SIEMENS

8¹⁰⁰
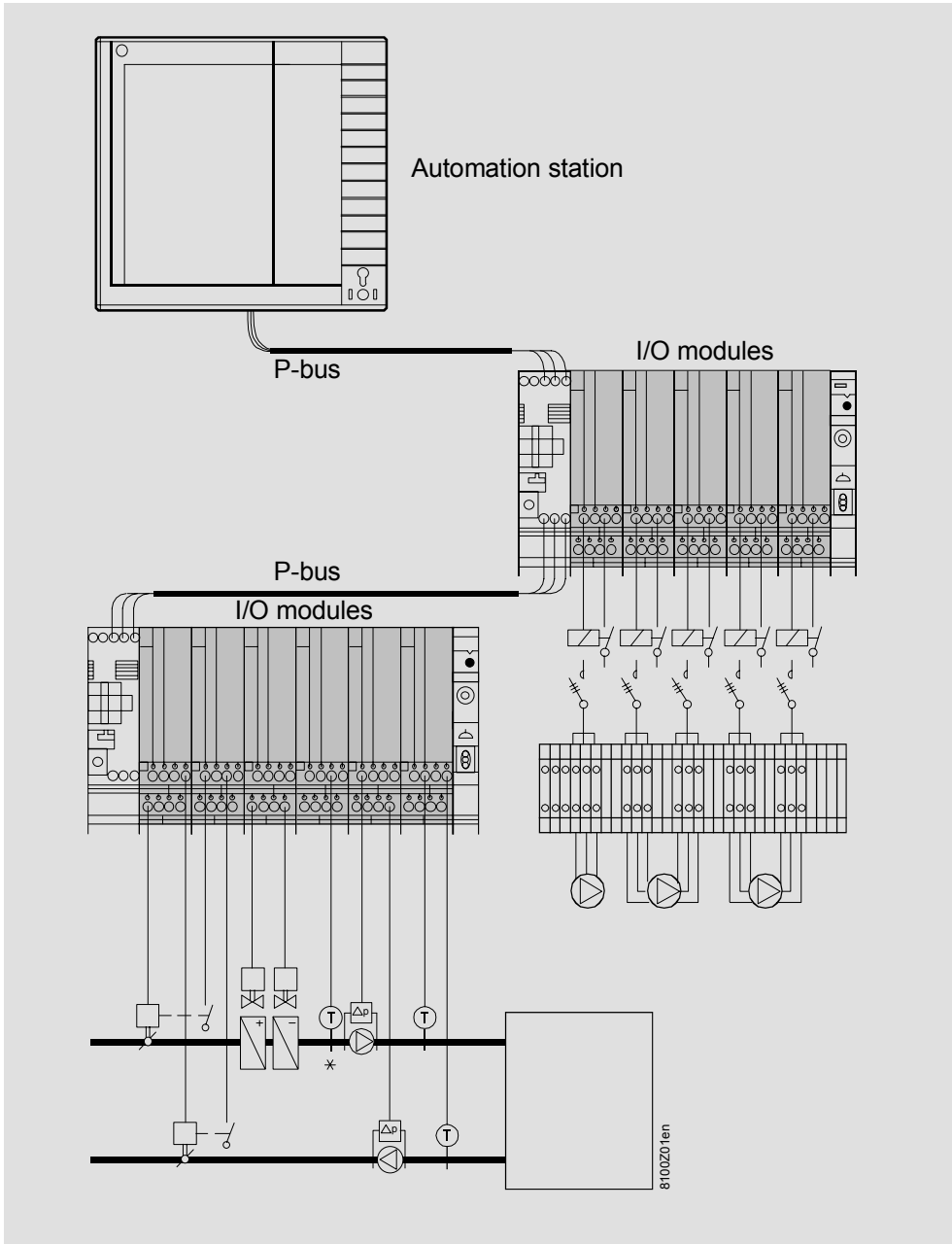
DESIGO™ I/O modules

I/O Module range

PTM...
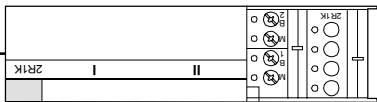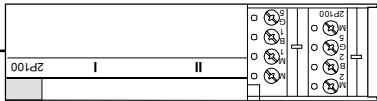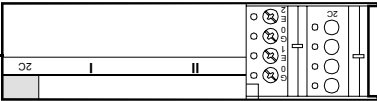
PTE…
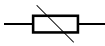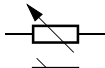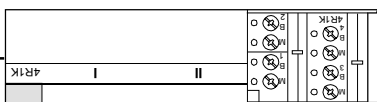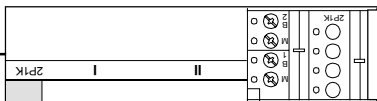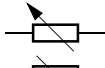
for P-bus connection; summary, functions and selection criteria

Siemens Building Technologies

Building Automation

Signalling

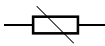| Basic function	SIGNALLING						
Signal source	voltage (yes/no)	voltage (yes/no)	status contact (open/closed)	status contact (open/closed)	status contact (open/closed)	status contact (open/closed)	status contact (open/closed)
Status signal	mains voltage	low voltage	potential-free	potential-free	potential-free	potential-free	potential-free
Type of signal	maintained	maintained	impulse	maintained	maintained	maintained	maintained
Status indication	voltage present	voltage present	open (E12, E22) closed (E14, E24)	contact open	without	contact closed	contact closed
Number of inputs	2	2	2	4	8	4	2
Module type PTM1. …	2D250	2D42	2D20S	4D20R	8D20E	4D20	2D20
Data sheet	8118	8117	8114	8112	8113	8112	8111

8100Z02E

AC 0V/250 V max.

AC 0V/24 V max.

Input modules   Measuring & Counting

COUNTING

Basic function		Signal source	Counting frequency	Number of inputs	Module type PTM1. …	Data sheet
COUNTING		potential-free contact	25 Hz max.	2	2C	8136

8100Z04E

MEASURING

Basic function	Measuring signal	Measuring variable	Measuring detectors and measuring ranges	Number of inputs	Module type PTM1. …	Data sheet	
MEASURING	active	current	DC 4…20 mA	2	2I420	8129	DC 4…20 mA
			DC 0…25 mA	2	2I25	8129	DC 0…25 mA
		voltage	DC 0…10 V	2	2U10	8127	DC 0…10 V
	passive	temperature and resistance	Pt1000 (up to 400 °C) Ni1000 (up to 150 °C) or 0…2500Ω	2	2P1K	8123	
			Pt100 (up to 400 °C) Ni100 (up to 150 °C) or 0…250Ω	2	2P100	8123	
		temperature	LG-Ni 1000 -50…+150°C	4	4R1K	8121	
				2	2R1K	8121	

8100Z03E

Measuring ranges can be selected with shunts
Supplied with shunt for 20 mA

Output modules — Switching

Basic function	Manual operation	Type of load	Steps per output	Checkback signal	Switching command	Type of relay	Potential-free	Number of outputs	Module type PTM1....	Data sheet
SWITCHING	with	coupled load stages	2 to 3	without	impulse	monostable	yes	1	4Q250-P3	8157
SWITCHING	with	coupled load stages	2 to 3	without	maintained	monostable	optional	1	3Q-M3	8149
SWITCHING	with	coupled load stages	2	with	maintained	monostable	no	1/1	4QD-M2	8146
SWITCHING	with	independent load stages	1	with	maintained	monostable	no	1/1	2QD-M	8146
SWITCHING	with	independent load stages	1	without	impulse	monostable	yes	4	4Q250A-P	8156
SWITCHING	with	independent load stages	1	without	impulse	monostable	yes	2	4Q250-P	8155
SWITCHING	with	independent load stages	1	without	maintained	monostable	yes	2	2Q250-M	8141
SWITCHING	without	independent load stages	1	with	maintained	monostable	no	2/2	4QD	8143
SWITCHING	without	independent load stages	1	with	maintained	monostable	no	1/1	2QD	8143
SWITCHING	without	independent load stages	1	without	maintained	bistable	yes	2	2Q250B	8159
SWITCHING	without	independent load stages	1	without	maintained	monostable	yes	2	2Q250	8141

Notes:
- 3Q-M3: No link: potential-free contacts
- 4QD-M2: Cannot be used with controller type PRV1...
- 2Q250-M, 2Q250B, 2Q250: AC 24...250 V

8100Z05E

4/14

Basic function — POSITIONING

Form of energy	Manual operation	Position output	Positioning signal	Number of outputs	Module type PTM1. …	Data sheet
pneumatic	with	modulating	0...138kPa (0...1.4bar)	1	PTM6.1PSI20-M	8167
electrical	with	three-position	AC 24...250 V	2	2Y250T-M	8171
electrical	with	modulating	DC 0...10 V	2	2Y10S-M	8162
electrical	without		AC 24...250 V	2	2Y250T	8171
electrical	without	modulating	DC 4...20 mA	2	2Y420	8164
electrical	without	modulating	DC 0...10 V	4	4Y10S	8162
electrical	without	modulating	DC 0...10 V	2	2Y10S	8162

8100Z06E

Can only be used with PRV... process units

0...138kPa (0...1.4bar)

No link: potential-free contacts — AC 24...250 V

DC 0...10 V

No link: potential-free contacts — AC 24...250 V

DC 4...20 mA

DC 0...10 V

DC 0...10 V

Basic Function	Signal Variables and Range	Signal Types and Functions	LED Display	Manual Operation	I/O Points	Channels or Data Points	Load Units at 12.5 mA	VA, Op.Voltage AC 24 V	Type ASN No.	From DESIGO Version	From UNIGYR FB Version	From VISONIK Version [1]	SIMATIC S7
Signalling	Potential-free maintained contact	Make contact	•		2	2	2		PTM1.2D20	2.x	3.3	2.x	X
		Make contact	•		4	4	1	3	PTM1.4D20	2.x	3.3	4.x	X
		Break contact	•		4	4	1	3	PTM1.4D20R	2.x	3.3	4.x	x
		Make contact			8	8	1	4	PTM1.8D20E	2.x	6	12.20	X
	Potential-free impulse contact	Make contact / break contact	•		2	2	2	2.5	PTM1.2D20S	2.x	3.3	2.x	---
	AC 24 V / DC 42 V	Extra-low voltage	•		2	2	2		PTM1.2D42	2.x	3.3	2.x	X
	AC 250 V / DC 100 V	Voltage	•		2	2	2		PTM1.2D250	2.x	3.3	2.x	X
Measuring	LG-Ni 1000	Temperature, passive			2	2	1		PTM1.2R1K	2.x	3.3	2.x	x
	LG-Ni 1000	Temperature, passive			4	4	1		PTM1.4R1K	2.x	5	12.20	x
	0 ... 250 Ohm / Pt100 / Ni100	Resistance, passive			2	2	2		PTM1.2P100	2.x	3.3	2.x	x
	0 ... 2500 Ohm / Pt1000 / Ni1000	Resistance, passive			2	2	2		PTM1.2P1K	2.x	3.3	2.x	x
	DC 0 ... 10 V	Voltage measurement			2	2	1	0.1	PTM1.2U10	2.x	3.3	2.x	x
	DC 0 ... max. 25 mA	Current measurement			2	2	1	0.5	PTM1.2I25/020	2.x	3.3	2.x	x
	DC 4 ... 20 mA (fix)	Current measurement			2	2	1	0.5	PTM1.2I420	2.x	3.3	2.x	x
Counting	Potential-free (max. 25 Hz)	Counting value impulse			2	2	2		PTM1.2C	2.x	3.3	2.x	---
Switching	Potential-free maintained contact	Single stage	•		2	2	2		PTM1.2Q250	2.x	3.3	2.x	x
		Single stage (bi-stable)	•		2	2	2	1.5	PTM1.2Q250B	2.x	3.3	2.x	---
		Single stage	•	•	2	2	2	2.0	PTM1.2Q250-M	2.x	3.3	2.x	x
	Non-floating maintained contact	Single stage with feedback	•		2	1	2		PTM1.2QD	2.x	3.3	2.x	x
		Single stage with feedback	•		4	2	4		PTM1.4QD	2.x	3.3	2.x	x
		Single stage with feedback	•	•	2	1	2	1.0	PTM1.2QD-M	2.x	3.3	2.x	x
		Two-stage with feedback	•	•	4	1	2	1.0	PTM1.4QD-M2	2.x	3.3	12.x	x
		Three-stage	•	•	3	1	2	2.0	PTM1.3Q-M3	2.x	3.3	2.x	x
	Potential-free impulse contact	Single stage		•	4	2	2	2.0	PTM1.4Q250-P	2.x	3.3	2.x	---
		Single stage		•	4	2	2	2.0	PTM1.4Q250A-P	2.x	7	14.12	---
		Three-stage		•	4	1	1	1.0	PTM1.4Q250-P3	2.x	3.3	2.x	---
Positioning	DC 0 ... 10 V (modulating)	Positioning signal	•		2	2	1	3.0	PTM1.2Y10S	2.x	3.3	2.x	x
		Positioning signal	•		4	4	1	3.0	PTM1.4Y10S	2.x	4.5	12.x	x
		Positioning signal	•	•	2	2	1	3.0	PTM1.2Y10S-M	2.x	3.3	2.x	x
	DC 4 ... 20 mA (modulating)	Positioning signal	•		2	2	1	3.0	PTM1.2Y420	2.x	3.3	2.x	x
	AC 24 ... 250 V (three-position)	Positioning signal	•		2	1	2		PTM1.2Y250T	2.x	3.3	4.x	x
		Positioning signal	•	•	2	1	2	1.0	PTM1.2Y250T-M	2.x	3.3	4.x	x
	Pneumatic (0 ... 138 kPa)	Positioning signal	•	•	1	1	2	3.0	PTM6.1PSI20-M	2.x	none	6.x	---
Compact units	12 ML / 4 MW (LG-Ni 1000) /	I/O compact	• [2]		30	6	13	12	PTK1.30V01	2.x	4.5	none	---
	8 MW (LG-Ni 1000) /	I/O compact	• [2]		23	7	17	0.1	PTK1.23V02	2.x	4.5	none	---
Interface modules	GRUNDFOS 2 pumps	2 x 2Y10 / 6 x 2R1K [3]	•		16	8 x 2	8	3,0	PTM52.16V01	—	5	6.x	x
	GRUNDFOS 4 pumps	2 x 4DOS / 2 x 4DIS 4 x 4AIS [3]	•		32	8 x 4	8	3,0	PTM52.32V01	2.x	5	none	---
	WILO 2 single / 1 twin pump	2 x 2Y10 / 6 x 2R1K [3]	•		16	8 x 2	8	3,0	PTM50.16V01	—	5	6.x	x
	WILO 4 single / 2 twin pumps	2 x 4DOS / 2 x 4DIS 4 x 4AIS [3]	•		32	8 x 4	8	3,0	PTM50.32V01	2.x	5	none	---
	M-bus 6 M-bus meters	2 x 4AOS / 6 x 4DIS 6 x 4AIS [3]	•		56	14 x 4	4	3,0	PTE-MBUS.60	2.x	7	none	---
	ALBATROS, SIGMAGYR 1 heating controller	8 x 2Y10 / 8 x 2R1K [3]	•		32	16 x 2	15	3,0	PTM59.20V01	—	6	14.12	---
	MICRO- und MIDIMASTER 2 VSD frequency converters	2 x 2Y10 / 7 x 2R1K 2 x 2Q250 [3]	•		22	11 x 2	13	3,0	PTE-ASED.20	—	7	14.12	---
	SED2 4 VSD frequency converters	2 x 4DOS / 2 x 4AOS 5 x 4DIS / 5 x 4AIS [3]	•		56	14 x 4	4	3,0	PTE-SED2	2.x	7	none	---
Integration	Hardware for custom-made integration solutions	Applications with up to 60 data points can be programmed	•		60			3,0	PTM1.RS232	2.x	5	6.x	---
	Hardware for custom-made integration solutions	Applications with up to 60 data points can be programmed	•		60			3,0	PTM1.RS485	2.x	5	6.x	---
Signalling /	Remote signalling and operation	24 msgs / 12 op.points	•	•	36	12	4		PHM1.36TL	—	5	none	---

[1] V 2.x/V 4.x/V 6.x = PRV1 versions; V 12 and V 14 = BPS versions   [2] only switching and positioning outputs   [3] Represented in the system by

Use

Principally, the I/O-modules can be connected to all automation stations with P-bus, provided they support the associated I/O-functions in terms of software. More information on this issue is available in the function description and in the system tools of the building automation and control system.

Diagrams

Remarks

To complement the summary of I/O modules, the following pages give an overview of the diagrams contained in the various data sheets. Please note:
- The diagrams shown are combinations of internal diagrams and wiring diagrams:
  - The internal diagram inside the box contains the terminal markings and shows details that are important to understand the unit functions, e.g., operating elements and signal lamps, relay contacts, and voltages picked up from the I/O bar
  - The wiring diagram shows the respective unit with the devices that can be connected and the related wiring
- Legends relating to the various diagrams are given in the relevant data sheets.
- The circuitry of the I/O modules only shows the basic connection choices, but not plant- and application-specific actions and switching functions.
- Connection variants - if not shown here - are given in the respective data sheets.
- When doing planning work, make use of the data sheets on the I/O modules. These data sheets contain the requirements relevant to safety and the restrictions on use and wiring.
- For type code and terminal markings, refer to document Z8102, "I/O module system".
- Refer to the funtion description of the building automation and control system, for a detailed description of the relationship between I/O blocks, I/O modules, I/O channels, and I/O points.

Makeup of I/O module diagrams (e.g. PTM1.4QD switching module with checkback signal)
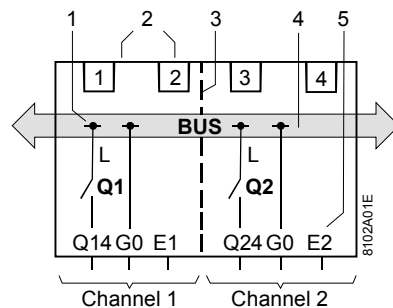
1   Contact on I/O bar for AC 24 V low voltage (G, G0) or mains voltage (L, N)

2   Consecutive numbering of the I/O points for a module.
    An I/O point is a signal input or output for a certain function (for example, the Q14 switching command and the associated E1 checkback signal represent two I/O points)

3   In the case of multiple modules, broken lines separate equal module functions in the same casing. There are double, quadruple and octouple modules, i.e., 2-, 4-, and up to 8-channel modules. The I/O channel (subaddress) is the smallest addressable unit.

4   The plug-in I/O modules are electrically connected to the I/O bar.

5   Connecting terminals for I/O points; several terminals depending on the input or output (e.g. three-position output).

Signalling modules

PTM1.2D20
PTM1.8D20E

PTM1.2D20 8111A01

PTM1.8D20E 8113A01

PTM1.4D20
PTM1.4D20R

PTM1.4D20 8111A02

PTM1.4D20R 8112A01

PTM1.2D20S

PTM1.2D20S 8114A01

PTM1.2D20S 8114A02
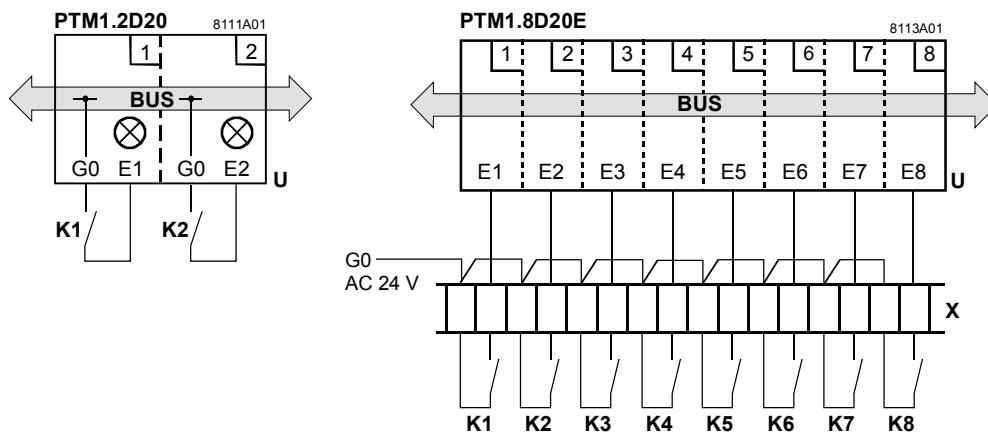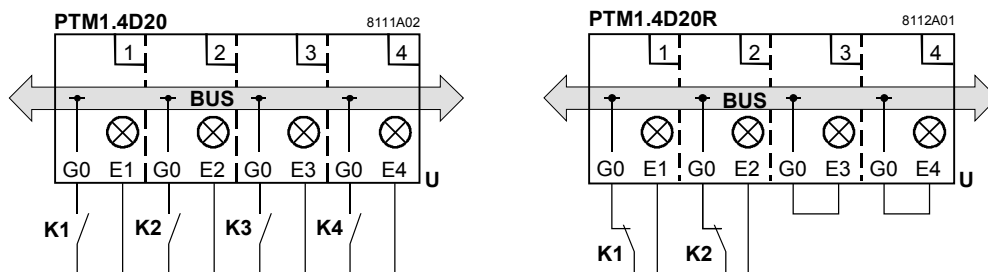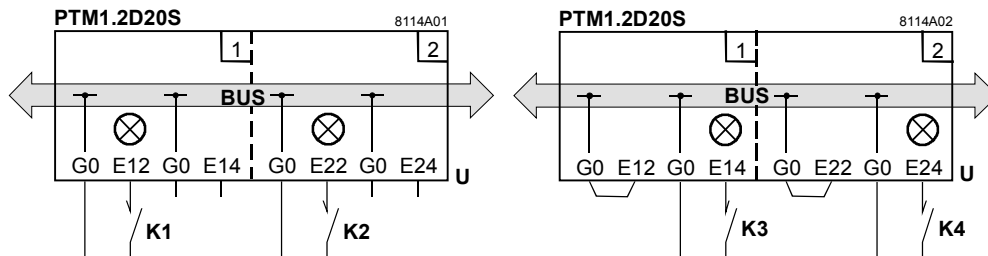
Connection of N.C. contacts

Connection of N:O. contacts

PTM1.2D42
PTM1.2D250

PTM1.2D42 8117A01

AC 24 V ±20 %
DC +10 V...42 V

PTM1.2D250 8118A01

AC 24...250 V
DC 24...100 V
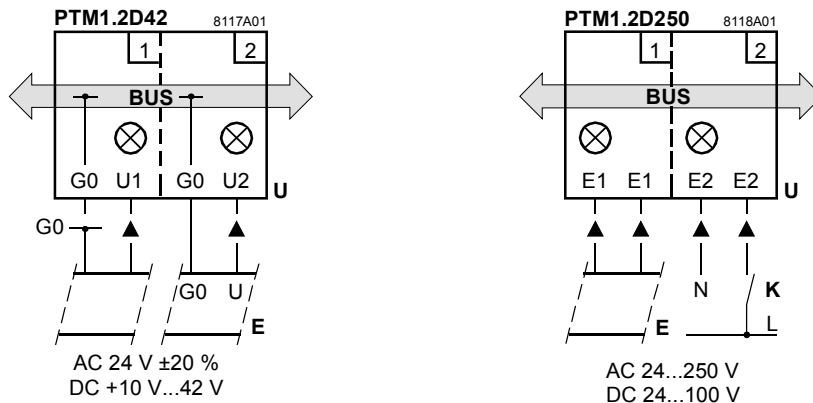
Measuring modules

PTM1.2R1K
PTM1.4R1K

PTM1.2R1K — 8121A01

| 1 | 2 |

BUS

| M | B1 | M | B2 | U |

| M | B | | M | B |
B1 | | | | B2

LG-Ni 1000

PTM1.4R1K — 8121A02

| 1 | 2 | 3 | 4 |

BUS

| M | B1 | M | B2 | M | B3 | M | B4 | U |

B1 **B2** **B3** **B4**

| M | B | M | B | M | B | M | B |

LG-Ni 1000

PTM1.2P1K
PTM1.2P100

PTM1.2P1K — 8123A02

| 1 | 2 |

BUS

| M | B1 | M | B2 | U |

| M | B |
B

Pt1000   0...2500 Ω
R

PTM1.2P100 — 8123A01

| 1 | 2 |

BUS

| M | M1 | B1 | G5 | M | M2 | B2 | G5 | U |

Pt100   Pot.-Meter 0...250 Ω
B   **R**

PTM1.2I25
PTM1.2I420

PTM1.2I25 — 8129A01

| 1 | 2 |

BUS

R1   **R2**

| G8 | M | I1 | G8 | M | I2 | U |

DC +12...30 V   DC 0...25 mA   DC +12...30 V   DC 0...25 mA

PTM1.2I420 — 8129A02

| 1 | 2 |

BUS

| G8 | M | I1 | G8 | M | I2 | U |

DC +12...30 V   DC 4...20 mA   DC +12...30 V   DC 4...20 mA

PTM1.2U10

PTM1.2U10 — 8127A01

| 1 | 2 |

BUS

| G | M | U1 | G | M | U2 | U |

AC 24V   DC 0...10V

| G | M | B |
B
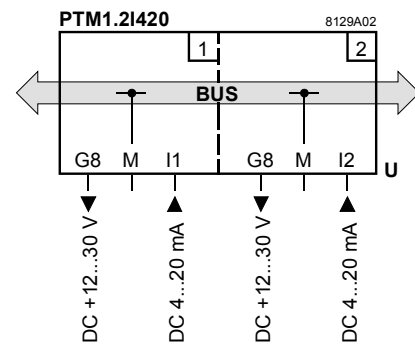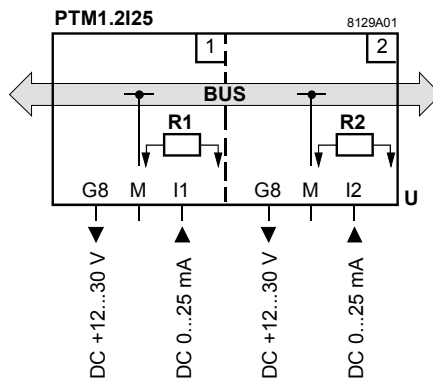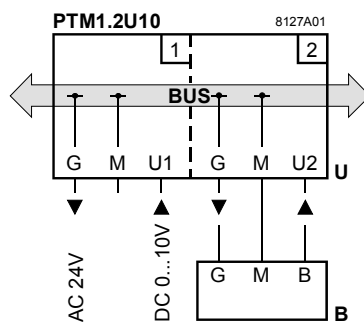
Counting modules

PTM1.2C

PTM1.2C — 8136A01

| 1 | 2 |

BUS

| G0 | E1 | G0 | E2 | U |

K1   **K2**

Switching modules

PTM1.2Q250
PTM1.2Q250-M

PTM1.2Q250 8141A01

PTM1.2Q250-M 8141A02

AC 24...250 V/4(3) A

PTM1.2Q250B

PTM1.2Q250B 8159A01

AC 24...250V/4(3)A

PTM1.2QD
PTM1.2QD-M

PTM1.2QD 8143A01

PTM1.2QD-M 8146A01

PTM1.4QD
PTM1.4Q-M2

PTM1.4QD 8143A02

PTM1.4QD-M2 8146A02

PTM1.3Q-M3

PTM1.3Q-M3   8149A01

1   2   3

BUS

L

S1
AUTO
I
II
III

Q1   Q2   Q3

Q10 Q13 Q14   Q24   Q34   U

K2   K1   K1

K3   K3   K2

K1   K2   K3

PTM1.4Q250-P

PTM1.4Q250-P   8155A01

1   2   3   4

BUS

S1
AUTO
MAN
S2

Q1   Q2   S3
AUTO
MAN
S4

Q3   Q4

Q11 Q12 Q13 Q14   Q21 Q22 Q23 Q24   U

AC 24...250V   AC 24...250V

K1   K2

PTM1.4Q250A-P

PTM1.4Q250A-P   8156A01

1   2   3   4

BUS

S1
AUTO
MAN
Q1
Q2
S2

Q1   Q2   S3
AUTO
MAN
Q3
Q4
S4

Q3   Q4

Q13 Q14 Q23 Q24   Q33 Q34 Q43 Q44   U

AC 24...250 V

K1   K2

PTM1.4Q250-P3

PTM1.4Q250-P3   8157A01

1   2 3 4

BUS

S1
AUTO
MAN
S2

S3

Q1   Q2

Q3 Q4

Q11 Q12 Q13 Q14 Q24 Q34   U

AC 24...250V

K2   K1   K1

K3   K3   K2

K1   K2   K3

PTM1.2Y10S
PTM1.2Y10S-M

PTM1.2Y10S   8162G01
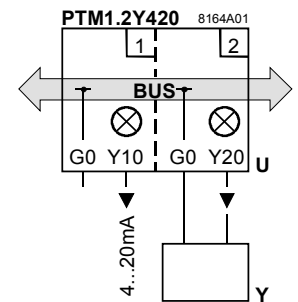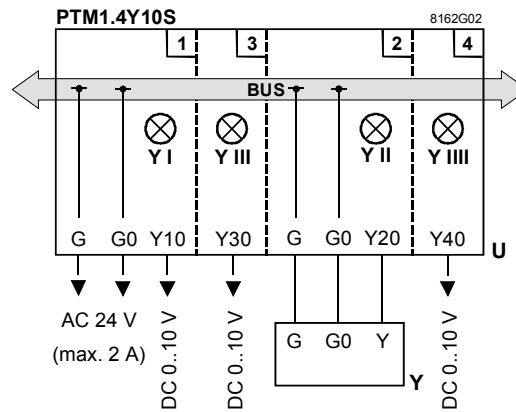
PTM1.2Y10S-M   8162G03

PTM1.4Y10S
PTM1.2Y420

PTM1.4Y10S   8162G02
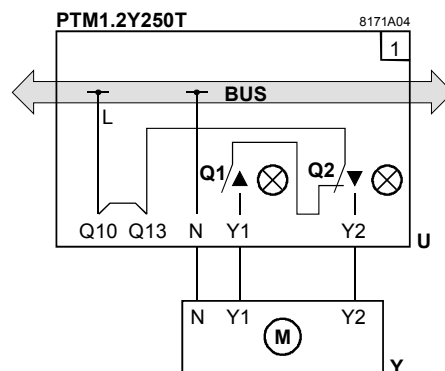
PTM1.2Y420   8164A01

PTM1.2Y250T

PTM1.2Y250T   8171A04

PTM1.2Y250T   8171A05

With actuator for mains voltage
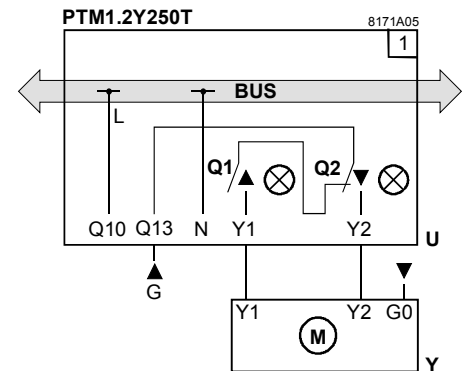
With actuator for external voltage (extra-low voltage), link Q10 – Q13 removed

PTM1.2Y250T-M
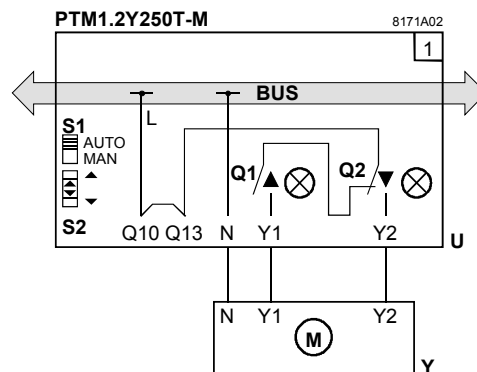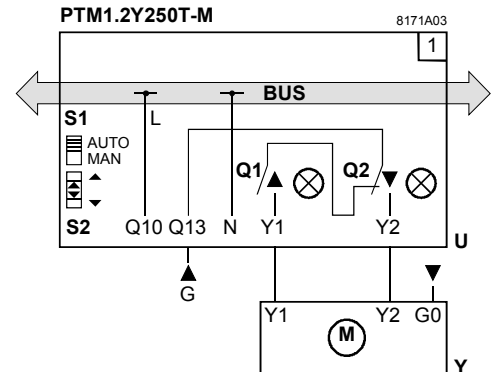
PTM1.2Y250T-M   8171A02

PTM1.2Y250T-M   8171A03

With actuator for mains voltage

With actuator for external voltage (extra-low voltage), link Q10 – Q13 removed

12/14

PTM6.1PSI20-M

PTM6.1PSI20-M   8167A01

| 1 |

BUS

>15
⋮
3

A
M

>15
⋮
3

U / p

R   S   U

Y

PTX1.00   **PTX1.01**

EN50022-35x7,5
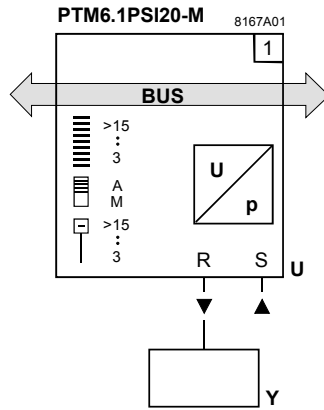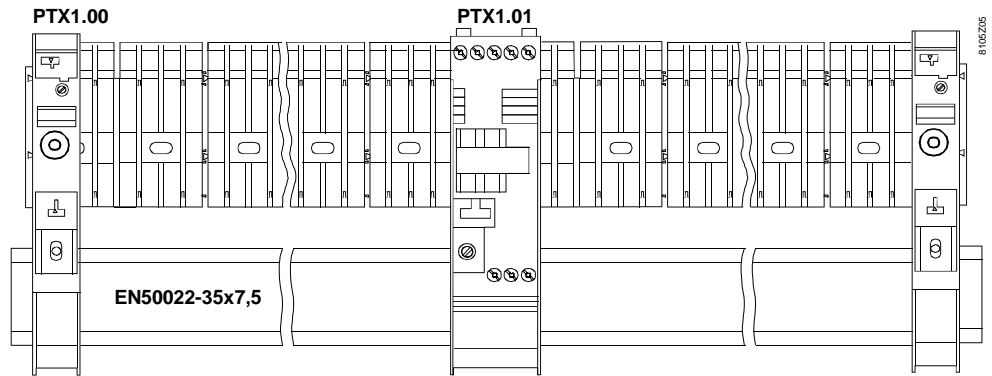
DESIGO™ I/O modules

Accessories for I/O module system

This data sheet contains a list and a description of the accessories required for mounting, labelling, and commissioning the I/O module system.

Type summary

I/O bars	I/O bar, 389 mm*	**PTX1.3**
	I/O bar, 517 mm*	**PTX1.5**
	I/O bar, 645 mm*	**PTX1.6**
	I/O bar, 901 mm*	**PTX 1.8**
	* Total length including end covers of approx. 5 mm	
	End cover for I/O bars	**PTX1.080**
Power supply	Module supply block AC 24 V and P-bus, also serving as an I/O bar connector	**PTX1.01**
	Phase supply block	**PTX1.00**
	Neutral supply block	**PTX1.02**
I/O bar sets	I/O bar set, small, for 10 modules, consisting of:	**PTX1.10**

I/O bar set, small, for 10 modules, consisting of: **PTX1.10**
    1 I/O bar, 389mm   PTX1.3
    1 phase supply block   PTX1.00
    1 module supply block   PTX1.01
I/O bar set, medium, for 14 modules, consisting of: **PTX1.14**
    1 I/O bar, 517mm   PTX1.5
    1 phase supply block   PTX1.00
    1 module supply block   PTX1.01
I/O bar set, large, for 18 modules, consisting of: **PTX1.18**
    1 I/O bar, 645mm   PTX1.6
    1 phase supply block   PTX1.00
    1 module supply block   PTX1.01

Address plug sets	Address numbers	1...16	**PTG1.16**
	Address numbers	1...32	**PTG1.32**
	Address numbers	33...64	**PTG1.64**
	Address numbers	65...96	**PTG1.96**
	Address numbers	97...112	**PTG1.112**
	Address numbers	97...128	**PTG1.128**
	Address numbers	129...160	**PTG1.160**
	Address numbers	161...192	**PTG1.192**
	Address numbers	193...224	**PTG1.224**
	Address numbers	225...255	**PTG1.255**

| Labelling materials | I/O marking labels | **PTP1.10** |
| | Terminal label holder | **PTX1.070** |

Terminal connectors — Spare terminal connectors for certain types of
signalling, switching, and positioning modules:
- Connector for adjacent terminal (pin spacing 6.5 mm), part no. **4 427 1503 0**
- Connector for fourth terminal (pin spacing 19.5 mm), part no. **4 427 1504 0**

Equipment combinations

I/O modules

Group	Type series	Data sheet
I/O modules	**PTM1...**	8100

I/O module accessories are always required for mounting and electrical connections of the I/O modules.

I/O compact units

Group	Type series	Data sheet
I/O compact unit	**PTK1...**	8181, 8182

When expanding I/O compact units with I/O modules, only the I/O bars of the I/O-module accessories are required for coupling; see above data sheets.

Mechanical design

For additional details, refer to "Technical data" and "Internal diagrams".
See "Dimensions" for accessories not shown in this section.

I/O bar — The I/O bar is used to carry the I/O modules and to establish the mechanical and electrical connections to them.
Three standard bar lengths are available; see "Type summary" for their measures.
The end covers provide protection against inadvertent touching of the conductors inside the bar. The I/O bars can be cut with a metal saw at distances of 32 mm.
The upper side of the I/O bar is covered with two plastic strips, one providing protection against dust for the low voltage conductor, and one for the mains voltage conductor.
The upper strip carries the mounting instructions for the I/O bar.
- The lower strip (A) should be pulled off only before fitting the terminal base
- The upper strip (B) should be pulled off only before fitting the module casings
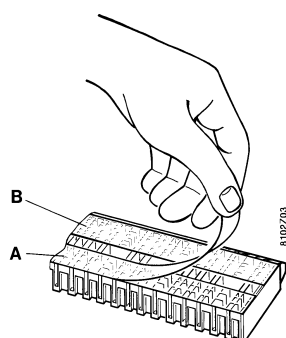
| End covers for I/O bars | The I/O bars are supplied with the end covers fitted. They serve as terminating covers and provide protection against inadvertent touching of the conductors inside the bars. The separately available end covers can be used as spares or are needed when cutting a long I/O bar into shorter sections. |

PTX1.080
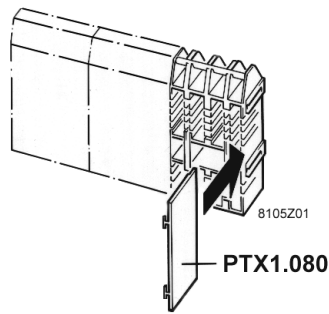
| Module supply block | The module supply block is used to feed the process bus signals (P-bus) and the AC 24 V operating voltage to the I/O bar. It also serves as the mechanical link between the I/O bar and the mounting rail at one rail end.
The connecting terminals for the P-bus are located on the front at the top and at the bottom and are internally interconnected, thus enabling the P-bus cable to be looped across several module supply blocks without using the same terminal twice.
To protect the I/O bar and the module's contacts, connections G and G0 of the AC 24 V operating voltage are fused inside the module supply block. The 10 A microfuses are located behind a cover at the rear. The module supply block snaps on and is secured to the mounting rail by means of a fixing screw.
A 5-pole plug establishes the connection between the connectors and the I/O bar.
The module supply block can also be used as a link between two I/O bars (refer to "Fitting notes"). |

| Phase supply block and neutral supply block | Phase supply and neutral supply block are used to feed the phase and the neutral wire to the I/O bar. Like the module supply block, they serve as the mechanical link between the I/O bar and the mounting rail at the other end of the rail.
The connecting terminal is located on the front at the top.
Snap-on design and fixing of the modules are the same as with the module supply block. |

| Address plugs | Each I/O module must be provided with a coded address plug at the time of commissioning latest, so that each of them is able to respond to the address number transmitted by the automation station. The address plug has a detachable address plate carrying the same number, which snaps on the terminal base. This shows the assignment of module casing and terminal base with regard to the address. The address plugs are supplied in the form of groups of numbers comprising 16 detachable pieces. |
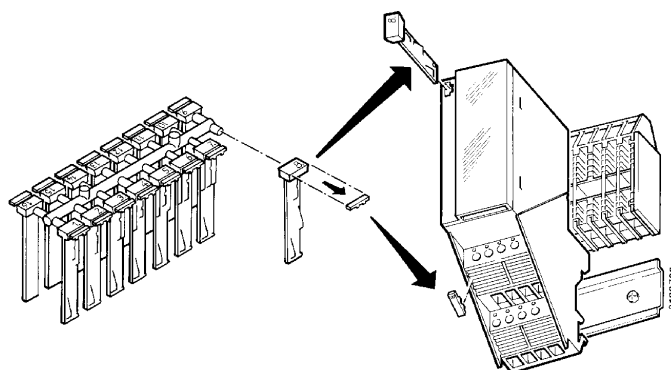
Labelling materials

For plant-specific labelling of the I/O modules, perforated inscription forms (A4 format) are available. They are divided into detachable strips which can be fitted to the module front and the connecting terminals. One form is large enough to provide labels for eight modules. The marking is usually made with a printer with the help of the engineering tool for the building automation and control system after the plant has been configured.

To fit the terminal labels, snap-on terminal label holders PTX1.070 are required.
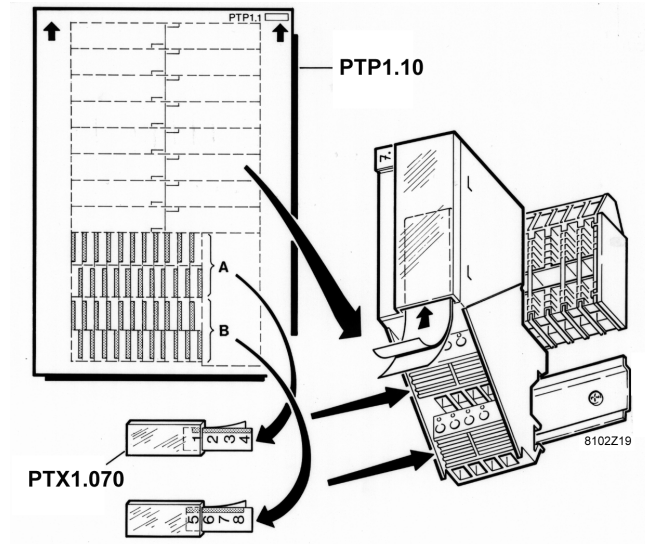
Accessories fitted, with module group
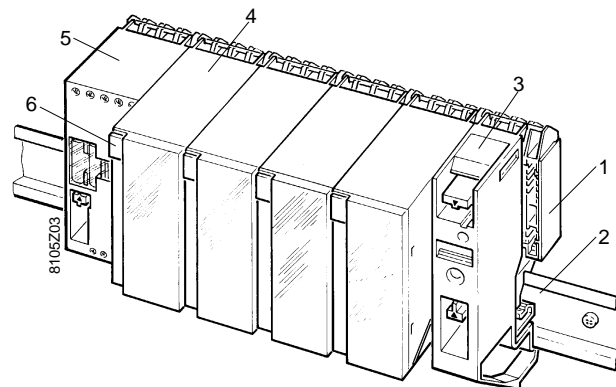
1   I/O bar PTX1..., supplied with end covers fitted
2   Standard mounting rail (top hat rail to EN 50022-35x7,5), not supplied by Siemens
3   Phase supply block PTX1.00
4   I/O module PTM1...
5   Module supply block PTX1.01
6   Address plug PTG1...

Mounting notes

Mounting orientation

The I/O bars for carrying the I/O modules can be arranged either horizontally or vertically; the position of the connecting terminals is optional - left, right, top, or bottom.

Basic arrangement of module supply block and phase supply block as I/O bar support
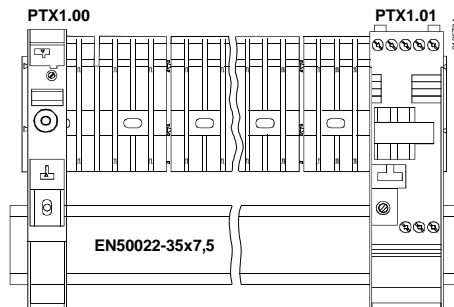
The module supply block and the phase supply block can be fitted to the right or left. If needed, the PTX1.02 neutral supply block is fitted next to the phase supply block.

Module supply block used as a rail connector
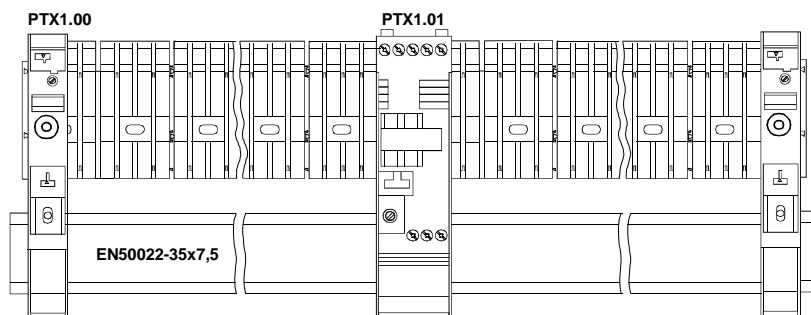
The module supply block serves as a mechanical and electrical link between two I/O bars. Not connected by it are the rail conductors for mains voltage L and N for which separate supply blocks are available.

Space requirement

The amount of space required in the control panel for each fully equipped I/O bar can be determined as follows:

Number of modules x 32 mm + 32 mm + 16 mm +(16 mm*)

* If neutral supply block is required

Module supply block (32 mm) and phase supply block (16 mm) are always required. They also serve as a mechanical link between the I/O bar and the mounting rail.

Standard mounting rails

To fix the I/O modules, the following types of standard mounting rails are required:
- Top hat rail to EN 50022-35 x 7.5 or
- G-type rail to EN 50035 G32

For mounting and installation work in the control panel, consult document M8012 "I/O modules and P-bus", which contains detailed information.

Engineering notes

STOP

Please refer to document Z8102, "I/O module system", which provides all system-related engineering details. Read this document prior to planning and using I/O module accessories and pay special attention to all safety-related information.

Proper use

Use the I/O module accessories in a system only for applications as described in document Z8102 "I/O module system". In addition, take note of all accessory-specific values as described in the section "Technical data" of this data sheet.

5/8

Technical data

General data

Environmental conditions	Transport	IEC 721-3-2
	climatic conditions	Class 2K3
	temperature range	–25 °C...+70 °C
	humidity	<95 % r.h.
	mechanical conditions	Class 2M2
	Operation	IEC 721-3-3
	climatic conditions	Class 3K5
	temperature range	–5 °C...+50 °C
	humidity (non-condensing)	<95 % r.h.
IP protection	I/O bars	IP20 as per EN 60 529
	Module supply block	IP20 as per EN 60 529
	Phase and neutral supply block	IP20 as per EN 60 529
Product standards	Automatic electrical controls for household and similar use	EN 60 730
Dimensions	See last page	

I/O bar PTX1...

Standard length	PTX1.3	389 mm (384 mm*)
	PTX1.5	517 mm (512 mm*)
	PTX1.6	645 mm (640 mm*)
	PTX1.8	901 mm (896 mm*)
	* length in parentheses without end covers	
Permissible load per bar	Mains voltage, rails L and N	
	voltage	max. AC 250 V
	current	max. 6 A
	Low voltage, rails G and G0	
	voltage	AC 24 V
	current	max. 6 A (150 VA)
Primary fuse (short-circuit protection)	Mains voltage	max. 10 A
	Low voltage (microfuse in module supply block)	10 A slow
$C\mathepsilon$ conformity	In accordance with European Union directives	
	low voltage directive	73/23/EEC
Weight without packaging	PTX1.3	0.24 kg
	PTX1.5	0.33 kg
	PTX1.6	0.40 kg
	PTX1.8	0.53 kg

Module supply block PTX1.01

Operating voltage supply	Safety extra-low voltage "SELV" or	
	Protection extra-low voltage "PELV" as per	HD 384
	voltage	AC 24 V ± 20 %
	current	max. 6 A
P-bus connection	Reference voltage in P-bus	DC 24 V
Fuses	Microfuses, integrated	10 A slow
Connecting terminals	Terminals for wires	min. 0.5 mm Ø
		max. 2 x 1.5 mm^2
		or 1 x 2.5 mm^2
$C\mathepsilon$ conformity	In accordance with European Union directives	
	electromagnetic compatibility	89/336/EEC
Electromagnetic compatibility	Emissions	EN 50 081-1
	Immunity	EN 61 000-6-2
Weight	Weight without packaging	0.09 kg

Phase supply block PTX1.00 and Neutral supply block PTX1.02

Mains voltage supply	Voltage	max. AC 250 V
	Current	max. 6 A
Connecting terminals	Terminals for wires	min. 0.5 mm Ø
		max. 2 x 1.5 mm^2
		or 1 x 2.5 mm^2
$C\mathepsilon$ conformity	In accordance with European Union directives	
	low voltage directive	73/23/EEC
Weight	Weight without packaging	0.04 kg

Internal diagrams

I/O bar PTX1…
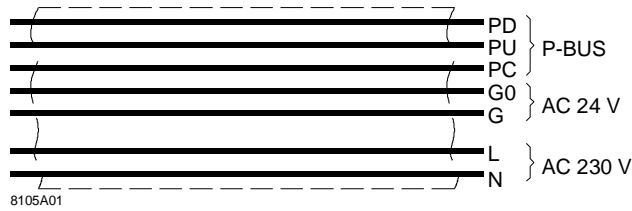
8105A01

P-BUS	**Process bus from the automation station**
PD	Bidirectional data line
PU	DC +24 V reference voltage for module functions
PC	Synchronization line (clock) for data transmission

AC 24 V	**Operating voltage**
G0	System neutral for reference voltage PU and operating voltage G
G	System potential of AC 24 V operating voltage from external transformer for
	- power supply to certain modules (relieving the automation station)
	- modules with manual control
	- power supply to active detectors and regulating units from the terminal base

AC 230 V	**Mains voltage**
L	Live (normally AC 230 V)
	for non-potential-free relay outputs used to control contactors and three-position actuators
N	Neutral

Module supply block
PTX1.01

8105A02
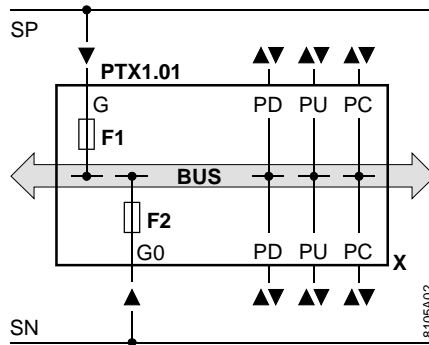
X	Module supply block PTX1.01
F1, F2	Microfuses, 10 A slow

P-BUS	**Process bus from the automation station**
PD	Bidirectional data line
PU	DC +24 V reference voltage for module functions
PC	Synchronization line (clock) for data transmission

AC 24 V	**Operating voltage**
G	System potential (SP)
G0	System neutral (SN)

Phase supply block
PTX1.00

8105A03
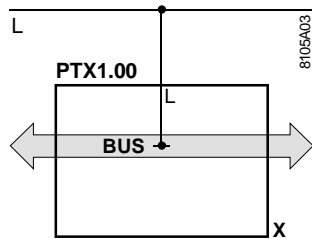
X	Phase supply block PTX1.00
L	Line (AC 250 V max.)

Neutral supply block
PTX1.02

8105A04
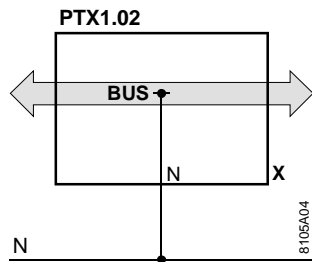
X	Neutral supply block PTX1.02
N	Neutral

Dimensions

I/O bar

X x 64 = Y + 4.5

64

4.5

22.3

60

18

8.5

16   32

8105M03E

Module supply block
PTX.01

2x32=64

32

63,2

5

40

4,5

123,3

59,3

54

35

32

EN50022-35x7,5

EN50035-G32   EN50022-35x7,5

7,5

EN50035-G32   15

8105M01
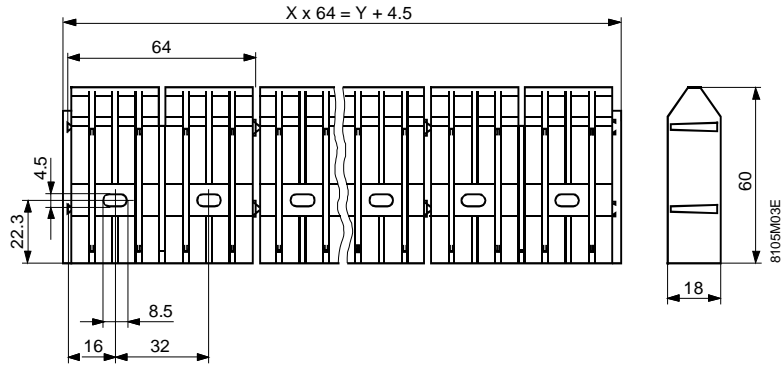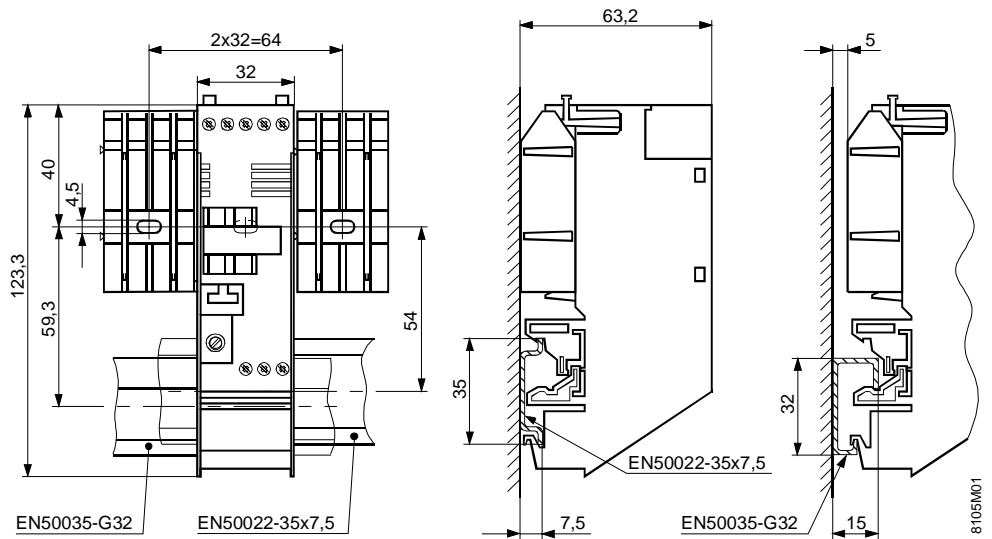
Phase supply block
PTX.00 and neutral
supply block PTX1.02

2x32=64

15.8

63.2

5

40

4,5

122

59,3

54

35

32

EN50035-G32   EN50022-35x7,5

7,5

EN50035-G32   15

8105M02

Dimensions in mm
8/8

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Accessories for I/O Module System

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20.11.2001

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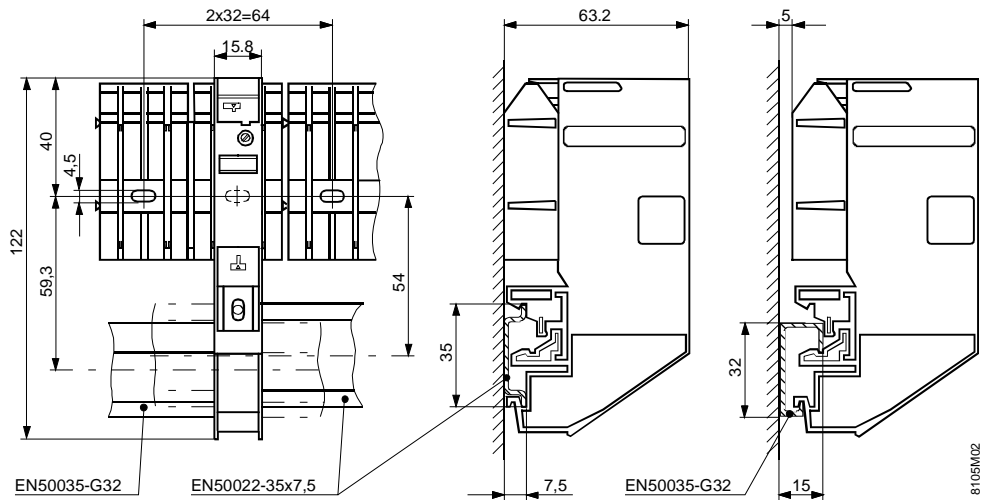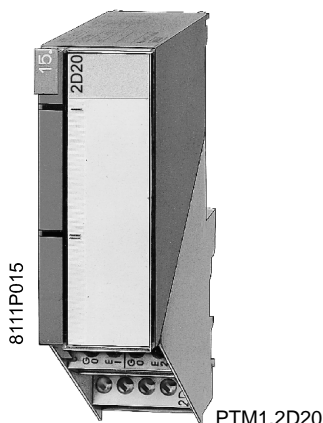
PTM1.2D20

DESIGO™ I/O modules

Signalling module PTM1.2D20

for maintained switching actions, double module

Signalling module for connection to P-bus, with two separate status inputs for acquiring signals from potential-free contacts or electronic switching devices.

Use

The signalling module is used to acquire status signals from maintained switching actions of potential-free contacts of different types of control and switching devices in the plant. The signals may originate from:

- on/off controls, such as thermostats, pressure switches, etc.
- status or auxiliary contacts of contactors, switches or relays
- any contacts of Siemens or non-Siemens units
- electronic switching devices such as transistors and optocouplers, if permitted by the application

Note   The module is not suitable for impulse switching actions. For details, refer to data sheet N8114.

Functions

- Conversion of status signals from the plant to P-bus status signals for the automation station.
- Indication of position of status contacts by individual signal lamps:
  - status contact open: lamp OFF
  - status contact closed: lamp ON (steady light)
  - the function of the signal lamps cannot be reversed

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Building Automation

Type summary

	Double signalling module	**PTM1.2D20**

Delivery Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevent safety requirements.

Technical design

Data traffic The status signals are acquired by the I/O module and then interrogated and handled by the automation station.

Note The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the process unit (software). For a full understanding of the scope of module functions, the relevant process sequences and choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.2D20

1   Signal lamp for status input I
2   Signal lamp for status input II

Engineering notes

STOP	The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.
Correct use	Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.
⚠	The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.
⚠ **Caution**	The insulation resistance of the connected status contacts against mains voltage must comply with the requirements **for safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384. Mechanical status contacts of this module must be **potential-free**. The status inputs **are not galvanically separated** from the system's electronics.
Type of status contacts	This module must always be used with **maintained** contacts. For impulse contacts, refer to data sheet N8114.
Number of status contacts per input	It is possible to connect a minimum of three status contacts to one status input, either in parallel or in series. The total number of status contacts that can be connected is dependent upon the line resistance and the transfer resistance of the status contacts; refer to "Technical data".
Signal lines	If several status contacts are to be connected to separate inputs - even to different modules - they can be connected to the same common system neutral (G0) of a status input, thus reducing the number of wires. But in that case, the respective signalling modules must be fitted on the **same I/O bar**. For the requirements with regard to line lengths, cross-sectional areas and the number of status contacts, refer to document Z8102, "I/O module system".
Electronic signal sources	For the basic connection of electronic switching devices, refer to "Connection diagrams" and "Technical data".

3/4

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Status inputs	Contact sensing	
	Voltage	DC 22 V
	Current	8 mA
	Perm. transfer resistance	
	when contacts are closed	100 Ohm max. (series connection)
	Perm. insulation resistance	
	when contacts are open	50 kOhm min (parallel connection)
Line lengths	Signal lines	
	Max. length	300 m
	Min. dia. of wire	0.6 mm
CE conformance	In compliance with the directives of the European Union Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagrams

U	Signalling module
K1/K2	Status contacts
BUS	I/O bar with P-bus
G0	System neutral
E1, E2	Status inputs for contact sensing

Basic connection for electronic switching devices

Siemens Building Technologies
Building Automation

Signalling module

CM2N8111en
20.11.2001

PTM1.4D20

PTM1.4D20R

DESIGO™ I/O modules
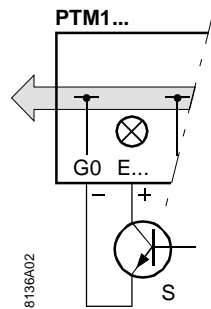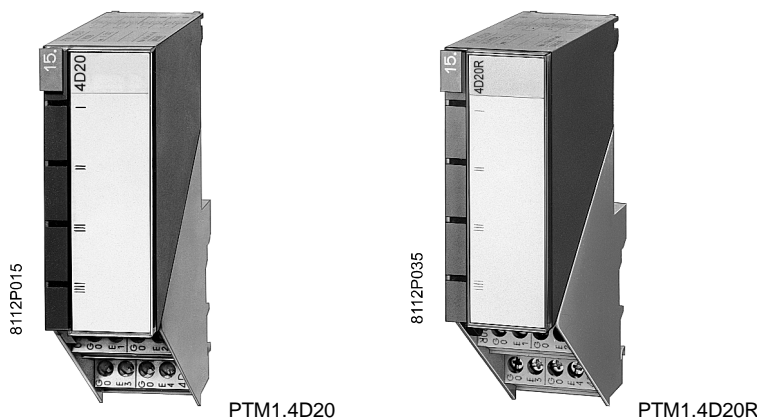
Signalling modules

PTM1.4D20
PTM1.4D20R

for maintained switching actions, quadruple modules

Signalling modules for connection to P-bus, with four separate status inputs to acquire signals from potential-free contacts or electronic switching devices. There are two versions, the difference being the kind of signalling:
- **PTM1.4D20: signal lamps lit when status contact is closed**
- **PTM1.4D20R: signal lamps lit when status contact is open**

Use

The two signalling modules are used to acquire status signals from maintained switching actions of potential-free contacts of different types of control and switching devices in the plant. The signals can be delivered by
- on/off controls, such as thermostats, pressure switches, etc.
- status and auxiliary contacts of contactors or switches
- any contacts of Siemens units or of devices of other manufacture
- electronic switching devices such as transistors and optocouplers

Note

The modules are not suitable for impulse switching actions. For details, refer to data sheet N8114.

Functions

- Transformation of status signals from the plant to P-bus status signals for the automation station.
- Indication of position of the status contacts by individual signal lamps:
  – status contact open: PTM1.4D20: Lamp OFF
  PTM1.4D20R: Lamp ON (steady light)
  – status contact closed: PTM1.4D20: Lamp ON (steady light)
  PTM1.4D20R: Lamp OFF
  – the function of the signal lamps cannot be reversed

Type summary

Quadruple signalling module,
with lamps lit when the status contacts are closed **PTM1.4D20**
Quadruple signalling module,
with lamps lit when the status contacts are open **PTM1.4D20R**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories
For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102 "I/O module system"

Field units
Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevent safety requirements.

Technical design

Contact sensing
- The status signals are acquired by the I/O module and then interrogated and handled by the automation station.
- The status contacts are sensed by a voltage of about DC 30 V from the AC 24 V operating voltage.

Behaviour in the event of fault
- If the operating voltage fails, the module will continue to operate, but at a reduced sensing current of 1 m A in place of 8 m A. The signal lamps are extinguished, however.
- If the master unit fails (P-bus failure), the signal lamps will continue to operate.
- If there is no telegram for more than 4 s, it is only the contact status that will be indicated.

Note
The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O Module System"**!Syntax Error, DATA**.

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.
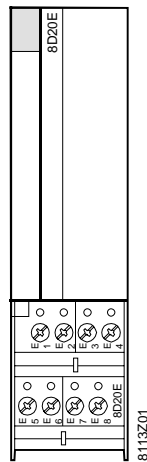
All I/O modules use the same accessories which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.

Front views

PTM1.4D20

PTM1.4D20R

1   Signal lamp for status input I
2   Signal lamp for status input II
3   Signal lamp for status input III
4   Signal lamp for status input IIII

Engineering notes

STOP

The document Z8102, "I/O module system"**!Syntax Error, DATA**, contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system"**!Syntax Error, DATA**. The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ **Caution**

The insulation resistance of the connected status contacts against mains voltage must comply with the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.

The mechanical status contacts of this module must be **potential-free.**

The status inputs are **not galvanically separated** from the system's electronics.

3/6

Type of status contacts	This module must always be used with **maintained contacts.** For impulse contacts, refer to data sheet N8114.
Number of status contacts per input	It is possible to connect a minimum of three status contacts to one status input, either in parallel or in series. The number of status contacts that can be connected depends on the line resistance and the transfer resistance of the contacts. For details, refer to "Technical data".
Unused inputs of PTM1.4D20R	With the PTM1.4D20R, the status inputs that are not used must be fitted with shorting plugs (terminals E... and G0, refer to "Connection diagrams").
Signal lines	If several status contacts are to be connected to separate inputs - also to different modules - they can be connected to the same common G0 (system neutral) of a status input. This reduces the number of wires, but the respective signalling modules must be fitted on the **same I/O bar.** For the respective requirements in terms of line lengths, cross-sectional areas and number of status contacts, refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.
Electronic signal sources	For the basic connection of electronic switching devices, refer to "Connection diagrams" and "Technical data".

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".**!Syntax Error, DATA**

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "**!Syntax Error, DATA**I/O module system".**!Syntax Error, DATA**
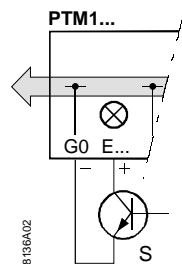
Technical data

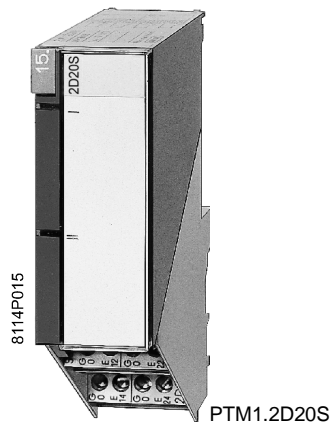| Power supply	Operating voltage	AC 24 V $\pm$ 20 %
	Safety extra-low voltage (SELV) or	
	protection by extra-low voltage (PELV) to	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	3 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	1 (12.5 m A each)
Status inputs	Contact sensing	
	Voltage	approx. DC 30 V
	Current	8 m A
	Perm. transfer resistance	
	when contacts are closed	100 Ω max. (series connection)
	Perm. insulation resistance	
	when contacts are open	50 kΩ min. (parallel connection)
Line lengths	Signal lines	
	Max. length	300 m
	Min. wire dia.	0.6 mm
$C\!\epsilon$-conformity	In accordance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions to document M8102 "I/O modules and P-bus".**!Syntax Error, DATA**	

Connection diagrams

Signalling module
PTM1.4D20

PTM1.4D20   8111A02

| 1 | 2 | 3 | 4 |

BUS

G0 E1 | G0 E2 | G0 E3 | G0 E4   **U**

K1   **K2**   **K3**   **K4**

Signalling module
PTM1.4D20R

PTM1.4D20R   8112A01

| 1 | 2 | 3 | 4 |

BUS

G0 E1 | G0 E2 | G0 E3 | G0 E4   **U**

K1   **K2**
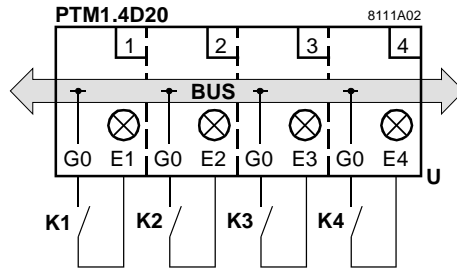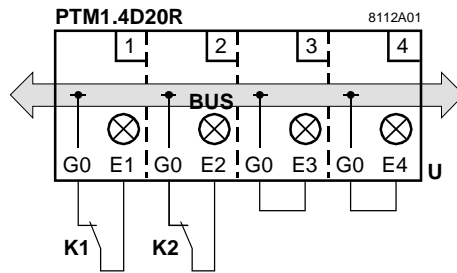
U	Signalling modules
K1...K4	Status contacts, N.O. contacts on the PTM1.4D20, N.C. contacts on the PTM1.4D20R (inputs that are not used on the PTM1.4D20R must be linked)
BUS	I/O bar with P-bus
E1...E4	Status inputs for contact sensing
G0	System neutral

Basic connection
for electronic
switching devices

PTM1...

G0 E...

− +

S

8136A02

8113P015
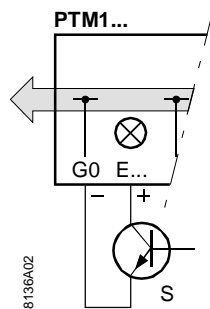
PTM1.8D20E

DESIGO™ I/O modules

Signalling module   PTM1.8D20E

for maintained switching actions, octuple modules

Signalling module for connection to P-bus, with eight separate status inputs for acquiring signals from potential-free contacts or electronic switching devices.

Use

The signalling module is used to acquire status signals from maintained switching actions of potential-free contacts of different types of control and switching devices in the plant. The signals may originate from:

- on/off controls, such as thermostats, pressure switches, etc.
- status or auxiliary contacts of contactors, switches or relays
- any contacts of Siemens or non-Siemens units
- electronic switching devices such as transistors and optocouplers

Note The module is not suitable for impulse switching actions. For details, refer to data sheet N8114.

Functions

Conversion of status signals from the plant to P-bus status signals for the automation station.

Type summary

	Octuple signalling module	**PTM1.8D20E**

Delivery   Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories   For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations   Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102 "I/O module system".

Field units   Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevent safety requirements.

Technical design

Data traffic   The status signals are acquired by the I/O module and then interrogated and handled by the automation station.

Note
- The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and choices available when configuring the user program must be taken into consideration.
- The AC 24 V operating voltage, from which the voltage for the contact is derived, is monitored in the module. In the event of voltage failure, telegram traffic on the P-bus is interrupted.
- For the technical features common to all I/O modules, refer to data sheet 8102, "Basic Data of I/O Module System", same chapter.

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connection terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
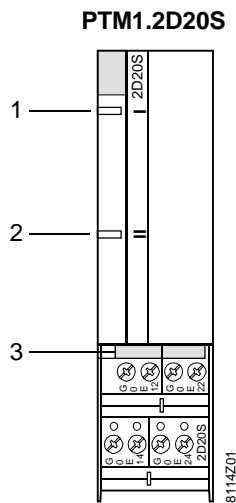In the case of this module, however, all terminals are used by the signalling inputs E1...E8; as a result, the signalling contacts must be connected to the system neutral G0 via additional control cabinet terminals; refer to "Connection diagrams".
Transparent module front to insert the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug is also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note   For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view	**PTM1.8D20E**

Engineering notes

STOP	The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.
Correct use	Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.
⚠	The sections of this chapter identified by a warning sign contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.
⚠ **Caution**	The insulation resistance of the connected status contacts against mains voltage must comply with the requirements **for safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384. Mechanical status contacts of this module must be **potential-free**. The status inputs **are not galvanically separated** from the system's electronics.
Type of status contacts	This module must always be used with **maintained** contacts. For impulse contacts, refer to data sheet N8114.
Number of status contacts per input	It is possible to connect a minimum of three status contacts to one status input, either in parallel or in series. The total number of status contacts that can be connected is dependent upon the line resistance and the transfer resistance of the status contacts (refer to "Technical data").
System neutral (G0)	System neutral (G0) must be connected to the I/O bar of the module supply block PTX1.01 and externally via additional control panel output terminals (refer to "Connection diagrams").
Signal lines	If several status contacts are to be connected to separate inputs - even to different modules - they can be connected to the same common system neutral (G0) of a status input, thus reducing the number of wires, but in that case, the respective signalling modules must be fitted on the **same I/O bar**. For the requirements with regard to line lengths, cross-sectional areas and the number of status contacts, refer to document Z8102, "I/O module system".
Electronic signal sources	For the basic connection of electronic switching devices, refer to "Connection diagrams" and "Technical data".

3/4

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes
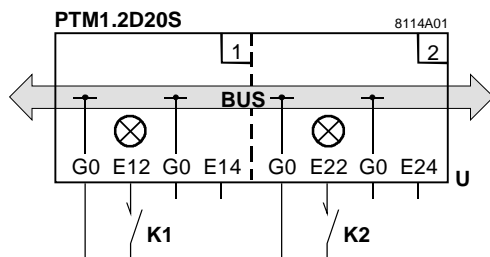
Please refer to document Z8102, "I/O module system".

Technical data

⚠ Supply	Operating voltage Safety extra low voltage (SELV) or protection by extra-low voltage (PELV) Frequency Power consumption I/O module power supply via P-bus Load units	AC 24 V ± 20 % HD 384 50 or 60 Hz 3 VA DC 24 V (against G0) 1 (12.5 mA each)

Status inputs	Contact sensing
	  Voltage
	  Current
	Perm. transfer resistance
	  when contacts are closed
	Perm. insulation resistance
	  when contacts are open
		
		approx. DC 30 V
		8 mA
		
		100 Ω max. (series connection)
		
		50 kΩ min. (parallel connection)

Line lengths	Signal lines
	  Max. Length
	  Min. dia. of wire
		
		300 m
		0.6 mm

CE conformity	In accordance with the directives of the European Union Electromagnetic compatibility	 89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O Module System", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagrams

PTM1.8D20E   8113A01

U	Signalling module
K1.K8	Status contacts
BUS	I/O bar with P-bus
G0	System neutral of AC 24 V
E1...E8	Status inputs for contact sensing
X	Control panel output terminals

Basic connection for electronic switching devices

8136A02

PTM1.2D20S

DESIGO™ I/O modules

Impulse signalling
module   PTM1.2D20S

for impulse signals, double module

Signalling module for connection to P-bus, with two separate status inputs to acquire status pulses from potential-free impulse contacts or electronic switching devices, with storage function.

Use

Acquisition of status pulses from potential-free impulse contacts in the plant which can be triggered by
- mains failure supervision equipment
- emergency signals via push-buttons, e.g. in lifts
- the supervision of start-up circuits for fault analyses

Electronic switching devices such as transistors and optocouplers can also be used as pulse sources.

Note

For signals via maintained contacts, the signalling modules covered by data sheets N8111, N8112 and N8113 must be used.

Functions

- Separate status inputs for N.C. and N.O. contacts. The status contacts can be connected as follows:
  - contacts: individual or several contacts in series via terminals E12 and E22
  - contacts: individual or several contacts in parallel via terminals E14 and E24
- Signal of an N.C. and an N.O. contact (OR-connective) via an I/O point:
  - N.C.contacts: terminal E12,   N.O. contacts: terminal E14 or
  - N.C.contacts: terminal E22,   N.O. contacts: terminal E24
- Indication of signals by the lamps on the module:
  - with impulse switching actions, only briefly, from the arrival of the pulse to its acquisition and acknowledgement by the master unit

Type summary

	Impulse signalling module	**PTM1.2D20S**

Delivery	Base and electronic module are supplied together but in separate boxes that are attached to one another. The I/O modules are supplied with the shorting plugs fitted across G0 and E14 and G0 and E24 respectively.
Accessories	For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations	Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".
Field units	Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Handling of pulses	The status pulses are acquired and stored by the I/O module. The status signals are interrogated and handled by the automation station and erased in the I/O module, which is then ready to receive other status pulses.
Sensing voltage	The impulse signalling module uses voltages of about DC 30 V from the AC 24 V operating voltage.

Behaviour in the event of fault	If the operating voltage fails, the module's function will be maintained, although the sensing current will be reduced from 8 mA to 1 mA. In this case, the signal lamps do not light up any more.
	In the event of a failure of the master unit (P-bus failure)
	• indication will be maintained
	• storage is immediately cancelled
	
	If there is no telegram for 4 seconds
	• storage is cancelled
	• only the contact status is indicated as follows:
	  − contact open: lamp OFF
	  − contact closed: lamp ON

Coupling	The status inputs are not galvanically separated from the system's electronics.
Note	The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.
	For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".**!Syntax Error, DATA**

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.
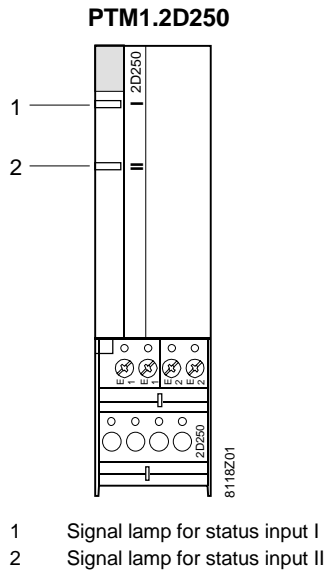
All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".**!Syntax Error, DATA**

Front view

PTM1.2D20S

1   Signal lamp for status input I
2   Signal lamp for status input II
3   Shorting plugs for N.O. contacts

Engineering notes

STOP The document Z8102, "I/O module system"**!Syntax Error, DATA**, contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system"**!Syntax Error, DATA**. The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠ The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ **Caution**

The insulation restistance of the connected status contacts against mains voltage must comply with the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.
The mechanical status contacts of this module must be potential-free.
The status input are **not galvanically separated** from the system's electronics.

Type of status contacts

This module must always be used with impulse contacts. For maintained contacts, refer to data sheets N8111, N8112 and N8113.

Number of status contacts per input

It is possible to connect a minimum of three status contacts to one status input, either in parallel or in series. The number of status contacts that can be connected depends on the line resistance and the transfer resistance of the contacts. For details, refer to "Technical data".

N.O. contacts

If the signals are delivered by N.O. contacts (via terminals G0, E14 and E24), the shorting plugs across terminals G0 and E12 or G0 and E22 must be fitted (standard delivery). This also applies to unused status inputs for N.O. contacts.

Signal lines

If several status contacts are to be connected to separate inputs - also to different modules - they can be connected to the same common G0 (system neutral) of a status input. This reduces the number of wires, but the respective signalling modules must be fitted on the **same I/O bar.**
For the respective requirements in terms of line lengths, cross-sectional areas and number of status contacts, refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.

Electronic signal sources

For the basic connection of electronic switching devices, refer to "Connection diagrams" and "Technical data".

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

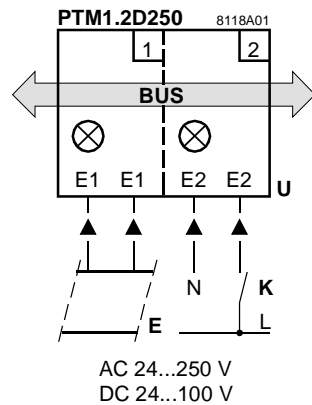Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.

Technical data

⚠ Supply	Operating voltage	AC 24 V ± 20%
	Safety extra low voltage (SELV)	
	or protection by extra-low voltage (PELV)	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	2.5 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Status inputs	Sensing of status contacts	
	Voltage	approx. DC 30 V
	Current	8 mA
	Closing time	20 ms min.
	Opening time	20 ms min.
	Bounce time	10 ms max.
	Perm. transfer resistance	
	when contact is closed	100 Ω max.
	Perm. insulation resistance	
	when contact is open	50 kΩ min.
	Interval of status pulses	1s min. (2 access cycles)
Line lengths	Signal lines	
	Max. length	300 m
	Min. wire dia.	0.6 mm
CE conformity	In accordancee with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O Module System", and for dimensions refer to document M8102, "I/O modules and P-bus".**!Syntax Error, DATA**.	

Connection of N.C. contacts

PTM1.2D20S   8114A01

| 1 | | 2 |

BUS

G0   E12   G0   E14 ┊ G0   E22   G0   E24 **U**

K1   **K2**

U	Impulse signalling module PTM1.2D20S
K1, K2	Potential-free impulse N.C. contacts
K3, K4	Potential-free impulse N.O. contacts
BUS	I/O bar with P-bus

Connection of N.O. contacts

PTM1.2D20S   8114A02

| 1 | | 2 |

BUS

G0   E12   G0   E14 ┊ G0   E22   G0   E24 **U**

K3   **K4**
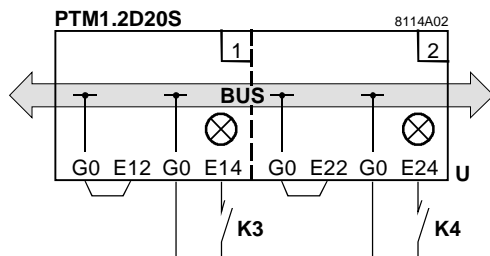
G0	System neutral (of AC 24V operating voltage)
E14, E24	Inputs for N.O. contacts
E12, E22	Inputs for N.C. contacts

Basic connection for electronic switching devices

PTM1...

G0   E...

−   +

S

8136A02

8117P015   PTM1.2D42
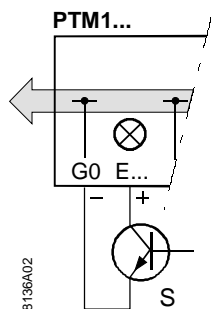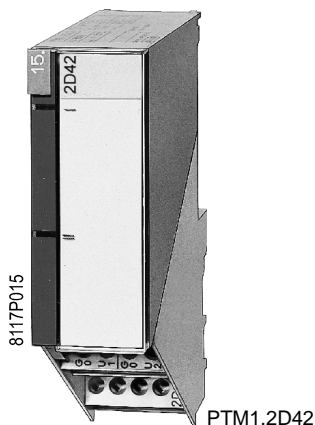
DESIGO™ I/O modules

Voltage signalling module

PTM1.2D42

for low voltages, binary, double module

Signalling module for connection to P-bus, with two separate status inputs for the binary acquisition of low voltages of AC 24 V or DC 10...42 V, with no galvanic separation between system and plant.

Use

The signalling module is used to signal the presence or absence of voltages. These are the voltages at non-potential-free outputs of different types of units in the plant, such as

* AC 24 V voltages as used by Siemens units and systems
* DC 10...42 V voltages
* the respective voltages used by products of other manufacturers

For the precise voltage ranges, refer to "Technical data".

Note   The module is not suitable for voltage pulses shorter than 2 seconds

Functions

The module indicates the input statuses with the help of signal lamps:

* lamp ON: voltage present
* lamp OFF: voltage not present

The indication cannot be reversed.

Type summary

	Voltage signalling module	**PTM1.2D42**

Delivery   Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories   For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations   Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units   Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Data traffic   The signals are acquired by the I/O module and then interrogated and handled by the automation station.

Note   The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.
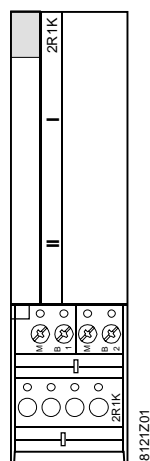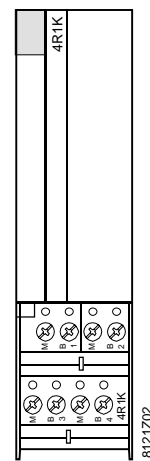
Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.
All I/O modules use the same accessories, which are shown on Data Sheet N8105.

Note   For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.

Front view

PTM1.2D42

1 Signal lamp for status input I
2 Signal lamp for status input II

Engineering notes

STOP

The document Z8102, "I/O module system"**!Syntax Error, DATA**, contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system"**!Syntax Error, DATA**. The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Caution

- The voltages present at the status inputs must satisfy the requirements for **safety extra low-voltages** (SELV) or **protective extra-low voltage** (PELV) as per HD 384.
- The status inputs are not galvanically separated.

Contact sensing

- This module can also be used for contact interrogation on altering voltage; at AC 24 V, approx. 8 mA contact current exist.
- Direct voltage, switched via a mechanical contact, can only be applied if gold contacts are used.

Line lengths

- If the signal voltage is delivered by the output of a unit, the permissible line length will be determined by the unit.
- If voltage is sensed that is delivered via a status contact, the maximum permissible line length is 300 m, as indicated under "Technical data".

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system"**!Syntax Error, DATA**.

3/4

Technical data

|		
Power supply	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Status inputs	Signal voltages	
	DC voltage	DC 42 V max.
	AC voltage	AC 30 V eff. max.
	Limit levels for the signals	
	With DC voltage log. "1"	DC $\geq$ 7.5 V
	log. "0"	DC $\leq$ 2.5 V
	With AC voltage log. "1"	AC $\geq$ 15 V eff.
	log. "0"	AC $\leq$ 5 V eff.
	Input resistance	
	(for DC voltage)	100 kΩ ($U_E : I_E$)
	Input impedance	
	(for AC voltage)	3 kΩ ($U_E : I_E$)
Line lengths	Perm. line lengths	
	For status contact voltages	300 m max.
	For output signals from	
	other units, refer to "Engineering notes"	
$\mathsf{C}\mathsf{E}$ conformity	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagram

U	Voltage signalling module PTM1.2D42
E	Voltage source of voltages to be signalled
BUS	I/O bar with P-bus
G0	System neutral (of AC 24V operating voltage)
U1, U2	Low voltages to be signalled (AC 24 V $\pm$ 20 % or DC 10..42 V)
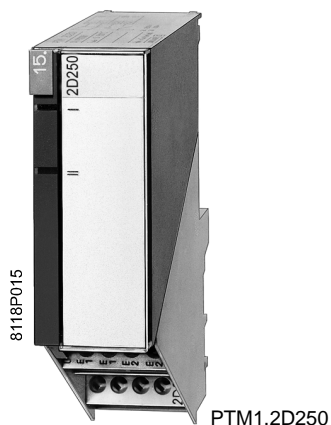
PTM1.2D250

DESIGO™ I/O modules

Voltage signalling
module   PTM1.2D250

for extra-low and mains voltages, binary, double module

Signalling module for connection to P-bus, with two separate status inputs for the binary acquisition of voltages of AC 24...250 V or DC 24...100 V, with galvanic separation between system and plant.

Use

The signalling module is used to signal the presence or absence of voltages. These are the voltages at non-potential-free outputs of different types of units in the plant, such as

- the control and switching voltages of control equipment of the Siemens range
- the control and switching voltages of units of other manufacturers
- the voltages at contacts (contact sensing) of
  - signal sources such as thermostats, pressure switches, etc.
  - manual switches
  - contactors (in this case the auxiliary contacts)

The module is specifically suited to sense poor or unsafe contacts (at AC 230 V).

For precise voltage ranges, refer to "Technical data".

Note

The module is not suitable for voltage pulses shorter than 2 seconds.

Functions

The module indicates the input statuses with the help of signal lamps:
- lamp ON: voltage present
- lamp OFF: voltage not present

The indication cannot be reversed.

Type summary

Voltage signalling module	**PTM1.2D250**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Data traffic

The signals are acquired by the I/O module and then interrogated and handled by the automation station.

Galvanic separation

The status inputs are galvanically separated from the system (optocoupler).

Notes

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.
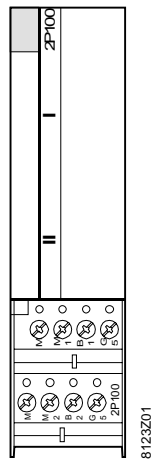
All I/O modules use the same accessories, which are shown on data sheet N8105.

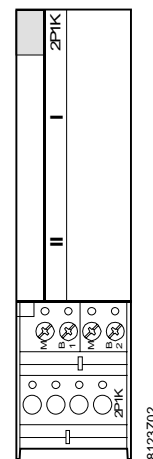|	
Note	For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.2D250

1   Signal lamp for status input I
2   Signal lamp for status input II

Engineering notes

STOP	The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.
Correct use	Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.
⚠	The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.
⚠ Signal voltage	At the two status inputs of the double module, either **mains voltage only or extra-low voltage only** must be present. A mixture of the two is not permitted.
Phases at the status inputs	If mains voltage is used, different phases may be connected to the two status inputs (AC 380 V insulation).
Galvanic separation	The status inputs are galvanically separated from the module's electronics (refer to "Technical data").
Status pulses	The voltage pulses at the status inputs must be present for at least 2 seconds.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes
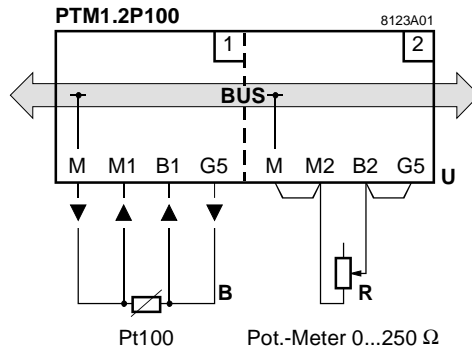
Please refer to document Z8102, "I/O module system".

3/4

Technical data

|		
Power supply	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Status inputs	Signal voltages	
	AC voltage	AC 24...250 V
	DC voltage	DC 24...100 V
	Limit levels for the signals	
	With AC voltage log. "1"	AC $\geq$ 15 V eff.
	log. "0"	AC $\leq$ 5 V eff
	With DC voltage log. "1"	DC $\geq$ 15 V
	log. "0"	DC $\leq$ 5 V
Insulating strength	Between status inputs and module's electronics	AC 3750 V, EN 60 730-1
Line lengths	Perm. line lengths for status contact voltages	300 m max.
CEconformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagram

U	Voltage signalling module PTM1.2D250
E	Voltage source of voltages to be signalled
K	Contact to be sensed
BUS	I/O bar with P-bus
E1, E2	Voltages to be signalled (AC 24...250 V or DC 24...100 V)
L	Live
N	Neutral
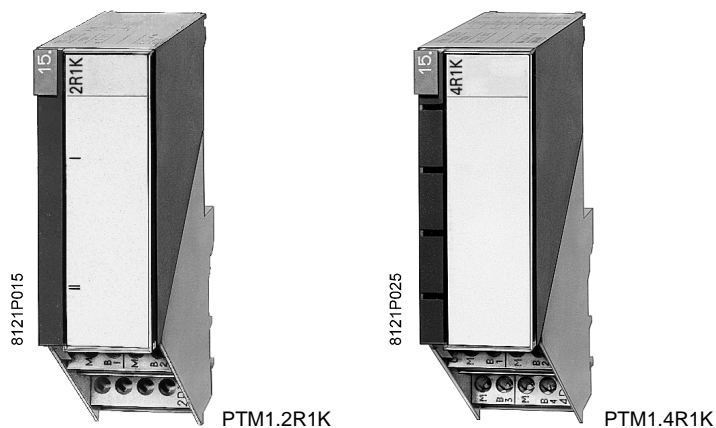
PTM1.2R1K   PTM1.4R1K

DESIGO™ I/O modules

Measured value modules

PTM1.2R1K
PTM1.4R1K

for use with LG-Ni 1000 temperature sensors

Measured value module for connection to P-bus and for use with LG-Ni 1000 temperature sensors. Available as a double module with two independent inputs or as a quadruple module with four independent inputs.

Use

Temperature measurement in the range -50…+150 °C with LG-Ni 1000 sensors.
Typical applications include the conversion of sensor signals of the following measuring variables:
- room temperatures
- temperatures in air ducts
- temperatures in piping systems
- outside temperatures
- window pane temperatures

Functions

- Measured value conversion and linearization of continuous sensor measuring signals from the plant to digital P-bus signals for handling by the automation station.
- If required in special situations, the calibration of the sensors can be readjusted in the automation station.
- Interruption and short-circuit of sensors are detected by the automation station.

Type summary

	Double measured value module	**PTM1.2R1K**
	Quadruple measured value module	**PTM1.4R1K**

Delivery Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories For general accessories that are used in connection with the I/O modules, please refer to data sheet N8105. Such accessories must be ordered as separate items.

Equipment combinations

Automation stations Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units Any units of the Siemens product ranges can be connected if their signals are compatible with the modules' inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Sensor calibration On the automation station, the calibration of the sensors can be readjusted in the associated function block should this be required by special ambient conditions or different line resistances (the sensors use two-wire connections).

Notes The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, please refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connection terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug is also on the front of the module.
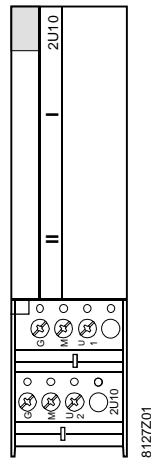
All I/O modules use the same accessories, which are shown on data sheet N8105.

Note For a more detailed description of the modules' mechanical design, please refer to document Z8102, "I/O module system".

Front view   **PTM1.2R1K**   **PTM1.4R1K**

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, the I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.

The sectons of this chapter identified by a warning sign contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

Measuring sensors

The insulation resistance of the connected measuring sensors must satisfy the requirements on **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.

Measured value inputs

The measured value inputs are **not galvanically separated** from the system's electronics.

Line lengths

Line lengths exceeding 300 m at the measured value input are permitted, but shielded cable will then be required to reduce humming.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	1 (12.5 mA each)
Measured value inputs	Suitable sensing elements	LG-Ni 1000 ohm at 0 °C
	Measuring range	−50...+150 °C
	Sensor current	2.1...2.7 mA
	Resolution of converter	0.05 K
	Calibrated compensation	
	of sensor line resistance	1 ohm
Line lengths	For perm. line lengths and cross-sectional areas,	
	please refer to document Z8102, "I/O module system"	300 m max.
	Min. dia. of wire	0.6 mm
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system",	
	and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagram

Double measured value
module PTM1.2R1K
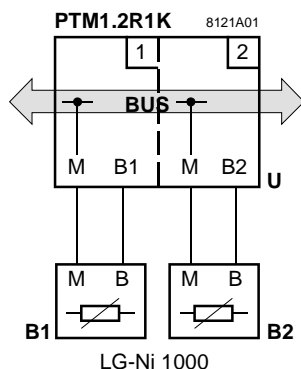
Quadruple measured
value module
PTM1.4R1K
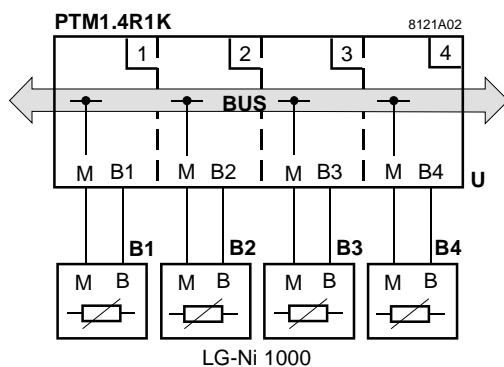
U	Measured value module PTM1.2R1K / PTM1.4R1K
B1.B4	Temperature sensors LG-Ni 1000 ohm at 0 °C
BUS	I/O bar with P-bus
B1…B4	Sensor signals
M	Measuring neutral

SIEMENS

8123P015   PTM1.2P100

8123P035   PTM1.2P1K
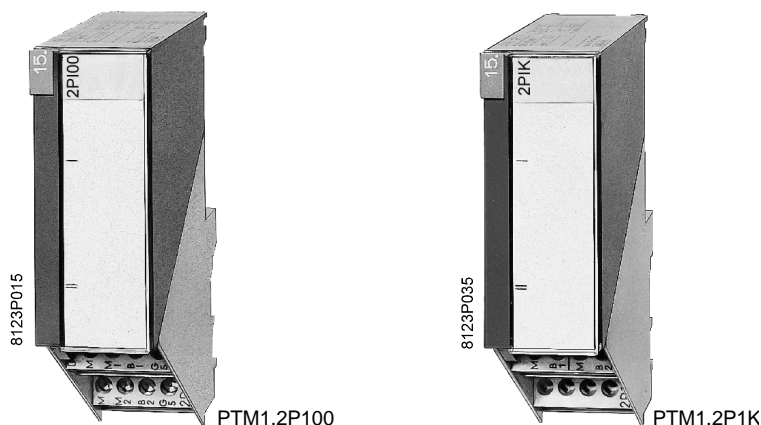
DESIGO™ I/O modules

Measured value modules

**PTM1.2P100
PTM1.2P1K**

for temperature sensors or resistance transmitters

Measured value converters for connection to P-bus, with two separate inputs (double modules) for:

- **resistance transmitters 0...250 ohm or temperature sensors Pt100 or Ni100 (module type PTM1.2P100)**
- **resistance transmitters 0...2500 ohm or temperature sensors Pt1000 or Ni1000 (module type PTM1.2P1K)**

Use

- Measurement with resistance transmitters in the range of
  0...250 ohm and in the range of
  0...2500 ohm in the form of
  - setting potentiometers
  - potentiometer sensors
  - remote setting units
  - outside temperatures
- Temperature measurement
  with Pt100 or Pt1000 sensors (DIN IEC 751) up to 400 °C, and
  with Ni100 or Ni1000 sensors up to 150 °C to acquire
  - room temperatures
  - temperatures in pipework
  - temperatures in air ducts and exhaust gas ducts
  - outside temperatures

Notes	Use of the two modules for temperature measurements requires intervention in the automation station's software. For details, refer to "Engineering notes".

For **LG-Ni 1000 sensors,** the use of measured value module type PTM1.2R1K or PTM1.4R1K is mandatory.

Functions

- Measured value conversion of analog sensor measuring signals from the plant to digital P-bus signals which are then handled by the automation station.
- Adjustment possibility for calibration of the sensors via the automation station.
- Interruption or short-circuit of sensors is recognized by the automation station.

Type summary

	Measured value module for 0...250 ohm resistance transmitters or Pt100 or Ni100 temperature measuring sensors	**PTM1.2P100**
	Measured value module for 0...2500 ohm resistance transmitters or Pt1000 or Ni1000 temperature measuring sensors	**PTM1.2P1K**
Delivery	Base and electronic module are supplied together but in separate boxes that are attached to one another.	
Accessories	For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.	

Equipment combinations

Automation stations	Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".
Field units	Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Four-wire link	With the Pt100 and Ni100 sensors, the four-wire link between the sensor and the module offsets the effect of line resistance (refer to "Connection diagrams").
Conversion and linearization	In the case of temperature measurements, the conversion of the sensor's resistance value to the temperature value and any linearization of the sensor's characteristics takes place in the automation station. The conversion parameters and characteristic factors are entered when the plant is configured.
Sensor calibration	If required by special ambient or fitting conditions, the calibration of the sensor can also be readjusted on the function block.
Notes	The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.
	For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug is also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front views

PTM1.2P100

PTM1.2P1K

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Measured value transmitters

The insulation resistance of the connected measuring sensors must comply with the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.

⚠ Measured value inputs

The measured value inputs are **not galvanically separated** from the system's electronics.

Conversion and linearization	When using the modules for temperature measurement, the respective conversion parameters and characteristic factors are to be entered in the corresponding functional unit of automation station.
Four-wire connection	As shown in the connection diagram, the connection between a Pt100 or Ni100 sensor and the PTM1.2P100 module requires two wires.
Line lengths	Line lengths exceeding 300 m at the measured value input are permitted, but shielded cable will be required to reduce humming.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	Module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Suitable resistance transmitters	At the PTM1.2P100	0...250 ohm
	At the PTM1.2P1K	0...2500 ohm
Suitable sensing elements	At the PTM1.2P100	Pt100 (DIN IEC 751)
		Ni100
	At the PTM1.2P1K	Pt1000 (DIN IEC 751)
		Ni1000
Temperature measuring range	With Pt sensors	up to 400 °C
	With Ni sensors	up to 150 °C
Resolution	A/D converter	13 bits
	Resistance with the PTM1.2P100	33 mOhm
	Resistance with the PTM1.2P1K	333 mOhm
	Temperature with Pt sensors	0.086 K
	Temperature with Ni sensors	0.059 K
Sensor current, constant	With the PTM1.2P100	4 mA
	With the PTM1.2P1K	1.25 mA
Line lengths	For permissible line lengths and cross-sectional areas, also refer to document Z8102, "I/O module system"	300 m max.
	Min. dia. of wire	0.6 mm
$C\epsilon$ conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Measured value module
type PTM1.2P100

PTM1.2P100 8123A01

Pt100   Pot.-Meter 0...250 Ω

U	Measured value module PTM1.2P100
B	Temperature sensor Pt100 (DIN IEC 751) or
	Temperature sensor Ni100
R	Resistance transmitter 0...250 ohm
BUS	I/O bar with P-bus
B1, B2	Sensor signal (four-wire connection),
	or transmitter signal
G5	Power supply for measuring sensor
M	Sensor supply neutral
M1, M2	Measuring neutral

Measured value module
type PTM1.2P1K

PTM1.2P1K 8123A02

Pt1000   0...2500 Ω
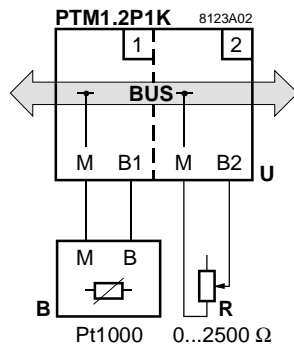
U	Measured value module PTM1.2P1K
B	Temperature sensor Pt1000 (DIN IEC 751) or
	Temperature sensor Ni1000
R	Resistance transmitter 0...2500 ohm
BUS	I/O bar with P-bus
B1, B2	Sensor or transmitter signal
M	Measuring neutral

SIEMENS
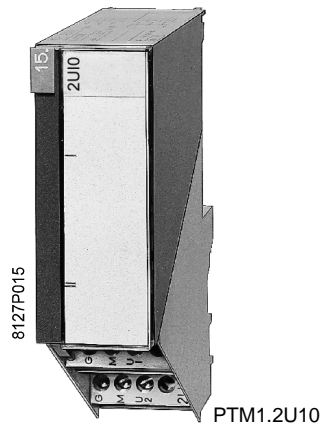
PTM1.2U10

DESIGO™ I/O modules

Measured value
module
PTM1.2U10

for continuous DC 0...10 V input signals

Measured value module for connection to P-bus, with two independent inputs for measuring voltages of DC 0...10 V (double module).

Use

The measured value module is used to acquire DC 0...10 V measuring signals. In the HVAC field, this type of signal is delivered by the following units:

- active Siemens sensors, such as humidity, pressure, differential pressure and frost protection sensors
- actuators that give position signals
- measuring converters of other manufacture
- shift controllers and setting units

Functions

- Measured value conversion of analog DC 0...10 V measuring signals from the plant to digital P-bus signals for handling by the automation station.
- Identification of interruptions at sensors.

Siemens Building Technologies
Building Automation

Type summary

	Measured value module	**PTM1.2U10**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories
For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units
Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevent safety requirements.

Technical design

Notes
The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug is also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note
For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.2U10

Engineering notes

STOP — The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

Measuring sensors

The insulation resistance of the connected measuring sensors must comply with the requirements for **safety-extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.

Measured value inputs

The measured value inputs are **not galvanically separated** from the system's electronics.

Line lengths

Line lengths exceeding 300 m at the measured value input are permitted, but shielded cable will be required to reduce humming.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

3/4

Technical data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra-low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	0,1 VA plus sensor current with active sensors
	I/O module power supply	DC 24 V (against G0)
	Load units	1 (12.5 mA each)
Measured value inputs	Input signal	DC 0...10 V
	Overrange	11.30 V
	Underrange	−1.30 V
	Input current	0.1 mA max.
	Resolution	3.125 mV = 0.3 ‰
	Permissible input voltage	DC ±20 V max.
Line lengths	For permissable line lengths and cross-sectional areas, refer to document Z8102, "I/O module system"	300 m max.
	Min. dia. of wire	0.6 mm
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagram

U	Measured value module PTM1.2U10
B	Measuring sensor with active DC 0...10 V measuring signal
BUS	I/O bar with P-bus
G	AC 24 V supply for sensor
M	Measuring neutral
U1, U2	Measured value

PTM1.2I25/020
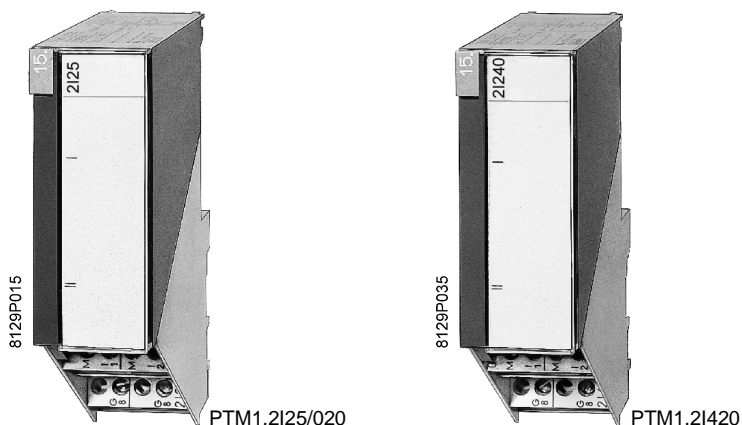
PTM1.2I420

DESIGO™ I/O modules

Measured value modules PTM1.2I25/020 PTM1.2I420

for DC 0...25 mA and DC 4...20 mA measuring ranges

Measured value converters for connection to P-bus, with two separate inputs (double modules). Two versions:

- **measuring range DC 0...25 mA**
- **measuring range DC 4...20 mA**

Use

The measured value modules are used to acquire measured values in the form of currents. Units that deliver such measured values are, for example:

- measuring converters
- measuring current sources

units and systems with current outputs, made by other manufacturers

Using plug-in shunts with module type PTM1.2I25/020, the following measuring ranges can be selected:

- 1...5 mA
- 0...10 mA
- 0(4)...20 mA
- 0...25 mA

Without a shunt, there is a voltage measuring range of DC 0...1 V available.

Module type PTM1.2I420 has a fixed current range of 4...20 mA.

Functions

- Measured value conversion of analog current signals from the plant to digital P-bus signals for handling by the automation station.
- Module type PTM1.2I25/020 offering selectable measuring ranges.
- Power supply facility for connected measured value sources in the range DC +12...30 V at max. 50 mA per output.

Type summary

Mesured value module DC 0...20 mA	**PTM1.2I25/020**

Measuring range shunts for PTM1.2I25
(standard packs of 10 pieces each)

- 1...5 mA	**PTR1.105**
- 0...10 mA	**PTR1.010**
- 0(4)...20 mA	**PTR1.020**
- 0...25 mA	**PTR1.025**

Mesured value module DC 4...20 mA	**PTM1.2I420**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.
Module type PTM1.2I25/20 is supplied with the shunt for 0...20 mA.

Accessories

If a module type PTM1.2I25/020 is used with a measuring range other than 0...20 mA, the appropriate shunts must be ordered (see above).

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

With the PTM1.2I25/020 module, the shunt used is not acquired by the automation station. Selection of the range 4...20 mA or 0...20 mA with the PTR1.020 shunt is made by the automation station.

Note

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug is also on the front of the module.

All I/O modules use the same accessories, which are shown on Data Sheet 8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front views

PTM1.2I25

PTM1.2I420

1   Plug-in type measuring range shunts
     (0...20 mA as supplied)

Engineering notes

STOP   The document Z8102, "I/O module system" contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

Measured value transmitters

The measured value transmitters connected to the measured value modules must satisfy the requirements for **safety-extra low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.

Measured value inputs

The measured value inputs are **not galvanically separated** from the system's electronics.

Burden

The burden specified under "Technical data" corresponds to the input resistance at the measured value inputs.
The sum of line resistance and burden of the measured value module must be smaller than the maximum permissible burden of the measured value transmitter.

Line lengths

Line lengths exceeding 300 m are permitted, but shielded cable will be required to reduce humming.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

If required, the measuring range shunts must be changed.

With the PTM1.2I25/020, the shunt used is not protected against incorrect wiring (e.g. against G on I1 or I2, refer to "Connection diagrams").

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning note

Please refer to document Z8102, "I/O module system".

Technical Data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra-low voltage "SELV" or	
	protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50 Hz / 60 Hz
	Power consumption	0.5 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	1 (12.5 mA each)
	Measured value inputs	
	PTM1.2I420	DC 4...20 mA
	PTM1.2I25/020	
	Current range (with shunts)	DC 0...25 mA
	Voltage	DC 0...1 V
Measuring range shunts	Only for PTM1.2I25/020	
	1...5 mA	200 Ohm
	0...10 mA	100 Ohm
	0(4)...20 mA	50 Ohm
	0...25 mA	40 Ohm
	Burden with PTM1.2I420	100 Ohm
Over- and underranges	PTM1.2I420	+2.2...21.8 mA
	PTM1.2I25/020	
	1...5 mA	–0.5...+5.5 mA
	0...10 mA	–1...+11 mA
	0(4)...20 mA	–2...+22 mA
	0...25 mA	–2.5...+27.5 mA
	0...1 V	–0.1...+1.1 V
Resolution of converter	With PTM1.2I420	5 µA
	With PTM1.2I25/...	
	Using 1...5 mA shunt	1.562 µA
	Using 0...10 mA shunt	3.125 µA
	Using 0(4)...20 mA shunt	6.250 µA
	Using 0...25 mA shunt	7.812 µA
	With 0...1 V voltage	0.312 mV
Perm. input voltage	PTM1.2I420	DC ±7 V max.
	PTM1.2I25/020 (without shunt)	DC ±20 V max.
Power supply for sensor (terminal G8)	Voltage range	DC 12...30 V
	Perm. current rating	
	At both terminals together	100 mA max.
	At each terminal G8	50 mA max.
Line lengths	Perm. line lengths (due to humming noise)	300 m
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagrams

Measured value module
PTM1.2I25/020

PTM1.2I25   8129A01
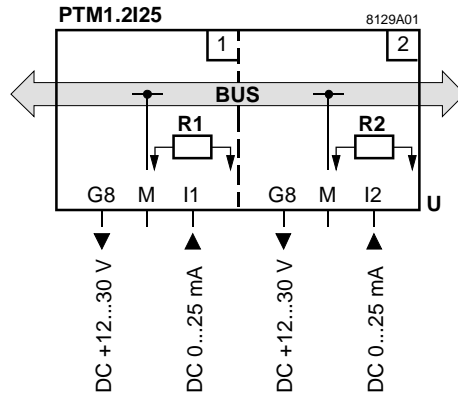
Measured value module
PTM1.2I420

PTM1.2I420   8129A02
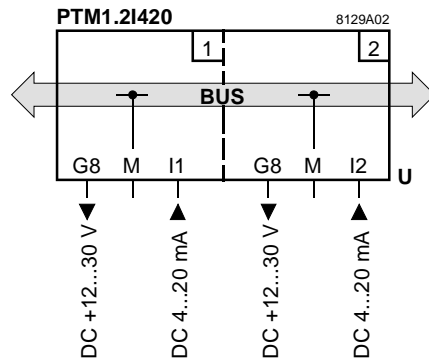
U   Measured value modules PTM1.2I25/020, PTM1.2I420
R1, R2 Measuring range shunts PTR1... (plug-in shunts)
Bus   I/O bar with P-bus
G8   Power supply for measuring converter DC +12...30 V, 50 mA
I1, I2   Measuring current signals

Connection examples
for measuring
converters

PTM1.2I...   8129A03   **PTM1.2I...**   8129A04
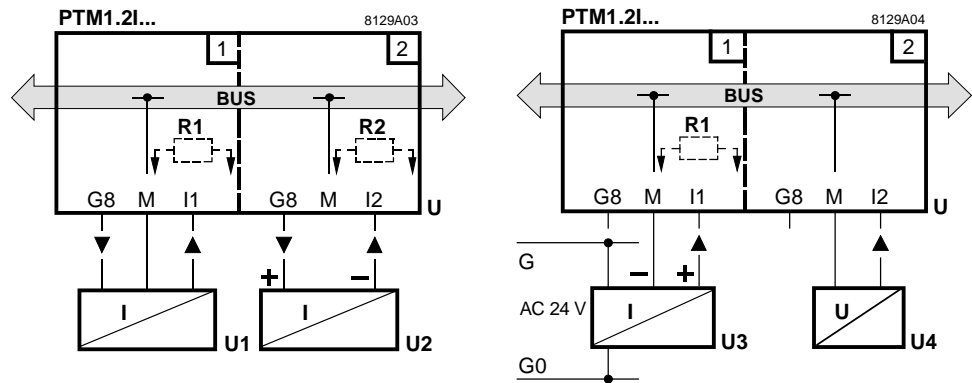
M   Measuring neutral
U   Measured value modules PTM1.2I25/020, PTM1.2I420
U1   Measuring converter with three-wire connection, power supply
     via measuring converter supply G8
U2   Measuring converter with two-wire connection, power supply
     via measuring converter supply G8, with basic current of 4 mA
     (possible only with 4...20 mA range)
U3   Measuring converter with external power supply, e.g. AC 24 V
U4   Voltage source connection DC 0...10 V, possible only
     with PTM1.2I25/020 without shunt
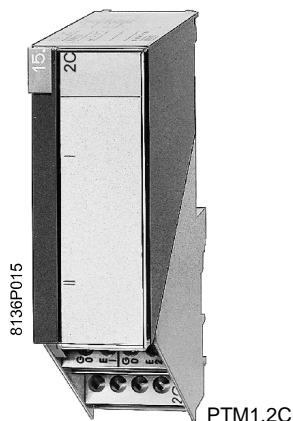
PTM1.2C

DESIGO™ I/O modules

Counting value module   PTM1.2C

for counting pulses from potential-free contacts

Counting pulse converter for connection to P-bus, with two separate inputs for the acquisition of counting values from potential-free switching contacts or electronic switching devices (double module).

Use

The counting value module is used to acquire measured values and measured variables in the form of counting pulses. Units that deliver such pulses are, for example:
- heat meters
- volumetric flow meters
- electricity meters

In conjunction with energy metering, the module can be used for the acquisition   of synchronization pulses that, for instance,
- initiate the start of a new measuring period, or
- trigger a switching action (such as change of tariff or load shedding)

Notes

Either normally open or normally closed contacts can be used to acquire counting pulses.

Electronic switching devices such as transistors and optocouplers can also be used as counting pulse sources.

Functions

- Intermediate storage of counting value pulses from the plant and conversion of counter reading to digital P-bus signals for handling by the automation station.
- Assignment of valency to the counting pulses is made by the automation station.

Type summary

Counting value module	**PTM1.2C**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories
For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units
Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Handling of pulses
The pulses received at the two inputs are continuously added up by two separate 7-bit counters. The counters' reading is periodically interrogated via the P-bus by the automation station. The automation station multiplies the number of counting pulses by the valency of one pulse (scaling). A volumetric flow meter, for instance, delivers one pulse for every 10 liters of volume that pass through the meter, giving a valency of 10.

Triggering of counting value
The counting value module responds only when the pulse contacts open. It is only the number of switching pulses that is registered, not their duration.

Device response during malfunction
Counting values are **not** buffered in a module, meaning that counting values are reset to zero in event of module voltage failure (voltage from automation station via P-bus) or when the module is removed from the I/O bar.

Notes
The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug is also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.2C

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ **Caution**

- The contacts of the signal sources connected to the counting value module must satisfy the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.
- Mechanical switching contacts connected to a counting value module must be **potential-free**
- The counting value inputs **are not galvanically separated** from the system's electronics.

Status pulses

For duration and frequency of the status pulses, refer to "Technical data".

Connecting wires

If several impulse contacts are to be connected to separate inputs - also to different modules - they may use the same common return wire G0 (system neutral) of a counting value input. This reduces the number of wires, but the respective counting values must be fitted on the same **I/O bar.**
The conditions with regard to line lengths, cross-sectional areas and number of status contacts given in document Z8102, "I/O module system", must be observed.

3/4

Electronic counting pulse sources	For the basic connection of electronic counting pulse sources, refer to "Connection diagrams" and "Technical data".

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical Data

Power supply	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Status inputs	Contact voltage (internally generated by the module)	DC 22 V
	Contact current	8 mA (typically)
	Permissible resistance	
	when contact is closed	200 ohm max.
	when contact is open	50 kOhm min.
	Permissible voltage levels	
	when contact is closed	DC 1.6 V max.
	when contact is open	DC 18 V min.
	Counting value storage	0...127 (7-bit counter)
Status pulses	Max. pulse frequency	25 Hz
	Min. pulse duration	20 ms
	Min. pulse interval	20 ms
	Max. bounce time	10 ms
Line lengths	Perm. line lengths	300 m max.
	Min. wire dia.	0.6 mm
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagrams

Connection with potential-free, mechanical impulse contacts
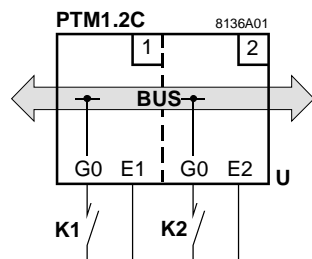
Connection with electronic pulse switching devices
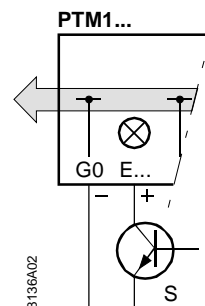
U	Counting value module PTM1.C
K1,K2	Potential-free contacts
S	Solid-state switch
BUS	I/O bar with P-bus
G0	System neutral (of AC 24 V operating voltage)
E1,E2	Sensing of counting pulses

PTM1.2Q250
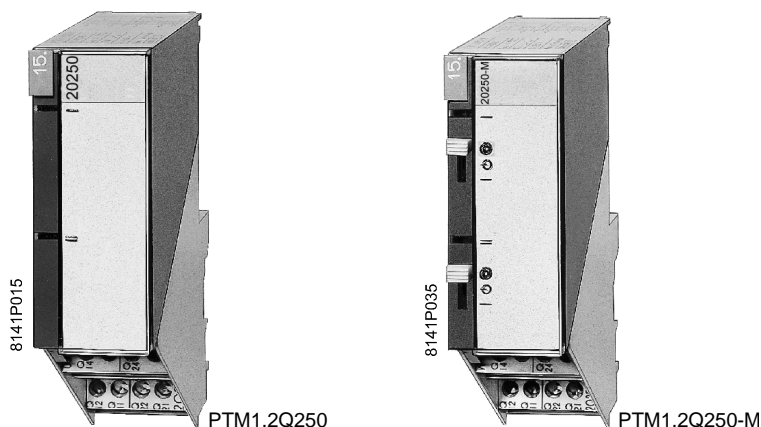
PTM1.2Q250-M

DESIGO™ I/O modules

Switching modules

PTM1.2Q250
PTM1.2Q250-M

for AC 24...250 V, with or without manual switching, double modules

---

Signal converters for connection to P-bus, with two independent on/off control outputs (binary control outputs) and potential-free changeover contacts.
Two versions:
- **without manual switch**
- **with manual switch**

Use

The two switching modules are used to:
- switch different types of units and loads, such as
  - power contactors
  - relays and semiconductor relays
  - motors
  - burners (control loop)
  - chillers and heat pumps (control loop)
  - solenoid valves
  - indicating units (optical or audible)
- drive actuators, e.g. air damper or valve actuators, to their fully open or fully closed positions

On applications where manual interventions are required, e.g. auxiliary operation, or to carry out service work, the switching module with the manual switches is used.

Functions

- Conversion of on/off signals delivered by the automation station via the P-bus to on/off commands for the plant.
- Indication of switching statuses of the control outputs:
  - lamp OFF: contact across terminals Q11-Q12 or Q21-Q22 closed
  - lamp ON: contact across terminals Q11-Q14 or Q21-Q24 closed (steady light)
  - The relays drop out (contact across terminals Q11-Q12, Q21-Q22 closed) when
  - the automation station is at fault
  - there is no correct P-bus telegram within 4 seconds
- Positions of manual switches:
  - AUTO: automatic operation, the switching status of the contacts is determined by the automation station
  - OFF: contact across terminals Q11-Q12, Q21-Q22 closed (relays dropped out)
  - ON: contact across terminals Q11-Q14, Q21-Q24 closed (relays picked up)
- Functions with manual control:
  - the positions of the manual switches can be identified (sensed) by the automation station
  - with the PTM1.2Q250-M module, manual control is also operational without the automation station when AC 24 V operating voltage is present at the I/O bar

Type summary

Switching module without manual switches	**PTM1.2Q250**
Switching module with manual switches	**PTM1.2Q250-M**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevent safety requirements.

Technical design

The signal flow between the automation station and the I/O module takes place via the process bus (P-bus) at an access cycle of 0.5 seconds.
The relays' switching status is determined by the automation station.

Notes

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software).For a full understanding of the scope module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug, the signal lamps and, in the case of the PTM1.2Q250-M module, the slide switches for manual control, are also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front views

PTM1.2Q250

1 Signal lamp for switching output I
2 Signal lamp for switching output II

PTM1.2Q250-M
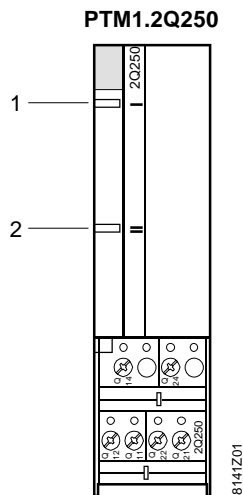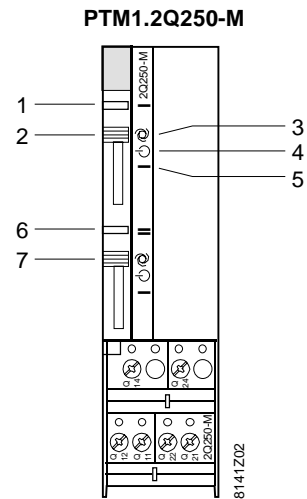
1 Signal lamp for switching output I
2 AUTOMATIC/MANUAL switch
3 Switch position AUTOMATIC
4 Switch position MANUAL: OFF
5 Switch position MANUAL: ON
6 Signal lamp for switching output II
7 AUTOMATIC/MANUAL switch for switching output II (the other elements are the same as those of switching output I)

3/6

Engineering notes

STOP The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

Caution

- To protect the I/O components, the breaking voltage routed via the I/O module must be fused with **10 A max.**
- Both switching outputs of these modules accept **only mains voltage or only extra-low voltage.** A mixture of both is not permitted!
- Different phases at the two outputs are permitted.
- The module's manual switch function must not be used for safety shutdown.

Switching frequency

On applications requiring great switching frequencies, the life of the relay contacts must be taken into account. For details, refer to "Technical data".

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	Operating voltage [1]	AC 24 V ± 20 %
	Safety extra low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency [1]	50 Hz or 60 Hz
	Power consumption [1]	2 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Switching outputs	Number of switching outputs (change-over contacts)	2
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	2×10^6 operations
	at 4 A (res.)	1×10^5 operations
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics	
	(reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between adjacent relay contacts	
	(basic insulation)	AC 1250 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC
	1) Applies only to PTM1.2Q250-M	
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

PTM1.2Q250 switching module without manual switch
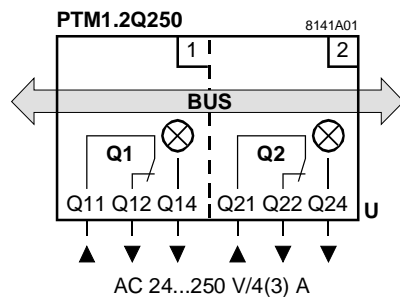
PTM1.2Q250-M switching module with manual switch
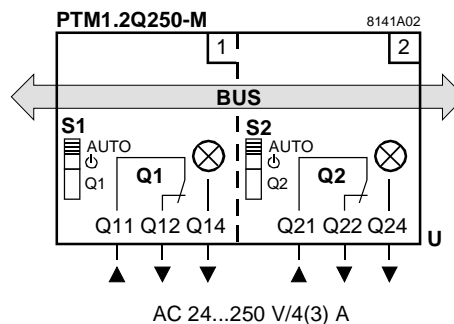
U	Switching modules
Q1, Q2	Switching relays
S1, S2	Manual switches
BUS	I/O bar with P-bus
Q11, Q21	Relay inputs
Q12, Q22	N.C. contacts
Q14, Q24	N.O. contacts

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Building Automation

Switching modules

CM2N8141E
20.11.2001

8143P015   PTM1.2QD

8143P035   PTM1.4QD
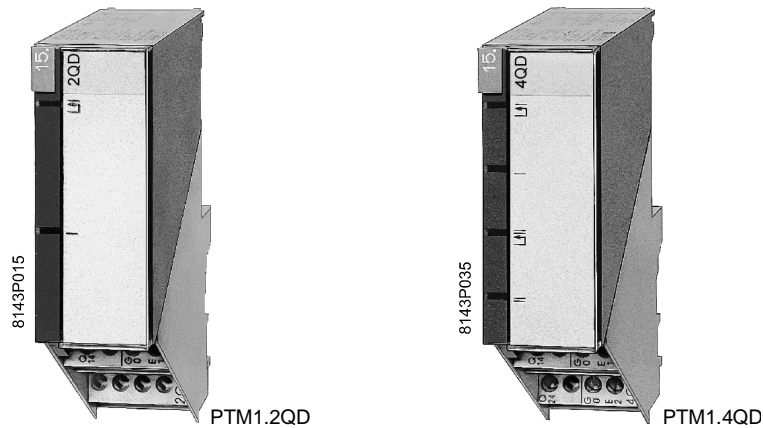
DESIGO™ I/O modules

Switching modules

PTM1.2QD
PTM1.4QD

for AC 230 V, non-potential-free, single and double module

Signal converters for connection to P-bus, with on/off control outputs (binary control outputs), non-potential-free N.O. contacts and status inputs. Two versions:
- **single module: with one control output and one status input**
- **double module: with two independent pairs of one control output and one status input each**

Use

The switching modules are used to
- control power contactors that switch motor speeds and other electric loads, such as
  - fans
  - pumps
  - chillers
  - heat pumps
  - burners
  - electric air heater batteries
- acquire status signals delivered by potential-free contacts; normally, these are the checkback signals from the respective contactors in the power section of the control panel, but may also be signals from the plant itself.

The control outputs and status inputs can also be used independently.

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The double module is suitable for the control of
- two independent single-stage loads
- one two-stage load
- multi-stage loads, together with additional double or single modules

Functions

- Conversion of P-bus on/off signals delivered by the automation station to on/off control signals for the plant.
- Conversion of status signals from the plant to P-bus status signals for the automation station.
- Indication of relay status and of position of the status contacts by individual signal lamps:
  - relay dropped out or status contact open: lamp OFF
  - relay picked up or status contact closed: lamp ON (steady light)
- The relays drop out when
  - the automation station is faulty
  - there is no correct P-bus telegram within 4 seconds

Type summary

Single switching module	**PTM1.2QD**
Double switching module	**PTM1.4QD**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories
For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units
Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Handling of signals
The relays' switching status is determined by the automation station.

The status signals are handled by the automation station.

Breaking voltage
The breaking voltage (normally AC 230 V mains voltage) for the relay outputs is picked up directly from the I/O bar, which means that no extra wiring is required.

Notes
The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer document Z8102, "I/O module system".

Front views

PTM1.2QD

PTM1.4QD

8143Z01

8143Z02
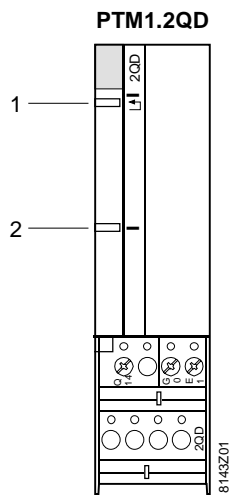
| 1 | Signal lamp for checkback signal |
| 2 | Signal lamp for switching command |
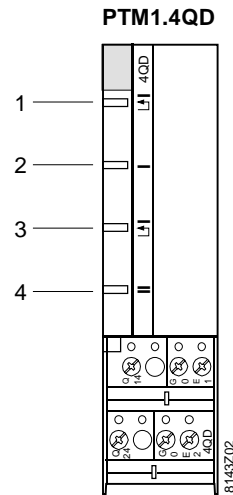
1	Signal lamp for checkback signal I
2	Signal lamp for switching command at output I
3	Signal lamp for checkback signal II
4	Signal lamp for switching command at output II

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ **Caution**

- The insulation resistance of the connected status contacts against mains voltage must comply with the requirements for **safety-extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.
- The mechanical status contacts of this module must be **potential-free**.
- The status inputs are **not galvanically separated** from the system's electronics.
- To protect the I/O components, the breaking voltage across the relays must be fused with **10 A max.**

Breaking voltage

The breaking voltage (normally AC 230 V mains voltage) for the relay contacts is picked up from the I/O bar. It must be supplied via the phase, which means that the relays are non-potential-free.

Switching frequency

On applications requiring great switching frequencies, the life of the relay contacts must be taken into account. For details refer to "Technical data".

Interlocking with PTM1.4QD

If the PTM1.4QD double module is used for two-speed motors, the contactors of the two speeds must be interlocked (refer to "Connection diagrams").

Signal lines

If several status contacts are to be connected to separate inputs - also to different modules - they can be connected to the same common G0 (system neutral) of a status input. This reduces the number of wires, but the respective signalling modules must be fitted on the **same I/O bar.**

For the respective requirements in terms of line lengths, cross-sectional areas and number of status contacts, refer to document Z8102, "I/O module System"

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	I/O module power supply via P-bus [1]	DC 24 V (against G0)
	Load units (12.5 mA each)	
	PTM1.2QD	2
	PTM1.4QD	4
Switching outputs	Number of switching outputs (n.o. contacts)	
	PTM1.2QD	1
	PTM1.4QD	2
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage (normally mains voltage) [1]	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	4×10^6 operastions
	at 4 A (res.)	3×10^5 operations
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics (reinforced insulation)	AC 3750 V, as per EN 60 730-1
Status inputs	Contact sensing	
	Voltage	DC 22 V
	Current	8 mA
	Permissible transfer resistance when contact is closed	100 Ohm max.
	Permissible insulation resistance when contact is open	50 kOhm min.
Line lengths	Permissible line lengths	
	Control line AC 230 V	1000 m max.
	Signal line	300 m max.
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC

1)   Picked up from I/O bar; for more information, refer to document Z 8102, "I/O module system".

Note   For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".

Connection diagrams

Single module
PTM1.2QD

Connection of a single-stage load

PTM1.2QD   8143A01
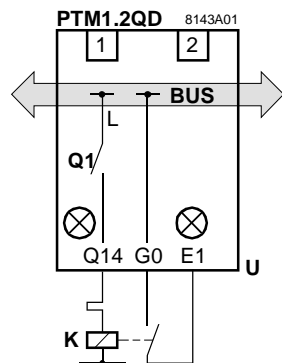
Double module
PTM1.4QD

Connection of two single-stage loads

PTM1.4QD   8143A02
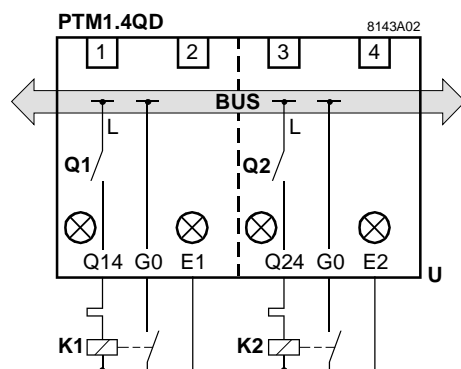
Connection of one two-speed motor,
speeds interlocked

PTM1.4QD   8143A03
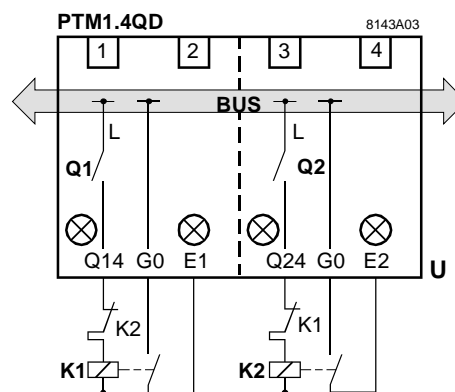
U	Switching module
BUS	I/O bar with P-bus
Q1, Q2	Switching relays
K, K1, K2	Power contactors
Q14, Q24	Switching outputs
E1, E2	Status inputs (for contact sensing)
G0	System neutral (of AC 24V operating voltage)

SIEMENS

PTM1.2QD-M
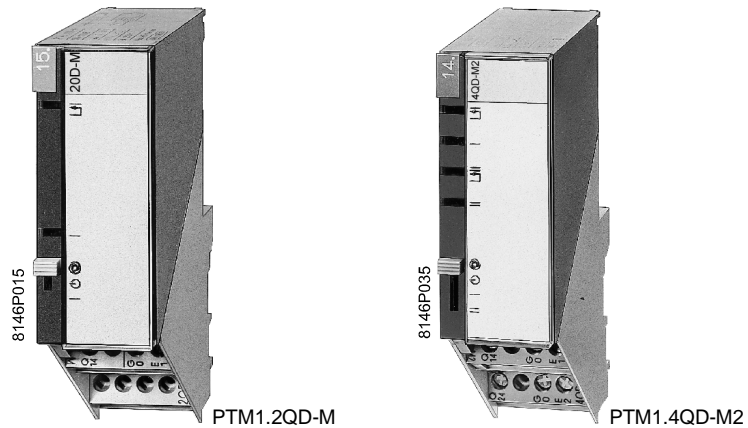
PTM1.4QD-M2

DESIGO™ I/O modules

Switching modules

PTM1.2QD-M
PTM1.4QD-M2

for AC 230 V, with manual switch, single and double module

Signal converter for connection to P-bus, with on/off control outputs (binary control outputs), non-potential-free N.O. contacts, status inputs and manual switch. Two versions:
- **single module: with one control output and one status input**
- **double module: with two interlinked and interlocked control outputs and two independent status inputs**

Use

The two switching modules are used when, in addition to automatic operation, manual interventions are required, namely to
- switch different types of units or loads or their stages.
  - PTM1.2QD-M for single-stage loads
  - PTM1.4QD-M2 for two-stage loads whose stages must be interlocked (only one stage activated at a time)

  Examples of such loads:
  - fans
  - pumps
  - chillers
  - heat pumps
  - burners
  - electric air heater batteries

- acquire status signals delivered by potential-free contacts; normally, these are the checkback signals from the respective power contactors in the power section of the control panel, but they may also be signals from the plant itself.

The control outputs and status inputs can also be used independently.

Functions

- Conversion of P-bus on/off signals delivered by the automation station to on/off control signals for the plant.
- Conversion of checkback signals or other status signals to P-bus signals for the automation station.
- Interlocking of the two relay outputs of the double module; this means the relays cannot be used independently.
- Indication of relay statuses and of position of status contacts by individual signal lamps:
  - lamp OFF: relay contact open, status contact open
  - lamp ON: relay contact closed, status contact closed (steady light)
- The relays drop out when
  - the automation station is faulty
  - there is no correct P-bus telegram within 4 seconds
- Positions of manual switch:
  - AUTO: automatic operation: switching status is determined by the automation station (applies to both types)
  - PTM1.2QD-M: OFF: relay contact open
    ON: relay contact closed
  - PTM1.4QD-M2:   OFF: both relay contacts open
    step I: relay contact Q1 closed
    relay contact Q2 open
    step II: relay contact Q1 open
    relay contact Q2 closed
- Functions with manual control:
  - the positions of the manual switch can be recognized by the automation station, but only when this function has been configured
  - manual control is also operational without the automation station when AC 24 V operating voltage is present at the I/O bar

Type summary

Single switching module	**PTM1.2QD-M**
Double switching module	**PTM1.4QD-M2**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Handling of signals

- The switching status of the relays is determined by the automation station.
- The status signals are handled by the automation station.

Breaking voltage

The breaking voltage (normally AC 230 V mains voltage) for the relay outputs is picked up directly from the I/O bar. Hence, no extra wiring is required.

Manual control

Manual control uses the AC 24 V operating voltage from the I/O bar. A master unit is not required.

Notes

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug, the signal lamps and the slide switch for manual control are also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front views

PTM1.2QD-M

PTM1.4QD-M2

	PTM1.2QD-M		PTM1.4QD-M2
1	Signal lamp for checkback signal	1	Signal lamp for checkback signal, switching stage I
2	Signal lamp for switching command	2	Signal lamp for switching stage I
3	AUTOMATIC/MANUAL switch	3	Signal lamp for checkback signal, switching stage I
4	Switch position AUTOMATIC	4	Signal lamp for switching stage II
5	Switch position MANUAL: OFF	5	AUTOMATIC/MANUAL switch
6	Switch position MANUAL: ON	6	Switch position AUTOMATIC
		7	Switch position MANUAL: stages I and II OFF
		8	Switch position MANUAL: stage I ON
		9	Switch position MANUAL: stage II ON, stage I OFF

Engineering notes

STOP The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠ The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ **Caution**
- The insulation resistance of the connected status contacts against mains voltage must comply with the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.
- Only **potential-free** status contacts may be connected to these modules.
- The status inputs are **not galvanically separated** from the system's electronics.
- To protect the I/O components, the breaking voltage via the relays must be fused with **10 A max.**
- The module's manual switch function must **never be used for safety shutdown**.

Breaking voltage The breaking voltage (normally AC 230 V mains voltage) for the relay contacts is picked up from the I/O bar. It is to be supplied via the phase supply block, which means that the relays are non-potential-free.

Switching frequency On applications requiring great switching frequencies, the life of the relay contacts must be taken into consideration. For details, refer to "Technical data".

Interlocking with PTM1.4QD-M2	Following applies to the PTM1.4QD-M2 double module only:
	• it is always only the relay contact of the selected stage that is closed
	• although the contacts inside the module are interlocked, the switch-on delay times may overlap when switching over, due to the drop-out delay times of the contactors or the welding of their contacts; for this reason, external interlocking of the contactors must always be provided (also refer to " "Connection diagrams").

Number of status contacts per input	It is possible to connect a minimum of threstatus contacts to one status input, either in parallel or in series. The total number of status contacts that can be connected is dependent upon the line resistance and the transfer resistances of the status contacts (refer to "Technical data").
Signal lines	If several status contacts are to be connected to separate inputs - even to different modules - they can use the same common return line G0 (system neutral) of a status input, thus reducing the number of wires, but in that case, the respective signalling modules **must be fitted on the same I/O bar**.
	For the requirements with regard to line lengths, cross-sectional areas and the number of status contacts, refer to document Z8102, "I/O module system.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	1 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Swiching outputs	Number of switching outputs	
	PTM1.2QD-M	2 (n.o. contacts)
	PTM1.4QD-M2	2 (1 n.o. contact, 1 change-over contact)
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage (normally mains voltage)[1]	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)

Lifetime of relay contacts at AC 250 V	guide values	
at 0.1 A (res.)	2×10^7 operations	.
at 0.5 A (res.)	4×10^6 operastions (n.o. contacts)	.
	2×10^6 operations (change-over contacts)	.
at 4 A (res.)	3×10^5 operations (n.o. contacts)	.
	1×10^5 operations (change-over contacts)	.
Red. faktor for ind. loads (cos phi = 0.6)	0.85	.

Insulation strenght	Between relay outputs and system electronics	
	(reinforced insulation)	AC 3750 V, as per EN 60 730-1
Status inputs	Contact sensing	
	Voltage	DC 22 V
	Current	8 mA
	Permissible transfer resistance when contact is closed	100 Ohm max
	Permissible insulation resistance when contact is open	50 kOhm min.
Line lengths	Permissible line lengths	
	Control lines AC 230 V	1000 m max.
	Signal lines	300 m max.
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC

1) Picked up from the I/O bar; for detailed information, refer to data sheet Z8102, "I/O module system".

Note   For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".
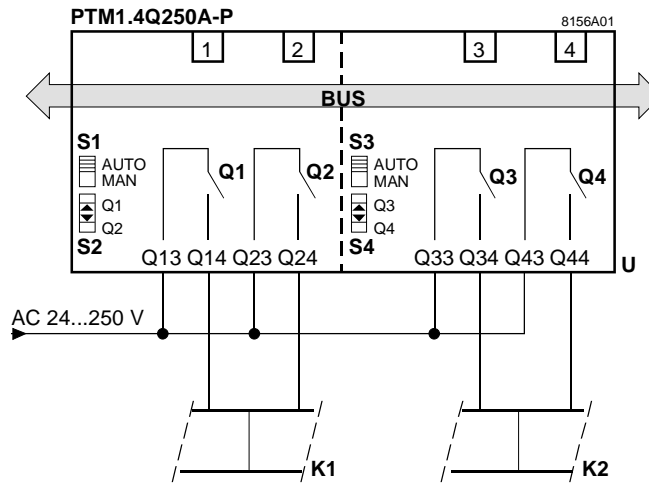
Connection diagrams

Single module
PTM1.2QD-M

U	Switching module
BUS	I/O bar with P-bus
Q1, Q2	Switching relays
K	Contactor
K1, K2	Motor contactors of the two load stages
Q14, Q24	Switching outputs
E1, E2	Status inputs
G0	System neutral
	(of AC 24 V operating voltage)

Double module
PTM1.4QD-M2

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Änderungen vorbehalten

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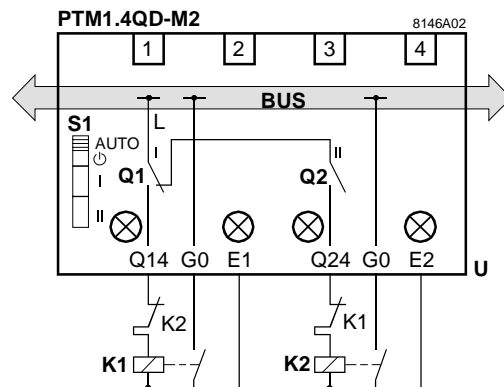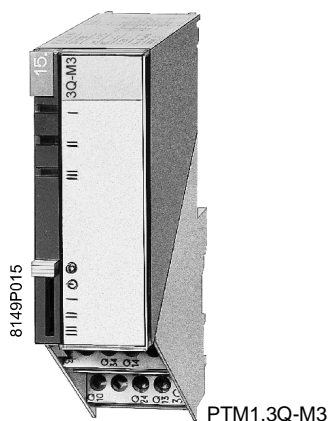
PTM1.3Q-M3

DESIGO™ I/O modules

Switching module   PTM1.3Q-M3

for AC 24…250 V and up to three load stages, with manual switching

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Signal converter for connection to P-bus, with three interlocked on/off control outputs (binary control outputs), control contacts optionally non-potential-free or potential-free, with manual switch.

Use

The switching module is used to control and switch two-or three-speed motors or other electric loads or their power contactors, whereby only one control output is switched at a time.

Such electric loads are, for example:

- fans
- pumps
- chillers
- heat pumps

Functions

- Conversion of P-bus on/off signals delivered by the automation station to on/off control signals for the plant.
- Interlocking of the three relay outputs; this means the relays cannot be used independently.
- Non-potential-free contacts as standard, can be changed to potential-free contacts; for details, refer to "Engineering notes" and "Connection diagram".

- Indication of relay statuses by individual signal lamps:
  - lamp OFF: relay contact open
  - lamp ON: relay contact closed (steady light)
- The relays drop out when
  - the automation station is faulty
  - there is no correct P-bus telegram within 4 seconds
- Positions of manual switch:
  - AUTO: automatic operation: switching status is determined by the automation station
  - OFF: relay contacts open
  - step 1: relay contact for step 1 closed
  - step 2: relay contact for step 2 closed
  - step 3: relay contact for step 3 closed
- Functions with manual control:
  - the positions of the manual switch can be recognized by the automation station
  - manual control is also operational without the automation station when the AC 24 V operating voltage is present at the I/O bar

Type summary

Switching module	**PTM1.3Q-M3**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.
The I/O module is supplied with the shorting plug fitted to the terminal base.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

The switching status of the relays is determined by the automation station.

Notes

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
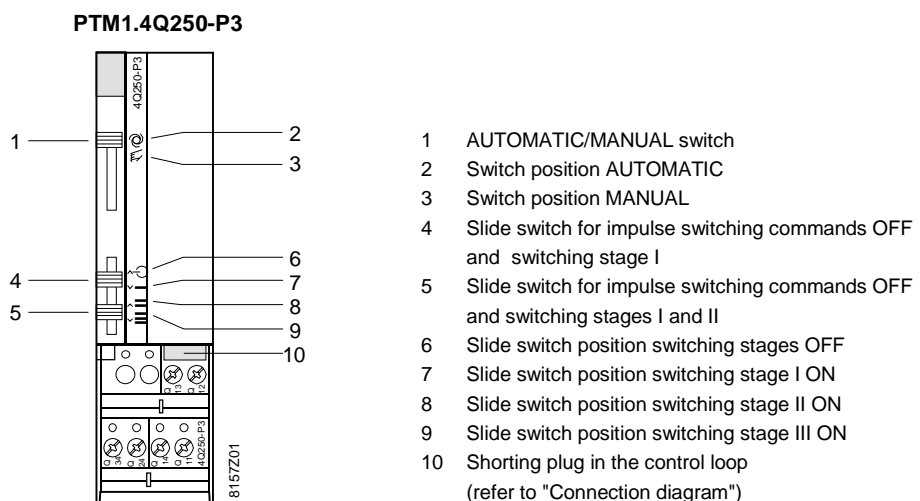
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug, the signal lamps and the AUTOMATIC/MANUAL switch are also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.3Q-M3
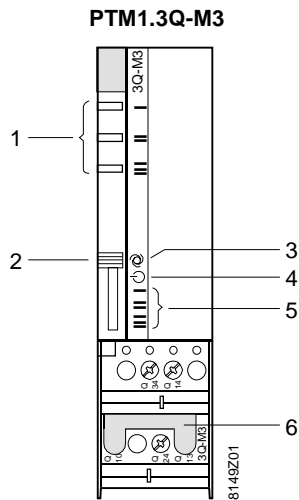
1   Signal lamps for the switching commands, steps I...III
2   AUTOMATIC/MANUAL switch
3   Switch position AUTOMATIC
4   Switch position MANUAL: switching steps I...III OFF
5   Switch position MANUAL: switching step I or II or III ON
6   Shorting plug in the control circuit (refer to "Connection diagram")

Engineering notes

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠ **Caution**

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

3/6

⚠ Breaking voltage	• Normally, the relay contacts of the switching outputs or non-potential-free (standard delivery). For operation, power (AC 250 V max.) must be supplied via the PTX1.00 mains terminal block to the I/O bar.
	• If required, external voltage in the form of breaking voltage can be supplied to terminal 13. In that case, the shorting plug across **Q10-Q13 must be removed.**
	• In place of the shorting plug, it is also possible to connect an auxiliary contact for motor protection, for instance.
	• **Do not make** external connections to terminals Q10-Q13 when the shorting plug is inserted.
	• To protect the I/O components, the breaking voltage via the relays must be fused with **10 A max.**
Switching sequence	It is always only the relay contact of the selected step that is closed.
Interlocking of contacts	Although the contacts inside the module are interlocked, the switch-on times may overlap when switching over, due to the drop out delay times of the contactors or the welding of their contacts. For this reason, external interlocking of the contactors is always recommended (also refer to "Connection diagram").
Checkback signals	If checkback signals of the controlled contactors shall be acquired, it is necessary to use separate status modules.
Switching frequency	On applications requiring great switching frequencies, the life of the relay contacts must be taken into consideration (for details, refer to "Technical data").
⚠ Manual switch	The module's manual switch function must never be used for safety shutdown.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes
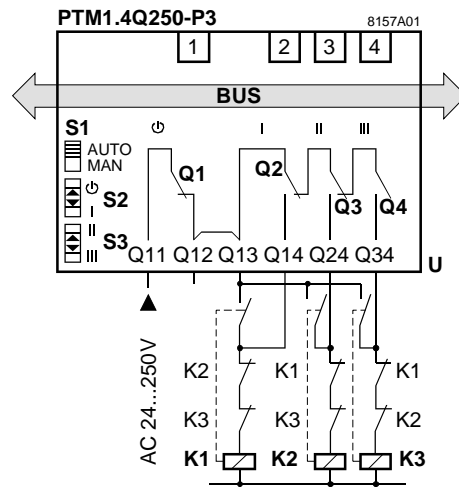
Please refer to document Z8102, "I/O module system".

Technical data

Power supply	Operating voltage	AC 24 V ± 20%
	Safety extra low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	2 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Switching outputs	Number of switching outputs	3
	(2 change-over contacts, 1 n.o. contact)	
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage (normally mains voltage) [1]	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	4×10^6 operastions (n.o. contacts)
		2×10^6 operations (change-over contacts)
	at 4 A (res.)	3×10^5 operations (n.o. contacts)
		1×10^5 operations (change-over contacts)
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics (reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between mains and relay terminals, without shorting plug between Q13–Q13 only (reinforced insulation)	AC 3750 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
CE conformity	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC

1) Picked up from the I/O bar; for detailed information, refer to document Z8102, "I/O module system".

Note For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".

Connection diagram

U	Switching module PTM1.3Q-M3
Bus	I/O bar with P-bus
S1	Manual switch
Q1, Q2, Q3	Switching relays of steps 1 to 3
Q14,Q24,Q34	Relay outputs for load stages
Q10, Q13	With shorting plug: non-potential-free relay contacts (standard delivery)
	Without shorting plug: potential-free, voltage input via terminal Q3
K1,K2,K3	Contactors of steps 1 to 3

Siemens Building Technologies   Switching module   CM2N8149en
Building Automation   20.11.2001
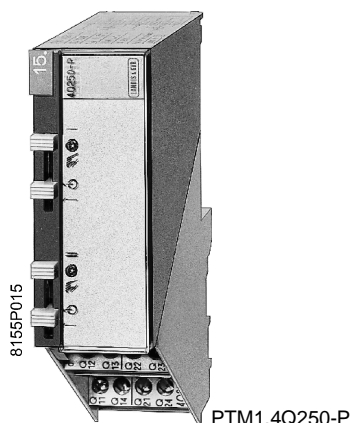
PTM1.4Q250-P

DESIGO™ I/O modules

Impulse switching module PTM1.4Q250-P

for AC 24...250 V, single-stage, with manual switch, double module

Signal converter on P-bus to issue impulse switching commands for automatic switchings with two mutually independent outputs; potential-free relay contacts and manual switches.

Use

Switching of two single-stage electric loads, each with a self-holding circuit,
* if, at the end of a control voltage failure of the self-holding circuit - even with manual control - the loads shall not automatically be switched on again, e.g. in the case of power restoration
* if, in the event of a failure of the master unit, the loads may not be switched on again, e.g. for lighting control
* if switching shall also be effected via manual switching pulses
* if, based on two or several control functions via the I/O modules, equal switching actions shall be performed
* equal manual switching actions shall be performed from two or several remote locations

Note
If only automatic operation is required, it is also possible to use module type PTM1.2Q250

Functions

Conversion of impulse commands from the P-bus or the manual switch to on/off impulse commands for self-holding circuits in the plant.

Selector for automatic operation and manual control for each switching output.
Selector positions:
- AUT: automatic operation; the switching status is determined by the automation station
- MAN: manual control; the switching status is determined by a slide switch having the positions OFF and ON

Manual control
- With manual control, the pulse length equals the actuating time. In automatic operation, it can be selected and equals at least the length of an access cycle of 0.5 seconds or multiples thereof. It is entered in the automation station's software.
- When changing from "AUT" to "MAN", or vice versa, the power contactors' switching status is maintained.
- Manual control is also operational without the automation station if the AC 24 V operating voltage at the I/O bar is present.

Behaviour in the event of fault
- If the AC 24 V operating voltage at the master fails, or if there is no correct P-bus telegram within 4 seconds, the relays will return to their initial positions (Q11/Q12 and Q21/Q22 closed and Q13/Q14 and Q23/Q24 open).
- Due to the self-holding circuit, the current switching status of the power contactors will be maintained.
- If the control voltage for the self-holding circuit fails, the power contactors will drop out, thus switching the loads off.

Type summary

Single-stage impulse switching module   **PTM1.4Q250-P**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.
The I/O module is supplied with the two shorting plugs fitted to the terminal base.

Accessories
For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units
Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Manual control	Manual control uses the AC 24 V operating voltage of the I/O bar. A master unit is not required.
Interrogation of manual switch position	If function "Emergency action" has been set when configuring the function block, the master is able to interrogate the manual switch positions "AUT" and "MAN", but not the manual control pulses. For interrogating the positions of the power contactors, refer to "Engineering notes".
Notes	The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.
	For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually found in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the slide switches and buttons for manual control are also on the front of the module.

All modules use the same accessories, which are shown on data sheet N8105.

Note   For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.4Q250-P

1   AUTOMATIC/MANUAL switch
2   Slide switch for impulse switching command
3   Designation of switching output I
4   Switch position AUTOMATIC
5   Switch position MANUAL
6   Slide switch position for impulse switching command OFF
7   Slide switch position for impulse switching command ON
8   Designation of switching output II
     (the other elements are the same as above)
9   Shorting plugs in the control loop
     (refer to "Connection diagrams")

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

Caution

- To protect the I/O components, the breaking voltage routed via the I/O module must be fused with **10 A max.**
- The two switching outputs of the double module must be connected to **mains voltage only or extra-low voltage only**. A mixture of the two is not permitted. The outputs may be operated with different phases.
- The module's manual switch function **must never be used for safety shutdown**.

Self-holding circuit

The self-holding circuits for the power contactors must be provided outside the I/O modules.

Checkback signals

If the positions of the power contactors shall be signalled back to the master, it is necessary to use separate signalling modules.

Control actions

When used in circuits with several equal control functions (automatically or manually) shorting plugs Q12/Q13 and Q22/Q23 must be removed.

Switching frequency

On applications requiring great switching frequencies, the life of the relay contacts must be taken into consideration (for details, refer to "Technical data").

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Supply	Operating voltage	AC 24 V $\pm$ 20 %
	Safety extra-low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50Hz or 60Hz
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Switching outputs	Number of switching outputs	4
	(2 n.c. contacts and 2 n.o. contacts)	
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	4×10^6 operastions
	at 4 A (res.)	3×10^5 operations
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics	
	(reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between adjacent relay contacts, between relays	
	Q1 and Q2, Q3 and Q4 only without shorting plug	
	(basic insulation)	AC 1250 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system",	
	and for dimensions refer to document M8102, "I/O modules and P-bus".	

The following connection diagrams show the self-holding circuits required for impulse control.

Impulse control of two single-stage loads
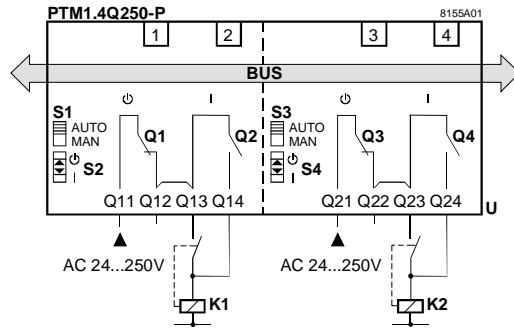
U	Impulse switching module PTM1.4Q250-P
K1,K2	Power contactors with self-holding circuit
BUS	I/O bar with P-bus
Q11,Q21	Control voltage inputs for self-holding circuits
Q13,Q23	Outputs for self-holding circuits
Q14,Q24	Impulse control outputs of "ON" command
Q12-Q13	Shorting plug, to be removed for other control actions
Q22-Q23	Shorting plug, to be removed for other control actions

Impulse control of a single-stage load, with equal switching actions from two control systems
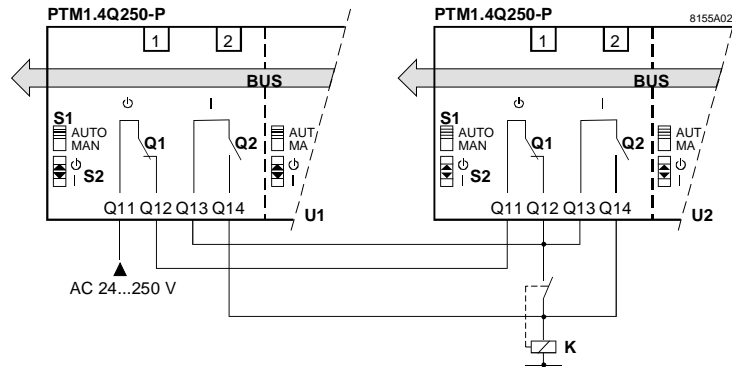
U1	Impulse switching module PTM1.4Q250-P of control system 1
U2	Impulse switching module PTM1.4Q250-P of control system 2
K	Power contactor for a single-stage load

The second load is to be connected to terminals Q21 to Q24.

Impulse control of a single-stage load, with equal push-button actions from two remote locations
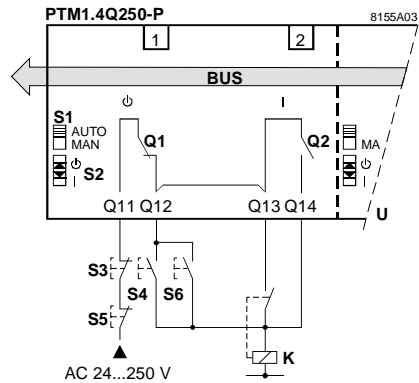
U	Impulse switching module PTM1.4Q250-P
S3	OFF button (remote location 1)
S4	ON button (remote location 1)
S5	OFF button (remote location 2)
S6	ON button (remote location 2)
K	Power contactor for a single-stage load

The second load is to be connected to terminals Q21 to Q24.

6/6

Siemens Building Technologies
Building Automation

Impulse switching module

CM2N8155en
20.11.2001
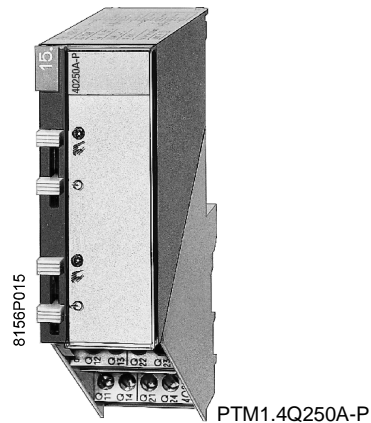
PTM1.4Q250A-P

DESIGO™ I/O modules

Impulse switching module PTM1.4Q250A-P

for AC 24...250 V, single-stage, with manual switches, double module

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Signal converter for connection to P-bus and for delivering impulse switching commands; with two independent outputs (channels) for automatic operation or manual operation, with potential-free relay contacts.

Use

Switching of electric loads if:

- in the event of a master unit failure, they may not be switched off, e.g. for lighting control
- switching actions shall also be performed via manual switching pulses

Note
If automatic operation is required all the time, it is also possible to use module type PTM1.2Q250.

Functions

Conversion of the impulse commands from the P-bus or the manual switch to on/off impulse commands in the plant.

Selector for automatic operation and manual control for each channel (channel 1: relays Q1,Q2; channel 2: relays Q3,Q4). Selector positions:

- AUT: Automatic operation: The switching status is determined by the automation station. If, for example, the command changes from "ON" to "OFF" via channel 1, relay Q1 is energized by a pulse (as per the preset puls length). If the command changes from "OFF" to "ON", relay Q2 is energized by a pulse of the same length. The same applies for channel 2 with relays Q3 and Q4.
- MAN: Manual control: the switching status of the impulse switching contacts is determined by the position of the slide switch

Manual control
- With manual control, the pulse length equals the actuating time.
- Manual control is also operational without the automation station if the AC 24 V operating voltage on the I/O bar is present.

Automatic operation
- In automatic operation, the pulse length can be selected and equals at least the length of an access cycle of 0.5 seconds or multiples thereof. It is entered in the automation station's software.
- When changing from "AUT" to "MAN", or vice versa, the last switching status of the load will be maintained and the internal relays will remain de-energized.

Behaviour in the event of fault
If the AC 24 V operating voltage at the master fails and/or if there is no correct P-bus telegram within 4 seconds, the relays will remain in their initial positions. Storage of the load status is achieved by an external circuit.

Type summary

Impulse switching module, single-stage   **PTM1.4Q250A-P**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories
For general accessories that are used in connection with the I/O modules, please refer to data sheet N8105. Such accessories must be ordered as separate items.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system"

Field units
Any units of the Siemens product range can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Manual control
Manual control uses the AC 24 V operating voltage of the I/O bar. A master is not required.

Interrogation of manual switch position	If function "Emergency action" has been set when configuring the function block, the master is able to interrogate the manual switch positions "AUT" and "MAN", but not the manual control pulses. For interrogating the load status (checkback signal), please refer to "Engineering notes".
Notes	The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.
	For the technical features common to all I/O modules, please refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connection terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually found in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the slide switches and buttons for manual control are also on the front of the module.
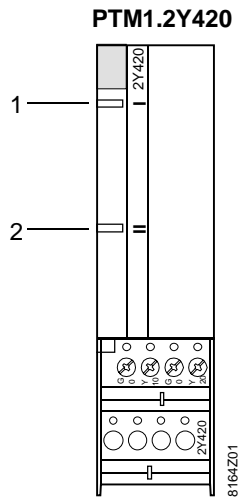
All modules use the same accessories, which are shown on data sheet N8105.

Note For a more detailed description of the module's mechanical design, please refer to document Z8102, "I/O module system".

Front view

PTM1.4Q250A-P

1, 3	Automatic/manual switch for impulse switching commands via Q1,Q2 and Q3,Q4
2, 4	Slide switch for impulse switching commands via Q1,Q2 and Q3,Q4
5, 9	Switch position AUTOMATIC
6, 10	Switch position MANUAL
7, 11	Slide switch position for impulse switching commands "OFF" (relays Q1,Q3)
8, 12	Slide switch position for impulse switching commands "ON" (relays Q2,Q4)

Engineering notes

STOP | The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

The sections of this chapter identified by a warning sign contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

Caution

- To protect the I/O components, the breaking voltage routed via the I/O module must be fused with **10 A** max.
- The two switching outputs of the impulse switching module must be connected to **mains voltage only or extra-low voltage only.** A mixture of the two is not permitted. The outputs may be operated with different phases.
- The module's manual switch function must never be used for safety shutdown.

Manual control

Two relays each (Q1, Q2, and Q3, Q4) have a common automatic/manual switch. These relays cannot be operated simultaneously (please refer to "Connection diagram").

Checkback signals

If the load status shall be signalled to the master, separate signalling modules are required.

Switching frequency

On applications where great switching frequencies are required, the life of the relay contacts must be taken into consideration (for details, please refer to "Technical data").

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra-low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Power consumption	2 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Switching outputs	Number of switching outputs (n.o. contacts)	4
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	4×10^6 operastions
	at 4 A (res.)	3×10^5 operations
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics	
	(reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between adjacent relay contacts	
	(basic insulation)	AC 1250 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagrams

Internal diagram

PTM1.4Q250A-P

8156G01

| 1 | 2 | | 3 | 4 |

BUS

S1 AUTO MAN
Q1
Q2
S2

Q1 **Q2**

S3 AUTO MAN
Q3
Q4
S4

Q3 **Q4**

Q13 Q14 Q23 Q24   Q33 Q34 Q43 Q44   **U**

AC 24...250 V / 4 (3) A

Wiring diagram

The circuits required for impulse control must be arranged externally.

Example:
impulse control with
impulsing switch

PTM1.4Q250A-P

8156A01

| 1 | 2 | | 3 | 4 |

BUS

S1 AUTO MAN
Q1
Q2
S2

Q1 **Q2**

S3 AUTO MAN
Q3
Q4
S4

Q3 **Q4**

Q13 Q14 Q23 Q24   Q33 Q34 Q43 Q44   **U**

AC 24...250 V

K1

K2

U	Impulse switching module PTM1.4Q250A-P
BUS	I/O bar with P-bus
S1, S3	Automatic/manual switches
S2, S4	Slide switches for impulse switching commands
K1, K2	Impulsing switches (load)
Q1...Q4	Impulse switching contacts OFF (Q1,Q3); ON (Q2,Q4)
Q13, Q23, Q33, Q43	Control voltage inputs
Q14, Q24, Q34, Q44	Impulse control outputs for OFF/ON commands

Siemens Building Technologies   Impulse switching module   CM2N8156en
Building Automation   20.11.2001
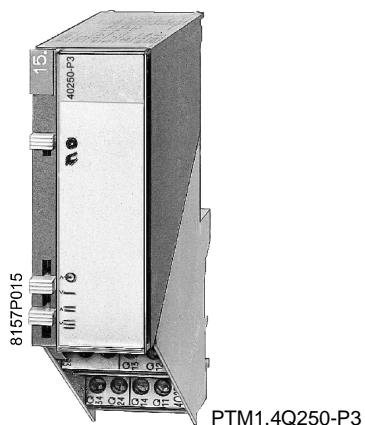
PTM1.4Q250-P3

DESIGO™ I/O modules

Impulse switching
module
PTM1.4Q250-P3

AC 24...250 V, 3-stage, with manual switch

Signal converter for connection to P-bus, with three interlocked impulse control outputs for one stage each, potential-free contacts, with manual switch.

Use

Switching of a two- or three-stage electric load, each stage using a self-holding circuit,
- if, at the end of a control voltage failure of the self-holding circuit - even with manual control - the load stage shall not automatically be switched on again, e.g. in the case of power restoration
- if, in the event of a failure of the master unit, the loads may not be switched on again, e.g. for lighting control
- if switching shall also be effected via manual switching pulses
- if, based on two or several control functions via the I/O modules, equal switching actions shall be performed
- equal manual switching actions shall be performed from two or several remote locations

Note   If only automatic operation is required, it is also possible to use two modules type PTM1.2Q250

Functions

Conversion of impulse commands from the P-bus or the manual switch to on/off impulse commands for self-holding circuits of the individual stages.

Selector for automatic operation and manual control. Selector positions:
- AUT: automatic operation; the switching status is determined by the automation station
- MAN: manual control; the switching status is determined by two slide switches with the impulse actions "OFF and stage 1" and "Stage 2 and stage 3"

Manual control
- With manual control, the pulse length equals the actuating time. In automatic operation, it can be selected and equals at least the length of an access cycle of 0.5 seconds or multiples of the cycle length. It is determined by the software of the automation station.
- When switching from "AUT" to "MAN", or vice versa, the switching status of the power contactors will not change.
- Direct switching of the stages is also ensured with manual control, because the required OFF pulse for the stage to be switched off is generated by the I/O module itself.
- Manual control is also operational without the automation station when AC 24 V operating voltage is present at the I/O bar.

Behaviour in the event of fault
- If the AC 24 V operating voltage at the master fails, or if there is no correct P-bus telegram within 4 seconds, the relays will return to their initial positions (Q11/Q12 and Q21/Q22 closed and Q13/Q14 and Q23/Q24 open).
- Due to the self-holding circuit, the current switching status of the power contactors will be maintained.
- If the control voltage for the self-holding circuit fails, the power contactors will drop out, thus switching the loads off.

Types summary

Three-stage impulse switching module   **PTM1.4Q250-P3**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.
The I/O module is supplied with the shorting plug fitted to the terminal base.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Manual control	Manual control uses the AC 24 V operating voltage of the I/O bar. A master unit is not required.
Interrogation of manual switch position	If function "Emergency action" has been set when configuring the function block, the master is able to interrogate the manual switch positions "AUT" and "MAN", but not the manual control pulses. For interrogating the positions of the power contactors, refer to "Engineering notes".
Notes	The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.
	For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually found in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the slide switches and buttons for manual control are also on the front of the module.

All modules use the same accessories, which are shown on data sheet N8105.

Note   For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Font view

PTM1.4Q250-P3

1	AUTOMATIC/MANUAL switch
2	Switch position AUTOMATIC
3	Switch position MANUAL
4	Slide switch for impulse switching commands OFF and switching stage I
5	Slide switch for impulse switching commands OFF and switching stages I and II
6	Slide switch position switching stages OFF
7	Slide switch position switching stage I ON
8	Slide switch position switching stage II ON
9	Slide switch position switching stage III ON
10	Shorting plug in the control loop (refer to "Connection diagram")

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Breaking voltage

To protect the I/O components, the breaking voltage routed via the I/O module must be fused with **10 A** m**ax.**

⚠ Manual switch

The module's manual switch function **must never be used for safety shutdown.**

Self-holding circuit

The self-holding circuits for the power contactors must be provided outside of the I/O modules.

Interlocking of contacts

Although the contacts inside the module are interlocked, the switch-on times may overlap when switching over, due to the drop out delay times of the contactors or the welding of their contacts. For this reason, external interlocking of the contactors is always recommended (also refer to "Connection diagrams").

Checkback signals

If the positions of the power contactors shall be signalled back to the master, it is necessary to use separate signalling modules.

Control actions

When used in circuits with several equal control functions (automatically or manually), shorting plug Q12/Q13 must be removed (refer to "Connection diagrams").

Switching frequency

On applications requiring switching great frequencies, the life of the relay contacts must be taken into consideration (for details, refer to "Technical data").

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Plese refer to document Z8102, "I/O module system".

Technical Data

Power supply	Operating voltage	AC 24 V ± 20%
	Safety extra low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	1 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	1 (12.5 mA each)
Switching outputs	Number of switching outputs (n.o. contacts)	4
	(1 n.c.contact, 1 n.o.contact, 2 change-over contacts)	
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	4×10^6 operastions (n.o.and n.c. contacts)
		2×10^6 operations (change-over contacts)
	at 4 A (res.)	3×10^5 operations (n.o. and contacts)
		1×10^5 operations (change-over contacts)
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics (reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between adjacent relay contacts Q11, Q12 and Q13 to Q34 with shorting plug removed only (basic insulation)	AC 1250 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
CE conformity	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

The following connection diagrams show the self-holding circuits required for impulse control.

Impulse control of a three-stage load

Impulse control of a three-stage load, with equal switching actions from two control systems
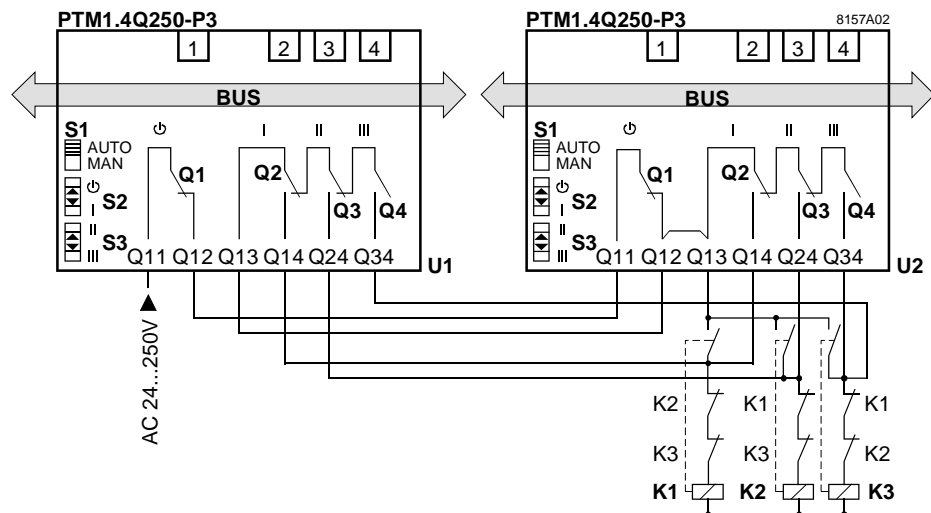
U	Impulse switching module PTM1.4Q250-P3
U1	Impulse switching module PTM1.4Q250-P3 of control system 1
U2	Impulse switching module PTM1.4Q250-P3 of control system 2
K1,**K2**,**K3**	Power contactors with self-holding circuits for a three-stage load
BUS	I/O bar with P-bus
Q11	Control voltage input for self-holding circuits
Q12-Q13	Shorting plug, to be removed for other control actions
Q13	Output for self-holding circuits
Q14,Q24,Q34	Impulse control outputs of ON commands

SIEMENS
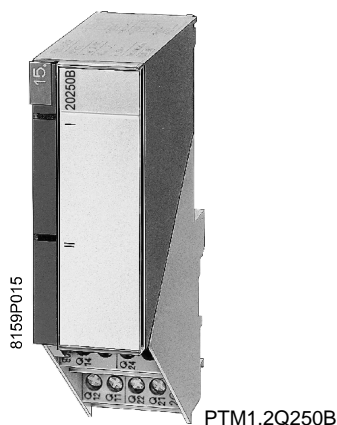
PTM1.2Q250B

DESIGO™ I/O modules

Switching module   PTM1.2Q250B

for AC 24...250 V, with bistable output relays, double module

---

Signal converter for connection to P-bus, with two independent on/off control outputs (double module), bistable relays with potential-free changeover contacts.

Use

This switching module is used
- to switch different types of units and loads by means of switching pulses
- where, in the event of a failure of the operating voltage or the automation station, the last switching status is to be maintained, for example for
  – lighting control
  – control of plant sections that must operate continously

Functions

- Conversion of P-bus on/off signals delivered by the automation station to the respective switching commands for the plant.
- Indication of switching statuses of control outputs:
  – lamp OFF: contact between terminals Q11-Q12 or Q21-Q22 closed
  – lamp ON: contact between terminals Q11-Q14 or Q21-Q24 closed (steady light)
- Maintaining the switching statuses last assumed:
  – when the automation station's AC 24 V operating voltage fails
  – when there is no correct P-bus telegram within 4 seconds
  – when the AC 24 V operating voltage on the I/O bar fails; the switching status, however, will not be signalled

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Siemens Building Technologies
Building Automation

Type summary

	Switching module	**PTM1.2Q250B**

Delivery
Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories
For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations
Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units
Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

The switching status of the relays is determined by the automation station. The bistable relays can be controlled either by impulse or maintained signals. They do not have a defined output status.

Notes
The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.
The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.
Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module. The space for the address plug and the two signal lamps are also on the front of the module.

l I/O modules use the same accessories, which are shown on data sheet N8105.

Note
For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.2Q250B

1 —

2 —

1   Signal lamp for switching command, switching output I
2   Signal lamp for switching command, switching output II

Engineering notes

STOP   The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use   Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠   The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Breaking voltage

- To protect the I/O components, the breaking voltage via the relays must be fused with **10 A max.**
- The two switching outputs of the module must be connected to **mains voltage only or extra-low voltage only**. A mixture of the two is not permitted!
- The two outputs may be operated with **different phases**.

Switching frequency   On applications requiring great switching frequencies, the life of the relay contacts must be taken into consideration (for details, refer to "Technical data").

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical Data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra-low voltage "SELV"	
	or protection by extra-low voltae "PELV" as per	HD 384
	Frequency	50 Hz / 60 Hz
	Power consumption	1.5 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Switching outputs	Number of switching outputs	2
	(change-over contacts, bistable)	
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage	max. AC 250 V
		min. AC 24 V
		max. DC 100 V
		min. DC 19 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 20 W at DC < 50 V
		max. 10 W at DC > 50 V
	Inductive load	L/R = 20 ms max.
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	2×10^6 operations
	at 4 A (res.)	1×10^5 operations
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics	
	(reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between adjacent relay contacts	
	(basic insulation)	AC 1250 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagram

U	Switching module PTM1.2Q250B
Q1, Q2	Bistable switching relays
BUS	I/O bar with P-bus
Q11, Q21	Relay inputs
Q12, Q22	Relay outputs
Q14, Q24	Relay outputs
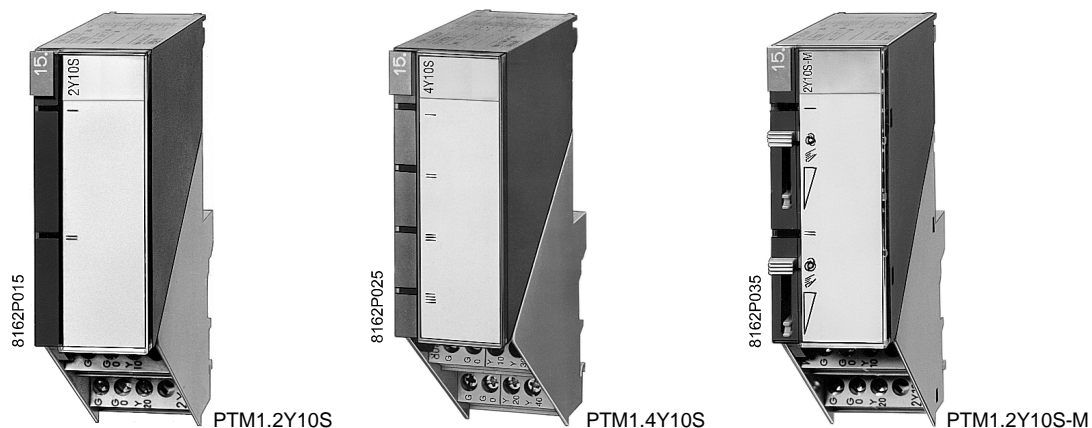
SIEMENS

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PTM1.2Y10S

PTM1.4Y10S

PTM1.2Y10S-M

DESIGO™ I/O modules

Positioning modules

with DC 0...10V output signals, and storage of positioning value

Signal converters for connection to P-bus, with independent outputs delivering continuous DC 0...10 V positioning signals and storage of positioning values if transmission is faulty. Three versions:
- **double module**
- **quadruple module**
- **double module with manual operation**

Use

For use with equipment that is controlled by DC 0...10 V signals or that is able to handle such signals, for example:
- air damper or valve actuators
- modulating/three-position converters
- analog indication and recording instruments
- interfacing with other systems using the DC 10 V signal, especially for the transmission of:
  - set values
  - sensor values
  - compensating variables

Functions

- Conversion of digital P-bus signals delivered by the automation station to continuous DC 0...10 V positioning signals for the plant.
- The output signals are indicated by signal lamps. The higher the output voltage, the brighter the light.
- Manual operation with positioning module PTM1.2Y10S-M:
  - AUTO: the DC 0...10 V positioning signal is delivered by the automation station
  - MANUAL: the positioning signal assumes the value set at the setting unit

Behaviour in the event of fault

- Storage of positioning value:
  if data transmission is faulty, that is, when there is no correct P-bus telegram from the automation station within 4 seconds, the following statuses can be preselected via the automation station:
  - the output will change to 0, even if no preselection has been made (basic value)
  - the output will assume a preselected value of between 0 and 10 V
  - the output will maintain the value transmitted last
- In the event the AC 24 V operating voltage at the I/O compact unit fails, the output signal will always change to 0. When power is restored, the signal will stay at 0 until the next valid telegram transmits some other value.

Note

When using the positioning modules together with the earlier process units PRV1 and PRU1, the positioning output will always change to 0 should transmission be faulty.

Type summary

Positioning module with two outputs	**PTM1.2Y10S**
Positioning module with four outputs	**PTM1.4Y10S**
Positioning module with two outputs and manual operation	**PTM1.2Y10S-M**

Delivery

Base and electronic module are delivered together but in separate boxes that are attached to one another.

Accessories

General accessories for the I/O modules must be ordered separately. For details, refer to data sheet N8105.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Switch-on behaviour

After power is supplied to the module (BEZ = reference voltage via P-bus line DC +24 V, and G = system potential AC 24 V), the following statuses will be attained:
- after 0.5 seconds, the I/O functions will be ready to receive a telegram
s after receive ready, the analog outputs will be stable

Short-circuit protection

The DC 0...10 V positioning outputs are short-circuit-proof.

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module, which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for external wiring usually found in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module. The module front of the PTM1.2Y10S-M also carries the elements for manual operation.

All I/O modules use the same accessories which are shown on data sheet 8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front views

PTM1.2Y10S **PTM1.4Y10S** **PTM1.2Y10S-M**
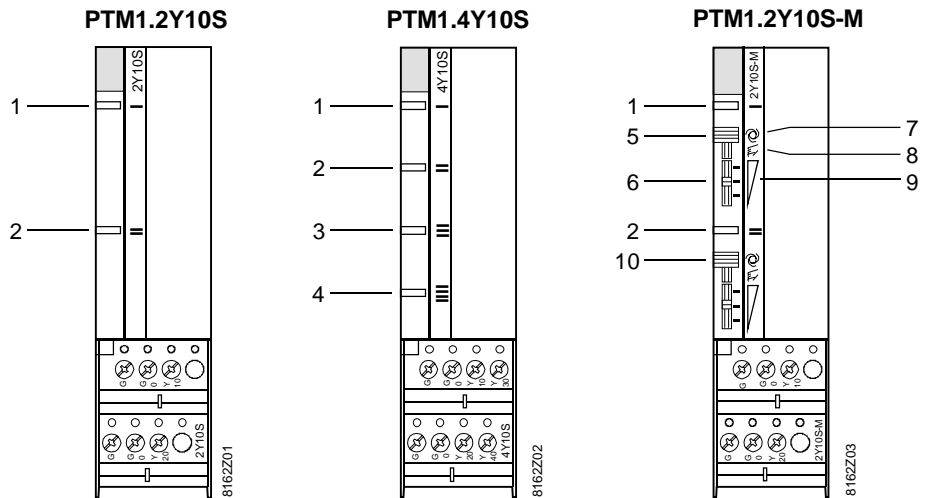
1...4	Signal lamps for positioning outputs I...IIII
5	AUTOMATIC / MANUAL slide switch for positioning output I
6	Manual setting unit for DC 0...10 V output signal
7	Slide switch position AUTOMATIC
8	Slide switch position MANUAL
9	Symbol for DC 0...10 V working range
10	AUTOMATIC / MANUAL slide switch for positioning output II
	(the other elements are the same as those for positioning output I)

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Field units

The units and systems connected must satisfy the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as per HD 384.

⚠ Positioning outputs

The positioning outputs are **not galvanically separated** from the system's electronics.

⚠ Manual switch

The module's manual switch function must **never be used for safety shutdown**.

Wiring of G0 at the PTM1.4Y10S module

To avoid inadmissible voltage drops over G0, the G0 wires for the outputs Y30 and Y40 must only be connected to the module's G0 terminals (right beside Y10 or Y20, refer to "connection diagrams").

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, " I/O module system".

Technical data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra low voltage (SELV)	
	or protection by extra-low voltage "PELV" as per	HD 384
Frequency	50 Hz or 60 Hz	
	Power consumption	3 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	1 (12.5 mA each)
Output signal	Voltage	DC 0...10 V
	Current	1 mA max.
	Overrange	DC 10.66 V
	Resolution	10.4 mV
Line lengths	Perm. line lengths	300 m max.
	Min. wire dia.	0.6 mm
CE conformity	In compliance with EU directives	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagrams

Double positioning module

PTM1.2Y10S   8162G01

```
          ┌─ 1 ─┐      ┌─ 2 ─┐
          │     │      │     │
  ◄═════ BUS ═══════════════► 
          ⊗            ⊗
         Y I          Y II

  G    G0   Y10    G    G0   Y20   U
  ▼    ▼    ▼      │    │    │
 AC 24 V          
 (max. 2 A)  DC 0..10 V
                   G    G0   Y
                              Y
```
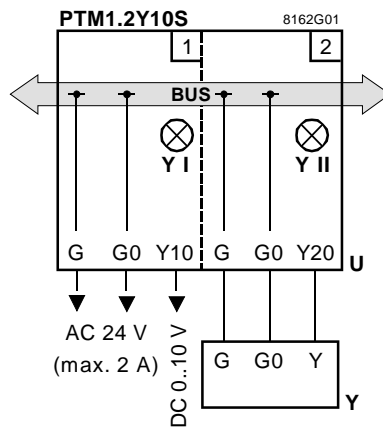
Quadruple positioning module

PTM1.4Y10S   8162G02

```
     ┌─1─┐  ┌─3─┐        ┌─2─┐  ┌─4─┐
  ◄════════ BUS ═════════════════════►
        ⊗      ⊗            ⊗      ⊗
       Y I    Y III       Y II   Y IIII

  G   G0  Y10  Y30   G   G0  Y20   Y40   U

 AC 24 V
 (max. 2 A)  DC 0..10 V  DC 0..10 V        DC 0..10 V
                    G    G0   Y
                                Y
```

Double positioning module with manual operation

PTM1.2Y10S-M   8162G03

```
            ┌─ 1 ─┐              ┌─ 2 ─┐
  ◄═════════ BUS ═══════════════════════►
      S1            ⊗       S2            ⊗
   10              Y I    10            Y II
    5                      5
    0  RI                  0  RII

   G    G0   Y10        G    G0   Y20   U

 AC 24 V
 (max. 2 A)  DC 0..10 V
                        G    G0   Y
                                    Y
```
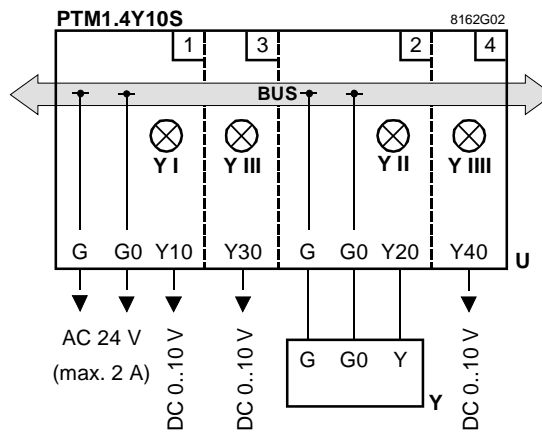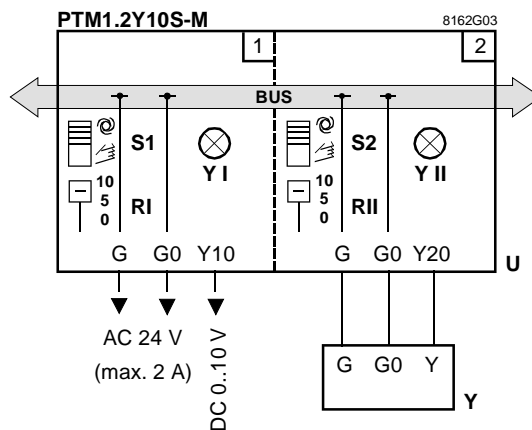
U	Positioning module
Y	Actuator with DC 0...10 V control input
BUS	I/O bar
G	Operating voltage AC 24 V for actuators (2 A max.)
G0	System neutral of operating voltage
Y10...Y40	Positioning signals DC 0...10 V

Positioning modules
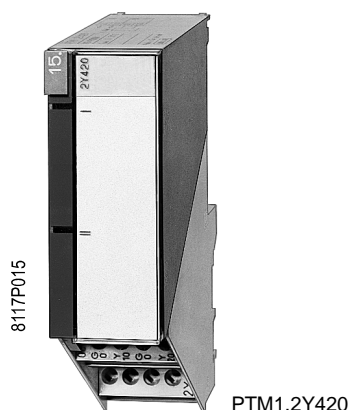
PTM1.2Y420

DESIGO™ I/O modules

Positioning module   PTM1.2Y420

with continuous DC 4...20 mA output signals, double module

**Signal converter for connection to P-bus, with two independent positioning
outputs DC 4...20 mA.**

Use

The positioning module is used where regulating units are controlled by DC 4...20 mA
signals or where DC 4...20 mA signals are further handled. Such units are:

- actuators
  - valve actuators
  - air damper actuators
  - modulating/three-position converters
- analog indicating and recording instruments
- interfaces that pass on reference values, sensor values or set values in the form of
  DC 4...20 mA signals (e.g. to units of other manufacture)

Functions

- Conversion of digital P-bus signals delivered by the automation station to analog
  DC 4...20 mA positioning signals for the plant.
- The output signals are indicated by signal lamps. The higher the output current, the
  brighter the light.
- Emergency function: when operation is disturbed, the outputs will be set to 0 when
  - data transmission via the P-bus is interrupted for more than 4 seconds
  - there is a breakdown of the AC 24V supply to the automation station or the I/O bar

Positioning module	**PTM1.2Y420**

Delivery

Base and electronic module are supplied together but in separate boxes that are attached to one another.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

The position outputs are not galvanically separated from the system.

The DC 4...20 mA position outputs are short-circuit proof.

Notes

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for the external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system. The space for the address plug and the signal lamps are also on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM1.2Y420

1 — Signal lamp for position output I
2 — Signal lamp for position output II
(the higher the output current, the brighter the light)

Engineering notes

STOP | The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use | Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present data sheet must also be taken into consideration.

⚠ | The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Field units | The units connected to the positioning module must satisfy the requirements for **safety extra-low voltage** (SELV) or **protection by extra-low voltage** (PELV) as HD 384.

Coupling | The position outputs are **not galvancially separated** from the system's electronics.

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

⚠ Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra low voltage "SELV"	
	or protection by extra-low voltage "PELV" as per	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	3 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	1 (12.5 mA each)
Position outputs	Output signals	DC 4...20 mA,
	Overrange	DC 21.05 mA
	Underrange	0 mA
	Resolution	17 µA
	Load resistance (burden)	500 ohm max.
Line lengths	Perm. line lengths	300 m
CE conformity	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".	

Connection diagram
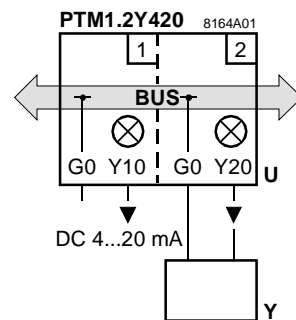
U	Positioning module PTM1.2Y420
Y	Actuator with DC 4...20 mA control input
BUS	I/O bar with P-bus
G0	System neutral (of AC 24V operating voltage)
Y10, Y20	DC 4...20 mA positioning signals
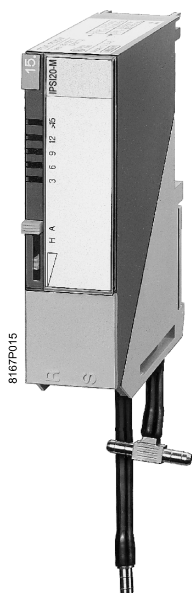
PTM6.1PSI20-M

DESIGO™ I/O modules

Pneumatic
positioning module PTM6.1PSI20-M

contiuous 0...138 kPa output signal, with manual operation

Electro-pneumatic signal converter for connection to P-bus, output with a continuous control signal of 0...138 kPa, with automatic/manual changeover and manual positioner.

Use

The positioning module is used to control pneumatic regulating units with a continuous control signal of 0...138 kPa and is suited for use with devices that are able to further handle such signals. Such pneumatically driven devices are:

- actuators of valves and air dampers
- positioners
- pneumatic/electric step switches
- switches
- indicating and recording instruments

Note Please refer to document Z8102, "I/O module system", for advice with which building automatioin and control system the pneumatic positioning module can be used.

Functions

Signal conversion	Conversion of the digital P-bus signal from the automation stations to the continuous pneumatic positioning signal of 0...138 kPa for the plant.
Signal indication	The level of the output signal is indicated by a multi-level LED.
Operating modes	Manual switch positions: • AUTO: the positioning signal is delivered by the automation station • MANUAL: the positioning signal assumes the value set on the positioner Functions with manual control: Manual control is also operative without using the automation station when the AC 24 V operating voltage at the I/O bar is present.
Behaviour in the event of fault	Emergency operation: in case of operation under fault condition, the output is set to zero if: • data transmission via the P-bus is interrupted for more than 4 seconds • the AC 24 V supply voltage to the automation station or to the I/O bar fails • the module is removed from its base

Type summary

	Pneumatic positioning module	**PTM6.1PSI20-M**
Delivery	Base and electronic module are supplied together, but in separate boxes that are attached to one another.	
Accessories	For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.	

Equipment combinations

Automation stations	Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".
Field units	Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Discharge valve	An integral fail-safe mechanism acts as a discharge valve and protects the pneumatically controlled equipment in the event of a power failure. Thus, the module can release any excess pressure. In the event of a power failure, the module opens the vent nozzle and closes the air inlet nozzle so that the output pressure becomes zero.
Pressure indication	Pressure indication functions only when the module is pressurized and the AC 24 V supply is present. In manual operation, by contrast, pressure indication remains functional also in case of a bus failure, that is, in case of loss of the DC 24 V reference voltage from the controller.
Notes	The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration. For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Mechanical design

Modular unit with plastic casing consisting of base with pneumatic connections and functional part with electric/pneumatic converter which can be plugged into the I/O bar. Operating voltage and electrical signals are picked up from contacts on the I/O bar.
A check valve in the base makes it possible to remove the functional part without loss of air.

Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system.

Receptacle for address connector and the following operator's controls and display elements are located on the front of the unit:

- AUTO/MAN switch
- manual 9-stage position indicator from 21 to 103 kPa in steps of 10 kPa
- 9-level LED display for the operating range from 21 to 103 kPa (3 to 15 psig); only the LED which corresponds to the actual control pressure is lit; only every second indicated level is marked with the appropriate value between the range limits 3 and 15 psig

The accessories for all I/O modules are listed together on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front view

PTM6.1PSI20-M
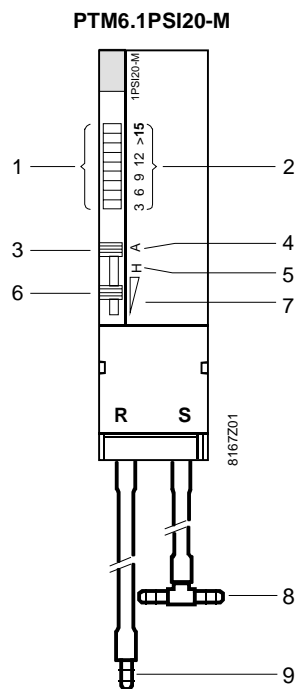
1   9-level positioning signal indication
2   Marking of operating range in 5 stages,
     from 3 to 15 psig (21 to 103 kPa)
3   AUTOMATIC/MANUAL switch
4   Switch position AUTOMATIC
5   Switch position MANUAL
6   Manual positioner
7   Operating range symbol
8   Connection for operating pressure (input)
9   Connection for control pressure (output)

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Compressed air

The compressed air required for the operation of the module must be oil- and dust-free. It must also be dry to avoid condensation in the module itself and in the pneumatic tubing.

Fail-safe mechanism

The integral fail-safe mechanism provides protection for the pneumatically controlled equipment in the event of a power failure. Use of a separate electro-pneumatic valve for this purpose is not necessary. See also under "Emergency operation" in chapter "Functions".

Fitting notes

General

Please refer to document M8102, "I/O modules and P-bus".

Operating pressure

The operating pressure (connection S) is provided either directly by the supply line or by the T-piece of a pneumatic module that is already connected.
Any connection on a T-piece that is not used must be closed off with an end fitting.

Air connections

The air connections are designed for use with 6 x 1 mm (¼ in.) tubing.

Minimum length of control pressure line

The length of tubing between the control pressure output and the controlled unit must be a minimum of 600 mm.

Pressure reducing orifices

Pressure reducing orifices in the control pressure line must be fitted no closer than 600 mm (length of tubing) to the module output.

Mounting instructions

Instructions for fitting the I/O module on the mounting rail and the I/O bar are printed on the packing.

Commissioning notes

General

Please refer to document Z8102, "I/O module system", which contains general notes on the commissioning of I/O modules.

Module-specific

- Prior to commissioning, it must be checked whether the requirements and conditions of the chapters "Technical data", "Engineering notes" and "Fitting notes" are met.
- It must be made certain that the tubing is correctly sized and fitted properly to prevent leakage.
- It is possible to remove individual pneumatic modules under pressure without adversely affecting the functioning of other modules. The built-in check valve in the base prevents loss of air when the functional part is removed.

Functional check

Regardless of the automation station, the built-in positioner can be used to test the functioning of the pneumatically controlled equipment in manual mode. To achieve this, the AC 24 V operating voltage must be present at the I/O bar, however.

Technical data

Power supply	Operating voltage	AC 24 V ± 20 %
	Safety extra low voltage "SELV" or protection by	
	extra low voltage "PELV" to	HD 384
	Frequency	50 Hz or 60 Hz
	Power consumption	3 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Pressure conditions	Operating pressure	207 kPa max. (2.07 bar)
	Control pressure at the positioning output	
	Automatic operation	0...138 kPa (0...1.4 bar)
	Manual operation	21...103 kPa (0.21...1 bar)
	Pressure drop operating/control pressure	0.35 kPa
	Air output	168 ml/s
	Own air consumption	none
	Leak rate	1.4 ml/s max.
Accuracy of converter	Accuracy	
	At 25 °C	1.7 kPa
	At 0...50 °C	3.5 kPa
	Reproducibility and	
	hysteresis (-18 °C...+50 °C)	0.35 kPa
	Resolution of positioning signal	0.14 kPa
	Resolution of digital/analog converter	10 bits
Air connections	For pneumatic tube	6 x 1 mm (¼ in)
	Min. length of control pressure line	600 mm
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
UL listing	Energy Management Equipment	UL 916
Note	For technical data common to all I/O modules, refer to document Z8102, "I/O module system".	

5/6

Connection diagram

PTM6.1PSI20-M 8167A01

BUS

>15
...
3

A
M

>15
...
3

U / p

R   S   U

Y
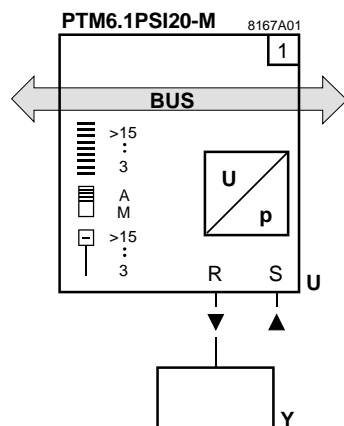
U   Positioning module PTM6.1PSI20-M
Y   Pneumatic actuator
S   Operating pressure 207 kPa max.
R   Control pressure 0...138 kPa

Dimensions

2x32=64

32

40

4,5

120

54

85

35

18

94

80

7,5

R   S

96

44

EN50022-35x7,5

6x1 (1/4")

8167M01

Dimensions in mm
6/6

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Subject to change

PTM1.2Y250T   PTM1.2Y250T-M
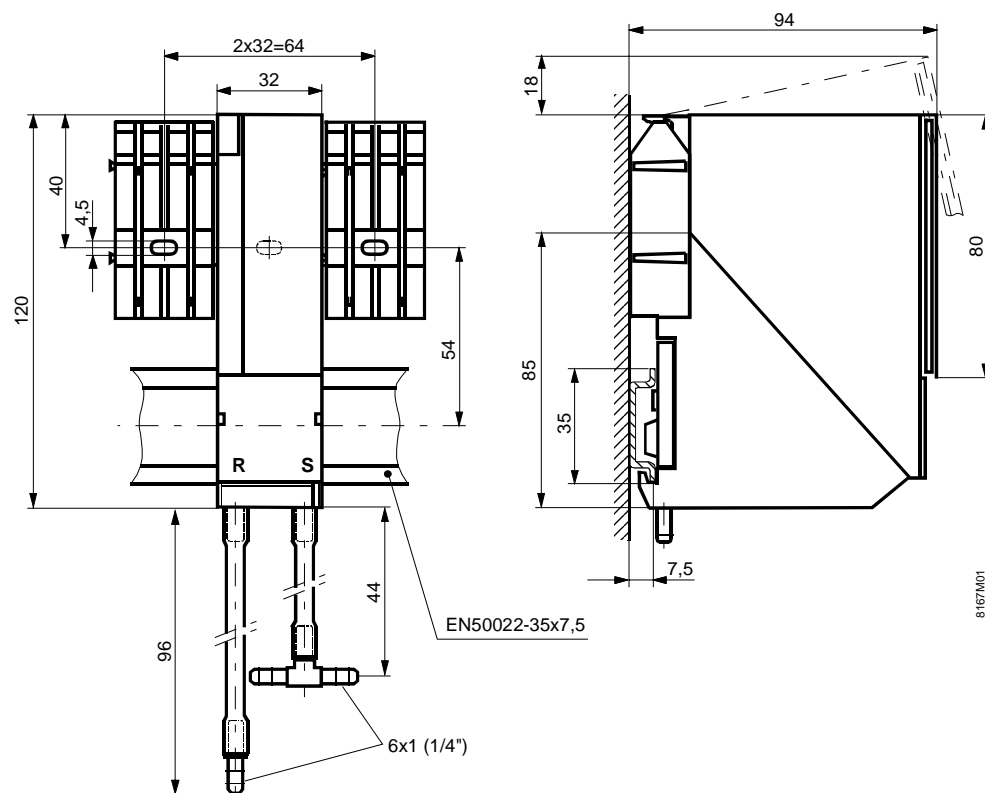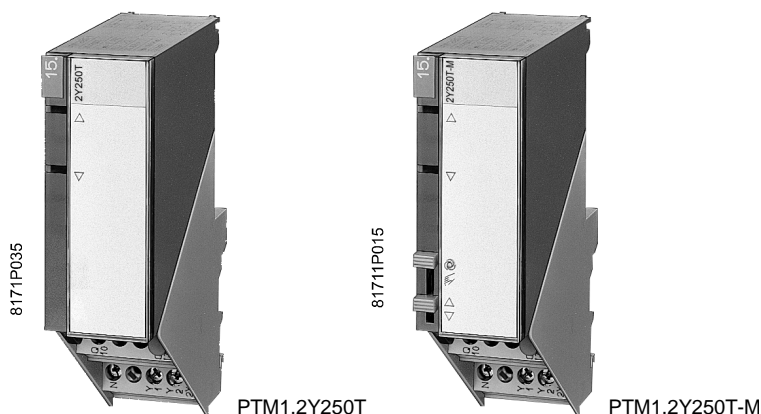
DESIGO™ I/O modules

Positioning modules   PTM1.2Y250T
PTM1.2Y250T-M

three-position output AC 24...250 V, with integral stroke model

---

Signal converter for connection to P-bus, with a three-position control output and an integral stroke model, potential-free or non-potential-free outputs (optional), two versions:

- **PTM1.2Y250T-M with manual adjustment**
- **PTM1.2Y250T without manual adjustment**

Use

The positioning module is used for the control of three-position actuators with no feedback (position potentiometer), such as

- valve actuators
- air damper actuators
- actuators of other manufacture

Note

The actuators controlled must have the same running times in both directions (refer to "Engineering notes").

Functions

- Conversion of the positioning signals received from the automation station via the P-bus to ON/OFF commands for the plant.
- Indication of switching status of control outputs:
  - lamp for OPEN signal on: contact between terminals Q13-Y1 made
  - lamp for CLOSE signal on: contact between terminals Q13-Y2 made

- Dropping out of relays:
  - in the steady-state condition (actual value = set value)
  - when the automation station's AC 24 V operating voltage fails
  - when there is no error-free P-bus telegram within 4 seconds;
    in that case, the actuator remains in the position assumed last

Only with
PTM1.2Y250T-M

- Positions of the manual switch:
  - AUTOMATIC: the switching status of the ON/OFF contacts (outputs Y1 and Y2) is determined by the automation station
  - MANUAL: the ON/OFF contacts have broken; using the slide switch, the actuator can be driven to the OPEN/CLOSED position
- Functions with manual control:
  - the position of the manual switch can be identified by the automation station
  - manual control is also operational without using a automation station when the AC 24 V operating voltage at the I/O bar is present

Type summary

Positioning module without manual adjustment	**PTM1.2Y250T**
Positioning module with manual adjustment	**PTM1.2Y250T-M**

Delivery

Base and electronic module are supplied together, but in separate boxes that are attached to one another.
The I/O modules are supplied with a shorting plug fitted to the terminal base.

Accessories

For general accessories that are used in connection with the I/O modules, refer to data sheet N8105. Such accessories must be ordered separately.

Equipment combinations

Automation stations

Basically, the I/O modules can be connected to any automation station with P-bus if the automation station supports the I/O functions on the software side. Refer to document Z8102, "I/O module system".

Field units

Any units of the Siemens product ranges can be connected if their signals are compatible with the module's inputs and outputs. It is also possible to use products of other manufacture if their signals are compatible and if they satisfy the relevant safety requirements.

Technical design

Internal stroke model

To enable a set value/actual value comparison of the actuator position to be made without using a checkback signal, the positioning module generates internally a so-called stroke model. For this purpose, the module stores the actuator's running time, which has been entered in the automation station or controller and then transmitted. The circuit continuously compares the set value of the position transmitted by the automation station with the actual value of the position generated by the module. The latter is calculated based on the entered actuator running time and the on times of the output relays. If the comparison produces a deviation, the OPEN or CLOSE relay will be energized until the deviation has been reduced to zero.

Synchronization of actuator with stroke model	To ensure synchronization of actuator and stroke model, automatic synchronization of actuator control is provided. The synchronization is always made in one of the actuator limit positions, with the stroke model at its limit. On the software side, the following variants can be selected at the automation station:

- start synchonization via the positioning time, that is, each time the plant is switched on, a control signal is fed to the actuator, lasting at least as long as the running time, to make certain the actuator will reach one of the limit positions
- immediate synchronization via the positioning time, that is, based on a command given from some other location
- limit position synchronization, that is, each time the stroke model reaches a limit position
- no synchronization

Notes	The engineering tool for the building automation and control system supports the entry of these settings into the automation station; the functions and procedures are explained in the corresponding description of functions.

The whole functionality of the I/O module comprises the module itself (hardware) and handling of the signals in the automation station (software). For a full understanding of the scope of module functions, the relevant process sequences and possible choices available when configuring the user program must be taken into consideration.

For the technical features common to all I/O modules, refer to document Z8102, "I/O module system".

Block diagram of positioning module with stroke model
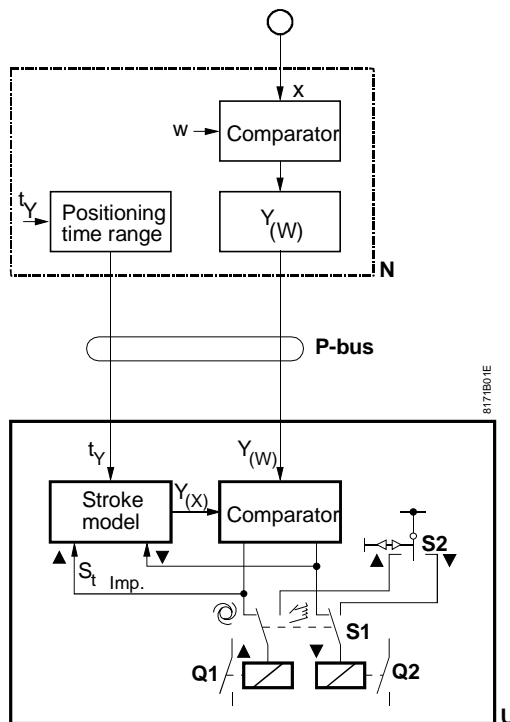
N	Function "Three-position output"	t_Y	Positioning time range
	in the automation station or the controller	$\sum t_{imp}$	Total time of positioning pulses
U	I/O module with three-position output	w	Set value (regulator)
▲	Positioning direction OPEN (Q1)	x	Actual value (regulator)
▼	Positioning direction CLOSE (Q2)	$Y_{(W)}$	Set value of manipulated variable
ℚ	AUTOMATIC operation*	$Y_{(X)}$	Actual value of manipulated variable
✍	MANUAL operation*		
S1	AUTOMATIC/MANUAL switch*		
S2	Slide switch for OPEN/CLOSE*		* only with PTM1.2Y250T-M

3/8

Mechanical design

Modular unit with plastic casing, consisting of terminal base and electronic module which are plugged onto the I/O bar. The signals and voltages are picked up from contacts on the I/O bar.

The connecting terminals of the I/O modules arranged on the I/O bar are used in place of the block terminals for external wiring usually installed in the control panel. They comply with the relevant standards and regulations and provide the test terminal function. Also, they can be fitted with plant-specific labels.·Transparent module front for insertion of the plant-specific module labels. The specifically prepared and perforated labels are marked with the help of the engineering tool for the building automation and control system.

The space for the address plug, the AUTOMATIC/MANUAL switch, the slide switch for the ON/OFF positioning commands and the signal lamps for the positioning signals are also located on the front of the module.

All I/O modules use the same accessories, which are shown on data sheet N8105.

Note

For a more detailed description of the module's mechanical design, refer to document Z8102, "I/O module system".

Front views

PTM1.2Y250T-M   PTM1.2Y250T
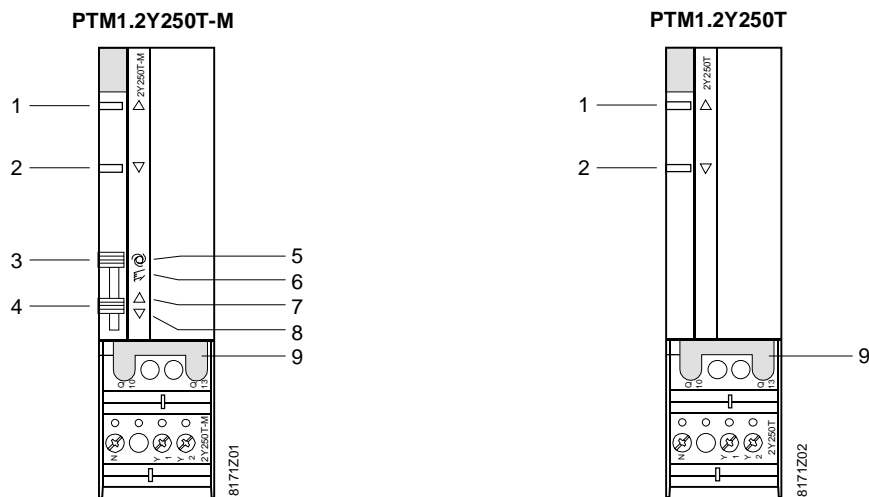
1	Signal lamp for positioning output OPEN
2	Signal lamp for positioning output CLOSE
3	AUTOMATIC/MANUAL switch
4	Slide switch for ON/OFF commands
5	Switch position AUTOMATIC
6	Switch position MANUAL
7	Slide switch position for positioning command OPEN
8	Slide switch position for positioning command CLOSE
9	Shorting plug for actuator voltage (refer to "Connection diagram")

Engineering notes

STOP

The document Z8102, "I/O module system", contains system-related engineering know-how. It should be studied before reading the following sections while paying special attention to the information relating to safety.

Correct use

Within the overall system, these I/O modules must always be used on applications as described in document Z8102, "I/O module system". The module-specific characteristics and features given in the brief description on the front page and in the chapters "Use", "Engineering notes" and "Technical data" of the present sheet must also be taken into consideration.

⚠

The sections of this chapter identified by a warning triangle contain additional requirements and restrictions relevant to safety. They must be observed to ensure the safety of persons and objects.

⚠ Actuator voltage

- To protect the I/O components, the breaking voltage fed via the I/O module must be fused with **10 A max.**
- The positioning module is supplied such that mains voltage will be fed to the actuator via the I/O bar, that is, due to the link across Q10 and Q13, the relay contacts of the positioning outputs Y1 and Y2 are non-potential-free. Therefore, the live wire must be fed to the I/O bar through the phase supply block PTX1.00 and the neutral through the neutral supply block PTX1.02 (AC 250 V max.); also refer to "Connection diagrams".
- If external voltage (e.g. low voltage) shall be used for the actuator, it must be fed to module terminal Q13. In that case, **shorting plug Q10-Q13 must be removed** to prevent voltage from being supplied back to the live wire L on the I/O bar and to prevent mains voltage from that bar to be fed to the low voltage circuits. In place of the shorting plug, it is also possible to connect the switching contact of a safety device.
- **Under no circumstances** should external connections be made to terminals Q10-Q13 **when the shorting plug is inserted**.

⚠ Manual switch on PTM1.2Y250T-M

The module's manual switch function must **never be used for safety shutdown**.

Running times of actuators

- The permissible running time range of the actuators used must be observed; refer to "Technical data".
- The running times of the actuators must be the same in both directions. If this is not observed, the calculated actuator position based on the stroke model and the entered running time are not correct so that synchronization of the actuators will not be possible.
- If electro-hydraulic three-position actuators are used, the opening and closing times in practical operation may differ. For this reason, these actuators must not be used in connection with the I/O modules type PTM1.2Y250T and PTM1.2Y250T-M.
- For the control of three-position actuators with different positioning times, an I/O positioning module type PTM1.2Y10... (DC 0...10 V) and a three-position converter (e.g. SEZ61.3) must be used. The actuators need to be fitted with a feedback potentiometer.

Switching frequency

On applications with great switching frequencies, the life of the relay contacts must be taken into consideration. For details, refer to "Technical data".

Fitting notes

Please refer to document M8102, "I/O modules and P-bus".

Instructions for fitting the I/O module on mounting rails and on the I/O bar are printed on the packing.

Commissioning notes

Please refer to document Z8102, "I/O module system".

Technical data

Power supply	Operating voltage[1]	AC 24 V ± 20 %
	Safety extra low voltage "SELV" or	
	protection by extra low voltage "PELV" to	HD 384
	Frequency[1]	50 or 60 Hz
	Power consumption[1]	1 VA
	I/O module power supply via P-bus	DC 24 V (against G0)
	Load units	2 (12.5 mA each)
Position output	Number of switching outputs	2
	(1 n.o. contact, 1 change-over contact)	
	External fusing of mains line	
	Fuse, slow	max. 10 A
	Circuit-breaker (c.b.)	max. 13 A
	Tripping characteristics (c.b.)	B, C, D as per EN 60898
	Contact data	
	Switching voltage	max. AC/DC 250 V
		min. AC 24 V
		min. DC 5 V
	AC current load	max. 4 A (res.), 3 A (ind.)
		min. 5 mA at AC 250 V
		min. 20 mA at AC 24 V
	DC current load	max. 4 A at DC 24 V (res.)
		max. 0.5 A at DC 24 V L/R = 20 ms
		max. 0.1 A at DC 250 V (res.)
		min. 0.1 A at DC 5V
	Switch-on currrent	max. 10 A (1 s)
	Lifetime of relay contacts at AC 250 V	guide values
	at 0.1 A (res.)	2×10^7 operations
	at 0.5 A (res.)	4×10^6 operastions (n.o. contact)
		2×10^6 operations (change-over contact)
	at 4 A (res.)	3×10^5 operations (n.o. contact)
		1×10^5 operations (change-over contact)
	Red. faktor for ind. loads (cos phi = 0.6)	0.85
Insulation strenght	Between relay outputs and system electronics	
	(reinforced insulation)	AC 3750 V, as per EN 60 730-1
	Between mains and relay terminals, with	
	shorting plug removed between Q11–Q13 only	
	(reinforced insulation)	AC 3750 V, as per EN 60730-1
Line lengths	Permissible line lengths	1000 m
Running times	Running time range of actuators	8.5 s...11 min
CE conformance	In compliance with the directives of the European Union	
	Electromagnetic compatibility	89/336/EEC
	Low voltage directive	73/23/EEC

[1] applies only to PTM1.24250T-M

Note For technical data common to all I/O modules, refer to document Z8102, "I/O module system", and for dimensions refer to document M8102, "I/O modules and P-bus".

Connection diagrams

With actuator for
mains voltage

Positioning module with
manual adjustment
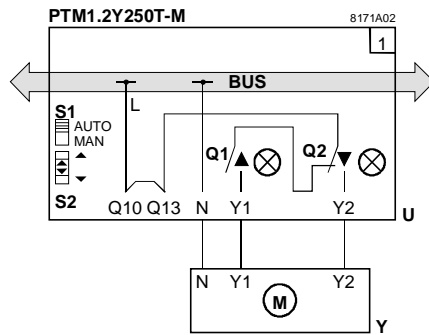
Positioning module without
manual adjustment
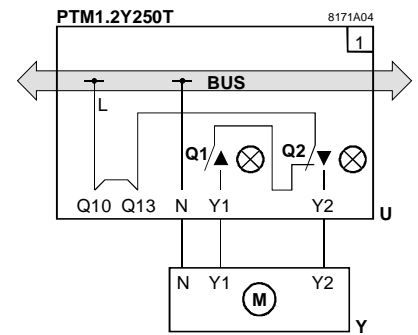
With actuator for low
voltage (shorting plug
Q10 - Q13 removed)

Positioning module with
manual adjustment
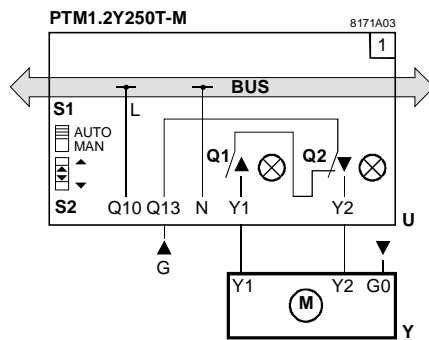
Positioning module without
manual adjustment
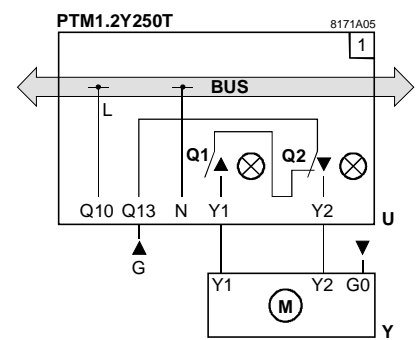
U	Positioning module PTM1.2Y250T or PTM1.24250T-M
Y	Actuator for three-position control
Q1, Q2	Switching relays
BUS	I/O bar with P-bus
S1	AUTOMATIC/MANUAL switch
S2	Slide switch for ON/OFF commands
N	Neutral from I/O bar
G	System potential
Q10	Live L from I/O bar to power the actuator (shorting plug Q10-Q13 fitted)
Q13	Relay input to receive external voltage (e.g. AC 24 V) or for the connection of a safety device (thermal reset or manual reset safety limit thermostat) (shorting plug Q10-Q13 removed)
Y1	Positioning signal OPEN
Y2	Positioning signal CLOSED

SIEMENS

DESIGO™ I/O-OPEN / UNIGYR

GRUNDFOS PTM52.32V01

For the integration of electronically-controlled GRUNDFOS circulating pumps

---

Interface module for the integration of intelligent circulating pumps with a GRUNDFOS bus connection into a DESIGO V2.2 building automation and control system. GRUNDFOS bus segments with four pumps per module or eight pumps on two interconnected modules.

Note *This document includes the engineering notes for the version DESIGO V2.2.*
For engineering notes for DESIGO V2.1 and UNIGYR see document CM2J8664en.

Application

The interface module enables up to 4 communicating pumps to be integrated into a DESIGO V2.2 building automation and control system. The pumps are integrated into a PXC64-U or PXC128-U automation station via the P-bus connection.

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Functions

General

The use of the interface module permits the following functions for each pump:

- General control: Off/On/Min-On and setpoint for pump head [1] (0 to 100% of local setting)
- Pump data points: operating data (encoded), pump head (m), flow rate (m3/h), pump output (kW), pump speed (%)
- Errors: fault data (encoded). For details, refer to "Pump data points"

[1] In exceptional cases, the pumps can be set locally to an operating mode in which the setpoint refers to the pump speed.

System topology: DESIGO V2.2
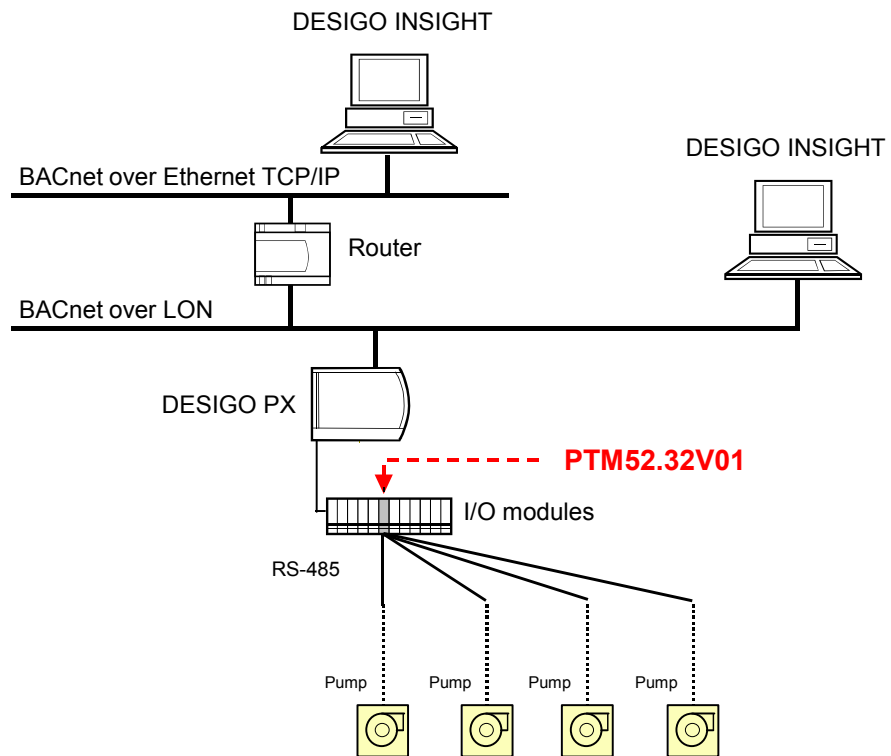
Pump data points

The table below shows the data points of the pumps which can be integrated via the interface module:

Data point name	Value range	Data point type [1]	Direction of data flow [2]
Switch command	0 = OFF 1 = ON	DOS	S → Pump
Setpoint, pump head	0 … 100.0 %	AOS	S → Pump
Operating data [3]	0 ... 255 (encoded)	DIS	Pump → S
Fault data [3]	0 ... 255 (encoded)	DIS	Pump → S
Pump head	0 … 254.0 m	AIS	Pump → S
Flow rate	0 … 254.0 m3/h	AIS	Pump → S
Pump output	0 ... 25.40 kW	AIS	Pump → S
Pump speed	0 … 100 %	AIS	Pump → S

1) Data point types:
   DI**S**, DO**S**, AI**S** and AO**S** are digital/analog inputs/outputs with a **s**tatus bit. They are the virtual P bus data points used for integration of the GRUNDFOS pumps.

2) Direction of data flow:

Pump	→ S	indicates data flowing from the PUMP to the SYSTEM
S	→ Pump	indicates data flowing from the SYSTEM to the PUMP

3) Encoded messages:
   The table shows the contents of the encoded messages, as they appear at the automation station. The messages are decoded with the enumeration data in the Grundfos compound.

Display	Operating state or type of error	Possible defaults or causes of error
Operating data		
00	OFF	Local switch-off or fault
01	OFF	Remote switch-off at pump
03	Ready	
05	Automatic	
06	Max. operation	Caused by remote max. switching via bus
07	Max. operation	Caused by remote max. switching at pump
08	Max. operation	Caused by local max. switching at pump
Fault data		
00	No alarm	
01	Supply fault	Undervoltage
02	Supply fault	Overvoltage
06	Supply fault	Insufficient water
07	Supply fault	Excess pressure, max. limit exceeded
08	Supply fault	Below low limit
09	Supply fault	Other (bus, ...)
10	Pump fault	Locked
19	Pump fault	
20	Motor fault	Excess temperature
39	Electronic fault	
40	Sensor fault	Open circuit

Access	Access to this data is as follows:

- Locally in the automation station or pump (if Grundfos HMI is connected)
- Centrally, via the PC user interface

Applications

The heating control and pump control are linked through the communication between the pump and the automation station. Based on the data and variables transmitted, the following functions, for example, can be implemented via the automation station:

- Adaptation of pump output to various building occupancy periods via time schedules
- Display of pump parameters and plotting of trend graphs
- Adaptation of pump output to the boiler operating state
- Optimization of heating control by measurement of the pump's flow rate
- Control of the primary circuit pump as a function of the downstream heating circuits
- Energy management to optimize consumption and efficiency
- Adaptation of pump output to the currently required flow rate, e.g. based on consumption measurements from electronic heat meters
- Central logging of operating states, with archiving and trend displays
- Central logging of faults, with instructions for service personnel
- Centralized maintenance management based on runtime totalization
- Integration into maximum (electricity) demand control system by transmission of power consumption data
- Remote messaging and monitoring via modem and mobile or land-line telephone

Display options on the interface module

The interface module has two LEDs, used to indicate the consistency of the communications.

Safety and reliability

Refer to the "Technical design" section for information on operational reliability and safety precautions.

Types

Ordering

The I/O-OPEN GRUNDFOS interface modules should be ordered via the Logistics department, using the ASN number: **PTM52.32V01**

Delivery

The base and electronics module are delivered in separate but interlinked packages.

Accessories

Accessories must be ordered as separate items. For general I/O accessories refer to data sheet 8105.

Compatibility

Automation stations

The interface module can be connected to any Siemens automation stations which have a P-bus connection and which provide software support for the required module type (AIS, AOS, DOS and DIS). In DESIGO V2.2 these are the PXC64-U and PXC128-U modular automation stations.

GRUNDFOS circulating pumps for heating systems

Use of communicating pumps with a GRUNDFOS bus connection: the GRUNDFOS bus segment may also incorporate a GRUNDFOS PMU device. Please refer to the relevant literature provided by the pump manufacturer.

General

With the interface module, it is possible to map data points from the GRUNDFOS pumps to the P-bus, enabling the automation station to read all the data points via the assigned addresses and channels. The module reads the data points from the pumps at regular intervals and updates the internal database with the actual values. When an automation station requests a reading, the data points are transferred from the interface module to the automation station. In the opposite direction, values are written from the automation station to the interface module via the P-bus.

Creating a program

From a functional point of view, the interface module contains 8 I/O virtual-module addresses (1 x [4 DOS], 1 x [4 AOS] 2 x [4 DIS] and 4 x [4 AIS]). They are referred to as "virtual" in the sense that they do not exist as individual physical modules. Module address 15 address remains unused, and address 16 is used for the module production test. The values and attributes of the pumps associated with these module addresses require scaling and decoding. The library element already contains these settings, which are described further below.

Data transmission

P bus

The data is transmitted between the interface module and the automation stations via the 3-wire P-bus (process bus). For details, refer to data sheet N8022, "Process bus".

GRUNDFOS bus

The pump data is transmitted in both directions between the interface module and the pumps via RS485 interfaces. For technical specifications refer to the "Technical data" section.

5/14

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Building Automation

GRUNDFOS – PTM52.32V01

CM2N8664D
12.2003

Addressing

For transmission over the P-bus, each data point is assigned an address.
This "P-bus address" comprises:
- Basic address
- Offset address
- Channel number

Data point addressing

The table below shows how the data points are addressed via the automation station.

Switch command Pump No. I 1 (+0)	Pump head Pump No. I 1 (+4)	(+8) 1	(+12) 1
Switch command Pump No. II 2	Pump head Pump No. II 2	2	2
Switch command Pump No. III 3	Pump head Pump No. III 3	3	3
Switch command Pump No. IV 4	Pump head Pump No. IV 4	4	4
4DOS	4AIS		
Pump head setpoint Pump No. I 1 (+1)	Flow rate Pump No. I 1 (+5)	(+9) 1	(+13) 1
Pump head setpoint Pump No. II 2	Flow rate Pump No. II 2	2	2
Pump head setpoint Pump No. III 3	Flow rate Pump No. III 3	3	3
Pump head setpoint Pump No. IV 4	Flow rate Pump No. IV 4	4	4
4AOS	4AIS		
Operating data Pumpe Nr. I 1 (+2)	Pump output Pump No. I 1 (+6)	(+10) 1	(+14) 1
Operating data Pump No. II 2	Pump output Pump No. II 2	2	2
Operating data Pump No. III 3	Pump output Pump No. III 3	3	3
Operating data Pump No. IV 4	Pump output Pump No. IV 4	4	4
4DIS	4AIS		
Fault data Pump No. I 1 (+3)	Pump speed Pump No. I 1 (+7)	(+11) 1	Reserved for test 1 (+15)
Fault data Pump No. II 2	Pump speed Pump No. II 2	2	Reserved for test 2
Fault data Pump No. III 3	Pump speed Pump No. III 3	3	Reserved for test 3
Fault data Pump No. IV 4	Pump speed Pump No. IV 4	4	Reserved for test 4
4DIS	4AIS		Module info : PTM52.32V01

Key

A. Data points

B. Address plug + offset

C. Internal pump number

D. Channel number

E. P-bus I/O module type

F. Reserved for manufacturing test

A basic address (the hardware address) is assigned to the interface module by means of an address plug. The interface module uses fixed offset addresses.
In order to enable all the data points in the interface module to be addressed on the P-bus, the highest address which may be used is Address Plug 241.

Note

In this context it should be noted that the permissible number of load units in the automation stations must not be exceeded. The **PTM52.32V01** module takes up 4 load units in the automation stations.
Where a GRUNDFOS bus segment contains two modules, the address plug number (basic address) must be less than 64 for one of the modules, and equal to or greater than 64 for the other. The module with the lower basic address then communicates with pumps 1 to 4, while the module with the higher basic address communicates with pumps 5 to 8.

LED indicators on the interface module

The two LEDs, "P-bus" and "GRUNDFOS RS485" indicate the operating state of the interface module.

The table below shows the information associated with these LEDs.

Phase	P-bus LED 1	GRUNDFOS LED 2	Description
Start-up phase (approx. 5 s)	On		Normal operation
	Off		No P-bus module power supply
	Flashing		Faulty module
Normal operation	On	On	Normal operation
	On	Flashing	Error in transmission between module and GRUNDFOS interface
	Off	Off	No P-bus module power supply or no AC 24 V operating voltage
	On	Off	No communication with the GRUNDFOS interface

DESIGO V2.2 operating states in detail

Operating states	PTM52.32V01 module P-bus LED 1	GRUNDFOS LED 2	PXM20 Error LED	DESIGO PXC-U Com-pound	Alarm list	Comments
Grundfos pump, first poll						
No pumps polled yet	On	Off	Flashing	Reliability 1	Display	Applies to all data points
All pumps can be read	On	On	Off	Reliability 0	None	Applies to all data points
Pump x not responding	On	Flashing	Flashing	Reliability 1	Display	Applies to all data points of Pump x
Certain DPs of Pump x not found	On	Flashing	Flashing	Reliability 1	Display	Applies to specific data points of Pump x
Repeat poll of Grundfos pump						
All pumps can be read	On	On	Off	Reliability 0	None	
Pump x not responding	On	Flashing	Flashing	Reliability 4	Display	Applies to all data points of Pump x
Certain DPs of Pump x not found	On	Flashing	Flashing	Reliability 4	Display	Applies to specific data points of Pump x
P-bus power off	Off	Off	Flashing	Reliability 1	Display	
P-bus power-on (start-up phase approx. 5s)	On	On	Flashing	Reliability 1	Display	No synchronization with controller yet
P-bus power-off	On	On	Off	Reliability 1	Display	Directly after synchronization with controller
	On	On	Off	Reliability 0	None	All data points read
Faulty module	Flashing	Flashing	Flashing	Reliability 1	Display	
Module <-> GRUNDFOS connection interrupted	On	Off	Flashing	Reliability 4	Display	

System safety and operational reliability

Start-up response

After the power supply has been switched on (reference voltage BEZ and system voltage G) and after synchronization with a PXC… automation station, the interface module is ready within 0.5 seconds to start communication with the pumps, i.e. to receive telegrams.

Reliability of data transmission

- Faulty data transmission identified, data not accepted.
  The CRC code guarantees the integrity of the transmitted data.
- A PXC… automation station must transmit updated output values in an error-free telegram to the PTM52.32V01 interface module within a period of 4-seconds. If no telegram is transmitted within this period of time, the default values for the interface module are enabled.
- If the GRUNDFOS bus to the pumps is interrupted or exposed to high-level interference, the pumps will continue to operate using the locally set default values. Apart from the error code, the pump data in the interface module is set to default values and marked invalid with status bit = 1. This data is then transmitted to the automation station in place of the missing current data. The error code, in this case "09" ("Supply fault", "Other" or "Bus fault") remains valid. All other data points have a default value of "0".

Short-circuit resistance

Both bus cables are short-circuit proof.

Working with the module connected to the power supply

Connecting and disconnecting the interface module with the power switched on will not cause damage to the module.

Note

The full functional scope of the interface module covers both the module hardware and the signal processing in the automation station software.
For a full understanding of the module functions, it is important to take note of the relevant processing steps. Refer to document CM2Z8102 for basic information about the I/O modules.

Mechanical design

The interface module comprises a plastic housing with a terminal base and an electronic assembly for plugging into an I/O terminal bar. Signals and voltages are picked up via the contact springs of the conductor rails in the I/O terminal bar.

The connection terminals of the interface module on the I/O terminal bar have the same function as the terminal strips conventionally installed in the control panel for outgoing cables. They also meet the standards and guidelines applicable to the latter. They can be labeled with a plant-specific reference and are designed as test terminals.

The module has a transparent front section for insertion of the plant-specific module label. The labels are created with DESIGO TOOLSET on pre-printed and perforated labeling sheets.

The front plate also incorporates the socket for the address plug and the two LEDs for the P-bus and the GRUNDFOS interface. There are no operator controls on the module.

For accessories (for all modules in general) refer to data sheet N8105.

Note

For an in-depth description of the design: refer to the relevant section of document CM2Z8102, "Technical principles of I/O Module System".

GRUNDFOS – PTM52.32V01

Front view

PTM52.32V01

1 ——

2 ——
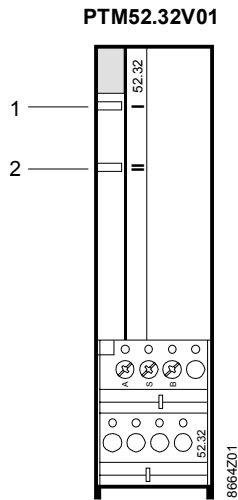
1   P bus indicator
2   GRUNDFOS bus indicator

Engineering notes

Document CM2Z8102 "Technical principles of I/O Module System" contains project engineering information relevant to the system and should be read before proceeding with the sections which follow.

Special attention should be paid to the safety information.

Appropriate use

The interface module should be used in the overall system only for the applications described in document CM2Z8102 "Technical principles of I/O Module System". Special attention should be paid to the brief description on the title page (printed in bold type) and to the sections headed "Use", "Engineering notes" and "Technical data".

System integration

The interface module represents a combination of several I/O modules in sequence, each of which is addressed individually, starting from the basic address. The data points of the automation station are mapped internally in the interface module to normal I/O data points, which can then be integrated into the automation stations.

GRUNDFOS Interface module

The GRUNDFOS bus is **electrically isolated** from the module electronics.

Library elements	The CAS library contains the following compound:	

- Pumps: PuGfos
  Path: U\Charts\UEqp\Pu\

The Grundfos compound is stored one level down in the hierarchy, in its own "envelope" (PTM5232) to allow the creation of instances in System Design. The "envelope" is designed solely to simplify the process described, and has no other function in the CFC.
The Grundfos compound is described in detail in the CAS documentation.

Engineering in System Design

There are two ways of creating an instance of a Grundfos solution in System Design:

- With the "Append data point" function
- With the Solution Browser

Append data point

In a plant, partial plant or aggregate, a data point can be added with the option **Generate → Data point**. The appropriate family (Pu) must be selected as the DP type. The version is then selected as the signal type (PTM52.32 GRUNDFOS). Although the Grundfos solution incorporates several data points, it is represented in System Design as an individual data point. When creating an instance of a Grundfos solution, the plus sign (+) indicates that this compound incorporates several data points.

	1	2	DP Type	#States	Signal Type	Feedback	Unit	User Designation	Lock	I/O Address
1			Pu		PTM52.32 Grundfos - Pump, Grundfos			Grundfos Pump		1.01
			BO		Digital output (with status)		Off/On			1.1
			AI		Analog input (with status)		m3/h			6.1
			MI		Digital input (with status)		Grundfos fault c			4.1
			MI		Digital input (with status)		Grundfos OpDat			3.1
			AI		Analog input (with status)		m			5.1
			AI		Analog input (with status)		kW			7.1
			AI		Analog input (with status)		%			8.1
			AO		Analog output (with status)		%			2.1

Solution Browser

In addition to the standard CAS pumps, it is also possible to select a Grundfos version in a predefined CAS solution. The interfaces are compatible. Options (e.g. pump kick) are not supported in V2.2. The compounds are saved as "maximum" versions. If this function is not required, it must be deleted afterwards in the CFC.

		Configuration	Detailed Description	Linked By	Compound Version
	Properties	Hierarchy Elements	Data Points	**Solution**	

3p [Third party equipment]

| PuGfos [Pump] | | Pump, Grundfos | | CAS03 |
| PuGfos [Pump, Grundfos] | | | | |

New el	PuWilo [Pump, Wilo]	PXC\CAS03 1
New eleme	PuGfos [Pump, Grundfos]	PXC\CAS03 2
	Pu1St [Pump, 1-stage]	PXC\CAS03 3
	Pu2St [Pump, 2-stage]	PXC\CAS03 4
	PuCtr [Pump, controlled (VSD)]	PXC\CAS03 5
	PuFqSED [Pump, frequency (SED)]	PXC\CAS03 6
	PuMdltSED [Pump, modulating control (SED)]	PXC\CAS03 7
	PuPSED [Pump, pressure (SED)]	PXC\CAS03 8
	PuTwn [Twin pump]	PXC\CAS03 9
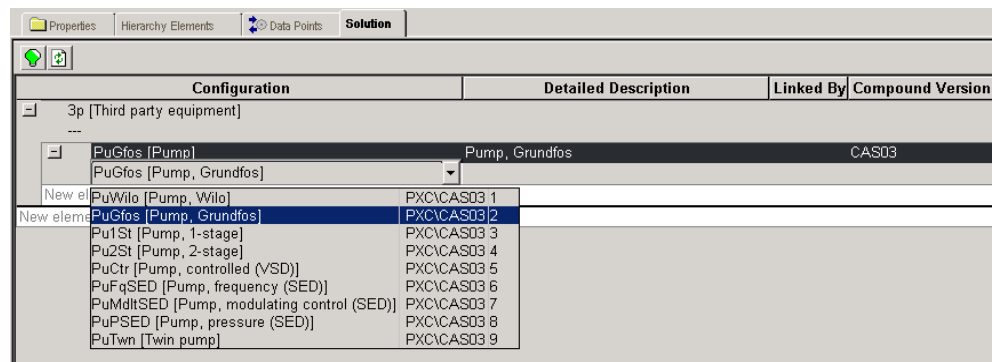
Internal structure of a GRUNDFOS compound

Unlike the PTE-MBUS.60, the PTM52.32V01 does not require a "Setting" compound. The pump addresses must be set as described in the "Addressing" section. The baud rate and other communications parameters are fixed, and cannot be adjusted.

10/14

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GRUNDFOS – PTM52.32V01

CM2N8664D
12.2003

The following Grundfos data points are mapped to BACnet:

Data point name	Pin name
Switch command	Cmd
Flow rate	FlRate
Fault data (encoded)	FltCode
Operating data (encoded)	Opcode
Pump output	PuOut
Pump speed	PuSpd
Pump head	PuHd
Setpoint, pump head	SpPuHd

The operating and fault data is displayed by enumeration.
If a fault occurs, the object FltInd BVAL will also be activated.

Setting
Slope and Intercept

The slope value should be set as follows for the data points below:

Data point	Slope
Pump output	0.01
Pump head	0.1
Flow rate	0.1

The compound already contains these settings.

Compound
interfaces

The Grundfos compound interfaces comply with the interfaces defined by CAS.

Note

In addition, for each Grundfos compound, suitably adjusted values for Critical Off and Critical On must be entered in the SELBO_R block. These are the setpoints for critical on/off switching. These values vary according to the applications.

The default values are as follows:

Compound	Critical Off	Critical On
PuGfos	0 %	100 %

Commissioning notes

Module address
The address plug, with the predefined basic address, must be connected. For detailed information, refer to the "Technical design" section. Apart from this, there are no settings or controls on the interface module itself.

Settings on the pump
The communicating GRUNDFOS pumps must be allocated a pump number / address in the commissioning process. P bus addresses below 64 support pump addresses 1 to 4, and P-bus addresses equal to or greater than 64 support pump addresses 5 to 8. After modifications to the GRUNDFOS pump addresses, the pumps must be cold-started (switch off and on again).

The pump head setpoint transmitted to the pump always refers to the setpoint set locally on the pump. With a local value below 100%, the setpoint can only be varied within this range. The setpoint is adjusted by means of a potentiometer on the pump housing.

For pumps with remote infrared control, the pump number or address can be set with the remote control unit. The maximum setpoint is set with the + / – buttons on the pump housing. However the settings for pumps with remote control are only possible with the interface module disconnected.

For further information on the pump settings, please refer to the pump manufacturer's literature.

General
For general information on the commissioning of I/O modules refer to document Z8102 "Technical principles of I/O Module System".

Technical data

Power supply

Operating voltage	AC 24 V ± 20%
Safety low voltage (SELV) in accordance with	EN 60 730
Frequency	50 Hz / 60 Hz
Power consumption	1.2VA
I/O module supply via P-bus	DC 24 V (against G0)
Load units	4 load units connected

Module addresses

Numerical range for basic addresses	1 to 241
Valid offset addresses	0 to 15

P bus

See document CM2N8022 "Process bus"

GRUNDFOS bus

Interface type	RS-485 (electrically isolated)
Transmission speed	9600 bit/s
Cable type	Good quality communications cable (two-wire, unscreened)
Maximum cable length	1200 m
Cross-section	Min. 2 x ≈0.5mm²

Konformität

Meets the requirements for CE marking in	
EU Directive: Electromagnetic compatibility	89/336/EEC

Note
Technical data which is applicable to all I/O modules is described in document CM2Z8102 "Technical principles of I/O Module System".

For mounting instructions, refer to: " I/O Module System, Mounting and installation guide", document CM2M8102.

Mounting instructions for the I/O modules on the rails and I/O terminal bar are printed on the packaging.

Internal diagram

See page 6

GRUNDFOS bus segment with max. four pumps

RS-485 interface:

A   Data cable +

B   Data cable –

S   Cable screen (support terminal only)
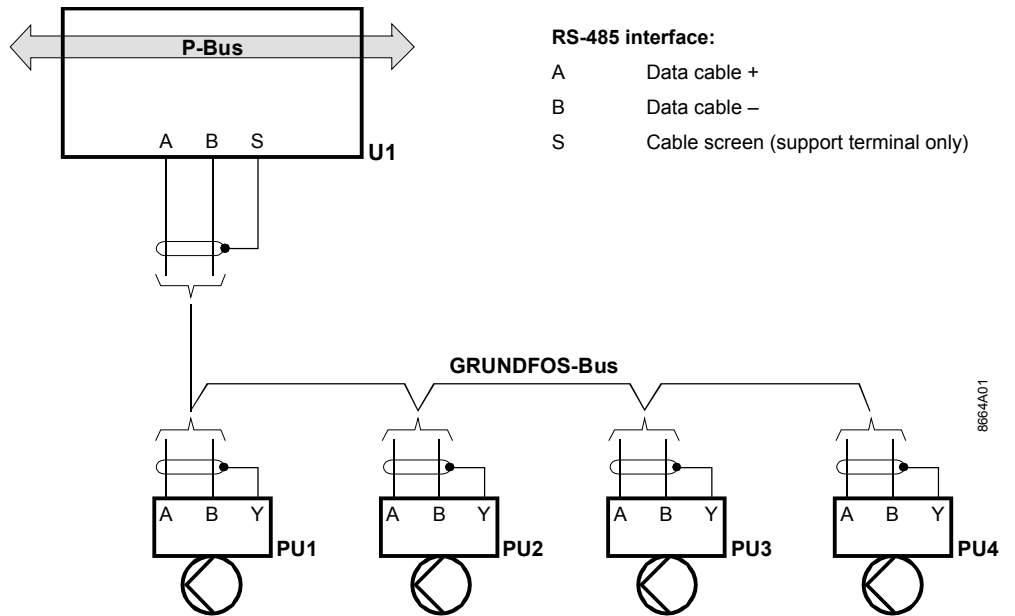
GRUNDFOS bus segment with max. eight pumps
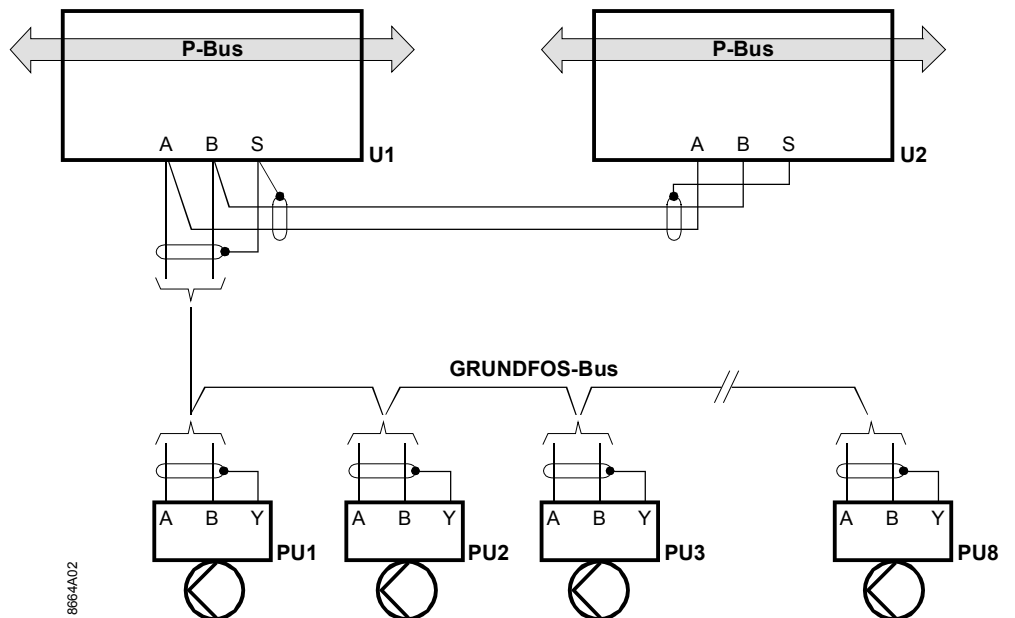
U1, U2   PTM52.32V01 interface module

PU1...PU8   Heat circulating pumps with GRUNDFOS bus

Note

The identification of the pump terminals may vary (e.g. numbers instead of letters). Refer to the pump manufacturer's literature.

13/14

Dimensions

Dimensions in mm

EN50035-G32   EN50022-35x7,5

EN50035-G32

EN50022-35x7,5

8106M01

Subject to change

SIEMENS
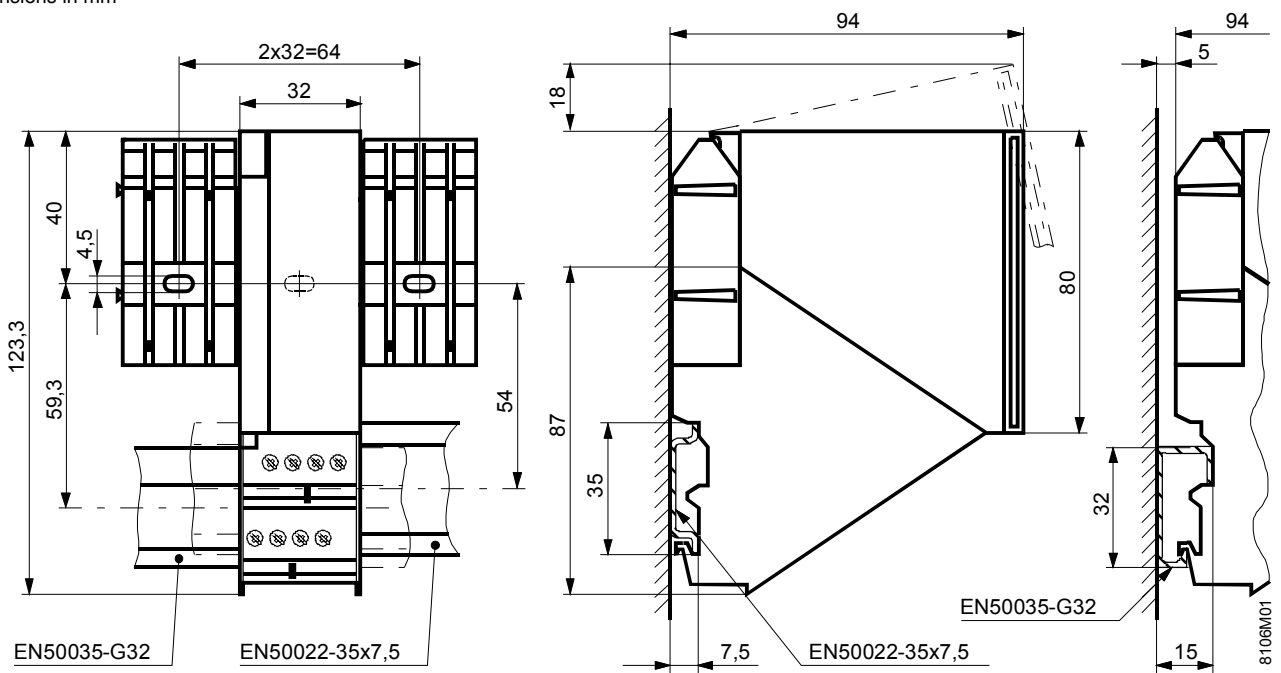
DESIGO™ I/O-OPEN / UNIGYR™

WILO   PTM50.32V01

For the integration of electronically-controlled WILO circulating pumps

---

Interface module for integration of intelligent circulating pumps with a WILO current interface into a DESIGO V2.2 building automation and control system. Option of connecting four pumps via separate interfaces or two twin pumps each via a shared interface.

Note   *This document includes the engineering notes for the version DESIGO V2.2.*
For engineering notes for DESIGO V2.1 and UNIGYR see document CM2J8666en

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Application

The interface module enables up to 4 communicating pumps to be integrated into a DESIGO V2.2 building automation and control system. The pumps are integrated into a PXC64-U or PXC128-U automation station via the P-bus connection.

Functions

General

The use of the interface module permits the following functions for each pump:

- General control: Off/On/Min-On and setpoint for pump head [1] (0 to 100 m)
- Pump data points: operating data (encoded), pump head (m), flow rate (m^3/h), pump output (W), pump speed (rpm)
- Errors: fault data (encoded). For details, refer to "Pump data points"

System topology:
DESIGO V2.2
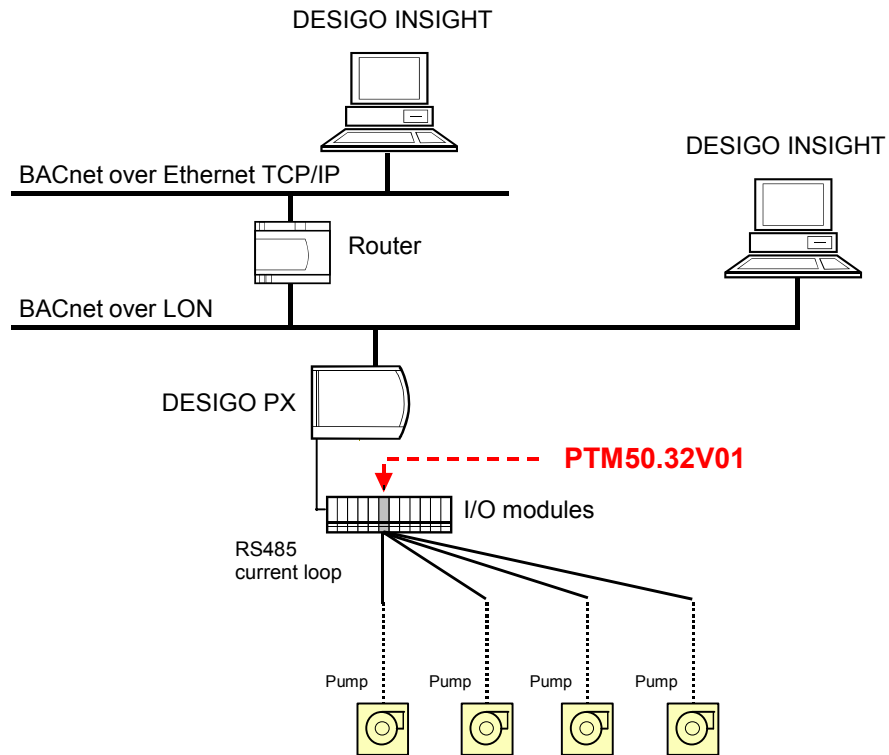
Pump data points

The table below shows the data points of the pumps which can be integrated via the interface module:

Data point name	Value range	Data point type [1]	Direction of data flow [2]
Switch command	0 = OFF 1 = ON 2 = MIN-ON	DOS	S → Pump
Setpoint, pump head	0 … 100.0 m	AOS	S → Pump
Operating data [3]	0 ... 7 (encoded)	DIS	Pump → S
Fault data [3]	0 ... 4 (encoded)	DIS	Pump → S
Pump head	0 to 100.0 m	AIS	Pump → S
Flow rate	0 … 400.0 m3/h	AIS	Pump → S
Pump output	0 … 4000 W	AIS	Pump → S
Pump speed	0 … 4000 rpm	AIS	Pump → S

1) Data point types:
   DI**S**, DO**S**, AI**S** and AO**S** are digital/analog inputs/outputs with a **s**tatus bit. They are the virtual P bus data points used for integration of the WILO pumps.

2) Direction of data flow:

Pump	→ S	indicates data flowing from the PUMP to the SYSTEM
S	→ Pump	indicates data flowing from the SYSTEM to the PUMP

3) Encoded messages:
   The table shows the contents of the encoded messages, as they appear at the automation station. Each message is displayed as a number (= bit position). These bits are mapped in CFC logic to BVAL objects in the Wilo compound.

Type of message	Encoded messages: (Bit position)	Bit status and meaning		Description
		Bit set (1)	Bit not set (0)	
Operating data	1	On	Off	OpSta: Operating status message
	2	Left	Right	Direction of rotation
	3	Yes	No	SpDvn: Setpoint deviation
	4	Off	On	ExtPrio: Pump via external switch
	5	Twin pump	Single pump	Type: Type of pump
	6	Manual	Automatic	OpMod: Pump Manual/Auto
	7	Invalid (cannot be determined)	Valid	FlRateRlb: Flow rate (Q) and pump head (H)
	8	Minimum speed	Normal	Spd: rpm
Type of fault	1	Alarm	Normal	MdlFlt: Module fault
	2	Alarm	Normal	MotFlt: Motor fault
	3	Alarm	Normal	ComErr: Communications error
	4	Alarm	Normal	PuFlt: Pump fault
	5	Alarm	Normal	PwrSply: Power supply

Access

Access to this data is as follows:

- Locally in the automation station or at the pump (if Wilo HMI is connected)
- Centrally, via the PC user interface

Applications

The heating and pump control loops are linked through the communication between the pump and the automation station. Based on the data and variables transmitted, the following functions, for example, can be implemented via the automation station:

- Adaptation of pump output to various building occupancy periods via time schedules
- Display of pump parameters and plotting of trend graphs
- Adaptation of pump output to boiler operating state
- Optimization of heating control by measurement of the pump's flow rate
- Control of the primary circuit pump as a function of the downstream heating circuits
- Energy management to optimize consumption and efficiency
- Adaptation of pump output to the currently required flow rate, e.g. based on consumption measurements from electronic heat meters
- Central logging of operating states, with archiving and trend displays
- Central logging of faults, with instructions for service personnel
- Centralized maintenance management based on runtime totalization
- Integration into maximum (electricity) demand control system by transmission of power consumption data
- Remote messaging and monitoring via modem and mobile or land-line telephone

Display options on the interface module

The interface module has two LEDs, used to indicate the consistency of the communications.

Safety and reliability

Refer to the "Technical design" section for information on operational reliability and system safety precautions.

Types

Ordering

The I/O-OPEN WILO interface modules should be ordered via the Logistics department, using the ASN number: **PTM50.32V01**

Delivery

The base unit and electronics module are delivered in separate but interlinked packages.

Accessories

Accessories must be ordered as separate items. For general I/O accessories refer to data sheet 8105.

Compatibility

Automation stations

The interface module can be connected to any Siemens automation stations which have a P-bus connection and which provide software support for the required module type (AIS, AOS, DOS and DIS). In DESIGO V2.2 these are the PXC64-U and PXC128-U modular automation stations.

WILO circulating pumps for heating systems

Use of communicating pumps with a WILO interface (TOP-WILO series with current interface): for detailed information refer to the technical literature supplied by the pump manufacturer.

General

With the interface module, data points from the WILO pumps can be mapped to the P-bus, enabling the automation station to read all the data points via the assigned addresses and channels. The module reads the data points from the pumps at regular intervals and updates the internal database with the actual values. When an automation station requests a reading, the data points are transferred from the interface module to the automation station. In the opposite direction, values are written from the automation station to the interface module via the P-bus.

Creating a program

From a functional point of view, the interface module contains 8 I/O virtual-module addresses (1 x [4 DOS], 1 x [4 AOS], 2 x [4 DIS] and 4 x [4 AIS]). They are referred to as "virtual" in the sense that they do not exist as individual physical modules. Module address 15 remains unused, and address 16 is used for the module production test. The values and attributes of the pumps associated with these module addresses require scaling and decoding. The library element already contains these settings, which are described further below.

Data transmission

P bus

The data is transmitted between the interface module and the automation stations via the 3-wire P-bus (process bus). For details, refer to data sheet N8022, "Process bus".

WILO interface

The pump data is transmitted between the interface module and the pumps in both directions via the WILO current interfaces. For technical specifications refer to the "Technical data" section.

Note

Failure of communications via the WILO interface:
If there is no communication with any of the pumps, the WILO interface LED (LED 2) is extinguished. In the case of pumps which were previously in communication, the failure is not detected until after the relevant failure tolerance period (approx. 50 s).

As the pumps are only sampled in a cycle of approximately 5 seconds, there is a delay of 5 to 10 s on start-up, until the module recognizes all the connected pumps.

The "Speed" data point is only available after a further 5 s. This is because of series-related differences in the protocols transmitted by the pumps.

When the pump starts up or when the speed is reduced significantly with the potentiometer, the pump head (H) and flow rate (Q) cannot be determined. In this case, bit position "7" is set, and the maximum possible values are transmitted for the pump head and flow rate. If required, these values can be corrected in the application software in the automation station.

Addressing

For transmission over the P-bus, each data point is assigned an address.
This "P-bus address" comprises:
- Basic address
- Offset address
- Channel number

Data point addressing

The table below shows how the data points are addressed via the automation station.

Data point (A)	Offset (B)	Pump No. (C)	Channel (D)	Module (E)
Switch command		I	1	
Switch command		II	2	
Switch command		III	3	
Switch command		IV	4	4DOS
Pump head	+4	I	1	
Pump head		II	2	
Pump head		III	3	
Pump head		IV	4	4AIS
	+8		1–4	
	+12		1–4	
Pump head setpt	+1	I	1	
Pump head setpt		II	2	
Pump head setpt		III	3	
Pump head setpt		IV	4	4AOS
Flow rate	+5	I	1	
Flow rate		II	2	
Flow rate		III	3	
Flow rate		IV	4	4AIS
	+9		1–4	
	+13		1–4	
Operating data	+2	I	1	
Operating data		II	2	
Operating data		III	3	
Operating data		IV	4	4DIS
Pump output	+6	I	1	
Pump output		II	2	
Pump output		III	3	
Pump output		IV	4	4AIS
	+10		1–4	
	+14		1–4	
Fault data	+3	I	1	
Fault data		II	2	
Fault data		III	3	
Fault data		IV	4	4DIS
Pump speed	+7	I	1	
Pump speed		II	2	
Pump speed		III	3	
Pump speed		IV	4	4AIS
	+11		1–4	
Reserved for test (F)	+15		1–4	Module info : PTM50.32V01

Key

A. Data points

B. Address plug + offset

C. Internal pump number

D. Channel number

E. P-bus I/O module type

F. Reserved for production test

A basic address (the hardware address) is assigned to the interface module by means of an address plug. The interface module uses fixed offset addresses.
In order to enable all the data points in the interface module to be addressed on the P-bus, the highest address which may be used is Address Plug 241.

Note

In this context it should be noted that the permissible number of load units in the automation stations must not be exceeded. The **PTM50.32V01** module takes up 4 load units in the automation stations.

LED indicators on the interface module

The two LEDs, "P-bus" and "WILO (RS485 Current Loop)" indicate the operating state of the interface module.

The table below shows the information associated with these LEDs.

Phase	P-bus LED 1	WILO LED 2	Description
Start-up phase (approx. 5 s)	On		Normal operation
	Off		No P-bus module power supply
	Flashing		Faulty module
Normal operation	On	On	Normal operation
	On	Flashing	Error in transmission between module and WILO interface
	Off	Off	No P-bus module power supply or no AC 24 V operating voltage
	On	Off	No communication with the WILO interface

DESIGO V2.2 operating states in detail

Operating states	PTM50.32V01 module P-bus LED 1	WILO LED 2	PXM20 Error LED	DESIGO PXC-U Compound	Alarm list	Comments
First poll of WILO pump						
No pumps polled yet	On	Off	Flashing	Reliability 1	Display	Applies to all data points
All pumps can be read	On	On	Off	Reliability 0	None	Applies to all data points
Pump x not responding	On	Flashing	Flashing	Reliability 1	Display	Applies to all data points of Pump x
Certain DPs of Pump x not found	On	Flashing	Flashing	Reliability 1	Display	Applies to specific data points of Pump x
Repeat poll of Wilo pump						
All pumps can be read	On	On	Off	Reliability 0	None	
Pump x not responding	On	Flashing	Flashing	Reliability 4	Display	Applies to all data points of Pump x
Certain DPs of Pump x not found	On	Flashing	Flashing	Reliability 4	Display	Applies to specific data points of Pump x
P-bus power off	Off	Off	Flashing	Reliability 1	Display	
P-bus power-on (start-up phase approx. 5s)	On	On	Flashing	Reliability 1	Display	No synchronization with controller yet
P-bus power-off	On	On	Off	Reliability 1	Display	Directly after synchronization with controller
	On	On	Off	Reliability 0	None	All data points read
Faulty module	Flashing	Flashing	Flashing	Reliability 1	Display	
Module <-> WILO connection interrupted	On	Off	Flashing	Reliability 4	Display	

System safety and operational reliability

Start-up response

After the power supply has been switched on (reference voltage BEZ and system voltage G) and after synchronization with a PXC… automation station, the interface module is ready within 0.5 seconds to start communication with the pumps, i.e. to receive telegrams.

Reliability of data transmission

- Faulty data transmission identified, data not accepted.
  The CRC code guarantees the reliability of the data transmission.
- A PXC… automation station must transmit updated output values in an error-free telegram to the PTM50.32V01 interface module within a period of 4-seconds. If no telegram is transmitted within this period of time, the default values for the interface module are enabled.
- If the WILO interface to the pumps is interrupted or the data transfer is affected by high-level interference, the pumps will continue to operate using their locally set default values. In the pump data, bit positions "7" (flow rate and pump head) and "8" (pump speed) will be set to "0".
- Exception: In the case of fault data, bit position "3" (communications error) will be set to "1".

Short-circuit resistance

Both bus cables are short-circuit proof.

Working with the module connected to power supply

The interface module can be plugged and unplugged without switching off the power, without suffering damage.

Note

The full functional scope of the interface module covers both the module hardware and the signal processing in the automation station software.
For a full understanding of the module functions, it is important to take note of the relevant processing steps. Refer to document CM2Z8102 for basic information about the I/O modules.

Design

The interface module comprises a plastic housing with a base unit and electronic assembly, for plugging into an I/O terminal bar. Signals and voltages are picked up via the contact springs of the conductor rails in the I/O terminal bar.

The connection terminals of the interface module on the I/O terminal bar have the same function as the terminal strips conventionally installed in the control panel for outgoing cables. They also meet the standards and guidelines applicable to the latter. They can be labeled with a plant-specific reference and are designed as test terminals.

The module has a transparent front section for insertion of the plant-specific module label. The labels are created with DESIGO TOOLSET on pre-printed and perforated labeling sheets.

The front plate also incorporates the socket for the address plug and the two LEDs for the P-bus and the WILO interface. There are no operator controls on the module.

For accessories (for all modules in general) refer to data sheet N8105.

Note

For an in-depth description of the design: refer to the relevant section of document CM2Z8102, "Technical principles of I/O Module System".

Front view

PTM50.32V01
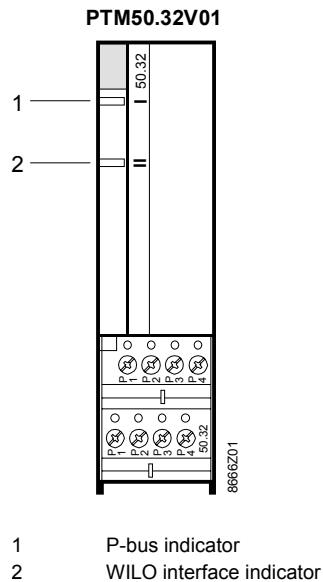
1   P-bus indicator
2   WILO interface indicator

Engineering notes

Document CM2Z8102 " Technical principles of I/O Module System" contains project engineering information relevant to the system and should be read before proceeding with the sections which follow.

Special attention should be paid to the safety information.

Appropriate use

The interface module should be used in the overall system only for the applications described in document CM2Z8102 " Technical principles of I/O Module System". Special attention should be paid to the brief description on the title page (printed in bold type) and to the sections headed "Use", "Engineering notes" and "Technical data".

System integration

The interface module represents a combination of several I/O modules in sequence, each of which is addressed individually, starting from the basic address. The data points of the automation station are mapped internally in the interface module to normal I/O data points, which can then be integrated into the automation stations.

WILO interface cables

The two-wire conductors are interchangeable.

Library elements	The CAS library contains the following compound:

- Pumps: PuWilo
  Path: U\Charts\UEqp\Pu\

The Wilo compound is stored at one level down in the hierarchy, in its own "envelope" (PTM5032) to allow the creation of instances in System Design. The "envelope" is designed solely to simplify the process described, and has no other function in the CFC. The Wilo compound is described in detail in the CAS documentation.

Engineering in System Design	There are two ways of creating an instance of a Wilo solution in System Design:

- With the "Append data point" function
- With the Solution Browser

Append data point

In a plant, partial plant or aggregate, a data point can be added with the option **Generate → Data point**. The appropriate family (Pu) must be selected as the DP type. The version (PTM50.32 WILO) is then selected as the signal type. Although the Wilo solution incorporates several data points, it is represented in System Design as an individual data point. When creating an instance of a Wilo solution, the plus sign (+) indicates that this compound incorporates several data points.

	1	2	DP Type	#States	Signal Type	Feedback	Unit	User Designation	Lock	I/O Address
1			Pu		PTM50.32 WILO - Pump, Wilo			Wilo Pump	🔒	1.01
			MO		Digital output (with status)		Wilo command			1.1
			AI		Analog input (with status)		m3/h			6.1
			MI		Digital input (with status)		Stage 15			4.1
			MI		Digital input (with status)		Stage 15			3.1
			AI		Analog input (with status)		W			7.1
			AI		Analog input (with status)		rew/min			8.1
			AO		Analog output (with status)	Analog input	m			2.1 ; 5.1

Solution Browser

In addition to the standard CAS pumps, it is also possible to select a Wilo version in a predefined CAS solution. The interfaces are compatible. Options (e.g. pump kick) are not supported in V2.2. The compounds are saved as "maximum" versions. If this function is not required, it must be deleted afterwards in the CFC.

Internal structure of a Wilo compound

Unlike the PTE-MBUS.60, the PTM50.32V01 does not require a "Setting" compound. There are no slave address settings, as each pump has its own connection on the terminal module (P1 to P4). The baud rate and other communications parameters are fixed, and cannot be adjusted.

The following Wilo data points are mapped to BACnet:

Data point name	Pin name
Switch command	Cmd
Flow rate	FlRate
Fault data (encoded)	FltCode
Operating data (encoded)	Opcode
Pump output	PuOut
Pump speed	PuSpd
Setpoint, pump head	SpPuHd

The operating and fault data is binary-coded. In the Wilo compound the data is mapped in software logic to BVAL objects, which are also available on BACnet.

Setting
Slope and Intercept

The slope value should be set as follows for the data points below:

Data point	Slope
Setpoint, pump head	10
Pump head	0.1
Flow rate	0.1

The compound already contains these settings.

Compound interfaces

The Wilo compound interfaces comply with the interfaces defined by CAS.
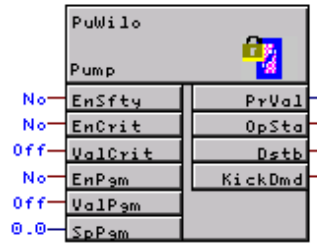
Note

In addition, for each Wilo compound, suitably adjusted values for Critical Off and Critical On must be entered in the SELBO_R block. These are the setpoints for critical on/off switching. These values vary according to the pump.

The default values are as follows:

Compound	Critical Off	Critical On
PuWilo	0 m	10 m

Commissioning

Module address	The address plug, with the predefined basic address, must be connected. For detailed information, refer to the "Technical design" section. Apart from this, there are no settings or controls on the interface module itself.
Settings on the pump	The communicating pumps (TOP-WILO series with current interfaces) must be allocated a pump number / address in the commissioning process. For further information on the pump settings, please refer to the pump manufacturer's literature.
Rewiring while pump is in operation	If a pump is connected to a different module while in operation, the module should be reset by disconnecting it briefly from the I/O strip.
General	For general information on the commissioning of I/O modules refer to document Z8102 "Technical principles of I/O Module system".

Technical data

Power supply	Operating voltage	AC 24 V ± 20%
	Safety low voltage (SELV) in accordance with	EN 60 730
	Frequency	50 Hz / 60 Hz
	Power consumption	1.2VA
	I/O module supply via P-bus	DC 24 V (against G0)
	Load units	4 load units connected
Module addresses	Numerical range for basic addresses	1 to 241
	Valid offset addresses	0 to 15
P bus	See document CM2N8022 "Process bus"	
WILO interface	Interface type	RS485 current loop
	Transmission speed	1200 bit/s
	Signal level logic 0	0 mA
	Signal level logic 1	10 mA
	Cable type	Good quality communications cable (two-wire, unscreened)
	Maximum cable length	500 m
	Cross-section	Min. $2x \approx 0.6mm^2$
Conformity	Meets the requirements for CE marking in	
	EU Directive: Electromagnetic compatibility	89/336/EEC

Note	Technical data which is applicable to all I/O modules is described in document CM2Z8102 "Technical principles of I/O Module System".

Mounting

For mounting instructions, refer to: "Mounting and installation guide for I/O Module System", document CM2M8102.

Instructions for mounting the I/O modules on the rails and I/O terminal bar are printed on the packaging.

Connection diagrams

Internal diagram

Connection options for single and twin pumps
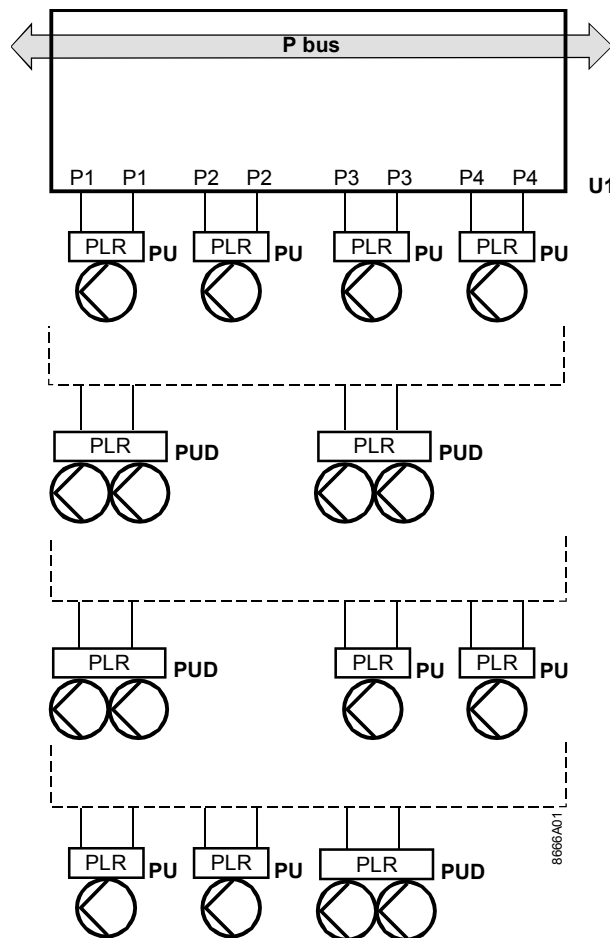
U1   PTM50.32V01 interface module
PU   Individual pumps
PUD Twin pumps (only permissible at connections P1–P1 and P3–P3)
PLR   Pump terminal designation

WILO current interfaces

P1–P1 to   Connections for TOP-WILO heat circulating pumps

P4–P4   (The two wires of a connection are interchangeable)

Dimensions

Dimensions in mm

EN50035-G32   EN50022-35x7,5

EN50035-G32

EN50022-35x7,5

8106M01D

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Subject to change

SIEMENS
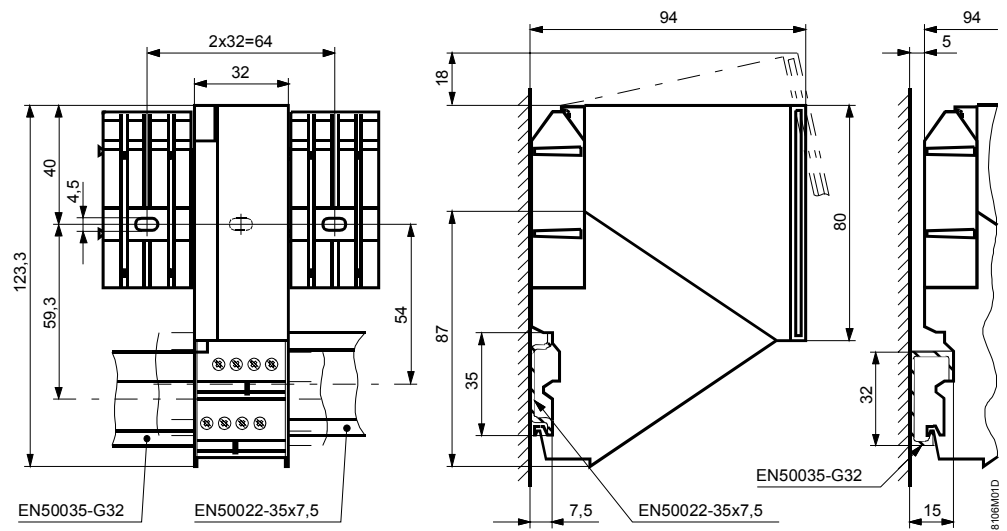
DESIGO™ I/O-OPEN / UNIGYR™

Platform   PTM1.RS232
PTM1.RS485

For integration of third-party devices into the DESIGO and UNIGYR building
automation and control systems.

For the implementation of customized integration solutions.
Applications with up to 60 data points can be programmed.

Note   *This document includes the engineering notes for the version DESIGO V2.2.*
For engineering notes for DESIGO V2.1 and UNIGYR see document CA1J9780en.

Application

With their respective interfaces (RS232 and RS485), the PTM1.RS232 and
PTM1.RS485 platforms can be used to integrate third-party devices into the DESIGO
V2.2 building automation and control system. The platforms are compatible with all
DESIGO V2.2 automation stations which use a P-bus connection.

Siemens Building Technologies
Building Automation

The I/O-OPEN platforms, PTM1.RS232 and PTM1.RS485 can be programmed to simulate a series of virtual I/O modules. The number of I/O modules is limited to 15 per platform. Each module has four channels.

System topology

01655

DESIGO PXC
I/O-OPEN
I/O modules
RS232 / 485
Third-party device
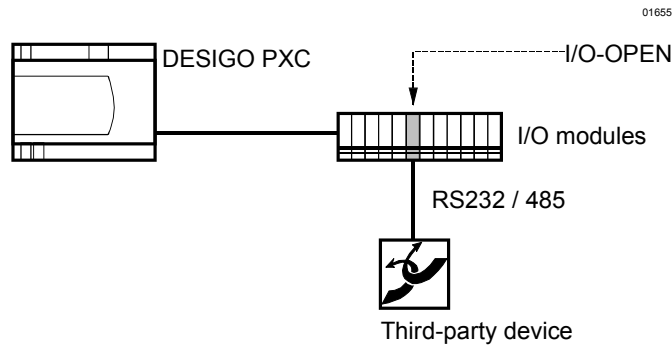
Application-specific functions

The I/O-OPEN platforms represent a series of virtual I/O modules, which start with a basic address and can be addressed individually.

The third-party data points are mapped internally in the I/O-OPEN platforms to normal I/O data points, which can then be integrated into the automation stations.

Indication

The I/O-OPEN platforms have two LEDs for checking the consistency of communications.

Safety and reliability

Refer to the "Technical design" section for details of the necessary safety precautions in respect of operational reliability and system safety.

Types

Ordering

The PTM1.RS232 and PTM1.RS485, which do not contain software applications, should be ordered from Logistics by their ASN numbers: **PTM1.RS232** and **PTM1.RS485.**

Note

The software and hardware development environment should be ordered from the Platforms manager at HQ, using a Service Request.

Delivery

The base unit and electronics module are delivered together, in separate but interlinked packages. The factory-fitted microprocessor is part of the delivery package (see below) and should be replaced by your individually developed application software.

Accessories

I/O accessories must be ordered as separate items (see data sheet 8105).

2/8

Siemens Building Technologies
Building Automation

Platform **PTM1.RS232 and PTM1.RS485**

CA1N9780en
11.2003

Compatibility

Automation stations

The I/O-OPEN platforms can be connected to any DESIGO V2.2 automation stations which have a P-bus connection and which incorporate the software necessary to support the required functions.

Third-party devices

Third-party devices which support the RS232 / RS485 standards can be connected. In some cases a converter may be necessary to convert the third-party bus to the RS485 or RS232 standard (e.g. M-bus ←→ RS232 converter).
The baud rate, data bits and stop bits can be configured in software in the module.
The maximum baud rate is 9600 bit/s.

Technical and mechanical design

General

The PTM1.RS232 and PTM1.RS485 are delivered with a factory-fitted microprocessor to allow manufacturing tests of the PTM1… hardware.

Creating a program

For information about programming the PTM1.RS232 and PTM1.RS485 platforms, refer to the I/O-OPEN application guide: P489303B (available from the Platforms manager at HQ).

Data traffic

P-bus

The data is exchanged between the I/O-OPEN platforms and the automation station over the 3-wire P-bus (process bus).
For further information, refer to data sheet 8022 "Process bus".

Addressing

For transmission over the P-bus, each data point is assigned an address.
This P-bus address comprises:
- Basic address
- Offset address
- Channel number

Status LEDs

The two LEDs for the P-bus or the third-party bus over RS232/RS485 indicate the operating state of the I/O-OPEN platforms and the third-party bus connections.

Phase	P-bus LED 1	RS232 / RS485 LED 2	Description
Power-up phase (approx. 5 s)	ON, steady	– –	Normal operation
	Off	– –	No power supply via P-bus
	Flashing	– –	Faulty module
Normal operation	ON, steady	ON, steady	Normal operation
	ON, steady	Flashing	Transmission error(s) between module and RS232/RS485 interface
	Off	Off	No module power supply via P-bus or no AC 24 V operating voltage
	ON, steady	Off	No communication with the RS232/RS485 port

System safety and operational reliability

Start-up response   After the power supply has been switched on (reference voltage BEZ and system potential G), the I/O-OPEN platform is ready within 0.5 seconds to start communication, i.e. to receive a telegram.

Reliability of data transmission   An automation station is required every four seconds to transmit updated output values in the form of an error-free telegram to the I/O-OPEN platform. If no telegram is received within the specified period, the default values held in the platform are activated and transmitted to the third-party in place of the unsent current values.

Protection against incorrect wiring   The platform is protected from potential damage in the event of accidental connection of an AC 230 V supply to the RS232/RS485 bus.

Short-circuit resistance   Both bus cables A and B (Tx and Rx respectively) are short-circuit proof.

Working on the I/O-OPEN platform with power connected   Without switching off the power, the I/O-OPEN platforms can be plugged in, unplugged or connected to the third-party network without suffering damage.

Note   Overall, the functions of the I/O-OPEN platform comprise hardware (the platform itself) and software functions (the processing of the signals in the platform). For a clear understanding of the scope of the platform functions, it is important to be aware of the associated process flow.

For technical details applicable to all the I/O modules, refer to document Z8102, "Technical principles of I/O Module System".

Mechanical design

The I/O-OPEN platform consists of a plastic housing with a terminal base and an electronic assembly. The platform can be plugged into the I/O terminal bar, enabling signals and voltage to be picked up via contact springs on the printed circuit tracks of the I/O bar.

The connection terminals of the I/O-OPEN platform, located on the I/O terminal bar, perform the same function as a terminal block. Terminal blocks normally have to be installed in the control panel for external wiring purposes. They comply with all the relevant standards and directives, also function as test terminals, and can be labeled for a specific plant.

The platform module has a transparent front cover for insertion of the plant-specific label. The required labels are created with the configuration tool, DESIGO TOOLSET, on pre-printed and perforated labeling sheets.

The address plug and the two LEDs for the P-bus and third-party bus are also located on the front of the module.

There are no operator controls on the PTM1… modules.

The accessories required for the I/O-OPEN platform are detailed in data sheet 8105.

Note   For a detailed description of the technical and mechanical design of the module, refer to document Z8102 " Technical principles of I/O Module System".

01656 B

PTM1.RS232   **PTM1.RS485**

1 - Status-LED for P-Bus

2 - Status-LED for RS232 / RS485

Front view

Motorola microprocessor MC68HC711E9 or E20 with customized application firmware

x4 = P-bus

Engineering notes

Correct use

Within the overall system, the I/O-OPEN platform must be used only in the applications described in document Z8102 "Technical principles of I/O Module System".

Note should be taken of the special features and functions of the I/O-OPEN platform referred to in the brief description on the first page and in the "Application" and "Engineering" and "Technical data" sections of this sheet.

Interface to third-party device

The third-party bus is electrically isolated from the electronics of the I/O-OPEN platform.

System integration

Essentially, the I/O-OPEN platform represents a series of I/O modules, each of which can be addressed individually, starting from a basic address. Inside the I/O-OPEN platform, the third-party data points are mapped to normal I/O data points, which can then be integrated into the automation station.

Creation of compounds DTS compatibility

Information about the creation of compounds and their storage in the library is provided in the advanced documentation:

- Programming of Compounds, CM110350en
- Erstellen der Compounds-Bibliothek, PD747-D-417
- Ergänzen von I/O-OPEN und PX-OPEN (PXE), PD747-D-418

Data point information and descriptions of the workflow are available via the online help systems in CFC and DTS.

Mounting instructions

For mounting instructions, refer to document M8102, "Mounting and installation guide for I/O Module System".

Instructions for mounting the I/O module on DIN rails and on the I/O terminal bar are printed on the packaging.

Factory-fitted microprocessor

A factory-fitted microprocessor is supplied with the PTM1.RS232 and PTM1.RS485, which should be replaced by the application software for a third-party device. The factory-fitted microprocessor is used in the manufacturing process for the hardware test.

Technical data

Power supply	Operating voltage	AC 24 V ± 20%
	Safety extra-low voltage (SELV)	to EN 60 730
	Frequency	50 Hz / 60 Hz
	Power consumption	1.2VA
	I/O module supply via P-bus	DC 24 V (against G0)
	Load units	4 connected load units irrespective of application
Module addresses	Numerical range of basic addresses	1 to 241
	Valid offset addresses	0 to 15
P-bus	See document N8022 "Process bus"	
RS232 / RS485 interface	Interface type	RS232 / RS485 (electrically isolated)
	Transmission speed	Can be selected (300 to 9600 bps)
	Data bits	7 or 8 bits
	Stop bits	1 or 2
	Parity	Can be selected (None, Even or Odd)
	Cable type	Select good-quality communications cable (screened, twisted pairs) recommended for RS-485 / RS232
	Maximum cable length	1 200 m for RS485
		3 m for RS232
	Cross-section	2 x ≈0.5mm²
Conformity	Meets the requirements for **CE** marking:	
	EMC Directive	89/336/EEC

Note   For technical data applicable to all I/O modules, refer to document Z8102 " Technical principles of I/O Module System".

Connection diagrams

RS485		RS232	
A	Transmit Data	TXD	Transmit Data
S	Ground	GS	Signal Ground
B	Receive Data	RXD	Receive Data
		S	Shield

Dimensions

Dimensions in mm

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Subject to change

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9^{781}
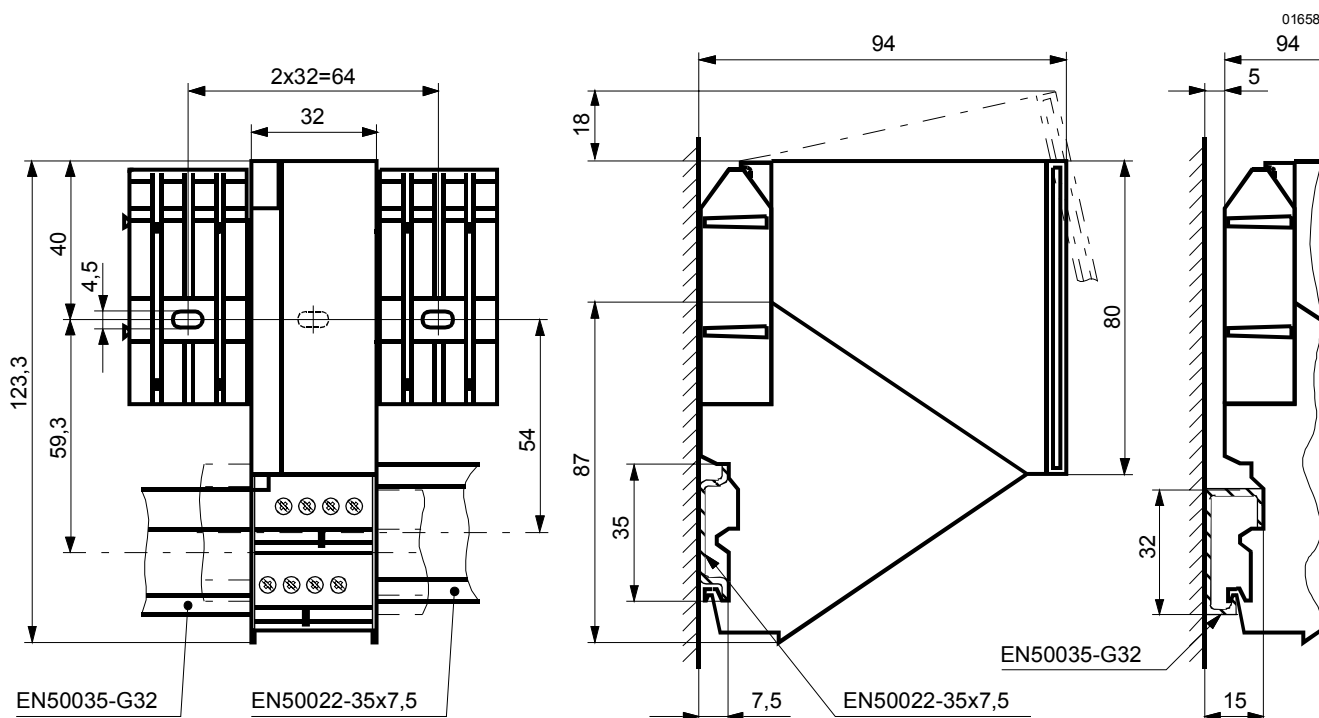
DESIGO™ I/O-OPEN / UNIGYR™

M-bus   PTE-MBUS.60

For the integration of M-bus heat meters

Interface module for the integration of the Siemens SONOHEAT (2WR5) and MEGATRON2 M-bus heat meters into a DESIGO V2.2 building automation and control system.
The generic approach to the read-out of M-bus data points, as implemented in the PTE-MBUS.60, also makes it possible to integrate third-party products.
A prior compatibility test is advised.

Note   *This document includes the engineering notes for the version DESIGO V2.2.*
For engineering notes for DESIGO V2.1 and UNIGYR see document CA1J9781en.

Application

With the interface module, up to six M-bus heat meters can be integrated into a DESIGO V2.2 building automation and control system. The meters are integrated into a PXC64-U or PXC128-U automation station via the P-bus connection.

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Building Automation

Functional scope

General

The interface module provides the following functions for each heat meter:

- Meter data points: cumulated energy (kWh), cumulated volume (m^3), flow (m^3/h), power (kW), flow temperature (°C), return temperature (°C).
- Communication parameters: baud rate, sampling cycles, meter addresses
- Errors: display and acknowledgement (for details refer to "Operating states").

System topology: DESIGO V2.2
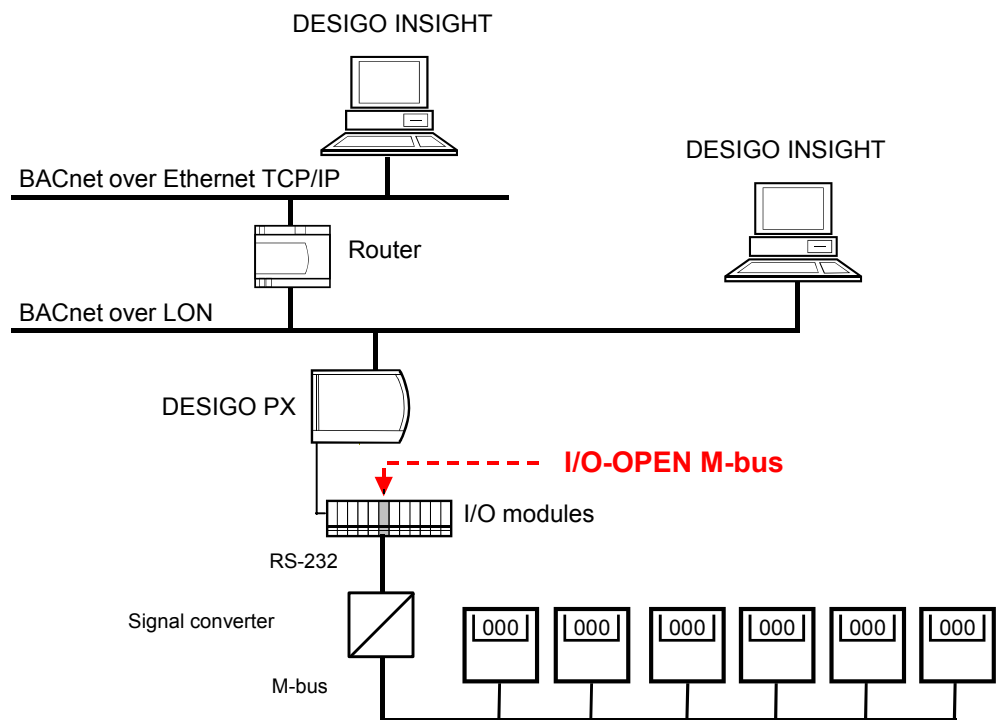
Meter data points

This table shows the heat meter data points which can be integrated via the interface module:

Data point name	Value range	Data point type [1]	Direction of data flow [2]
Energy kWh (cumulated)	0 … 268,435,455 kWh	DIS	HM → S
Volume m^3 (cumulated)	0 … 268,435,455 m^3	DIS	HM → S
Flow m^3/h (actual)	0 … 163 m^3/h	AIS	HM → S
Power kW (actual)	0 … 16,383 kW	AIS	HM → S
Flow temperature °C	0 … 1,638 °C	AIS	HM → S
Return temperature °C	0 … 1,638 °C	AIS	HM → S

Addressing parameters

This table shows the data point types used in the interface module as addressing parameters for the heat meters (slave addresses):

Data point name	Value range	Data point type [1]	Direction of data flow [2]
Slave address, meter 1	1 … 250	AOS	C → M
Slave address, meter 2	1 … 250	AOS	C → M
Slave address, meter 3	1 … 250	AOS	C → M
Slave address, meter 4	1 … 250	AOS	C → M
Slave address, meter 5	1 … 250	AOS	C → M
Slave address, meter 6	1 … 250	AOS	C → M

Note

For every heat meter, a data point is available for setting the slave address (SlvAddr). All addresses must be within the range 1 to 250. The PTE-MBUS.60 module does not support secondary addressing.

Duplicate addresses are not allowed. The module only updates a meter compound to which a valid address (1 -250) has been allocated. The address must be set retrospectively in the CFC.

If the slave address is set to zero, then neither the associated meter compound nor its data points will be updated by the module.

Communication parameters

This table shows the data points used as communication parameters in the interface module:

Data point name	Range	Data point type [1]	Direction of data flow [2]
Baud rate	300, 600, 1200, 2400, 4800 and 9600 baud	AOS	C → M
Telegram delay time [3] (Time delay between two telegram requests)	0 to 8 seconds		
Example for 2400 baud: Time delay = **0** sec. Time delay = **1** sec. Time delay = **2** sec. Time delay = **3** sec. Time delay = **4** sec. Time delay = **5** sec. Time delay = **6** sec. Time delay = **7** sec. Time delay = **8** sec.	Adjustment value: 240**9** 240**1** 240**2** 240**3** 240**4** 240**5** 240**6** 240**7** 240**8**		
Sampling cycle (Delay between heat meter read-outs)	Adjustable in the range 0 … 16,384 seconds	AOS	C → M

1) Data point types:
   DI**S**, AI**S** and AO**S** are digital / analog inputs/outputs with a **S**tatus bit. They are the virtual P-bus data points used for integration of the meters.

2) Direction of data flow:
   HM → S   indicates data flowing from the heat meter to the system
   C → M   indicates data flowing from the controller to the PTE-MBUS.60 interface module.

3) The time delay between two telegram requests can be specified by means of the communications parameter "Baud rate". Times from 0 to 8 seconds can be programmed. If a "straight" baud rate is selected directly, e.g. 2400 or 300, a default time delay of 2 seconds is implemented.

Access

Access to this data is as follows:

- Locally, at the heat meter
- Centrally, via the PC user interface

Applications

The interface module incorporates a combination of a series of virtual I/O modules in sequence, which can be addressed individually, starting from a base address. The heat meter data points are mapped internally in the interface module to normal I/O data points, which are then integrated into the automation stations.

The M-bus data points are integrated via the communication between the heat meter and the automation station. This data can be displayed and set centrally via the building automation and control system.

Display options on the interface module	The interface module has two LEDs, used to indicate the consistency of the communications.
Safety and reliability	Refer to the section headed "Technical design" for information on operational reliability and system safety precautions.

Types

Ordering	The I/O-OPEN M-bus heat meter interfaces should be ordered via Logistics, using the ASN number: **PTE-MBUS.60**
Delivery	The base and electronics module are delivered in separate but interlinked packages.
Accessories	Accessories must be ordered as separate items. For general I/O accessories refer to data sheet 8105.

Compatibility

Automation stations	The interface module can be connected to Siemens automation stations which have a P-bus connection and which provide software support for the required module type (AIS, AOS, DOS and DIS). In DESIGO V2.2 these are the PXC64-U and PXC128-U modular automation stations.
Heat meters	Officially, the Siemens SONOHEAT (2WR5) and MEGATRON2 M-bus heat meters are supported.
	However, with the generic approach to the read-out of M-bus data points, as implemented in the PTE-MBUS.60, it is also possible to integrate third-party products. A prior compatibility test is advised.
Signal converter	The M-bus signal converter, type WZC-P60 (data sheet N5382) can be used for signal conversion between the M-bus and the RS232. **Please refer to the wiring notes on page** 14.

Technical design

General

The interface module makes it possible to map data points from the M-bus heat meter to the P-bus, enabling the automation station to read all the data points via the assigned addresses and channels. The module reads the data points from the heat meters at regular intervals and updates the internal database with the actual values. When an automation station requests a reading, the data points are transferred from the interface module to the automation station. In the opposite direction, values are written from the automation station to the interface module via the P-bus.

Creating a program

From a functional point of view, the interface module contains 14 I/O virtual module addresses (2 x [4 AOS], 6 x [4 DIS] und 6 x [4 AIS]). They are referred to as virtual in the sense that they are do not exist as individual physical modules. Module address 15 remains unused, and address 16 is used for the module production test. The values and attributes of the heat meters of these module addresses require scaling and decoding. This process is explained further below.

Data transmission

P-bus

The data is transmitted between the interface module and the automation stations via the 3-wire P-bus (process bus). For details, refer to data sheet N8022, "Process bus".

Signal converter
M-Bus <-> RS232

The data is transmitted between the interface module and the M-bus network via an RS232 <-> M-bus signal converter using the M-bus protocol.

Protocol

The communications are in accordance with European Standard EN1434-3. The protocol (Data Link Layer) is based on the international standard IEC 870-5.

Addressing

For transmission over the P-bus, each data point is assigned an address.
This "P-bus address" comprises:
- Basic address
- Offset address
- Channel number

Data point addressing

The table which follows shows how the data points are addressed via the automation station.

Diagram labels: A, B, C, D, E, F

Block +0 (4AOS)

Data point	M-bus meter no.	Channel
Slave address Meter 1 / Internal parameter	I	1
Slave address Meter 2 / Internal parameter	II	2
Slave address Meter 3 / Internal parameter	III	3
Slave address Meter 4 / Internal parameter	IV	4

Block +1 (4AOS)

Data point	M-bus meter no.	Channel
Slave address Meter 5 / Internal parameter	V	1
Slave address Meter 6 / Internal parameter	VI	2
Baud rate + datagram delay / Internal parameter		3
Sampling cycle / General setting / Internal parameter		4

Block +2 (4DIS)

Data point	M-bus meter no.	Channel
Energy (cumulative) / Most significant bytes	I	1
Energy (cumulative) / Least significant bytes	I	2
Energy (cumulative) / Most significant bytes	II	3
Energy (cumulative) / Least significant bytes	II	4

Block +3 (4DIS)

Data point	M-bus meter no.	Channel
Energy (cumulative) / Most significant bytes	III	1
Energy (cumulative) / Least significant bytes	III	2
Energy (cumulative) / Most significant bytes	IV	3
Energy (cumulative) / Least significant bytes	IV	4

Block +4 (4DIS)

Data point	M-bus meter no.	Channel
Energy (cumulative) / Most significant bytes	V	1
Energy (cumulative) / Least significant bytes	V	2
Energy (cumulative) / Most significant bytes	VI	3
Energy (cumulative) / Least significant bytes	VI	4

Block +5 (4DIS)

Data point	M-bus meter no.	Channel
Volume (cumulative) / Most significant bytes	I	1
Volume (cumulative) / Least significant bytes	I	2
Volume (cumulative) / Most significant bytes	II	3
Volume (cumulative) / Least significant bytes	II	4

Block +6 (4DIS)

Data point	M-bus meter no.	Channel
Volume (cumulative) / Most significant bytes	III	1
Volume (cumulative) / Least significant bytes	III	2
Volume (cumulative) / Most significant bytes	IV	3
Volume (cumulative) / Least significant bytes	IV	4

Block +7 (4DIS)

Data point	M-bus meter no.	Channel
Volume (cumulative) / Most significant bytes	V	1
Volume (cumulative) / Least significant bytes	V	2
Volume (cumulative) / Most significant bytes	VI	3
Volume (cumulative) / Least significant bytes	VI	4

Block +8 (4AIS)

Data point	M-bus meter no.	Channel
Flow (present)	I	1
Flow (present)	II	2
Flow (present)	III	3
Flow (present)	IV	4

Block +9 (4AIS)

Data point	M-bus meter no.	Channel
Flow (present)	V	1
Flow (present)	VI	2
Power (present)	I	3
Power (present)	II	4

Block +10 (4AIS)

Data point	M-bus meter no.	Channel
Power (present)	III	1
Power (present)	IV	2
Power (present)	V	3
Power (present)	VI	4

Block +11 (4AIS)

Data point	M-bus meter no.	Channel
Flow temperature	I	1
Flow temperature	II	2
Flow temperature	III	3
Flow temperature	IV	4

Block +12 (4AIS)

Data point	M-bus meter no.	Channel
Flow temperature	V	1
Flow temperature	VI	2
Return temperature	I	3
Return temperature	II	4

Block +13 (4AIS)

Data point	M-bus meter no.	Channel
Return temperature	III	1
Return temperature	IV	2
Return temperature	V	3
Return temperature	VI	4

Block +14 (empty — channels 1, 2, 3, 4)

Block +15

Data point	Channel
Reserved for test	1
Reserved for test	2
Reserved for test	3
Reserved for test	4
Modul Info : PTE-MBUS.60	

Key

A) Data points
B) Address plug + offset
C) Internal meter number
D) Channel number
E) P-bus I/O module type
F) Reserved for manufacturing test

A basic address (the hardware address) is assigned to the interface module by means of an address plug. The interface module uses fixed offset addresses.
In order for all the data points in the interface module to be addressed on the P-bus, the highest address which may be used is address plug 241.

Note   In this context it should be noted that the permissible number of load units in the automation stations must not be exceeded. The **PTE-MBUS.60** module takes up 4 load units in the automation stations.

LED indicators on the interface module

The two LEDs, "P-bus" and "RS232" indicate the operating state of the interface module.

The table below shows the information associated with these LEDs.

Phase	P-bus LED 1	RS232 LED 2	Description
Start-up phase (approx. 5 s)	On		Normal operation
	Off		No P-bus module power supply
	Flashing		Faulty module
Normal operation	On	On	Normal operation
	On	Flashing	Error in transmission between module and RS232 interface
	Off	Off	No P-bus module power supply or no AC 24 V operating voltage
	On	Off	No communication with the RS232 interface

DESIGO V2.2 operating states in detail

Operating states	PTE-MBUS.60 module P-bus LED 1	RS232 LED 2	PXM20 Error LED	DESIGO-PXC Compound	Alarm list	Comments
Initial poll of meters						
No slaves polled yet	On	Off	Flashing	Reliability 1	Display	Applies to all data points
All slaves can be read	On	On	Off	Reliability 0	None	Applies to all data points
Slave A not responding	On	Flashing	Flashing	Reliability 1	Display	Applies to all data points of Slave A
Individual DPs of Slave A not present	On	Flashing	Flashing	Reliability 1	Display	Applies to individual data points of Slave A
Repeat poll of meters						
All slaves can be read	On	On	Off	Reliability 0	None	
Slave A not responding	On	Flashing	Flashing	Reliability 4	Display	Applies to all data points of Slave A
Individual DPs of Slave A not present	On	Flashing	Flashing	Reliability 4	Display	Applies to individual data points of Slave A
P-bus power off	Off	Off	Flashing	Reliability 1	Display	
P-bus power-on (start-up phase approx. 5s)	On	On	Flashing	Reliability 1	Display	No synchronization with controller yet
P-bus power-off	On	On	Off	Reliability 1	Display	Directly after synchronization with controller
	On	On	Off	Reliability 0	None	All data points read
Signal converter power-off	On	Off	Flashing	Reliability 4	Display	
Signal converter power-on	On	On	Off	Reliability 1	Display	Directly after synchronization with controller
	On	On	Off	Reliability 0	None	All data points read
Faulty module	Flashing	Flashing	Flashing	Reliability 1	Display	
Module <-> meter connection interrupted	On	Off	Flashing	Reliability 4	Display	

System safety and operational reliability

Start-up response

After switching on the power supply (reference voltage BEZ and system voltage G) and synchronization with a PXC… automation station, the interface module is ready within 0.5 seconds to start communication with the M-bus subscribers, i.e. to receive telegrams.

Transmission reliability

- Faulty data transmission identified, data not accepted.
  The CRC code guarantees the integrity of the data transmission.
- A PXC… automation station must transmit updated output values in an error-free telegram to the PTE-MBUS.60 interface module within a period of 4-seconds.
  If no telegram is transmitted within this period of time, the default values for the interface module are enabled (e.g. Baud rate = 2400).

Short-circuit resistance

Both bus cables are short-circuit proof.

Working with module connected to power supply

The interface module can be connected and disconnected with the power switched on, without suffering damage.

Note

The full functional scope of the interface module covers both the module hardware and the signal processing in the automation station software.
For a full understanding of the module functions, it is important to take note of the relevant processing steps. The technical principles of the I/O modules are described in document CM2Z8102.

Mechanical design

The interface module comprises a plastic housing with a terminal base and an electronic assembly for plugging into an I/O terminal bar. Signals and voltages are picked up via the contact springs of the conductor rails in the I/O terminal bar.

The connection terminals of the interface module on the I/O terminal bar have the same function as the terminal strips conventionally installed in the control panel for outgoing cables. They also meet the standards and guidelines applicable to the latter. They can be labeled with a plant-specific reference and are designed as test terminals.

The module has a transparent front section for insertion of the plant-specific module label. The labels are created with DESIGO TOOLSET on pre-printed and perforated labeling sheets.

The front plate also incorporates the socket for the address plug and the two LEDs for the P-bus and the RS232 interface. There are no operator controls on the module.

For accessories (for all modules in general) refer to data sheet N8105.

Note

For an in-depth description of the design: refer to the relevant section of document CM2Z8102, "Technical principles of I/O Module System".

Front view

PTE-MBUS.60   ⁰¹⁷⁹⁶

    1   LED indicator for P-bus

    2   LED indicator for RS232 bus

Engineering notes

Document CM2Z8102, "Technical principles of I/O Module System" contains project engineering information relevant to the system and should be read before proceeding with the sections which follow.

Special attention should be paid to the safety information.

Appropriate use

The interface module should be used in the overall system only for the applications described in document CM2Z8102, "Technical principles of I/O Module System". Special attention should be paid to the brief description on the title page (printed in bold type) and to the sections headed "Use", "Engineering notes" and "Technical data".

System integration

The interface module represents a combination of several I/O modules in sequence, each of which can be addressed individually, starting from the basic address. The data points of the automation station are mapped internally in the interface module to normal I/O data points, which can then be integrated into the automation stations.

System adjustment parameters and defaults

The parameters / standard values in the PTE-MBUS.60 interface module are as follows:

Data point description	Data point type	Address (+ Basic)	Default value
Slave address, meter 1	AOS	0.1	0
Slave address, meter 2	AOS	0.2	0
Slave address, meter 3	AOS	0.3	0
Slave address, meter 4	AOS	0.4	0
Slave address, meter 5	AOS	1.1	0
Slave address, meter 6	AOS	1.2	0
Baud rate	AOS	1.3	2400
Telegram delay	AOS	1.3	2 sec
Sampling cycle	AOS	1.4	10 sec

Library elements	The CAS library contains the following compounds:

- Heat meter compound: MtrH
  Path: U\Charts\UEqp\Mtr\
- "Setting" compound: MdlSet
  Path: U\Charts\UEqp\Mtr\

The compounds are stored one level down in the hierarchy, in their own "envelope" (MBUS60) to allow the creation of instances in System Design. The "envelope" is designed solely to simplify the process described, and has no other function in the CFC. The two compounds are described in detail in the CAS documentation.

Engineering in System Design	There are two ways of creating instances of M-bus solutions in System Design:

- With the "Append data point" function
- With the Solution Browser

Append data point

In a plant, partial plant or aggregate, a data point can be added with the option **Generate→Data point**. The appropriate family (Mtr) must be selected as the DP type, and for the signal type, "Heat Meter" should be selected for the heat meter compound, and "M-bus Module Settings" for the "Setting" compound. Although both M-bus compounds comprise a number of data points, they are represented in System Design as single data points. When creating an instance of an M-bus compound, the plus sign (+) indicates that this compound incorporates several data points.

		Description	DP Type	#States	Signal Type	Feedback	Unit	User Designation
1	⊟	Module Settings	Mtr		M-bus module PTE-MBUS.60 - M-bus module settings			Meter Settings
		Baud rate	AO		Analog output (with status)		no-units	
		Sampling time	AO		Analog output (with status)		s	
2	⊟	Heat meter	Mtr		M-bus module PTE-MBUS.60 - Heat meter			Heat Meter
		Cumulated energy	CI		Digital input (with status)		kWh	
		Cumulated volume	CI		Digital input (with status)		m3	
		Flow	AI		Analog input (with status)		m3/h	
		Power	AI		Analog input (with status)		W	
		Slave address	AO		Analog output (with status)		no-units	
		Flow temperature	AI		Analog input (with status)		°C	
		Return temperature	AI		Analog input (with status)		°C	

Solution Browser

In addition to the default CAS solutions, it is also possible to use the Solution Browser to select an M-bus solution. The procedure is the same as for the CAS solutions.

Configuration	Detailed Description	Linked By	Compound Version
⊟ 3p [Third party equipment]			

⊟ MtrH [Heat meter]	Wärmezähler		CAS03
MtrH [Wärmezähler]			
New el MdlSet [M-Bus Modul Einstellungen]	PXC\CAS03 1		
New eleme MtrH [Wärmezähler]	PXC\CAS03 2		

Internal structure of the "Setting" compound	Various communication parameters for the PTE-MBUS.60 can be set using a "Setting" compound (MdlSet):

- A standard AO is used to set the baud rate and telegram delay.
- A second AO makes the sampling cycle adjustable.
- Both AO blocks write these values to an AOS module simulated by the PTE-MBUS.60.

The following "Setting" data points are mapped to BACnet:

Data point name	Pin name
Baud rate	Baud
Sample Time	SmplTi

Internal structure of a Meter compound

The heat-meter data points are displayed with the MtrH compound. A standard AO is also used here for the slave address (SlvAddr). Standard AI blocks have been used, except for the cumulated values. These are addressed by means of (AIS) modules. The cumulated values are mapped to Counter objects (CI). For this purpose, a dual syntax is used (e.g. P=9.1;9.2 (DIS)), in order to re-construct 28-bit value. These blocks read in the values through DIS modules simulated by the PTE-MBUS.60.

The following M-bus data points are mapped to BACnet:

Data point name	Pin name
Energy kWh (cumulated)	CumEg
Volume m^3 (cumulated)	CumVlm
Flow m^3/h (actual)	Fl
Power kW (actual)	Pwr
Flow temperature °C	TFt
Return temperature °C	TRt

Setting theSlope

The slope value should be set as follows for the data points below:

Data point	Slope
Power	0.01
Flow temperature °C	0.1
Return temperature °C	0.1

The library elements already contain all these settings.

Compound interfaces	PTE-MBUS.60 compounds have no compound interfaces. They are recommended only to display the meter values. Control based on the flow or return temperature is inadvisable, due to the lag in the M-bus network and the variable sample times.

"Setting" compound (MdlSet):   Heat meter compound (MtrH):

MdlSet	MtrH
M-bus module	Heat meter
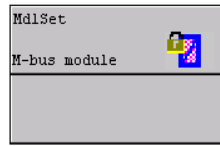
Setting the slave addresses	The slave addresses have to be entered retrospectively in the CFC, after System Design and PX-Design have been synchronized. To do this, the meter address must be set at the [ValPgm] pin of the SlvAddr block. The default value is 1.

```
SlvAddr
A0
Slave ad              OB1
                    23/44
Yes─ EnPgm        PrVal ─
1.0─ ValPgm       StaFlg ─
'P=0.0(AOS)' IOAddr  Rlb ─
                    Dstb ─
```
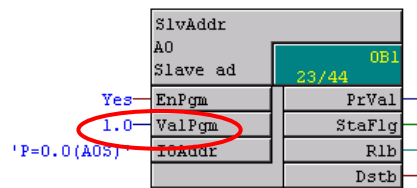
Setting the baud rate	The baud rate must be set retrospectively in the CFC, after the synchronization of System Design and PX-Design. To do this, the baud rate must be set at the [ValPgm] pin of the Baud block. The default value is 0; this value activates the default Baud rate of 2400in the module.

```
Baud
A0
Baud rat              OB1
                    23/3
Yes─ EnPgm        PrVal ─
0.0─ ValPgm       StaFlg ─
'P=1.2(AOS)' IOAddr  Rlb ─
                    Dstb ─
```
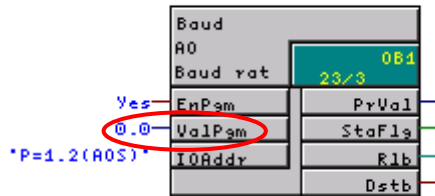
Setting the Sampling cycle	The sampling cycle must be set retrospectively in the CFC, after the synchronization of System Design and PX-Design. To do this, the cycle time must be set at the [ValPgm] pin of the SmplTi block. The default value in the **library compound** is 60 sec (sampling more often would load the heat meter's battery too much). If this value is changed to 0, the compound does not write to the module, therefore activating the **module's** default value of 10 sec.

```
SmplTi
A0
Sampling              OB1
                    23/2
Yes─ EnPgm        PrVal ─
0.0─ ValPgm       StaFlg ─
'P=1.3(AOS)' IOAddr  Rlb ─
                    Dstb ─
```

Technical data

Power supply	Operating voltage	AC 24 V ± 20%
	Safety low voltage (SELV) in accordance with	EN 60 730
	Frequency	50 Hz / 60 Hz
	Power consumption	1.2VA
	I/O module supply via P-bus	DC 24 V (against G0)
	Load units	4 load units connected

Module addresses	Numerical range for basic addresses	1 to 241
	Valid offset addresses	0 to 15

P-bus	See document CM2N8022 "Process bus"	

RS232 interface	Interface type	RS-232 (electrically isolated)
	Transmission speed	300, 600, 1200, 2400, 4800 and 9600 baud
	Data bits	8 bits
	Stop bits	1
	Parity	Even
	Cable type	Select good-quality communications cable (screened, twisted pairs) recommended for RS-232 interfaces
	Maximum cable length	Max. 3 m
	Cross-section	2x ≈ 0.5mm²

Conformity	Meets the requirements for CE marking in	
	EU Directive: Electromagnetic compatibility	89/336/EEC

Note   Technical data which is applicable to all I/O modules is described in document CM2Z8102, "Technical principles of I/O Module System".

Mounting

For mounting instructions, refer to the following document: "Installation guide I/O Module System" CM2M8102

Instructions for mounting the I/O modules on the rails and I/O terminal bar are printed on the packaging.

M-bus signal converter WZC-P60   With the PTE-MBUS.60 interface module, the M-bus signal converter WZC-P60 can be used to convert signals from M-bus to RS232.

For the RS232 bus, the connection is normally crossed.   TX — RX
RX — TX

(STOP) **Caution**   **Contrary to the rules for the RS232 bus, the WZC-P60 signal converter must be wired as follows:**

WZC-P60   PTE-MBUS.60
TX — TXD
RX — RXD

Connection diagrams

Internal diagram   See page 7.

RS232 interface   TXD   Transmit
                             GS   Signal ground
                             RXD   Receive
                             S   Shield

Dimensions

Dimensions in mm

Subject to change

PTE-MBUS.60 – M-bus

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20.01.2004
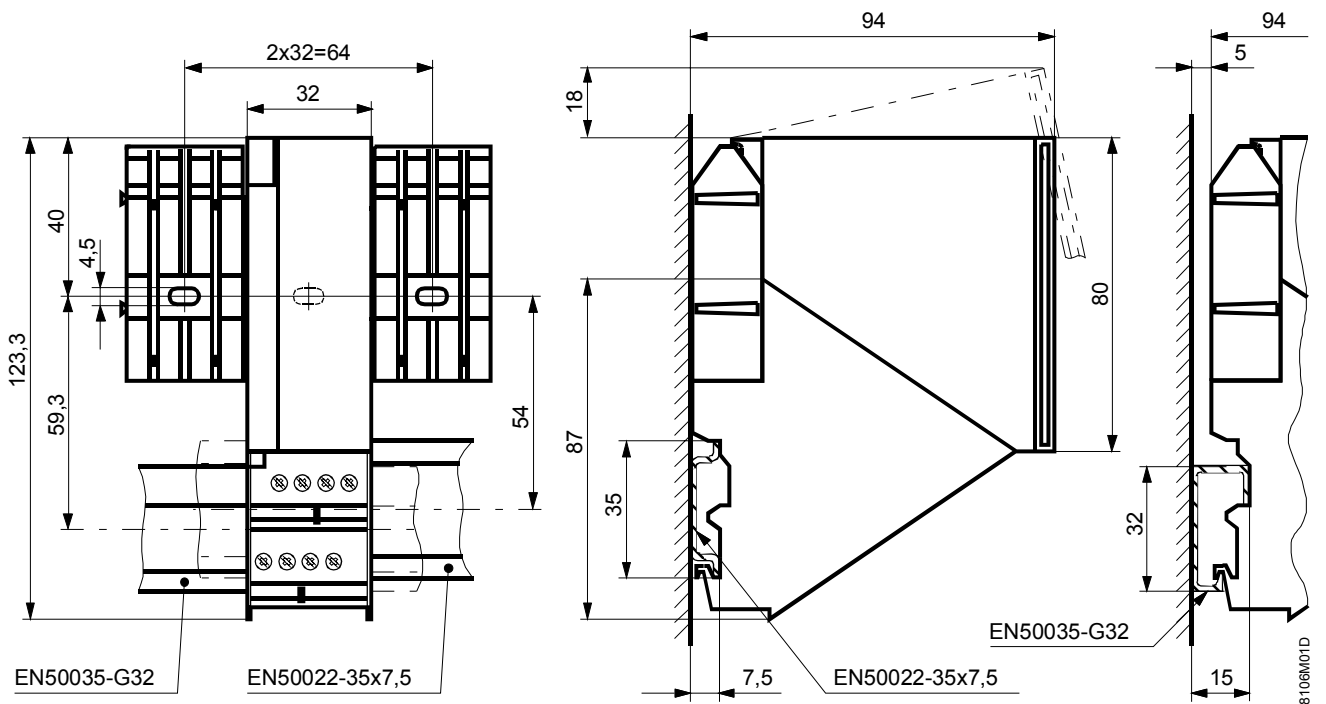
DESIGO™ I/O-OPEN / UNIGYR™

SED2 Solution   PTE-SED2

For integration of the Siemens SED2 variable speed drives

Interface module for integration of the Siemens SED2 variable speed drives into a DESIGO V2.2 building automation and control system.
The PTE-SED2 module can be used to integrate up to four variable speed drives.

Note   *This document includes the engineering notes for the version DESIGO V2.2.*
*For engineering notes for DESIGO V2.1 and UNIGYR see document CA2**J**9782en.*

Application

The interface module enables up to 4 variable speed drives to be integrated into a DESIGO V2.2 building automation and control system. The variable speed drives are integrated into a PXC64-U or PXC128-U automation station via the P-bus connection.

Functions

General   The interface module provides the following functions for each variable speed drive:

- General control: on/off and setpoint definition (frequency, % PID or pressure) both with feedback
- Variable speed drive data points: output frequency (Hz), output current (A), cumulative energy (kWh) and power (kW)
- Errors: display and acknowledgement (for details refer to "Operating states").

**System topology:
DESIGO V2.2**
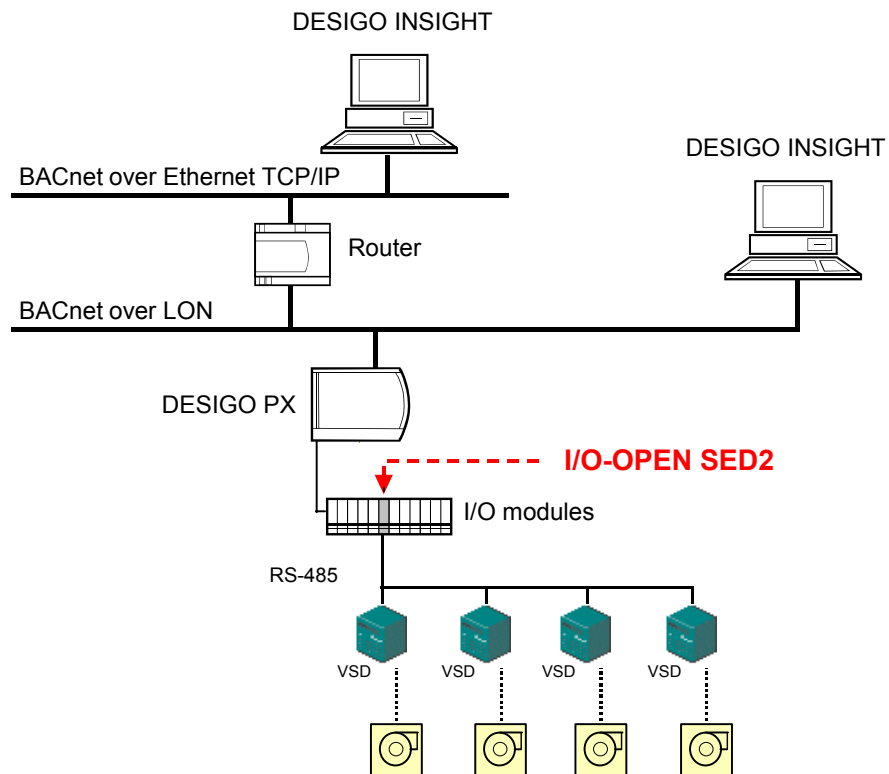
VSD data points

The table shows the variable speed drive data points which can be integrated via the interface module:

Data point name	Value range	Data point type [1]	Direction of data flow [2]
Variable speed drive: OFF/ON	0 / 1	DOS	S → VSD
Error acknowledgement	0 / 1	DOS	S → VSD
VSD bus address [3]	1 … 31	AOS	S → VSD
VSD frequency setpoint [4]	0 ... 150 Hz	AOS	S → VSD
VSD fixed PID setpoint in %	0 … 100 %		(P2201)
VSD pressure setpoint in Pa	−200 … + 200 Pa		(P2201)
PID feedback signal	Signal AIN2	AIS	VSD → S
Output frequency	0 ... 75 Hz	AIS	VSD → S
Output current	0 ... 1638.3 A	AIS	VSD → S
Energy	0 ... 2.684e8 kWh	DIS	VSD → S
Power	0 … 163.83 kW	AIS	VSD → S
Error code	0 ... 255	AIS	FU → S
Error display: Normal/Error	0 / 1	DIS	VSD → S
VSD running: OFF/ON	0 / 1	DIS	VSD → S
VSD: AUTO/MANUAL	0 / 1	DIS	VSD → S

1) Data point types:

   D**I**S, DO**S**, AI**S** and AO**S** are digital/analog inputs/outputs with a **s**tatus bit.
   They are the virtual P-bus data points used for integration of the SED2 drives.

2) Direction of data flow:

   VSD → S   indicates data flowing from the variable speed drive to
                the SYSTEM
   S   → VSD   indicates data flowing from the SYSTEM to the
                variable speed drive.

3) Bus address:

   For each variable speed drive, there is a data point for setting the slave address,
   (SlvAddr, P2011). All addresses must be within the range 1 to 31. Duplicate
   addresses are not allowed. The module only updates a VSD compound to which a
   valid address (1 -31) has been allocated. The address must be set retrospectively
   in the CFC.
   If the slave address is set to zero, then neither the associated variable speed drive
   compound nor its data points will be updated by the module.

4) Variable speed drive setpoints:

   The PTE-SED2 module can specify a frequency setpoint, a fixed PID setpoint or a
   pressure setpoint for the VSD. The different setpoint options are selected by using
   different compounds. There are three categories of SED2 compounds: Pumps
   (Pu), Motors (Mot) and Fans (Fan). Each category has three setpoint options:
   frequency (Hz), % PID (%) and pressure (Pa). There are therefore **nine** SED2
   compounds in the CAS library.

   For a frequency-controlled variable speed drive, the available compounds are
   PuFqSED, MotFqSED and FanFqSED. This enables a frequency of 0 to 150 Hz
   to be set.

If the chosen setpoint is a fixed PID percentage value, the compounds PuMdltSED, MotMdSED and FanMdSED are available. This enables a %-value from 0 to 100% to be set. The PID settings are carried out on the VSD itself.

Finally, compounds PuPSED, MotPSED and FanPSED are available for the integration of a pressure-controlled variable speed drive. The pressure can be set in the range –200 to +200 Pa. The internal PID controller settings are carried out on the variable speed drive itself.

Data point name	Value range	Data point type [1]	Direction of data flow [2]
VSD frequency setpoint VSD fixed PID setpoint in % VSD pressure setpoint	0 ... 150 Hz 0 … 100 % –200 … 200 Pa	AOS	S → VSD (P2201) (P2201)

VSD frequency setpoint	Adjustment value:		
Frequency setpoint 0 to 150 Hz	0 … 150		
e.g. 50 Hz	50		

VSD fixed PID setpoint	Adjustment value:		(P2201)
Setpoint for pressure control 0 to 100 %	0 … 100%		
e.g. 80 %	80		80

VSD pressure setpoint	Adjustment value:		(P2201)
Pressure control setpoint –200 to 200 Pa	–200 … + 200 Pa		
e.g. 75 Pa	75		75

When the fixed PID setpoint or pressure setpoint is used, in each case the PTE-SED2 writes parameter **P2201** of the SED2 variable speed drive. This is how setpoints for pressure or room temperature control can be set via the module. The CAS library is delivered with a pressure, frequency and % PID solution. The integral PID controller in the variable speed drive can control engineering units other than pressure. This can be done by using the xxMdSED or xxPSED compounds as a template, modifying and saving this as a new solution in the library, and by carrying out the relevant settings on the variable speed drive.

When commissioning and configuring the PID controller in the SED2, the relevant parameters must be set in accordance with Section 6.4, "HVAC functions of the SED2", in document CM1U5192.

Access

Access to this data is as follows:

- Locally, on the variable speed drive itself
- Centrally, via the PC user interface

Applications

The interface module comprises a combination of virtual I/O modules in sequence, which are addressed individually, starting from a base address. The variable speed drive data points are mapped internally in the interface module to normal I/O data points, which are then integrated into the automation stations.

The variable speed drive data points are integrated through the communication between the variable speed drive and the automation station. This data can be displayed and set centrally via the building automation and control system.

Display options on the interface module

The interface module has two LEDs, used to indicate the consistency of the communications.

Safety and reliability

Refer to the "Technical design" section for information on operational reliability and system safety precautions.

Types

Ordering

The I/O-OPEN SED2 variable speed drive interface modules should be ordered via the Logistics department, using the ASN number: **PTE-SED2**

Delivery

The base unit and electronics module are delivered in separate but interlinked packages.

Accessories

Accessories must be ordered as separate items. For general I/O accessories refer to data sheet 8105.

Compatibility

Automation stations

The interface module can be connected to any Siemens automation stations which have a P-bus connection and which provide software support for the required module type (AIS, AOS, DOS and DIS). In DESIGO V2.2 these are the PXC64-U and PXC128-U modular automation stations.

Variable speed drives

The PTE-SED2 module is basically suitable for the integration of all variable speed drives in the SED2 product range. Document CM1U5192 contains an overview of the various VSDs in the range.

General

The interface module can be used to map data points from the SED2 variable speed drive to the P-bus, enabling the automation station to read all the data points via the assigned addresses and channels. The module reads the data points from the variable speed drives at regular intervals and updates the internal database with the actual values. When an automation station requests a reading, the data points are transferred from the interface module to the automation station. In the opposite direction, values are written from the automation station to the interface module via the P-bus.

Creating a program

From a functional point of view, the interface module contains 14 I/O virtual-module addresses (2 x [4 AOS], 2 x [4 DOS], 5 x [4 DIS] und 5 x [4 AIS]). They are referred to as "virtual" in the sense that they do not exist as individual physical modules. Module address 15 remains unused, and address 16 is used for the module production test. The values and attributes of the variable speed drives of these module addresses require scaling and decoding. The library elements already contain these settings, which are described further below.

Data transmission

P-bus

The data is transmitted between the interface module and the automation stations via the 3-wire P-bus (process bus). For details, refer to data sheet N8022, "Process bus".

USS protocol via RS485

Data is transmitted between the interface module and the variable speed drive network in accordance with the requirements of the USS protocol. Consult the relevant Siemens Universal Serial Protocol (USS) literature for further information.

The data is transmitted at 9600 baud, in 8-bit binary format with one stop/start bit and even parity.

6/18

Siemens Building Technologies
Building Automation

SED2 Solution – PTE-SED2

CA2N9782en
19.01.2004

Addressing

For transmission over the P-bus, each data point is assigned an address.
This "P-bus address" comprises:

- Basic address
- Offset address
- Channel number

Data point addressing

The table below shows how the data points are addressed via the automation station.

Column 1 (+0 – +3)	Column 2 (+4 – +7)	Column 3 (+8 – +11)	Column 4 (+12 – +15)
Slave address VSD 1 — Variable speed drive No. I, *Internal parameter* / **Slave address VSD 2** — Variable speed drive No. II, *Internal parameter* / **Slave address VSD 3** — Variable speed drive No. III, *Internal parameter* / **Slave address VSD 4** — Variable speed drive No. IV, *Internal parameter* — **4AOS**	+4 **Output frequency** — Variable speed drive No. I–IV, *Telegram word* — **4AIS**	+8 **Error code** — Variable speed drive No. I–IV, *USS parameter* — **4AIS**	+12 **VSD running** — Variable speed drive No. I–IV, *Telegram bit* — **4DIS**
+1 **Frequency setpoint or PID setpoint** — Variable speed drive No. I–IV — **4AOS**	+5 **Output current** — Variable speed drive No. I–IV, *USS parameter* — **4AIS**	+9 **Energy (kWh)** — Variable speed drive No. I, *USS parameter MSB* / No. I *USS parameter LSB* / No. II *USS parameter MSB* / No. II *USS parameter LSB* — **4DIS**	+13 **Manual/Auto** — Variable speed drive No. I–IV, *Telegram bit* — **4DIS**
+2 **Start / Stop** — Variable speed drive No. I–IV, *Telegram bit* — **4DOS**	+6 **Power (kW)** — Variable speed drive No. I–IV, *USS parameter* — **4AIS**	+10 **Energy (kWh)** — Variable speed drive No. III *USS parameter MSB* / No. III *USS parameter LSB* / No. IV *USS parameter MSB* / No. IV *USS parameter LSB* — **4DIS**	+14
+3 **Error ack.** — Variable speed drive No. I–IV, *Telegram bit* — **4DOS**	+7 **PID feedback signal** — Variable speed drive No. I–IV, *USS parameter* — **4AIS**	+11 **Error indication** — Variable speed drive No. I–IV, *Telegram bit* — **4DIS**	+15 Reserved for test (1–4) — Module info : PTE-SED2

Key

- A. Data points
- B. Address plug + offset
- C. Internal VSD number
- D. Channel number
- E. P-bus I/O module type
- F. Reserved for production test

A basic address (the hardware address) is assigned to the interface module by means of an address plug. The interface module uses fixed offset addresses.
In order for all the data points in the interface module to be addressed on the P-bus, the highest address which may be used is address plug 241.

Note

In this context it should be noted that the permissible number of load units in the automation stations must not be exceeded. The **PTE-SED2** module takes up 4 load units in the automation stations.

LED indicators on the interface module

The two LEDs, "P-bus" and "RS485" indicate the operating state of the interface module.

The table below shows the information associated with these LEDs.

Phase	P-bus LED 1	RS485 LED 2	Description
Start-up phase (approx. 5 s)	On		Normal operation
	Off		No P-bus module power supply
	Flashing		Faulty module
Normal operation	On	On	Normal operation
	On	Flashing	Error in transmission between module and RS485 interface
	Off	Off	No P-bus module power supply or no AC 24 V operating voltage
	On	Off	No communication with the RS485 interface

DESIGO V2.2 operating states in detail

Operating states	PTE-SED2 module P-bus LED 1	RS485 LED 2	PXM20 Error LED	DESIGO PXC-U Compound	Alarm list	Comments
First poll of SED2						
No slaves polled yet	On	Off	Flashing	Reliability 1	Display	Applies to all data points
All slaves can be read	On	On	Off	Reliability 0	None	Applies to all data points
Slave A not responding	On	Flashing	Flashing	Reliability 1	Display	Applies to all data points of Slave A
Individual DPs of Slave A not present	On	Flashing	Flashing	Reliability 1	Display	Applies to individual data points of Slave A
Repeated poll of SED2						
All slaves can be read	On	On	Off	Reliability 0	None	
Slave A not responding	On	Flashing	Flashing	Reliability 4	Display	Applies to all data points of Slave A
Individual DPs of Slave A not present	On	Flashing	Flashing	Reliability 4	Display	Applies to individual data points of Slave A
P-bus power off	Off	Off	Flashing	Reliability 1	Display	
P-bus power-on (start-up phase approx. 5s)	On	On	Flashing	Reliability 1	Display	No synchronization with controller yet
P-bus power-off	On	On	Off	Reliability 1	Display	Directly after synchronization with controller
	On	On	Off	Reliability 0	None	All data points read
Faulty module	Flashing	Flashing	Flashing	Reliability 1	Display	
Module <-> SED2 connection interrupted	On	Off	Flashing	Reliability 4	Display	

System safety and operational reliability

Start-up response
After switching on the power supply (reference voltage BEZ and system voltage G) and synchronization with a PXC… automation station, the interface module is ready within 0.5 seconds to start communication with the M-bus subscribers, i.e. to receive datagrams.

Reliability of data transmission
- Faulty data transmission identified, data not accepted.
  The CRC code guarantees the integrity of the data transmission.
- A PXC… automation station must transmit updated output values in an error-free datagram to the PTE-SED2 interface module within a period of 4-seconds. If no datagram is transmitted within this period, the default values for the interface module are enabled.

Short-circuit resistance
Both bus cables are short-circuit proof.

Working with module connected to power supply
Connecting and disconnecting the interface module with the power switched on will not cause damage to the module.

Note
The full functional scope of the interface module covers both the module hardware and the signal processing in the automation station software.
For a complete understanding of the module functions, it is important to take note of the relevant processing steps. The technical principles of the I/O modules are described in document CM2Z8102.

Design

The interface module comprises a plastic housing with a base unit and electronic assembly, for plugging into an I/O terminal bar. Signals and voltages are picked up via the contact springs of the conductor rails in the I/O terminal bar.

The connection terminals of the interface module on the I/O terminal bar have the same function as the terminal strips conventionally installed in the control panel for outgoing cables. They also meet the standards and guidelines applicable to the latter. They can be labeled with a plant-specific reference and are designed as test terminals.

The module has a transparent front section for insertion of the plant-specific module label. The labels are created with DESIGO TOOLSET on pre-printed and perforated labeling sheets.

The front plate also incorporates the socket for the address plug and the two LEDs for the P-bus and the RS485 interface. There are no operator controls on the module.

For accessories (for all modules in general) refer to data sheet N8105.

Note
For an in-depth description of the design: refer to the relevant section of document CM2Z8102, "Technical principles of I/O Module System".

Front view   PTE-SED2

1 - LED indicator for P-bus
2 - LED indicator for RS485/USS interface

Engineering notes

Document CM2Z8102 "Technical principles of I/O Module System" contains project engineering information relevant to the system and should be read before proceeding with the sections which follow.

Special attention should be paid to the safety information.

Appropriate use

The interface module should be used in the overall system only for the applications described in document CM2Z8102 "Technical principles of I/O Module System". Special attention should be paid to the brief description on the title page (printed in bold type) and to the sections headed "Use", "Engineering notes" and "Technical data".

System integration

The interface module represents a combination of several I/O modules in sequence, each of which is addressed individually, starting from the basic address. The data points of the automation station are mapped internally in the interface module to normal I/O data points, which can then be integrated into the automation stations.

System adjustment parameters and defaults

The parameters / standard values in the PTE-SED2 interface module are as follows:

Data point description	Data point type	Address (+ Basic)	Default value
Slave address, VSD 1	AOS	0.1	0
Slave address, VSD 2	AOS	0.2	0
Slave address, VSD 3	AOS	0.3	0
Slave address, VSD 4	AOS	0.4	0
Frequency setpoint or fixed PID setpoint	AOS	1.1 to 1.4	0
Start / Stop	DOS	2.1 to 2.4	0
Error acknowledgement	DOS	3.1 to 3.4	0

Library elements

The CAS library contains the following compounds:

- Pumps: PuFqSED, PuPSED, PuMdltSED
  Path: U\Charts\UEqp\Pu\
- Fans FanFqSED, FanPSED, FanMdSED
  Path: A\Charts\AEqp\Fan\
- Motor: MotFqSED, MotPSED, MotMdSED
  Path: U\Charts\UEqp\Mtr\

The compounds are stored one level down in the hierarchy in "envelopes" (xxxTpl), to allow the creation of instances in System Design. These "envelopes" are designed solely to simplify the process described, and have no other function in the CFC. The two SED2 compounds are described in detail in the CAS documentation.

Engineering in System Design

There are two ways of creating an instance of an SED2 solution in System Design:
With the "Append data point" function
With the Solution Browser

Append data point

In a plant, partial plant or aggregate, a data point can be added with the option **Generate →Data point**. The appropriate family (Fan, Mot or Pu) must be selected as the DP type. The signal type is then defined by selecting the type of control (frequency, PID or pressure control). Although the SED2 solutions all consist of a number of data points, they are represented in System Design as single data points. When creating an instance of an SED2 solution, the plus sign (+) indicates that this compound incorporates more than one data point.

		DP Type	#States	Signal Type	Feedback	Unit	User Designation	Lock	I/O Address
1		Pu		Pump, pressure (SED) templ ▼			SED Pump Pr	🔒	20.01
		BO		Digital output (with status)	Digital inpu	Off/On			22.1 ; 32.1
		CI		Digital input (with status)		kWh			29.1 ; 29.2
		AI		Analog input (with status)		A			25.1
		BO		Digital output (with status)		Unack/Ack			23.1
		AI		Analog input (with status)		no-units			28.1
		BI		Digital input (with status)		Normal/Fault			31.1
		AI		Analog input (with status)		Hz			24.1
		BI		Digital input (with status)		Auto/Manual			33.1
		AI		Analog input (with status)		W			26.1
		AO		Analog output (with status)		no-units			20.1
		AO		Analog output (with status)	Analog inp	Pa			21.1 ; 24.1

Solution Browser

In addition to the standard CAS pumps, fans and motors, it is also possible to select different SED2 versions in a predefined CAS solution. The interfaces are compatible. Options (e.g. pump kick) are not supported in V2.2. The compounds are saved as "maximum" versions. If this function is not required, it must be deleted afterwards in the CFC.
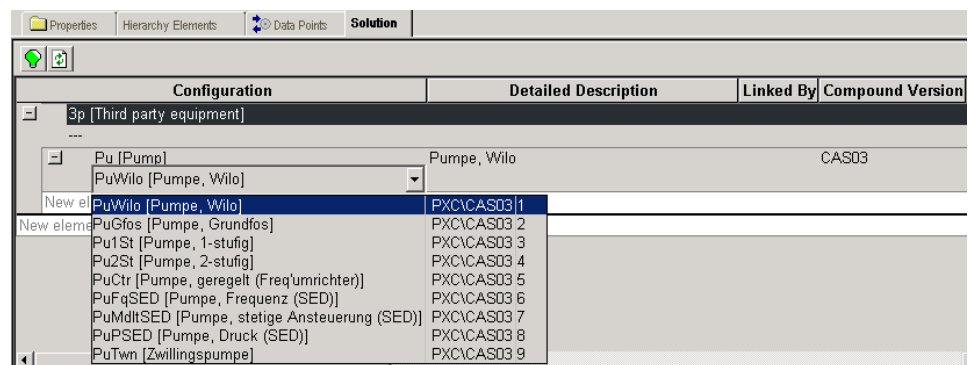
Internal structure of an SED2 VSD compound	Unlike the PTE-MBUS.60, the PTE-SED2 module does not require a "Setting" compound. The slave address is set directly in the relevant variable speed drive compound. The baud rate and other communications parameters are fixed, and cannot be modified.

A standard AO is also used here for the slave address (SlvAddr). Standard AI blocks have been used, except for the cumulative values. These are addressed by means of (AIS) modules. The cumulative values are mapped to Counter objects (CI). For this purpose, a dual syntax is used (e.g. P=9.1;9.1 (DIS)), in order to re-construct 28-bit values. These blocks read in the values through DIS modules simulated by the PTE-SED2.

The other digital inputs (e.g. error dislpay etc.) are mapped to DIS, but use simple syntax (i.e. only one address, e.g. P=12.1 (DIS)).

The following SED2 data points are mapped to BACnet:

Data point name	Pin name
Variable speed drive ON/OFF	Cmd
Error acknowledgement	FltAck
VSD bus address	SlvAddr
VSD frequency setpoint	SpFq
VSD PID setpoint	SpMdlt
VSD fixed PID setpoint	SpP
PID or pressure feedback signal	Not available with xxFqSED
	As FbVal of SpP wth xxPSED
	As FbVal of SpMdt with xxMdSED
Output frequency	As FbVal of SpFq with xxFqSED
	As Fq with xxPSED
	As Fq with xxMSED
Output current	Curr
Energy	CumEg
Power	Pwr
Error code	FltCode
Error display	FltInd
VSD running:	As FbVal of Cmd
VSD Manual / Auto	ManInd
Slave address	SlvAddr

Setting the slope	The slope value should be set as follows for the data points below:

Data point	Slope
Power	0.01
Output frequency	0.1
Output current	0.1
PID feedback signal	0.1

All xxPSED and xxMdSED compounds also have an intercept value of 1000 for their data point setpoints, so that the PTE-SED2 module will write these values to parameter 2201 instead of interpreting them as frequency values. The library elements already contain all these settings.

Compound interfaces   The SED2 compound interfaces comply with the interfaces defined by CAS.

Pump compounds:

Motor compounds
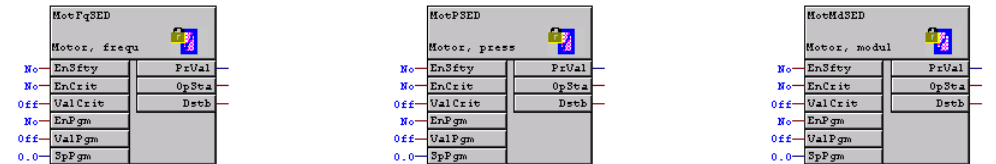
Fan compounds:
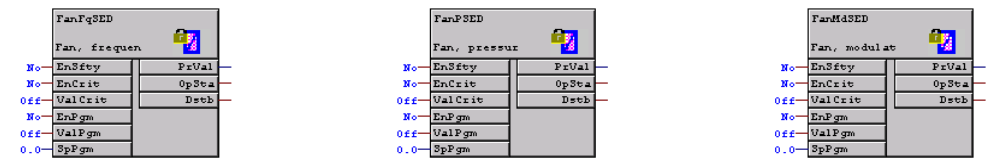
Setting the slave address   The slave addresses must be entered retrospectively in the CFC, after synchronization of System Design and PX-Design. To do this, the variable speed drive address must be set at the "ValPgm" pin of the SlvAddr block (2nd page in CFC). The default value is 1.
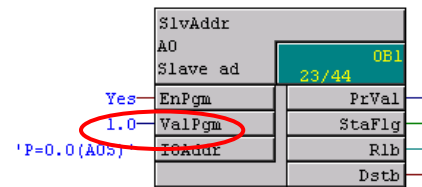
Note   In addition, for each compound, suitably adjusted values for Critical Off and Critical On must be entered in the SELBO_R block. These are the setpoints for critical on/off switching.

The default values are as follows:

Compound	Critical Off	Critical On
PuFqSED, MotFqSED, FanFqSED	0 Hz	50 Hz
PuPSED, MotPSED, FanPSED	0 Pa	30 Pa
PuMdltSED, MotMdSED, FanMdSED	0 %	100 %

Setting VSD parameters for communication

To enable the PTE-SED2 module to communicate with variable speed drives via the USS protocol, the following VSD parameters must be set as shown below. Refer to the procedure for modifying parameters, as described in the product documentation for the SED2 variable speed drive, e.g. in document CM1U5192.

P0003 = 3	**User access level** 3=Expert: User can carry out USS settings
P0700[0] = 5	**Selection of command source** 5=USS to COM link
P1000[0] = 5	**Selection of frequency setpoint** 5=USS to COM link
P2009[0] = 1	**USS scaling** (COM-Link serial port) 1=Enabled
P2010[0] = 6	**USS baud rate** (COM-Link serial port) 6= 9600 baud
P2011[0] = 1 ... 31	**USS address** (slave address) Address range 1 to 31
P2014[0] **= 0 ... 65535ms**	**USS telegram timeout** If no telegram is received via the USS channels within the defined period, an error message will be generated (F0072).

Note

The way in which the VSD responds to an error can be defined variously (no message, warning message, or switch-off). Critical errors such as overvoltage always cause the VSD to switch off. An error code can be entered in P2100[0…3], and the associated response in P2101[0..3]. Thus, means that the response to a USS telegram timeout error (F0072) can be selected so that the variable speed drive transmits only a warning, and otherwise continues to operate using the previously received setpoint. Refer also to the product literature for the SED2 variable speed drive, e.g. document CM1U5192.

SED2 parameters

The table below shows the correspondence between the data points supported by the PTE-SED2 and the SED2 parameters.

Data point name	Value range in V2.2	SED2 parameters
Variable speed drive Off/On	OFF/ON	r0967 Bit 00
Error acknowledgement	Unack. /Ack	--
VSD bus address [3]	1 ... 31	P2011[0]
VSD frequency setpoint [4]	0 ... 150 Hz	r0020
VSD fixed PID setpoint in %	0 … 100 %	P2201
VSD pressure setpoint in Pa	–200 … + 200 Pa	P2201
PID feedback signal	Signal AIN2	r0754[1]
Present output frequency	0 ... 150.0 Hz	r0021
Output current	0 ... 16383.3 A	r0027
Energy	0 ... 2.684e8 kWh	r0039
Power	0 … 163.83 kW	r0032
Current error code	0 … 16383	r0947[0]
Error display	Normal/Error	r0968 Bit 03
VSD running:	OFF/ON	r0968 Bit 02
Manual indication	Automatic / Manual	r0718[0]

Connections and wiring

The SED2 variable speed drives are connected to each other in parallel and linked to the PTE-SED2 module via terminals A, S and B.

I/O interface module
PTE-SED2

A = + Tx / Rx
S = Screen
B = – Tx / Rx
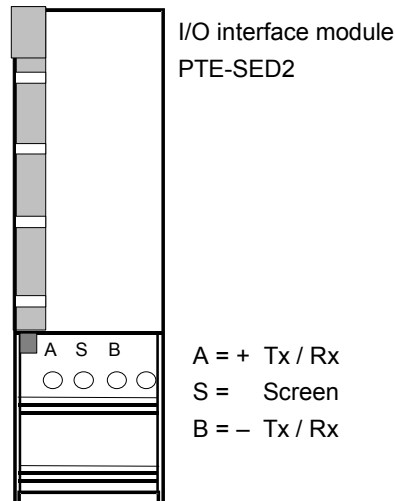
The following illustrates the connection between the module and the VSD drives:

Recommended data cable: 2 x 2 x 0.75 mm² (e.g. Li-YCYP-2 x 2 x 0.75 mm2 or LIY(C)Y-0B 2 x 2 x 0.75 mm²)
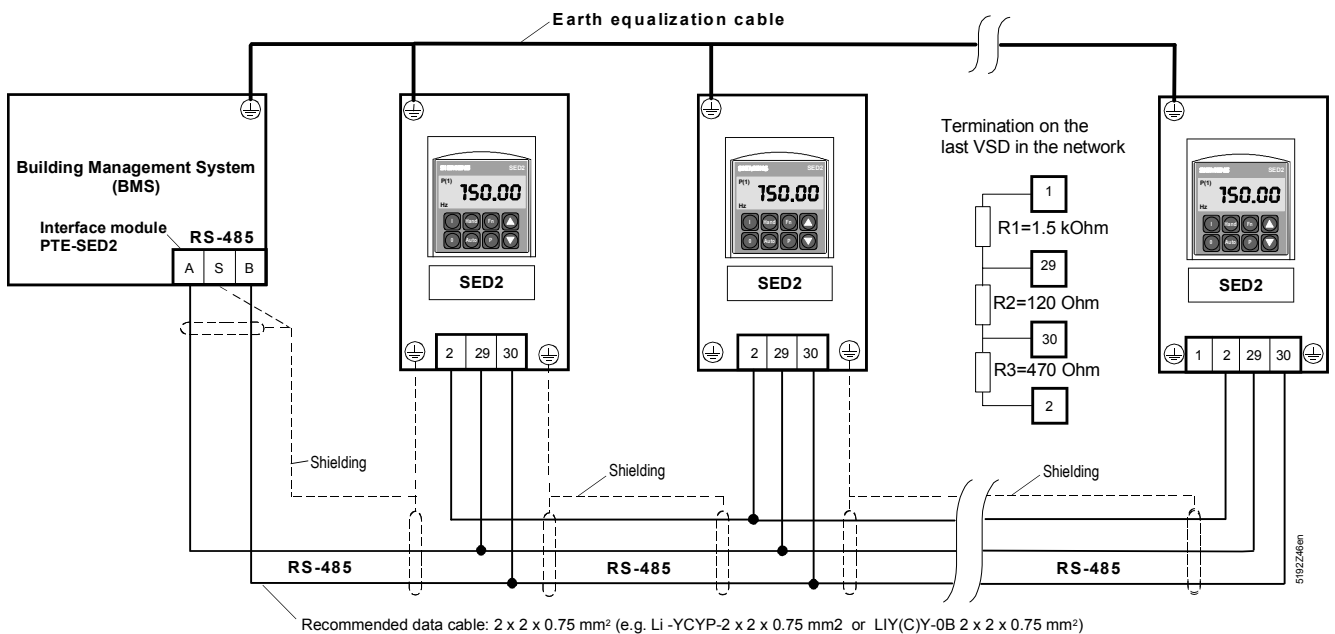
Caution

For information on the screening and earthing strategy, please also consult the commissioning guide for the SED2 variable speed drive, document CM1G5192.

Terminating resistors

To terminate the bus, the resistances shown above must be connected to **the last (and only the last) variable speed drive** on the bus:

Caution

For information on the bus termination resistances, please also consult the commissioning guide for the SED2 variable speed drive, document CM1G5192.

Connection terminals on the SED2

The following schematic shows the designations of the VSD connection terminals.

						RL1 NC	RL1 NO	RL1 COM	RL2 NC	RL2 NO	RL2 COM
						18	19	20	23	24	25

A OUT1 +	A OUT1 -	PTC A	PTC B	DIN 5	DIN 6	A OUT2 +	A OUT2 -	Iso 0V	P+	N-
12	13	14	15	16	17	26	27	28	29	30

10V	0V	AIN1 +	NI1Kin1	DIN 1	DIN 2	DIN 3	DIN 4	Iso 24V	AIN2 +	NI1Kin2
1	2	3	4	5	6	7	8	9	10	11
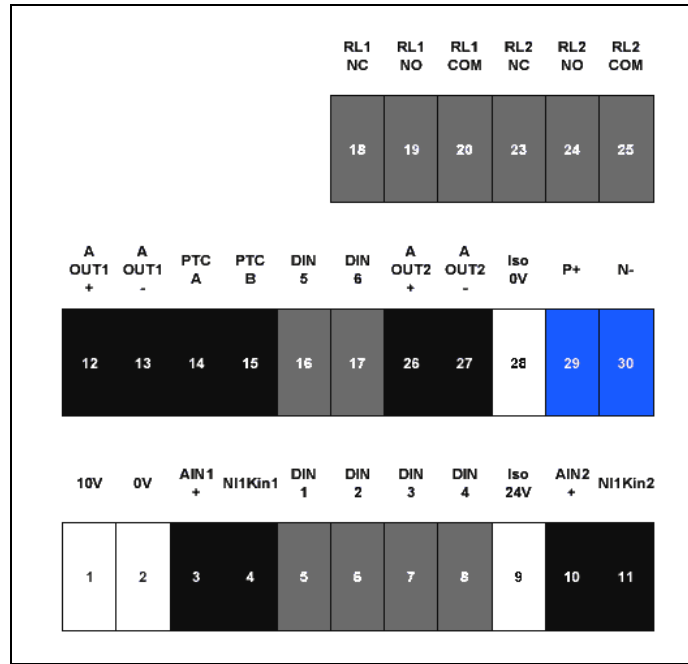
Designation of the SED2 terminals

Technical data

Power supply	Operating voltage	AC 24 V ± 20%
	Safety low voltage (SELV) in accordance with	EN 60 730
	Frequency	50 Hz / 60 Hz
	Power consumption	1.2VA
	I/O module supply via P-bus	DC 24 V (against G0)
	Load units	4 load units connected

Module addresses	Numerical range for basic addresses	1 … 241
	Valid offset addresses	0 … 15

P-Bus	See document CM2N8022 "Process bus"	

RS485 bus	Interface type	RS-485 (electrically isolated)
	Transmission speed	9600 bps
	Data bits	8 bits
	Stop bits	1
	Parity	Even
	Cable type	Select good-quality communications cable (screened, twisted pairs) recommended for RS-485 interfaces
	Maximum cable length	1 200 m
	Cross-section	2x ≈ 0.5mm²

Conformity	Meets the requirements for CE marking in	
	EU Directive: Electromagnetic compatibility	89/336/EEC

Note Technical data which is applicable to all I/O modules is described in document CM2Z8102 "Technical principles of I/O Module System".

Mounting

For mounting instructions, refer to: "Installation guide I/O Module System", document CM2M8102.
Instructions for mounting the I/O modules on the rails and I/O terminal bar are printed on the packaging.

Connection diagrams

Internal diagram   See page 7

RS485 bus
A   Data cable, positive
B   Data cable, negative
S   Protective earth

Dimensions

Dimensions in mm

EN50035-G32   EN50022-35x7,5

EN50035-G32

EN50022-35x7,5

8106M01D

Subject to change