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Adjustable electronic overcurrent protection from 1...10 A / 24 Vdc



According to the new EN60204-1 Std. it is **compulsory** to protect wires on SELV-PELV lines against the effects of surges. The standard requires that surge protection devices on 24Vdc cut the fault off before the 24 Vdc control drops below 21.6 V, disconnecting power to controls and preventing the starting of emergency and safety functions.

According to EN 60204-1 and EN 61131-1 and -2, surge protection devices on SELV-PELV lines must be able to disconnect shorts within 10ms and dangerous surges within 5s. The use of power supplies with high output surge capacity and precise and quick protection devices enables to cut faults off before 24V drops below 21.6V disconnecting power to controls.

Fuses and magneto-thermic switches on 24 Vdc lines do not have I /t features enabling to quickly and precisely cut faults off; moreover fuses may be replaced with different types thus altering the system's protection and safety.

The correct coordination of the circuitry into which the surge protection device is incorporated must take into account the line's total R: R connections + R wires + R protection + residual R of the damaged load. R total value must always enable that the protection device's tripping current may flow in the circuit; it is also important to avoid undersizing the protection device in order to prevent inconvenient trips due to the load's breakaway starting I, or oversizing it thus increasing t of intervention.

The whole circuitry made up of power supply, surge protection device, wires and connections must be designed so as to enable the safe interruption of surges within 5s before 24 Vdc drops below 21.6 Vdc. This condition may be met using Cabur's power supplies - series CSF and CSG - dimensioned to supply high output surge (>+50% of rat.I for >5s) and electronic surge protection devices with CEP System which are more precise and quicker than magneto-thermic switches and devices whose tripping t does not depend upon ambient T and may be reset with local or remote controls.

Features of protection devices

Mgts have two different intervention curves: Thermal and Magnetic. The magnetic relay trips exclusively in the event of a short with different I / t curves: thermal relays have all the same intervention curve, regardless of the mgt curve and in the event of a surge, they operate as described in figure 2: surge currents $1.13 \times I_n$ are cut in >1h and with surges $> 1.45 \times I_n$, the tripping takes place in a few minutes.

The disconnection of short currents is carried out by a magnetic relay whose tripping t goes from 0.01 to 0.1 sec, with very high currents which the power supply may not be able to supply; an mgt C5 used on DC has >70A safe tripping, a current that only power supplies with much higher rated I, i.e. 40A, may be able to supply (and not all of them) and that can not be supplied by 10A power supplies.

Using mgt as surge protection device, if the power supply has a surge I 1.2 times its rat. I, disconnection will take place in 20...60 min, while with 2.5 currents higher than rat.I it will take place between 25 sec. and 2 min., depending on amb.T., whose times are too long to ensure the stability of 24V, for protecting wires and the selectivity of protection devices. In the event of a failure - until the protection device trips - the power supply remains with a higher surge of $I_n \times 1.5 \times 5s$ and 24V drops below 21.6V leaving standard functions and most of all safety functions with no power supply.

Selectivity of protection devices

In the event of a surge or a short, only the damaged circuit is disconnected by its protection device with no repercussions on the supply of the other loads. This function is obtained with power supplies having high surge capacity and quick and precise protection devices.

CEP system - a smart system for current's control

CEP "recognizes" surges at their lowest and more precise stage and disconnects the damaged circuit as quickly as possible. For an excellent flexible use, the CEP system allows to set 10 tripping currents ranging from 1A to 10A in 1A steps and 3 intervention curves "Fast - Normal - Delayed" (see figure 3).

The protection status is displayed by two leds and by a remote alarm transistor output; the load may be activated / deactivated by pressing a button on the front (figure 5) or by the PLC remote control. The possibility of separately controlling single channels is useful during installation, because the various components may be separately activated and tested and - in big systems - the remote control may be used in order to gradually activate loads thus preventing simultaneous overloads when the system is started up. Another important features in terms of safety is the possibility of manually disconnecting the load, which means that even when protection devices are reset from the remote control, the load will remain inactive thus preventing dangerous situations.



figure 1



figure 3



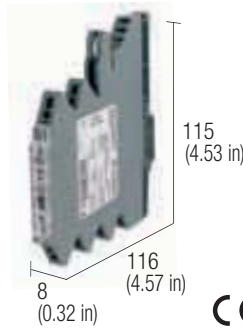
figure 4



figure 5

Programmable electronic overcurrent protection 1...10 A / 24 Vdc

- Programmable from 1 A to 10 A in 1 A steps
- 3 programmable characteristic curves
- Remote or local ON/OFF control
- Status signal with LED and remote signal
- Slide contact for the manual load disconnection
- Sealable front cover allows to protect the set up of the protection



- 1) sealable front cover
- 2) current selector
- 3) identification label
- 4) characteristic curve selector
- 5) ste/reset button

NOTES

The measures include the overall dimensions and the fixing to the guide.

(1) Version available upon request; for information call our sales department, local agent or representative

(2) 24 Vdc remote pulse switch the protection at falling edge. The pulse duration must be: ON = pulse > 1 s / OFF = pulse > 100 ms and < 800 ms

(3) The three standard intervention curves are described in the graphics; the C EP-D3 Version is also provided with a curve programmable through a software

VERSIONS

With overload indication

With status indication (ON/OFF/Overload)

With one wire bus

INPUT TECHNICAL DATA

Rated voltage

Rated current

Max system current

Protection

Remote control ON/OFF

OUTPUT TECHNICAL DATA

Rated voltage

Current min. / max.

Programmable characteristic curves

Switch ON capacity

Status indication

Status display

GENERAL TECHNICAL DATA

Operating temperature range

Input/output isolation

Protection degree

Reference Standards

Connection terminal

Housing material

Approx. weight

Mounting information

MOUNTING ACCESSORIES

Mounting rail type according to IEC60715/TH35-7.5

Mounting rail type according to IEC60715/G32

Distribution kit (terminal + end bracket)

Distribution rail (busbar)

Insulation cover for distribution rail

Plug-in jumper

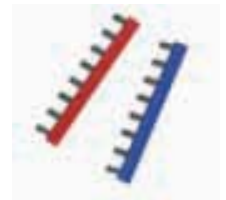
red

blue

Marking tag

BLOCK DIAGRAM

Cod. XCEPD1	Cod. XCEPD2	Cod. XCEPD3
CEP-D1 (1)	CEP-D2	CEP-D3
24 Vdc (range 18...32 Vdc)		
10 A dc max.		
40 A dc with CEP-RCC copper rail		
Internal against reverse polarity		
24 Vdc external pulse	24 Vdc external pulse and by software (2)	
24 Vdc (voltage drop <170 mV @ Un / In)		
1...10 A dc programmable in 10 step of 1 A		
slow, medium, fast	slow, medium, fast and a special programmable custom curve (3)	
10.000 µF		
green LED: fixed = ok, flashing = lout at 90% of the nominal, red LED: fixed = output manually switched off, slow flashing = overcurrent, quick flashing = error		
open collector transistor (overcurrent status)	open collector transistor (ON/OFF status)	open collector transistor (programmable status)
-25...+60°C, derating Imax. 8 A over 40°C		
3 kVac / 60 s SELV output		
IP 20 IEC 529, EN60529		
EN60950-1, EN61131-1, EN61131-2, EN60898, EN60947-4-1, EN50081		
0.25...2.5 mm² fixed screw type		
PA 6.6 (UL94V-0, NFF I2, F2)		
120 g (4.24 oz)		
vertical on rail, adjacent without gap, we recommend the use of end brackets		
PR/3/AC, PR/3/AC/ZB, PR/3/AS, PR/3/AS/ZB		
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CEP-SS	(cod. XCEPSS)	
CEP-RCC	(cod. XCEPRCC)	
CEP-RCP	(cod. XCEPRCP)	
CEP-BCR	(cod. XCEPBCR)	(8 poles)
CEP-BCB	(cod. XCEPBCB)	(8 poles)
CEP-MTW	(cod. XCEPMTW)	(table with 50 tags)



CEP-BCR and CEP-BCB



CEP-MTW



CEP-SS

Intervention curves:

- 1) fast
- 2) medium
- 3) slow

