
| Input type | OL-LINK | DC voltage | | | - | |
| Signal range | | 0-10 V DC | | | - | |
| Resolution | analog | 0.01 V | | | - | |
| Tanad Inna ad | digital | 0.01 V; 10 Bit (value 1 | -1023) | | - | |
| Input impedance Accuracy of the | two CL devices | 11.2 k Ω +3 % | ·····• | | _ | |
| actual value | within one devices | | ·····• | | - | |
| Conversion time | Input delay ON | | • | | - | |
| analog/digital | Input delay OFF | each cycle | | | - | |
| Input current | | < 1 mA | ····· | . | - | |
| Cable length (shielded) | | < 30 m | | | <u>:-</u> | |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LMR.C18DC1 | CL-LMR.C18DC2 CL-LMT.C20DC2 | CL-LMR.C18AC1 | CL-LMR.C18AC2 |
|---|--|---|---|---|---|
| Input circuit - Digital in | puts | 12 V DC | 24 V DC | 24 V AC | 115 / 230 V AC |
| Number Inputs can be used as a Indication of operational Electrical isolation | | no yes | | | Ves |
| Rated operational | memory module, CL-NET, CL-LINK | | 24 V DC | 24 V AC | |
| voltage U _e | U _e on "0" signal | 4 V DC (I1-I12) | < 5 V DC (l1-l12, R1-R12) | 0-6 V AC (sinusoidal) | 0-40 V AC (sinusoidal) |
| | U _e on "1" signal | 8 V DC (I1-I12) | > 15 V DC (I1-I6, I9, I10) > 8 V DC (I7, I8, I11, I12) | 14-26.4 V AC (sinusoidal) (I1-I6, I9, I10) > 7 V AC (sinusoidal) (I7,I8; I11, I12) | 79-264 V AC (sinusoidal) |
| Rated frequency | | - | | 50-60 Hz | |
| Input current on "1" signal | | 3.3 mA (at 12 V DC, I1-I6, I9-I12), 1.1 mA (at 12 V DC, I7, I8) | 3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12) | 11-16, 19, 110), 2 mA (at 24 V AC, 50 Hz, 17, 18, 111, 112), 2 mA | 6x0.25 mA (at 115 V AC, 60 Hz, 11-16), 6x0.5 mA (at 230 V AC, 50 Hz, 11-16) 2x4 mA (at 115 V AC, 60 Hz, 17, 18), 2x6 mA (at 230 V AC, 50 Hz, 17, 18), 4x0.25 mA (at 115 V AC, 60 Hz, 19-112), 4x0.5 mA (at 230 V AC, 50 Hz, |
| Time delay | debounce ON | 20 mg | | 80 ms (at 50 Hz), 66 2/3 | 19-112) |
| from "0" to "1" | | typ. 0.3 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12) | | 20 ms (at 50 Hz), 16 2/3 | ms (at 60 Hz) |
| Time delay from "1" to "0" | debounce ON debounce OFF | 20 ms typ. 0.4 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12) | | 80 ms (at 50 Hz), 66 2/3 20 ms (at 50 Hz), 16 2/3 | ms (at 60 Hz) ms (at 60 Hz) |
| Cable length (unshielde Maximum cable length | ed) per input | 100 m | | max. 40 m, typ. 40 m (l9, l10) | typ. 40 m (l1-l6, l9-l12), typ. 100 m (l7, l8) |
| Frequency counter | number | 2 (13, 14) | | - | - |
| | counting frequency pulse shape pulse / pause ratio | < 1 kHz square-wave 1:1 | | - - - | - - - |
| Rapid counter inputs | number counting frequency pulse shape | 2 (I1, I2) < 1 kHz square-wave | • | - - - | - - - |
| Cable length (chiefded) | pulse / pause ratio | 1:1 | | - | - |
| Cable length (shielded) Input circuit - Analog ir | nputs | < 20 m | | <u>:</u> | <u>:-</u> |
| Number Electrical isolation | from voltage supply from the digital inputs from the outputs from PC interface, memory module, CL-NET, CL-LINK | no yes | | | - - - - - |
| Input type Signal range Resolution | analog | DC voltage 0-10 V DC 0.01 V | | | - - - |
| Input impedance Accuracy of the actual value | | 0.01 V; 10 Bit (value 1-10 11.2 kΩ ±3 % |)23) | | - - - - |
| Conversion time analog/digital Input current | Input delay ON Input delay OFF | 20 ms | | | - - - |
| Cable length (shielded) | | < 30 m | | | - |

Data at $\rm T_{\rm a}$ = 25 $^{\circ}\rm C$ and rated values, if nothing else indicated.

| Туре | | CL-LER.18DC2, CL-LET.20DC2 | CL-LER.18AC2 |
|-------------------------|------------------------------|-----------------------------|--|
| Input circuit - Digital | inputs | 24 V DC | 115 / 230 V AC |
| Number | | 12 | |
| Inputs can be used as | | - | |
| Indication of operation | | - | |
| Electrical isolation | from voltage supply | | |
| | between digital inputs | | |
| | from the outputs | | |
| | from PC interface, | no | |
| | memory | | |
| | module, CL-NET, CL-LINK | | |
| | GL-LINK | 04.44.00 | |
| Rated operational | | 24 V DC | 0.40.1/40./-15 |
| voltage U _e | | < 5 V DC (I1-I12, R1-R12) | 0-40 V AC (sinusoidal) |
| | U _e on "1" signal | - | 79-264 V AC (sinusoidal) |
| Rated frequency | | - | 50-60 Hz |
| Input current | | 3.3 mA (at 24 V DC, R1-R12) | 12x0.25 mA (at 115 V AC, 60 Hz, R1-R12), |
| on "1" signal | | | 12x0.5 mA (at 230 V AC, 50 Hz, R1-R12) |
| Time delay | debounce ON | 20 ms | 80 ms (at 50 Hz, I1-I12, R1-R12), |
| from "0" to "1" | | | 66 2/3 ms (at 60 Hz, I1-I12, R1-R12) |
| | debounce OFF | typ. 0.25 ms (R1-R12) | 20 ms (at 50 Hz, I1-I12, R1-R12), |
| | | | 16 2/3 ms (at 60 Hz, I1-I12, R1-R12) |
| Time delay | debounce ON | 20 ms | 80 ms (at 50 Hz, I1-I12, R1-R12), |
| from "1" to "0" | | | 66 2/3 ms (at 60 Hz, I1-I12, R1-R12) |
| | debounce OFF | - | 20 ms (at 50 Hz, I1-I12, R1-R12), |
| | | | 16 2/3 ms (at 60 Hz, I1-I12, R1-R12) |
| Cable length (unshield | | 100 m | - |
| Maximum cable length | h per input | - | typ. 40 m (I1-I6, I9-I12, R1-R12), |
| | | | typ. 100 m (I7, I8) |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LSR | CL-LMR CL-LER | CL-LER.20 |
|---|--|---------------------------|----------------------|--|
| Output circuit - Relay outputs | | | OL-LEN | <u>:</u> |
| Number | | 4 | 6 | 2 |
| Outputs in groups of | , | 1 | | 2 |
| Parallel switching of outputs to | increase capacity | not permissible | O A (-1 | ···•·································· |
| Fusing of the output relay Electrical isolation | from voltage supply | circuit-breaker B16 or fu | se 8 A (slow-acting) | ···•·································· |
| Liectifical isolation | from the inputs | | | |
| | from PC interface, memory module, | | | |
| | CL-NET, CL-LINK | | | |
| | protective separation | | | ······································ |
| | basic isolation | | | |
| Mechanical lifetime | | 10x106 switching cycles | | |
| Rung | recommended for load 12 V AC/DC | 8 A | | |
| | short-circuit proof cos φ = 1; | 15 000 IIIA | | |
| | characteristic B16 at 600 A | | | |
| | short-circuit proof $\cos \varphi = 0.5$ up to 0.7; | | | |
| | characteristic B16 at 900 A | | | |
| | Rated impulse withstand voltage U _{imp} | 6 kV | | ••••• |
| | contact-coil | | | |
| | Rated operational voltage U | 250 V AC | | •••• |
| Rated insulation voltage U | | 250 V AC | | |
| Protective separation (EN | between coil and contact | 300 V AC | | |
| 50178) | between two contacts | | | |
| Making capacity | AC-15, 250 V AC, 3 A (600 ops./h) | | S | |
| · , | DC13, L/R ≤ 150 ms, 24 V DC, 1 A | 200.000 switching cycle | S | ••••• |
| | (500 ops./h) | | | |
| Breaking capacity | AC-15, 250 V AC, 3 A (600 ops./h) | 300.000 switching cycle | S | |
| | DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h) | | S | |
| Incandesent lamp load | 1000 W at 230/240 V AC | 25.000 switching cycles | | |
| incandesent lamp load | 500 W at 115/120 V AC | 25.000 switching cycles | | |
| Fluorescent lamp load | 10 x 58 W at 230/240 V AC | 25.000 switching cycles | | |
| | with electrical control gear | | | |
| | 10 x 58 W at 230/240 V AC | 25.000 switching cycles | | ••••• |
| | uncompensated | | | |
| | 1 x 58 W at 230/240 V AC | | | |
| Outtobing from an | conventional compensated | | | |
| Switching frequency | mechanical operations switching frequency | 10010 | | |
| | resistive load / lamp load | | | |
| | inductive load | | | |
| JL/CSA | | | | |
| Continuous current at 240 V | | 10 A AC | | |
| Continuous current at 24 V | | 8 A DC | | |
| AC | Utilization catagory (Control Circuit Rating Codes) | | | |
| | max. rated operational voltage | | | |
| | max. continuous thermal current cos φ = | | | |
| | 1 at B 300 | | | |
| | max. making / breaking apparent power (Make/Break) cos φ ≠ 1 at B 300 | | | |
| DC | Utilization catagory (Control Circuit Rating | | | |
| | Codes) | , | | |
| | max. rated operational voltage | | | |
| | max. continuous thermal current at R 300 | 1 A | | |
| | max. making / breaking apparent power | | | |
| | (Make/Break) at R 300 | | | |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LST | CL-LMT | CL-LET |
|--|--|---|--|--|
| Output circuit - Transistor out | outs | | - | |
| Number | | 4 | 8 | <u>.</u> |
| Rated operational voltage U _e | | 24 V DC | | |
| Operational voltage range | | 20.4-28.8 V DC | | |
| Residual ripple | | ≤ 5 % | | ······ |
| Supply current | on "0" signal | typ. 9 mA / max. 16 | mA typ. 18 mA / max. 32 | 2 mA |
| Reverse voltage protection | on "1" signai | yes (Attention: If sup outputs, causes a st | nA typ. 24 mA / max. 44 ply voltage is reversed, a port circuit) | applying voltage at the |
| Electrical isolation | from voltage supply | | | ······ |
| | from the inpute | 1,00 | | ··········· |
| | from PC interface, memory module, CL-NET, CL-LINK | | | |
| Rated operational current I _e on, | 1" signal DC | max. 0.5 A | | |
| Lamp load without R _v | | 5 W | ······ | ······································ |
| Residual current on "0" signal p | er channel | < 0.1 mA | | ······································ |
| Max. output voltage | on "0" signal at external load < 10 M Ω | 2.5 V | | |
| | on "1" signal at le = 0.5 A | √U = Ue - 1 V | | |
| Short-circuit protection Short-circuit tripping current for | $R_a \le 10 \text{ m}\Omega$ | $0.7 \text{ A} \leq \text{I}_{\text{a}} \leq 2 \text{ A per}$ | | input I16, I15; R15, R16) |
| Total short-circuit current | | 8 A | 16 A | |
| Peak short-circuit current | | | | <u>-</u> |
| Thermal tripping | • | yes | | |
| Max. switching frequency with a | constant resistive load $R_L < 100 \text{ k}\Omega$ | 40.000 switching cy | cles/h | |
| (depending on active channels a | and their load) with resistive load, inductive load with | | | |
| Parallel connection of outputs | with resistive load, inductive load with external | | group 1: Q1-Q4, group 2: Q5-Q8 | group 1: S1-S4, group 2: S5-S8 |
| | suppressor, combination within one group | | group 2. Q5-Q0 | 2. 00-00 |
| | number of outputs | .4 | <u>i</u> | i |
| | max. total current | | uts must be actuated sim | ultaneously and for the |
| Indication of operational states | of the outputs | LCD-Display (if exist | ng) | |
| Inductive load ⁱ⁾ without external | suppressor | | | |
| $T_{0.95} = 1 \text{ ms},$ $R = 48 \Omega,$ | utilization factor | 0.25 g | | |
| $H = 48 \Omega$, L = 16 mH | duty time | 1100 % | | |
| L = 10 IIII1 | max. switching frequency f = 0,5 Hz (max. duty time = 50 %) | 1 1500 Switching Cycle | es | |
| DC13, | utilization factor | | ······ | ······· |
| $T_{0.95} = 72 \text{ ms},$ R = 48 Ω , | م دیاب با در امار در در امار در در در در امار در در در در در در در در در در در در در | 1100 0/ | | ··········· |
| | max. switching frequency f = 0,5 Hz | 1500 switching cycle | es . | •••••• |
| L = 1.15 H | (max. duty time = 50 %) | 1 | | |
| T _{0.95} = 15 ms, | utilization factor | [0.25 g | | |
| $R = 48 \Omega$, L = 0.24 H | duty time | 1100 % | | |
| L - U.24 FI | max. switching frequency f = 0,5 Hz (max. duty time = 50 %) | I 1500 SWITCHING CYCIE | 28 | |
| Inductive load ¹⁾ with external su | | | | |
| | demand factor | 1 g | | |
| | duty time | 100 % | | |
| | max. switching frequency | depends on suppres | sor | •••••• |
| 4) = 1.11.18.11.18.11.18.11.18.11.18.11.18.11.11 | max. duty time | | | |

¹⁾ For inductive loading, without external suppression of the transistor outputs, the following applies: $T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95}$ 3 × $T_{0.65}$ = 3 × L/R.

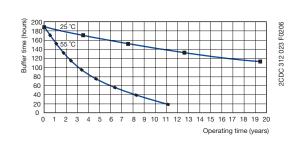
Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LSR, CL-LST | CL-LMR CL-LMT | CL-LER.20 |
|--|--------------------------------------|--|---|--|
| | | | CL-LET, CL-LER.18 | CL-LEC.CI000 |
| General data | | | | |
| Dimensions (W x H x D) | | 71.5 mm x 90 mm x 58 mm (2.81 inch x 3.54 inch x 2.28 inch) | 107.5 mm x 90 mm x 58 mm (4.23 inch x 3.54 inch x 2.28 inch) | 35.5 mm x 90 mm x 58 mm (1.40 inch x 3.54 inch x 2.28 inch) |
| Weight | •••••• | 0.2 kg (0.44 lb) | 0.3 kg (0.66 lb) | 0.07 kg (0.15 lb) |
| Mounting | | DIN rail (IEC/EN 60715), CL-LAS.FD001 (accesso | 35 mm or screw mountii | ng with fixing brackets |
| Mounting position | | horizontal / vertical | | |
| Electrical connection | | | | |
| Wire sizefir | | 0.2-4 mm² (22–12 AWG) 0.2-2.5 mm² (22–12 AWG) | 3) | |
| Max. tightening torque | | 0.6 Nm | | <u></u> |
| Environmental data | | | | |
| Ambient temperature range | operation storage | | o IEC 60068-2-1, heat ac | cc. to IEC 60068-2-2 |
| LCD-Display (clearly legible) Condensation | | 0+55 °C avoid condensation with | auitable methode | <u>.</u> |
| Humidity, no condensation (IEC/EN 60068-2-30) | | 5-95 % | Sultable methods | • |
| Air pressure (operation) | | 795-1080 hPa | *************************************** | • |
| Degree of protection (IEC/EN 60529) | •••••• | IP20 | *************************************** | • |
| Vibration (IEC/EN 60068-2-6) | | 10-57 Hz (constant ampacceleration 2 g) | olitude 0.15 mm), 57-150 l | Hz (constant |
| Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60 Drop (IEC/EN 60068-2-31) height of fall Free fall, packaged (IEC/EN 60068-2-32) | 068-2-27) | 18 Shocks 50 mm 1 m | | |
| Insulation data | | 1 | | |
| Overvoltage category Pollution degree (DIN EN 60947) Rating of air and creepage distances Insulation resistance | | III 2 EN 50178, UL 508, CSA EN 50178 | . C22.2, No. 142 | |
| Standards | | LIN JUTTO | | |
| Standards and directives | | EN 55011 EN 55022 IE | C/EN 61000-4, IEC 6006 | 88-2-6 IEC 60068-2-27 |
| Electromagnetic compatibility | | LIN 00011, LIN 00022, 1L | O/LIN 01000-4, 1LO 0000 | 00-2-0, ILO 00000-2-21 |
| Interference immunity | | | | |
| electrostatic discharge (ESD) electromag, field (HF radiation resistance) fast transients (Burst) powerful impulses (Surge) | IEC/EN 61000-4-3 IEC/EN 61000-4-4 | Level 3 (air discharge 8 10 V/m Level 3 (supply cable 2 supply cable symmetric Level 2 (supply cable sy | kV, signal lines 2 kV) al (AC) 2 kV. | (V) |
| HF line emission | IEC/EN 61000-4-6 | | innatioal (DO) 0.5 KV) | • |
| Interference suppression (EN 55011, EN 55022) Real time clock | .20,21,01000 + 0 | class B | | |
| Back-up time | | see diagram | | :- |
| Accuracy | | typ. ±5 (±0.5 h/year) | | <u>-</u> |
| Repeat accuracy of the time relay | | | | • |
| Accuracy (from value) | | ±1 | | - |
| Resolution | range "S" | 10 ms | | - |
| | range "M:S" | [1 s | | - |
| Detention heliculeur | range "H:M" | 1 min | | <u>-</u> |
| Retention behaviour | | L. 000 000 (:-=:) | | |
| Write cycles of retention memory (minimum) | | 1.000.000 (10 ⁶) | | - |

Technical diagram

Back-up time of the real time clock



Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LDD |
|--|-------------------|---|
| Input circuit - Supply circuit | | |
| Power failure buffering (IEC/EN 61131-2) | | 10 ms |
| General data | | |
| Dimensions (W x H x D) | | with keypad: |
| | | 86.5 x 86.5 x 21.5 mm (3.41 x 3.41 x 0.85 inch) |
| | | without keypad: |
| | | 86.5 x 86.5 x 20 mm (3.41 x 3.41 x 0.79 inch) |
| Weight | | 0.13 kg (0.29 lb) |
| Mounting | | 2 x 22.5 mm, with 2 retainers screwed |
| Mounting position | | horizontal / vertical |
| Environmental data | | |
| Ambient temperature range | | -25+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC |
| | | 60068-2-2) |
| | storage | -40+70 °C |
| LCD-Display (clearly legible) | | -5+50 °C, |
| <u></u> | | -100 °C (with backlit / continuous operation) |
| Condensation | | avoid condensation with suitable methods |
| Humidity, no condensation (IEC/EN 60068-2-30) | | 5-95 % |
| Air pressure (operation) Degree of protection (IEC/EN 60529) | | 795-1080 hPa |
| Degree of protection (IEC/EN 60529) | | IP65 |
| Vibration (IEC/EN 60068-2-6) | | 10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant |
| 0) 1 (1) (1) (2) (3) | | acceleration 2 g) |
| Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27) | | 18 Shocks |
| Drop (IEC/EN 60068-2-31) height of fall | | 50 mm |
| Free fall, packaged (IEC/EN 60068-2-32) | | 1 m |
| Insulation data | | 0 |
| Pollution degree (DIN EN 60947) Rating of air and creepage distances | | S EN 50178, UL 508, CSA 22.2, No 142 |
| Insulation resistance | | EN 50178, OL 508, GSA 22.2, NO 142 |
| Standards | | EN 30176 |
| Standards and directives | | EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, |
| Standards and directives | | IEC 60068-2-6. IEC 60068-2-27 |
| Electromagnetic compatibility | | IEC 00000-2-0, IEC 00000-2-21 |
| Interference immunity | | |
| | IEC/EN 61000-4-2 | Level 3 (air discharge 8 kV, contact discharge 6 kV) |
| electrostatic discharge (ESD) electromag. field (HF radiation resistance) | IEC/EN 61000-4-2 | |
| fast transients (Burst) | IEC/EN 61000 4 4 | Loyal 2 (aupply apple 2 k)/ signal lines 2 k)/ |
| a account display long (County) | IFC/FN 61000-4-5 | Level 3 (supply cable 2 kV, signal lines 2 kV) Level 3 (supply cable symmetrical 2 kV, CL-LDC.LAC2) |
| powerful impulses (Surge) | 120/214 01000-4-0 | Level 2 (0.5 kV supply cable symmetrical, CL-LDC.LAC2) |
| HF line emission | IEC/EN 61000-4-6 | |
| Interference suppression (EN 55011, EN 55022) | | class B |
| | | 0.000 5 |

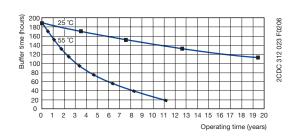
Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LDC.SDC2 | CL-LDC.SAC2 | CL-LDC.LDC2 | CL-LCD.LAC2 | CL-LDC.LNDC2 | CL-LDC.LNAC2 |
|---|-------------------------|----------------------------|-------------------|-----------------|-------------------|-----------------------------|---------------|
| Input circuit - Supply circuit Rated operational voltage U | | 24 V DC | 100-240 V AC | 24 V DC | 100-240 V AC | 24 V DC | 100-240 V AC |
| Rated operational voltage tolera | nce | -15+20 % | -15+10 % | -15+20 % | -15+10 % | -15+20 % | -15+10 % |
| Operational voltage range | | 20.4-28.8 V DC | 85-264 V AC | 20.4-28.8 V DC | 85-264 V AC | 20.4-28.8 V DC | |
| Frequency | | 0 Hz | 50/60 Hz | 0 Hz | 50/60 Hz | 0 Hz | 50/60 Hz |
| Frequency tolerance | ···· | - | ± 5 % | :_ | ± 5 % | :_ | ± 5 % |
| Residual ripple | ···· | ≤ 5 % | = | <u>-</u> ≤ 5 % | - | ≤ 5 % | - |
| Input current | at 24 V DC | typ. 185 mA | - | typ. 200 mA | - | typ. 200 mA | - |
| ' | at 115/120 V AC (60 Hz) | | typ. 90 mA | - | typ. 90 mA | - | typ. 90 mA |
| | at 230/240 V AC (50 Hz) | - | typ. 60 mA | - | typ. 60 mA | - | typ. 60 mA |
| Power failure buffering (IEC/EN | 61131-2) | 10 ms | | ······ | | · · ······ | |
| Power dissipation | at 24 V DC | 1.5 W | - | 3.4 W | - | 3.4 W | - |
| • | at 115/120 V AC | - | typ. 11 VA | - | typ. 11 VA | - | typ. 11 VA |
| | at 230/240 V AC | - | typ. 15 VA | - | typ. 15 VA | - | typ. 15 VA |
| Network - point-to-point conne | ection | | | • | . 71 | | |
| Number of stations | | 1 | | <u>:_</u> | | | |
| Data transfer rate | CL-LS, CL-LM | 9.6 kBaud | ••••• | | ••••• | ••••• | ••••• |
| Data transfer rate | | 19.2 kBaud | | ÷ | | | |
| Distance | OL-LDD | max. 5 m | | | ·•····· | | |
| Electrical isolation | to voltage supply | | ••••• | | | ••••• | ••••• |
| Liectrical isolation | to connected device | | ••••• | +[| ••••• | ••••• | ••••• |
| Termination system | to connected device | spring-type te | rminal | . <u>:</u> [| | | |
| Network - CL-NET | | Spring-type te | IIIIIIai | | | | |
| | | | | - | | | |
| Number of stations | <u>.</u> | max. 1 | | <u>-</u> | | max. 8 | |
| Data transfer rate | 6 m | + | | | | 1000 kBit/s | |
| | 25 m | - | | | | 500 kBit/s | |
| | 40 m | - | | | | 250 kBit/s | |
| | 125 m | - | | | | 125 kBit/s | |
| | 300 m | - | | | | 50 kBit/s | |
| | 700 m | - | | | | 20 kBit/s | |
| ····· | 1000 m | * | | | | 10 kBit/s | |
| Electrical isolation | to voltage supply | + | | | | yes | |
| | to inputs | | | | | yes | |
| | to outputs | - | | | | yes | ••••• |
| | to PC interface, | - | | | | yes | |
| | memory module, | | | | | | |
| · | CL-NET, CL-LINK | | | | | | |
| Bus terminator (first and last sta | tion) | - | | | | yes | ••••• |
| Termination system | | - | | - | | RJ45, 8 pole | - |
| General data | | | | | | | |
| Dimensions (W x H x D) | | 75 x 58 x 36.2 | mm | 107.5 x 90 x 30 | 0 mm | | |
| | | (2.95 x 2.28 x | 1.43 inch) | (4.23 x 3.54 x | 1.18 inch) | | |
| Weight | • | 0.164 kg (0.36 | lb) | 0.145 kg (0.32 | lb) | | |
| Mounting | | plugged onto | CL-LDD | plugged onto | CL-LDD or on D | IN rail (IEC/EN 6 | 30715) |
| Mounting position | | | | | | | |
| Electrical connection - Supply | circuit | | | | | | |
| Wire size | fine-strand with wire | 0.2 mm ² / 2.5 | mm² (24-12 AW | (G) | | | |
| | end ferrule | | , | • | | | |
| | rigid | 0.2 mm ² / 4 m | m² (24-12 AWG) |) | •••••• | ••••• | ••••• |
| Electrical connection - Data cab | le | | , , , | | | | - |
| Wire size | fine-strand with wire | 0.08 mm ² / 1.5 | mm² (28-12 | - | | 0.2 mm ² / 2.5 i | mm² (24-12 |
| | end ferrule | | ` | | | AWG) | , |
| | | 0.08 mm ² / 2.5 | mm² (28-12 | - | ••••• | 0.2 mm ² / 4 mi | m² (24-12 AWG |
| | | AWG) | , - | | | | , |
| Environmental data | | | | • | | • | |
| | operation | -25 +55 °C /a | old acc to IEC | 60068-2-1, hea | it acc to IEC sc | 1068-2-21 | |
| Ambient temperature range | operation | -40+70 °C | UIU AUU. IU IEU | 00000-2-1, 1108 | ıı acc. ı∪ I⊑C bl | 1000-2-2) | ••••• |
| Condensation | siorage | | ation with suita | blo mothodo | ······ | | ••••• |
| | EN 60069 2 20\ | • | audii Willi Sulla | inia mamona | ••••• | ••••• | ••••• |
| Humidity, no condensation (IEC/ Air pressure (operation) | EIN 00000-2-30) | 5-95 % | ••••• | ••• | | | ••••• |
| | 520) | 795-1080 hPa | | | | | ••••• |
| Degree of protection (IEC/EN 60 | 029) | IP20 | ntant amplitude | 015 mm\ 571 | 50 Uz (constant | annoloration 0 | α\ |
| Vibration (IEC/EN 60068-2-6) | | TIO-DI HZ (CON | starit ampiitude | 0.15 mm), 57-1 | oo nz (constant | acceleration 2 | 9/ |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | CL-LDC. | CL-LDC. | CL-LDC. | CL-LCD. | CL-LDC. | CL-LDC. |
|--|------------------------|------------------------|------------------|----------------|---|---|
| | SDC2 | SAC2 | LDC2 | LAC2 | LNDC2 | LNAC2 |
| Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27) | 18 Shocks | | | | | |
| | 50 mm | | | | | |
| Free fall, packaged (IEC/EN 60068-2-32) | 1 m | | | | | |
| Insulation data | | | | | | |
| Degree of protection (DIN EN 60947) | 2 | | | •••• | | *************************************** |
| Rating of air and creepage distances | EN 50178, UL | 508, CSA 22.2, | No 142 | | | *************************************** |
| | EN 50178 | | | | | |
| Standards | 1 | | | | | |
| Standards and directives | EN 61000-6-1, 2-27 | EN 61000-6-2 | , EN 61000-6-3 | , EN 61000-6-4 | I, IEC 60068-2- | 6, IEC 60068- |
| Electromagnetical compatibility | | | | | | |
| Interference immunity | | | | •••• | | *************************************** |
| electrostatic discharge (ESD) IEC/EN 61000-4-2 | | charge 8 kV, co | ontact discharge | e 6 kV) | .* | *************************************** |
| electromag. field (HF radiation IEC/EN 61000- | | | | | | |
| resistance) 4-3 | | - - 0 1 / - ! - | | ••••• | | • |
| fast transients (Burst) IEC/EN 61000-4-4 | | | | 201 400) | *************************************** | *************************************** |
| powerful impulses (Surge) IEC/EN 61000-4-5 | Level 3 (Supply | r cable symmet | Level 2 (0.5 kV | JU.LAUZ) | vmmotrical Cl | |
| | symmetrical) | ирріу Сарів | L6V61 2 (0.5 KV | supply cable s | yiiiiiletiicai, OL | LDO.LAOZ) |
| HF line emission IEC/EN 61000-4-6 | | ••••• | | ••••• | •••••• | *************************************** |
| Interference suppression (EN 55011, EN 55022) | class B | • | | ••••• | | *************************************** |
| Real time clock | 10.0.00 | | | | | |
| Back-up time | - | | see diagram | | | |
| Accuracy | - | •••••• | typ. ± 5 s/day | (± 0,5 h/year) | ••••• | ••••• |
| Repeat accuracy of the time relay | | | | | | |
| Accuracy (from value) | - | | ± 0.02 % | | | |
| Resolution range "S" | - | | 5 ms | | | |
| range "M:S" | _ | ••••• | 1 s | •••• | | • |
| range "H:M" | - | | 1 min | | | |
| Retention behaviour | | | | | | |
| Write cycles of retention memory (minimum) | - | | 1010 (read/ writ | e cycles) | | |

Technical diagram Back-up time of the real time clock



Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LD16DC2 CL-LD17DC2 | CL-LDR.16AC2 |
|--|---|---|---------------------------|
| Input circuit - Digital inputs | | 24 V DC | 115/230 V |
| Number | | 12 | |
| Inputs can be used as analog inputs | } | [4 (17, 18, 111, 112) | - |
| Indication of operational states | | - | LCD-Display (if existing) |
| Electrical isolation | from supply voltage | | |
| | from digital inputs | | |
| | from the outputs | yes | |
| | from PC interface, memory module, | | |
| | CL-NET, CL-LINK | 4 | |
| Rated operational voltage U _e | | 24 V DC | - |
| | U _e on "0" signal | < 5 V DC (I1-I6, I9, I10), < 8 V DC (I7, I8, I11, I12) | 0-40 V AC (sinusoidal) |
| | U on "1" signal | > 15 V DC (I1-I6, I9, I10), > 8 V DC (I7, I8, I11, I12) | 79-264 V AC |
| | e " | | (sinusoidal) |
| Rated frequency | • | 0 Hz | 50-60 Hz |
| Input current on "1" signal | • | 3.3 mA (at 24 V DC, I1-I6, I9, I10), | 12x0.2 mA (at 115 V AC, |
| | | 2.2 mA (at 24 V DC, I7, I8, I11, I12) | 60 Hz, I1-I12), |
| | | | 12x0.5 mA (at 230 V |
| | | | AC, 50 Hz, I1-I12) |
| Time delay from "0" to "1" | debounce ON | 20 ms | 10 ms (at 50 Hz), |
| | | | 100 ms (at 60 Hz) |
| | debounce OFF | typ. 0.1 ms (I1-I4), typ. 0.25 ms (I5-I12) | 10 ms (at 50 Hz), |
| | | | 100 ms (at 60 Hz) |
| Time delay | debounce ON | 20 ms | 10 ms (at 50 Hz), |
| from "1" to "0" | | | 100 ms (at 60 Hz) |
| | debounce OFF | typ. 0.1 ms (I1-I4), typ. 0.4 ms (I5, I6, I9, I10), | 10 ms (at 50 Hz), |
| | | typ. 0.2 ms (I7, I8, I11, I12) | 100 ms (at 60 Hz) |
| Cable length (unshielded) | | 100 m | - |
| Maximum cable length per input | | - | typ. 60 m |
| Frequency counter | number | [4 (I1, I2, I3, I4) | - |
| | counting frequency | < 3 kHz | - |
| | pulse shape | square-wave | - |
| | pulse / pause ratio | | - |
| Incremental counter | | 2 (11 + 12, 13 + 14) | - |
| | counting frequency | | - |
| | puise snape | square-wave | - |
| | signal offset | | - |
| Decid equates include | pulse / pause ratio | | - |
| Rapid counter inputs | | 4 (11, 12, 13, 14) | - |
| | counting frequency | square-wave | - |
| | pulse / pause ratio | | - |
| Cable length (shielded) | puise / pause ratio | < 20 m | - |
| Input circuit - Analog inputs | | \ 20 III | <u>:</u> . |
| | | 14 (17 10 144 140) | |
| Number | to rolling a second | 4 (17, 18, 111, 112) | |
| Electrical isolation | to voltage supply | | - |
| | to digital inputs | | - |
| | to outputs | lyes | - |
| | to PC interface, memory modul, CL-NET, CL-LINK | yes | - |
| Input type | GL-INE I, GL-LINK | DC voltage | |
| Input type | | 0-10 V DC | |
| Signal range Resolution | | 0.01 V | |
| Hesolution | | 0.01 V; 10 Bit (value 0-1023) | _ |
| Input impedance | uigitai | 11.2 kΩ | _ |
| Accuracy of the actual value | two CL-LD | ± 3 % | . <u>i.</u> |
| Accuracy of the actual value | devices | | |
| | within one device | | _ |
| Conversion time analog/digital | within one device | each cycle | _ |
| Input current | | < 1 mA | |
| Cable length (shielded) | | < 30 m | |
| ouble length (america) | | C 00 III | <u>:</u> |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | CL-LD16DC2 | CL-LD17DC2 | CL-LDR.16AC2 |
|---|---|------------------------------------|--------------------------|
| Output circuit - Analog outputs | | | |
| Number | | 1 | - |
| Electrical separation from voltage supply | | no | - |
| from the digital inputs | | no | - |
| from the digital outputs | | yes | - |
| from PC interface, memory module, CL-NET, CL-LINK | | yes | = |
| Output type | | DC voltage | |
| Signal range | | 0-10 V DC | |
| Max. output current | | 0.01 A | - |
| Burden resistance | | 1 kΩ | = |
| Overload and short-circuit protection | | yes | - |
| Resolution analog | - | 0.01 V DC | - |
| digita | | 10 Bit, (value: 0-1023) | - |
| Setting time | | 100 ms | - |
| Accuracy -25+55 °C | | 2 % | - |
| 25 °C | | 1 % | - |
| Conversion time | - | each CPU cycle | <u> -</u> |
| General data | | | |
| Dimensions (W x H x D) | CL-LDR: 89 x 90 x 44 mm (| | 89 x 90 x 44 mm |
| | CL-LDT (build-in): 89 x 90 x | 25 mm (3.5 x 3.54 x 0.98 | (3.5 x 3.54 x 1.73 inch) |
| | inch) | · | <u> </u> |
| Weight | CL-LDR: 0.15 kg (0.33 lb) / | | 0.15 kg (0.33 lb) |
| Mounting | snap-on power supply u horizontal / vertical | nit | |
| Mounting position Electrical connection | monzoniai / verticai | | |
| | | | |
| Wire size fine-strand with wire end ferrule | | | |
| | 0.2 mm ² / 4 mm ² (24-12 | AWG) | |
| Electrical connection - Data cable | | | |
| Wire size fine-strand with wire end ferrule | | | |
| | 0.08 mm ² / 2.5 mm ² (28- | 12 AWG) | |
| Environmental data | | | |
| | -25+55 °C (cold acc. to | o IEC 60068-2-1, heat ac | cc. to IEC 60068-2-2) |
| | -40+70 °C | | |
| Condensation | avoid condensation with | suitable methods | |
| Humidity, no condensation (IEC/EN 60068-2-30) | 5-95 % | | |
| Atmospheric pressure (operation) Degree of protection (IEC/EN 60529) | 795-1080 hPa IP20 | | |
| Vibration (IEC/EN 60068-2-6) | 10-57 Hz (constant amp | litudo 0.15 mm) 57-150 l | Hz (constant |
| VIDIALION (IEO/EN 00000 2-0) | acceleration 2 g) | intude 0.13 mm, 37-130 i | 12 (CONSTAIN |
| Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27) | 18 Shocks | | |
| Drop (IEC/EN 60068-2-31) height of fall | 50 mm | | |
| Free fall, packaged (IEC/EN 60068-2-32) | 1 m | ••••• | • |
| Insulation data | * | | |
| Pollution degree | 2 | | |
| Rating of air and creepage distances | EN 50178, UL 508, CSA | C22.2. No. 142 | |
| Isolation resistance | EN 50178 | , | |
| Standards | 1 | | |
| Standards and directives | EN 61000-6-1/-2/-3/-4, IEC | /FN 61000-4. JFC 60068-2 | -6. IFC 60068-2-27 |
| Electromagnetic compatibility | | , 01000 1, 120 00000-2 | . 0,0 00000 2 21 |
| | Loyal 3 (air diagharas 9 l | // contact discharge 6 | |
| electrostatic discharge (ESD) IEC/EN 61000-4-2 electromag, field (HF radiation res.) IEC/EN 61000-4-3 | Level 3 (air discharge 8 l | v, contact discharge 6 | \v) |
| fast transients (Burst) IEC/EN 61000-4-3 | Level 3 (supply cable 2 k | W signal cable 2 kW | |
| powerful impulses (Surge) IEC/EN 61000-4-4 | 2 kV (supply cable 2 k | v, signal cable 2 kv) netrical) | |
| powerral impalace (earge) | Level 2 (0.5 kV supply ca | able symmetrical) | |
| HF line emission IEC/EN 61000-4-6 | | | |
| Interference suppression (EN 55011, EN 55022) | class B | | |
| | | | |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Type | | CL-LDR |
|---|--|---|
| Output circuit - Relay outputs | | |
| Number | | 4 |
| Outputs in groups of | | - |
| Parallel switching of outputs to in | ncrease capacity | not permissible |
| Fusing of the output relay | from voltone avent | circuit-breaker B16 or fuse 8 A (slow-acting) |
| Electrical isolation | from voltage supply | |
| | from the inputs | |
| | from PC interface, memory module, CL-NET, CL-LINK | |
| | protective separation | L |
| | Basic isolation | |
| Mechanical lifetime | Dasic isolation | 10x10° switching cycles |
| Rung | conventional thermal current (10 A UL) | |
| Tiding | recommended load 12 V AC/DC | > 500 mA |
| | short-circuit proof $\cos \varphi = 1$; | 116 A |
| | characteristic B16 at 600 A | |
| | short-circuit proof $\cos \varphi = 0.5$ up to 0.7; | 16 A |
| | characteristic B16 at 900 A | |
| | Rated impulse withstand voltage Uimp contact-coil | 6 kV |
| | Rated operational voltage U | 250 V AC |
| Data dia antalia antalia | Tiatou oporational voltago o | |
| Rated insulation voltage U _i | | 250 V AC |
| Protective separation (EN 50178) | | |
| | between two contacts | |
| Making capacity | AC-15, 250 V AC, 3 A (600 ops./h) | |
| · <u>·</u> ········ | DC13, L/R \leq 150 ms, 24 V DC, 1 A (500 ops./h) | |
| Breaking capacity | AC-15, 250 V AC, 3 A (600 ops./h) | |
| | DC13, L/R \leq 150 ms, 24 V DC, 1 A (500 ops/h) | 200.000 switching cycles |
| Incandesent lamp load | 1000 W at 230/240 V AC | 25.000 switching cycles |
| Fluorescent lamp load | 10 x 58 W at 13/120 V AC | 25.000 switching cycles |
| riuorescent lamp load | with electrical control gear | |
| | 10 x 58 W at 230/240 V AC | |
| | uncompensated | |
| | 1 x 58 W at 230/240 V AC | |
| | conventional compensated | 1 |
| Switching frequency | mechanical operations | 10×106 |
| Switching frequency | switching frequency | 10 Hz |
| | resistive load / lamp load | |
| | inductive load | |
| UL/CSA | | |
| Continuous current at 240 V | | 10 A AC |
| Continuous current at 24 V | | 18 A DC |
| AC | Utilization category (Control Circuit Rating Codes) | |
| 710 | max. rated operational voltage | |
| | max. continuous thermal current cos j = 1 at B 300 | |
| | max. making / breaking apparent power | |
| | (Make/Break) cos φ ≠ 1 at B 300 | |
| DC | Utilization category (Control Circuit Rating Codes) | |
| | max. rated operational voltage | |
| | max. continuous thermal current at R 300 | |
| | max. making / breaking apparent power | 28/28 VA |
| | (Make/Break) at R 300 | |

Data at $T_a = 25$ °C and rated values, if nothing else indicated.

| Туре | | CL-LDT |
|--|---|---|
| Output circuit - Transistor output | s | |
| Number | | 4 |
| Rated operational voltage U _e Operational voltage range | | 24 V DC |
| Operational voltage range | | 20.4-28.8 V DC |
| Residual ripple | | - |
| Supply current | on "0" signal | typ. 18 mA / max. 32 mA |
| | on "1" signal | typ. 24 mA / max. 44 mA yes (Attention: If supply voltage is reversed, |
| Reverse voltage protection | | applying voltage at the outputs, causes a short circuit.) |
| Electrical isolation | from voltage supply | yes |
| | from the inputs | yes |
| | from PC interface, memory module, | |
| Rated operational current I _e on,,1": | CL-NET, CL-LINK | max. 0.5 A |
| nated operational current i _e on, i | signal DC | |
| Lamp load without R _v | | 5 W (Q1-Q4) |
| Residual current on "0" signal per | channel | < 0.1 mA |
| Max. output voltage | on "O sidhal at external load < 10 MZ | 2.5 V |
| | on "1" signal at I _e = 0.5 A | |
| Short-circuit protection | | thermal (Q1-Q4), (analysis results from diagnosis input I16) |
| Short-circuit tripping current for R | _a ≤ 10 mΩ | $0.7 \text{ A} \leq I_e \leq 2 \text{ A per output}$ |
| 1010101011 0110011 00110111 | | 8 A |
| Peak short-circuit current | | 16 A |
| Thermal tripping | | yes |
| active channels and their load) | istant resistive load ${ m R}_{_{ m L}}$ < 100 k Ω (depending on | 40.000 switching cycles/h |
| Parallel connection of outputs | with resistive load, inductive load with external suppressor, combination within one group | |
| | number of outputs | max. 4 |
| | max. total current | max. 4 2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.) |
| Indication of operational states of | the outnuts | LCD-Display (if existing) |
| Inductive load1) without external si | | |
| | utilization factor | 0.25 g |
| $T_{0.95} = 1 \text{ ms},$ R = 48 Ω , | duty time max. switching frequency f = 0,5 Hz | 100 % |
| L = 16 mH | max. switching frequency f = 0,5 Hz | 1500 switching cycles |
| <u></u> | (max. duty time = 50 %) | |
| DC13, | utilization factor | 0.25 g |
| $T_{0.95} = 72 \text{ ms},$ $R = 48 \Omega,$ | duty time max. switching frequency f = 0,5 Hz | 100 % |
| L = 1.15 H | (max. duty time = 50 %) | 1500 switching cycles |
| | utilization factor | |
| $T_{0.95} = 15 \text{ ms},$ $R = 48 \Omega,$ | | |
| L = 0.24 H | max. switching frequency f = 0,5 Hz | 1500 switching cycles |
| | (max. duty time = 50 %) | |
| Inductive load ¹⁾ with external suppl | | |
| | demand factor | 1 g |
| | duty time max. switching frequency max. duty time | |
| 1) For inductive loading, without extern | max. Switching frequency max. duty time | |

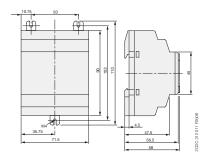
¹⁾ For inductive loading, without external suppression of the transistor outputs, the following applies: $T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95}$ 3 × $T_{0.65}$ = 3 × L/R.

Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

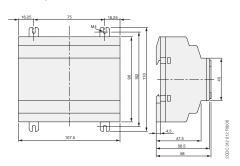
Logic relays Dimensional drawings

Dimensional drawings dimensions in mm

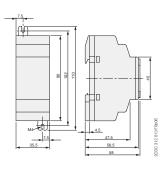
CL-LSR, CL-LST



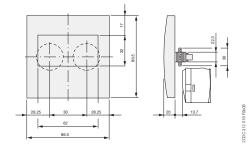
CL-LMR, CL-LMT



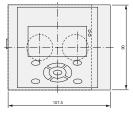
CL-LER.20



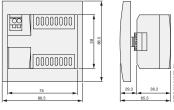
CL-LDD



CL-LDD.K + CL-LDC.L.. + (CL-LDR or CL-LDT)



CL-LDC.S..



CL-LDR, CL-LDT

