CPC20 ControlPlex® System
Intelligent DC 24 V power supply – protection included

Ready for industry 4.0
Intelligent power distribution systems increasingly find their way into industrial production plants. Their major purpose is to increase system availability, to ensure stable production processes, to avoid undesired standstills and to provide flexibility of the plants in terms of predictive maintenance.

This purpose is best served by the system’s consistency from the field level to the cloud. System data are available everywhere and provide the required transparency. Undesirable developments can quickly be identified and rectified. This ensures stable production processes and a constant high quality.

Besides the PROFINET interface the system also has an additional Ethernet interface which allows connection to OPC UA and MQTT. The operator can also connect to the integral web server and retrieve and analyse all vital data of the DC 24 V power distribution.
The intelligent CPC20 ControlPlex® system protects your DC 24 V power distribution against overload and short circuit. The basis is the modular terminal block system module 18plus. The ESX60D electronic circuit protector completes the system. It continuously records the load current and the load voltage of the system.

The CPC20 bus controller combines all measuring values and forwards them to the connected control systems via PROFINET. The system operator can continuously monitor his power distribution system and detect changes or aberrations at an early stage.

The ControlPlex® system prevents undesired downtimes, improves system transparency and stabilises the production process in terms of condition monitoring. Quality of the produced goods and system availability are significantly improved.

The CPC20 power distribution system allows intelligent and transparent protection of the DC 24 V power distribution. The interfaces for PROFINET, OPC UA and MQTT make status information and measuring values of the circuit protectors available on all levels of the control structure.
Versatile and intelligent DC 24 V power supply for your individual requirements

Modular design offers more flexibility
The modular design of the CPC20 ControlPlex® system allows individual adjustment of the DC 24 V power distribution to the system operator’s requirements. It combines selective protection of the various loads with the flexibility of the terminal block system and smart bus controllers, enhancing transparency and thus system availability.

The module 18plus ControlPlex® is the basis of the power distribution system. Up to 16 modules can be added to the connection module side-by-side. It has a fully-fledged 80A potential distribution. The screwless push-in technology for DIN rail mounting significantly reduces wiring time. The user then plugs the ESX60D circuit protectors into the modules.

The ESX60D is an intelligent electronic circuit protector. It offers active current limitation to enable protection also of capacitive and inductive loads. Despite its small width of only 12.5 mm, it provides two channels. Status can be seen per channel via an LED directly on the device. In addition, the ESX60D transmits status and measuring values to the superordinate control unit. The ESX60D is parameterisable which makes it particularly flexible in use.

18plus-EM03 supply module 18plus-AM03 connection module ESX60D circuit protector
The CPC20 bus controller is the brain of the entire system. Its interfaces offer the perfect connection to the superordinate systems. On the field level, it connects the power distribution system with the connected CPUs and HMIs via its PROFINET interface and thus allows the required data exchange. On this basis, measuring values and status information can be visualised for the operator and the maintenance personnel.

Quick access through integral web server
A web server is included on the bus controller. It allows direct access to the data of the DC 24 V power distribution. The maintenance personnel can directly access all measuring data and status information without using the field bus interface. In the event of initial start-up or of a machine downtime, this allows particularly quick access of the required information.

**Your benefits**

- **Enhances system availability** through comprehensive diagnostic functions
- **Improves protection against voltage dips** through selective protection of loads
- **Increases flexibility in planning a system** due to the modular terminal block system
Increasing system availability by data logging and transmission

The **CPC20 ControlPlex®** system increases system availability significantly by continuous data logging and recording of status information. The system provides a precise overview of the DC 24 V power distribution in the plant. The user is immediately informed about changes in the system conditions and the corresponding current consumption. Aberrations can be detected and resolved at an early stage. Maintenance and exchange of defective parts can be planned well in advance. System downtimes are reduced.

The bus controller’s analysis functionality provides help with trouble-shooting. The system detects an error cause and visualises it. This helps find and remedy error causes quickly. Downtimes are reduced and the system can be restarted faster.
The CPC20 bus controller

Separate power supply
The devices’ power supply is separated form the load circuit of the system and allows an independent supply of the bus controller.

Status indication
The operating condition of the device can be read any time via the LEDs.

USB service interface
The service interface allows complete access of the CPC20 bus controller via laptop on site. Firmware update at a later date and extension of the functional scope are therefore possible.

ELBus® Extended
The user can connect another 16 modules with 32 channels to the second ELBus® interface.

OPC UA and MQTT interface
Another RJ45 interface allows transmission of measuring values and status information directly via OPC UA and MQTT into superordinate Ethernet topographies. This is also possible via the two lower interfaces.

Integral web server
The integral web server allows direct access to all data of the CPC20 ControlPlex® system.

Field bus connection
The connection to PROFINET provides transmission of measuring values and status information to the superordinate control systems as well as remote control of all circuit protectors.
The ESX60D intelligent circuit protector
Adjustable for unrivalled flexibility

Space-saving design
The double channel ESX60D is a compact electronic circuit protector with active current limitation. It requires only 12.5 mm for the protection of two channels. By means of the two LEDs, maintenance personnel can see the status of the individual channel in the control cabinet.

Continuous data collection
In parallel, the status and the recorded measuring values are forwarded to the superordinate controller and can there be visualised on the connected screens. Continuous recording of the load current, of supply and output voltage as well as of the device temperature provides an overview of the current condition of power distribution.

Automatic parameterisation
The intelligent ESX60D circuit protector is versatile in use because it is parameterisable. The CPC20 bus controller stores parameters and the circuit protectors used. If a protector is replaced or freshly plugged in, this is detected by the CPC20 bus controller and the circuit protectors are parameterised automatically. The circuit protectors are hot-swappable, allowing a quick start-up of the system. In addition, the warning threshold, inrush behaviour and trip times can be adjusted.

Reduced inventory
Since the current ratings of the circuit protectors can be adjusted in 1A-increments up to 10 A, stockkeeping is significantly reduced. One product version on stock is sufficient to provide various current ratings.

Parameterisation of circuit protectors possible via HMIs

ESX60D electronic circuit protector
Proper protection of systems and loads
The intelligent ESX60D is a state-of-the-art circuit protector and offers ideal protection against overcurrent and short circuit for the connected loads.

A special field of application is the protection of DC 24 V switch mode power supplies. These are widely used in automation today. The power reserve of a standard power supply is often 1.5 times its rated current. For example, a 20 A switch mode power supply can supply a max. current of 20 A x 1.5, i.e. 30 A. If this value is exceeded, a voltage dip with all connected loads will be the consequence. Not only does this frequently cause undefined fault conditions, but it can even lead to complete system downtimes.

If we look at the characteristic curve of a thermal-magnetic circuit breaker, we realise that its trip curve is outside the scope of the switch mode power supply.

The current required for a fast magnetic trip cannot be achieved. Hence, tripping is always delayed. This leads to overload and thus to a voltage dip at the switch mode power supply. The result is a complete failure of the power supply in the event of a short circuit or an overload.

Ideal overcurrent protection
This is where the ESX60D comes in. It responds faster to the overload conditions than the switch mode power supply and limits the max. possible overcurrent to typically 1.4 times rated current. In the event of a failure, only the affected load will be disconnected. The other loads remain unaffected. Switching on capacitive loads of min. 20,000 μF continues being possible.

Switch-on performance and current limitation

The magnetic trip range of an MCB with C characteristic (45 A ... 90 A) is not always within the allowed overload range of the 20 A power supply: the DC 24 V output voltage breaks down.

The current curve of an MCB with C characteristic (45 A ... 90 A) is not always within the allowed overload range of the 20 A power supply: the DC 24 V output voltage breaks down.
Module 18plus ControlPlex®:
Modular socket system provides unrivalled flexibility

The intelligent module 18plus ControlPlex® combines compact and innovative wiring technology with the smart CPC20 ControlPlex® bus controller.

Modular power distribution concept
The Module 18plus power distribution system is a complete mounting and power distribution system with push-in technology for DIN rail mounting. The system has a fully-fledged 80 A potential distribution and is suitable for wiring of all load cables and signal lines of the DC 24 V control voltage. The Module 18plus is suitable for decentralised power distribution systems as well as centralised system concepts.

Push-in technology for quick wiring
The push-in technology for DIN rail mounting is suitable for wiring all load and signal lines of the DC 24 V control voltage. The modular design offers a flexibility second-to-none for any requirement in a system and can easily be mounted.

The system consists of the supply module and up to 16 connection modules with a width of 13 mm each. For supply of max. 80 A, the supply module has three supply terminals.

The supply module is connected with the connection modules and can then be wired up extremely flexibly and tailored exactly to the required number of channels. Additional terminals and connecting cables are not necessary. This enables the construction of a power distribution system with up to 16 connection modules. Each of these connection modules accommodates one intelligent ESX60D circuit protector with two channels each. It is thus possible to protect 32 different load outputs with one flexibly configured system.

The whole set-up can be completed by an additional transfer module. Another 16 connection modules with the 2-channel ESX60D circuit protector can be mounted side-by-side to this transfer module. The number of system-controlled and monitored channels is doubled so that flexible protection of the most different system constellations is made possible.

The additional system can also be connected to the CPC20 bus controller, so that the entire system can finally protect up to 64 channels (circuits).

Terminals
The supply module has three 0.5-16 mm² terminals for connection of +24 V, GND and functional earth.

Number of modules
16 modules for 32 channels can be mounted side-by-side. This allows a flexible and individual design of the power distribution.

Power distribution of max. 80 A
The power distribution is via busbars which are pushed into the modules and ensure a reliable distribution.

Push-in technology
The push-in technology enables quick and maintenance-free wiring of the DC 24 V power distribution.

2 channels on 12.5 mm width
Integration of two channels on an installation width of only 12.5 mm saves space in the control cabinet and allows a compact system design.
CPC20 protection for industry 4.0
condition monitoring – predictive maintenance

status indication
- status indication
- short circuit
- overcurrent

data logging
- load current
- load voltage
- input voltage

data analysis
- limit value
- current curve
- voltage curve

control unit
- control ON
- control OFF
- control RESET

parameterisation
- current rating adjustment
- limit value

circuit protectors
- active current limitation
- plug-in type