

DESIGO™ PX

Automation stations, compact model

PXC...D

PXC12.D	PXC12-T.D	PXC12-E.D
PXC22.D	PXC22-T.D	PXC22-E.D
PXC36.D	PXC36-T.D	PXC36-E.D

- Freely programmable compact automation stations for HVAC and building services.
- Native BACnet automation stations with communication via
 - BACnet over Ethernet / IP
 - BACnet over LONTALK
 - BACnet PTP (point to point)
- BTL label (BACnet communication passed the BTL test)
- PPC processor for high performance and reliable operation
- Comprehensive management and system functions (alarm management, time scheduling, trends, remote management, access protection etc.)
- 12, 22, or 36 physical inputs / outputs per automation station
- For stand-alone applications or for use within a device or system network
- Supports the following methods of operation:
 - QAX... room units
 - Local or network-compatible operator units
 - system or web operation via system network

Functions

These freely programmable automation stations provide the infrastructure for the provision and processing of system-specific and application-specific functions. Apart from the freely programmable control functions these units comprise integrated convenient management functions such as:

- Alarm management with alarm routing throughout the whole network. Three level alarm management (simple, basic and enhanced) with safety control transmission and automatic transmission monitoring
- Time schedulers
- Trend functions
- Remote management functions
- Access protection for the whole network with individually defined user profiles and categories

I/O points

In addition to building and system management functions, the automation stations provide control of

- PXC12....D: 12 inputs / outputs,
- PXC22....D: 22 inputs / outputs,
- PXC36....D: 36 inputs / outputs.

Programming language

The automation stations are freely programmable with the D-MAP programming language (follows closely CEN Standard 1131). All function blocks available in libraries are graphically linked with the plant operating programs.

Communication

Communication is via Ethernet with the international standard BACnet protocol. Both peer-to-peer communications with other automation stations and connections to the PXM20 operator units are supported.

Operation

There are various options for operation of the PXC....D automation stations:

- **QAX... room unit** connected to the PPS2 interface. A **maximum** of five room units QAX... (not QAX5...) can be connected. Details on the PPS2 communication are described in the DESIGO Technical principles manual (chapter "I/O blocks", section "PPS2 addressing").
- **Local PXM10 operator unit *)**, connected via PXA-C1 cable
- The **PXM20 operator unit *)** connected via PXA-C1 cable, can be used either locally or decentralized for all plant connected together in one BACnet / LONTALK network

Note *) In the case of a PXC....D or PXC...-T.D automation station, one PXM10 and one PXM20 operator unit may be connected, but not twice the same type.

- The **PXM20-E operator unit** can be used either locally or decentralized for all plant connected together in one BACnet / IP network (connect via a hub / switch)

Types

Automation stations	PXC12.D 1) PXC12-T.D 2) PXC12-E.D 3)	PXC22.D 1) PXC22-T.D 2) PXC22-E.D 3)	PXC36.D 1) PXC36-T.D 2) PXC36-E.D 3)
Total number of inputs / outputs	12	22	36
Number of universal inputs (UI)	4	12	18
Number of digital inputs (DI)	2	-	4
Number of analog outputs (AO)	4	4	6
Number of relay outputs (DO)	2	6	8

1) Communications BACnet / LONTALK

2) Communications BACnet / LONTALK and BACnet / PTP (point to point) (*from V2.37*)

3) Communications BACnet / IP

Accessories

	Types
Connecting cable between PXM10 or PXM20 operator unit and automation station	PXA-C1
Adapter for firmware download	PXA-C2
Adapter cable USB to RS232 for modems (<i>from V2.37</i>)	PXA-C3

Technology

Inputs

The **universal inputs** accept the following signal types:

- Passive sensors LG-Ni 1000, Ni 1000, Pt 1000, T1
- Active sensors 0 ... 10 V
- Binary inputs Volt-free
- Counters Volt-free up to 20 Hz (DC 24 V)

The **digital inputs** (DI) accept volt-free contacts:

Outputs

On the one hand, universal outputs (AO) can control modulating actuators and, on the other hand, can be programmed via the program structure for binary switching functions.

- Analogue 0 ... 10 V
- Binary 0 or DC24 V, max. 22 mA

The relay outputs (DO) are designed for max. AC 250 V, 2 A.

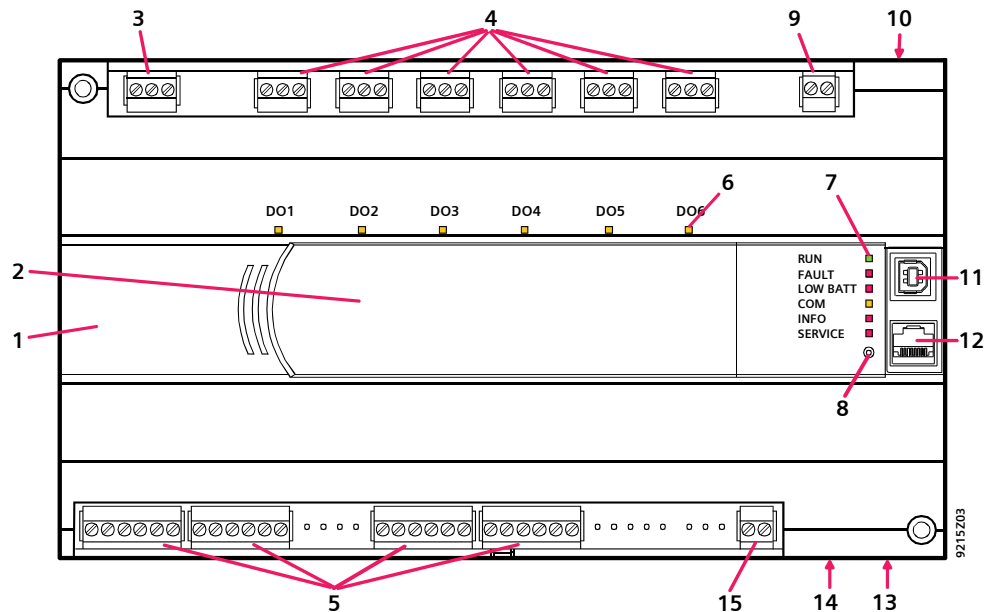
Power Supply

The power supply provides regulated power to the inputs / outputs and active sensors. It is internal to the automation station housing, simplifying installation and troubleshooting.

The power supply works with the processor to ensure smooth power up and power down sequences for the equipment controlled by the I/O points, even through brownout conditions.

Brownout protection and power recovery circuitry protect the automation station from power fluctuations.

The compact construction enables the automation stations to be used in highly confined spaces and makes them especially suitable for compact control panels or technical equipment with integrated control panels.



1	Plastic housing
2	Front cover
3	Plug-in screw terminal block (operating voltage)
4	Plug-in screw terminal block (relays)
5	Plug-in screw terminal block (inputs, outputs)
6	LED indicators for relay outputs
7	LED indicators for device and system status
8	Service pin (Network identification)
9	Plug-in screw terminal block (LONWORKS bus, PXC... D and PXC...- T.D only)
10	Network interface RJ45 (BACnet / IP, PXC...- E.D only)
11	USB device interface (for future use)
12	RJ45 Interface for operator unit and tool (RJ45, PXC... D and PXC...- T.D only)
13	RJ45 interface for operator unit
14	USB host interface (modem, PXC...- T.D only)
15	Plug-in screw terminal block (room units)

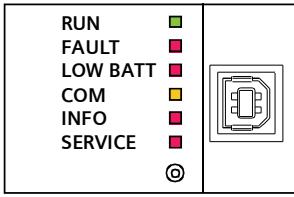
Terminal blocks

The terminal blocks are removable for easy termination of field wiring.

LED indicators

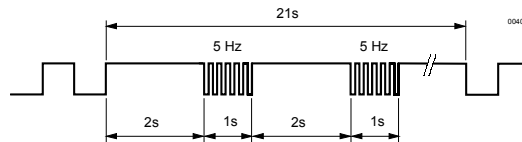
Each **relay output** has a yellow status LED

The **other LEDs** have the follow meanings:



LED	Color	Activity	Function
RUN	Green	Continuously off Continuously on	No supply Supply OK
FAULT	Red	Continuously off Continuously on Quick flashes	OK Fault Missing / Corrupt Firmware
LOW BATT	Red	Continuously off Continuously on	Battery ok Battery low - replace
COMM	Yellow	Continuously off Continuously on Flashing	No Link to Hub Link to Hub Communication
INFO	Red		Freely programmable
SERVICE (Ethernet)	Red	Continuously off Continuously on Flashing Flashing acc. to wink command pattern *)	OK No Link to Hub No IP Address configured Physical identification of automation station after receiving wink command
SERVICE (LONWORKS bus)	Red	Continuously off Continuously on Flashing Flashing acc. to wink command pattern *)	LONWORKS node is configured LONWORKS chip defective or service key was pressed again LONWORKS node is not configured Physical identification of automation station after receiving wink command

*) Wink command rhythm pattern:



Service pin

Identification of the automation station in the IP network or LONWORKS network: see "Commissioning".

Disposal



The unit contains electric and electronic components and must not be disposed of with domestic waste. Lithium battery, printed circuit board and housing must be disposed of separately.

The local and actual regulations must be observed.

Mounting instructions

The automation stations can be snap-mounted on DIN rails or directly screwed to a mounting plate or a building wall.

The connections for field devices and power supply are via plug-in screw terminals. The other interfaces are quick connecting jacks.

Commissioning

In order to prevent equipment damage and/or personal injuries always follow local safety regulations and the required safety standards.

Loading plant operating program

Download the plant operating program to the automation station with the PX Design tool in the DESIGO TOOLSET, locally via the RJ45 interface of the AS or via the Network (BACnet/IP or BACnet/LonTalk).

Setting parameters and configurations

Use the PX Design tool in the DESIGO TOOLSET for setting the control parameters and the configuration data.

Data visible in the network can also be changed with a PXM20 / PXM20-E operator unit (BACnet / LonTalk or BACnet / IP).

Certain data can also be changed with a PXM10 operator unit.

Wiring test

It is possible to test field devices and the wiring as soon as the power supply is connected, without first downloading the plant operating program.

- BACnet / LonTalk for PXC...D and PXC...T.D: with PXM20 operator unit.
- BACnet / IP for PXC...E.D: with PXM20-E operator unit.

Prerequisite: PX and PXM20-E are on Default-IP and alone in the IP segment.

Network connection

The network addresses are configured with the DESIGO TOOLSET. In order to provide a unique identification in the network (BACnet/IP or BACnet/LonTalk), press the **service pin** with a thin, long instrument or send a wink command to the relevant automation station (service LED flashes).

Force Firmware Download

- **Variant via V24:**

If the **Force Firmware Download key** is pressed during a restart (reset) the current D-MAP program is deleted from the FLASH. The automation station waits a short while for the signal to activate the FWLoader and then starts the automation station.

- **Variant via IP:** (for PXC...E.D, faster than via V24)

Press the **Force Firmware Download key** for 5 s (without touching the reset pin).

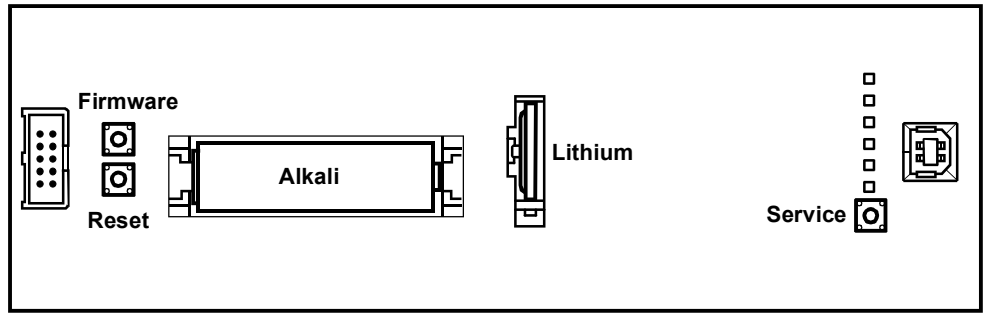
Prerequisite: the automation station has made a node setup and no application is loaded, or it has been removed previously by "clear/ reset" in the CFC (communication settings remain intact).

Reset

Pressing the **reset key** forces a restart.

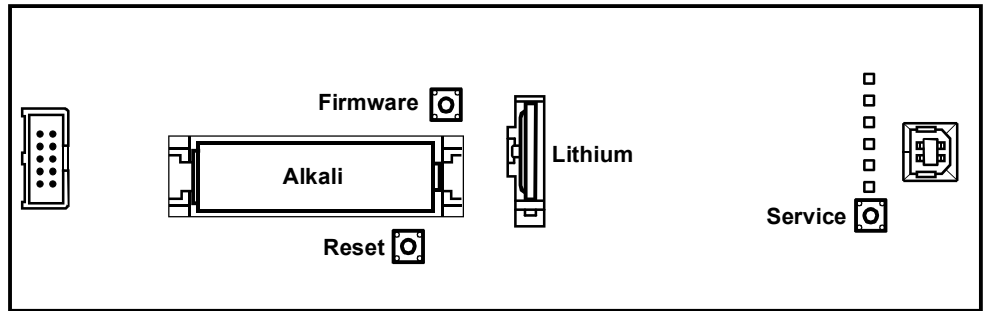
Positions of pins and batteries

PXC12-E.D und PXC22-E.D



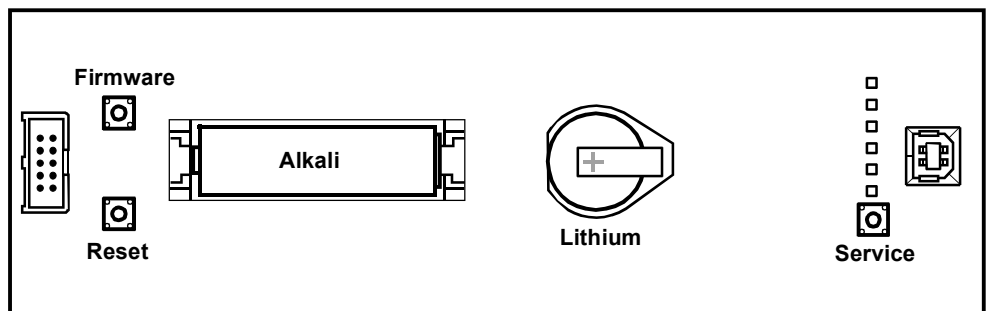
9215Z02

PXC12.D; PXC22.D; PXC12-T.D; PXC22-T.D



9215Z12

PXC36....D



9215Z05

Maintenance and service

Battery life

The **database** information stored in the **SDRAM memory** is battery-backed (**Alkaline AA Type**). This eliminates the need for time-consuming program and database re-entry in the event of an extended power failure (up to 1 month).

After the "Battery low" event there are several days of remaining life span under load. Alkaline batteries have a typical life span of 4 years without load.

The **real time clock** is backed by a **lithium battery** which has a life span of 10 years.

When one of the batteries needs to be replaced, the automation station illuminates a "battery low" status LED and automatically sends a system event.

The automation station can also send an alarm message to selected terminals.

Battery change

To change the batteries, remove the front cover. As long as there is an external power supply, the battery may be removed for unlimited time.



Caution!

To prevent hardware damage by electrostatic discharge (ESD), a wrist strap with earth cable must be used during the battery change.

Firmware upgrades

The firmware, including the operating system, is stored in non-volatile flash ROM memory. Flash ROM is easily upgradeable at the job site. This provides for ease of upgrade, as new firmware updates are made available.

Technical data

General device data

Operating voltage	AC 24 V ± 20%
Safety extra-low voltage SELV or Protection extra-low voltage PELV	HD 384
Operating frequency	50/60 Hz
Power Consumption	PXC12....D max.24 VA
(depending on field devices)	PXC22....D max.26 VA
	PXC36....D max.35 VA
Internal fuse	5 A

Operating data

Processor	PXC12/22....D	Motorola Power PC MPC852T
	PXC36....D	Motorola Power PC MPC885
Memory	PXC12/22....D	16MB SDRAM / 8MB FLASH (24MB total)
	PXC36....D	64MB SDRAM / 16MB FLASH (80MB total)
Accuracy class		0.5
Scan cycle		Max. 1 s
Data backup in case of power failure		
Battery Backup of SDRAM		1 month typical
1 x AA Alkaline (field replaceable)		(4 years without load)
Battery Backup of Realtime Clock		10 years
Lithium (field replaceable)		

Interface, room units	Interface type Supply class PPS2 baud rate	PPS2 4 4.8 kBit/s
Interfaces, communication	PXC...D, PXC...-T.D	PXC...-E.D
Building Level Network	LONWORKS FTT Transceiver (Screw terminals)	10 Base-T / 100 Base-TX IEEE802.3, Auto-sensing (RJ45)
Local Communication (HMI, Tool) (RJ45)	<ul style="list-style-type: none"> • PXM10 (RS-232) • PXM20 (BACnet/LonTalk) • Tool 	--
Local Communication (HMI) (RJ45)	<ul style="list-style-type: none"> • PXM10 (RS-232) • PXM20 (BACnet/LonTalk) 	• PXM10 (RS-232)
USB host interface (Modem)	(PXC...-T.D) – RS232 modem via USB-RS232- adapter cable (PXA-C3)	One PXM10 on RJ45
Universal inputs UI...	Configurable by software	
	A/D Resolution (analog in)	16 bits
	Measured value inputs	
	Range	0 ... 11.0 V
	Input resistance	100 k Ω against \perp
	Sensor inputs	
	Temperature sensors	
	LG-Ni 1000, NI 1000, Pt 1000, T1	Scaling range – 50 ... 150 °C
	Sensor current (continuous current)	Approx. 2.1 mA
	Resolution	0.2 K
	Measuring error at 25 °C (Ni 1000, PT 1000)	Max. 0.3 K (without cable and sensor)
	Measuring error at 25 °C (T1)	Max. 1.0 K (without cable and sensor)
	Signal inputs	
	Contact voltage	DC 20 ... 25 V
	Contact current	7 mA
	Contact transfer resistance	Max. 200 Ω (closed)
	Contact isolation resistance	Min. 50 k Ω (open)
	Counter inputs	
	Counting frequency (symmetric)	Max. 20 Hz
	<i>Counter inputs faster than 1 Hz must be shielded if they are routed in the same trunking as analog inputs for more than 10 m.</i>	
Binary inputs DI...	Contact voltage	DC 20 ... 25 V
	Contact current	10 mA
	Contact transfer resistance	Max. 200 Ω (closed)
	Contact isolation resistance	Min. 50 k Ω (open)
Analog outputs AO...	Configurable by software	
	D/A Resolution (analog out)	10 bits
	Proportional outputs	
	Output voltage range	0 ... 11.0 V
	Output current	Max. 4 mA source, max. 1.5 mA sink
	Binary outputs (for off-board relays)	
	Output voltage range	0 / DC 24 V
	Load	\geq 1000 Ω

△ Relay outputs DO... *

Relay type	single pole, change-over contact
Contact details for AC voltage	
Voltage range	Min. AC 10 V, max. AC 250 V
Current, resistive load	Max. AC 5 A
Current, inductive load	2 A
Switching current	Min. 10 mA, max. 20 A
Contact details for DC voltage	
Voltage range	Min. DC 5 V, max. DC 250 V
Switching current	Min. 100 mA at DC 5 V
Switching load	Max. 20 W

* The relay outputs are safely isolated from each other, from earth/cover and the remaining electronics (AC 24 V) in accordance with SELV and PELV specifications. The relay outputs can be used in mixing applications with AC 250 V and SELV / PELV circuits.

Plug-in screw terminal

Power supply and signals	Stranded or solid conductors, 0.25 ... 2.5 mm ² or 2 x 1.5 mm ²
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Single cable lengths and cable types

Universal inputs UI...	Max. 100m where A = 1 mm ²
Binary inputs DI...	Max. 100 m with diameters ≥ 0.6 mm
Universal outputs AO...	Max. 100m where A ≥ 1.5 mm ²
Relay outputs DO...	Depends on load and local regulations
Interface, room unit	Max. 125 m where A = 1.0 mm ²
Cable type	2-core, twisted pair, unshielded
Capacitance per unit length	Max. 56 nF/km
Connecting cable Ethernet and PXM20-E	Max. 100 m
Cable type	Standard at least CAT5 UTP (Unshielded Twisted Pair) or STP (Shielded Twisted Pair)
Connecting cable LONWORKS bus	See installation manual CA110396
Cable type	ConCab or CAT5
Connecting cable PXM10	Max. 3 m

Housing protection standard
Protection class

Protection standard to EN 60529	IP 20
Insulation protection class	II

Ambient conditions

Operation	To IEC 69721-3-3
Climatic conditions	Class 3K5
Temperature	0 ... 50 °C
Humidity	5 ... 95 % rh (no condensation)
Mechanical conditions	Class 3M2
Transport	To IEC 69721-3-2
Climatic conditions	Class 2K3
Temperature	-25 ... +70 °C
Humidity	5 ... 95 % rh (no condensation)
Mechanical conditions	Class 2M2

Standards, directives
and approbations

Product safety	
Automatic electronic controls for household and similar use	EN 60730-1
Electromagnetic compatibility	
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Meets requirements for CE marking:	
Electromagnetic compatibility	89/336/EEC
Low Voltage Directive	2006/95/EEC
UL-Approbation (UL 916)	PAZX7
Federal Communications Commission (US)	FCC CFR 47 Part 15 Class B
C-Tick conformity to Australian EMC Framework	Radio Communications Act 1992
Radio Emission Standard	AS/NZS 2064

Dimensions
Weight

See "Dimensions"

Type	without packaging	with packaging
PXC12....D	750	830
PXC22.... D	754	834
PXC36.... D	1080	1180

Connection terminals

PXC12.D, PXC12-T.D



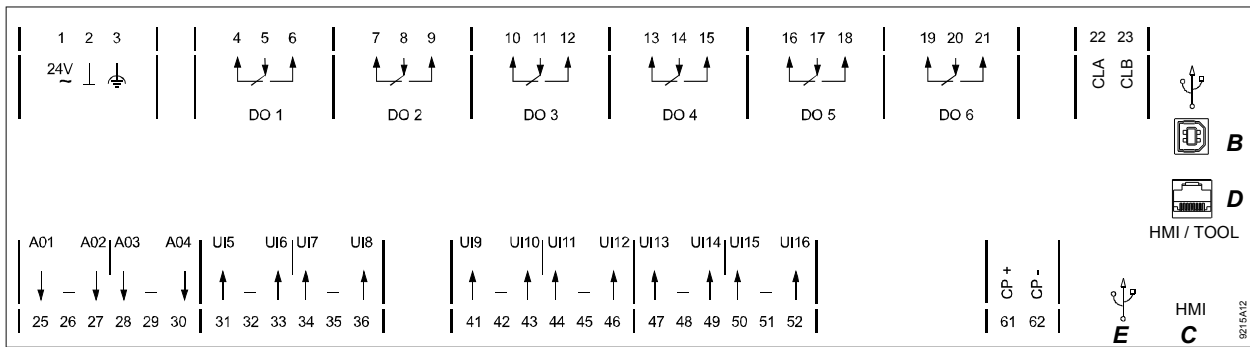
1, 2	24 V ~, ⊥	Operating voltage AC 24 V	
3		Functional earth	CFC IOAddr
4 ... 9	DO1, DO2	2 Digital outputs (Relays)	DO1: C=5.1
22, 23	CLA, CLB	LonWorks-Bus	
25 ... 30	AO1 ... AO4	4 Analog outputs	AO1: C=4.1
31 ... 36	UI5 ... UI8	4 Universal inputs	UI5: C=1.1
58 ... 60	DI1, DI2	2 Digital inputs	DI1: C=3.1
61, 62	CP+, CP-	PPS2 bus (for QAX... room units)	
B		USB Device interface (not supported)	
C	HMI	RJ45 socket for operator unit	
D	HMI / Tool	RJ45 socket for operator unit and tool	
E		USB Host interface (modem, PXC...-T.D only)	



Caution!

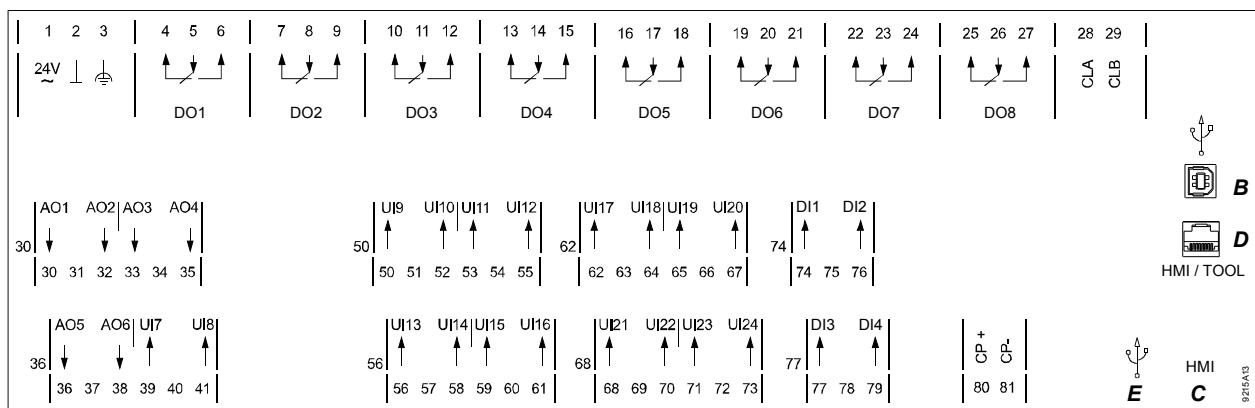
- Observe the technical data for the relay outputs.
- Local installation regulations must be observed.

PXC22.D, PXC22-T.D



1, 2	24 V ~, ⊥	Operating voltage AC 24 V	
3		Functional earth	CFC IOAddr
4 ... 21	DO1 ... DO6	6 Digital outputs (Relays)	DO1: C=5.1
22, 23	CLA, CLB	LonWorks-Bus	
25 ... 30	AO1 ... AO4	4 Analog outputs	AO1: C=4.1
31 ... 52	UI5 ... UI16	12 Universal inputs	UI5: C=1.1
61, 62	CP+, CP-	PPS2 bus (for QAX... room units)	
B		USB Device interface (not supported)	
C	HMI	RJ45 socket for operator unit	
D	HMI / Tool	RJ45 socket for operator unit and tool	
E		USB Host interface (modem, PXC...-T.D only)	

PXC36.D, PXC36-T.D



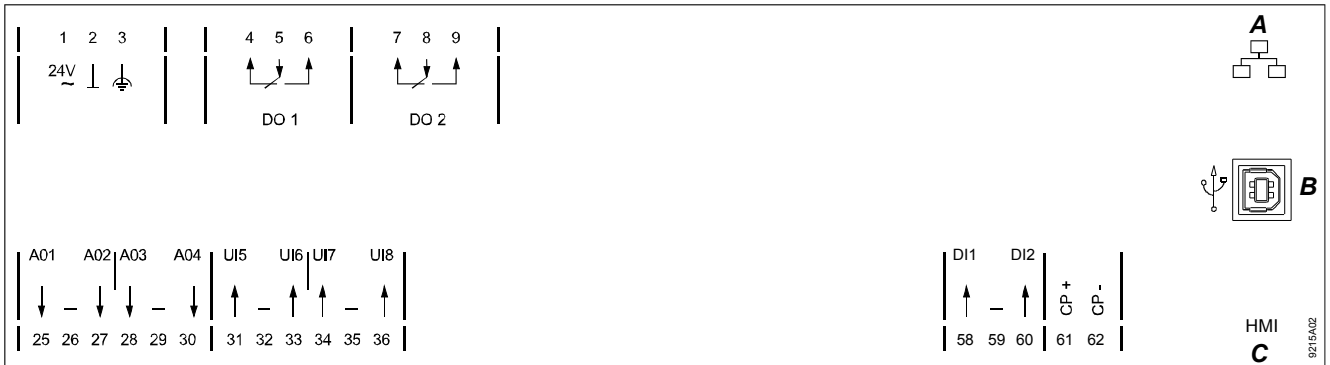
1, 2	24 V ~, ⊥	Operating voltage AC 24 V	
3		Functional earth	CFC IOAddr
4 ... 27	DO1 ... DO8	8 Digital outputs (Relays)	DO1: C=5.1
28, 29	CLA, CLB	LONWORKS bus	
30 ... 38	AO1 ... AO6	6 Analog outputs	AO1: C=4.1
39 ... 73	UI7 ... UI24	18 Universal inputs	UI7: C=1.1
74 ... 79	DI1 ... DI4	4 digital inputs	DI1: C=3.1
80, 81	CP+, CP-	PPS2 bus (for QAX... room units)	
B		USB Device interface (not supported)	
C	HMI	RJ45 socket for operator unit	
D	HMI / Tool	RJ45 socket for operator unit and tool	
E		USB Host interface (modem, PXC...-T.D only)	



Caution!

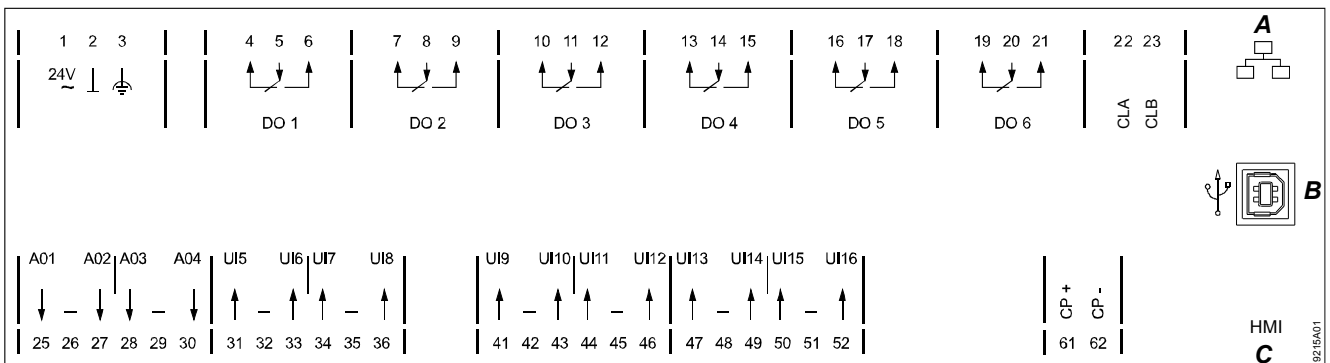
- Observe the technical data for the relay outputs.
- Local installation regulations must be observed.

PXC12-E.D



1, 2	24 V ~, ⊥	Operating voltage AC 24 V	
3		Functional earth	CFC IOAddr
4 ... 9	DO1, DO2	2 Digital outputs (Relays)	DO1: C=5.1
25 ... 30	AO1 ... AO4	4 Analog outputs	AO1: C=4.1
31 ... 36	UI5 ... UI8	4 Universal inputs	UI5: C=1.1
58 ... 60	DI1, DI2	2 Digital inputs	DI1: C=3.1
61, 62	CP+, CP-	PPS2 bus (for QAX... room units)	
A		Ethernet socket	
B		USB Device interface (not supported)	
C	HMI	RJ45 socket for operator unit	

PXC22-E.D



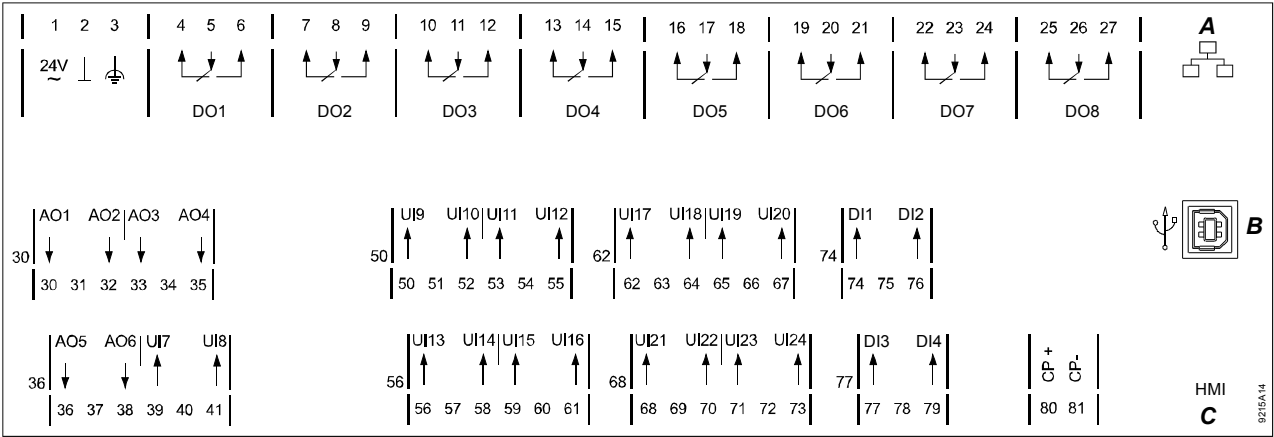
1, 2	24 V ~, ⊥	Operating voltage AC 24 V	
3		Functional earth	CFC IOAddr
4 ... 21	DO1 ... DO6	6 Digital outputs (Relays)	DO1: C=5.1
25 ... 30	AO1 ... AO4	4 Analog outputs	AO1: C=4.1
31 ... 52	UI5 ... UI16	12 Universal inputs	UI5: C=1.1
61, 62	CP+, CP-	PPS2 bus (for QAX... room units)	
A		Ethernet socket	
B		USB Device interface (not supported)	
C	HMI	RJ45 socket for operator unit	



Caution!

- Observe the technical data for the relay outputs.
- Local installation regulations must be observed.

PXC36-E.D



1, 2	24 V ~, ⊥	Operating voltage AC 24 V	
3		Functional earth	CFC IOAddr
4 ... 27	DO1 ... DO8	8 Digital outputs (Relays)	DO1: C=5.1
30 ... 38	AO1 ... AO6	6 Analog outputs	AO1: C=4.1
39 ... 73	UI7 ... UI24	18 Universal inputs	UI7: C=1.1
74 ... 79	DI1 ... DI4	4 Digitale Eingänge	DI1: C=3.1
80, 81	CP+, CP-	PPS2 bus (for QAX... room units)	
A		Ethernet socket	
B		USB Device interface (not supported)	
C	HMI	RJ45 socket for operator unit	



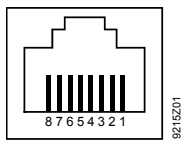
Caution!

- **Observe the technical data for the relay outputs.**
- **Local installation regulations must be observed.**

Pin layout

Tool socket "HMI" (Ethernet)

Automation stations for **BACnet / IP**



Pin Description

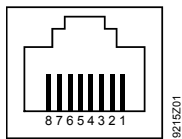
1. Unoccupied
2. Unoccupied
3. G0, GND
4. G/Plus

Pin Description

5. Unoccupied
6. Hot-wired to Pin 8
7. COM1/TxD
8. COM1/RxD

Tool socket "HMI" (LONWORKS)

Automation stations for **BACnet / LonTalk**



Pin Description

1. LONWORKS Data A (CLA)
2. LONWORKS Data B (CLB)
3. G0 / GND
4. G / Plus

Pin Description

5. Unoccupied
6. Hot-wired to Pin 8
7. COM1 / TxD
8. COM1 / RxD

Connecting the field devices



Note!

In the automation stations described in this data sheet, system neutral (G0) and measuring ground (–) are NOT CONNECTED.

For active 4-wire field devices, this connection is made in the device.

For active 3-wire field devices, you have to make an additional connection:

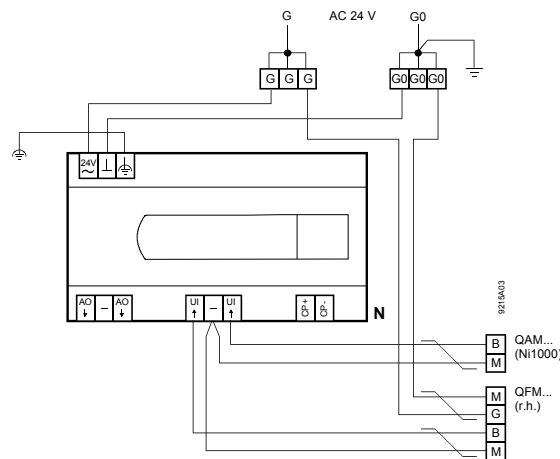
- ① either on the terminals of the field device
- ② or between one of the (–) terminals of the automation station and G0 (in existing plants where there are only 3 conductors installed).

Field device supply voltage from system transformer

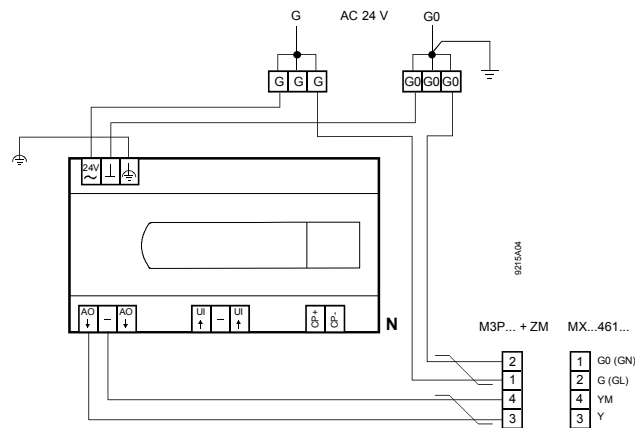
Counter inputs

Counter inputs faster than 1 Hz must be shielded if they are routed in the same trunking as analog inputs for more than 10 m.

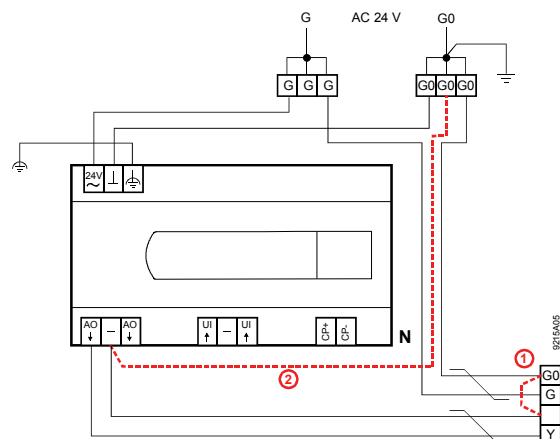
Passive sensors
(e.g. QAM... , Ni 1000)
Active sensors
(e.g. QFM... , humidity)



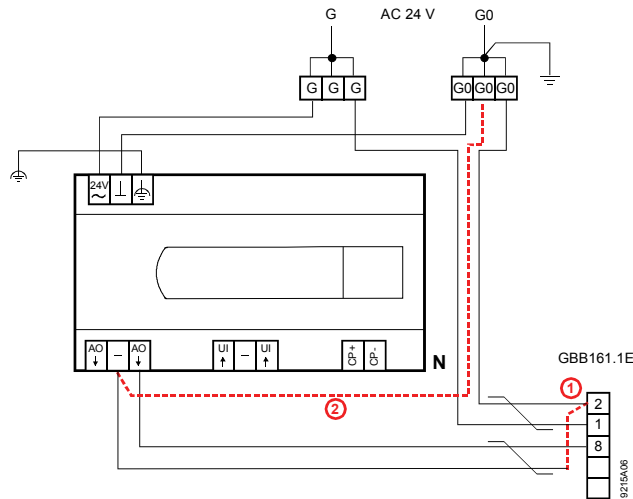
Magnetic valves
(e.g. M3P... + ZM
or MX...461...)



Motorized valves

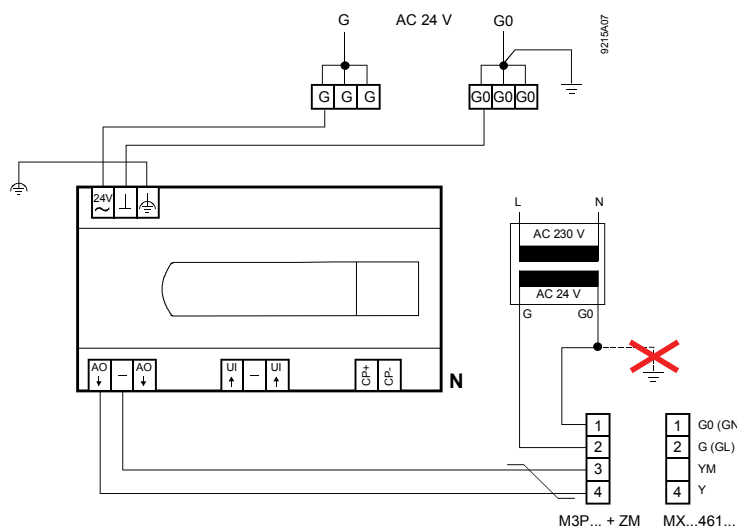


Damper actuators
(e.g. GBB161.1E)



Field device supply from separate transformer

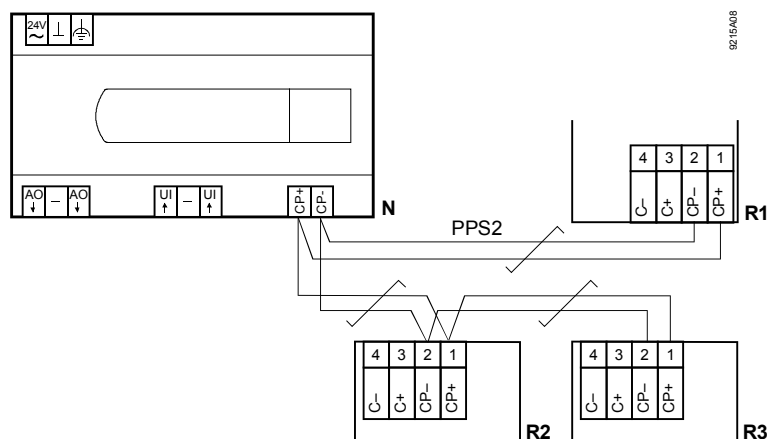
Magnetic valves
(e.g. M3P... + ZM
or MX...461...)



STOP Note!
Do NOT earth
the local
transformer

Connecting the room units

- N Automation station
- R... Max. 5 room units (parallel)
- PPS2
 - Twisted pair bus cable
 - Reversible polarity
 - Cable length, see "Technical data"

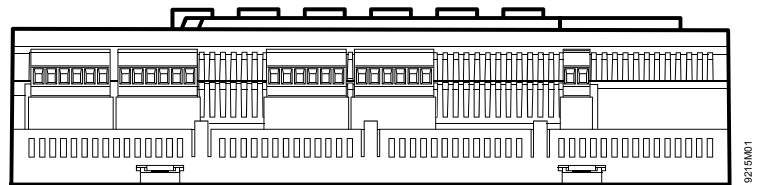
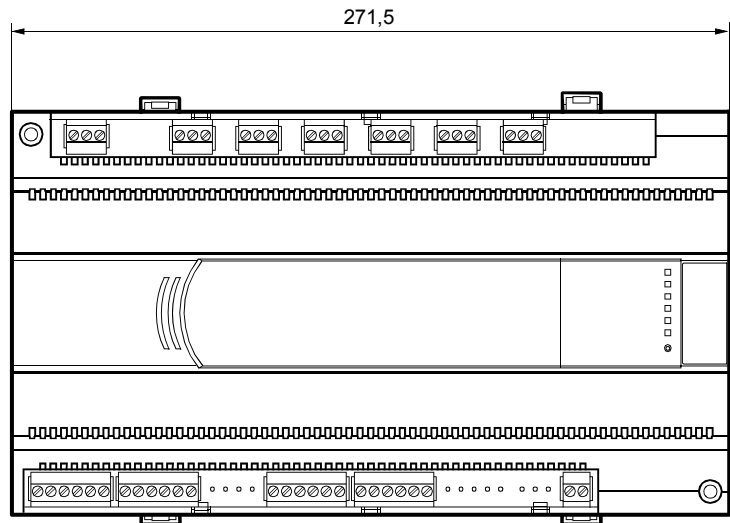
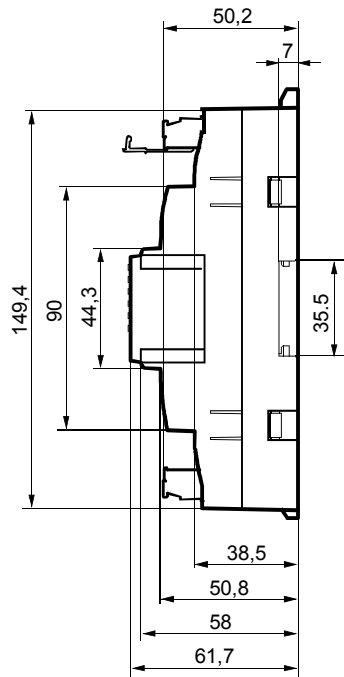


- Notes
- The room units are connected in parallel (max. five devices).
 - To distinguish between them, they must be addressed by use of jumpers (address plug on the printed circuit board). The factory-setting is Address 1.

Dimensions

All dimensions in mm

PXC12....D and PXC22....D



PXC36....D

