

Description

The CPC20 bus controller is the central communication sub-assembly of the **18plus-ControlPlex® ELBus®** intelligent power distribution system. The CPC20 allows communication with up to 32 double channel ESX60D electronic circuit protectors. It enables read-out of the electronic circuit protectors' status, their corresponding operation data such as the present load current and the load voltage and it enables control and parameterising of the devices.

In addition the CPC20 ensures the connection between the circuit protectors and superordinate control level by means of the integral field bus interface. Its internal **ELBus®** interface allows realisation of the connection to the power distribution boards and the plugged-in ESX60D electronic circuit protectors. Up to two **ELBus®** interfaces are available. With an additional **ELBus®** interface, the bus Controller CPC20 can be used for a second power distribution system type 18plus ControlPlex. The CPC20 allows entire access on all required parameters of the electronic circuit protectors, their control unit and the visualisation of the device data.

This is made available at the field bus interface for the superordinate control unit and also at the RJ45 interface for the operation on site. The USB interface was designed as a service and maintenance interface. The combination of the CPC20 bus controller with the power distribution system **18plus-ControlPlex®** and the plugged in ESX60D electronic circuit protectors offers a fully parameterisable protection of the DC 24 V circuits and ensures the selective overcurrent protection of sensors and actuators, of decentralised peripheral sub-assemblies etc. and their supply cables.

It is therefore ideally suited to the use in machine construction and process control, in the chemical, pharmaceutical and foodstuffs industry, in building automation, steel production and car manufacturing. **ControlPlex®** reduces wiring time, increases system availability and enhances diagnostic functions.

Suitable for the following types:

Power distribution board	18plus-ControlPlex®
Electronic circuit protector	ESX60D
	(fully parameterisable by means of CPC20)

Approvals



(In connection with the 18plus, ESX60D modules)

Approvals

Authority	Standard	File-Certificate No.	Voltage ratings
UL	UL 2367	E306740	DC 24 V
UL	UL 508 listed CSA C22.2 No.14	E492388	DC 24 V



CPC20

Features

- Integral DC24 V power distribution system for power distribution and overcurrent protection
- Complete diagnosis and parameterising of the entire power distribution system
- For ESX60D electronic circuit protector
- Variable configuration of up to 16 two-channel electronic circuit protectors extension
- Variable configuration of up to 32 two-channel electronic circuit protectors with extension
- Fully fledged communication interface PROFINET
- Fully fledged communication interface Ethernet (web server)
- Service and maintenance interface via USB terminal
- Integral memory HISTOMEMO for overload and short-circuit diagnosis of the load circuits
- Profitability through considerably reduced wiring time
- Reduction of planning, design and installation time
- Ease of maintenance, diagnosis and system extension

Comliances



Certification

PNO certification: Profinet

Technical data (T_{amb} = 25 °C, U_B = DC24 V)
Typical applications

Intelligent DC 24 V Power Distribution System

Supply (XD1)

Voltage ratings	DC24 V (18 ... 30 V)
Current ratings	typically= 160 mA (with 1x Ethernet and 2x PROFINET)
Terminals	4 x push-in terminals (+/-0V/0V) max. cable cross section rigid 0.2 – 2.5 mm ² flexible with wire end ferrule (with plastic sleeve) 0.2 – 2.5 mm ² flexible with wire end ferrule (without plastic sleeve) 0.2 – 2.5 mm ² stripping length 11 mm

ELBus® terminal for connection with the Module 18plus-ControlPlex® (X2)

COM-1	Direct connection with 18plus-ControlPlex® (no wiring required)
X2 COM-2	Connection for the second power distribution board 18plus-ControlPlex® cable length max. 3 m typically H07V-K 1.5 mm ² female 16: addressing 15: data line ELBus® ELB

USB service and maintenance interface (X3)

X3	service interface type: USB 2.0 type C cable length max. 2.5 m
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PROFINET interface (-XF1, -XF2) with integral switch

XF1 (port 1)	connection to bus system PROFINET and to web server type: RJ45 When wiring and connecting to the bus system PROFINET the installation and wiring regulations of the PROFIBUS User Organisation (PNO) have to be observed.
XF2 (port 2)	connection to bus system PROFINET and to web server type: RJ45 When wiring and connecting to the bus system PROFINET the installation and wiring regulations of the PROFIBUS User Organisation (PNO) have to be observed.

ETHERNET interface (X1)

X1	communication interface to web server type: RJ45
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Technical data (T_{amb} = 25 °C, U_B = DC24 V)
Status indication of CPC20

LED »BF«	display of bus error (PROFINET) LED status indication options: red
LED »SF«	display of system error (PROFINET) LED status indication options: red
LED »US1«	LED lighted with supply voltage applied LED status indication options: red, green, orange

Operating mode	Indication of operating mode		
	LED BF	LED SF	LED US1
Start-up mode	orange	orange	orange
Bus error	red	OFF	green
System error	OFF	red	green
Firmware update	blinking red	blinking red	blinking red

LED »LNK« Ethernet communication activity per port
LED status indication options: green

Operating mode	Indication of operating mode
	LED LNK
Link available	green
No link available	OFF
PROFINET device localisation	blinking green

LED »ACT« Ethernet communication activity per port
LED status indication options: yellow

Operating mode	Indication of operating mode
	LED ACT
No activity	OFF
Activity available	blinking yellow

General data

Mounting method	rail mounting to EN 60715 - 35 x 7.5
Ambient temperature	0 °C ... +60 °C (without condensation)
Mounting temperature	+10 °C ... +30 °C
Storage temperature	-40 °C ... +70 °C
Housing material	polyamide UL94V0
Degree of protection	terminals IP20 EN60529
Dielectric strength	DC32 V (load circuit)
Dimensions	see dimensional drawing (tolerances to DIN ISO 286 part 1 IT13)
Mass	approx. 150 g
EMC	Emitted interference: EN 61000-6-3 Noise immunity: EN 61000-6-2
Vibration resistance	3 g, test to IEC 60068-2-6 test Fc

Order numbering code

Type

CPC20 bus controller for **18plus-ControlPlex®**
with ESX60D

Version: Bus system

PN PROFINET (connection: 2 x RJ45 female connector)

Version – number of power distribution boards to be connected

T2 optional connection of two **18plus-ControlPlex®**
power distribution systems

Product versions

001 marking

CPC20 PN - T2 - 001 ordering example

Conformity and approvals

- CE

Notes

- The CPC20 is only intended for use with safety extra-low voltage (=24V DC).
- Connection to a higher or not reliably disconnected voltage can cause hazardous conditions or damages
- The **18plus-ControlPlex®** power distribution system must exclusively be used.
- The technical data of the used circuit protectors have to be observed
- The entire power distribution system must only be installed by qualified personnel
- Only after expert installation must the device be supplied with power.
- After tripping of the circuit breaker/protector and reset, the cause of the failure (short circuit or overload) must be remedied.
- The national standards (e.g. for Germany DIN VDE 0100) have to be observed for installation and selection of feed and return cables.
- 0 V potential for load and control voltage is mandatory.
- 0 V potential load and control voltage connected
- For convenient adjustment and configuration by means of projecting software a master data file (GSDML file) will be made available for downloading on the E-T-A homepage
- The CPC20 has a direct and fixed connection between the housing shield of the RJ45 connectors (XF1, XF2 and X1) and the 0 V of XD1.
- Please observe the separate user manual for CPC20.

Safety Note



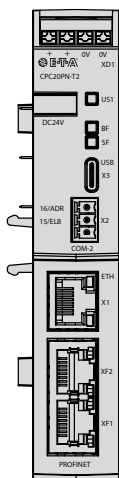
Caution:

Electrostatically sensitive sub-assemblies can be destroyed by voltages far below the human perception threshold. These voltages already occur if you touch a component or electrical terminals of a sub-assembly

without being electrostatically discharged. The damage of a sub-assembly caused by an overvoltage is often not immediately recognised, but will be noticed only after a longer operating time.

All information and data given on our products are accurate and reliable to the best of our knowledge, but E-T-A does not accept any responsibility for the use in applications which are not in accordance with the present specification. E-T-A reserves the right to change specifications at any time in the interest of improved design, performance and cost effectiveness. Dimensions are subject to change without notice. Please enquire for the latest dimensional drawing with tolerances if required. All dimensions, data, pictures and descriptions are for information only and are not binding. Amendments, errors and omissions excepted. Ordering codes of the products may differ from their marking.

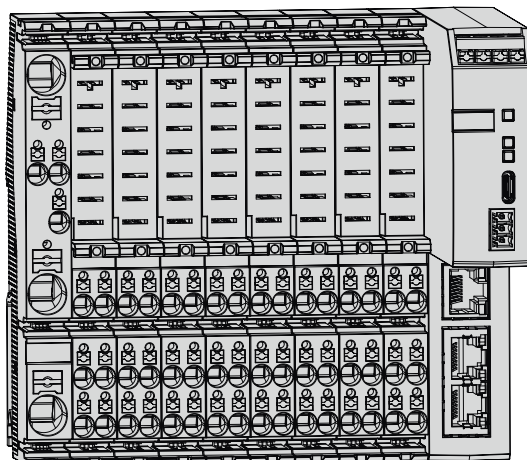
Terminal selection



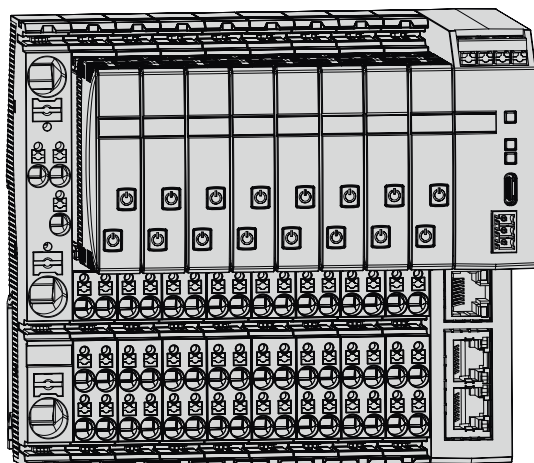
Designation of the connectors of the bus controller CPC20

Wiring diagram

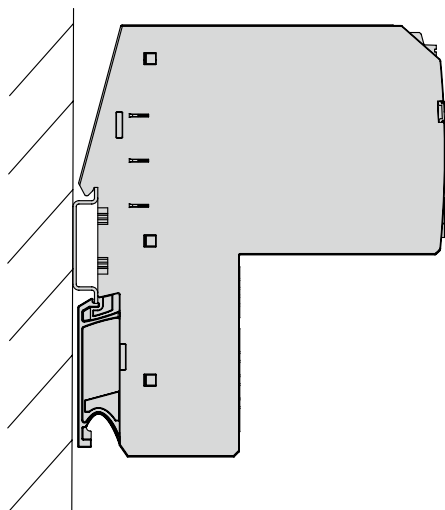
CPC20 bus controller and 18plus *ControlPlex*® unpopulated



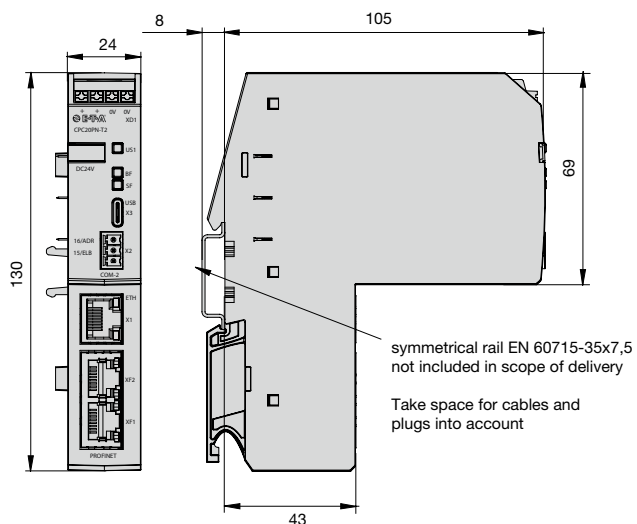
CPC20 bus controller and 18plus *ControlPlex*® populated with ESX60D



Mounting position

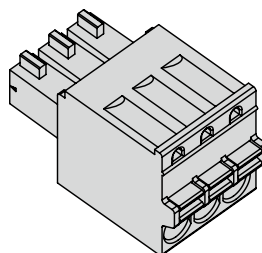


Dimensions of CPC20 bus controller



Accessories

3-pole terminal strip
FK-MCP 1.5/3-ST-3 (X52 COM2)
Y31154801



Description

The CPC20 bus controller is the central communication sub-assembly of the **ControlPlex® CPC20 intelligent power distribution system**. The CPC20 allows communication with up to 32 double channel ESX60D electronic circuit protectors. It allows read-out of the electronic circuit protectors' status, their corresponding operation data such as the present load current and the load voltage and it enables control and parametrising of the devices.

In addition, the CPC20 ensures the connection between the circuit protectors and superordinate control level by means of the integral field bus interface. Its internal **ELBus®** interface allows realisation of the connection to the power distribution boards and the plugged-in ESX60D electronic circuit protectors. Up to two **ELBus®** interfaces are available. With an additional **ELBus®** interface, the CPC20 bus controller can be used for a second **ControlPlex® CPC20** power distribution system. The CPC20 allows entire access on all required parameters of the electronic circuit protectors, their control unit and the visualisation of the device data.

This is made available at the field bus interface for the superordinate control unit and also at the RJ45 interface for the operation on site. The USB interface was designed as a service and maintenance interface. The combination of the CPC20 bus controller with the 18plus-ControlPlex® power distribution system and its ESX60D electronic circuit protectors offers a fully parametrisable protection of the DC 24 V circuits and ensures the selective overcurrent protection of sensors and actuators, of decentralised peripheral sub-assemblies etc. and their supply cables.

It is therefore ideally suited to the use in machine construction and process control, in the chemical, pharmaceutical and foodstuffs industry, in building automation, steel production and car manufacturing. **ControlPlex®** reduces wiring time, increases system availability and enhances diagnostic functions.

Suitable for the following types:

Power distribution system **18plus-ControlPlex®**
Electronic circuit protectors **ESX60D**
(fully parametrisable by means of CPC20)



Features

- Integral DC 24 V power distribution system for power distribution and overcurrent protection
- Complete diagnosis and parametrising of the entire power distribution system
- For ESX60D electronic circuit protectors
- Variable configuration of up to 16 two-channel electronic circuit protectors extension
- Variable configuration of up to 32 two-channel electronic circuit protectors with extension
- Fully fledged EtherNet/IP communication interface
- Fully fledged Ethernet communication interface (web server)
- Service and maintenance interface via USB terminal
- Integral history memory »HISTOMEMO« for overload- and short-circuit diagnosis of the load circuit
- Profitability through extremely reduced wiring time
- Reduction of planning, design and installation time
- Ease of maintenance, diagnosis and system extension

Your benefits

- Enhances system availability through comprehensive diagnostic functions
- Improves protection against voltage dips through selective protection of loads
- Increases the flexibility of system planning through a modular terminal block system

Approvals and certificates



(in connection with the 18plus, ESX60 D devices)

Approval authority	Standard	File certificate no.	Rated voltage
UL	UL 2367	E306740	DC 24 V
UL	UL 508 Listed CSA C22.2 No. 14	E492388	DC 24 V

Conformity



Technical data (T_U = 25 °C, U_B = DC 24 V)
Typical applications

Intelligent DC 24 V power distribution system

Supply (XD1)

Rated voltage	DC 24 V (18 ... 30 V)
Current rating	Typically = 160 mA (with 1x Ethernet and 2x EtherNet/IP)
Terminals	4 x push-in terminals (+/+0V/0V)
	Max. cable cross section rigid 0.2 – 2.5 mm ²
	Flexible with wire end ferrule (with plastic sleeve) 0.2 – 2.5 mm ²
	Flexible with wire end ferrule (without plastic sleeve) 0.2 – 2.5 mm ²
	Stripping length 11 mm

ELBus® terminal for connection with the 18plusControlPlex® module (X2)

COM-1	Direct connection with 18plus ControlPlex® (no wiring required)
X2 COM-2	Connection for the second 18plus-ControlPlex power distribution board® Cable length max. 3 m Typically H07V-K 1.5 mm ² 16: Addressing 15: Data line ELBus® ELB

USB service and maintenance interface (X3)

X3	Service interface Type: USB 2.0 type C Cable length max. 2.5 m
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EtherNet/IP interface (XF1, XF2) with integral switch

XF1 (Port 1)	Connection to the EtherNet/IP bus system and the web server Type: RJ45 When wiring and connecting to the Ethernet IP bus system the installation and wiring regulations of the EtherNet/IP™ specification have to be observed.
XF2 (Port 2)	Connection to the EtherNet/IP bus system and the web server Type: RJ45 When wiring and connecting to the Ethernet IP bus system the installation and wiring regulations of the EtherNet/IP™ specification have to be observed.

Ethernet interface (X1)

X1	Communication interface to web server Type: RJ45
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Technical data (T_U = 25 °C, U_B = DC 24 V)
Status indication of CPC20

LED »NS«	Display of the network status (EtherNet/IP) LED status indication options: red, green, orange
LED »MS«	Display of the module status (EtherNet/IP) LED status indication options: red, green, orange
LED »US1«	LED lighted with supply voltage applied LED status indication options: red, green, orange

Operating mode	Indication of operating mode		
	LED MS	LED NS	LED US1
Start-up mode	orange	orange	orange
CIP connected	green	green	green
No IP address	green blinking	OFF	green
IP address not valid, no CIP connected	green	green blinking	green
System error	red	–	–
Firmware update	red blinking	red blinking	red blinking

LED »LNK/ACT« Ethernet communication activity per port
LED status indication options: green

Operating mode	Indication of operating mode
	LED LNK/ACT
No link available	OFF
Link available	green
Activity available	green blinking

General data

Mounting method	Rail mounting to EN 60715 - 35 x 7.5
Ambient temperature	0 °C to +60 °C (without condensation)
Mounting temperature	+10 °C ... +30 °C
Storage temperature	-40 °C ... +70 °C
Housing material	Polyamide UL94V0
Degree of protection	Terminals IP20 EN60529
Dielectric strength	DC 32 V (load circuit)
Dimensions	See dimensional drawing (tolerances to DIN ISO 286 part 1 IT13)
Mass	approx. 150 g
EMC	Emitted interference: EN 61000-6-3 Noise immunity: EN 61000-6-2
Vibration resistance	3 g, test to IEC 60068-2-6 test Fc

All information and data given on our products are accurate and reliable to the best of our knowledge, but E-T-A does not accept any responsibility for the use in applications which are not in accordance with the present specification. E-T-A reserves the right to change specifications at any time in the interest of improved design and performance. Dimensions are subject to change without notice. Please enquire for the latest dimensional drawing with tolerances if required. All dimensions, data, pictures and descriptions are for information only and are not binding. Amendments, errors and omissions excepted. Part numbers of the devices may differ from their marking.

Ordering information

Series

CPC20 Bus controller for **18plus ControlPlex®**
with ESX60D

Design: Bus system

EN EtherNet/IP (connection: 2 x RJ45 female connector)

Version - number of power distribution systems to be connected

T2 Optional connection of two power distribution systems **18plus-ControlPlex®**

Product versions

001 Marking

CPC20 EN - T2 - 001 Ordering example

Notes

- The CPC20 is only intended for use with safety extra-low voltage (= 24 VDC).
- Incorrect connection to a higher and/or not reliably disconnected voltage can cause hazardous conditions or damage.
- Exclusively the power distribution system of type **18plus-ControlPlex®** is to be used.
- The technical data of the used circuit breakers have to be observed.
- The entire power distribution system must only be installed by qualified personnel.
- Only after expert installation must the device be supplied with power.
- After tripping of the circuit breaker and before resetting, the cause of the failure (short circuit or overload) must be remedied.
- The national standards (e.g. for Germany DIN VDE 0100) have to be observed for installation and selection of supply and discharge cables.
- 0 V potential for load and control voltage is mandatory.
- 0 V potential load and control voltage connected.
- For convenient parametrisation and configuration by means of projecting software a master data file (EDS file) will be made available for downloading on the E-T-A homepage.
- The CPC20 has a direct and fixed connection between the housing shield of the RJ45 connectors (XF1, XF2 and X1) and the 0 V of XD1.
- Please observe the separate user manual for CPC20.

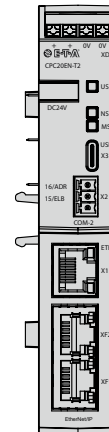
Safety Note



Caution:

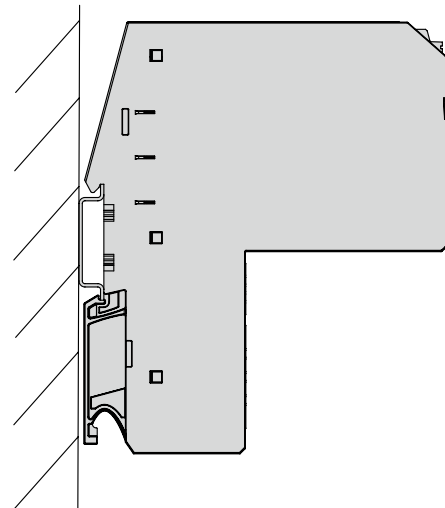
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Terminal selection

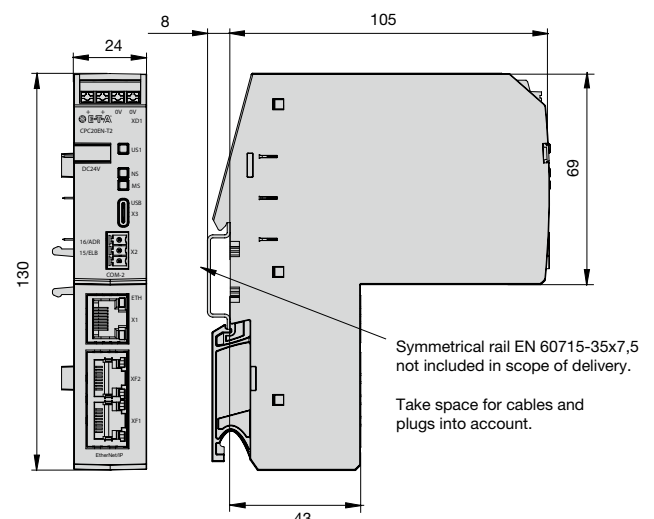


Designation of the connectors of the CPC20 bus controller

Mounting position

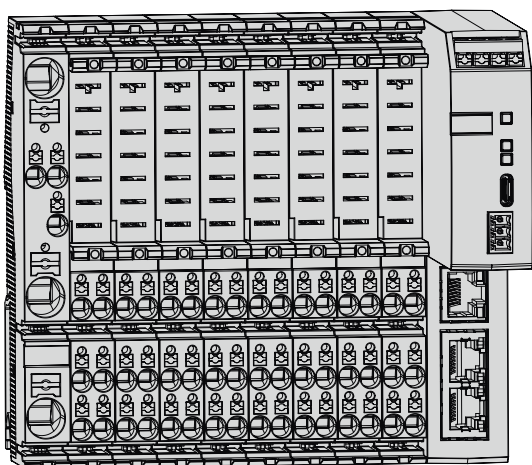


Dimensions CPC20 bus controller

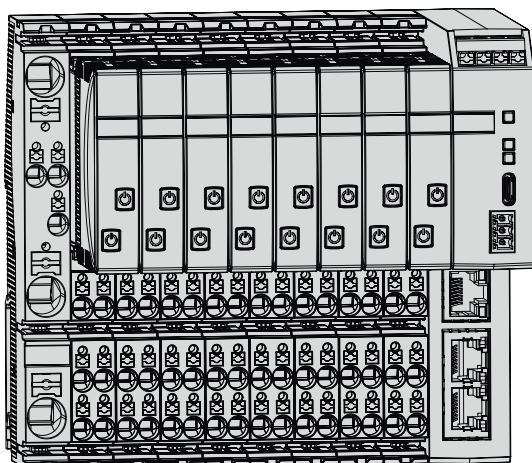


Wiring diagram

**CPC20 bus controller and 18plus ControlPlex®
unpopulated**

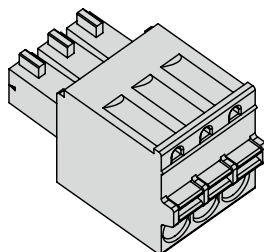


**CPC20 bus controller and 18plus ControlPlex®
populated with ESX60D**



Accessories

3-pole terminal strip
FK-MCP 1.5/3-ST-3 (X2 COM2)
Y31154801



Description

The 18plus-**ControlPlex**® intelligent power distribution system offers the option, in connection with the CPC20 controller, to accommodate up to sixteen double-channel ESX60D electronic circuit protectors and to enable communication. It enables read-out of the electronic circuit protectors' status, their corresponding operation data such as the present load current and the load voltage and it enables control and parameterising of the devices.

In addition the CPC20 ensures the connection between the circuit protectors and superordinate control level by means of the integral field bus interface. Its internal **ELBus**® interface allows realisation of the connection to the power distribution boards and the plugged-in ESX60D electronic circuit protectors. Up to two **ELBus**® interfaces are available. With an additional **ELBus**® interface, the bus Controller CPC20 can be used for a second power distribution system type 18plus ControlPlex. The CPC20 allows entire access on all required parameters of the electronic circuit protectors, their control unit and the visualisation of the device data.

The combination of CPC20 with the power distribution system 18plus-**ControlPlex**® and the plugged in ESX60D electronic circuit protectors offers a fully parameterisable protection of the DC 24 V circuits and ensures the selective overcurrent protection of sensors and actuators, of decentralised peripheral sub-assemblies etc. and their supply cables.

It is therefore an ideal system to use in machine construction and process control, in the chemical, pharmaceutical and foodstuffs industry, in building automation, steel production and car manufacturing. It reduces wiring time, increases system availability and enhances diagnostic functions.

The module 18plus-**ControlPlex**® holds a complete mounting and power distribution system for DIN rail mounting which has, together with the busbars, a fully-featured 80 A power distribution DC 24 V control voltage without additionally required terminals and connection lines.

All electrical connections are made by means of push-in terminals with the following properties:

- All conductors can be plugged in easily and without tools
- Reliable contact making
- Firm connection of the conductors due to high pull-out forces
- Ease of operation with any tool
- Contact reliability in the event of shock and vibration
- Gas-tight connection
- Maintenance-free

All pushers were designed in four different colours (red, blue, orange, grey) so as to easily distinguish the different voltage potentials and functions of the device.

red = supply 24 V/LINE+ or protected load output/LOAD+
 blue = supply power supply 0 Volt or load/0 Volt
 orange = supply system FE (functional earth) or load/FE
 grey = ELBus terminals 15 ELB; 16 ADR; 18 GND

Suitable for the following types:

Controller	CPC20
Electronic circuit protector	ESX60D (completely parameterisable by means of CPC20)



Module 18plus-ControlPlex®

Features

- Space-saving wiring method for load and data lines
- For professional electric planning and design work in the future
- Ideal for all control cabinets and switch boxes with ongoing decentralisation of the entire automation technology
- Compact design, significant cost reduction for the whole power distribution including wiring in the control cabinet
- Holds a complete installation and power distribution system for symmetrical rail mounting.
- Together with the busbars it holds a fully-fledged 80 A potential distribution of the DC 24 V control voltage without additionally required connection terminals or connecting cables
- Line entry of the DC 24 V supply for LINE+, 0 Volt and functional earth FE is by means of plug-in type busbars.
- Bus connection for **ControlPlex**® applications

Your benefits

- Flexible plant design by means of are Module
- Compact and Clear cable concept through a clear assignment of channels
- Cost reduction through quick wiring and low stockkeeping

CE marking



Technical data

Plug-in type circuit protectors	ESX60D
Rated voltage	DC 24 V
Rated insulation voltage	AC 250 V
Main circuit, rated current I_N supply module	80 A (IEC 60947-7-1/-2)
Connection module	20 A (IEC 60947-7-1/-2)
Busbar for power distribution	I_{max} 80 A
Insulated busbar	
Reference ambient temperature	-25° C ... +60° C
Mounting ambient temperature	+5° C ... +60° C
Storage temperature	-40° C ... +70° C
Mounting position	any
Creepage resistance	CTI 600
Mounting method	symmetrical rail EN 50022-35x7.5 symmetrical rail EN 50022-35x15/1.5
Supply module EM supply terminals (1, 3, 4)	Push-in terminal PT 16 0.5 – 16 mm ² rigid (without wire end ferrule AWG 20 – 6; 0.5 – 16 mm ² flexible (without wire end ferrule AWG 20 – 6; 0.5 – 16 mm ² flexible with wire end ferrule* without plastic sleeve 0.5 – 16 mm ² flexible with wire end ferrule* with plastic sleeve
supply terminals (15, 16, 18)	Push-in terminal PT 4 0.2 – 6 mm ² rigid (without wire end ferrule AWG 24 – 12; 0.2 – 4 mm ² flexible (without wire end ferrule AWG 24 – 12; 0.25 – 4 mm ² flexible with wire end ferrule* without plastic sleeve 0.25 – 4 mm ² flexible with wire end ferrule* with plastic sleeve

Technical data

AM connection module terminals (2.1; 2.2; 3.1; 3.2; 4.1; 4.2)	Push-in terminal PT 4 0.2 – 6 mm ² rigid (without wire end ferrule AWG 24 – 12 0.2 – 4 mm ² flexible (without wire end ferrule AWG 24 – 12 0.25 – 4 mm ² flexible with wire end ferrule* without plastic sleeve 0.25 – 4 mm ² flexible with wire end ferrule* with plastic sleeve
TM connection module terminals (15: 16: 18)	push-in terminal PT 4 0.2 – 6 mm ² rigid (without wire end ferrule) AWG 24 – 12 0.2 – 4 mm ² flexible (without wire end ferrule AWG 24 – 12 0.25 – 4 mm ² flexible with wire end ferrule* without plastic sleeve 0.25 – 4 mm ² flexible with wire end ferrule* with plastic sleeve

Wire stripping length

Push-in terminal PT 16 18 mm

Push-in terminal PT 4 11 mm

*) Application note: When using wire end ferrules we recommend a square-shaped crimp

Typical electrical operational values

Insulation coordination (IEC 60664-1)

main circuit	rated impulse voltage 4 kV overvoltage category III pollution degree 3
ELBUS/ADR/0 V	rated impulse voltage 4 kV overvoltage category III pollution degree 3

Dielectric strength

main circuit to main circuit 1,500 V

main circuit to ELBUS/ADR/0 V 1,500 V

ELBUS/ADR/ 0 V to ELBUS/ADR/ 0 V 450 V

Insulation resistance > 100 MOhm (DC 500 V)

Typical internal resistance values

main circuit (EM1 – AM2.1/2.2); without device 5 mΩ

ELBUS/ 0V (1xEM, 4xAM, 1xTM); without device 60 mΩ; (5 mΩ for every additional AM)

Technical data

Typical mechanical values

Mounting values (circuit protectors)

Typical push-on force	approx. 180 N
Typical pull-out force	approx. 170 N

Number of push-on operations

Devices	50
Busbar	20

Mass

Module 18plus-EM03	approx. 76 g
Module 18plus-AM03	approx. 60 g
Module 18plus-TM03	approx. 47 g

Vibration (sinusoidal)

Test to IEC 60068-2-6, test Fc	3 g (57-500Hz), ± 0.38 mm (10-57 Hz)
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Shock

Test to IEC 60068-2-27, test Ea	15 g (18 ms)
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Humidity

Test to IEC 60068-2-78, test Cab	96 hrs in 95% RH
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Available versions

18plus-EM03-00-PT01-01	18plus supply module, ELBus® version ControlPlex®
18plus-AM03-00-PT01-01	18plus connection module ControlPlex® for ESX60D circuit protector
18plus-TM03-00-PT01-01	18plus transfer module ControlPlex extension for CPC20 controller

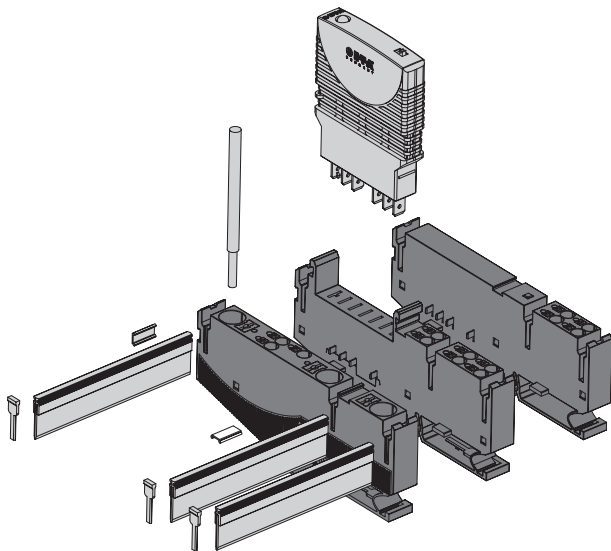
Notes

- The 18plus is only intended for use with safety extra-low voltage (= 24 V DC).
- Connection to a higher or not reliably disconnected voltage can cause hazardous conditions or damages
- The CPC20 controller must exclusively be used.
- The technical data of the used circuit protectors have to be observed
- The entire power distribution system must only be installed by qualified personnel
- Only after expert installation must the device be supplied with power.
- After tripping of the circuit breaker/protector and reset, the cause of the failure (short circuit or overload) must be remedied.
- The national standards (e.g. for Germany DIN VDE 0100) have to be observed for installation and selection of feed and return cables.
- 0 V potential for load and control voltage is mandatory.
- For convenient adjustment and configuration by means of projecting software a master data file (GSDML file) will be made available for downloading on the E-T-A homepage
- Please observe the separate user manual for CPC20.

Module 18plus **ControlPlex®** consists of three different basic modules:

- supply module 18plus-EM03-...
terminal 1 (LINE +), terminal 3 (0 V), terminal 4 (FE)
ELBus terminal 15 ELB; 16 ADR ; 18 GND
- 18plus-AM03-... connection module
terminal 2.1/2.2 (LINE +), terminal 3.1/3.2 (0 V), terminal 4.1/4.2 (FE)
- 18plus-TM03-... transfer module
ELBus terminals 15 ELB; 16 ADR; 18 GND

Mounting method



First the 18plus-EM supply module is snapped onto the symmetrical rail.

Snap on the 18plus-AM connection modules at a distance to the right and push them into the direction of the EM module until both latch on with a clicking sound.

Mechanical and electrical contact of the modules has then been established. Repeat as required corresponding to the number of connection modules. »SNAP ON – PUSH – CLICK«

The CPC20 module forms the end on the right side of the first system, the transfer module forms the end of the second system, which can be administrated by the CPC20. Assembly is the same as described above.

The supply module 18PLUS-EM with a width of 13.5mm holds 16mm² supply terminals for LINE+ (DC24V), 0V and FE (functional earth).

An 80A power distribution of the supply onto the individual slots with a common supply is achieved by plugging in a busbar for PLUS, 0V and FE on the terminal side of the modules in the provided slots.

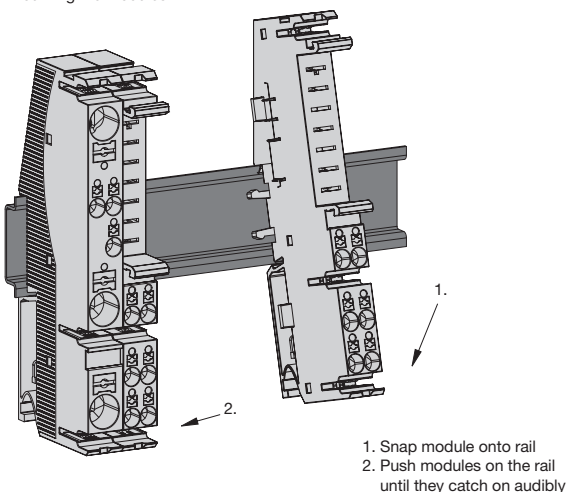
At the bottom of the connection modules there are two small moulded brush protection slides which can be broken out easily. These slides serve as an end cap over the plugged in busbars to ensure a mechanical protection against brush contact.

The connection module 18plus-AM ELBus has been designed to accommodate double channel ESX60D circuit protectors. Those will be plugged into the connection modules 18plus-AM. The AM modules can be mounted side by side, enabling bigger distribution systems with up to 16 slots. Each AM module is fitted with 4mm² push-in terminals for double connection of DC 24 V loads via L+, 0 V and FE, the max. load current is 20A per module.

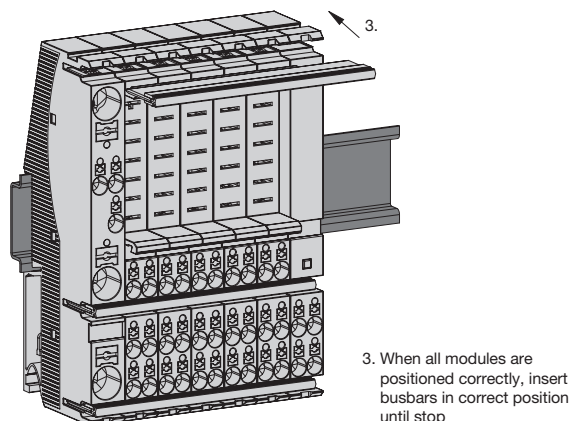
By mounting the individual connection modules 18PLUS-AM side-by-side, all internal wiring connections are established for the ELBus.

The 0 V reference potential of the connection module 18plus-EM for the ESX60D is already directly connected to the 0 V potential of the supply terminal 18plus-EM and is looped through to the next element over the blade terminals on the side. The side-by-side mounting (plug together) of the individual modules simultaneously establishes all internal wirings for the 0 V potential and for the **ELBus®**.

Mounting the modules:

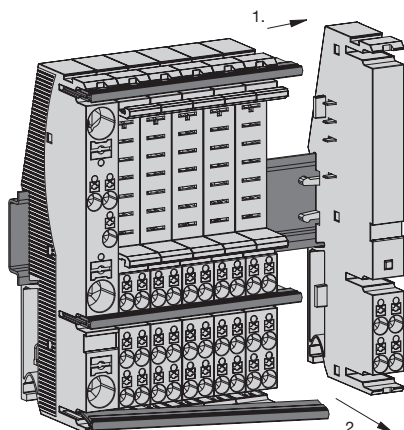


Mounting the busbars:



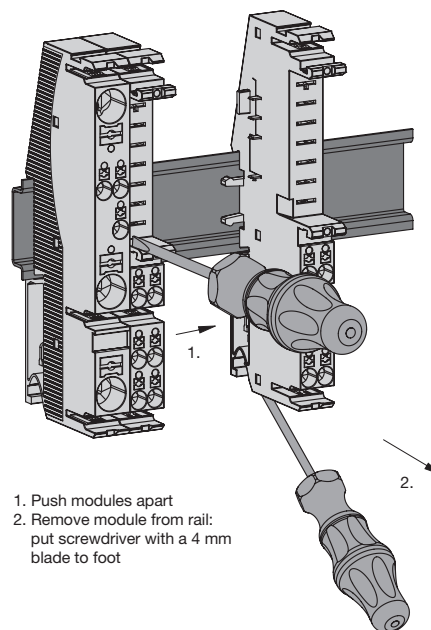
Disassembly

Removing the busbars:



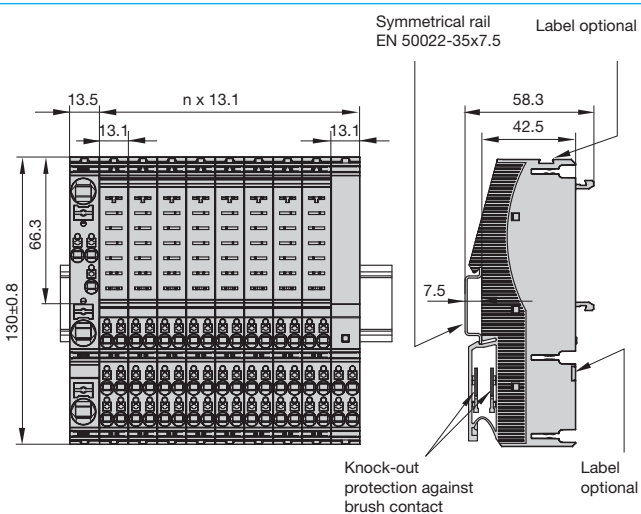
1. Push away signalling module to remove busbar
2. Pull busbar out of the groove

Removing the modules:

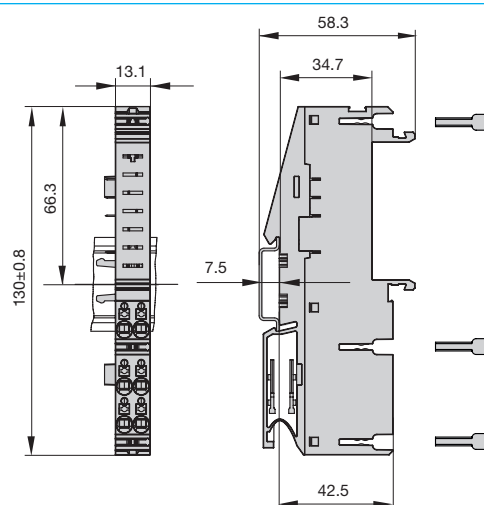


1. Push modules apart
2. Remove module from rail: put screwdriver with a 4 mm blade to foot

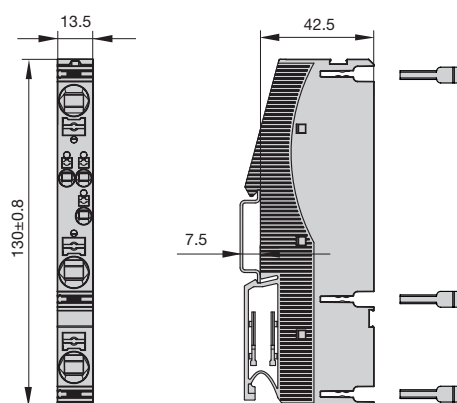
Dimensions of socket system:



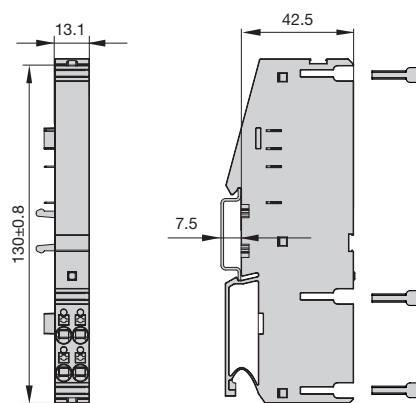
Dimensions AM



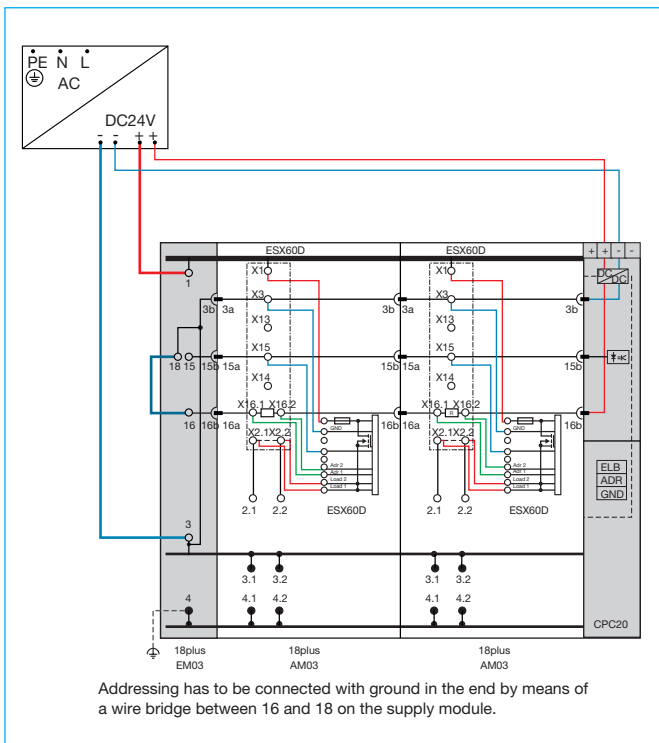
Dimensions EM



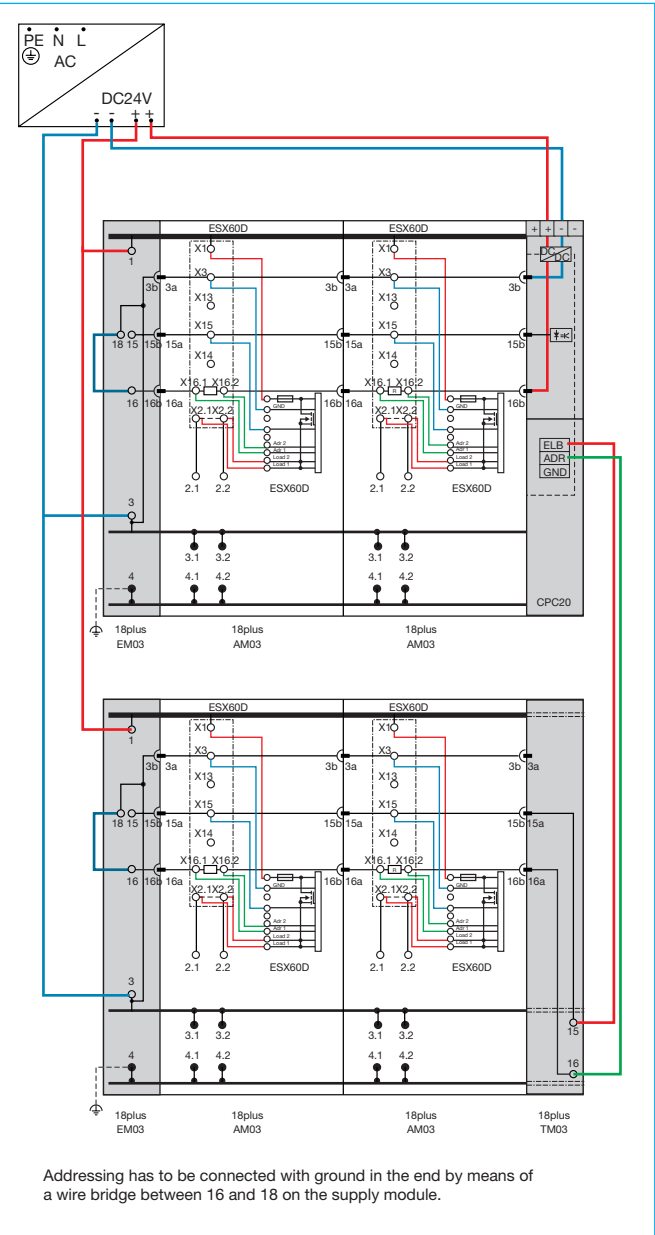
Dimensions TM



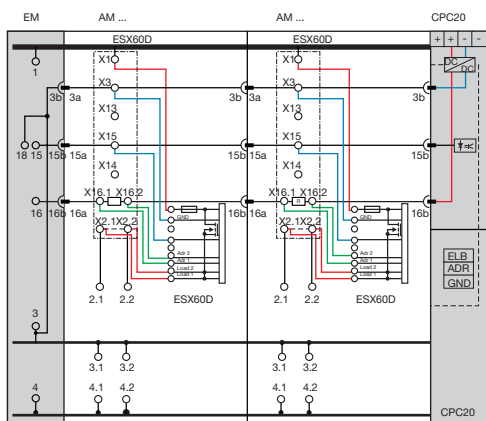
Wiring diagram for Module 18plus- ControlPlex®



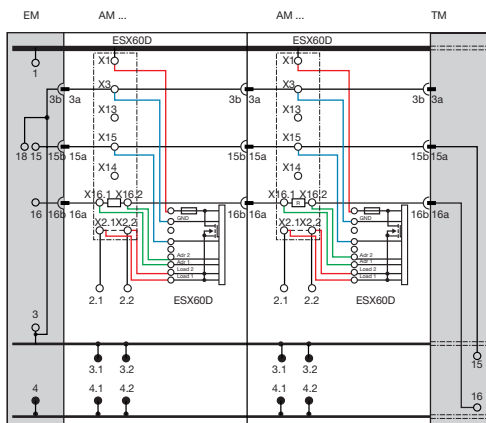
Wiring diagram for Module 18plus- ControlPlex® with extension module



Schematic diagram, with ESX60D circuit protector

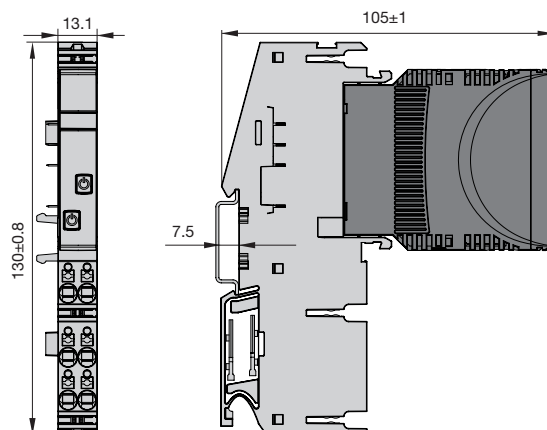


EM	AM	CPC20
1 Line	2.1, 2.2 Load	+ 24VDC
3 0 Volt	3.1, 3.2 0 Volt	(+ 24VDC cascade)
4 functional earth	4.1, 4.2 functional earth	- GND
13 signalling		15 ELBus®
		16 address
		18 GND



EM	AM	TM
1 Line	2.1, 2.2 Load	15 ELBus®
3 0 Volt	3.1, 3.2 0 Volt	16 address
4 functional earth	4.1, 4.2 functional earth	18 GND
13 signalling		

Dimensions, fitted with ESX60D



Pin assignment, fitted with ESX60D

ESX60D	Module 18plus-ControlPlex®
1 LINE (+)	1
3 GND	3
15 ELB	15
16.1, 16.2 ADR	16.1, 16.2
2.1, 2.2 LOAD (+)	2.1, 2.2



Accessories

Busbar

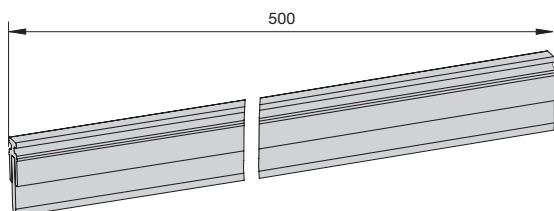
X 222 611 02

busbar for LINE, 0 V, FE,
grey insulation, 500 mm

FTG-Busbar

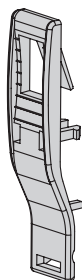
X 223 571 01

busbar for LINE, 0 V, FE,
grey insulation, 500 mm

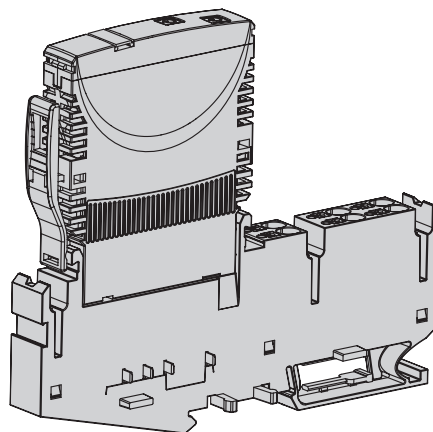


Retaining clip Y 311 978 01

Retaining clip for ESX60D



**Installation example with ESX60D
with optional retaining clip**



Description

The ESX60D is a double channel smart electronic circuit protector, forming an intelligent power distribution system with the CPC20 bus controller and power distribution module 18plus-**ControlPlex**®.

By means of its communication interface, the recorded measuring values and status messages are forwarded first to the CPC20 via the proprietary device bus **ELBus**® and then to a superordinate programmable control unit. This allows flexible adjustment of the current rating and its parameters to the requirements of the system and its direct controllability. So the user can import the relevant information regarding his DC 24 V voltage supply and process it accordingly.

The ESX60D electronic circuit protector offers adjustment of the current rating via a field bus system or via CPC20's integral web server.

At a width of only 12.5 mm, the double-channel ESX60D provides selective protection for all DC 24 V load circuits. This is achieved by a combination of active electronic current limitation in the event of a short circuit and a configurable overload disconnection.

A typical application is the protection of DC 24 V switch-mode power supplies which are widely used in factory automation today. In the event of a faulty overload, the output voltage of the switch mode power supply is turned down. This will cause a voltage breakdown with all connected loads. Not only does this frequently cause undefined fault conditions, but it can even lead to complete machine stoppages or system downtimes.

This is exactly where the ESX60D comes in, because it responds faster to overload conditions than the switch mode power supply and so it protects the entire system against voltage dips of the supply voltage.

The max. possible overcurrent is limited to 1.4 times or 1.8 times the selected current rating. This allows switching on capacitive loads up to min. 20,000 µF, disconnection is effected in the event of overload or short circuit or at undervoltage and overheating.

Suitable for the following types:

Controller	CPC20
Power distribution system	18plus-<i>ControlPlex</i>®



ESX60D

Features

- Communication capability with superordinate control units which are programmable from memory
- Import and adjust parameters of the device
- Remote control of load outputs and selective load protection, electronic trip curve
- All types of loads can be connected (DC 24 V motors upon request)
- Active current limitation when switching on capacitive loads of min. 20,000 µF and in case of overload/short circuit
- Two channels
- Whole-number adjustable current ratings from 1 A to 10 A by means of a superordinate control unit, independent of the channel
- Reliable parameterisable overload disconnection (factory setting: $1.2 \times I_N$) even with long load lines or small cable cross sections
- Manual ON/OFF momentary switch per channel
- Clear status indication through LED per channel and signalling to the superordinate control system
- Integral fail-safe element
- Low voltage drop
- Installation width for two channels only 12.5 mm
- Pluggable onto Module 18plus-**ControlPlex**®

Your benefits

- Permanent data logging and transmission.
- Enhanced system availability through intelligent interfaces.
- High flexibility of system planning due to parameterising capability.

Approvals



(In connection with the 18plus-**ControlPlex**®, CPC20 modules)

Approvals

Authority	Standard	File-Certificate No.	Voltage ratings
UL	UL 2367	E306740	DC 24 V
UL	UL 508 listed CSA C22.2 No.14	E492388	DC 24 V

Compliances



Technical data ($T_{amb} = 25\text{ °C}$, $U_B = \text{DC } 24\text{ V}$)
Operating data

Operating voltage U_B	DC 24 V (18 ... 30 V)	
Current rating range I_N	adjustable ratings 1 A ... 10 A in 1 A-steps	
Supply status	ON	
Closed current I_0	in ON condition: typically 26 mA	
Status indication by means of multicoloured LED	green	load circuit connected
	green/ reached	load current warning limit
	orange blinking	
	red	after disconnection due to overload, short circuit or high temperature or in the event of undervoltage or internal failure
	orange	device switched off via the communication interface
Low voltage monitoring of operating voltage	OFF	at typically $U_B < 16.0\text{ V}$
	ON	at typically $U_B < 17.5\text{ V}$ return to previous switching condition when voltage is restored
Fail-safe element	integral fail-safe element 15 A (blade fuse) 350 A rupture capacity	
Temperature monitoring	internal temperature monitoring with electronic disconnection	

Load circuit

Load output	Power MOSFET switching output (plus switching)	
	factory settings	range
Rated current	1 A	1 ... 10 A
Switch-on behaviour	condition latest state	condition latest state, OFF, ON
Load current warning limit (I_{WLimit})	80 % I_N	50 ... 100 % I_N
Warning limit hysteresis	5 %	5...20 %
Short-circuit limitation	active current limitation at $I_{KS} = 180\text{ % } I_N$ ($I_N = 1 \dots 5\text{ A}$) $I_{KS} = 140\text{ % } I_N$ ($I_N = 6 \dots 10\text{ A}$)	
Overload detection	120 % $I_N \pm 10\text{ %}$	105 ... 135 % $I_N \pm 10\text{ %}$
Trip time at overload at short circuit	3 s thermally limited (see time/current characteristics)	50 ms ... 10 s
ON delay t_{Start}	100 ms	100 ms ... 2.5 s
Disconnection of the load circuit	electronic disconnection without physical isolation	

Technical data ($T_{amb} = 25\text{ °C}$, $U_B = \text{DC } 24\text{ V}$)

Switching in OFF condition:	- manually on the device with the ON/OFF momentary switch - by means of a superordinate command of the communication interface - after disconnection due to overload or short circuit - temporarily at undervoltage - at excess temperature of the device - during ON delay - with internal device failure
Leakage current in OFF condition	typically <1 mA
Voltage drop	typically 12 mV/A
Capacitive loads	min. 20,000 μF
Inductive loads	external free-wheeling diode recommended for inductive load
Dielectric strength	max. DC 33 V
Parallel connection of several load outputs	not permitted
Terminals	LINE+ / GND / ELB / ADR / LOAD+
blade terminals	6.3 mm to EN 60934 - 6.3 x 0.8 for LINE+ / GND / ELB 2.8 mm to EN 60934 - 2.8 x 0.8 for ADR / LOAD
Housing material	moulded
Mounting	on Module 18plus- ControlPlex®
Ambient temperature	0 ... +60 °C (without condensation, cf. EN 60204-1)
Storage temperature	-40 ... +70 °C
Damp heat	IEC 60068-2-30 Db, 40 °C, 2 cycles @ 24 hrs
Vibration resistance	3 g, test to IEC 60068-2-6 test Fc
Degree of protection	IEC 60529, DIN VDE 0470 operating area IP30 terminal area IP00
EMC requirements (EMC Directive, CE Logo)	emitted interference: EN 61000-6-3 noise immunity: EN 61000-6-2
Insulation co-ordination (IEC 60934)	0.5 kV / pollution degree 2 reinforced insulation in the operating area
Insulation resistance (OFF condition)	n/a, only electronic disconnection
Dimensions (h x w x d)	12.5 x 70 x 60 mm (tolerances to DIN ISO 286 part 1 IT13)
Mass	approx. 40 g

Notes

- The user has to ensure that the cable cross section of the load circuit in question complies with the current rating of the ESX60D used.
- In addition special precautions must be taken in the system or machine (e.g. use of a safety PLC) which reliably prevent an automatic re-start of parts of the system (cf. Machinery Directive 2006/42/EG and EN 60204-1, Safety of Machinery). In the event of a failure (short circuit/overload) the load circuit will be disconnected electronically by the ESX60D.

Communication interface

Overview of commands:

- Write/read of configuration (parameters) independent of the channel
 - Switch-on behaviour (latest state, OFF, ON)
 - ON delay (50 ms ... 2500 ms)
 - Current ratings 1 A up to 10 A, integer
 - Overload disconnection (105 % ... 135 % I_N)
 - Trip time at short circuit (50 ... 10,000 ms)
 - Current limit value (50 % ... 100 %)
 - Hysteresis limit value (5 % ... 20 %)
- Reading of product information
 - Product type
 - Serial number
 - Hardware version
 - Software version
 - Assembly order number
 - Production facilities number

- Reading of measuring values

- Error memory
- Trip counter
- Statistical values
- Reason of last trip
- Status / event of device
- Load voltage
- Load current
- Operating voltage
- Temperature of device
- Bar chart memory

- Switch on/off or reset load output

- Reset error memory
- Reset statistical values
- Reset trip counter
- Read / delete bar chart memory
- Set parameters to factory setting

Order numbering code

Type No.	
ESX60D	Intelligent electronic circuit protector, with current limitation
Mounting method	
S	plug-in type
Design	
A	1 load output terminal per channel, adjustable current ratings xA/ xA
Number of channels	
2	2 channels
Version	
1	without physical isolation
Signal input	
0	current rating adjustable via communication interface
Signal output	
0	without signal output
Operating voltage	
DC 24 V	voltage rating DC 24 V
Current rating range	
1 A - 10 A adjustable	
ESX60D-S A 2 - 1 0 0 - DC24V - 1A-10A	ordering example

Please be informed that we have minimum ordering quantities to be observed.

Derating ($U_B = \text{DC } 24 \text{ V}$, cont. operation or effective currents in 1 min, without forced convection)

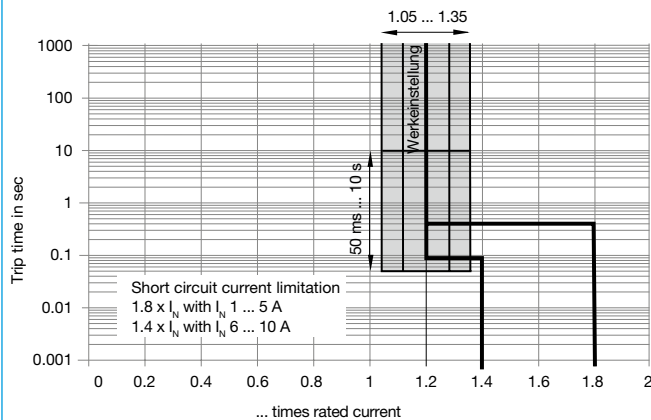
The internal temperature monitoring prevents overheating of the electronic circuit protector by disconnecting the causal load current. In order to ensure trouble-free operation, the max. load currents must be observed.

Max. load current with symmetrical split onto channels:

$T_{AMB} = 25^\circ\text{C}$		$T_{AMB} = 40^\circ\text{C}$		$T_{AMB} = 50^\circ\text{C}$		$T_{AMB} = 60^\circ\text{C}$	
10 A	10 A	8 A	8 A	6.5 A	6.5 A	6 A	6 A

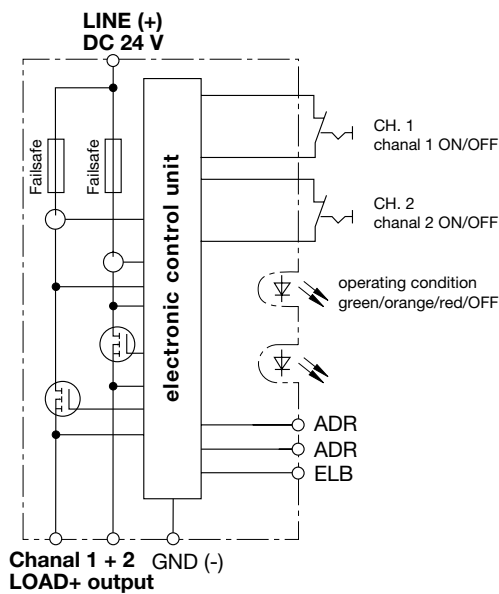
In the event of forced convection, the max. current may be increased by up to 20 % until the rated current is reached.

Typical time/current characteristic
($T_{amb} = 25\text{ °C}$, $U_B = \text{DC } 24\text{ V}$)



- Without the current limitation there would be a much higher overcurrent in the event of an overload or short circuit.

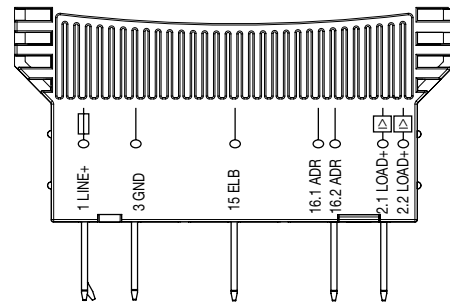
Schematic diagram ESX60D



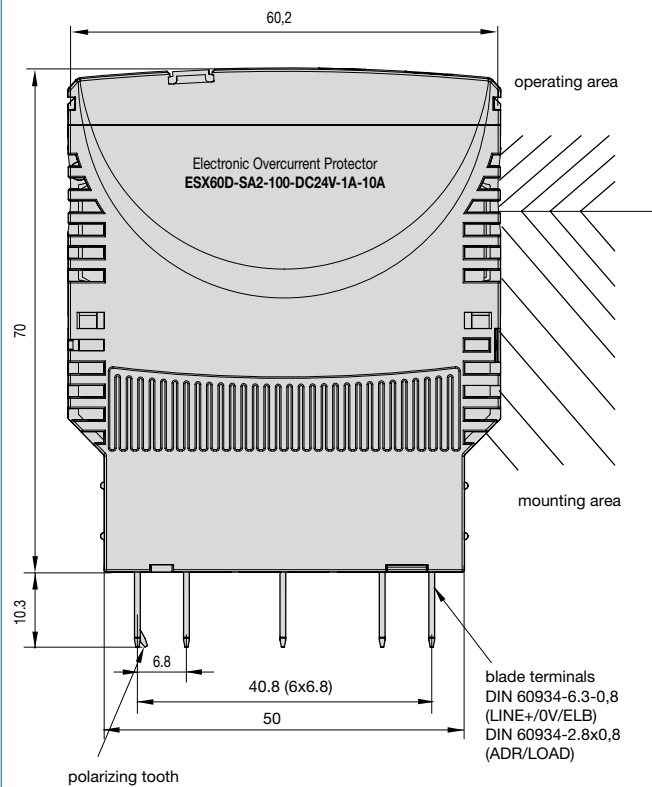
Wiring diagrams

ESX60D

with communication and address contact



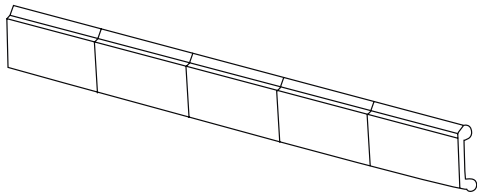
Dimensions ESX60D



Accessories

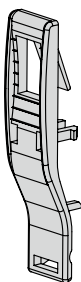
X22297750

White label, unmarked, packing qty = 50 pcs
(10 strips, 1 strip holds 5 pcs)



Retaining clip Y 311 978 01

Retaining clip for ESX60D



Installation example with ESX60D with optional retaining clip

