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PROFIBUS/DP Network

Overview

The open PROFIBUS/DP network enables extremely fast data exchange with a very wide variety of slave devices, including:

- Remote digital I/Os
- Remote analog I/Os
- Remote intelligence PLC (FX1N, FX2N)
- Frequency inverters (FR-A 240, FR-A 540 (L), FR-E 500)
- Operator terminals (MAC E series)
- A range of other devices from third-party manufacturers

Structure

The maximum coverage of a bus segment is 1200 m (at a maximum of 93.75 kbit/s). Up to 3 repeaters are allowed. Thus the maximum distance between 2 stations is calculated with 4800 m.

Cable types

To help reduce costs PROFIBUS/DP uses RS 485 technology with shielded 2-wire cabling.

Suitable cables include the UNITRONIC BUSLD from Lappkabel and the DUE 4451 from Alcatel.

Cable check

An adapter from Bihl + Wiedemann is available for the quick check of the cable connection and performance.

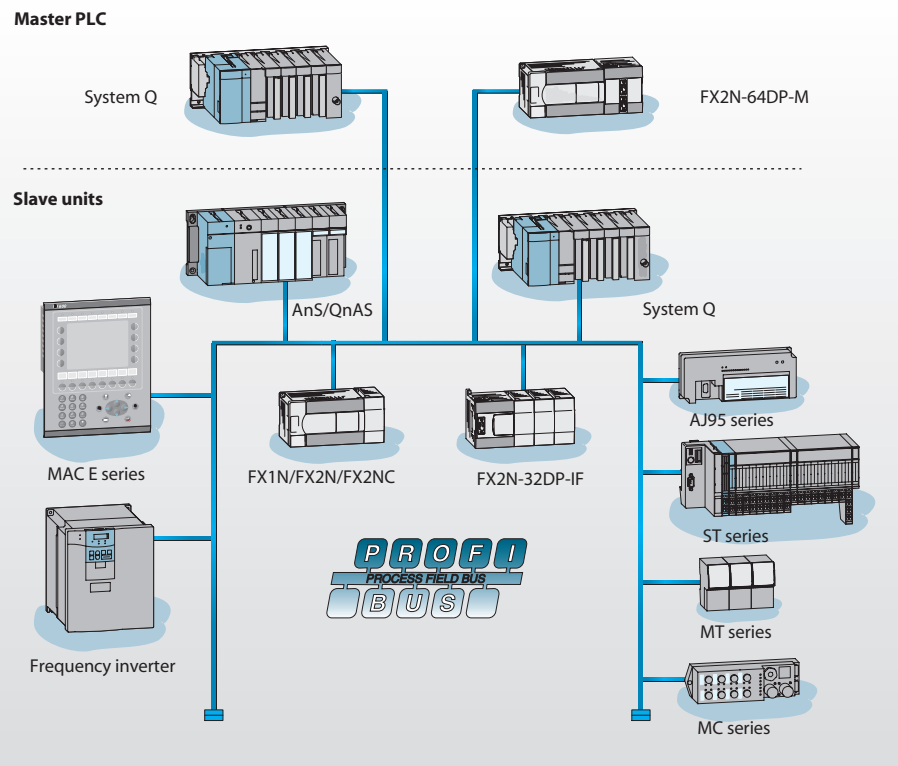
Data exchange

The PROFIBUS FX2N-64DP-M, AJ71PB92, A1SJ71PB92D and QJ71PB92D master modules support slave device data exchange with up to 244 send bytes and 244 receive bytes. This means you can exchange a total of up to 128 bytes with a slave unit per network cycle. The processing time depends on the CPU of the PLC series.

Administration

In combination with the software GX Configurator DP the FX2N-64DP-M, A1SJ71PB92D and QJ71PB92D PROFIBUS/DP master units give you user-friendly plug-and-play technology. The configuration software is self-explanatory, using a graphical model for setting up the network. You simply select the slave unit (e.g. FX2N), assign the station numbers and specify where the information is stored in the master CPU.

Of course, PROFIBUS/DP slaves from MITSUBISHI ELECTRIC can also be connected to master devices from other manufacturers.



Specifications			FX2N-64DP-M	A1SJ71PB92D	QJ71PB92D
Application range			MELSEC FX2N(C)	MELSEC AnS/QnAS	System Q
Communications protocol			EN 50170 / DIN 19245-T3		
Cabling			Shielded 2-wire with 24 AWG = 0.22 mm², impedance: 100 – 130 Ω; Shielded 2-wire with 22 AWG = 0.34 mm², impedance: 135 – 165 Ω;		
Interface			RS485		
Data transfer rate	distance				
	1 200 m	kBit/s	9.6 / 19.2 / 93.75		
	1 000 m	kBit/s	187.5		
	400 m	kBit/s	500		
	200 m	kBit/s	1 500	12000 / 6000 / 3000 (100 m) 1500 (200 m)	
Processing time			Depends on the CPU of the PLC series		
Max total distance		m	4800 (3 repeaters)		
Slave units per master			60		
Stations per segment			32		
Repeaters per network			3		

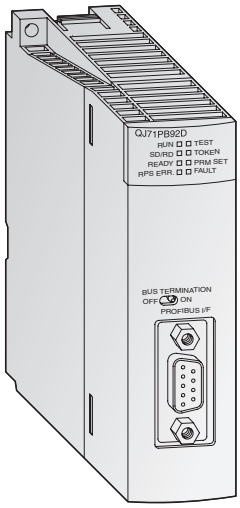
Accessories	PROFIBUS plug connector for up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 (refer to page 76)

Recommended cable types by company Belden:

Belden number	Type	Specifications	Use as
3079A	Installation cable		EN50170 cable
3079ANH	Installation cable	IEC60332-part 3 cat. C	Halogen free cable
3079E*	Installation cable		Standard Trunk cable with stranded conductors

* Belden Europe advises to use 3079E with stranded conductors since conductors tend to brake with vibration or if put under constant strain.

■ MELSEC System Q Master and Slave Modules



QJ71PB92D / QJ71PB93D

The QJ71PB92D PROFIBUS/DP master module and the QJ71PB93D PROFIBUS/DP slave module enable MELSEC programmable logic controllers to communicate with other PROFIBUS devices.

Special features:

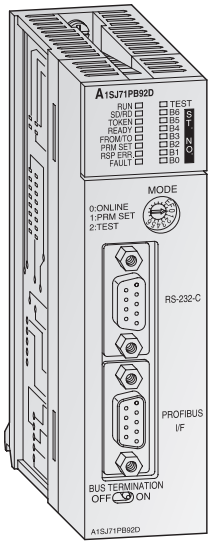
- The QJ71PB92D PROFIBUS/DP master can communicate with up to 60 slave units.
- Up to 244 input bytes and 244 output bytes can be processed at a time per slave station.
- Supported functions include Sync, Freeze and specialised diagnostics messages for the specific slave types used.
- Data exchange with automatic refresh is possible.
- Data exchange with batch transfer is possible as an option.
- The QJ71PB93D PROFIBUS/DP slave module the enables data exchange with all PROFIBUS master modules.

Specifications			QJ71PB92D	QJ71PB93D
Module type			Master	Slave
Network type			PROFIBUS/DP	PROFIBUS/DP
Communications protocol			EN50170, DIN19245T3	EN50170, DIN19245T3
Interface		type	RS485	RS485
Communications mode			Logical token ring with subordinate Master/Slave procedure	Logical token ring with subordinate Master/Slave procedure
Topology			Bus	Bus
Modulation			NRZ	NRZ
Cabling			Shielded 2-wire	Shielded 2-wire
Communications distance	9.6 kbps 19.2 kbps 93.75 kbps	m	1200, 4800 (3 repeaters)	1200, 4800 (3 repeaters)
	187 kbps	m	1000, 4000 (3 repeaters)	1000, 4000 (3 repeaters)
	500 kbps	m	400, 1600 (3 repeaters)	400, 1600 (3 repeaters)
	1500 kbps	m	200, 800 (3 repeaters)	200, 800 (3 repeaters)
	3 Mbps 6 Mbps 12 Mbps	m	100, 400 (3 repeaters)	100, 400 (3 repeaters)
Max. nodes			32, 62 (1 repeater), 92 (2 repeaters), 126 (3 repeaters)	32, 62 (1 repeater), 92 (2 repeaters), 126 (3 repeaters)
Max. transmission distance		m	4800 (3 repeaters)	4800 (3 repeaters)
Repeaters per network			Max. 3	Max. 3
I/O points			32	32
Internal power consumption (5 V DC)		mA	570	360
Weight		kg	0.15	0.15
Dimensions (W x H x D)		mm	27.4 x 105 x 97.5	27.4 x 105 x 97.5

Order information	Art. no.	134931	143545

Accessories	Configuration software incl. configuration cable for GX Configurator DP, art. no. 136579 (refer to page 100) PROFIBUS plug connector for up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 (refer to page 76)

■ MELSEC AnSH/QnAS Master and Slave Modules



A1SJ71PB92D, A1SJ71PB93D

The A1SJ71PB92D and A1SJ71PB93D PROFIBUS/DP modules enable MELSEC PLCs to communicate with other PROFIBUS devices.

Special features:

- The A1SJ71PB92D PROFIBUS/DP master can communicate with up to 60 slave units. Up to 32 input bytes and 32 output bytes can be processed at a time per slave station. Supported functions include Sync, Freeze and specialised diagnostics messages for the specific slave types used.
- The A1SJ71PB93D PROFIBUS/DP slave enables the data exchange with MELSEC AnS series PLCs in the PROFIBUS/DP network.

Specifications			A1SJ71PB92D	A1SJ71PB93D
Module type			Master (Class 1)	Slave
Network type			PROFIBUS/DP	PROFIBUS/DP
Communications protocol			EN50170, DIN19245T3	EN50170, DIN19245T3
Interface		type	RS485	RS485
Communications mode			Token passing between Master and Slave and polling between Master and Slave	Token passing between Master and Slave and polling between Master and Slave
Topology			Bus	Bus
Modulation			NRZ	NRZ
Cabling			Shielded 2-wire	Shielded 2-wire
Communications distance	9.6 kbps 19.2 kbps 93.75 kbps	m	1200, 4800 (3 repeaters)	1200, 4800 (3 repeaters)
	187 kbps	m	1000, 4000 (3 repeaters)	1000, 4000 (3 repeaters)
	500 kbps	m	400, 1600 (3 repeaters)	400, 1600 (3 repeaters)
	1500 kbps	m	200, 800 (3 repeaters)	200, 800 (3 repeaters)
	3 Mbps 6 Mbps 12 Mbps	m	100, 400 (3 repeaters)	100, 400 (3 repeaters)
Max. nodes			32, 62 (1 repeater), 92 (2 repeaters), 126 (3 repeaters)	32, 62 (1 repeater), 92 (2 repeaters), 126 (3 repeaters)
Max. transmission distance		m	4800 (3 repeaters)	4800 (3 repeaters)
Repeaters per network			Max. 3	Max. 3
I/O points			32	32
Internal power consumption (5 V DC)		mA	560	360
Weight		kg	0.27	0.18
Dimensions (W x H x D)		mm	34.5 x 130 x 93.6	34.5 x 130 x 93.6

Order information	Art. no.	63393	140673

Accessories	Configuration software for A1SJ71PB92D: GX Configurator DP, art. no. 136579 (refer to page 100) PROFIBUS plug connector for up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 (refer to page 76)

■ The New MELSEC ST Series

System description

The new ST series is designed as a modular input/output system for connection to PROFIBUS/DP and comprises:

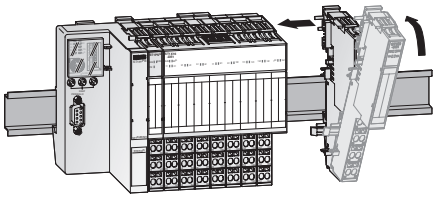
- basic module (head station and bus node for PROFIBUS/DP)
- power supply modules
- digital and analog I/O modules

They can be combined freely to provide an efficient system configuration depending to your demands.

The name "ST" means "Slice-type Terminal" and comes from the physical appearance of the very slim modules (12.6mm) , similar to slices. As well as slice type modules, cost saving block modules with 16 inputs or outputs are available.

The extension modules are designed as a 2-component system, that means they consist of electronic modules for the function and base modules as modular backplane bus with two types of terminals: spring clamp or screw clamp terminals.

The electronic modules can be clipped easily in the base modules without any tool and can be mounted on a DIN rail. Exchange of the electronic modules can be made on-line, so the system keeps running. Re-wiring is not needed.

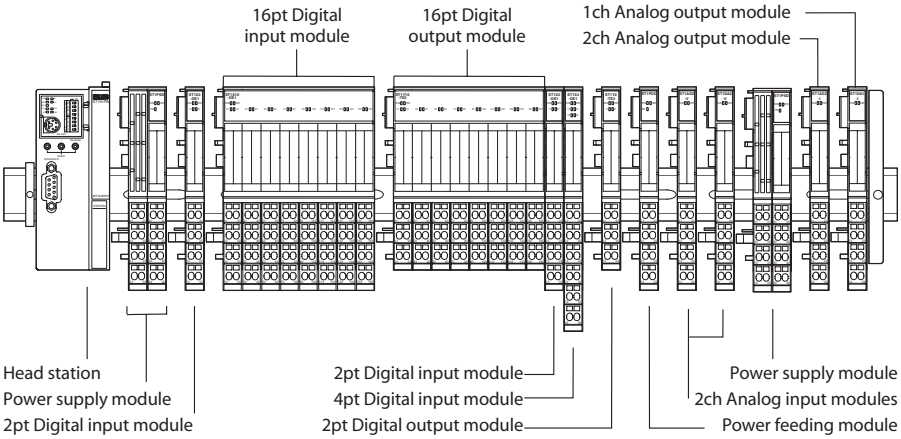


Every electronic module provides LEDs for quick and easy diagnostics and also additional information. Error and status messages are also shown on the basic module.

Special features:

- ST = Slice terminals, only 12.6mm wide
- Modular structure with no restriction on installation position
- Easy and complete handling via 3 push buttons
- Connection diagram on every module
- Applicable wire size for all base modules 0.5–2.5mm², flexible wire with ferrule or solid core wire without ferrule
- Expandable in two-point increments
- Mounting on DIN rail
- Replaceable electronic modules
- Hot swap function without re-wiring
- Standing wiring
- Quick diagnostics via LED´s
- Distributed 24V DC for actors/sensors
- Gold contacts for all bus and signal connections
- Electronic elements are coded to prevent an incorrect unit being inserted
- Easy parameter setting with GX Configurator DP

Product range



Reference Tables for Model Designation Code

Electronic modules

ST1	Y	16	–	TPE3
a	b	c		d

The code in detail:

- **a** Designation of the series
- **b** Designation of I/O type module
  - H = head station
  - P = power module
  - Y = output module
  - X = input module
  - AD = analog input module
  - DA = analog output module
- **c** Number of I/Os, e.g. 2, 4 or 16 I/Os
- **d** Model variation

Base modules

ST1	B	S3	–	Y	16
f	g	h		i	k

The code in detail:

- **f** Designation of the series
- **g** "B" = base module, "A" = accessory
- **h** Terminal type and number of wires
  - S = Spring clamp type
  - E = Screw clamp type
- **i** Applicable electronic module
  - Y = output module
  - X = input module
  - IR = analog/relay modules
- **k** number of I/Os

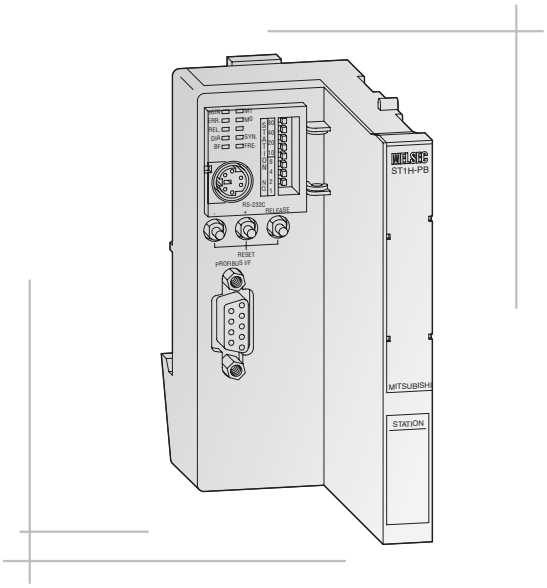
Product range and Selection guide

The following table shows the possible combinations between electronic modules and the applicable base modules. However, two types of base modules featuring spring clamp terminals or screw clamp terminals are available. Choose the best solution for your special application.

Electronic modules	Base modules Spring clamp terminals	Screw clamp terminals
Head station		
ST1H-PB	no need	no need
Power supply modules		
ST1PSD (first one)	ST1B-S4P2-H-SET	ST1B-E4P2-H-SET
ST1PSD (second and more)	ST1B-S4P2-R-SET	ST1B-E4P2-R-SET
ST1PDD	ST1B-S4P2-D	ST1B-E4P2-D
Digital input modules		
ST1X2-DE1	ST1B-S4X2	ST1B-E4X2
ST1X4-DE1	ST1B-S6X4	ST1B-E6X4
ST1X16-DE1	ST1B-S4X16	ST1B-E4X16
Digital output modules		
ST1Y2-TE2	ST1B-S3Y2	ST1B-E3Y2
ST1Y16-TE2	ST1B-S3Y16	ST1B-E3Y16
ST1Y2-TPE3	ST1B-S3Y2	ST1B-E3Y2
ST1Y16-TPE3	ST1B-S3Y16	ST1B-E3Y16
ST1Y2-R2	ST1B-S4IR2	ST1B-E4IR2
Analog input modules		
ST1AD2-V	ST1B-S4IR2	ST1B-E4IR2
ST1AD2-I	ST1B-S4IR2	ST1B-E4IR2
Analog output modules		
ST1DA2-V	ST1B-S4IR2	ST1B-E4IR2
ST1DA1-I	ST1B-S4IR2	ST1B-E4IR2
Temperature modules		
ST1TD2	ST1B-S4TD2	ST1B-E4TD2

ST Series Basic Module

PLC ➠ All series



Basic module (head station) of the ST series

The basic module ST1H-PB connects the remote I/O modules of the ST series to PROFIBUS/DP. The basic module and all ST devices are mounted on a DIN rail.

The ST1H-PB provides a Mini-DIN socket for diagnostics and parameter setting using the QC30R2 cable. The station number can be set via DIP switches on the basic module. LEDs show the status of the connected systems.

Special features:

- DIN rail mounting
- LEDs for RUN, ERROR, MODE and status massages
- Connection to the PROFIBUS via RS 485 Sub-D interface
- Connection to the I/O modules via integrated backplane bus
- Easy maintenance, Hot swap with switches, no PC, software or special tools needed
- End plate and bracket for fixing the ST series modules on the DIN rail are included.

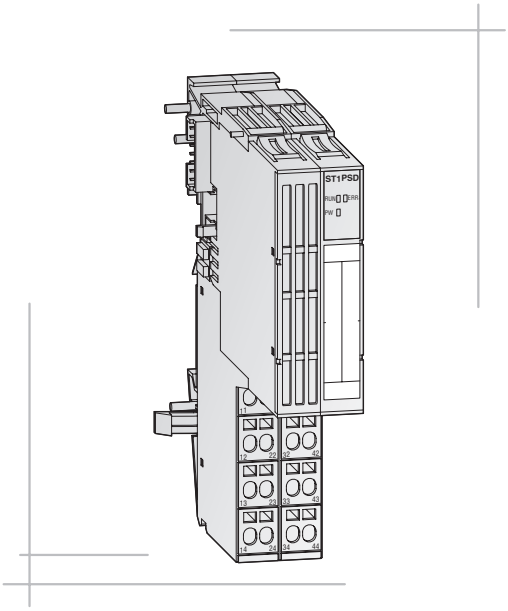
Specifications			ST1H-PB
Module type			Head station of the MELSEC ST series for PROFIBUS/DP
Occupied I/O points			4 / 4
Communications	protocol		IEC 61158/EN50170
	medium		Shielded 2-wire
Interface		type	RS485
Supported operation modes			Sync mode, freeze mode
Max. transmission distance		m	4800 (3 repeaters)
Programming interface			RS232 Mini-DIN socket for diagnostics and programming
Diagnostics LEDs			RUN, ERR, REL, DIA, BF, SYN, FRE, M0, M1
Data exchange with master			304 total / 32 / 64 / 128 / 256, selectable mode
Number of addressable slices			max. 63
Addressable I/O points	digital	bit	256
	analog	word	32
Internal power consumption (5 V DC)		mA	530
External power supply			Via ST1PSD
Dimensions (W x H x D)		mm	114.5 x 50.5 x 74.5
Weight		kg	0.1

Order information	Art. no.	152951

Accessories	End plate and bracket for fixing on the DIN rail included in package Configuration software: GX Configurator DP V6.00 or higher, art. no. 136579 (refer to page 100) PROFIBUS plug connector for up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 (refer to page 76) Programming cable QC30R2 (for connection of PC–ST series), art. no. 128424

■ ST Series Bus Power Supply and Refreshing Module

PLC ➠ All series



Bus power supply and refreshing module

The Bus power supply and refresh module ST1PSD can serve in two ways: distribute 24 V DC power supply for the basic module and I/Os field supply and 5 V DC for the internal backplane bus (H mode) or distribute 24 V DC power supply for I/Os field supply and refresh the internal backplane bus with 5 V DC (R mode). Each mode (H or R) is indicated by the use of a different base module, marked with "H" or "R".

You need 1 ST1PSD with H-type base module beside the basic module to operate the ST station, a second or more (using the R-type base module) is only needed depending of the power consumption of the connected consumers (see bottom of this page).

LEDs on the module show the status for RUN and ERROR. Diagnosis can be made via the head module.

Special features:

- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Four selectable types of base modules (double function):
  - spring clamp type terminals for power supply (H)
  - spring clamp type terminals for bus refresh (R)
  - screw clamp type terminals for power supply (H)
  - screw clamp type terminals for bus refresh (R)

Specifications		ST1PSD
Module type		Power supply for head station, internal 5V DC backplane bus and 24V DC for I/Os (double function)
Occupied I/O points		2 / 2
Occupied Slice number		2
Nominal voltage	V DC	24.0
System supply	V DC	24.0 for basic module and I/O´s, field supply / 5.0 for internal backplane bus
Permissible range for operating	V DC	24.0 (19.2 – 28.8 (±20%))
Ripple		< 5%
Output current (5 V DC)	A	2.0
Output current (24 V DC)	A	8 / 10 with fuse
Dimensions (W x H x D)	mm	25.2 x 55.4 x 74.1
Weight	kg	0.05
Connection cable type		24 V DC (with shield) + 24 V DC for field supply

Order information	Art. no.	152952

Applicable base module for **basic module supply**	Spring clamp type	ST1B-S4P2-H-SET, art. no. 152908
	Screw clamp type	ST1B-E4P2-H-SET, art. no. 152918
Applicable base module for **bus refreshing** within the station	Spring clamp type	ST1B-S4P2-R-SET, art. no. 152909
	Screw clamp type	ST1B-E4P2-R-SET, art. no. 152919
Accessories		Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77); Ext. power supply modules for mounting on DIN rail: DLP□□□-24-1/E (refer to p. 77)

Note: For connection diagram refer to page 90.

Note: Calculation of the power consumtion

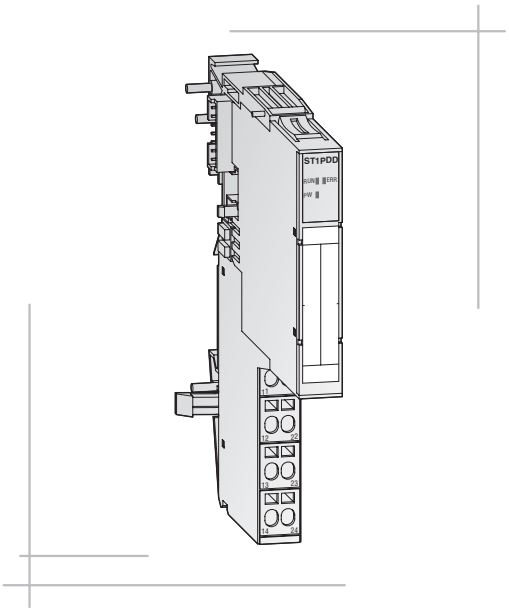
The power consumtion and the need of a power refresh module will be calculated exactly in the GX Configurator DP during your configuration of the System.

For a rough calculation of the internal 5V DC power consumtion and a rough calculation for the number of needed PSD refresh modules, please refer to the attached table.

Module type	Power supply/consumtion	Description
ST1PSD	2.0A	Power supply infeed
ST1H-PB	0.53A	Power consumption
Slicemodule	0.1A	Power consumption
Blockmodule	0.15A	Power consumption

■ ST Series Power Feeding Module

PLC ➠ All series



Power feeding module

The power feeding module ST1PDD distributes 24V DC only for the I/Os of the actuators and sensors.

The number of ST1PDD modules needed can be calculated individually by addition of the current consumption of all connected devices.

The electronic module is fitted in a base module, which can be installed on a standard DIN rail.

Special features:

- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- ST1PDD can be placed anywhere on the DIN rail, the only restriction is the power consumption of the connected consumers.
- Two selectable types of base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications		ST1PDD
Module type		Power feeding module
Occupied I/O points		2 / 2
Occupied Slice number		1
Nominal voltage	V DC	24.0
Permissible range	V DC	24.0 (19.2 – 28.8 (±20%))
Ripple		< 5%
Internal power consumption (5 V DC)	mA	60
Maximum operating current	A	8 (24V DC) / 10 (24V DC) with fuse
Dimensions (W x H x D)	mm	12.6 x 55.4 x 74.1
Weight	kg	0.03
Base module for power feeding	Spring clamp type	ST1B-S4P2-D, art. no. 152910
	Screw clamp type	ST1B-E4P2-D, art. no. 152920
Connection cable type		24 V DC with shield

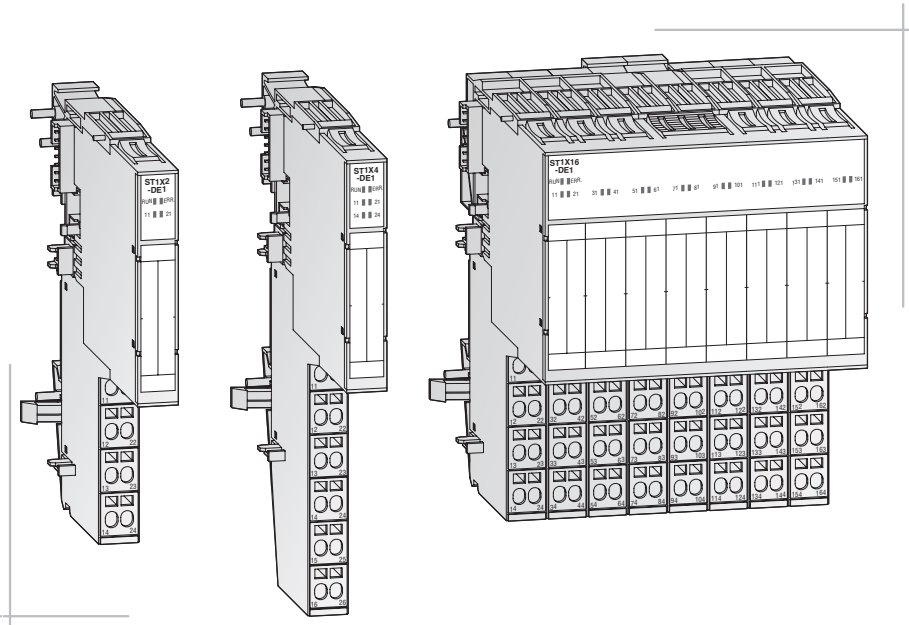
Order information	Art. no.	152953

Accessories	
	Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77); Ext. power supply modules for mounting on DIN rail: DLP□□□-24-1/E (refer to p. 77)

Note: For connection diagram refer to page 90.

■ ST Series Digital Input Modules

PLC ➠ All series



Digital input modules

The digital input modules of the ST series connect directly to field devices (contacts, limit switches, sensors, etc.) and PROFIBUS/DP master module.

Two slim slice modules with 2 or 4 inputs are available. Also a cost saving block type module with 16 inputs is available.

Special features:

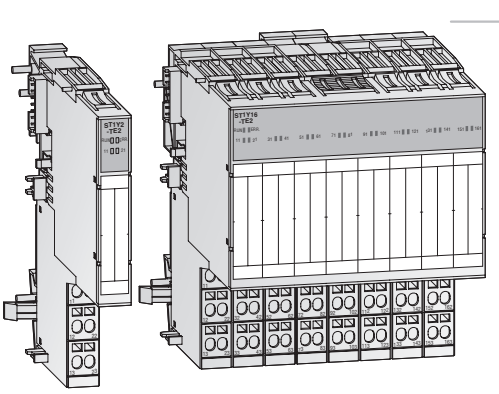
- Modules with 2, 4 or 16 inputs available
- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Two selectable types of connecting terminals base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications			ST1X2-DE1	ST1X4-DE1	ST1X16-DE1
Module type			DC input module, 2 inputs	DC input module, 4 inputs	DC input module, 16 inputs
Occupied I/O points			2 / 2	4 / 4	16 / 16
Occupied Slice number			1	1	8
Isolation method			Photo coupler	Photo coupler	Photo coupler
Rated input voltage		V DC	24 (+20/-15%, ripple ratio within 5%)	24 (+20/-15%, ripple ratio within 5%)	24 (+20/-15%, ripple ratio within 5%)
Rated input current		mA	4	4	4
Inputs simultaneous ON			100%	100%	100%
Switch ON	voltage	V	min. 19	min. 19	min. 19
	current	mA	min. 3	min. 3	min. 3
Switch OFF	voltage	V	max. 11	max. 11	max. 11
	current	mA	max. 1.7	max. 1.7	max. 1.7
Input resistance		kΩ	5.6	5.6	5.6
Response time	OFF ⟶ ON	ms	0.5 / 1.5 or less (default: 1.5)		
	ON ⟶ OFF	ms	0.5 / 1.5 or less (default: 1.5)		
Dielectric withstand voltage			500 V AC for 1 minute between all DC external terminals and ground		
Insulation resistance			10 MΩ or more by insulation resistance tester		
Noise immunity			By noise simulator of 500 V p-p noise voltage; 1 s noise width and 25 to 60 Hz noise frequency; Fast transient noise IEC61000-4-4: 1 kV		
Internal current consumption (5V DC)		mA	85	95	120
Dimensions (W x H x D)		mm	12.6 x 55.4 x 74.1	12.6 x 55.4 x 74.1	100.8 x 55.4 x 74.1
Weight		kg	0.03	0.03	0.1
Applicable base module	Spring clamp type		ST1B-S4X2, art. no. 152911	ST1B-S6X4, art. no. 152912	ST1B-S4X16, art. no. 152913
	Screw clamp type		ST1B-E4X2, art. no. 152921	ST1B-E6X4, art. no. 152922	ST1B-E4X16, art. no. 152923
Connection cable type			3-wire 24 V DC (with shield)	3-wire 24 V DC	3-wire 24 V DC (with shield)
Order information		Art. no.	152964	152965	152966
Accessories			Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77)		

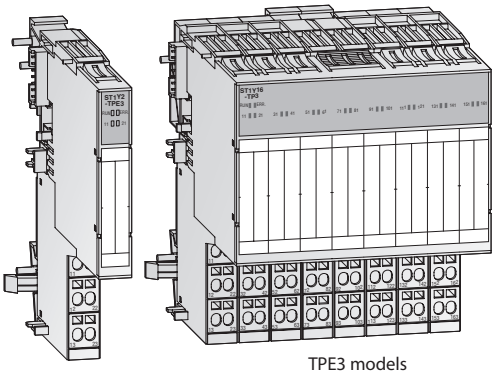
Note: For connection diagram refer to page 90.

■ ST Series Digital Output Modules

PLC ➠ All series



TE2 models



TPE3 models

Digital output modules

The digital output modules of the ST series connect directly to field devices (e.g. contactors, valves, lights) and PROFIBUS/DP master module.

The TPE3 models provide advanced protection functions e.g. for thermal and short circuit failures.

Two slim slice modules with 2 or 4 outputs are available. Beside this, two cost saving block type modules with 16 outputs each are available.

Special features:

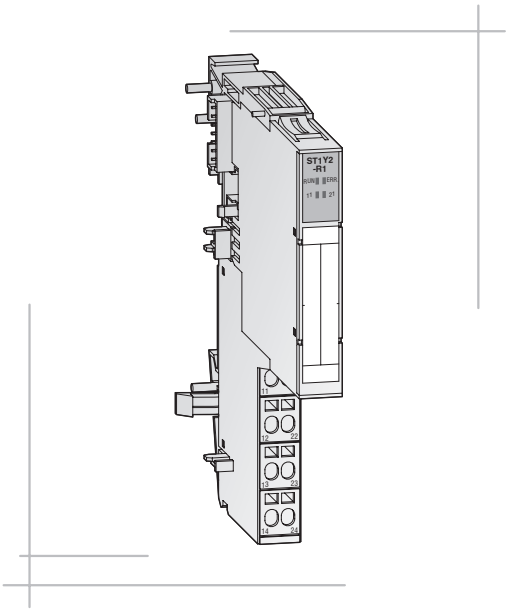
- Modules with 2 or 16 outputs available
- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Two selectable types of connecting terminals base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications			ST1Y2-TE2	ST1Y16-TE2	ST1Y2-TPE3	ST1Y16-TPE3
Module type			Transistor output, 2 outputs	Transistor output, 16 outputs	Transistor output, 2 outputs	Transistor output, 16 outputs
Occupied I/O points			2 / 2	16 / 16	2 / 2	16 / 16
Occupied Slice number			1	8	1	8
Isolation method			Photo coupler	Photo coupler	Photo coupler	Photo coupler
Rated load voltage		V DC	24 (+20/-15%)	24 (+20/-15%)	24 (+20/-15%)	24 (+20/-15%)
Max. load current		A	0.5/point; 1.0/common	0.5/point; 4.0/common	1.0/point; 2.0/common	1.0/point; 4.0/common
Max. inrush current		A	4.0 (10 ms or less)	4.0 (10 ms or less)	2.0 (10 ms or less)	4.0 (10 ms or less)
Leakage current OFF		mA	0.1 or less	0.1 or less	0.3 or less	0.3 or less
Max. voltage drop at ON			0.2 V DC (TYP) 0.5 A, 0.3 V DC (max.) 0.5 A	0.2 V DC (TYP) 0.5 A, 0.3 V DC (max.) 0.5 A	0.15 V DC (TYP) 1.0 A, 0.2 V DC (max.) 1.0 A	0.15 V DC (TYP) 1.0 A, 0.2 V DC (max.) 1.0 A
Response time	OFF ⟶ ON	ms	max. 1.0	max. 1.0	max. 0.5	max. 0.5
	ON ⟶ OFF	ms	max. 1.0 (rated load, resistive load)	max. 1.0 (rated load, resistive load)	max. 1.5 (rated load, resistive load)	max. 1.5 (rated load, resistive load)
Surge compressor			Zener diode	Zener diode	Zener diode	Zener diode
Fuse		A	6.7 (fuse blow capacity: 50 A)		—	—
Fuse blown indicator			Yes (when fuse blows, LED indicates it and signal is output to head module)		—	—
Protection functions			—		Thermal protection, short circuit protection (Thermal and short circuit protection are activated in increments of 1 points. When the output section protection function is working, LED indicates it and signal is output to Head module. Automatic reset.)	
Dielectric withstand voltage			500 V AC for 1 minute between all DC external terminals and ground			
Insulation resistance			10 MΩ or more by insulation resistance tester			
Noise immunity			By noise simulator of 500 V p-p noise voltage; 1 s noise width and 25 to 60 Hz noise frequency; Fast transient noise IEC61000-4-4: 1kV			
Internal current consumption (5V DC)		mA	90	150	95	160
Dimensions (W x H x D)		mm	12.6 x 55.4 x 74.1	100.8 x 55.4 x 74.1	12.6 x 55.4 x 74.1	
Weight		kg	0.03	0.1	0.03	0.1
Applicable base module	Spring clamp type		ST1B-S3Y2, art. no. 152914	ST1B-S3Y16, art. no. 152915	ST1B-S3Y2, art. no. 152914	ST1B-S3Y16, art. no. 152915
	Screw clamp type		ST1B-E3Y2, art. no. 152924	ST1B-E3Y16, art. no. 152925	ST1B-E3Y2, art. no. 152924	ST1B-E3Y16, art. no. 152925
Connection cable type			2-wire 24 V DC with shield	2-wire 24 V DC with shield	2-wire 24 V DC with shield	2-wire 24 V DC with shield
Order information		Art. no.	152967	152968	152969	152970
Accessories			Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77)			

Note: For connection diagram refer to page 90.

■ ST Series Relay Output Module

PLC ➠ All series



Relay output module

The digital relay output module of the ST series connect directly to field devices (e.g. contactors, valves, lights) and PROFIBUS/DP master module.

The electronic module is fitted in a base module, which can be installed on a standard DIN rail. The electronic module can be replaced without having to turn OFF the power ("Hot Swap"), without rewiring and without using any tool.

Special features:

- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Two selectable types of connecting terminals base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications			ST1Y2-R2
Module type			Relay output module
Occupied I/O points			2 / 2
Occupied Slice number			1
Isolation method			Relay
Rated load voltage			24 V DC (+20/-15%); 240 V AC
Max. load current		A	2.0 (cos ϕ=1)/point; 4.0/common
Max. switching load			264 V AC/125 V DC
Response time	OFF ⟶ ON	ms	max. 10
	ON ⟶ OFF	ms	max. 12
Life	Mechanical		20 million times or more
	Electrical		200 V AC 1.5 A, 240 V AC 1.0 A (cosϕ=0.7) 0.1 million times or more 24 V DC 1.0 A,100 V DC 0.1 A (L/R=7ms) 0.1 million times or more
Max. switching frequency			3600/h
Dielectric withstand voltage			2830 VAC; rms/3 cycles (altitude 200m)
Insulation resistance			10 MΩ or more by insulation resistance tester
Noise immunity			By noise simulator of 500 V p-p noise voltage; 1 s noise width and 25 to 60 Hz noise frequency; Fast transient noise IEC61000-4-4: 1 kV
Internal current consumption (V DC)		mA	90
Dimensions (W x H x D)		mm	12.6 x 55.4 x 74.1
Weight		kg	0.04
Applicable base module	Spring clamp type		ST1B-S4IR2, art. no. 152916
	Screw clamp type		ST1B-E4IR2, art. no. 152927
Connection cable type			2 wires (internal connected)

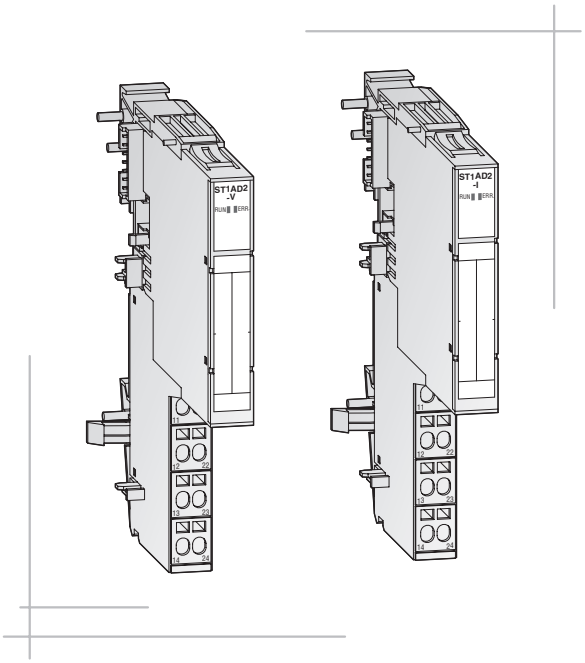
Order information	Art. no.	152971

Accessories	Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77)

Note: For connection diagram refer to page 90.

■ ST Series Analog Input Module

PLC ➠ All series



Analog input modules

The analog input modules of the ST series convert analog process data like pressure, temperature, etc. into digital values that are sent to the PROFIBUS/DP master.

The electronic modules are fitted in a base module, which can be installed on a standard DIN rail. The electronic modules can be replaced without having to turn OFF the power ("Hot Swap"), without rewiring and without using any tools.

Special features:

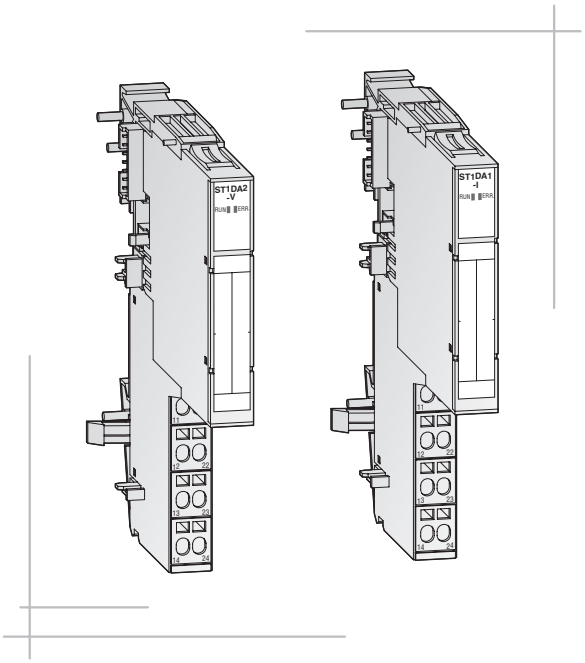
- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Two selectable types of connecting terminals base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications			ST1AD2-V	ST1AD2-I
Module type			Analog input module	Analog input module
Occupied I/O points			4 / 4	4 / 4
Occupied Slice number			1	1
Number of input channels			2	2
Signal input range			-10 – +10 V 0 – +10 V 0 – 5 V 1 – 5 V	0–20 mA 4–20 mA
Resolution			12 bit + sign	12 bit + sign
Conversion time			0.1 ms per channel	0.1 ms per channel
Maximum input voltage			±15 V	—
Maximum input current			—	±30 mA
Total error			±0.8 % (0–55 °C)	±0.8 % (0–55 °C)
Data length			16 bit	
Input resistance	at Single-End		1.0 MΩ	250 Ω
Isolation	between the channels and backplane bus		Photo coupler	Photo coupler
	between the channels		—	—
Noise immunity			By noise simulator of 500 V p-p noise voltage; 1 s noise width and 25 to 60 Hz noise frequency; Fast transient noise IEC61000-4-4: 1 kV	
Dielectric withstand voltage			500 V AC for 1 minute between all DC external terminals and ground	
Internal current consumption (5V DC)		mA	110	110
Dimensions (W x H x D)		mm	12.6 x 55.4 x 74.1	12.6 x 55.4 x 74.1
Weight		kg	0.04	0.04
Applicable base module	Spring clamp type		ST1B-S4IR2, art. no. 152916	ST1B-S4IR2, art. no. 152916
	Screw clamp type		ST1B-E4IR2, art. no. 152927	ST1B-E4IR2, art. no. 152927
Connection cable type			2-wire 24 V DC with shield	2-wire 24 V DC with shield
Order information		Art. no.	152972	152973
Accessories			Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77) Connectors for shielded analog cable: ST1A-SLD-□ (refer to p. 77)	

Note: For connection diagram refer to page 90.

■ ST Series Analog Output Module

PLC ➠ All series



Analog output modules

The analog output modules of the ST series convert the digital values sent from the PROFIBUS/DP master into an analog voltage signal. This signal can be used to control valves, inverters, servo-motors, etc.

The electronic modules are fitted in a base module, which can be installed on a standard DIN rail. The electronic modules can be replaced without having to turn OFF the power ("Hot Swap"), without rewiring and without using any tools.

Special features:

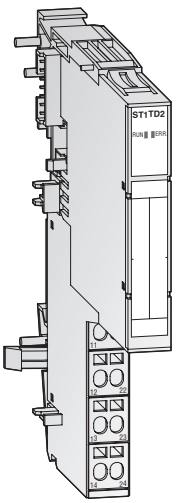
- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Hot swap function for the electronic module
- Two selectable types of connecting terminals base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications			ST1DA2-V	ST1DA1-I
Module type			Analog output module	Analog output module
Occupied I/O points			4 / 4	4 / 4
Occupied Slice number			1	1
Number of output channels			2	1
Signal output range			-10 – +10 V 0 – +10 V 0 – 5 V 1 – 5 V	0–20 mA 4–20 mA
Resolution			12 bit + sign	12 bit + sign
Conversion time			0.1 ms per channel	0.1 ms per channel
Maximum input voltage			±15 V	—
Maximum input current			—	±30 mA
Total error			±0.8 % (0–55 °C)	±0.8 % (0–55 °C)
Data length			16 bit	
External load resistance value			1.0 kΩ–1.0 MΩ	0–500 Ω
Isolation	between the channels and backplane bus		Photo coupler	Photo coupler
	between the channels		—	—
Noise immunity			By noise simulator of 500 V p-p noise voltage; 1 s noise width and 25 to 60 Hz noise frequency; Fast transient noise IEC61000-4-4: 1 kV	
Dielectric withstand voltage			500 V AC for 1 minute between all DC external terminals and ground	
Internal current consumption (5V DC)		mA	95	95
Dimensions (W x H x D)		mm	12.6 x 55.4 x 74.1	
Weight		kg	0.04	0.04
Applicable base module	Spring clamp type		ST1B-S4IR2, art. no. 152916	ST1B-S4IR2, art. no. 152916
	Screw clamp type		ST1B-E4IR2, art. no. 152927	ST1B-E4IR2, art. no. 152927
Connection cable type			2-wire 24 V DC with shield	2-wire 24 V DC with shield
Order information		Art. no.	152975	152976
Accessories			Wiring markers in different colours: ST1A-WMK-☐☐☐ (refer to p. 77); Base module labels: ST1A-BMK- ☐☐☐ (refer to p. 77) Connectors for shielded analog cable: ST1A-SLD-☐ (refer to p. 77)	

Note: For connection diagram refer to page 90.

■ ST Series Analog Temperature Input Module

PLC ➠ All series



Analog Temperature Input Module

The analog temperature input modules of the ST series convert analog temperature data into digital values that are sent to the PROFIBUS/DP master.

The electronic modules are fitted in a base module, which can be installed on a standard DIN rail. The electronic modules can be replaced without having to turn OFF the power ("Hot Swap"), without rewiring and without using any tools.

Special features:

- DIN rail mounting
- LEDs for RUN and ERROR on the modules and also on the basic module
- Connection to the basic module (head station) via integrated backplane bus in the base modules
- Hot swap function for the electronic module
- Two selectable types of connecting terminals base modules:
  - spring clamp type terminals
  - screw clamp type terminals

Specifications			ST1TD2
Module type			Analog input module
Occupied I/O points			4 / 4
Occupied Slice number			2
Number of input channels			2
Output	Temperature conversion		1-bit signed binary (-2,700–18,200: value to the first decimal place × 10 times)
	Micro conversion		16-bit signed binary (-20,000–20,000)
Standard with thermocouple conforms			IEC584-1 (1997), IEC854-2 (1982), JIS C1602-1995
Cold junction temperature compensation accuracy			Ambient air temperature 25±5 °C: 1.5 °C; ambient air temperature 0–55 °C: ±2.5 °C
Thermocouple input accuracy			Depends on the used model of thermocouple
Micro voltage input range		mV	-80 – +80 (input resistance 1 MΩ or more)
Micro voltage input accuracy			Ambient air temperature 25±5 °C: ±0.16 mV; ambient air temperature 0–55 °C: ±0.32 mV
Resolution	Thermocouple input		K,T: 0.3 °C; E: 0.2 °C; J: 0.1 °C; B: 0.7 °C; R, S: 0.8 °C; N: 0.4 °C
	Micro voltage input	µV	4
Conversion speed			Cold junction temperature compensation setting: Not set: 30 ms/channel; Set: 60 ms/channel
Wire break detection			Yes (channel independent)
Absolute maximum input			±4 V
ROM write count			ROM write count by user range write or parameter setting: up to 10,000 times
Isolation	between the channels and backplane bus		Photo coupler
	between the channels		—
Noise immunity			By noise simulator of 500 V p-p noise voltage; 1 s noise width and 25 to 60 Hz noise frequency; Fast transient noise IEC61000-4-4: 1 kV
Dielectric withstand voltage			500 V AC for 1 minute between all DC external terminals and ground
Internal current consumption (5V DC)		mA	95
Dimensions (W x H x D)		mm	12.6 x 55.4 x 77.6
Weight		kg	0.04
Applicable base module	Spring clamp type		ST1B-S4TD2, art. no. 161736
	Screw clamp type		ST1B-E4TD2, art. no. 161737
Connection cable type			2-wire 24 V DC with shield

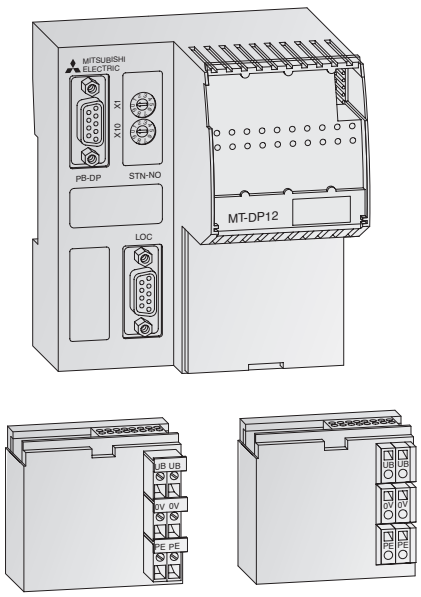
Order information	Art. no.	152972

Accessories	Wiring markers in different colours: ST1A-WMK-□□□ (refer to p. 77); Base module labels: ST1A-BMK- □□□ (refer to p. 77) Connectors for shielded analog cable: ST1A-SLD-□ (refer to p. 77)

Note: For connection diagram refer to page 90.

■ MT Series Basic Modules

PLC ➠ All series



Basic module (head station) of the MT series

The basic modules connect the extension modules of the MT series (MT = Modular Type) to PROFIBUS/DP. Due to the additional second interface on the basic module the extension modules can be installed in two rows.

The modules on the separate DIN rail are supplied with data and the system voltage via an extension cable and the local system extension module.

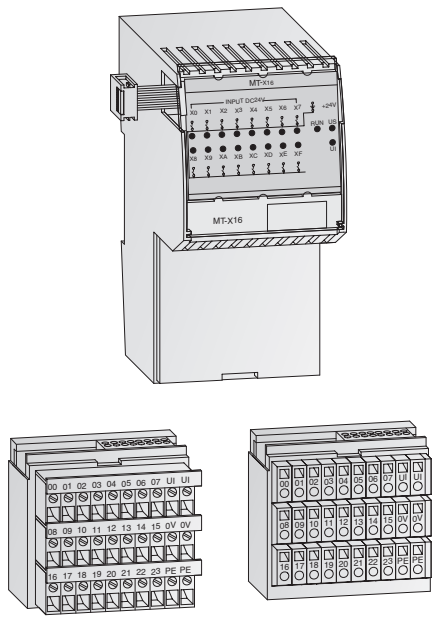
Special features:

- Up to 16 digital and 8 analog extension modules can be connected.
- Automatic detection of the data transfer rate
- Optocouplers between interface and system
- Two selectable types of connecting terminals:
  - screw clamp type terminals
  - spring clamp type terminals
- Supported installation in two rows through the local extension MT-LE-SET to be connected to the basic module.
- Up to 256 digital inputs/outputs per basic module
- DIN rail mounting

Specifications			MT-DP12	MT-DP12E
Module type			Basic module of the MT series, PROFIBUS/DP slave	Basic module of the MT series, PROFIBUS/DP slave
Communications	protocol		DIN 19245-T3	EN50170, DIN 19245-T3
	medium		Shielded pair with 24AWG = 0.22 mm², impedance: 100 – 130 Ω; Shielded pair with 22AWG = 0.34 mm², impedance: 135 – 165 Ω	Shielded pair with 24AWG = 0.22 mm², impedance: 100 – 130 Ω; Shielded pair with 22AWG = 0.34 mm², impedance: 135 – 165 Ω
Interface			RS485	RS485
Operation modes			Sync mode and freeze mode are supported	Sync mode and freeze mode are supported
Communications rate			9.6; 19.2; 93.75; 187.5; 500 kBit/S, 1.5; 3; 6; 12 Mbit/s	9.6; 19.2; 93.75; 187.5; 500 kBit/S, 1.5; 3; 6; 12 Mbit/s
Max. total distance		m	4800 (3 repeater)	4800 (3 repeater)
No. of connectable extension modules			Max. 16 extension modules (digital and analog I/O modules)	Max. 4 extension modules (digital and analog I/O modules)
Adressable digital I/Os			256	72
I/O points			—	—
Integrated inputs				
Digital inputs			—	8
Isolation			—	Optocoupler isolation between input terminals and internal power.
Rated input current		V DC	—	24 (18 – 30)
Response time	OFF ⟶ ON	ms	—	1
	ON ⟶ OFF	ms	—	1
Short circuit protection			—	Electronic
Status display for inputs			—	The module has status LEDs for all inputs.
Common data				
Applicable wire size		mm²	0.75 – 2.5	0.75 – 2.5
Power supply		V DC	24	24
Internal power consumption (24 V DC)		A	Max. 0.8 (with maximum configuration)	Max. 0.5 (with maximum configuration)
Weight		kg	0.28	0.35
Dimensions (W x H x D)		mm	96 x 114 x 60	96 x 114 x 60
Order information		Art. no.	130070	124622
Accessories			Local system adapter MT-LE with extension cable MT-LE-CBL50 (length 0.5 m) = MT-LE-SET, art. no. 69759 Screw type terminal block MT-DP12-TBS, art. no. 68888 Spring clamp terminal block MT-DP12-TBC, art. no. 68889 PROFIBUS plug connector for up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 (refer to page 76)	Screw type terminal block MT-DP12E-TBS, art. no. 124624 Spring clamp terminal block MT-DP12E-TBC, art. no. 124623 PROFIBUS plug connector for up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009 (refer to page 76)

■ MT Series Digital Input/Combination Modules

PLC ➠ All series



Digital input/combination modules

The digital input modules of the MT series connect directly with field devices (contacts, limit switches, etc.) and PROFIBUS/DP master module.

Modules with 4, 8 and 16 inputs are available.

Beside the 4 inputs the combination module MT-X4Y4T consists of 4 transistor outputs. It additionally controls devices (e.g. contactors, valves, lights) via a PROFIBUS/DP master module.

Special features:

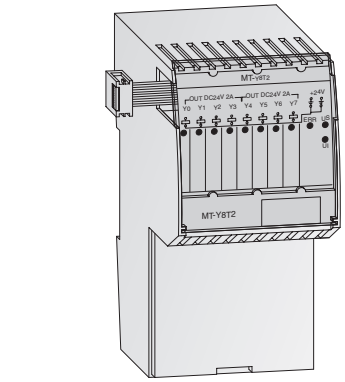
- For the 16-type modules potential terminal blocks in three-wire technology are available.
- The power supplying the sensors and outputs (except relay output) is directly fed into the module.
- Standard potential isolation between process and module
- Two selectable types of connecting terminals:
  - screw clamp type terminals
  - spring clamp type terminals
- Also supports 3-wire sensors

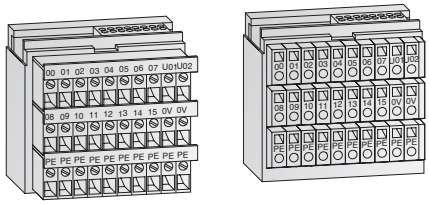
Specifications			MT-X8	MT-X16	MT-X4Y4T
Inputs			8	16	4
Simultaneously ON inputs			70 %	70 %	100 %
Outputs			—	—	4
Output type			—	—	Transistor
Common terminal arrangement			—	—	4
Isolation			Optocoupler isolation between input terminals and internal power for all modules.		
Input voltage (sensor supply)		V DC	24 (±25 %)	24 (±25 %)	24 (±25 %)
Output voltage range		V DC	—	—	24 (-1 %)
Output voltage (actuator supply)		V DC	—	—	24 (±25 %)
Max. switching voltage		V DC	—	—	—
Rated input current		A	0.7	0.7	0.7
Max. current	per output	A	—	—	0.5
	per group	A	—	—	4
Inrush current			—	—	—
Leakage current at OFF			—	—	< 50 µA
Response time	OFF ⟶ ON	ms	≤ 1	≤ 1	≤ 14
	ON ⟶ OFF	ms	≤ 1	≤ 1	≤ 0.05
Short circuit protection			Electronic	Electronic	Electronic
Status display for inputs			All modules have one or two status LEDs per input.		
Error indicator			LED	LED	LED
I/O points			8	16	8
Connection terminal			All modules can be fitted with screw type or spring clamp terminal blocks (see accessories).		
Applicable wire size		mm^2	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5
External sensor/actor supply			24 V DC (≤30 mA)	24 V DC (≤30 mA)	24 V DC (≤20 mA)
Internal power consumption (8 V DC)		mA	25	30	35
Weight (without terminal block)		kg	0.16	0.17	0.22
Dimensions (W x H x D)		mm	56 x 114 x 60	56 x 114 x 60	56 x 114 x 60
Order information		Art. no.	68893	68896	124625
Accessories*		Terminal blocks	MT-X8-TBS, art. no. 68894 MT-X8-TBC, art. no. 68895	MT-X16-TBS, art. no. 68897 MT-X16-TBC, art. no. 68898 MT-X16-PTBS, art. no. 69400 MT-X16-PTBC, art. no. 69397	MT-X4Y4T-TBS, art. no. 124626 MT-X4Y4T-TBC, art. no. 124627

* Description of the terminal blocks: TBS=screw type terminal block, TBC=spring clamp terminal block, PTBS=screw type terminals with potential terminal, PTBC=spring clamp terminals with potential terminal

■ MT Series Digital Output Modules

PLC ➠ All series





Digital output modules

The digital output modules of the MT series connect directly with field devices (e.g. contactors, valves, lights) and PROFIBUS/DP master module.

Modules with 4, 8 and 16 outputs and a wide selection of output types are available to suit all applications.

Special features:

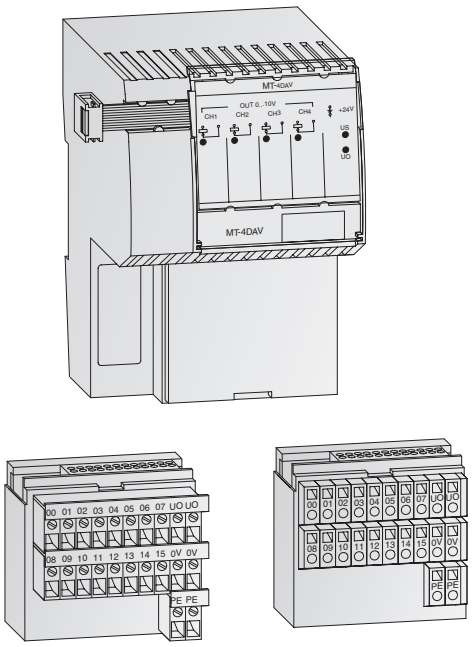
- The output modules provide transistor outputs rated at 0.5 A and 2 A, and relay outputs with up to 3 A (AC).
- The power supplying the sensors and outputs (except relay output) is directly fed into the module.
- Standard potential isolation between process and module
- Two selectable types of connecting terminals:
  - screw clamp type terminals
  - spring clamp type terminals
- Also support 3-wire devices

Specifications			MT-Y8T	MT-Y16T	MT-Y8T2	MT-Y4R	MT-Y8R5
Outputs			8	16	8	4	8
Output type			Transistor	Transistor	Transistor	Relay	Relay
Common terminal arrangement			8	8	4	1	1
Isolation			Optocoupler isolation between input and output terminals and internal power for all modules.				
Output voltage range			24 V DC (-1 %)	24 V DC (-1 %)	24 V DC (-0.5 %)	24 / 110 / 230 V DC, AC	24 / 110 / 230 V DC, AC
Output voltage (actuator supply)			24 V DC (±25 %)	24 V DC (±25 %)	24 V DC(±25 %)		
Max. switching voltage			—	—	—	250 V AC	250 V AC
Switching capacity conf. EN60947/5/1		at 24 V	—	—	—	2 A (AC15) / 1.3 A (DC 13)	5 A (AC12) / 3 A (AC15) / 1.0 A (DC 13)
		at 110 V	—	—	—	2 A (AC15) / 0.25 A (DC 13)	5 A (AC12) / 3 A (AC15) / 0.2 A (DC 13)
		at 220 V	—	—	—	2 A (AC15) / 0.1 A (DC 13)	5 A (AC12) / 3 A (AC15) / 0.1 A (DC 13)
Max. current	per output	A	0,5	0,5	2	—	—
	per group	A	4	4	10	—	—
Leakage current at OFF			<50 µA	<50 µA	<50 µA	—	—
Response time	OFF ⟶ ON	ms	≤ 0.14	≤ 0.14	≤ 0.3	10 ms	10 ms
	ON ⟶ OFF	ms	≤ 0.05	≤ 0.05	≤ 0.08	5 ms	5 ms
Short circuit protection			Electronic	Electronic	Electronic	—	—
Status display for outputs			All modules have one or two status LEDs per output.				
Error indicator			LED	LED	—	—	—
I/O points			8	16	8	8	8
Connection terminal			All modules can be fitted with screw type or spring clamp terminal blocks (see accessories).				
Applicable wire size		mm^2	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5
External sensor/actor supply			24 V DC (≤20 mA)	24 V DC (≤20 mA)	24 V DC (≤20 mA)	24 V DC (≤20 mA)	24 V DC (≤20 mA)
Internal power consumption (8 V DC)		mA	35	60	35	Max. 45	Max. 120
Weight (without terminal block)		kg	0.16	0.16	0.18	0.175	0.325
Dimensions (W x H x D)		mm	56 x 114 x 60	56 x 114 x 60	56 x 114 x 60	56 x 114 x 60	112 x 114 x 60
Order information		Art. no.	68899	68902	68905	68908	124628
Accessories*		Terminal blocks	MT-Y8T-TBS, art. no. 68900 MT-Y8T-TBC, art. no. 68901	MT-Y16T-TBS, art. no. 68903 MT-Y16T-TBC, art. no. 68904 MT-Y16T-PTBS, art. no. 69399 MT-Y16T-PTBC, art. no. 69398	MT-Y8T2-TBS, art. no. 68906 MT-Y8T2-TBC, art. no. 68907	MT-Y4R-TBS, art. no 69401 MT-Y4R-TBC, art. no. 69402	MT-Y8R5-TBSLR, art. no. 125534 MT-Y8R5-TBCLR, art. no. 125533

* Description of the terminal blocks: TBS=screw type terminal block, TBC=spring clamp terminal block, PTBS=screw type terminals with potential terminal, PTBC=spring clamp terminals with potential terminal

■ MT Series Analog Input/Output Modules

PLC ➠ All series



Analog input/output modules

Analog input modules of the MT series convert analog process data like pressure, temperature, etc. into digital values that are sent to the PROFIBUS/DP master.

The analog output modules convert the digital values sent from the PROFIBUS/DP master into an analog voltage signal. This signal can be used to control valves, inverters, servomotors, etc.

Special features:

- 4 separately parameterisable channels per module
- Voltage, current, and temperature evaluation (MT-4AD-N) can be set via parameter.
- The power supplying the sensors and outputs is directly fed into the module.
- With the analog input module current, voltage, and 4-wire PT100 inputs can be operated in parallel
- Two selectable types of connecting terminals:
  - screw clamp type terminals
  - spring clamp type terminals
- Standard potential isolation between process and module

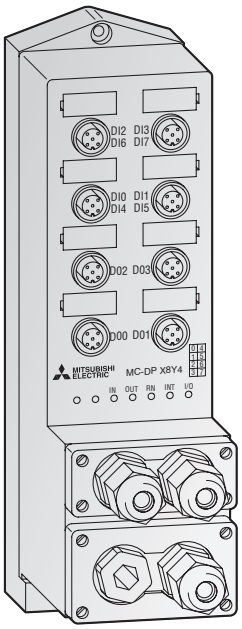
5 PROFIBUS

Specifications			MT-4AD-N		MT-4DA		MT-4DAV	
Module type			Analog input module		Analog output module		Analog output module	
No. of channels			4		4		4	
Analog input			-10 V – +10 V, -20 mA – +20 mA, 4 – 20 mA, -180 – +600 °C (PT100)		—		—	
Resolution of digital output			16 bits binary (incl. sign)		—		—	
Resolution of digital input			—		16 bits binary (incl. sign)		16 bits binary (incl. sign)	
Analog output			—		-10 – +10 V, 0 – +20 mA		0 – 10 V DC	
Input resistance	voltage	kΩ	200		—		—	
	current	Ω	50		—		—	
Max. input	voltage	V	±15		—		—	
	current	mA	±30		—		—	
Max. output load			—		≥750 Ω		≥750 Ω	
I/O characteristics			**Analog input**	**Digital output**	**Digital input**	**Analog output**	**Digital input**	**Analog output**
			-10 – +10 V -20 – +20 mA 4 – 20 mA -180 – +600 °C	-2048 – +2048 -2048 – +2048 0 – +2048 -1800 – +6000	- 2000 – +2000 0 – 2000	-10 – +10 V 0 – +20 mA	0 – 4000	0 – 10 V
Max. resolution			2.5 mV 5 µA 4 µA 0.125 °C		5 µV 10 µA		—	2.5 mV
Overall accuracy in % of the measurement range			± 50 mV (-10 – +10 V) ± 80 µA (-20 – +20 mA) ± 76 µA (4 – 20 mA) ± 4.2 °C (-180 – +600 °C)		—		—	± 30 mV (0 – +10 V)
Max. conversion time			50 ms/channel		1 ms/4 channels		1 ms/channel	
Isolation			Optocoupler isolation between input terminals and internal power					
Connection terminal			All modules can be fitted with screw type or spring clamp terminal blocks (see accessories).					
External sensor/actor supply			24 V DC (≤50 mA)		24 V DC (≤50 mA)		24 V DC (≤120 mA)	
Applicable wire size		mm^2	0.75 – 1.5		0.75 – 1.5		0.75 – 1.5	
Internal power consumption (8 V DC)		mA	80		60		60	
Weight		kg	0.225		0.225		0.22	
Dimensions (W x H x D)		mm	76 x 114 x 60		56 x 114 x 60		76 x 114 x 60	
Order information		Art. no.	133769		124643		68912	
Accessories		Terminal blocks	Screw type terminal block MT-4AD-TBS-N, art. no. 133770 Spring clamp terminal block MT-4AD-TBC-N, art. no. 133771		Screw type terminal block MT-4DA-TBS, art. no. 124645 Spring clamp terminal block MT-4DA-TBC, art. no. 124644		Screw type terminal block MT-4DAV-TBS, art. no. 68913 Spring clamp terminal block MT-4DAV-TBC, art. no. 68914	

*Description of the terminal blocks: TBS=screw type terminal block, TBC=spring clamp terminal block

■ MC Series Digital Input/Output Modules

PLC ➠ All series



Digital input, output, and combined modules acc. to IP67

The digital I/O modules of the MC series connect directly with field devices (contacts, limit switches, etc.) on the machine and PROFIBUS/DP master. The sensors and actuators are connected via plug-type/screw terminals.

Different modules with 16 inputs max. and 16 outputs max. as well as a combined I/O module with 8 inputs and 4 outputs are available.

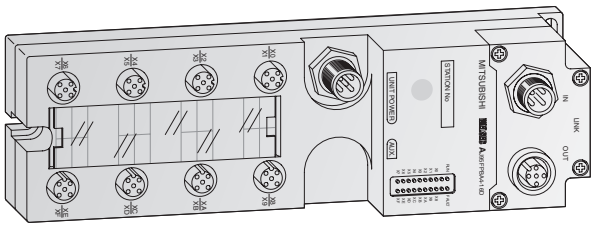
Special features:

- The power for the sensors and actuators is supplied directly on the module.
- Standard electrical isolation between process and control via optocoupler.
- Overload and short-circuit protection.
- Supports 3-wire connection

Specifications			MC-DPX8	MC-DPX16	MC-DPY8	MC-DPX8Y4	MC-DPY16
Inputs			8	16	—	8	—
Outputs			—	—	8	4	16
Output type			—	—	Transistor	Transistor	Transistor
Isolation			Optocoupler isolation between input terminals and internal power				
Input voltage (sensor supply)			24 V DC (±25 %)	24 V DC (±25 %)	24 V DC (±25 %)	24 V DC (±25 %)	
Rated output voltage			—	—	24 V DC (-1 %)	24 V DC (-1 %)	
Output voltage (actuator supply)			—	—	24 V DC (±25 %)	24 V DC (±25 %)	
Max. switching voltage		A	—	—	1.6	1.6	1.0
Max. input current		A	< 0.1	< 0.1	—	< 0.1	—
Max. current	per output	A	—	—	2	2	1
	per group	A	—	—	10 at 0–55 °C, 16 at 0–40 °C	10 at 0–55 °C, 16 at 0–40 °C	10 at 0–55 °C, 16 at 0–40 °C
Leakage current at OFF			—	—	<10 µA	<10 µA	<10 µA
Response time	OFF ⟶ ON	ms	1	1	0.5	0.5	0.5
	ON ⟶ OFF	ms	1	1	0.5	0.5	0.5
Short circuit protection			Electronic	Electronic	Electronic	Electronic	Electronic
Status display for outputs			All modules have one status LED per output.				
Error indicator			LED	LED	LED	LED	LED
I/O points			8	16	8	12	16
Sensor/actor connection			M12	M12	M12	M12	M12
Applicable wire size		mm^2	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5
External sensor/actor supply			24 V DC (≤100 mA)	24 V DC (≤100 mA)	24 V DC (≤100 mA)	24 V DC (≤100 mA)	24 V DC (≤100 mA)
Internal power consumption (8 V DC)		mA	80	80	80	80	80
Weight (without termninal block)		kg	0.47	0.47	0.47	0.47	0.47
Dimensions (W x H x D)		mm	62 x 217.5 x 70.5	62 x 217.5 x 70.5	62 x 217.5 x 70.5	62 x 217.5 x 70.5	62 x 217.5 x 70.5
Order information		Art. no.	127208	127211	127209	127210	130649
Accessories			Special connection accessories on request; M12 connection cables (refer to page 78)				

■ Waterproof Type Input, Output and Combination Modules

PLC ➠ All series



IP67 Waterproof type input, output and combination modules

The waterproof modules of the AJ95FPBA□□-□□□ series connect directly to field devices (contacts, limit switches, etc.) on the machine and PROFIBUS/DP master module. The sensors and actuators are connected via plug-type/screw terminals.

Different modules with 16 inputs max. and 16 outputs max. as well as a combined I/O module with 8 inputs and 8 outputs are available.

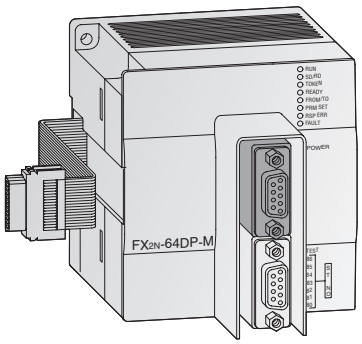
Special features:

- The driving power for the sensors and actuators is supplied directly on the module.
- Electrical isolation between process and control via optocoupler as standard.
- Overload and short-circuit protection
- IP67 protection (water proof)
- Simple connection without tools saves installation time
- Switch setting is available even after the module has been mounted.
- The built-in terminal resistor makes no need for the installation of an external terminal resistor.
- The slim design saves installation space.
- Supports 3-wire connection

Specifications			AJ95FPBA4-16DE	AJ95FPBA2-16TE	AJ95FPBA42-16DTE
Module type			Input module	Output module	Combination module
Level of protection			IP67	IP67	IP67
Inputs			16	—	8
Outputs			—	16	8
Input type			DC input	—	DC input
No. of points per module			16	—	8
Output type			—	DC output	DC output
No. of points per module			—	16	8
Insulation type			All modules feature photocoupler insulation.		
Input voltage		V DC	24	12 / 24	24
Input current		mA	7	—	7
Max. output current	per output	A	—	1	1
	per group	A	—	4	4
Minimum signal voltage	ON voltage	V	≥ 14	—	≥ 14
	OFF voltage	V	≤ 6	—	≤ 6
Response time	OFF ⟶ ON	ms	≤ 1.5	≤ 0.5	≤ 1.5 / ≤ 0.5
	ON ⟶ OFF	ms	≤ 1.5	≤ 1.5	≤ 1.5
Status display of I/Os			All modules provide LEDs for each I/O.		
Error (RUN) display of stations			LED	LED	LED
I/O points			16	16	16
Connection terminals			M12	M12	M12
Internal power consumption		mA	65	75	75
Weight (without terminal block)		kg	0.40	0.40	0.40
Dimensions (W x H x D)		mm	60 x 200 x 48	60 x 200 x 48	60 x 200 x 48
Order information		Art. no.	142200	142201	142202
Accessories			M12 connection cables (refer to page 78)		

■ MELSEC FX PROFIBUS/DP Master Module FX2N-64DP-M

PLC ➠ FX2N(C) series



FX2N-64DP-M

The Profibus/DP master module FX2N-64DP-M enables communication between PLCs of the MELSEC FX family and other Profibus devices.

The FX2N-64DP-M can control up to 60 slave units. In Extended Service mode it can process up to 244 input bytes and 244 output bytes.

Setup and parameter adjustment are performed with the user-friendly GX Configurator DP configuration software package. The FX2N-64DP-M supports Sync global control, Unsync global control, Freeze global control and Unfreeze global control.

Profibus parameters such as cycle periods and I/O data can be set and displayed directly using the programming software or the FX-20 PE hand-held programming unit.

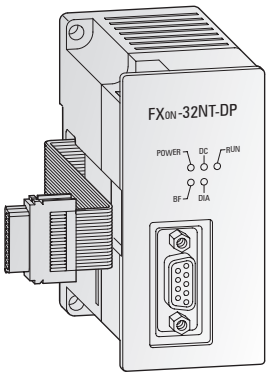
Specifications		FX2N-64DP-M
Module type		Master
General specifications		Conforms to FX1N/FX2N/FX2NC base units
Power supply		5 V DC / max. 30 mA (from base unit), 24 V DC / 250 mA
Communications protocol		EN50170, DIN19245T3
Interface		PROFIBUS/DP (with 9 pole D-SUB)
Communications speed		PROFIBUS standard (see table on page 43)
PROFIBUS specifications		PROFIBUS standard (see table on page 43)
Max. number of nodes		32, 62 (1 Repeater), 92 (2 Repeater), 126 (3 Repeater)
Communications distance	m	Max. 1,200 (depends on communication speed)
Related I/O points		8
Weight	kg	0.4
Dimensions (W x H x D)	mm	85 x 90 x 87

Order information	Art. no.	on request

Accessories	Configuration software: GX Configurator DP (Vers. 4.0), Art. no. 136578; PROFIBUS connector up to 12 Mbaud: PROFICON-PLUS, art. no. 140008 or PROFICON-PLUS-PG, art. no. 140009

■ MELSEC FX PROFIBUS/DP Slave Module FX0N-32NT-DP

PLC ➠ FX1N/FX2N(C) series



FX0N-32NT-DP

The FX0N-32NT-DP PROFIBUS/DP module enables you to integrate a MELSEC FX1N/FX2N(C) system in an existing PROFIBUS/DP network.

This interface module provides your FX1N, FX2N or FX2NC CPU with an intelligent PROFIBUS/DP link for the implementation of decentralised control tasks.

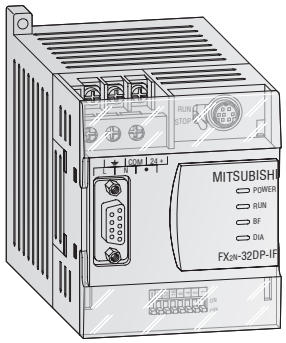
It links the system to the master PLC in the PROFIBUS/DP network for efficient and trouble-free data exchange.

Specifications			FX0N-32NT-DP
General specifications			Conforms to FX1N/FX2N(C) base units
Power supply			5 V DC / max. 170 mA (from base unit), 24 V DC / 60 mA
Interface			PROFIBUS/DP (with 9 pole D-SUB connector)
Communication speed	distance		
	1,200 m	kbit/s	9.6 / 19.2 / 93.75
	1,000 m	kbit/s	187.5
	200 m	kbit/s	1500
	100 m	kbit/s	3,000 / 6,000 / 12,000
Communication distance		m	Max. 1,200 (depends on communication speed)
Communication cable			PROFIBUS cable with 9-pin D-SUB connector
Related I/O points			8
Weight		kg	0.3
Dimensions (W x H x D)		mm	43 x 90 x 87

Order information	Art. no.	62125

■ MELSEC FX PROFIBUS/DP Decentralised I/O Stations

PLC ➠ FX1N/FX2N(C) series



FX2N-32DP-IF / FX2N-32DP-IF-D

The remote I/O station FX2N-32DP-IF(-D) forms an extremely compact communication unit and provides a connection of I/O modules with up to 256 I/O points or up to 8 special function modules as an alternative.

It features an entire electrical isolation of the PROFIBUS/DP connector and of the sensor/actuator circuits.

The module FX2N-32DP-IF includes a 230 V AC power supply unit and a 24 V DC service voltage terminal e.g. for analog modules. The FX2N-32DP-IF-D includes a 24 V DC power supply unit.

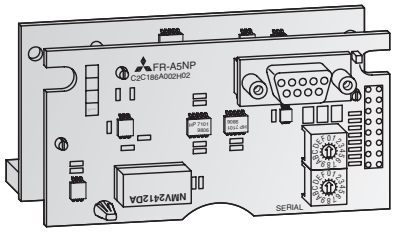
Profibus data such as the cycle time or I/O data can be monitored by using the programming software or directly on the hand-held programming unit FX-20PE. This allows easy error diagnosis directly on the module.

For detailled information on compatible I/O modules please refer to the Technical Catalogue FX series.

Specifications			FX2N-32DP-IF	FX2N-32DP-IF-D
General specifications			Conforms to FX1N/FX2N(C) base units	
Power supply			100–240 V AC (±10 %) 50/60 Hz	24 V DC (+20 % -30 %)
Power consumption			35 VA	14 W
Internal current supply			5 V DC / max. 200 mA (from base unit), 24 V DC / 500 mA	5 V DC / max. 220 mA, 24 V DC / max. 190 mA
Interface (connectors)			9-pin D-SUB for PROFIBUS/DP, 8-pin Mini-DIN for PC or programming unit FX-20PE	
Communication speed	distance			
	1,200 m	kBit/s	9.6 / 19.2 / 45.45 / 93.75	9.6 / 19.2 / 45.45 / 93.75
	1,000 m	kBit/s	187.5	187.5
	400 m	kBit/s	500	500
	200 m	kBit/s	1,500	1,500
	100 m	kBit/s	3,000 / 6,000 / 12,000	3,000 / 6,000 / 12,000
Communication distance		m	Max. 1,200 (depends on communication speed)	
Communication cable			PROFIBUS cable with 9-pin D-SUB connector	
Max. number of controllable I/O points			Max. 256	Max. 256
Weight		kg	0.4	0.4
Dimensions (W x H x D)		mm	75 x 98 x 87	75 x 98 x 87
Order information		Art. no.	103705	142763

■ Communications Boards for Inverters

INV ➠ FR-A 500/FR-E 500 series



FR-A5NP, FR-E5NP

These inverter options allow Mitsubishi Electric frequency inverters to be connected to a PROFIBUS/DP network. This enables remote control of the frequency inverters via PROFIBUS.

The option boards are mounted directly in the inverter front face.

The FR-A5NP is used for the FR-A 500 type and the FR-E5NP is used for the FR-E 500 type.

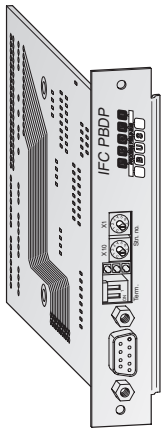
Special features:

- Data rates up to 12 Mbit/s
- Up to 126 stations are supported in a single network
- Network access to all inverter parameters is possible.
- LED status light for status information on the communication link

Specifications			FR-A5NP	FR-E5NP
Applicable inverters			FR-A 540 (L) EC, FR-A 520	FR-E 500 EC
General specifications			Conforms to Mitsubishi frequency inverters	
Power supply			5 V DC / max. 300 mA (from inverter), 24 V DC / 130 mA	
Backplane isolation		V DC	Min. 500	
Interface			PROFIBUS/DP	
Communication speed	distance			
	1200 m	kbit/s	9.6 / 19.2 / 93.75	
	1000 m	kbit/s	187.5	
	200 m	kbit/s	1500	
	100 m	kbit/s	3000 / 6000 / 12000	
Communication distance		m	Max. 1200 (depends on communication speed)	
Communication cable			PROFIBUS cable with 9-pin D-SUB plug	
Related I/O points			8	
Dimensions (W x H x D)		mm	96 x 49 x 33	
Order information		Art. no.	132707	104556

■ HMI Communications Adapter

HMI ➠ MAC E series



MAC-IFC-PBDP/E

The PROFIBUS/DP interface board supports the connection of the MAC E series HMIs to a PROFIBUS/DP network.

The board is easily inserted into the according slot of the control unit.

Specifications		MAC-IFC-PBDP/E
Application for		MAC E300/E600/E610/E615/E700/E710/E900T/E900VT/E910T
Type		Plug-in board
Use		PROFIBUS/DP slave
Order information	Art. no.	56166

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