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**Trademark Information**

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## OVERVIEW OF MODELS

This document pertains to the devices listed in the following table:

Table 1. Overview of models

features	models (order no.)														
	CLPA21LC02	CLPA21LC12	CLPA21LM02	CLPA21LM12	CLPA21LC22	CLPA21LM22	CLPA21NN12	CLPA21NC12	CLPA13LC02 (Mini)	CLPA13LC12 (Mini)	CLPA13LM02 (Mini)	CLPA13LM12 (Mini)	CLPA13LM22 (Mini)	CLPA13NN12 (Mini)	CLPA13NC12 (Mini)
MMI	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y
Cyrillic MMI	N	N	N	N	Y	Y	N	N	N	N	N	N	Y	N	N
mounting in front door of wiring cabinet	N	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y
mounting on DIN rail	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
app. mod. XD50C-FCL (= LONWORKS +C-Bus)	Y	Y	N	N	Y	N	N	N	Y	Y	N	N	N	N	N
app. mod. XD50-FLS (= LONWORKS +M-Bus)	N	N	Y	Y	N	Y	N	N	N	N	Y	Y	Y	N	N
app. mod. XD50C -FC (= FLASH + C-Bus)	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y
app. mod. XD50C -F (= FLASH, only)	N	N	N	N	N	N	Y	N	N	N	N	N	N	Y	N
no. of analog outputs	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2
no. of analog inputs	8	8	8	8	8	8	8	8	4	4	4	4	4	4	4
no. of digital outputs	6	6	6	6	6	6	6	6	3	3	3	3	3	3	3
no. of digital inputs	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

## GENERAL

### Safety Instructions

- When performing any work (installation, mounting, start-up), all instructions given by the manufacturer and in particular the safety instructions provided in these Installation Instructions are to be observed.
- The PANTHER controller may be installed and mounted only by authorized and trained personnel.
- If the unit is modified in any way, except by the manufacturer, all warranties concerning operation and safety are invalidated.
- Make sure that applicable local standards and regulations are observed at all times. Examples of such regulations are VDE 0800 and VDE 0100.
- Use only accessory equipment coming from or approved by CentralLine.
- Before the system is dismantled, disconnect the power supply. Do this by removing terminal block A or by installing an additional 3<sup>rd</sup>-party switch onto the DIN rail close to the controller; see the following caution and note.



### CAUTION

Disconnect the power supply before you start to install the PANTHER controller. Do not reconnect the power supply until you have completed installation.

#### IMPORTANT

*To comply with CE requirements, devices with a voltage in the range of 50 to 1000 Vac or 75 to 1500 Vdc which are not provided with a supply cord and a plug or with other means for disconnection from the supply having a contact separation of at least 3 mm in all poles, must have the means for disconnection incorporated in the fixed wiring.*



### CAUTION

Disconnect the power supply before removing or plugging in the application module.

## Hardware Overview

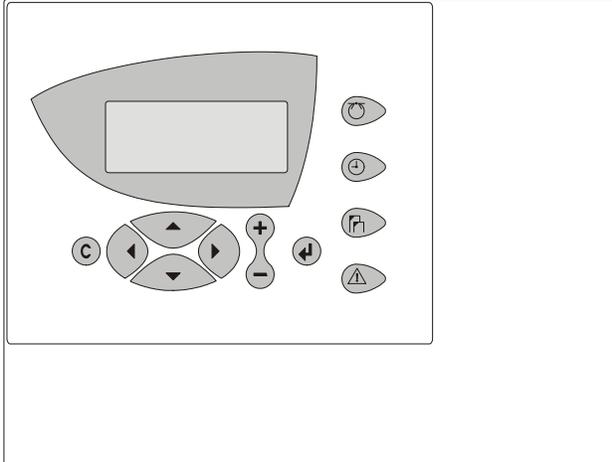


Fig. 1. PANTHER housing (front view, with MMI)

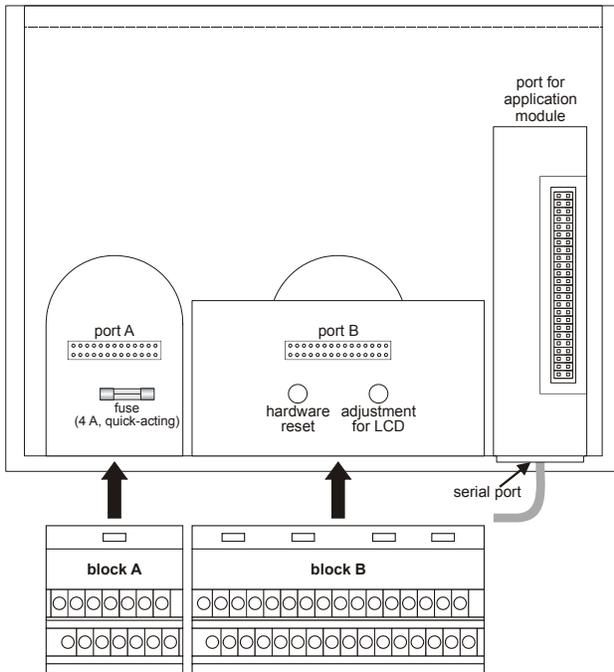


Fig. 2. PANTHER housing (rear view)

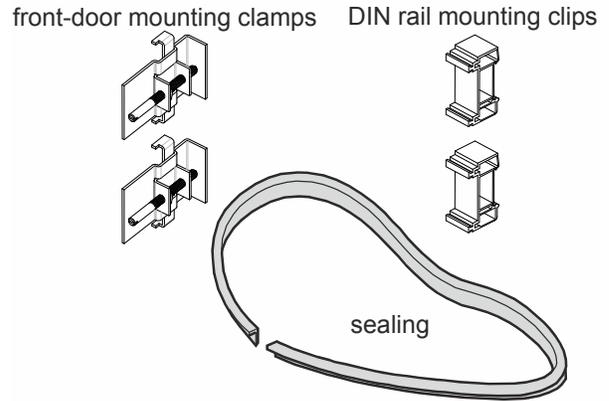


Fig. 3. Mounting accessories

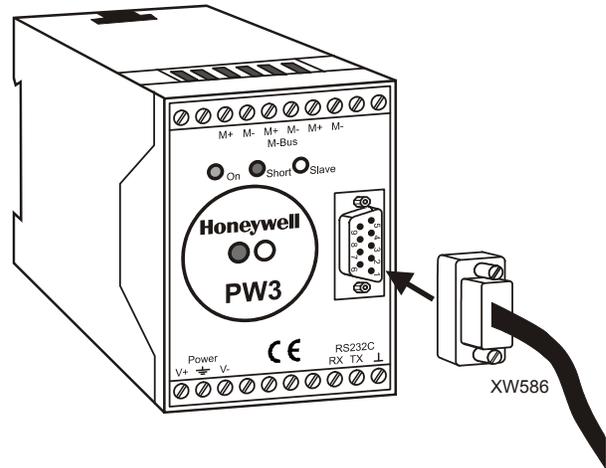


Fig. 4. PW3 M-Bus adapter, XW586 M-Bus adapter cable

**NOTE:** The PW3 (or PW20) M-Bus adapter and XW586 M-Bus adapter cable are optional accessories which must be ordered separately. The PW20 is a third-party device which can be ordered from [www.relay.de](http://www.relay.de)

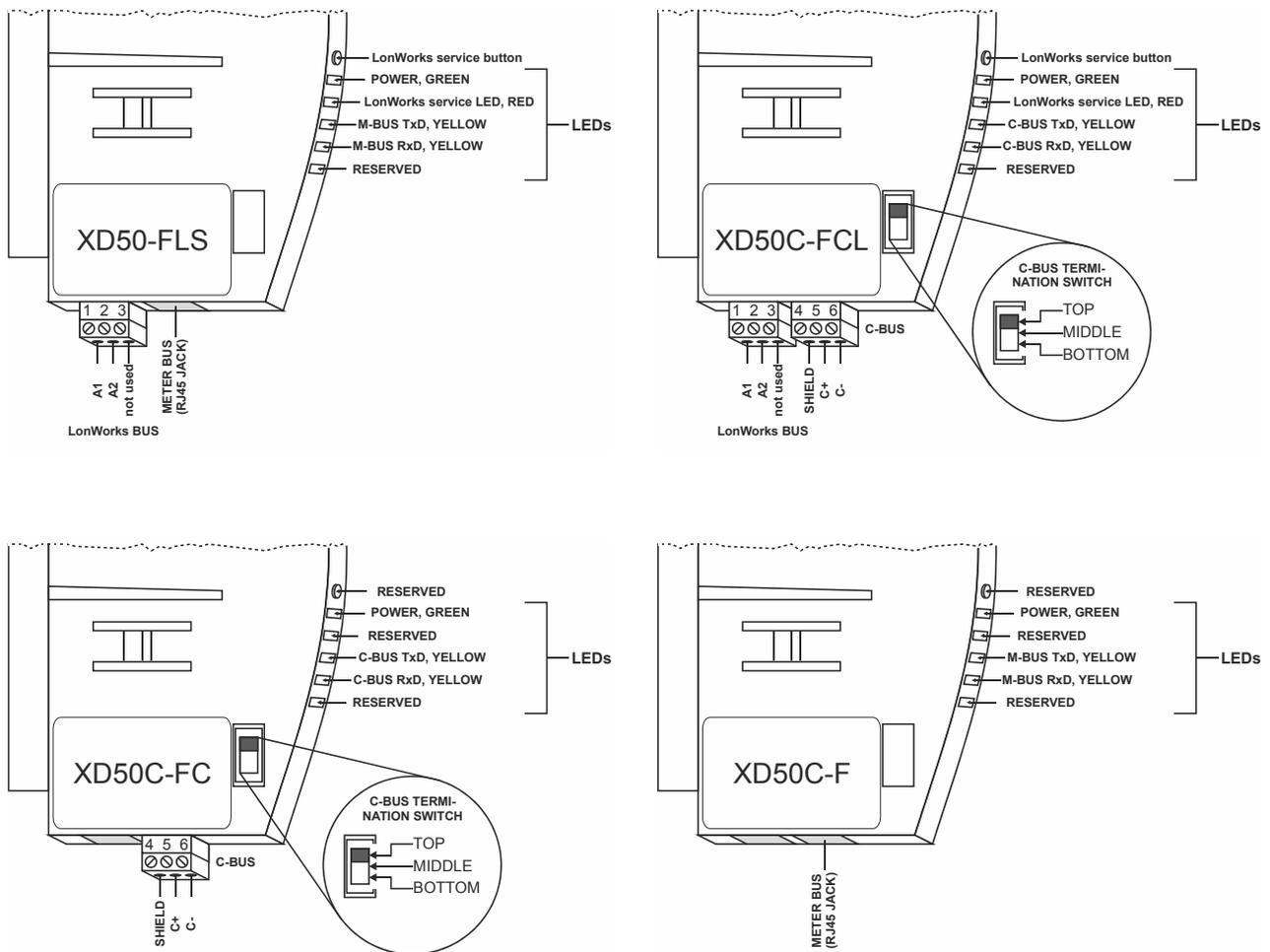


Fig. 5. Application modules

## Dimensions

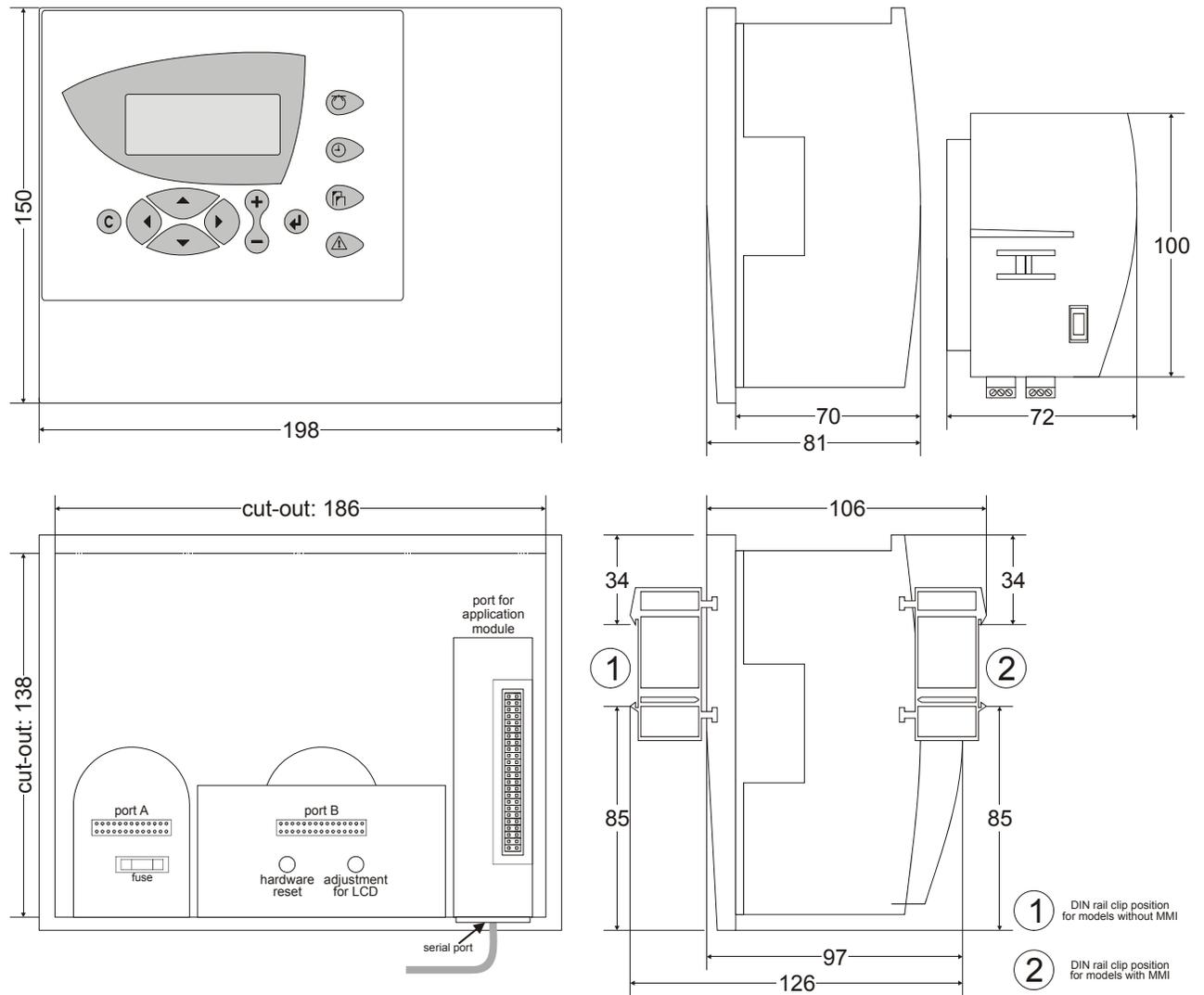


Fig. 6. Dimensions

## MOUNTING

In the case of models equipped with an MMI, the housing is mounted either in the front door of a cabinet or on a DIN rail with the back facing to the DIN rail.

In the case of models not equipped with an MMI, the controller is mounted on a DIN rail with the front facing to the DIN rail.

**Table 2. Mounting versions**

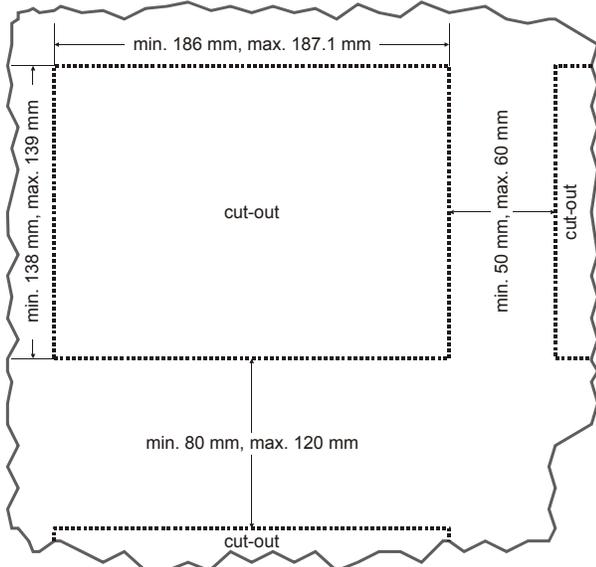
MMI	version	where mounted	necessary accessory
yes	front door	cut-out in front door	ACC3 <sup>1</sup> (rubber sealing and two front-door mounting clamps)
	inside cabinet	DIN rail	ACC2 <sup>2</sup> (two DIN rail mounting clips)
no	inside cabinet	DIN rail	ACC2 <sup>2</sup> (two DIN rail mounting clips)

<sup>1</sup>incl. with models featuring an MMI.  
<sup>2</sup>incl. with all models.

## Housing

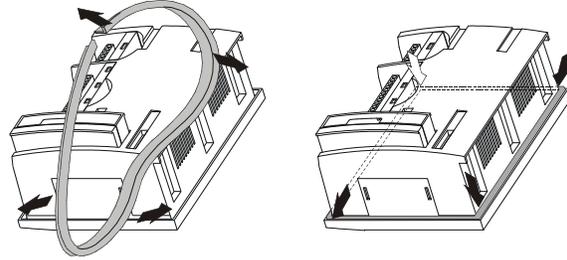
### Front Door

1. Choose the position of the controller in the front door. Observe the min. and max. distances to other devices in the front door.
2. Cut a rectangle measuring 186 mm x 138 mm out of the front door (standard DIN cut-out).



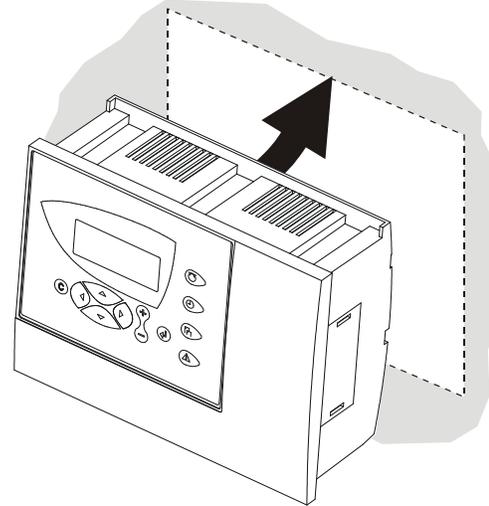
**Fig. 7. Front door cut-out dimensions**

3. Insert the rubber sealing into the gap around the front plate of the PANTHER controller.



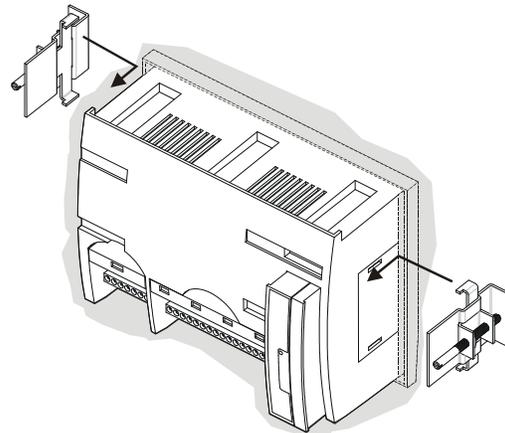
**Fig. 8. Inserting rubber sealing**

4. Insert the controller into the cut-out in the front door.



**Fig. 9. Inserting controller in front door cut-out**

5. Attach front-door mounting clamps on both sides of the controller (Fig. 10) and tighten the screws with a screwdriver (Fig. 11).



**Fig. 10. Fixing with front-door mounting clamps (a)**

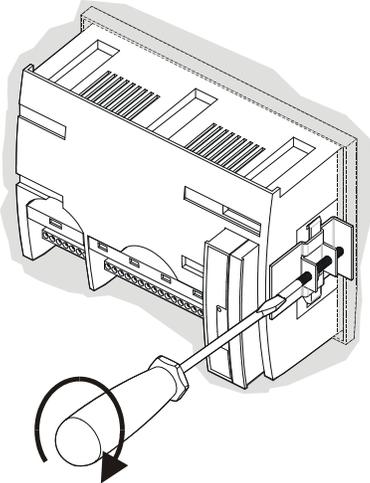


Fig. 11. Fixing with front door mounting clamps (b)

### Inside Cabinet (models without MMI)

1. Break plastic tabs covering the slots on the controller for the DIN rail mounting clips using a screwdriver.
2. Attach the DIN rail mounting clips to housing (Fig. 12).
3. Mount the controller on the DIN rail (Fig. 13).

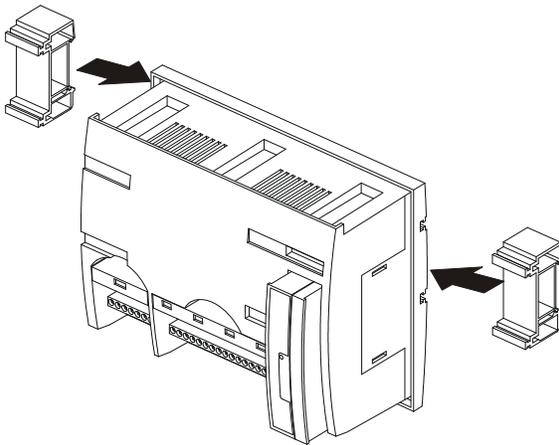


Fig. 12. Inside cabinet mounting (models w/o MMI) (a)

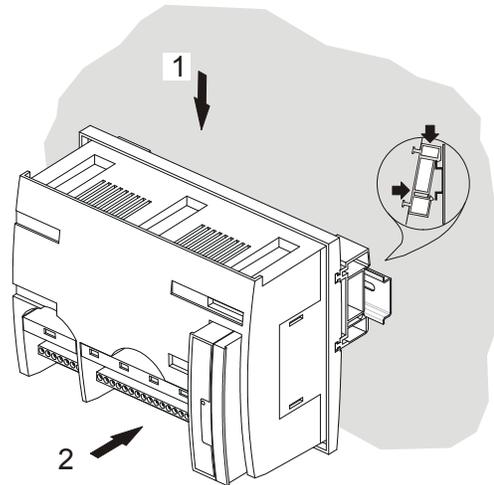


Fig. 13. Inside cabinet mounting (models w/o MMI) (b)

### Inside Cabinet (models with MMI)

The screw terminal blocks and the switch for the bus termination cannot be accessed after the controller is mounted on the DIN rail. Although the bus terminal socket can still be plugged in and unplugged, it is easier to do the complete installation before mounting the controller onto the DIN rail:

1. Plug in the application module (Fig. 16).
2. Read the complete section "Installation" carefully.
3. Follow the instructions in section "Screw Terminal Block Installation Procedure".
4. *Optional:* Connect the C-Bus to the application module as described in section "C-Bus Connection Procedure".
5. Break plastic tabs covering the slots on the controller for the DIN rail mounting clips using a screwdriver.
6. Attach the DIN rail mounting clips to housing (Fig. 14).
7. Mount the controller on the DIN rail (Fig. 15).

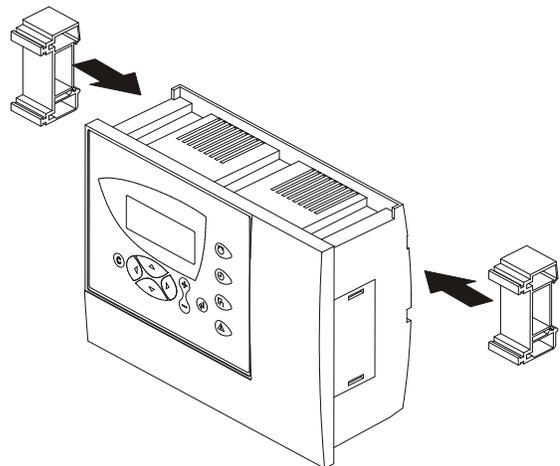


Fig. 14. Inside cabinet mounting (models with MMI) (a)

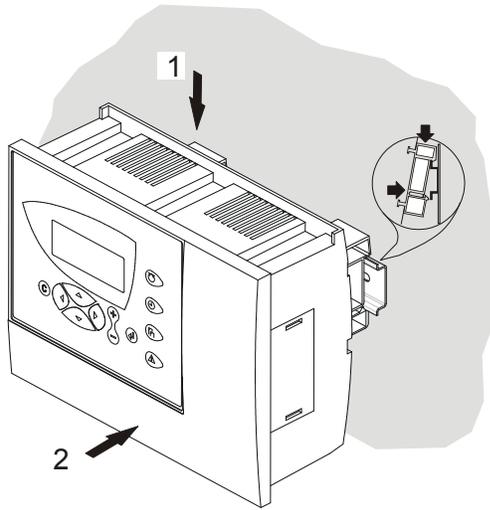


Fig. 15. Inside cabinet mounting (models with MMI) (b)

### Application Module



Always disconnect the power supply before plugging in or unplugging the application module.

Plug in the application module until it snaps into the controller housing.

**IMPORTANT**

*Electrostatic discharge can damage the application module.*

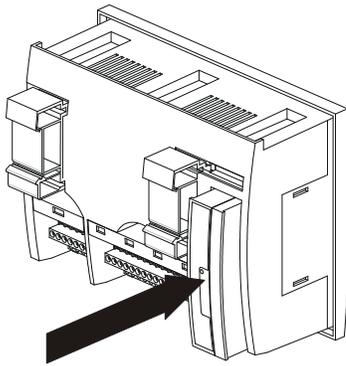


Fig. 16. Inserting application module

**NOTE:** If the application module has been replaced or removed and then re-inserted, please push the reset button (behind I/O terminals) after power ON.

## INSTALLATION

The PANTHER controller is wired via two screw terminal blocks (A + B) attached directly to the controller housing.

For proper installation, read this entire section carefully and follow all of the instructions.

### Screw Terminal Block Details

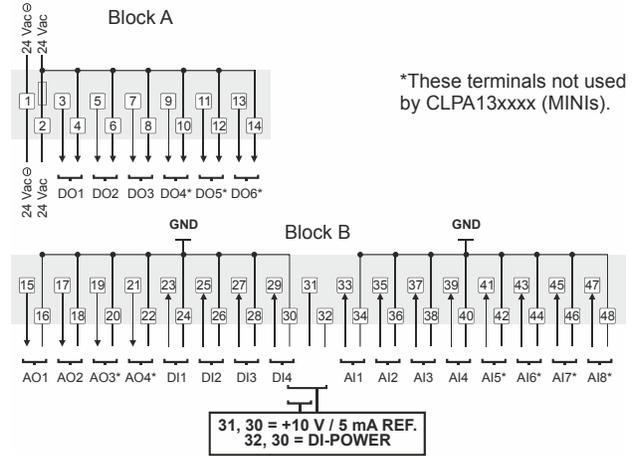


Fig. 17. Screw terminal blocks A and B

### Cabling

#### Cable Routing

All signal (input/output, low-voltage) cables are communication circuits as per VDE 0100, VDE 0800 and should therefore be routed separately from line voltage.

In the case of unshielded cable, a min. distance to the line voltage of 100 mm should be maintained. In the case of shielded cable, a min. distance of 10 mm should be maintained.

**IMPORTANT**

*Avoid joining sensor cables.*

#### Shielding

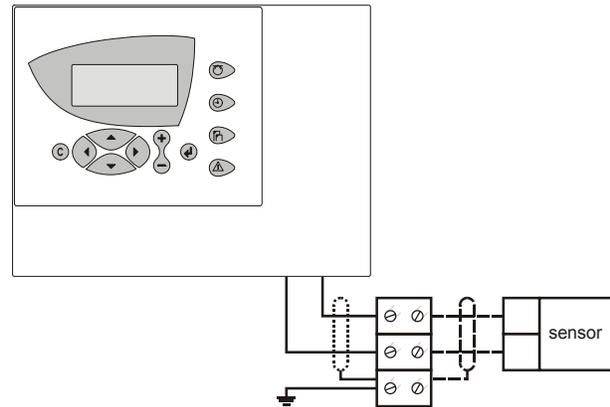


Fig. 18. Sensor shielding

Shielding of sensor and actuator cables with low protective voltages is not necessary if the general guidelines on cable routing are observed (see "Cable Routing", page 8). If these

guidelines cannot be observed, shielded cable must always be used. The shielded cable must be grounded as shown in Fig. 18.

**IMPORTANT**

*Shielding of I/O cables connected to peripherals such as sensors and actuators must be grounded at the control cabinet side, only; this is in order to avoid ground loops.*

**Lightning Protection**

Please check with your local CentralLine PARTNER for information on lightning protection.

**Cable Lengths and Cross-Sectional Areas**

Table 3. Signal types and cross-sectional areas

type of signal	cross-sectional area		
	≤ 100 m	≤ 170 m	≤ 400 m
power supply (24 Vac)	≥ 1.5 mm <sup>2</sup>	≥ 2.5 mm <sup>2</sup>	use separate transformer
low-current signals*	≥ 0.5 mm <sup>2</sup>		

\*E.g. for 0...10 V sensors, totalizers, digital inputs, 0...10 V signals for actuators.

**IMPORTANT**

*The max. length of a signal cable with 24 Vac supply is 170 m. The max. length of a two-wire, 0...10 Vdc signal cable is 400 m. The secondary side of the transformer must not be connected to earth ground.*

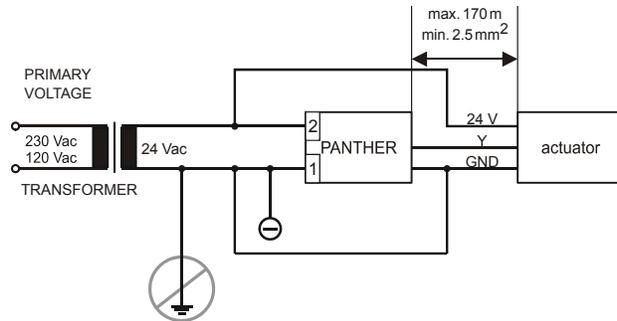


Fig. 19. Cabling of actuator with 24 Vac supply

If the distance between the controller and actuator or sensor with 24 Vac supply is greater than 170 m, a separate external transformer for the actuator or sensor is necessary.

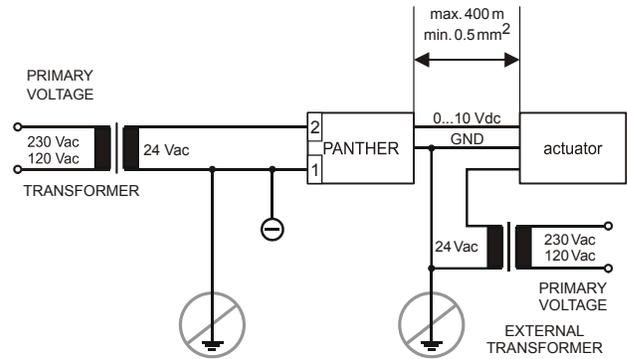


Fig. 20. Cabling of actuator with 24 Vac supply from external transformer

**IMPORTANT**

*We recommend installing a fuse on the secondary side of the transformer in order to protect the devices against miswiring.*

**Analog Inputs**

**Technical Description**

The eight (MINI: four) analog inputs convert data from passive sensors and active sensors with voltage output. The analog inputs can be used as current inputs for active sensors, but then an external resistor parallel to the sensor is necessary. It is also possible to feed digital signals to the analog inputs (see also section "Sensors and Transducers").

**Technical Specification**

**Types of input signals:**

NTC 20kΩ (range: -50...+150 °C)

0...+10 V (max. +11 V)

0 (4)...20 mA (with an external resistor of 499 Ω ±0.25% [see Fig. 21])

Each input is switched automatically via software either as input for NTC 20k ohms (low impedance) or voltage source 0...+10 V (max. +11 V, high impedance).

**IMPORTANT**

*The analog inputs are protected against short circuit and overvoltage up to 24 Vac and 40 Vdc. If any input is sourced with more than 40 Vdc or with negative voltage, the other inputs will be influenced. This could result in wrong values.*

**Table 4. Sensors suitable for use with PANTHER (external transducer not required)**

sensor type	range	characteristic in controller (set using COACH/CARE)
CLSN1T10 Outside Air Temperature Sensor	-20...+30° C	NTC
CLSN2T10 Strap-On Temperature Sensor	0...+110° C	
CLSN3T120 Boiler Temperature Sensor	0...+100° C	
CLSN4T11 Duct Temperature Sensor	-30...+100° C	
CLCM1C155 or AQS71 or C7110C1001 CO <sub>2</sub> Sensor	0...2000 ppm CO <sub>2</sub>	0...10 V = 0...2000 ppm
CLCMNA172B Air Quality (Mixed Gas) Sensor	0...100%	0...10 V = 0...100%
C7110A1010 Air Quality (Mixed Gas) Sensor		
CLCM1H112 Combined Room Temp. / Humidity Sensor or H7012B1024 Room Humidity Sensor	6...40°C	NTC
	20...95% relative humidity	0..10 V = 0...100%

**Table 5. Room Temperature Sensors suitable for use with PANTHER (external transducer not required)**

sensor type	range	characteristic in controller (set using COACH/CARE)
CLCM1T11N Room Temperature Sensor	6...40°C	NTC
CLCM2T11N Room Temperature Sensor	setpoint wheel	linear input
	6...40°C	NTC
CLCM3T111 Room Temperature Sensor	setpoint wheel	linear input
	operating knob	-
CLCM4T111 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
CLCM5T111 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 3 stages	-
CLCM6T111 Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 5 stages	-
CLCM6T21N Room Temperature Sensor	6...40°C	NTC
	setpoint wheel	linear input
	occupancy button*	-
CLCM1H112 Combined Room Temperature / Humidity Sensor	6...40°C	NTC
	20...95% r.h.	0..10 V = 0...100%
	6..40°C	NTC
CLCM4C155 Combined Room Temperature / CO <sub>2</sub> Sensor	0...2000 ppm CO <sub>2</sub>	0..10 V = 0...2000 ppm
	setpoint wheel	linear input
	occupancy button*	-
CLCM6H212 or T7560B1008 Combined Room Temperature / Humidity Sensor	6...40°C	NTC
	20...95% r.h.	0...10 V = 0...100%
	setpoint wheel	linear input
	occupancy button*	-
	fan speed, 5 stages	-

\*supported in AH03

**Table 6. Humidity Sensor suitable for use with PANTHER (external transducer not required)**

sensor type	characteristic in controller (set using COACH/CARE)	additional remarks
H7015B1060 Duct Humidity Sensor	0..10 V = 0...100%	set jumper to 0...10 V
H7508A1042 Outside Humidity Sensor		

**Table 7. Flue Gas Sensors suitable for use with PANTHER (external transducer required)**

sensor type	characteristic in controller (set using COACH/CARE)	additional remarks
AGF1	0...10 V = 0...400 °C	requires LC-MV-1xPT1000.0-400°C: converts PT1000 to 0...10 V: order from: <a href="http://www.rinck-electronic.de">www.rinck-electronic.de</a>

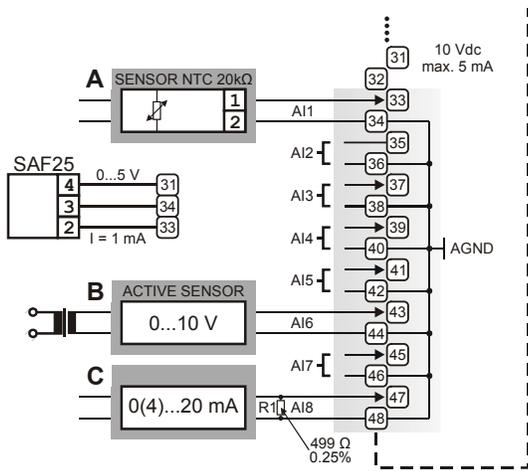
**Table 8. Differential (+ Static Duct) Pressure Sensor suitable for use with PANTHER (no external transducer required)**

sensor type	range	characteristic in controller (set using COACH/CARE)	additional remarks
DPTM500 Differential (+ Static Duct) Pressure Sensor	0...500 Pa	0..10 V = 0...500 Pa	set jumper to 0...500 Pa
	0... 1000 Pa	0..10 V = 0...1000 Pa	set jumper to 0...1000 Pa

**Table 9. Differential Pipe Pressure Sensors suitable for use with PANTHER (external transducer not required)**

sensor type	range	characteristic in controller (set using COACH/CARE)
PTHDB0032V3	0 –3.0 bar	0...10 V = 0... 300 kPa
PTHDB0062V3	0 –6 bar	0...10 V = 0... 600 kPa
PTHDB0202V3	0 –20 bar	0...10 V = 0... 2000 kPa

**Sensors and Transducers**

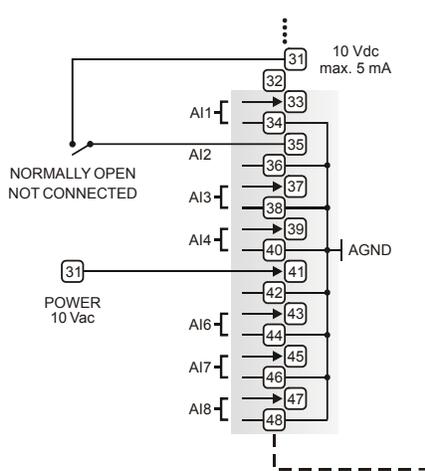


**Fig. 21. Analog inputs, sensor connections**

**Table 10. Accuracy of analog inputs with NTC sensors**

range	deviation / ± Kelvin (without sensor tolerance) NTC (20k ohms)
-50...-40°C	≤ 5.5 K
-40...-30°C	≤ 3.0 K
-30...-20°C	≤ 1.8 K
-20...-10°C	≤ 1.1 K
-10...0°C	≤ 0.8 K
0...10°C	≤ 0.6 K
10...50°C	≤ 0.4 K
50...70°C	≤ 0.6 K
70...90°C	≤ 1.0 K
90...100°C	≤ 1.5 K
100...120°C	≤ 2.4 K
120...150°C	≤ 5.3 K

**Analog Inputs Used as Digital Inputs**

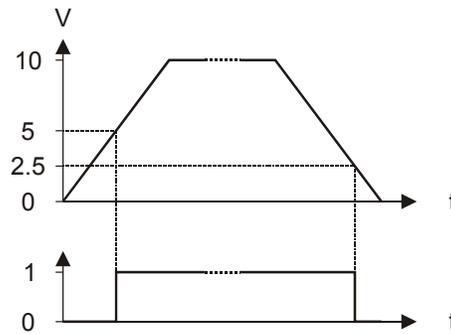


**Fig. 22. Analog inputs used as digital inputs**

Unconnected inputs have a default voltage of 0 V.

**Digital Inputs**

**Technical Description**



**Fig. 23. Input switching voltages**

The digital input signals can be d.c. voltage signals. If an input voltage is higher than 5 V, the digital signal switches to logic "1" status. With a hysteresis of 2.5 V, the input signal must fall below 2.5 V before the digital status switches to logic "0".

**Table 11. Technical specifications of digital inputs**

no.	type of signal	input resistance
4	d.c. signal (max. 24 Vdc)	10k Ω

**IMPORTANT**

The digital inputs are protected against short circuit and overvoltage up to 24 Vac and 40 Vdc.

**Parameter requirements:**

If the digital inputs are used for normal digital or analog signals, the signals have to meet the static and dynamic requirements stated in Table 12 and Table 13.

If three out of four digital inputs are used as totalizers, the signals at the totalizer inputs have to fulfill the static and dynamic requirements stated in Table 12 and Table 14 while the signal at the fourth input has to meet only the static requirements of Table 12.

**Table 12. Static parameters of digital inputs**

contact	N-O/N-C	logical status	input voltage
open	N-O	0	≤ 2.5 V
closed	N-O	1	≥ 5 V
open	N-C	1	≤ 2.5 V
closed	N-C	0	≥ 5 V

**Table 13. Dynamic parameters of digital inputs**

frequency	pulse duration	pause interval	bounce time
max. 0.4 Hz	min. 1.25 s	min. 1.25 s	max. 50 ms

**Table 14. Dynamic parameters of totalizers (DI1, DI2, and DI3, only)**

frequency	pulse duration	pause interval	bounce time
max. 15 Hz	min. 20 ms	min. 30 ms	max. 5 ms

Connection Examples (Models with 4 AOs)

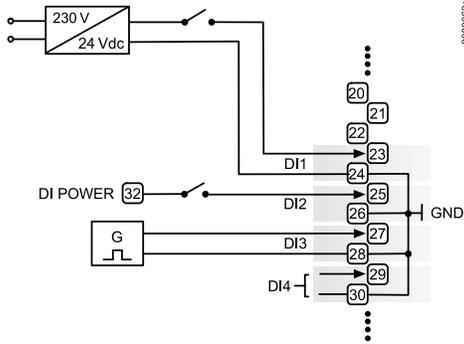


Fig. 24. Digital inputs, connection examples

Analog Outputs

Technical Description

The four (MINI: two) analog outputs can be used, for example, to operate valve or damper actuators. The characteristic curves for these actuators can be defined by means of COACH/CARE data-point customization (see PANTHER User Guide, EN2Z-0908GE51).

Each analog output can also be used as a digital output.

Table 15. Technical specifications of analog outputs

voltage	current	resolution	min. step	accuracy
0...10 V, max. 11 V	max. 1 mA	8-Bit	0.043 mV	±100 mV ±1 digit

IMPORTANT

The analog outputs are protected against overvoltage up to 24 Vac and 35 Vdc.

Relay Modules

The relay modules facilitate the control of peripheral devices with high load via the analog outputs of the controller. Connection examples (for the relay modules MCD 3 and MCE 3) are shown here.

IMPORTANT

The external supply of the terminals of the relay modules must be 24 Vac, the same as of the supply of the controllers.

Supply:

Several relay modules can be connected in series via the bridged terminal pair:

- 24 Vac: Terminals 11/12 of the relay
- 24 Vac (-): Terminals 13 to 16 of the relay

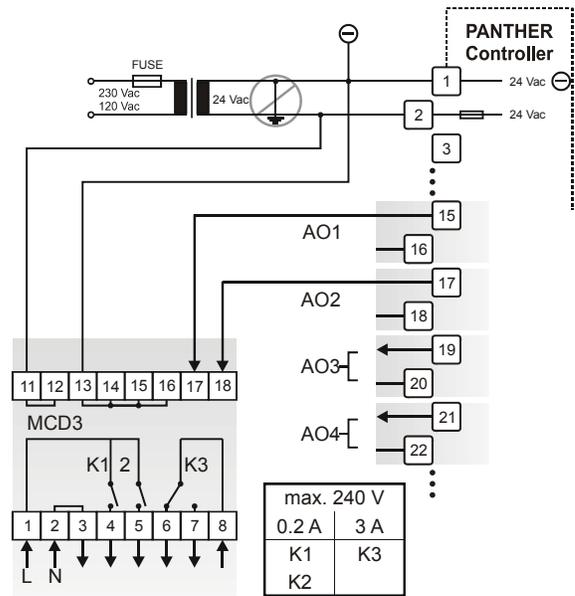


Fig. 25. Analog outputs, connection of relay MCD 3

MCD 3:

Relay terminal 17 controls the changeover contact K3. Relay terminal 18 controls the N-O contacts K1, K2. Ground can be looped through terminals 2/3.

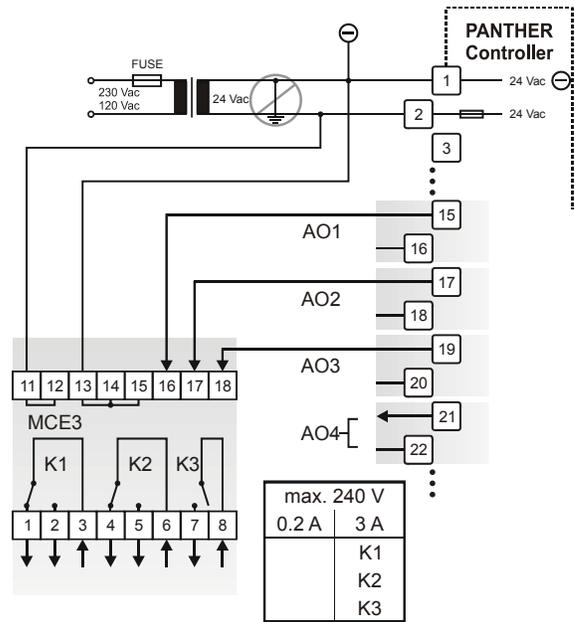


Fig. 26. Analog outputs, connection of relay MCE 3

MCE 3:

Relay terminal 16 controls the N-O contact K3. Relay terminal 17 controls the changeover contact K2. Relay terminal 18 controls the changeover contact K1.

## Digital Outputs

### Technical Description

The six (MINI: three) digital outputs are switched by a triac that can be connected directly to an external relay or a 24 Vac actuator.

### Technical Specification

#### Output stages:

Low signal	0 V
High signal	24 Vac
Type	Close, only

#### Load:

Per output	min. 0.01 A
	max. 0.8 A
Total	max. 2.4 A
Cos φ	0.5 to 1

#### IMPORTANT

The digital outputs are protected against short-circuiting via internal fuse, but are not protected against overloading. All digital outputs are protected via only a single fuse; if any digital output is short-circuited, the fuse will be blown and will interrupt the main power. In that case, the controller will stop working. If the CPU is running into the WATCHDOG as a result of a software or hardware error, all digital outputs will be set to low signal, which means all digital outputs are inactive.

Table 16. Digital output parameters

relay ON/OFF	NO/NC attribute	logical status
ON	N-O	1
OFF	N-O	0

### Connection Examples (Models with 6 DOs)

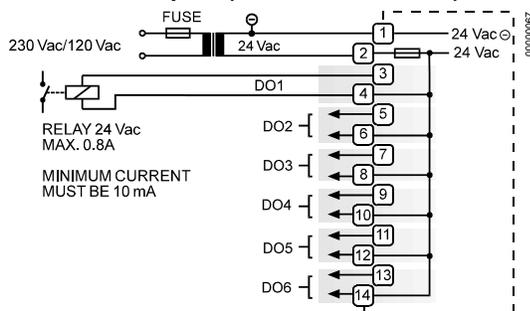


Fig. 27. Digital outputs, connection of relay

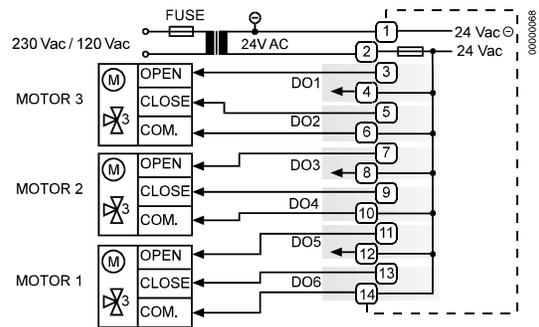


Fig. 28. Digital outputs, direct connection of 3-position actuators

## Power Supply

The PANTHER controller is powered by an external transformer.

#### Transformer requirements for one PANTHER controller:

Voltage	24 Vac $\pm 20\%$
Current	3 A, if fully equipped (6 DO's x 0.4 A)
	2 A, if current of DO's does not exceed 1.8 A
Power	72 VA, if fully equipped

The transformer, already installed in the cabinet, can be used to supply several controllers, communication devices or peripherals (actuators, etc.) if the transformer provides sufficient power.

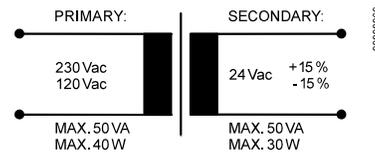


Fig. 29. Transformer example

## CRT-Series

Table 17. No. of controllers connected to one transformer

transformer	no. of PANTHER controllers
CRT 2	one (1.8 A max.)
CRT 6	two
CRT 12	four

Use quick-acting backup fuse 10 A (or automatic H16 or L16) to protect the transformer primary side. On the primary side of the CRT 2, there is a fusible output of type M 0.315 A (T) 250 V for the purpose of fine fusing.

Table 18. Overview of CRT Series a.c./d.c. current

transformer	max. a.c. current	max. d.c. current
CRT 2	2 A	0.5 A = 500 mA
CRT 6	6 A	1.3 A = 1300 mA
CRT 12	12 A	2.5 A = 2500 mA

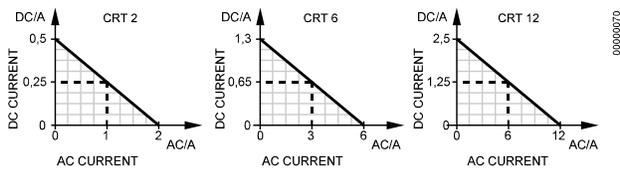


Fig. 30. AC/DC current graphs

### Standard Transformers

Standard commercially available transformers must fulfill the following specifications:

Table 19. Requirements for standard transformers

output voltage	impedance	AC current
24.5 Vac to 25.5 Vac	$\leq 1.15 \Omega$	max. 2 A
24.5 Vac to 25.5 Vac	$\leq 0.40 \Omega$	max. 6 A
24.5 Vac to 25.5 Vac	$\leq 0.17 \Omega$	max. 12 A

### Screw Terminal Block Installation

1. Make sure that the power supply of the cabinet is disconnected and that the application module is plugged in the housing.
2. Choose the min. cross-sectional areas for all cables to and from sensors, actuators, valves, relays, etc. you want to connect to the PANTHER controller from Table 3.
3. Connect sensors, transducers, etc. to the analog input terminals.

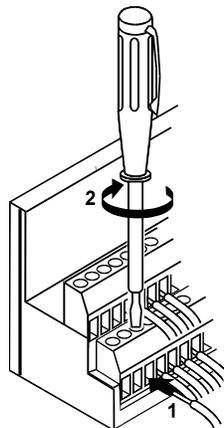


Fig. 31. Connecting a cable to a screw terminal

#### IMPORTANT

Never connect the cabinet ground to the controller system ground.

4. If the distance between the controller and an actuator or sensor with 24 Vac supply is greater than 170 m: Choose a transformer from the transformers listed in section "Power Supply" and connect it directly to the actuator or sensor.
5. Connect sensors, transducers, etc. to the digital input terminals.
6. Connect valves, actuators, relays, etc. to the analog output terminals.
7. Connect relays, actuators etc. to the digital output terminals.

8. Select one of the transformers of the CRT series from the Table 18 or take a commercially available standard transformer fulfilling the requirements of Table 19.
9. Make sure that the application module is attached to the controller housing.

## ⚠ WARNING

### High Voltage

Risk of death or electrical shock.

- Do not connect line power supply directly to the terminals.
- It is not allowed to connect voltages exceeding 24 Vac or 40 Vdc to any of the PANTHER terminals

#### IMPORTANT

The transformer feeding the PANTHER controller must be in the same cabinet. When selecting the transformer, the max. direct-current must be considered if field devices with d.c. load are used.

The secondary side of the transformer must not be connected to earth ground.

10. Connect the 24 Vac (-) on the secondary side of the transformer to terminal 1 on screw terminal block A.
11. Connect the 24 Vac on the secondary side of the transformer to terminal 2 on screw terminal block A.

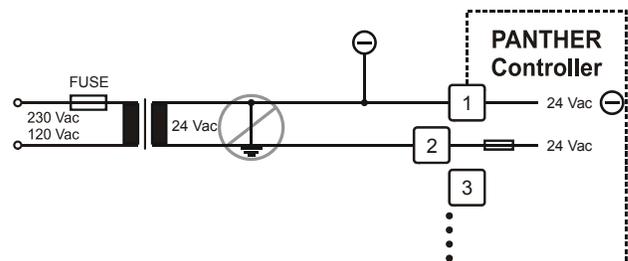


Fig. 32. Connecting the power supply

#### IMPORTANT

If there already are additional transformers, for example supplying actuators or active sensors:

- Connect the 24 Vac (-) (secondary side) of the transformers together.

12. Attach the terminal blocks to the housing (Fig. 33).

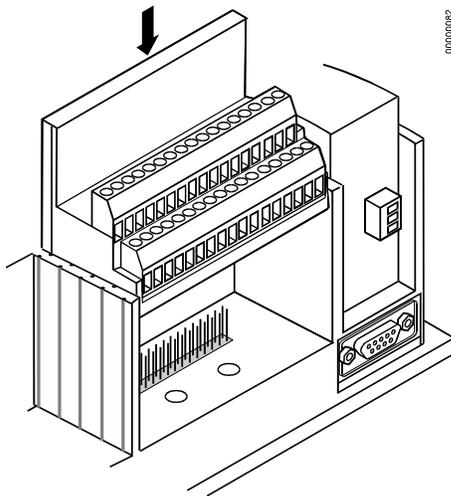


Fig. 33. Attaching screw terminal blocks

## Adjusting MMI Display Contrast

### Front Door Mounted

1. Unplug the screw terminal block B to port B while the controller is connected to the power supply.
2. Adjust the display contrast with a slotted screwdriver or a cross-tip screwdriver.

#### **IMPORTANT**

*Turn the display contrast potentiometer gently. Using excessive force may damage the potentiometer and disable the display.*

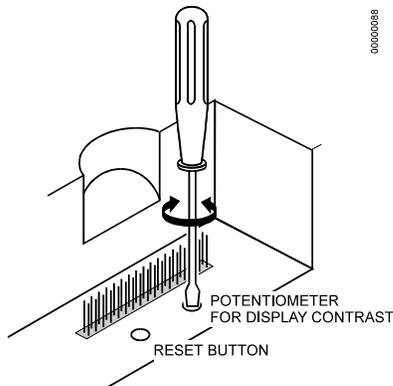


Fig. 34. Adjusting the display contrast

3. Attach screw terminal block B to port B.

## DIN Rail Mounted

1. Dismount the controller from the DIN rail.
2. Unplug the screw terminal block B to port B while the controller is connected to the power supply.

#### **IMPORTANT**

*Turn the display contrast potentiometer gently. Using excessive force may damage the potentiometer and disable the display.*

3. Adjust the display contrast with a slotted screwdriver or a cross-tip screwdriver (Fig. 34).
4. Attach screw terminal block B to port B.
5. Mount the controller on the DIN rail again.

## COMMUNICATION

### General

The PANTHER controllers are equipped with four different types of Application Modules. They all feature 64 kB of EPROM (boot), 256 kB of RAM, and 2 MB of Flash EPROM (for the firmware and application).

### XD50C-FCL Application Module

Models equipped with an XD50C -FCL Application Module (see Fig. 5) can simultaneously communicate

- via LONWORKS: with the ARENA front-end as well as with RANGER and COACH/CARE;
- via the C-Bus: with C-Bus devices;
- via the B-port: with COACH Online / XL-Online.

See also sections "C-Bus Communication" and "LonWorks Communication".

### XD50C -FC Application Module

Models equipped with an XD50C -FC Application Module (see Fig. 5) can simultaneously communicate

- via the C-Bus: with C-Bus devices;
- via the B-port: with COACH Online / XL-Online.

See also sections "C-Bus Communication".

### XD50C-F Application Module

Models equipped with an XD50C-F Application Module (see Fig. 5) has no communication features and is used only for Flash downloading.

### XD50-FLS Application Module

Models equipped with an XD50-FLS Application Module (see Fig. 5) can simultaneously communicate

- via LONWORKS: with the ARENA front-end as well as with RANGER and COACH/CARE;
- via the RS232 interface: with M-Bus meters (connected by adapter PW3/PW20 and cable XW586);
- via the B-port: with COACH Online / XL-Online.

See also sections "M-Bus Communication" and "LonWorks Communication".

## M-Bus Communication

### General

In the case of Meter-Bus communication, data from external M-Bus meters is read and made available to the CentralLine system. A maximum of six M-Bus meters can be connected to a single PANTHER controller (via the XD50-FLS, connected using adapter PW3/PW20 and cable XW586).

### List of Supported M-Bus Meters

Due to the large number of suppliers and the wide range of meters currently found on the market, COACH is unable to support all types of meters. For a list of meters which CentralLine has qualified to support, see PANTHER / COACH – Supported M-Bus Meters (EN3Z-0908GE51). In the case of unlisted meters, it is the user's responsibility to verify their compatibility.

### M-Bus Wiring and Connection Procedure

The meter bus adapter PW3 is connected with the cable XW586 to the RJ45 plug of the XD50-FLS. The cable XW586 has a length of 2.5 m.

Table 20. Cable XW586

RJ45 plug, pin no.	RS232 function	9-Pin -Sub-D connector Pin No.
1	DCD	1
2	RxD	2
3	TxD	3
4	DTR	4
5	GND	5
6	DSR	6
7	RTS	7
8	CTS	8
	not used	9

The capacity of the total length of wiring influences the signal quality. Depending upon the baud rate, the following network lengths are possible (cable type: JYSTY nx2x0.8):

Table 21. M-Bus baud rate vs. max. network length

M-Bus baud rate (baud)	max. network length (m)
9600	1000
2400	4000
300	12000

The baud rates can be set using the PANTHER's MMI (or COACH Online / XL Online via the B-port connection) in the "Parameters", "System Config." screen.

The voltage-drop on the bus lines depends upon the quiescent current (i.e. no. of M-Bus meters) and the wire resistance. This voltage-drop limits the distance between the PW3 and the M-Bus meters. The following network lengths are possible (cable type: JYSTY nx2x0.8).

Table 22. No. of M-Bus meters vs. max. network length

no. of M-Bus meters	max. network length (m)
5	6900
10	5100
20	3200

The connection procedure is as follows:

1. Install PW3 Meter-Bus Adapter on DIN rail. Insert a screwdriver into the slot in the DIN rail clamp on the underside of the PW3 and pry downward to loosen clamp until the unit snaps onto the rail. See Fig. 35.

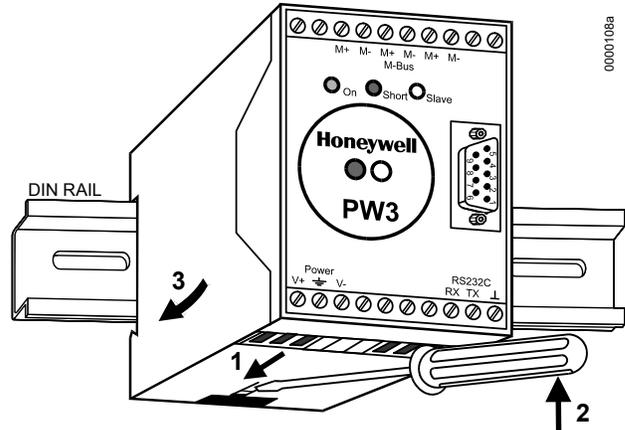


Fig. 35. Mounting of PW3

2. Connect Meter-Bus meters to PW3. See PANTHER / COACH – Supported M-Bus Meters (EN3Z-0908GE51) for a list of supported devices. Insert wires into the terminals on the top of PW3 and tighten the screws on the front of the unit.

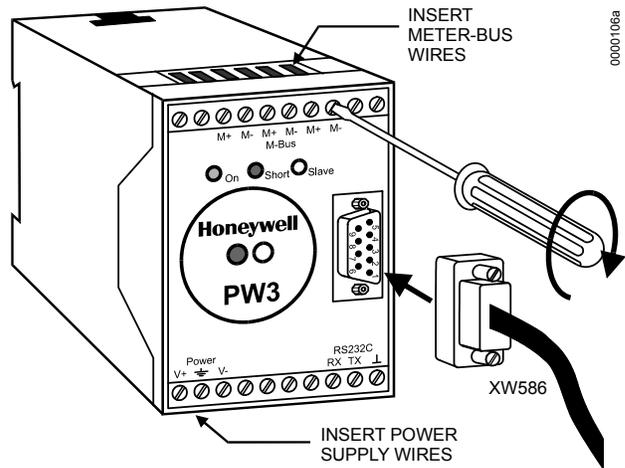
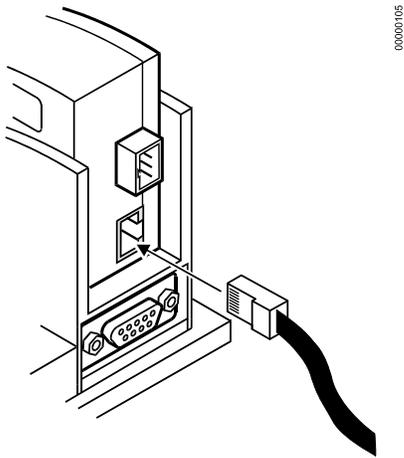


Fig. 36. PW3 Meter-Bus adapter connections

3. Connect PW3 to PANTHER controller using XW586 cable.

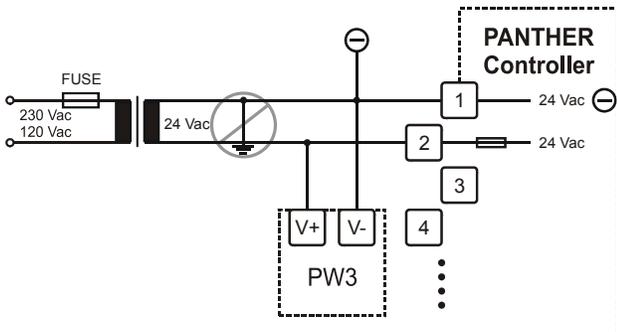


**Fig. 37. Connecting PANTHER to Meter-Bus adapter**

4. Connect 24 V power to the PW3 according to Fig. 38. Insert wires into the terminals on the underside of the PW3 and tighten the screws on the front of the unit.

**CAUTION**

Never connect V- of the PW3 to pin 2 of the PANTHER controller and V+ to pin 1. This could damage the controller.



**Fig. 38. PW3 Meter Adapter power connections**

Meter-Bus activity can be monitored using the LEDs on the XD50-FLS Application Module (see Fig. 5).

Meter-Bus activity can also be monitored using the slave LED on the PW3 (see Fig. 35, Fig. 36).

**C-Bus Communication**

Via the C-Bus, up to 30 controllers can communicate with one another.

**C-Bus Termination**

The XD50C-FCL and XD50C-FC Application Modules (see Fig. 5) are equipped with a DIP switch for the C-Bus which you can use to set the bus termination appropriate for the communication speed.

**Table 23. DIP switch settings for C-bus termination**

DIP switch setting	communication speed (max.)	controller location
up	9.6 Kbaud	-
middle	76.8 Kbaud	middle of bus
down	76.8 Kbaud	beginning or end of bus

**NOTE:** The controllers with the termination must be switched ON prior to the controllers in the middle of the C-Bus. The C-Bus may not work if controllers equipped with termination have been switched OFF.

**Cable Specification**

The *max.* cable length is 1,200 m. Only shielded cable may be used.

Recommended for installation inside the cabinet: J-Y-(ST)Y 2 x 2 x 0.8. Shielded, twisted pair.

Recommended for installation outside the cabinet: A-Y-(ST) 2 x 2 x 0.8. Shielded, twisted pair.

In principle, data transmitting cables should be shielded against RFI. Note that baud rate and max. bus length are related to each other. Each end of the shield on the C-Bus should be connected to the shield terminal of the respective device. Do not connect it to the cabinet ground or any other ground points.

**C-Bus Extension by Using Repeaters**

The length of the C-Bus can be extended by using repeaters (order no.: XD 509). Each repeater extends the bus length by 1,200 m. In Europe, only the version with housing is allowed.

**C-Bus Connection Procedure**

1. Choose a suitable C-Bus cable.

**IMPORTANT**

*Make sure that all bus devices connected to the same C-Bus are set to the same baud rate; otherwise, proper communication cannot be ensured.*

2. Set the DIP switch according to Table 23.

**IMPORTANT**

*The C-Bus must be connected through the individual controllers (open ring). Star connection is not permitted because uncontrollable line reflections could occur.*

3. Connect the cable shield to C-Bus terminal 4 (see Fig. 5).
4. Connect the C+ cable to C-Bus terminal 5 (see Fig. 5).
5. Connect the C- cable to C-Bus terminal 6 (see Fig. 5).
6. If the *max.* C-Bus length for the chosen cable is exceeded: Use repeaters (see section "C-Bus Extension by Using Repeaters").

**NOTE:** When adding or removing a controller to/from the C-Bus, it may take up to two minutes to re-initialize the bus. During this time, communication on the C-Bus is lost.

**LONWORKS Communication**

The XD50C-FCL Application Module (see Fig. 5) contains an FTT-10A Free Topology Twisted Pair Transceiver allowing

communication on a LONWORKS network. Such transceivers communicate at 78 Kbaud and provide transformer isolation. The bus wiring does not have polarity; that is, it is not important which of the two bus terminals are connected to each wire of the twisted pair. Via LONWORKS and with ARENA, up to 29 controllers can communicate with one another.

FTT devices can be wired in daisy chain, star, loop or any combination thereof as long as the max. wire length requirements given below are met. The recommended configuration is a daisy chain with two bus terminations. This layout allows for max. bus length, and its simple structure presents the least number of possible problems, particularly when adding on to an existing bus.

**NOTE:** A doubly-terminated bus may have stubs of up to 3 m from the bus to each node.

**Table 24. Doubly-terminated bus specifications**

cable type	max. bus length
Belden 85102	2,700 m
Belden 8471	2,700 m
Level IV, 22 AWG	1,400 m
JY (St) Y 2x2x0.8, twisted pair	900 m
TIA568A Categ. 5 24AWG, twisted pair	900 m

**NOTES:**

The cable types listed above are as recommended by Echelon in their FTT-10A User Guide. The cable recommended by Centraline is the level IV, 22 AWG, solid core, non-shielded cable. Belden part numbers are 9H2201504 (plenum) and 9D220150 (non-plenum). The FTT specification includes two components that must be met for proper system operation. The distance from each transceiver to all other transceivers and to the termination must not exceed the *max. node-to-node distance*. If multiple paths exist, the *max. total wire length* is the total amount of wire used.

**Table 25. Free topology (singly-terminated) specs**

cable type	max. node-to-node distance	max. total wire length
Belden 85102	500 m	500 m
Belden 8471	400 m	500 m
Level IV, 22AWG	400 m	500 m
JY (St) Y 2x2x0.8	320 m	500 m
TIA568A Category 5 24AWG, twisted pair	250 m	450 m

**IMPORTANT**

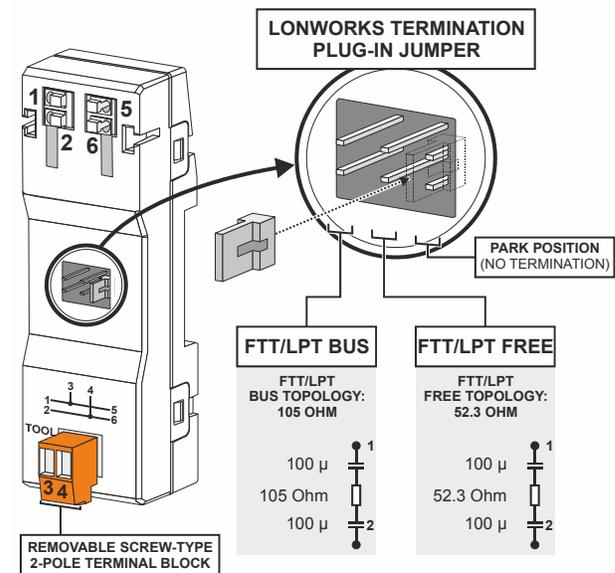
*Do not use different wire types or gauges on the same LONWORKS network segment. The step change in line impedance characteristics would cause unpredictable reflections on the network.*

**NOTE:** If the limit on the total wire length is exceeded, FTT physical layer repeaters (FTT 10A) can be added to interconnect segments and increase the overall length by an amount equal to the original specification for that cable type and bus type for each repeater used. E.g.: Adding repeaters for a doubly-terminated bus using JY (St) Y 2x2x0.8 cable increases the max. length 900 m for each repeater.

**LONWORKS Bus Termination**

Depending upon the configuration, either one or two termination modules are required for terminating a LONWORKS bus with FTT devices on it. The following LONWORKS termination unit is available for this purpose:

- XAL-Term2 LONWORKS connection and termination module (see Fig. 39), which can be mounted on DIN rails and in fuse boxes.



**Fig. 39. XAL-Term2**

**LONWORKS Service LED Diagnostics**

The LONWORKS service LED (located on the application module) is used to diagnose the state of the PANTHER controller. In general:

- If the LED is lit continuously, the controller is applicationless.
- If the LED is blinking, the controller has an application but it is not configured.
- If the LED is OFF, the controller is running normally.

Do not push the LONWORKS service button.

A more detailed diagnosis can be carried out by observing the duration of the ON and OFF states of the service LED in connection with power ON / OFF. Fig. 40 illustrates the different service LED behaviors. These are the most common behaviors, but others are possible since the state of the service LED is under firmware control and can be affected both by hardware and software anomalies.

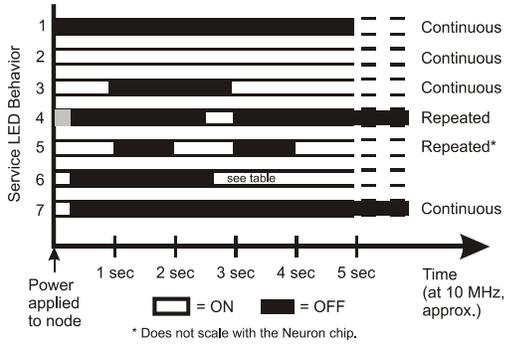


Fig. 40. LonWorks Service LED behavior

Table 26 describes each of these behaviors under different contexts. Again, this list is not exhaustive and therefore does not explain every possible service LED behavior.

Table 26. LonWorks Service LED behavior descriptions

behavior	context	likely explanation
1	Power-up of the PANTHER	PANTHER hardware is defective.
2	Power-up of the PANTHER	PANTHER hardware is defective.
3	Power-up / reset of the PANTHER	The PANTHER is applicationless. May be caused by the Neuron chip firmware when a mismatch occurs on application checksums.
4	Anytime	Possible corrupt EEPROM. Use a newly programmed PROM, or EEBLANK and follow bring-up procedure.
5	Anytime	The PANTHER is unconfigured.
6a	First power-up, <i>applicationless</i> firmware state exported	OFF duration is approx. 1 sec. Service LED should then turn ON and stay ON, indicating an applicationless state. The controller is defective – return to factory.
6b	First power-up, <i>unconfigured</i> firmware state exported	OFF duration is 1...15 sec, depending on the application size and system clock. Service LED should then begin flashing as in behavior 5, indicating an unconfigured state.
6c	First power-up, <i>Configured</i> firmware state exported	OFF duration is indefinite (1...15 sec to load internal EEPROM; stays OFF, indicating configured state.) The PANTHER is configured and running normally.
7	Anytime	The PANTHER is configured and running normally.

### Controller Serial Port



Fig. 41. Serial port

The serial port has a 9-pin sub-D connector and has a default communication speed of 9.6 Kbaud.

When the cable from COACH Online / XL-Online is plugged in during normal operation of a PANTHER controller equipped with an MMI, the functionality of the built-in MMI is disabled.

After unplugging COACH Online / XL-Online, it takes up to 15 sec until the built-in MMI resumes operation.

### Cable Specifications

Ready-made cables (XW 585, 2.5 meters long) with the shield already connected to the computer module plug end are available for the connection of COACH Online / XL-Online.

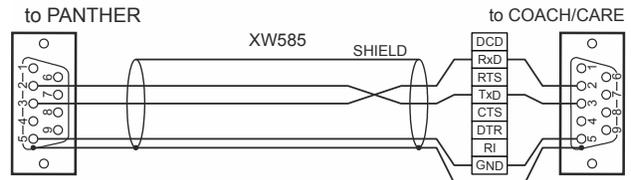


Fig. 42. XW585 cable details

### Connection of COACH Online / XL-Online

For direct communication, a PC hosting COACH Online / XL-Online can be connected to the serial port using a standard zero modem cable or the XW585.

## OPERATION – QUICK REFERENCE

The following quick reference summarizes procedures for using PANTHER controllers equipped with a built-in MMI or without an MMI (in which case operation is via COACH Online / XL-Online).

### Operator's Terminal

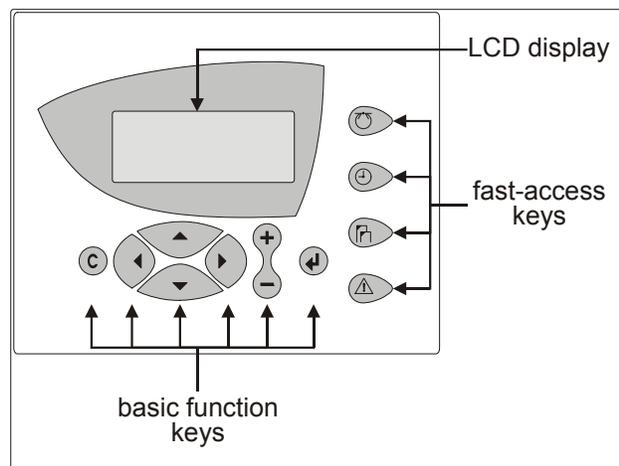


Fig. 43. PANTHER MMI

The **MMI (Man-Machine Interface)** consists of a keyboard and a display described below.

### Basic Function Keys

- CANCEL:** Enables you to escape to root screen, cancel an incorrect entry, or confirm alarm message.
- UP ARROW:** Moves cursor to previous field or, when already at the top of a screen, to bottom field.
- DOWN ARROW:** Moves cursor to subsequent field or, when already at the bottom of a screen, to top field.
- RIGHT ARROW:** Moves cursor to next digit at right of a field, to the subsequent field, or to first field of a subsequent screen (equivalent to "page down").
- LEFT ARROW:** Moves cursor to next digit at left of a field, to previous field, or to last field of a previous screen (equivalent to "page up").
- PLUS:** Increases displayed numerical value by 1. In the case of a digital state, it changes the state to the opposite state. Increments scroll bar values (i.e. destination screens). Creates new "Daily" or "Annual" schedules.
- MINUS:** Decreases displayed numerical value by 1. In the case of a digital state, it changes the state to the opposite state. Decrements scroll bar values (i.e. destination screens). Deletes existent "Daily" or "Annual" schedules.
- ENTER:** Confirms any changes made or shifts to the subsequent screen.

Table 27. Effects of Basic Function Keys

key	screens containing				
	display fields, only	edit fields in display mode	edit fields in edit mode	a listbox without scrollbar*	a listbox with scrollbar
	no effect	goes to prev. field	increments value	goes to previous field	
	no effect			no effect, except for time schedules (adds a new schedule)	increments scrollbar value (screen no.)
	no effect	goes to next field	decrements value	goes to next field	
	no effect			no effect, except for time schedules (deletes a schedule)	decrements scrollbar value (screen no.)
	goes to previous or stays in same screen		goes to prev. digit	pages up	
	goes to next or stays in same screen		goes to next digit	pages down	
	escapes to root screen		rejects change	escapes to root screen	
	no effect	shifts from display to edit mode	confirms value / shifts from edit to display m.	confirms selection	

\* Also Plant Components lists, Point Attributes lists, and System Topics submenus

**Resetting**

 Simultaneously pressing the DOWN ARROW key and the MINUS key causes a reset.

A reset can also be achieved by pressing the hardware RESET button at the rear of the controller housing under screw terminal block B.

A reset causes all RAM data and all configuration codes to be lost, and the controller will therefore have to be re-initialized in order to work with it. You should reset your PANTHER controller only as a preliminary to downloading a new application.

**Fast-Access Keys**

The use of the fast-access keys is summarized below.

-  **PLANTS:** Displays a list of the selected plant components and their current states.
-  **TIME PROGRAMS:** Displays a list of configured time programs and provides all time schedule customization options. See also section "Time Programs" on page 24.
-  **SYSTEM TOPICS:** Available only in access level 3. Provides system settings and application parameters.
-  **ALARMS:** Displays alarm information on alarm history, points currently in an alarm condition, critical alarms, and non-critical alarms.

**Access Levels**

**Table 28. Access Levels and Authorizations**

level	key			
	Plants	Time Program	Sys. Topics	Alarms
1	read only	read only	no effect	read only
2	read only	time schedules	no effect	read only
3	unlimited editing possible			read only

**IMPORTANT**

*If you have forgotten the level-3 password, please contact your local CentralLine PARTNER.*

**Powering Up / Resetting the Controller**

After powering up the controller or following a RESET, a series of screens (the so-called "start-up sequence") will appear (see Fig. 44).



**Fig. 44. The start-up sequence**

**NOTE:** The screens of the start-up sequence are part of the operating system and therefore always in English.

The cursor is positioned at "NEXT" by default. However, you can page up using the CANCEL button.

The first screen of the start-up sequence presents only non-editable information, namely: the firmware version. You may proceed to the next screen by pressing the ENTER key.

The second screen presents the date (format: DD. MM. YYYY), clock-time (format: HH:MM), and controller number fields. You can edit any or all of these fields using the basic function keys

**NOTE:** If no controller number is set or if the number shown is not reconfirmed, the controller will not go online on the C-Bus after start-up.

You may proceed to the next screen by pressing the ENTER key.

The third screen provides information about whether modem communication is enabled and about the application's memory size.

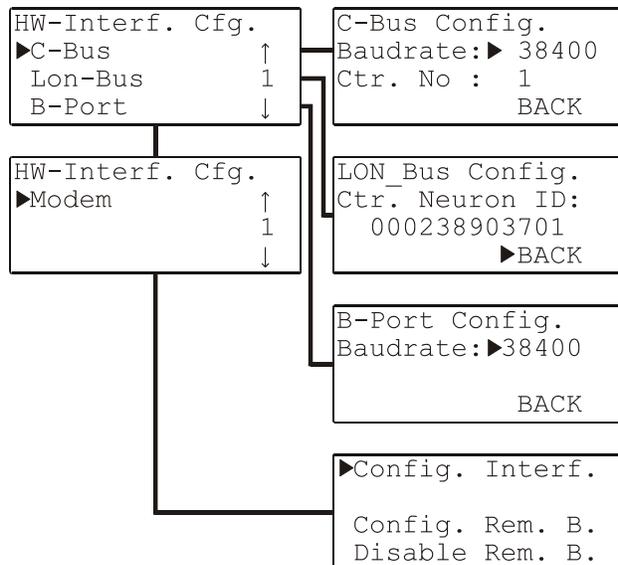
**NOTE:** Modem communication and changing the application's memory size are future options.

You may proceed to the next screen by pressing the ENTER key.

The fourth screen contains editable fields for configuring the controller-specific hardware interfaces ("Contr. Setup"), choosing the application manually ("Select Applic."), downloading an application from a PC hosting COACH Online / XL-Online, and setting up the test mode with default data-point names ("DP Wiring Check"). Move your cursor to the desired entry and confirm by pressing the ENTER key. Depending upon your selection, you will proceed to one of the series of screens described in the respective section below.

**Hardware Interface Configuration**

If "Contr. Setup" has been selected, a corresponding listbox with the heading "HW-Interf. Cfg." will appear (see Fig. 45).



**Fig. 45. Hardware interface configuration**

**NOTE:** The entry "Modem" is a future option.

**B-Port**

Selecting "B-Port" will cause a screen with a corresponding heading to appear, and in which you can edit the baud rate, as appropriate.

**C-Bus**

Selecting "C-Bus" will cause a screen with a corresponding heading to appear, and in which you can edit the baud rate and controller number, as appropriate.

**NOTE:** Changing the baud rate or the controller number requires a level-3 password.

**NOTE:** If no controller number is set or if the number shown is not reconfirmed, the controller will not go online on the C-Bus after start-up.

**NOTE:** Only if you assign the bus ID a value of "0" (see "LON-Bus" below) will C-Bus communication be possible.

- If "Baudrate" is selected: Move the cursor with the ARROW keys to the baud rate field for the C-Bus. Use the '+' and '-' keys to edit the fields. Confirm with ENTER.
- If "Contr. No." is selected: Set the controller number using the '+' or '-' keys. Confirm with ENTER.

**LON-Bus**

Selecting "Lon-Bus" will cause a screen with a corresponding heading to appear, and which displays the unique ID number of the PANTHER controller's Neuron processor.

**NOTE:** If you now assign the bus ID a value of "0", C-Bus communication with PANTHER controllers will be possible. If instead you assign the bus ID a value of "1" (this is the default setting), LonWORKS communication with ARENA, COACH/CARE, SERVAL, or other PANTHER controllers will be possible.

**NOTE:** When using legacy systems with MCR 200, you must assign the bus ID a value of "0". This must be done *after* application download and while the application is running.

**M-Bus**

Selecting "M-Bus" will cause a screen with a corresponding heading to appear, and in which you can edit the baud rate. You may now move the cursor with the ARROW keys to the baud rate field for the M-Bus. Use the '+' and '-' keys to edit the fields. Confirm with ENTER.

**Downloading an Application**

**Downloading an Application via LonWORKS**

The preferred method of downloading an application is via LonWORKS. Proceed as follows:

1. Before downloading the application, assign (in COACH/CARE) the Neuron ID of the controller into which you are downloading the application.
2. Then right-click the controller, and from the context menu, select "Download application". The download will then launch automatically.

3. When downloading is complete, the application download dialog box will close automatically, indicating that the download has been successfully concluded.

**Downloading an Application via the B-Port**

An alternative method of downloading an application is via the B-Port.

After resetting, the start-up sequence will appear, in the fourth screen of which you can request a download ("Requ. Download"), after which a screen with the text "Please Execute Download" will appear.

You may then proceed as follows

1. Establish the physical connection (e.g. a null-modem cable) between the PANTHER controller's B-Port and your PC.
2. Launch the COACH/CARE icon visible on your PC's screen.
3. Open one of the applications (e.g. HE01V3.00) present in the corresponding sub-folder. A list of equipment units will then appear.
4. Select the desired configuration.
5. Under "Options", check the COM port and baud rate.

**IMPORTANT:** The selected baud rate must agree with the baud rate setting of the PANTHER controller.

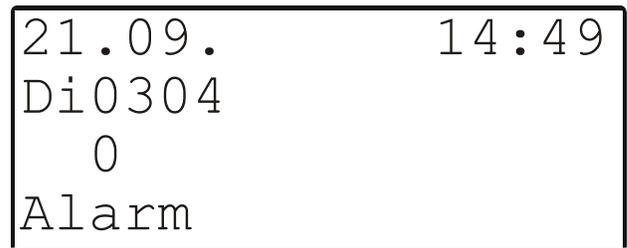
For verification purposes, the configuration parameters will then be again displayed.

6. In the LCD display of the PANTHER controller's MMI, a screen stating the date and clocktime will appear. You have now completed the downloading procedure.

**NOTE:** The fastest download is achieved by setting both the PANTHER controller's B-Port and the COACH/CARE PC-COM port baud rates to 38400 baud.

**Setting Up Test Mode with Default Data-Point Names**

Selecting and confirming "DP Wiring Check" will cause the corresponding screen to appear.



**Fig. 46. Setting up test mode with default d-p names**

The resultant default data-point's names are generated according to the following pattern:

- AI0101: Analog input, board 1, input 1
- AO0201: Analog output, board 2, output 1
- DI0301: Digital input, board 3, input 1
- DO0401: Digital output, board 4, output 1

**NOTE:** The board numbers shown above are internal references and are not relevant to the user.

After generating the default data-point's names, the resultant alarm must first be cancelled. After this is done, the corresponding screen will appear:

Move the cursor to

- "Default Points" to display I/O points for checking values and manually setting outputs for testing.
- "Alarm History" to display current alarms. This feature allows the system to be checked out by a single person opening and closing inputs and then later reading the alarm buffer to see if they were detected by the controller.

and confirm using the ENTER key.

If "Default Points" has been selected, a corresponding listbox will be displayed showing all default data-point names and their current values.

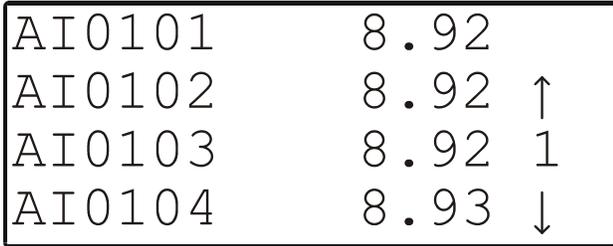


Fig. 47. Default data-point names

To manually set the state/value of output data-points, use the ARROW keys to move the cursor to the appropriate output data-point from the list box and confirm.

In the case of e.g. analog output data-points, a corresponding screen will be displayed.

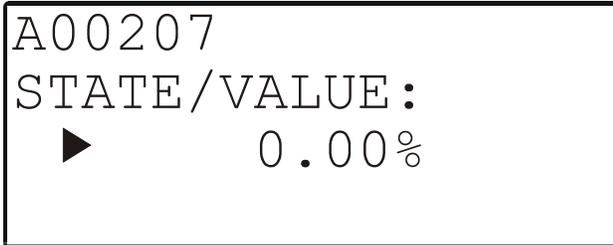


Fig. 48. Manually setting the state/value of analog output data-points

Confirm the displayed value with ENTER, or change the value using the PLUS or MINUS keys and confirm.

In the case of e.g. digital output data-points, a corresponding screen will be displayed.

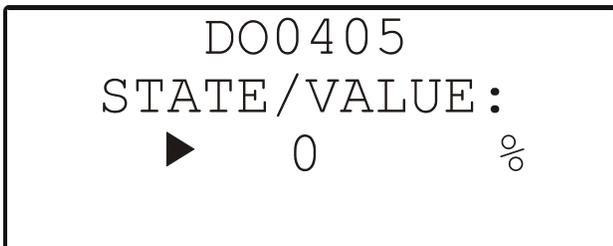


Fig. 49. Manually setting the state/value of digital output data-points

Confirm the displayed value with ENTER, or change the state/value using the PLUS or MINUS keys and confirm.

If "Alarm History" has been selected, a corresponding listbox will be displayed showing all points in alarm as well as any system alarms (max. 100 entries):

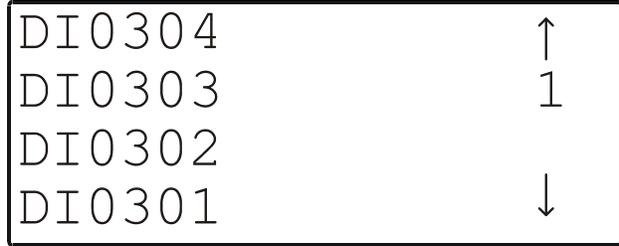


Fig. 50. Alarm history

**NOTE:** Alarms are generated for changes of state/value on inputs, which allows shorting and opening the inputs at the switches and/or sensors and then checking the alarm buffer to verify the wiring.

To display an alarm, use the ARROW keys to move the cursor to the default data-point's name from the list box and confirm. A corresponding screen will appear.

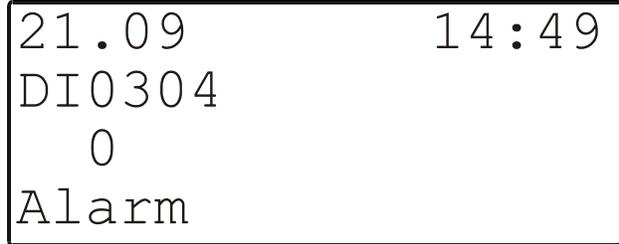


Fig. 51. Displaying an alarm

If, by manipulating the hardware, you change the state to "1", "return to normal" will be displayed.

**NOTE:** Reset the controller after using the test options to clear the alarm buffer.

### Time Programs



Fig. 52. Displaying / changing a daily, weekly, or yearly program



Fig. 53. Navigating through a daily program

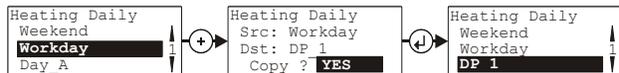


Fig. 54. Adding a new daily program

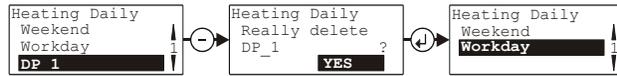


Fig. 55. Deleting a daily program

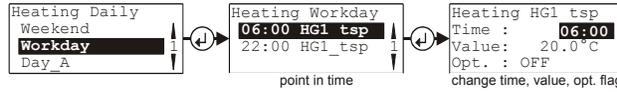


Fig. 56. Changing a daily program switching point

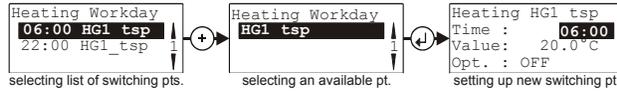


Fig. 57. Adding a switching point to a daily program

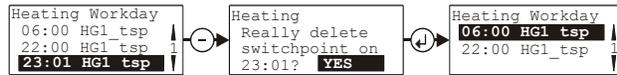


Fig. 58. Deleting a switching point from a daily program

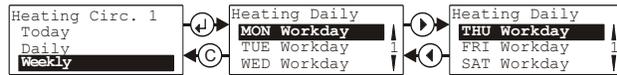


Fig. 59. Displaying a weekly program

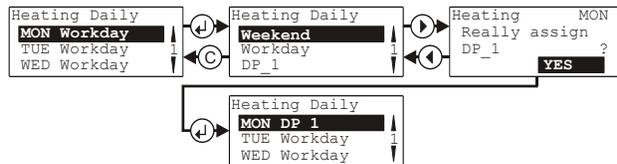


Fig. 60. Changing a weekly program assignment

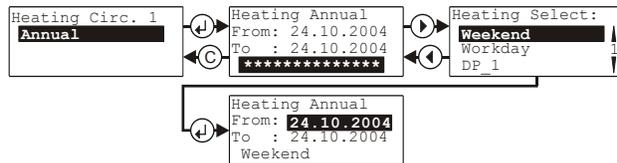


Fig. 61. Displaying an annual program

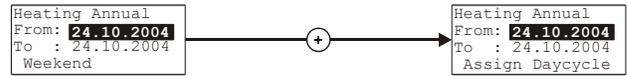


Fig. 62. Adding a new time period to the annual program



Fig. 63. Browsing through / deleting an annual program

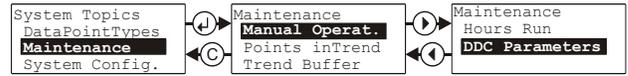


Fig. 64. Displaying parameters

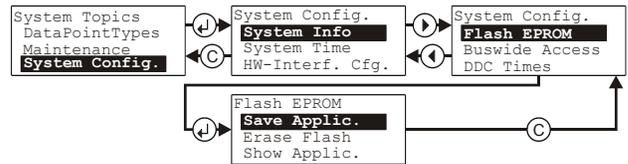


Fig. 65. Saving/erasing/showing the Flash EPROM

**NOTE:** Always delete the flash EPROM first; only then may you save (burn) the application, after which you may show the application with today's date.

**NOTE:** You save (burn) an application into the flash EPROM only while the PANTHER controller is in the "run" state.

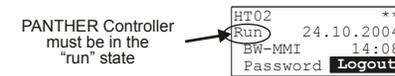


Fig. 66. Saving (burning) an application

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