Operation instruction

ControlPlex® Views

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2 General information

2.1 Safety instructions

This manual points out possible danger for your personal safety and gives instruction how to avoid property damage. The following safety symbols are used to draw the reader's attention to the safety instructions included in this manual.

Danger!
Danger to life and limb unless the following safety precautions are taken.

Warning
Danger to machinery, materials or the environment unless the following safety precautions are taken.

Note
Information is provided to allow a better understanding.

2.2 Qualified personnel

This user manual must exclusively be used by qualified personnel, who are able - based on their training and experience - to realise arising problems when handling the product and to avoid related hazards. These persons have to ensure that the use of the product described here meets the safety requirements as well as the requirements of the presently valid directives, standards and laws.

2.3 Use

The product is part of a continuous enhancement process. Therefore there might be deviations between the product in hand and this documentation. These deviations will be remedied by a regular review and resulting corrections in future editions. The right to make changes without notice is reserved. Error and omissions excepted.

2.4 Delivery state

The product is supplied with a defined hardware and software configuration. Any changes in excess of the documented options are not permitted and lead to liability exclusion.

3 General description

Modern factory automation and process control have ever more complex and sophisticated requirements. Control is no longer the sole focus, but monitoring of components and processes becomes more and more important. This is exactly the target application area of the intelligent and bus-capable power distribution system ***ControlPlex®***. It serves for the protection of industrial applications as well for monitoring and control.

The bus controller CPC10 is the centrepiece of the intelligent and bus-capable power distribution system ***ControlPlex®***. It connects the superordinate programmable control unit with the power distribution system SVS201-PWR and with the ESX50D electronic circuit protectors. This functionality allows direct access to the electronic circuit protectors. Communication options comprise transmission of the operating condition, of measuring values and device information of the connected components as well as changes of the product-specific parameters such as current ratings and execution of actions, e.g. ON and OFF operation. In parallel to the bus interface, this functional scope can also be used by means of the service interface. This requires the installation of the user interface ***ControlPlex®*** **Views** on your service computer. After the completion of the installation, the computer has only to be connected with the CPC10 bus controller via the USB interface. This allows parameterisation of the electronic circuit protectors even without a bus communication in place. Particularly for a first start-up of the system or without bus communication, this software is a very helpful tool and allows complete parameterisation.

3.1 Design of the entire system

The bus controller CPC10PB-Tx is the centre of the ***ControlPlex®*** system. Thanks to its interfaces, it allows a consistent communication between the power distribution systems SVS201-PWR-xx with the plugged-in electronic circuit protectors ESX50D-S1xx and the superordinate control units as well as the service computer.

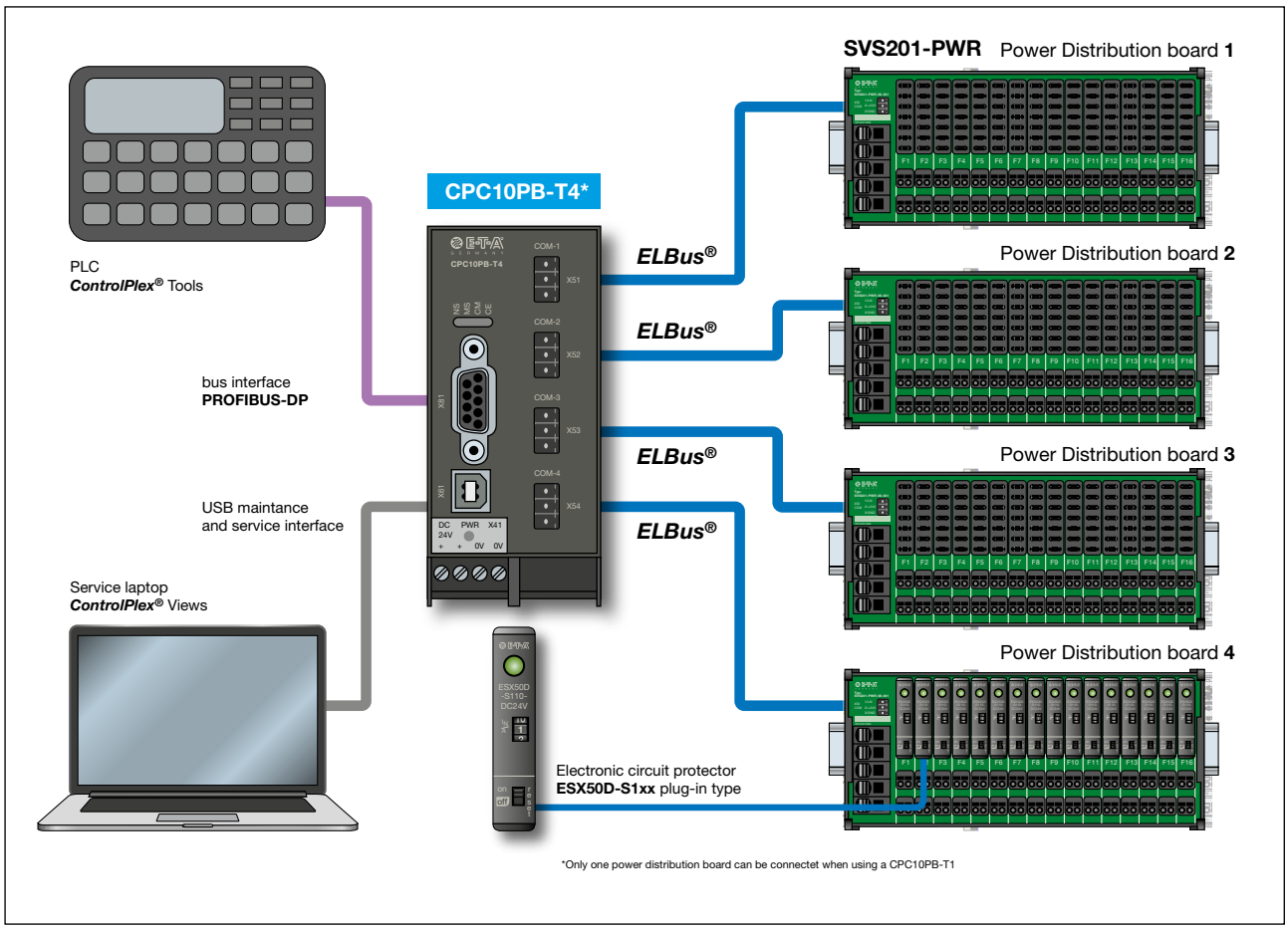


fig. 1: System overview

3.2 USB service interface, terminals X61

The USB interface serves for connection of the service computer. By means of the available user software ***ControlPlex®*** it is possible to import the measuring values of the individual circuit protectors, to change parameters and to switch the devices on or off. The connection is realised by means of USB-2.0 type B. The cable length must not exceed 3 m. In the event of a bus communication with the superordinate control unit, the user software has only reader access. If a change of the device parameters should be made possible on behalf of the user software, this has to be explicitly released by the superordinate control unit.

Warning: The USB interface has exclusively been designed as a service and maintenance interface. An unrestricted and faultless continuous operation cannot be guaranteed.

When using Windows 7 with USB-3.0 host ports, you may experience problems with the USB interface. Windows operating systems prior to Windows 8 do not provide basic support for USB-3.0, therefore USB-3.0 drivers are provided by the manufacturer of the mainboard. This can lead to compatibility issues with the CPC10 buscontroller.

4 Installation

After executing the installation file, the installation routing of the programme will start. A selection window appears for selecting the language for installation.

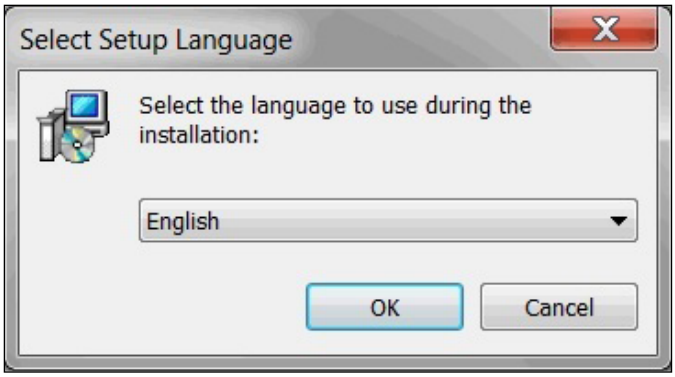


fig. 2: Installation language

Then you have to accept the license agreement.

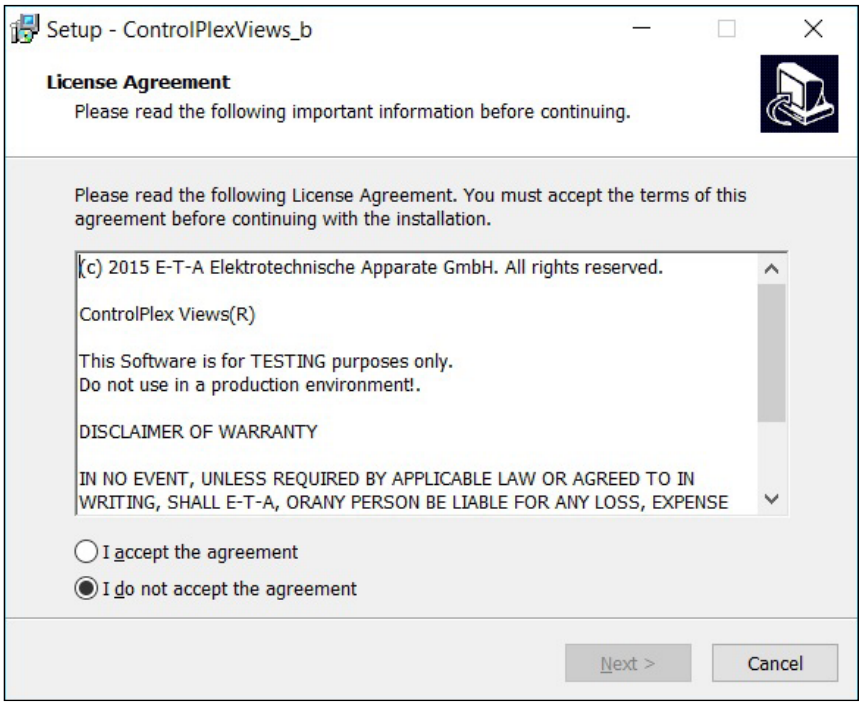


fig. 3: License agreement

After selection of the installation directory and the name for the programme link, the programme will be installed.

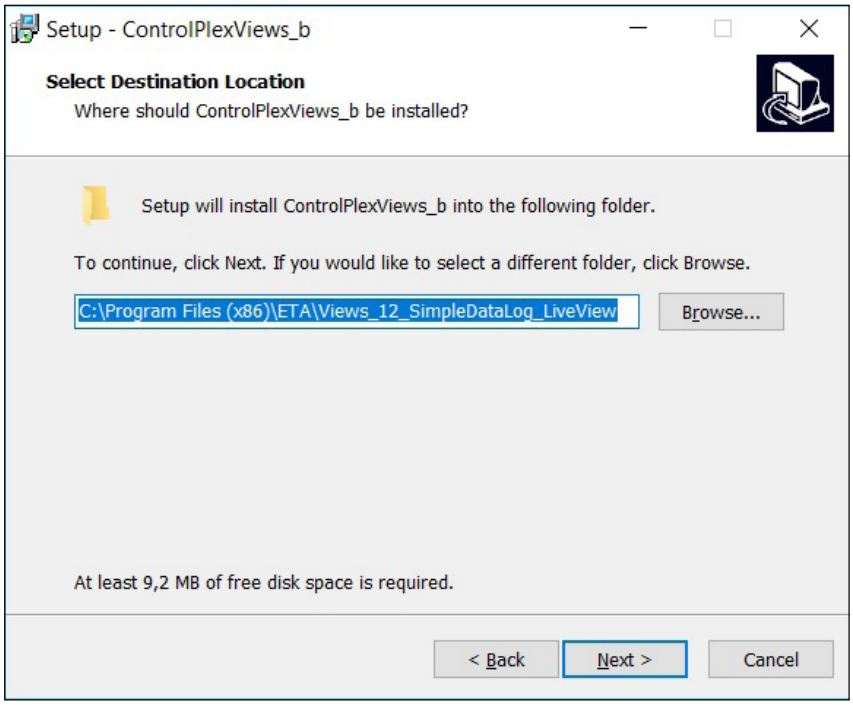


fig. 4: Selection of target directory.

After successful completion of the installation, the programme can be started directly.

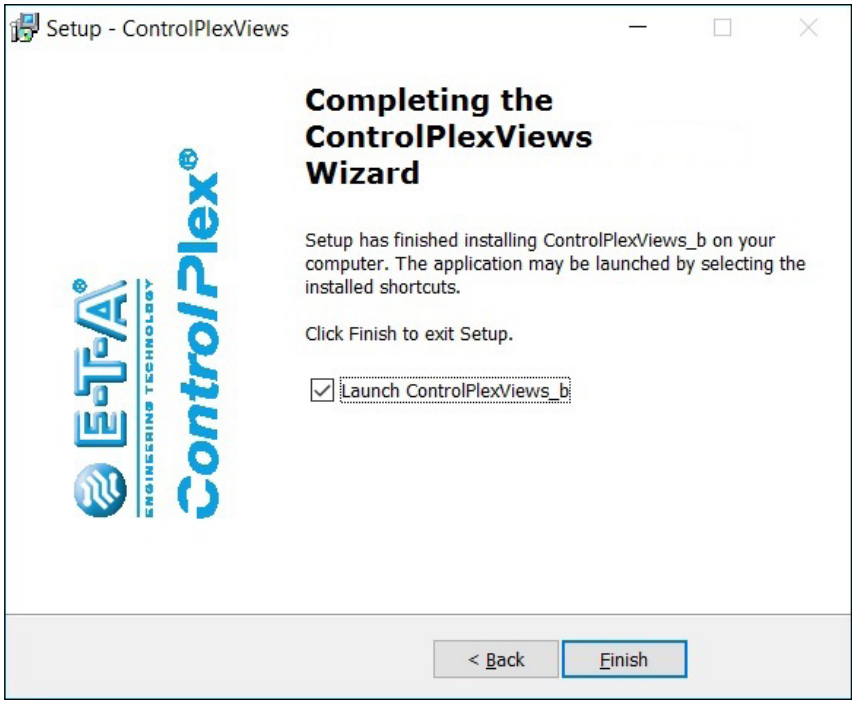


fig. 5: Completion of installation

5 Operation of the programme

5.1 Overview for operation

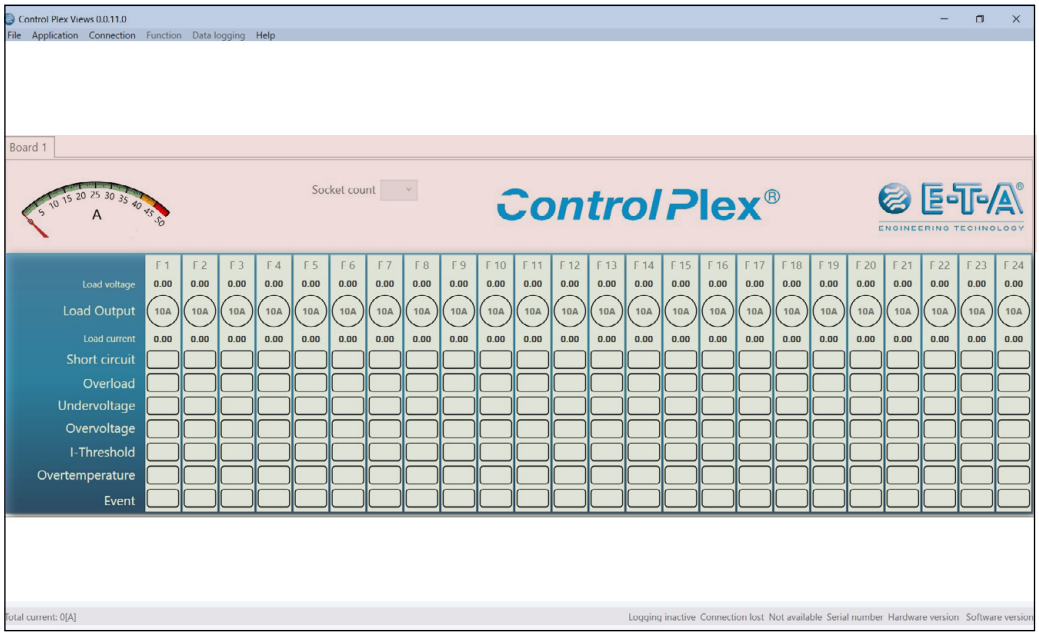


fig. 6: Distribution of the areas

The user surface splits up in three areas:

- menu line for operating the general programme functions and the information line with all relevant information e.g. regarding the software version.
- functional area regarding the individual power distribution systems
- information area for the relevant electronic circuit protectors

5.2 Functions of the menu bar

5.2.1 Menu bar file

5.2.1.1 Update firmware

The bus controller holds a firmware. It defines the entire communication between the bus controller and the individual electronic circuit protectors. In addition it serves as interface to the superordinate control systems. During the life cycle of a device, changes or system extensions may occur. It is therefore possible that these may affect the firmware of the device so that it has to be updated.

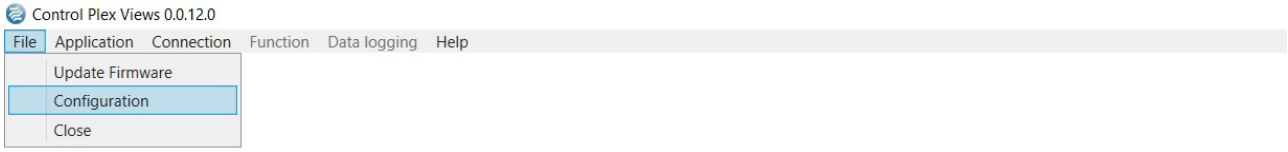


fig. 7: Firmware update

If the firmware of the device has to be updated, this software has to be downloaded from the homepage. It is stored in the download area of the corresponding device. After download, the software will be saved on the service computer. This memory location is selected upon update of the firmware on the device. On this occasion the firmware is explicitly selected by the user.

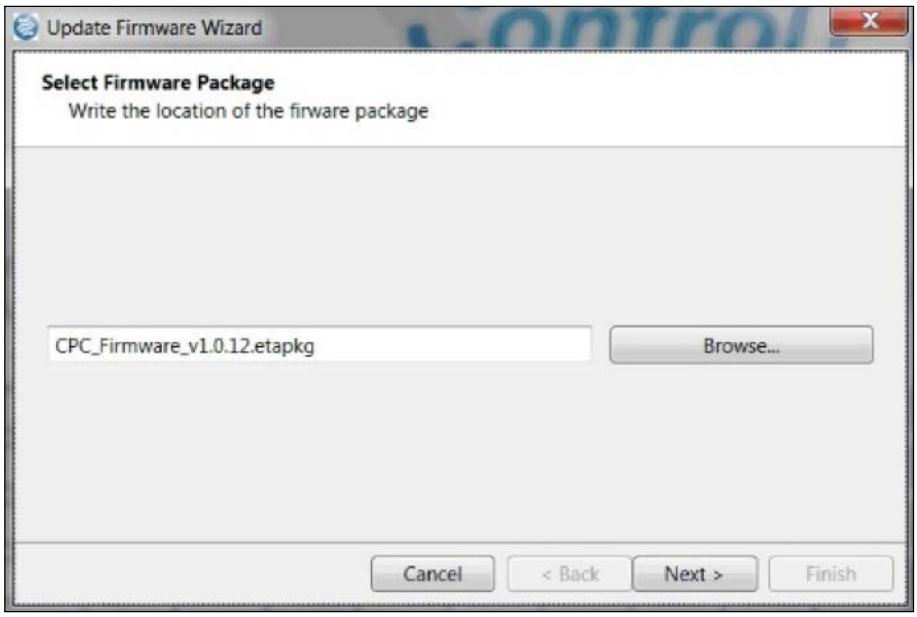


fig. 8: Update path

Should there a process interruption during firmware update, e.g. caused by a power failure, the firmware has to be transferred onto the device once again. Thus the device is responsive even without a completely transferred firmware. It is, however, important that the update process is re-started and completed successfully.

5.2.1.2 Configuration

The menu option “configuration” allows the user to edit, enter and load configuration files. This can be established on a service computer and subsequently be transmitted to the bus controller. It is equally possible to save already established configurations of the bus controller on the service computer.

5.2.1.2.1 The configuration window

Click on the configuration entry to open another window (see fig. 9) which holds the functions described in the following.

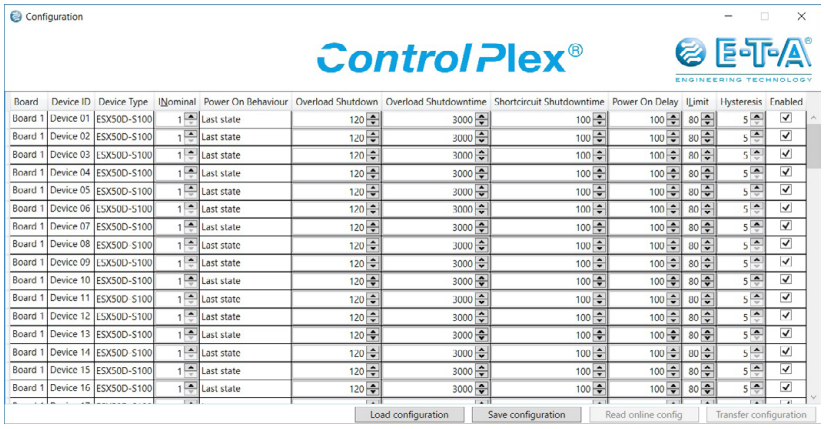


fig. 9: configuration window

The configuration window now opening shows all parameters in the shape of a table. It shows all parameters of the up to four power boards, which can be configured with up to 24 circuit protectors each.

The table consists of the following columns:

denomination	description	adjustable
Board	board number of the corresponding parameter set	no
Device ID	device number of the corresponding parameter set	no
Device Type	name of the device type	yes
INominal	rated current [A]	yes
Power On Behaviour	switch-on behaviour	yes
Overload Shutdown	overload disconnection [%]	yes
Overload Shutdowntime	disconnection time at overload [ms]	yes
Shortcircuit Shutdowntime	disconnection time at short circuit [ms]	yes
Power On Delay	ON delay [ms]	yes
ILimit	threshold value of limit current [%]	yes
Hysteresis	hysteresis [%]	yes
Enabled	activation condition of slot	yes

Table 1: set-up of a configuration table

In this view the user has the possibility to adjust or re-edit all parameters of the circuit protectors.

If the configuration is started after a successful connection with a CPC10 module, the table will be sized in the main area by means of the settings.

5.2.1.2.2 Save configuration

The button “save configuration” offers the option to save the previously set parameters in a *.json file. Clicking on this button opens a typical save-file-window where you can enter directory and file name.

5.2.1.2.3 Load configuration

After clicking on the “load configuration” button, a typical open-file-window will open. It offers the user to load a configuration file. Only files with the extension *.json will be accepted. The table shown will be updated with the loaded parameters after closing the windown and the name of the loaded file will be displayed in the lower left part of the window (without path).

5.2.1.2.4 Read online configuration

If the user has configured his circuit protectors in the main surface and wants to save this configuration or transmit it to another system, he can import the current online configuration by means of the button “read online configuration”. A progress bar will briefly be shown informing on the status of the import. The shown table will then be updated and the user can save the imported data via the button “save configuration”.

5.2.1.2.5 Transmit configuration

If the parameters are to be transmitted to the currently connected system, the user has to start transfer via the button “transmit configuration”. Transmission will take some time. By means of a progress bar in the left lower part of the window the user is informed about the current status.

5.2.2 Menu bar Application

5.2.2.1 Language

The user interface ***ControlPlex®* Views** supports several languages. Selecting the menu option “application” calls up the language selection of the programme.

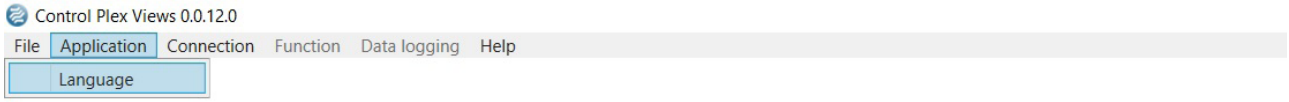


fig. 10: Change the language

You can choose among four languages. These are German, English, French and Spanish.

fig. 11: Change to German

After selecting the required language, the user interface must be closed and re-started afterwards. Re-start of the user interface adopts the change of language carried out previously.

5.2.3 Menu bar Connection

The user software and the bus controller are connected by means of a USB cable.

fig. 12: Connecting the computer with CPC10

This cable connects the service computer with the port of type: USB-2.0 type B of the bus controller. After connecting the service computer with the bus controller, the windows drivers will be updated. After successful completion, the connection will build up automatically.

fig. 13: USB connection

5.2.4 Menu bar Functions

This menu provides the option to switch all electronic circuit protectors of a power distribution system on or off.

This is done by selecting the corresponding entry in the menu bar.

fig. 14: Broadcast command to all circuit protectors

5.2.4.1 Switch all devices ON or OFF

When activating the function “switch all devices on or off” by clicking, all load outputs are correspondingly switched on or off. This is done by way of a broadcast command. It ensures that all devices receive the command at the same time.

5.2.4.2 Power saving mode

Clicking on this function activates the power saving mode.

5.2.4.3 Reset all load outputs

When clicking on the function “reset all load outputs”, all load outputs will be reset. They will be reset one after the other, because the reset command is not provided as a broadcast command in the CPC10 software. If ***ControlPlex®* Views** is closed while the command is executed, the transmission of the commands to the electronic circuit protectors is stopped. All electronic circuit protectors not yet reset at that time keep their previous status.

5.2.4.4 Delete all bar charts

The execution of the function “delete all bar charts” is also run successively. Completion of this function will take a longer period of time. Duration depends on the number of devices providing a bar chart. If ***ControlPlex®* Views** is terminated during execution of this function, the execution is cancelled and all bar charts not yet deleted will be preserved.

5.3 Functional scope of the individual power distribution systems

This section shows information valid for the entire power distribution board. Max. four power distribution boards can be connected to the bus controller type CPC10Px-T4. The display by means of tabs clearly illustrated which of the four power distribution boards is presently visualised.

The panelmeter shows the present total current opf the connected power distribution board. The max. load current of the SVS201-PWR is 40A. By means of te display it is easy to find out how much current flows over the entire power distribution board and thus the utilisation of the power supply.

fig. 15: Functional scope of the power distribution boards

The number of sockets indicates the size of the power distribution board and thus how many circuit protectors can be accommodated.

The selection field “power saving mode” defines the behaviour of the light emitting diodes on the circuit protector. If this mode is activated, the green LEDs are dimmed and their power consumption reduced significantly. This will not affect the display of errors, disruptions or warnings.

5.4 Information range of the individual circuit protectors

In the centre of the user interface we find the information of the individual channels and electronic circuit protectors. The matrix set-up used improves clarity and handling for the user. Each electronic circuit protector has its own column on the user interface. The position of the device is defined in the top line. Starting with the first slot, all electronic circuit protectors are shown in accordance with their position on the power distribution board.

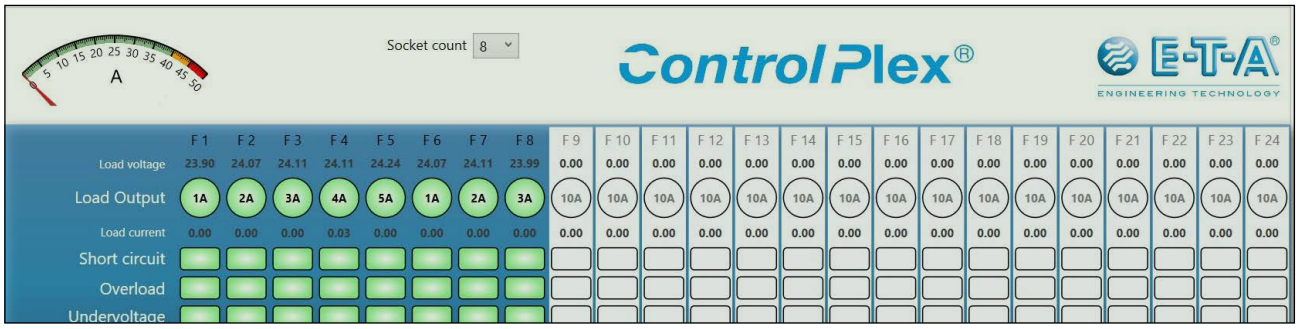


fig. 16: Functional scope of the individual circuit protectors

5.4 .1 Status and measuring values of the electronic circuit protectors

Load voltage

Each electronic circuit protector records its output voltage. It is transmitted to the CPC10 and displayed there.

Load output

The status indication of the individual channels on the user interface is a copy of the LED appearance on the electronic circuit protectors. The display mode is identical with the status indication of the circuit protector.

Besides the status, the rated current adjusted on the device is also displayed. This current rating can be changed, depending on the selected electronic circuit protector, either directly on the device or by visualising the control unit and/or the user dialogue platform ***ControlPlex®* Views**.

Load current

The load current of the electronic circuit protectors is recorded cyclically and transmitted to the bus controller.

Short circuit

If the circuit breaker trips due to a short circuit, it will be clearly be identified and indicated accordingly. This will significantly facilitate trouble-shooting for the service and maintenance staff.

Overload

If the current consumption of a load is higher than on normal duty and if it thus exceeds the current rating of the electronic circuit protector, the latter will trip and disconnect the load.

Undervoltage

Undervoltage monitoring of the load output is by means of a hysteresis. The load output is switched off below UB=16V and reconnected automatically above UB=17.5V. Reset of the error message is not required.

Overvoltage

Overvoltage is detected if the voltage value is >= 30.0 Volt for at least 10 ms. A hysteresis of approx. 500 mV is integrated.

If overvoltage is detected, only the corresponding bit will be set in the status byte. The load output will not be switched off.

I-limit value

The message appears if the load current exceeds the pre-set limit value.

Excess temperature

If the device temperature exceeds a limit value of 100°C, this message is activated and the load output will be switched off.

Event

This message appears if one of the events listed below shall be reported:

- circuit protector ready for parameters
- new bar chart available
- new parameters available
- slide switch of circuit protector in OFF position
- critical failure of circuit protector detected

Example:

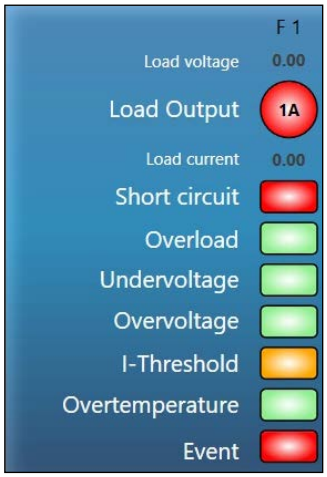


fig. 17: Status example of the circuit protector

The example shows that the circuit protector was tripped by a short circuit. The limit value had been exceed before trip a bar chart is available for the current/voltage curve of the last four seconds before disconnection.

5.4.2 Parameterising the electronic circuit protectors

Clicking on the column of the circuit protector opens the menu for this device. This window holds all vital information and parameters.

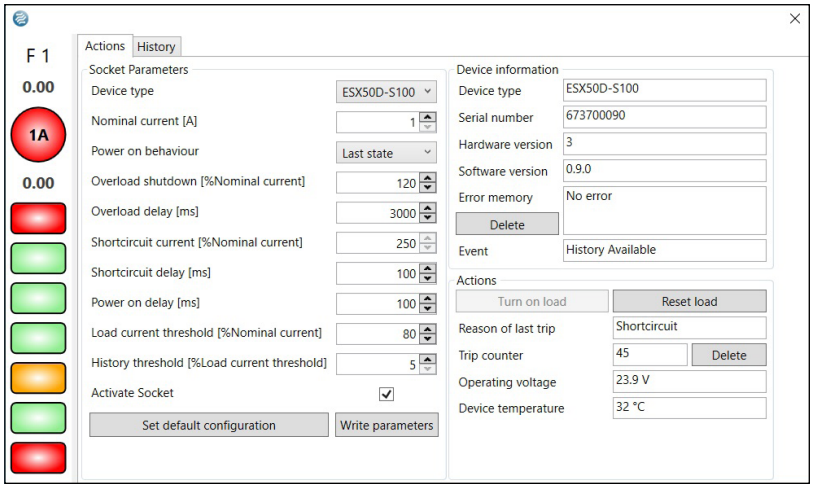


fig. 18: Parameterisation of the circuit protectors

The current status of the device is also shown on the left side. This information is identical with the display on the overview.

The first tab is called “actions”. There you can find all parameters which can be adjusted for the individual circuit protector to the requirements of the system surroundings.

Circuit protector type

There are tow different types available.

With type ESX50D-S100 the current rating is adjusted via visualisation. With type ESX50D-S110 the current rating is adjusted via a selector switch directly on the device. Thereby a change of the current rating is not possible via visualisation.

If there is a difference between the parameterised and the actually plugged in device, the device cannot be switched on. The error has to be corrected beforehand.

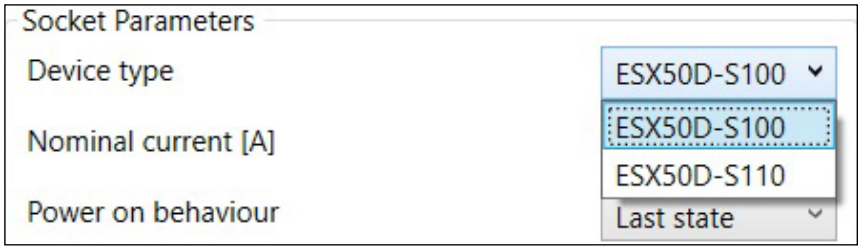


fig. 19: Device types

Current rating

With product type ESX50D-S100 (without selector switch) the current rating is parameterised via the visualisation. This can either be done via the control unit or the user interface ***ControlPlex®* Views**. The current rating can have the following values: 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A or 10A.

Switch-on behaviour

The switch-on behaviour of the electronic circuit protector is determined by means of the parameter “switch-on behaviour”. It defines whether the circuit protector shall be switched “ON” or “OFF” after applying the supply voltage or if it will resume its latest condition. The latest condition is defined as the one that was present before disconnection of the supply voltage.

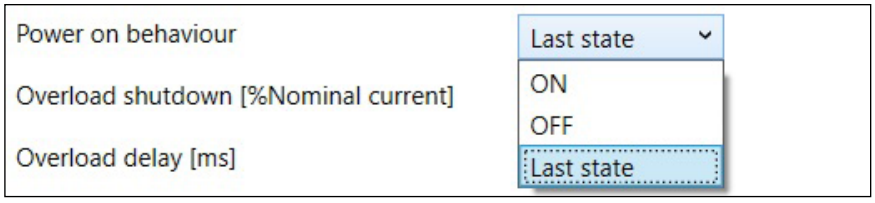


fig. 20: Switch-on behaviour of the circuit protectors

Overload disconnection [% of rated current]

This parameter determines the rated current percentage at which the electronic circuit protector signals overload. This parameter can be set in a range of 105 and 135 percent in whole numbers. The factory settings are 120 percent of the rated current.

Trip time at overload [ms]

This parameter determines after which period in the overload range the electronic circuit protector will be disconnected. This parameter can be set in 50 ms steps in a range between 50 and 10,000 ms. The factory setting is 3,000 ms.

Short circuit trip [% of rated current]

The value of the short circuit trip is firmly associated with the current rating and cannot be changed. It is 250% IN at 1 A and 140% IN at 2 to 10 A. It is detected when the voltage difference between Vcc and Uload is >= 12V. If this condition is met, the status short circuit is set and the short circuit trip time is started. When time has run out, the output will be shut down due to short circuit.

Trip time at short circuit [ms]

This parameter can be set in 10 ms steps in a range between 50 and 1000 ms. Factory setting for trip time is 100 ms.

ON delay [ms]

This parameter determines the time delay between ON command the switch-on of the load output of electronic circuit protectors This parameter can be set in 10 ms steps in a range between 50 and 2500 ms. The factory setting is 100 ms.

Limit value load current [% of rated current]

This parameter determines at which load current the message “limit value exceeded” of ESX50-D is activated. This parameter can be set in a range of 50 and 100 percent in whole numbers. The factory settings are 80 percent of the rated current.

Hysteresis limit value [% of limit value load current].

This parameter determines the hysteresis of the limit value. This parameter can be set in a range of 5 and 20 percent in whole numbers. The factory setting is five percent.

Activate slot

This parameter allows switching off the slot which is then no longer available for operation.

Button “select factory settings”

When clicking on this button, all parameters will be reset to the factory settings. This means that the circuit protectors will again have the parameters of the condition as delivered.

Button “Write parameters”

Only when hitting this button will the parameters be transmitted to the circuit protector. Before that, the changes were carried out only locally on the user interface. Without the actuation they are not active on the circuit protector.

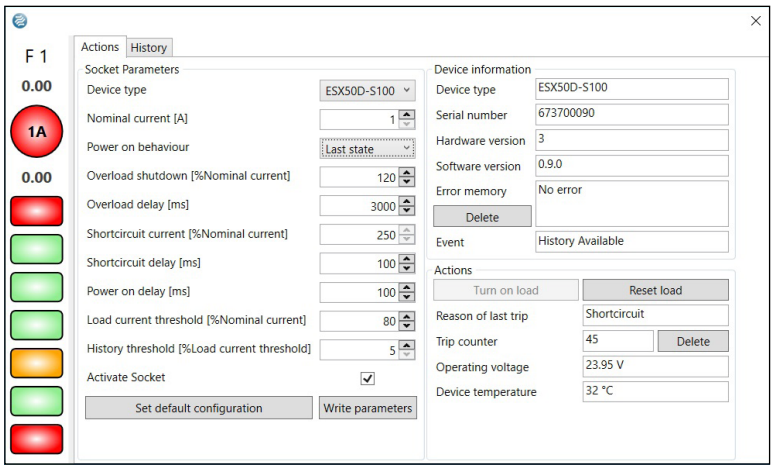


fig. 21: Overview device status information

Circuit protector type

The bus controller automatically identifies the type of the plugged in circuit protector and will display it accordingly.

Serial number

Each device carries a serial number.

Hardware version

In the event of a firmware update, compatibility of the new firmware with the hardware has to be observed. This information is supplied along with the update description.

Software version

The firmware version used on the device is displayed.

Error memory

If an internal failure of the electronic circuit protector is detected, e.g. a check sum error in programme memory, this will be displayed in the information field.

Button “delete error memory”

Any message in the error memory is deleted when pressing this button.

Event

The status indication of the overview window shows the existence of an event. Information is substantiated in this field.

The following events are displayed in plaintext:

- circuit protectors ready for parameters
- new bar chart available
- new parameters available
- slide switch of the circuit protector in OFF position
- critical failure of circuit protector detected

Button “Switch on load output”

The load output is switched on when hitting this button. This is only possible with a functional communication with the application CPU and if the slide switch is in ON position.

Button “Switch OFF load output”

The load output is switched off when hitting this button. This is only possible with a functional communication with the application CPU.

Button “Reset load output”

If the electronic circuit protector tripped due to a short circuit or overcurrent, the load output is reset by pressing this button and switched on again subsequently.

Reason of last trip

This field indicates the reason why the electronic circuit protector tripped. This could be because of an overload or a short circuit.

Trip counter

Each trip of the device is counted. The advantage is a precise documentation how often the circuit protector tripped within a defined period of time. It thus allows to find out if the number of interferences is increasing.

Button “Delete trip counter”

By means of this button the trip counter can be set to zero.

Operating voltage

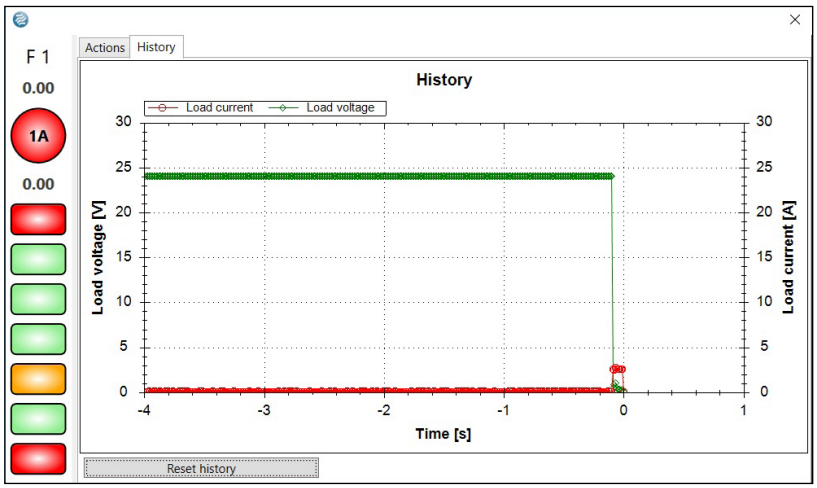
Displays the operating voltage of the device.

Temperature

The temperature range of the electronic circuit protector ESX50D reaches up to max. 55 °C ambient temperature. The current temperature on the pcb of the device is displayed in this information field.

5.4.3 Past events memory (bar chart)

If the electronic circuit protector trips, records of the current and voltage values of the past four seconds before trip are saved. The values are saved and displayed every 10 ms. This adds up to a meaningful picture providing the service and maintenance staff with detailed insights regarding the trip reason. Before a new bar chart can be shown, the displayed pair of values has to be deleted from the memory of the circuit protector. This can be done automatically after transmission of the values to the PLC in the event of connection to a superordinate control unit. With the user interface ***ControlPlex®*** **Views** this has to be carried out explicitly by hitting the button “delete bar chart”.



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6.2 Technical data

System requirements are the operating systems Windows 7 or Windows 10

Notes

http://www.e-t-a.de/qr1031/

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