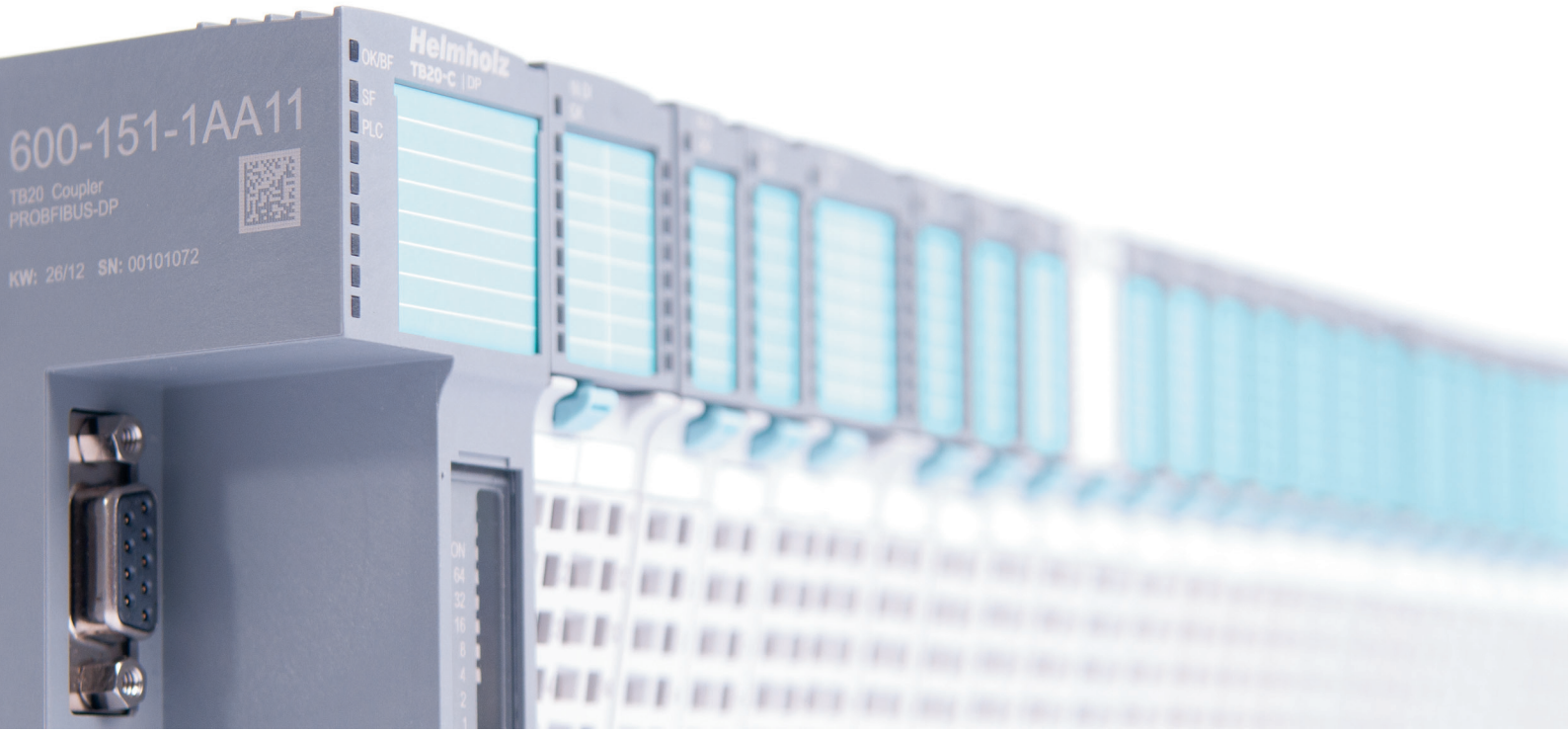
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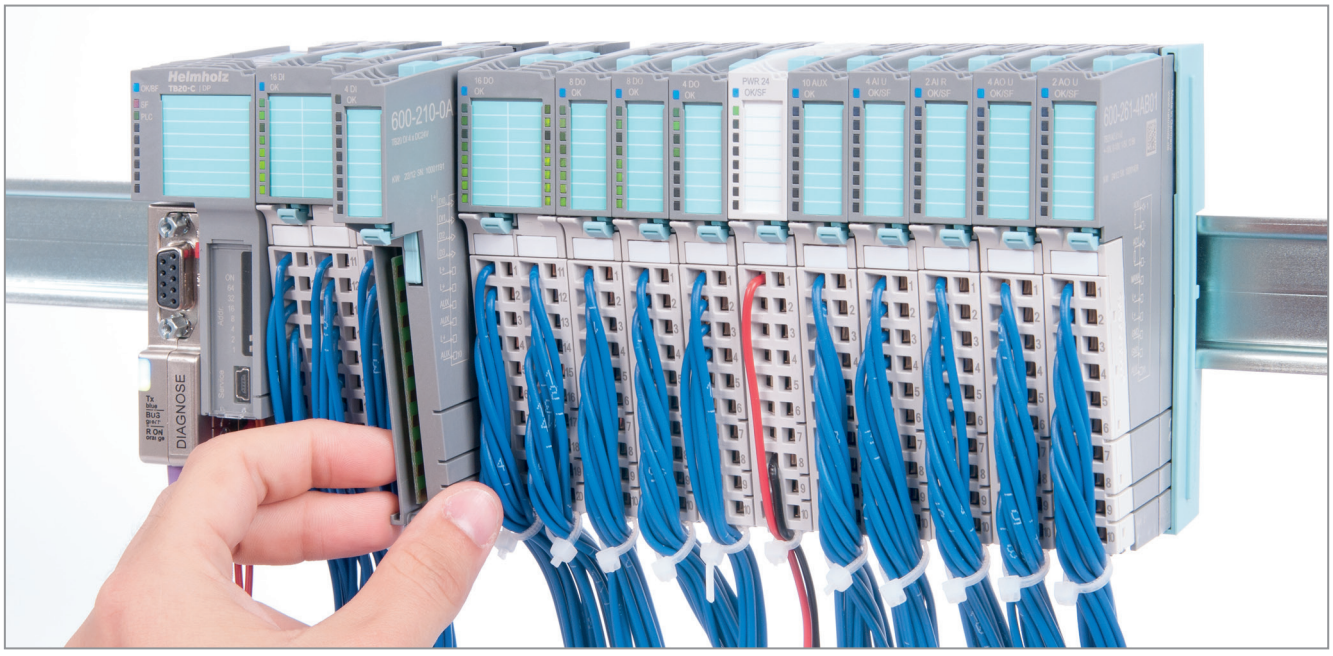


Three-component modular design

TB20 I/O modules have three components: a separate front connector, an electronic module, and a base module. A locking mechanism ensures that all modules can be quickly mounted and securely attached on DIN rails while guaranteeing a reliable electrical connection. Likewise, all modules can be easily and quickly removed for maintenance and/or system expansions. Modules are delivered as complete assembled units and can be installed immediately.

Bus coupler

All bus couplers feature an integrated power module. However, power modules are also available separately for users interested in segmenting the power supply for the I/O modules in their system. Bus couplers for PROFIBUS, CAN, and PROFINET are currently available. As an open-ended fieldbus system we will continue to gradually expand our range of bus couplers.



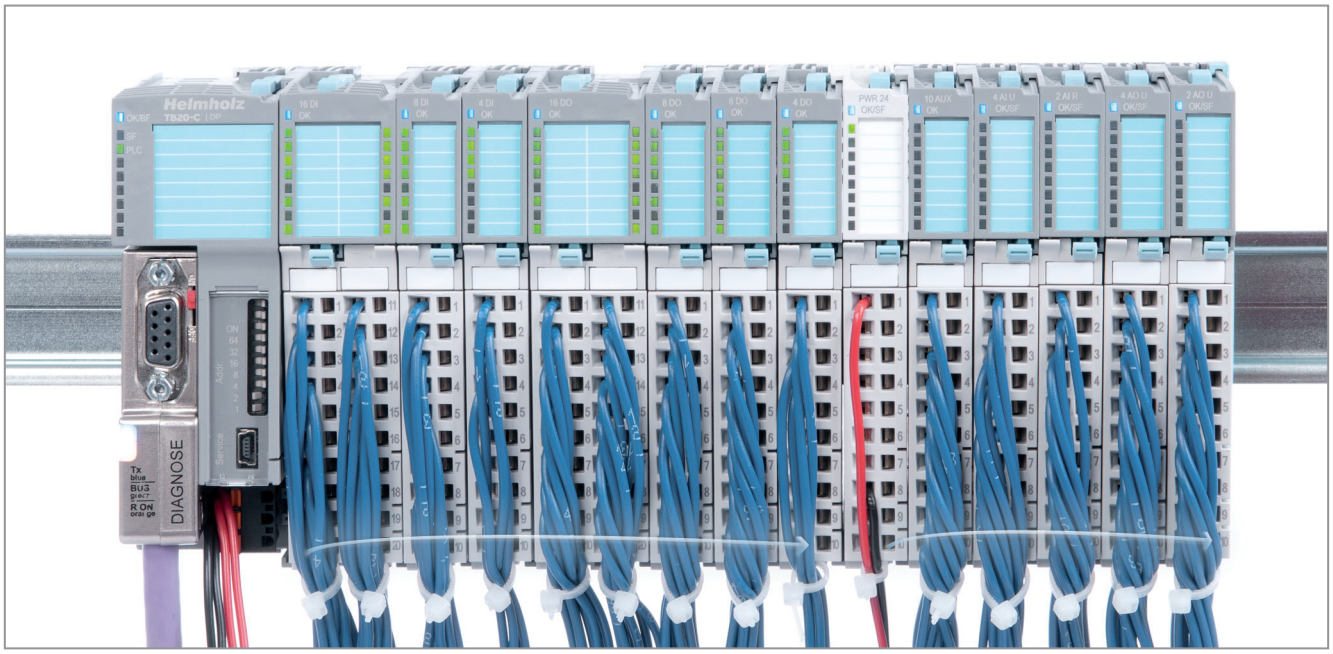
Hot-pluggable

Individual modules can be easily and quickly replaced while the remaining system continues to run. This electronic module hot-swap functionality helps keep downtimes to a minimum.



Module granularity

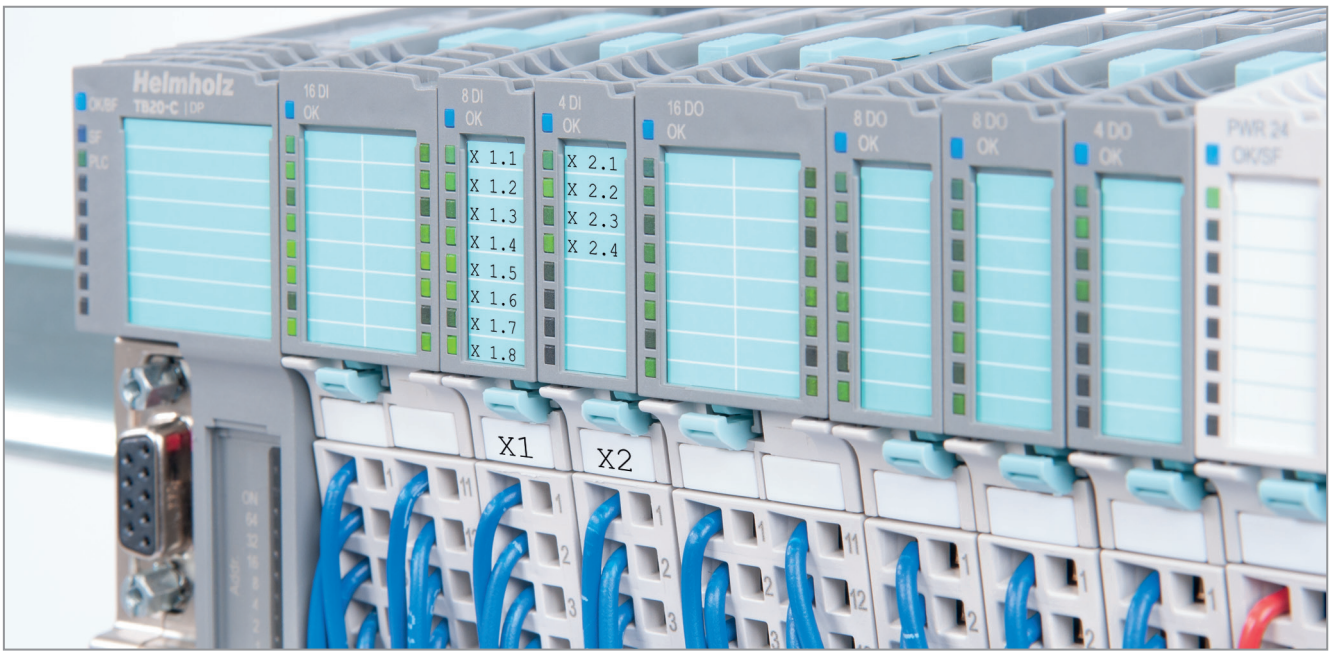
The TB20 system has modules with two, four, eight, and 16 channels available so as to ensure that users will be able to design systems with utmost flexibility and maximum effectiveness. Digital mixed I/O modules complete the range of products. Moreover, 16-channel modules make it possible to implement up to 1,024 inputs/outputs.



Freely definable auxiliary terminal

This additional terminal can be used flexibly and from end to end, e.g., in order to provide an additional voltage as a reference ground or implement shielding as necessary. This flexibility makes wiring faster and frees up additional distributor terminals.

Clear, Unique Labels; Electronic Nameplates; Ideal Handling

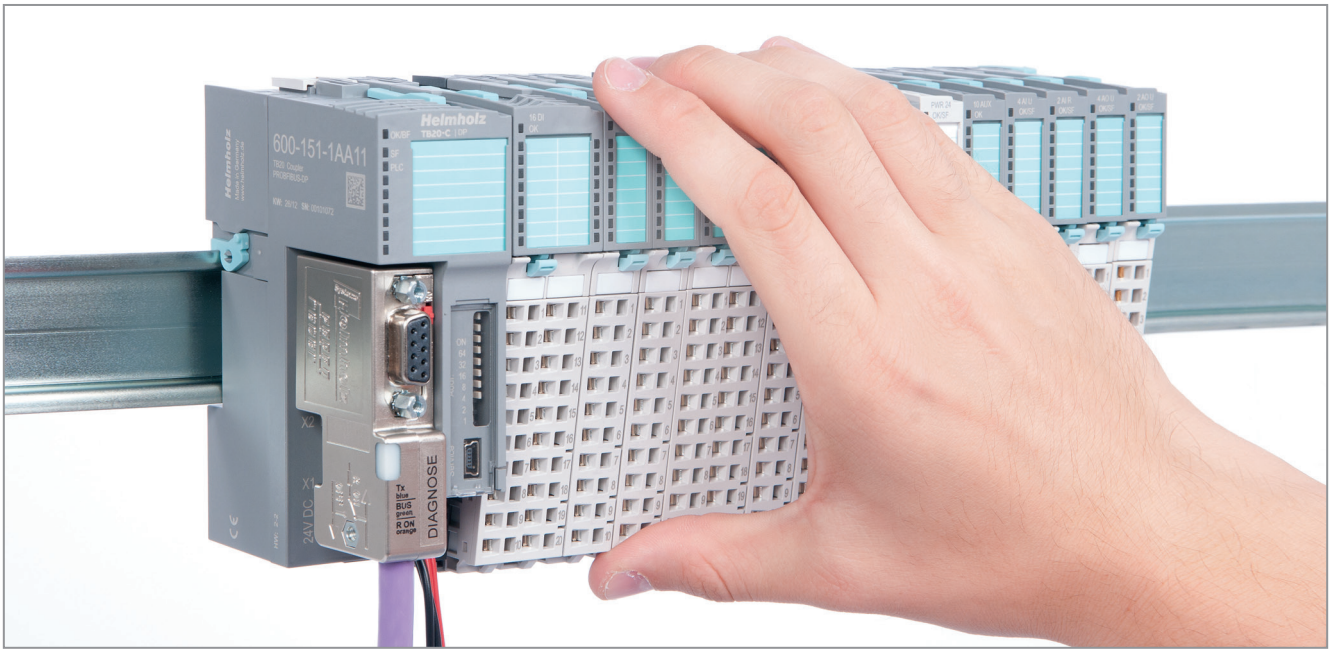


Clear, unique labels

The system's design ensures that each channel will be labeled clearly and uniquely. Labels can be easily read during operation, making it possible to directly determine which terminals correspond to which LED indicators. Connector terminal assignment labels are placed on the electronic module. The label strips can be used with laser printers. In addition to the I/O modules, the front connector can be labeled as well.

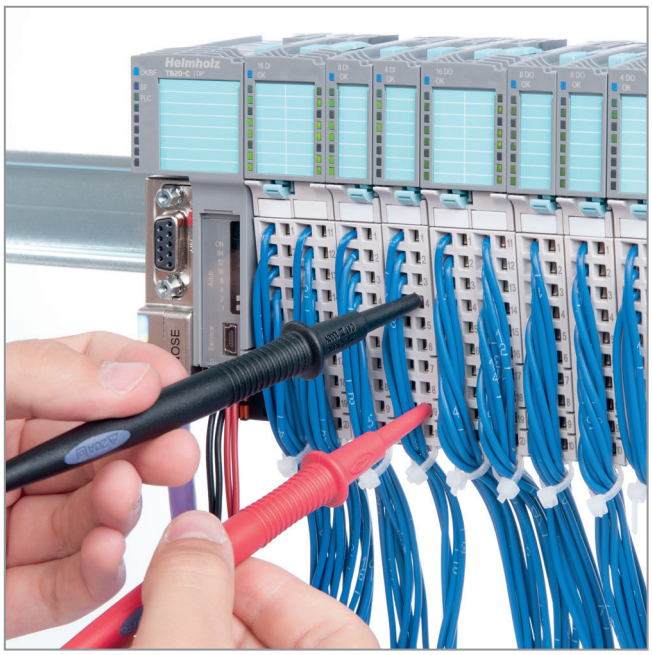
Electronic nameplate

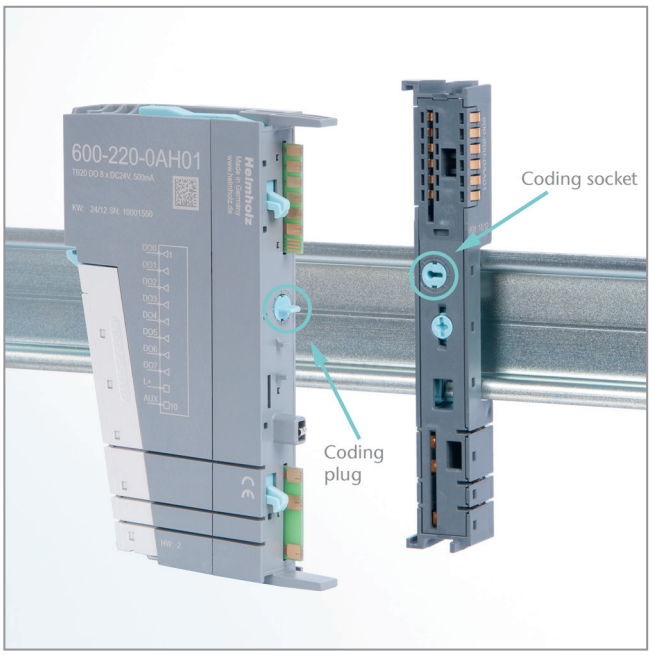
All of a TB20 module's important information can be found on its electronic nameplate. For example the corresponding module ID, module model, order number, unique serial number, hardware version, firmware version, and internal range of functionalities. This information can be read in a number of ways, one of which is using the "TB20 ToolBox" configuration and diagnosis program. The modules' electronic nameplates not only make it possible to prevent configuration errors (setup), but also make maintenance (servicing) easier.



Ideal handling, achieved with a compact design

The system's ergonomic design makes it easy to handle. Moreover, the space-saving compact dimensions behind it do not take away from the system components' heavy-duty sturdiness and reliable electrical contacts for industrial applications, which are complemented by an IP20 protection rating.



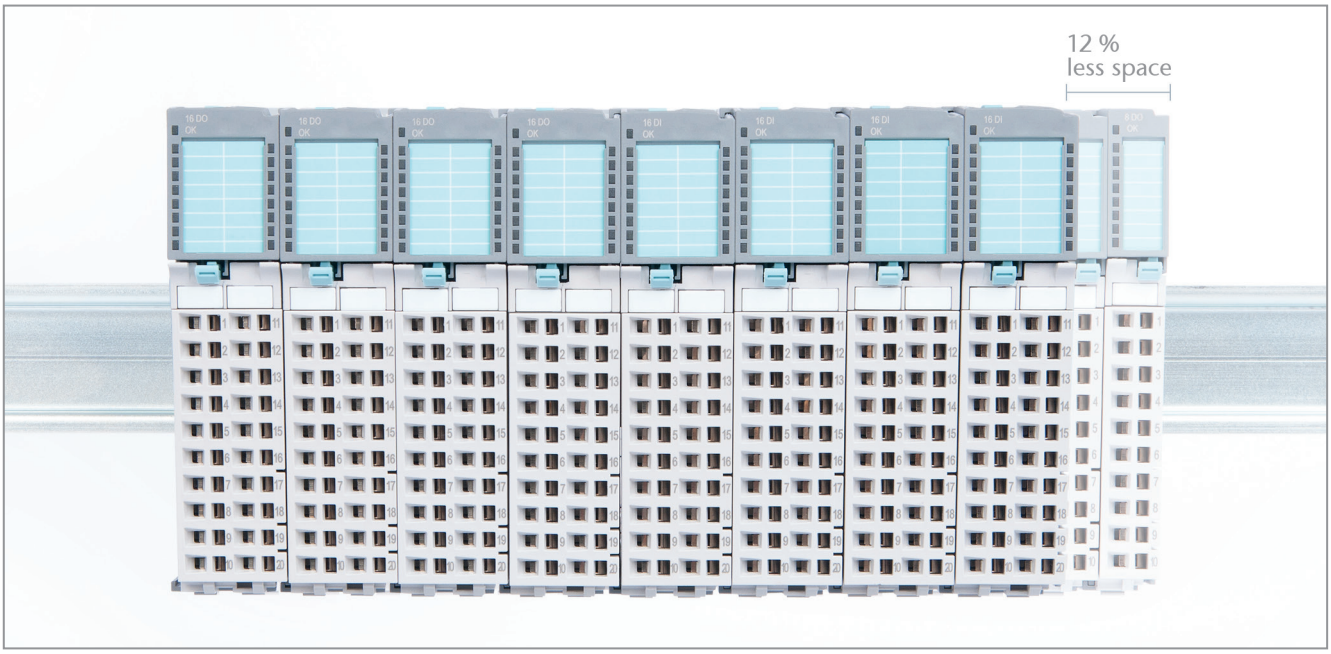


Front connector wiring

The system's front connectors feature spring-type terminals throughout, and can be either snapped into place or wired without an electronic module.
Each terminal is able to accommodate wires with a cross-sectional area of up to 1.5 mm² and is designed to work with test probes.

Coded system

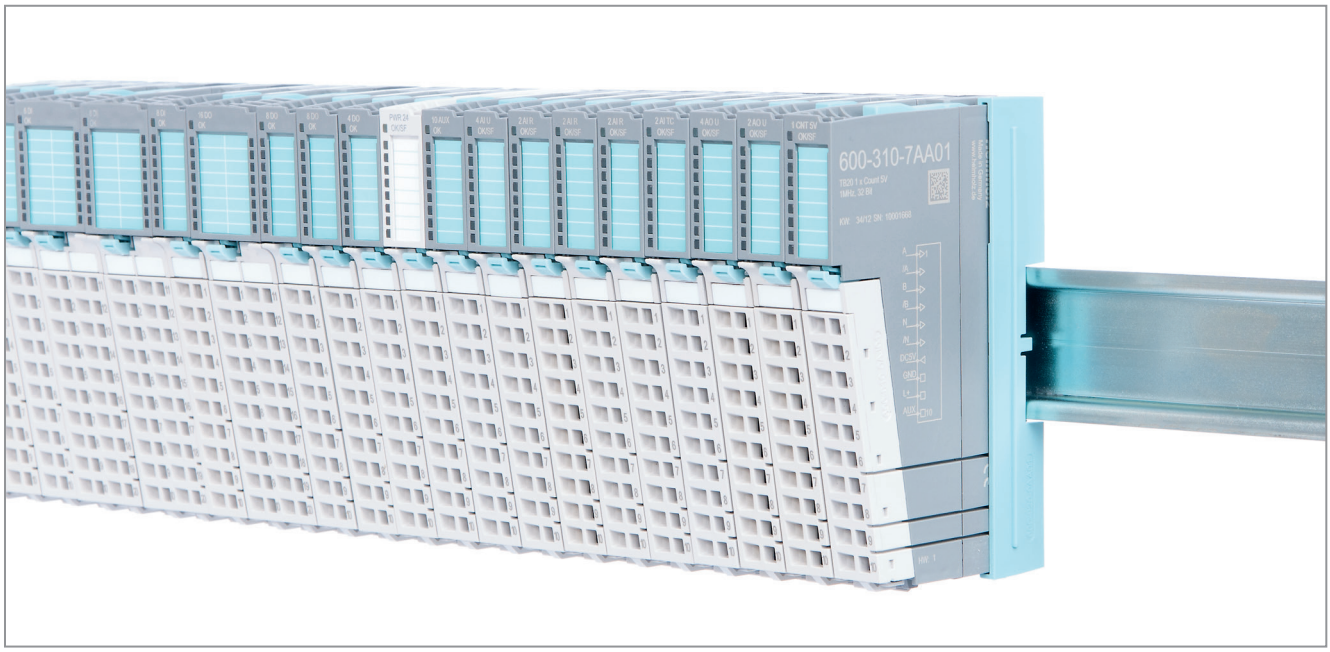
The integrated rotary coding system prevents users from plugging in this slot incorrect modules, ensuring that modules can be replaced in a foolproof manner.
This not only helps prevent damage to the system, but also system malfunctions.



Total solution concept

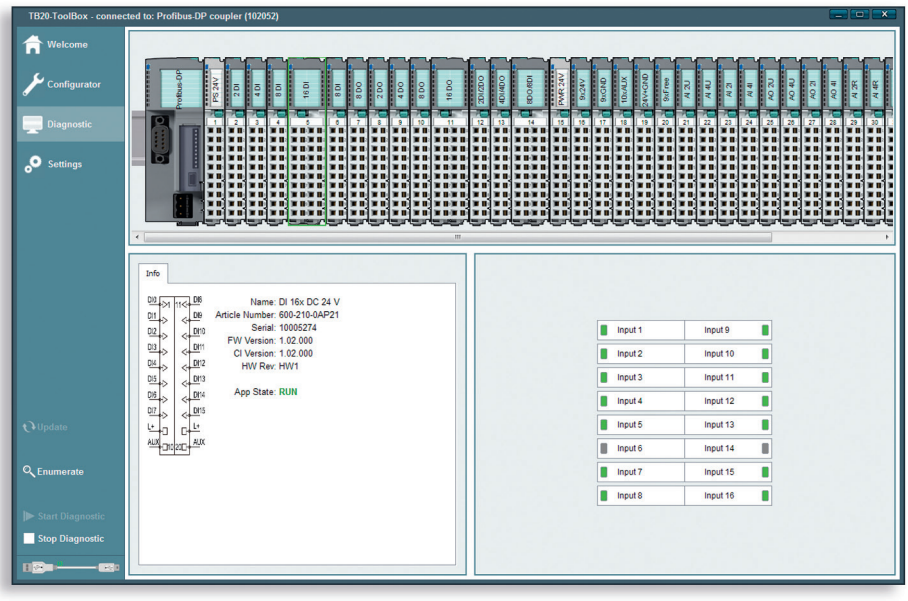
An ideal variety of modules guarantees that products can be easily selected and conveniently ordered. No additional accessories or add-on parts are required for any unit. Furthermore, each individual I/O module is characterized by unparalleled quality and a large number of functionalities that come as standard.

An ideal system design width can be achieved by modules with up to 16 channels and digital mixed I/O modules.



Final bus cover

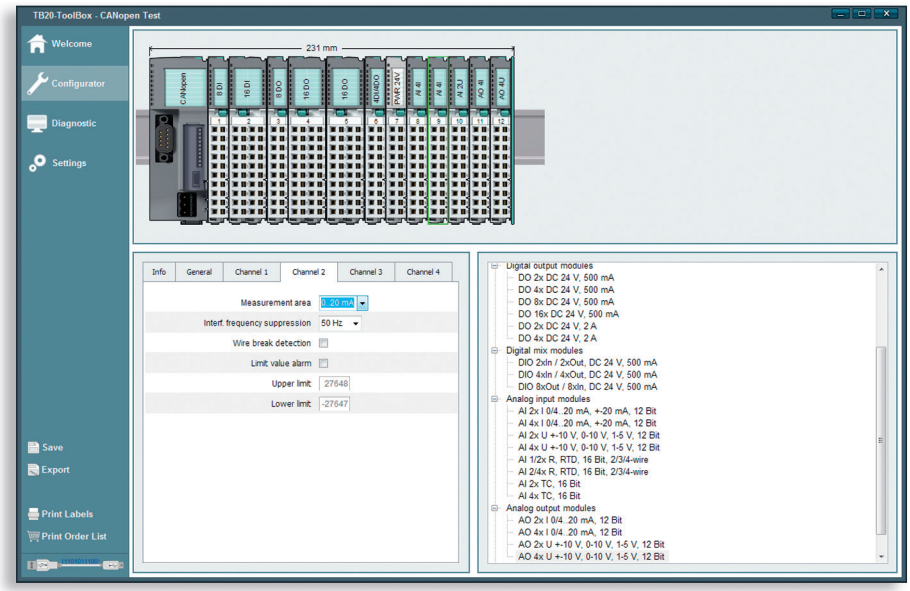
The final bus cover protects the contacts on the last module. It is a passive element, i.e., TB20 I/O systems can work without one if necessary.



Our service: real-time diagnosis

TB20 ToolBox is a practical setup and servicing tool used to import configurations, display a system's current status, and analyze parameter configuration and setup errors. An I/O map, the current parameter configuration, and diagnostic messages can all be displayed in real-time.

In addition, the tool shows the electronic nameplate for each module, ensuring that all of them can be reliably identified and serviced. Finally, the option of setting up TB20 I/O systems without a higher-level controller by directly reading and writing to inputs and outputs makes it easier to check the system's wiring and entire design (currently in development).



Smart design and configuration

TB20 ToolBox makes it easy to methodically design TB20 systems. From selecting and positioning components, through configuring their parameters, to printing label strips, every single step is combined into one single intuitive software package. Integrated terminal mapping, system design width calculations, and current-carrying capacity monitoring all make it possible to quickly design a system without making any mistakes.

In addition, TB20 ToolBox can be used to configure all the parameters in a TB20 system and store them in the coupler's non-volatile memory when working with bus systems that require the coupler to be configured directly. The software's configuration and diagnostic functionalities work hand in hand during the entire process, and are further complemented by a function that makes it possible to export description and configuration files for higher-level systems (EDS, DCF, etc.).

General Technical Data

This page contains the general technical data for all modules. Module-specific specifications can be found on the relevant product pages.

In order to obtain ordering information for all our TB20 manuals, please refer to page 79. All manuals are available in German and English and can also be downloaded on the Internet at www.helmholz.com.

General technical data	
Certifications	CE, UL pending
Noise immunity	DIN EN 61000-6-2 “EMC Immunity”
Interference emission	DIN EN 61000-6-4 “EMC Emission”
Vibration and shock resistance	DIN EN 60068-2-8:2008 “Vibration” DIN EN 60068-27:2010 “Shock”
Isolation voltage	1.5 kV
Protection rating	IP 20
Relative humidity	95 % without condensation
Installation position	Any
Permissible ambient temperature	0 °C to 60 °C
Transport and storage temperature	-20 °C to 80 °C



Bus Couplers

PROFIBUS-DP
CANopen®
PROFINET



PROFIBUS-DP

The PROFIBUS-DP bus coupler is designed to connect a PROFIBUS fieldbus to TB20 peripheral modules. It supports protocols DP-V0 and DP-V1.
A functioning TB20 configuration will always require a bus coupler and at least one peripheral module, but can accommodate up to 64 modules of any kind connected in series with the bus coupler. The PROFIBUS-DP bus coupler supports hot-swapping for replacing modules during operation.
The bus coupler will recognize all connected peripheral modules and assign each module the corresponding inputs/outputs from the process image table.

General characteristics

- PROFIBUS DP slave as per EN 50170/IEC 61158
- Supports all PROFIBUS baud rates
- DP-V0 and DP-V1 support
- A maximum of 64 modules
- Supports hot-plug
- Up to 244 bytes of input data and 244 bytes of output data
- One class 1 master connection with 240 bytes of payload data
- Up to three class 2 master connections with 240 bytes of payload data (as a DP-V1 slave)
- 24 VDC power supply
- I&M data
- Integrated power supply unit for powering peripheral modules (2.5 A)
- Supplies the I/O voltage (24 VDC)
- DIP switch for configuring the PROFIBUS address; can be covered
- 3 LEDs, one of them bi-color
- USB device port for online diagnosis with TB20 ToolBox

Parameters

- Diagnostic alarm: ON | OFF
- Process alarm: ON | OFF
- Pull/plug alarm: ON | OFF
- Startup when expected/actual configuration differ: ON | OFF (hot plugging allowed: Yes | No)
- Identifier-related diagnostics: ON | OFF
- Submodule status: ON | OFF
- Channel-related diagnostics: ON | OFF

Technical data/Ordering data	
TB20-C, Bus Coupler PROFIBUS-DP Slave	**600-151-1AA11**
PROFIBUS interface	
· Protocol	PROFIBUS DP/V0 & DP/V1 as per EN 50170
· Baud rate	9.6 kbaud to 12 Mbaud, automatic detection
· I/O image table size	244 input bytes/244 output bytes
· Parameter configuration length	244 bytes
· Interface	RS-485
· Connector	9-pin D-sub female connector
USB port	
· Protocol	Full-speed USB 2.0 Device
· Connector	Mini-USB
· Electrical isolation	Yes
· Isolation voltage	1.5 kV
Power supply	24 VDC, 18–28 VDC
Current draw without modules (internal)	75 mA
Power dissipation	Max. 8 W
Power supply for modules	5 VDC; max 2.5 A
Dimensions (H x W x D)	110 mm x 35 mm x 73 mm
Weight	115 g
Certifications	CE, UL pending
Noise immunity	DIN EN 61000-6-2 “EMC Immunity”
Interference emission	DIN EN 61000-6-4 “EMC Emission”
Vibration and shock resistance	DIN EN 60068-2-8:2008 “Vibration” DIN EN 60068-27:2010 “Shock”
Protection rating	IP 20
Relative humidity	95 % without condensation
Installation position	Any
Permissible ambient temperature	0 °Cto 60 °C
Transport and storage temperature	-20 °C to 80 °C



CANopen®

The CANopen® bus coupler is designed to connect a CAN bus to TB20 peripheral modules. It supports the CANopen® protocol as per DS 301 and uses the DSP-401 profile for digital and analog I/O modules.
A functioning TB20 configuration will always require a bus coupler and at least one peripheral module, but can accommodate up to 64 modules of any kind connected in series with the bus coupler. The CANopen® bus coupler supports hot-swapping for replacing modules during operation.
This coupler makes it possible to use SDOs to freely access all I/O values, parameters, and diagnostics, and can manage up to 256 bytes of I/O data with the PDO protocol.

General characteristics

- CANopen® protocol as per DS301 and DSP401
- Bit rates of 20 kbps to 1 Mbps
- 16 TPDOs/16 RPDOs
- One SDO server
- Heartbeat producer
- Two heartbeat consumers
- Node guarding
- SYNC object
- Storable parameter configuration
- A maximum of 64 modules
- Supports hot-plug
- 24 VDC power supply
- Integrated power supply unit for powering TB20 peripheral modules (2.5 A)
- Supplies the I/O voltage (24 VDC)
- DIP switches for configuring the node ID and bit rate; can be covered
- 5 LEDs, one of them bi-color
- USB device port for online diagnosis with TB20 ToolBox

Technical data/Ordering data	
TB20-C, Bus Coupler CANopen® Slave	**600-160-1AA11**
CAN interface	
· Protocol	CANopen® as per DS301 V4.2 and DSP401 V3.0.0
· Bit rate	20, 50, 125, 250, 500, 800, 1000 kbps
· TPDOs	16
· RPDOS	16
· Interface	ISO 11898-2
· Connector	9-pin D-sub male connector
USB port	
· Protocol	Full-speed USB 2.0 Device
· Connector	Mini-USB
· Electrical isolation	Yes
· Isolation voltage	1.5 kV
Power supply	24 VDC, 18–28 VDC
Current draw without modules (internal)	75 mA
Power dissipation	Max. 8 W
Power supply for modules	5 VDC; max 2.5 A
Dimensions (H x W x D)	110 mm x 35 mm x 73 mm
Weight	115 g
Certifications	CE, UL pending
Noise immunity	DIN EN 61000-6-2 “EMC Immunity”
Interference emission	DIN EN 61000-6-4 “EMC Emission”
Vibration and shock resistance	DIN EN 60068-2-8:2008 “Vibration” DIN EN 60068-27:2010 “Shock”
Protection rating	IP 20
Relative humidity	95 % without condensation
Installation position	Any
Permissible ambient temperature	0 °C to 60 °C
Transport and storage temperature	-20 °Cto 80 °C



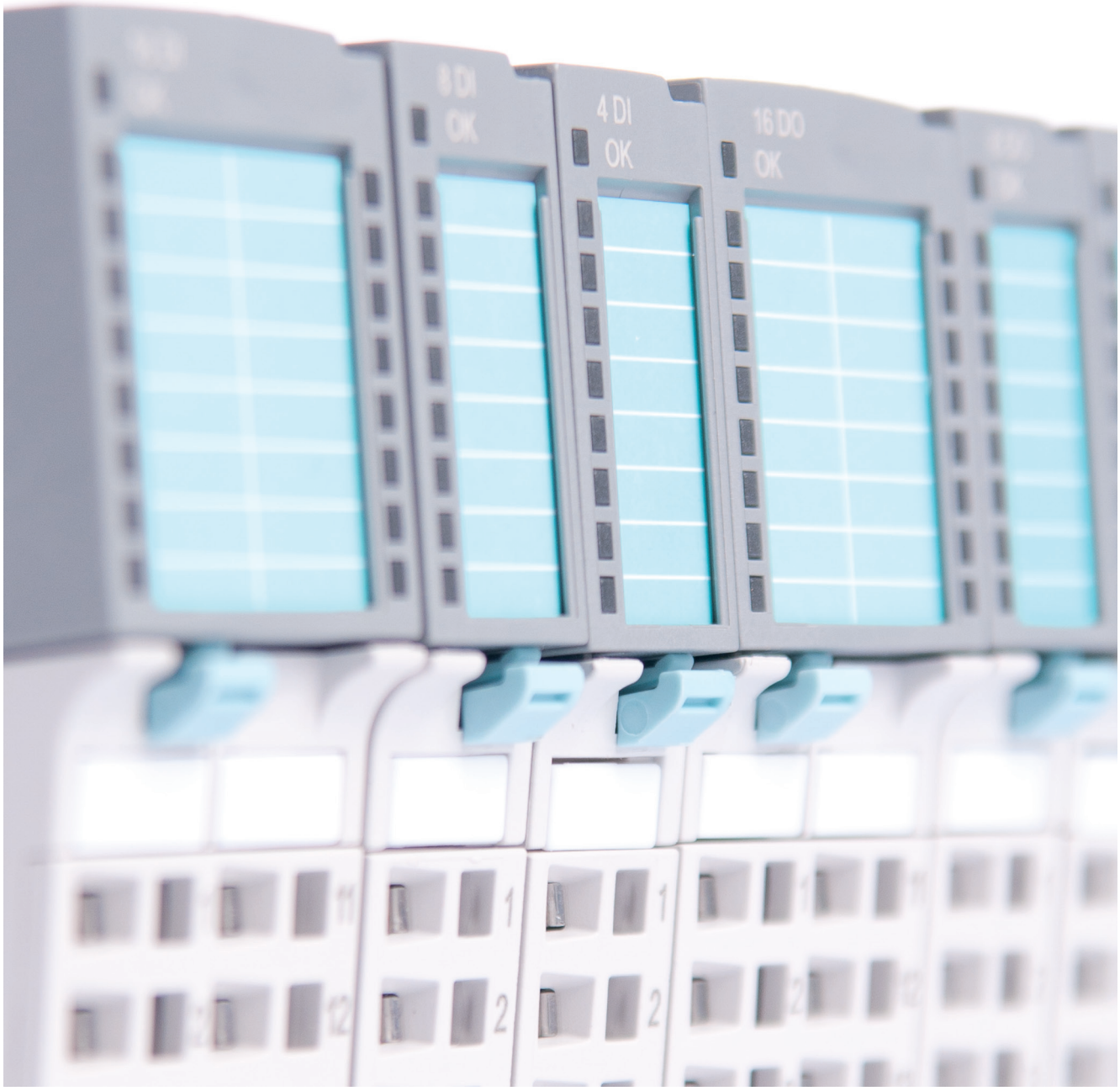
PROFINET IO

The PROFINET bus coupler is designed to connect a PROFINET bus to TB20 peripheral modules.
A functioning TB20 configuration will always require a bus coupler and at least one peripheral module, but can accommodate up to 64 modules of any kind connected in series with the bus coupler. The PROFINET IO bus coupler supports hot-swapping for replacing modules during operation.
In addition, the bus coupler will recognize all connected peripheral modules and assign each module the corresponding inputs/outputs from the process image table.

General characteristics

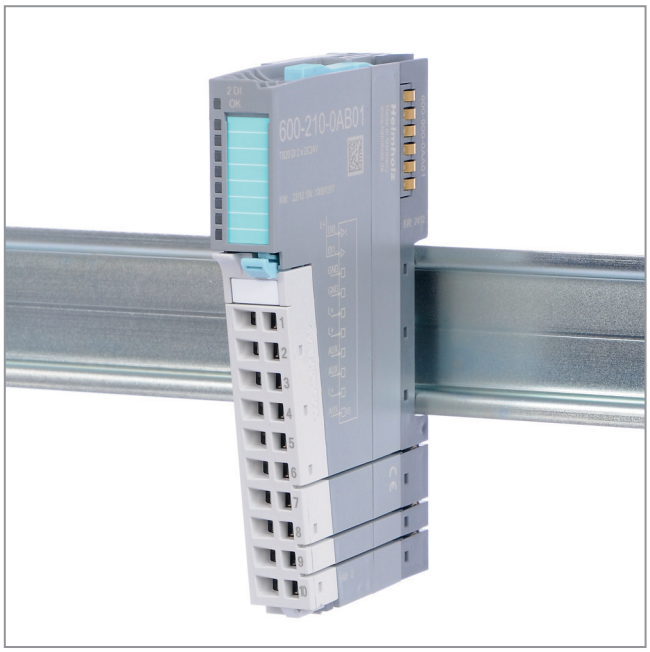
- IO device as per PROFINET IO (IEC 61158-6-10)
- Integrated 2-port switch
- Full-duplex 100 Mbps transmission rate
- Diagnostic alarms, process alarms, pull/plug alarms
- 512 bytes of input data; 512 bytes of output data
- Startup when expected/actual configuration differ
- I&M data
- A maximum of 64 peripheral modules
- Supports hot-plug
- 24 VDC power supply
- Integrated power supply unit for powering TB20 peripheral modules (2.5 A)
- Supplies the I/O voltage (24 VDC)
- 5 LEDs, three of them bi-color
- USB device port for online diagnosis with TB20 ToolBox

Technical data/Ordering data	
TB20-C, Bus Coupler PROFINET IO	**600-180-1AA11**
PROFINET interfaces	
· Protocol	PROFINET IO
· Physical layer	Ethernet
· Transmission rate	Full-duplex 100 Mbps
· I/O image table size	512 bytes/512 bytes
· Connector	Two RJ-45 ports with switch
USB port	
· Protocol	Full-speed USB 2.0 Device
· Connector	Mini-USB
· Electrical isolation	Yes
· Isolation voltage	1.5 kV
Power supply	24 VDC, 18–28 VDC
Current draw without modules (internal)	150 mA
Power dissipation	Max. 8 W
Power supply for modules	5 VDC; max 2.5 A
Dimensions (H x W x D)	110 mm x 35 mm x 73 mm
Weight	115 g
Certifications	CE, UL pending
Noise immunity	DIN EN 61000-6-2 “EMC Immunity”
Interference emission	DIN EN 61000-6-4 “EMC Emission”
Vibration and shock resistance	DIN EN 60068-2-8:2008 “Vibration” DIN EN 60068-27:2010 “Shock”
Protection rating	IP 20
Relative humidity	95 % without condensation
Installation position	Any
Permissible ambient temperature	0 °C to 60 °C
Transport and storage temperature	-20 °C to 80 °C



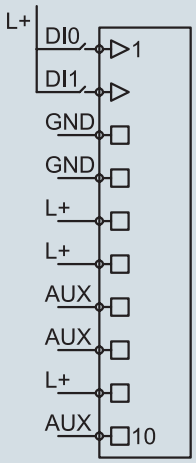
Digital Input/Output Modules

Digital In
Digital Out
Digital Mix



DI 2 x 24 VDC

Terminal Assignment	
Terminal	**Assignment**
1	Input 0
2	Input 1
3	GND
4	GND
5	L+, 24 VDC
6	L+, 24 VDC
7	AUX
8	AUX
9	L+, 24 VDC
10	AUX

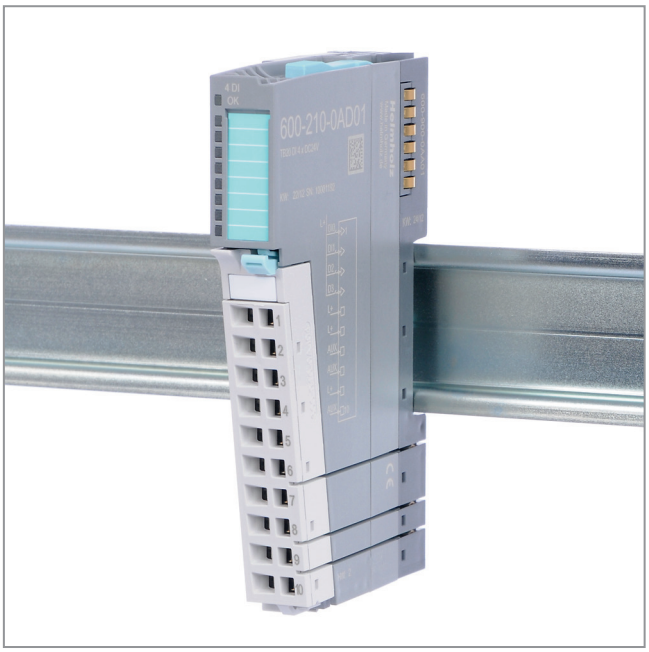


General characteristics

- 2 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate two-wire proximity sensors
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' states

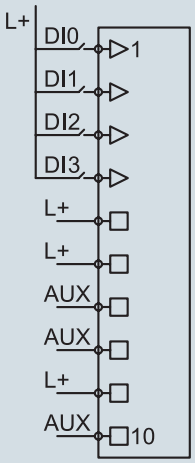
Technical data/Ordering data	
Digital Input Module – DI 2x 24 VDC	**600-210-0AB01**
Number of inputs	2
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 0 mA Max. 22 mA
Power dissipation	Max. 0.5 W
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

DI 4 x 24 VDC



DI 4 x 24 VDC

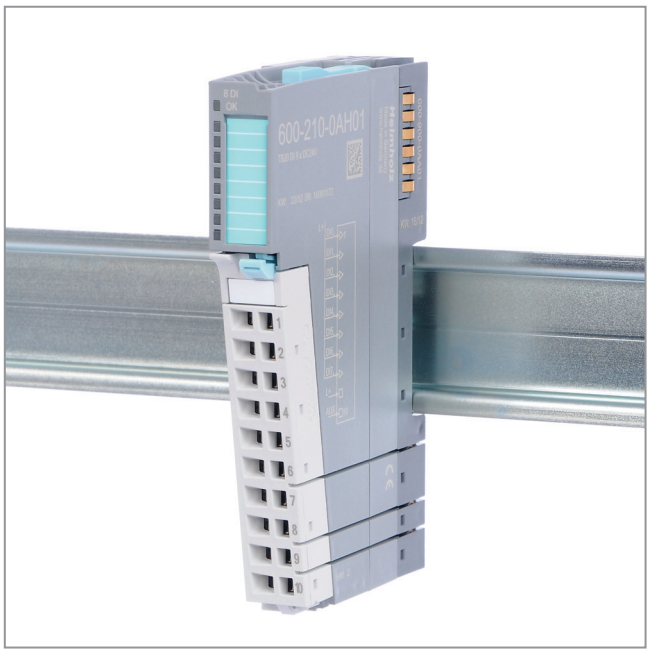
Terminal Assignment	
Terminal	**Assignment**
1	Input 0
2	Input 1
3	Input 2
4	Input 3
5	L+, 24 VDC
6	L+, 24 VDC
7	AUX
8	AUX
9	L+, 24 VDC
10	AUX



General characteristics

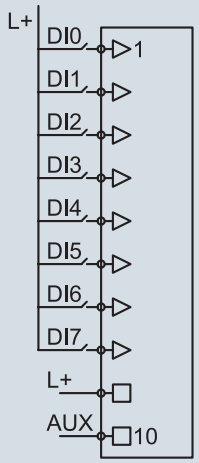
- 4 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate two-wire proximity sensors
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' states

Technical data/Ordering data	
Digital Input Module – DI 4 x 24 VDC	**600-210-0AD01**
Number of inputs	4
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 0 mA Max. 22 mA
Power dissipation	Max. 0.95 W
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



DI 8 x 24 VDC

Terminal Assignment	
Terminal	**Assignment**
1	Input 0
2	Input 1
3	Input 2
4	Input 3
5	Input 4
6	Input 5
7	Input 6
8	Input 7
9	L+, 24 VDC
10	AUX



General characteristics

· 8 inputs (electrically isolated from the backplane bus)
· 24 VDC input voltage
· Can accommodate two-wire proximity sensors
· A blue LED indicates the module's operating status
· Green LEDs (one for each input) indicate the inputs' states

Technical data/Ordering data	
Digital Input Module – DI 8 x 24 VDC	**600-210-0AH01**
Number of inputs	8
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 0 mA Max. 22 mA
Power dissipation	Max. 1.85 W
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

DI 16 x 24 VDC

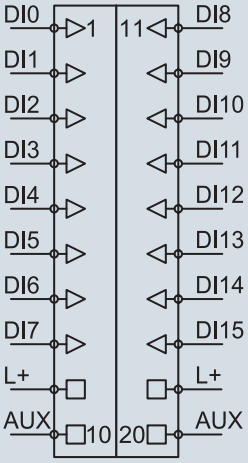


DI 16 x 24 VDC

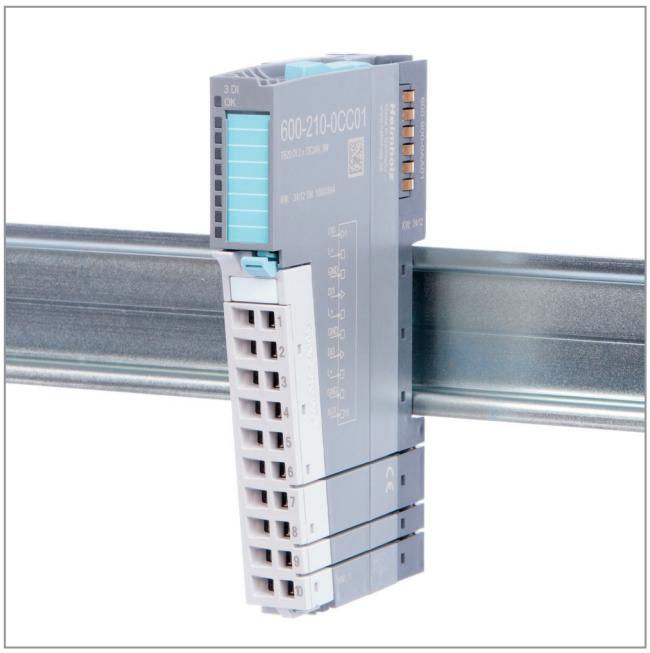
General characteristics

- 16 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate two-wire proximity sensors
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' states

Terminal Assignment			
Terminal	**Assignment**	**Terminal**	**Assignment**
1	Input 0	11	Input 8
2	Input 1	12	Input 9
3	Input 2	13	Input 10
4	Input 3	14	Input 11
5	Input 4	15	Input 12
6	Input 5	16	Input 13
7	Input 6	17	Input 14
8	Input 7	18	Input 15
9	L+, 24 VDC	19	L+, 24 VDC
10	AUX	20	AUX

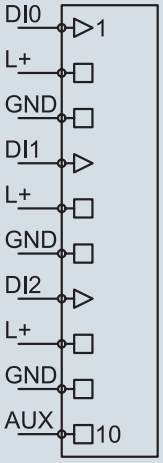


Technical data/Ordering data	
Digital Input Module – DI 16 x 24 VDC	**600-210-0AP21**
Number of inputs	16
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 0 mA Max. 23 mA
Power dissipation	Max. 3.7 W
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 25 mm x 73 mm
Weight	Approx. 110 g



DI 3 x 24 VDC, 3-wire

Terminal Assignment	
Terminal	**Assignment**
1	Input 0
2	L+, 24 VDC
3	GND
4	Input 1
5	L+, 24 VDC
6	GND
7	Input 2
8	L+, 24 VDC
9	GND
10	AUX

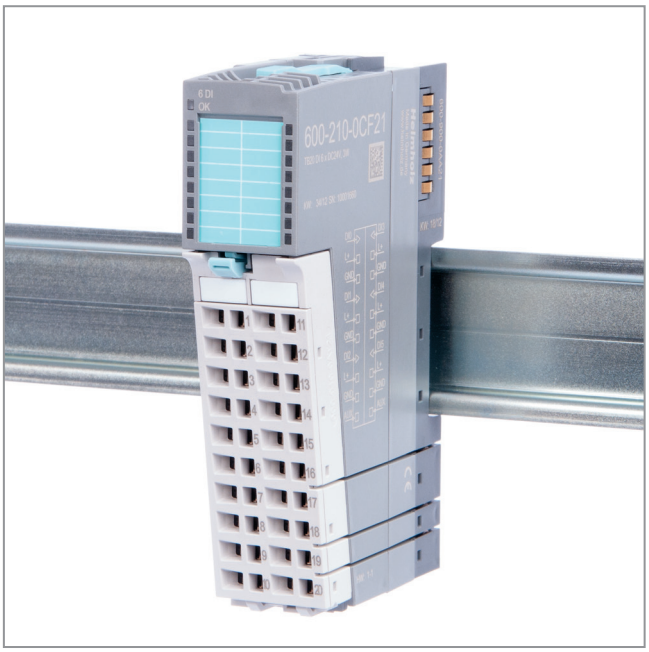


General characteristics

- 2 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate 3-wire sensors
- Fuse for 24 VDC
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' states

Technical data/Ordering data	
Digital Input Module – DI 3 x 24 VDC, 3-wire	**600-210-0CC01**
Number of inputs	3
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 0 mA Max. 22 mA
Power dissipation	Max. 0.7 W
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage For low signal ("0") For high signal ("1")	 -3 V to 9 V 12 V to 30 V
L+ fuse	4 A
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

DI 6 x 24 VDC, 3-wire

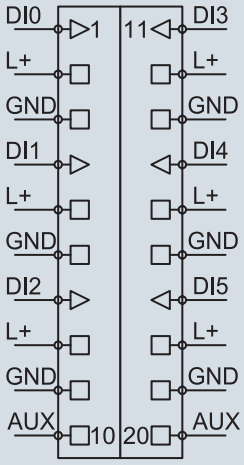


DI 6 x 24 VDC, 3-wire

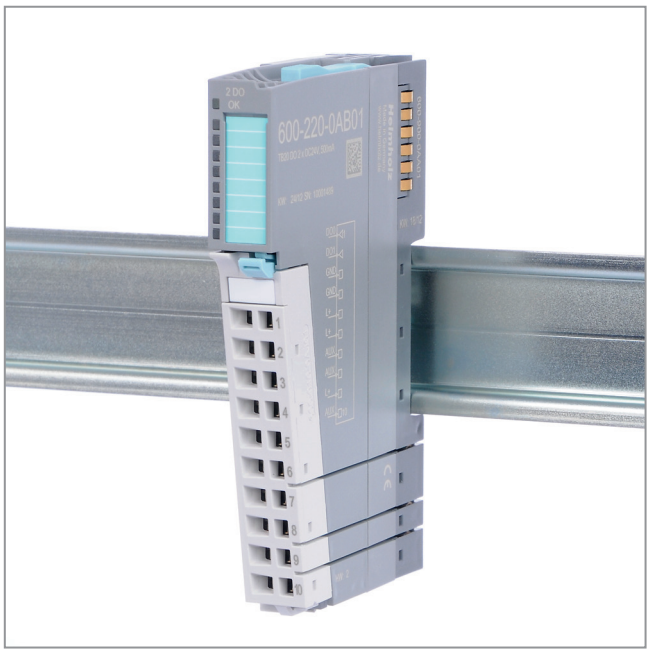
General characteristics

- 6 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate 3-wire sensors
- Fuse for 24 VDC
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' states

Terminal Assignment			
Terminal	**Assignment**	**Terminal**	**Assignment**
1	Input 0	11	Input 3
2	L+, 24 VDC	12	L+, 24 VDC
3	GND	13	GND
4	Input 1	14	Input 4
5	L+, 24 VDC	15	L+, 24 VDC
6	GND	16	GND
7	Input 2	17	Input 5
8	L+, 24 VDC	18	L+, 24 VDC
9	GND	19	GND
10	AUX	20	AUX

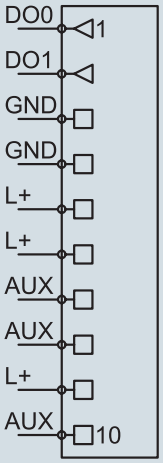


Technical data/Ordering data	
Digital Input Module – DI 6 x 24 VDC, 3-wire	**600-210-0CF21**
Number of inputs	6
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 0 mA Max. 22 mA
Power dissipation	Max. 1.4 W
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
L+ fuse	4 A per group Group 1: terminals 2, 5, and 8 | Group 2: terminals 12, 15, and 18
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 25 mm x 73 mm
Weight	Approx. 110 g



DO 2 x 24 VDC, 500 mA

Terminal Assignment	
Terminal	**Assignment**
1	Output 0
2	Output 1
3	GND
4	GND
5	L+, 24 VDC
6	L+, 24 VDC
7	AUX
8	AUX
9	L+, 24 VDC
10	AUX

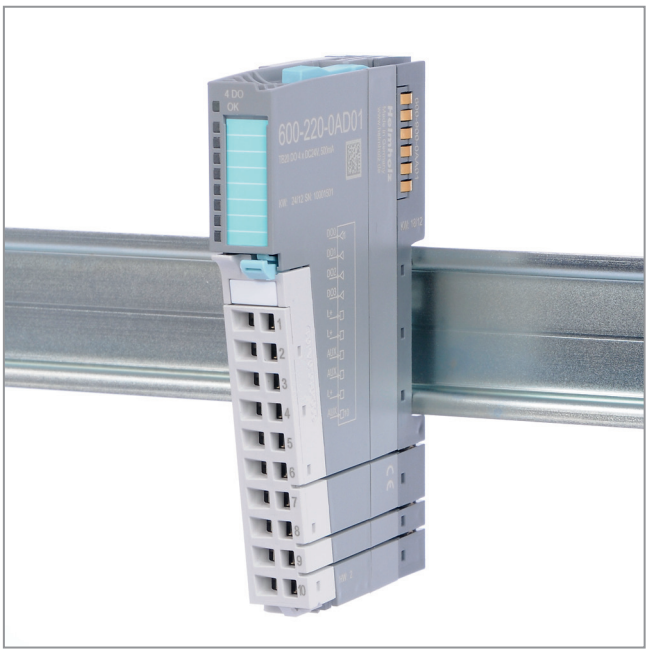


General characteristics

- 2 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Works with solenoid valves, contactors, small motors, etc.
- A blue LED indicates the module's operating status
- Green LEDs (one for each output) indicate the outputs' states

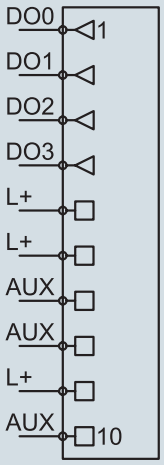
Technical data/Ordering data	
Digital Output Module – DO 2 x 24 VDC, 500 mA	**600-220-0AB01**
Number of outputs	2
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Current draw · External · Internal	 Max. 10 mA + load Max. 27.5 mA
Power dissipation	Max. 0.7 W
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

DO 4 x 24 VDC, 500 mA



DO 4 x 24 VDC, 500 mA

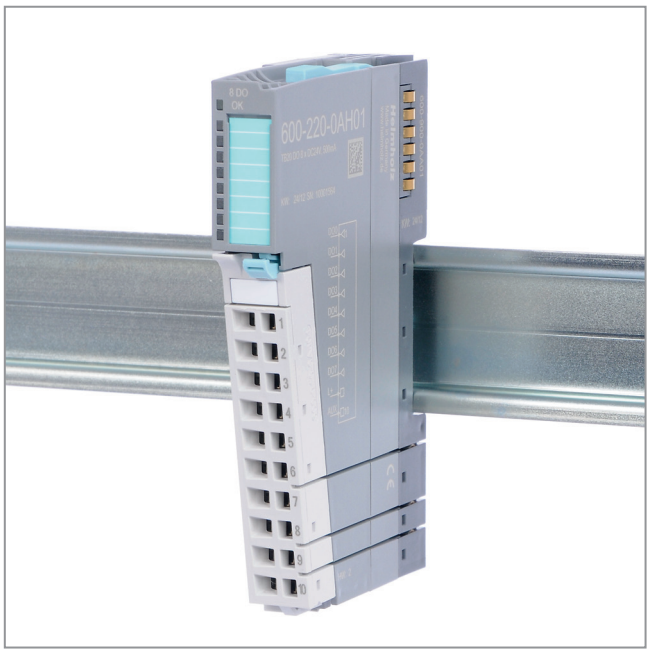
Terminal Assignment	
Terminal	**Assignment**
1	Output 0
2	Output 1
3	Output 2
4	Output 3
5	L+, 24 VDC
6	L+, 24 VDC
7	AUX
8	AUX
9	L+, 24 VDC
10	AUX



General characteristics

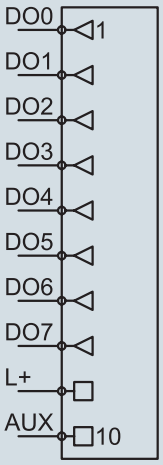
- 4 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Outputs work with solenoid valves, contactors, small motors
- A blue LED indicates the module's operating status
- Green LEDs (one for each output) indicate the outputs' states

Technical data/Ordering data	
Digital Output Module – DO 4 x 24 VDC, 500 mA	**600-220-0AD01**
Number of outputs	4
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Current draw · External · Internal	 Max. 20 mA + load Max. 30 mA
Power dissipation	Max. 1.0 W
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



DO 8 x 24 VDC, 500 mA

Terminal Assignment	
Terminal	**Assignment**
1	Output 0
2	Output 1
3	Output 2
4	Output 3
5	Output 4
6	Output 5
7	Output 6
8	Output 7
9	L+, 24 VDC
10	AUX



General characteristics

- 8 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Outputs work with solenoid valves, contactors, small motors
- A blue LED indicates the module's operating status
- Green LEDs (one for each output) indicate the outputs' states

Technical data/Ordering data	
Digital Output Module – DO 8 x 24 VDC, 500 mA	**600-220-0AH01**
Number of outputs	8
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Current draw · External · Internal	 Max. 40 mA + load Max. 35 mA
Power dissipation	Max. 2.5 W
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

DO 16 x 24 VDC, 500 mA



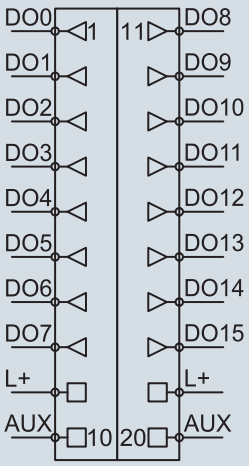
DO 16 x 24 VDC, 500 mA

General characteristics

- 16 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Outputs work with solenoid valves, contactors, small motors
- A blue LED indicates the module's operating status
- Green LEDs (one for each output) indicate the outputs' states

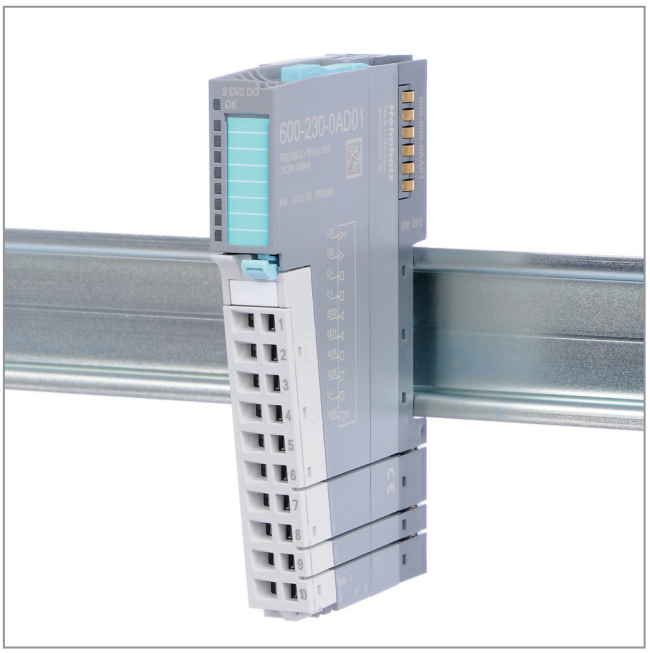
Terminal Assignment

Terminal	Assignment	Terminal	Assignment
1	Output 0	11	Output 8
2	Output 1	12	Output 9
3	Output 2	13	Output 10
4	Output 3	14	Output 11
5	Output 4	15	Output 12
6	Output 5	16	Output 13
7	Output 6	17	Output 14
8	Output 7	18	Output 15
9	L+, 24 VDC	19	L+, 24 VDC
10	AUX	20	AUX



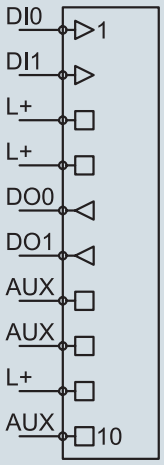
Technical data/Ordering data	
Digital Output Module – DO 16 x 24 VDC, 500 mA	**600-220-0AP21**
Number of outputs	16
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Current draw · External · Internal	 Max. 80 mA + load Max. 47 mA
Power dissipation	Max. 2.5 W
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 25 mm x 73 mm
Weight	Approx. 110 g

DIO 2 x In/2 x Out 24 VDC, 500 mA



DIO 2 x In/2 x Out 24 VDC, 500 mA

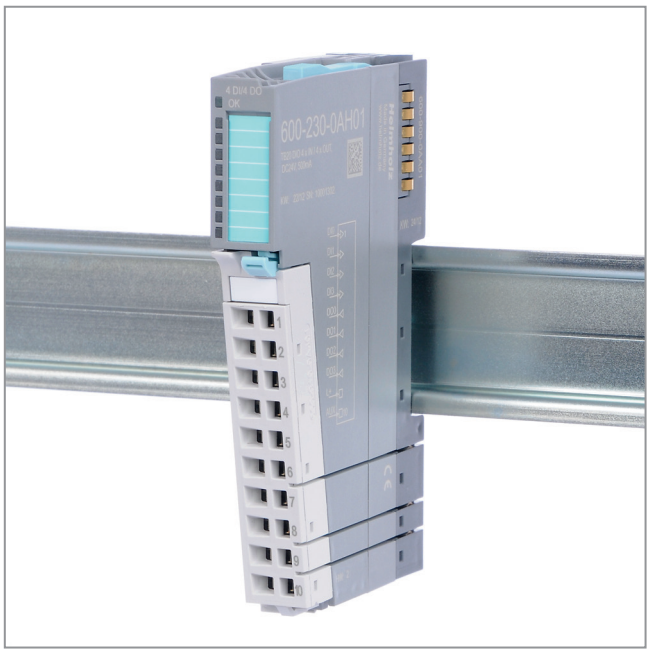
Terminal Assignment	
Terminal	**Assignment**
1	Input 0
2	Input 1
3	L+, 24 VDC
4	L+, 24 VDC
5	Output 0
6	Output 1
7	AUX
8	AUX
9	L+, 24 VDC
10	AUX



General characteristics

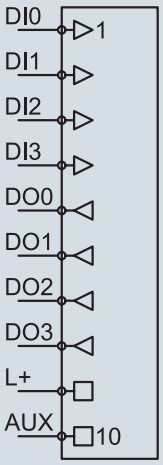
- 2 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate two-wire proximity sensors
- 2 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Outputs work with solenoid valves, contactors, small motors
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' and outputs' states

Technical data/Ordering data	
Digital Mix Module – DIO 2 x In/2 x Out 24 VDC, 500 mA	**600-230-0AD01**
Number of inputs	2
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
Number of outputs	2
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Current draw · External · Internal	 Max. 10 mA + load Max. 25 mA
Power dissipation	Max. 1.2 W
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



DIO 4 x In/4 x Out 24 VDC, 500 mA

Terminal Assignment	
Terminal	**Assignment**
1	Input 0
2	Input 1
3	Input 2
4	Input 3
5	Output 0
6	Output 1
7	Output 2
8	Output 3
9	L+, 24 VDC
10	AUX

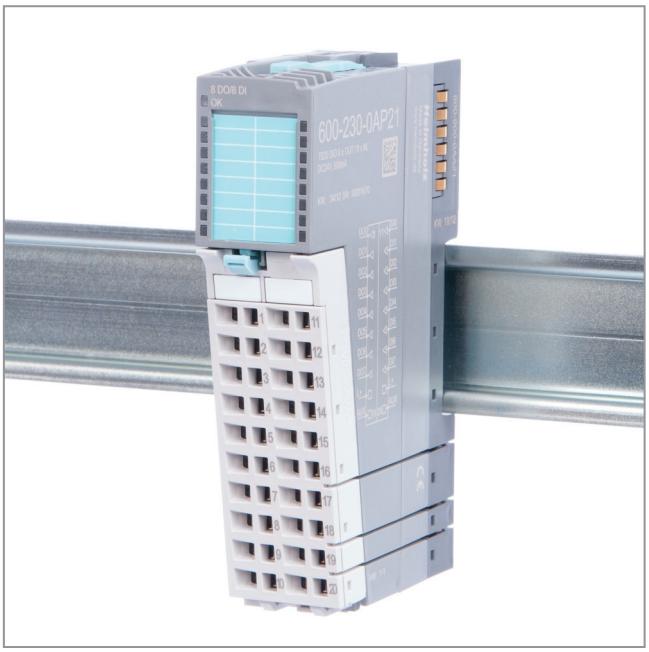


General characteristics

- 4 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate two-wire proximity sensors
- 4 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Outputs work with solenoid valves, contactors, small motors
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' and outputs' states

Technical data/Ordering data	
Digital Mix Module – DIO 4 x In/4 x Out 24 VDC, 500 mA	**600-230-0AH01**
Number of inputs	4
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal ("0") · For high signal ("1")	 -3 V to 9 V 12 V to 30 V
Number of outputs	4
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Current draw · External · Internal	 Max. 20 mA + load Max. 28 mA
Power dissipation	Max. 1.95 W
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

DIO 8 x Out/8 x In 24 VDC, 500 mA

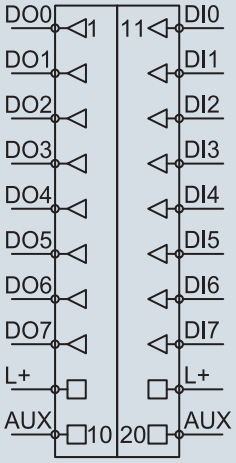


DIO 8 x Out/8 x In 24 VDC, 500 mA

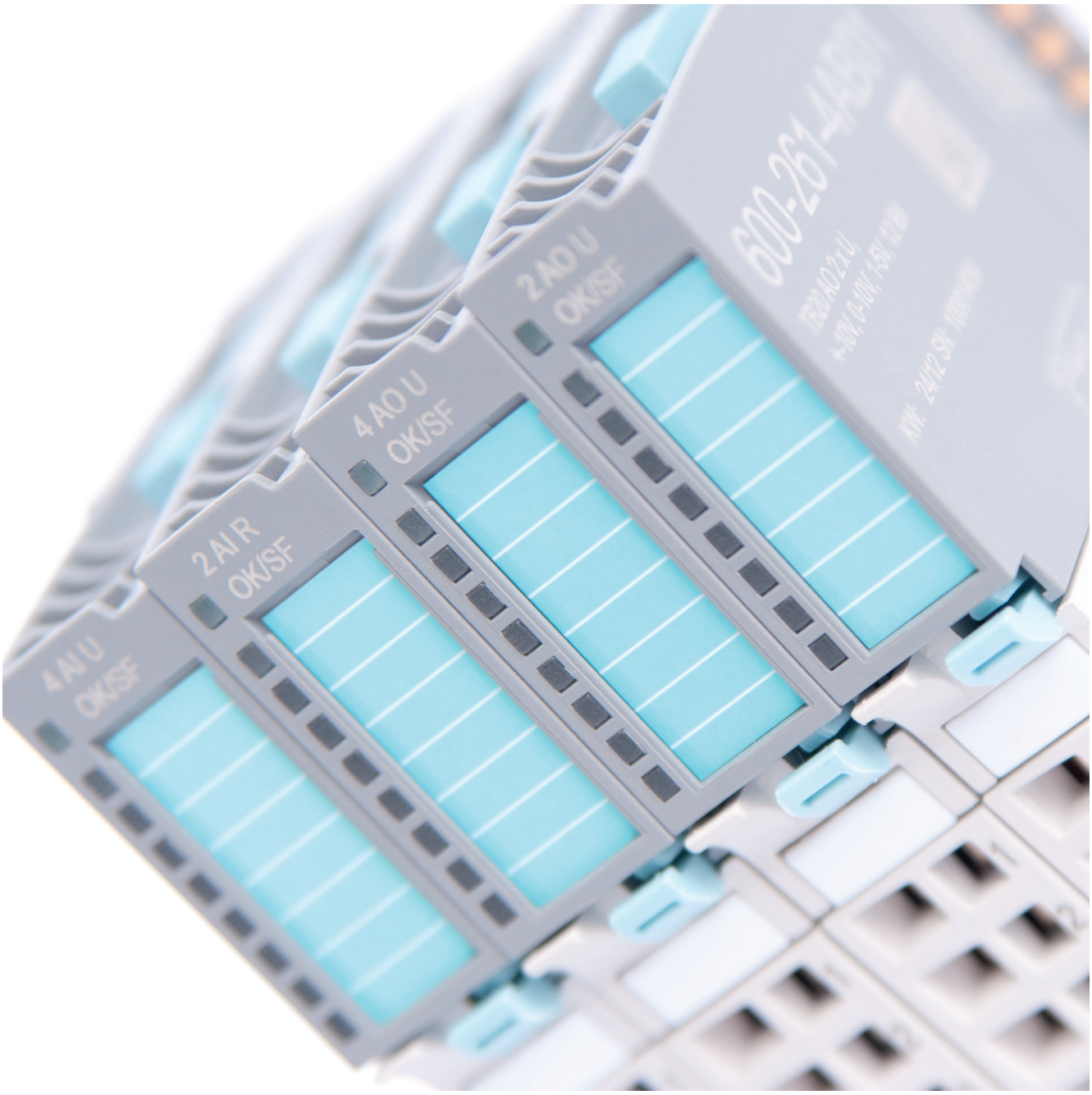
General characteristics

- 8 inputs (electrically isolated from the backplane bus)
- 24 VDC input voltage
- Can accommodate two-wire proximity sensors
- 8 outputs (electrically isolated from the backplane bus)
- 24 VDC output voltage
- Output current of 500 mA per channel
- Outputs work with solenoid valves, contactors, small motors
- A blue LED indicates the module's operating status
- Green LEDs (one for each input) indicate the inputs' and outputs' states

Terminal Assignment			
Terminal	**Assignment**	**Terminal**	**Assignment**
1	Output 0	11	Input 0
2	Output 1	12	Input 1
3	Output 2	13	Input 2
4	Output 3	14	Input 3
5	Output 4	15	Input 4
6	Output 5	16	Input 5
7	Output 6	17	Input 6
8	Output 7	18	Input 7
9	L+, 24 VDC	19	L+, 24 VDC
10	AUX	20	AUX



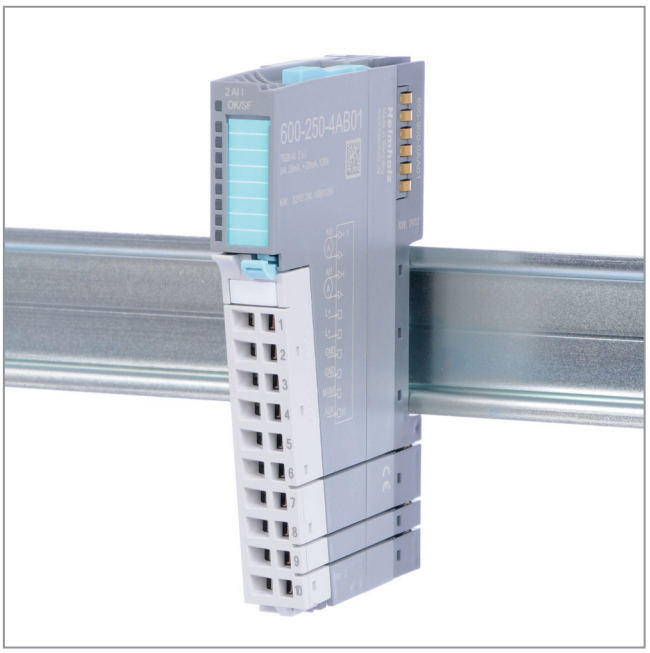
Technical data/Ordering data	
Digital Mix Module – DIO 8 x Out/8 x In 24 VDC, 500 mA	**600-230-0AP21**
Number of inputs	8
Input characteristic curve	Type 2, EN 61131-2
Reverse polarity protection for inputs	Yes
Input voltage · For low signal (“0”) · For high signal (“1”)	 -3 V to 9 V 12 V to 30 V
Number of outputs	8
Supply voltage U_P, U_S · Rated · Ripple U_{SS} · Permissible range (with ripple) · Voltage for t < 10 ms	 24 VDC Max. 3.6 V 20–30 V 50 V
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Output short-circuit protection	Electronic, for each channel
Inductive cutoff voltage limit	-48 V
Current draw · External · Internal	 Max. 40 mA + load Max. 35 mA
Power dissipation	Max. 4.35 W
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 25 mm x 73 mm
Weight	Approx. 110 g



Analog Input/Output Modules

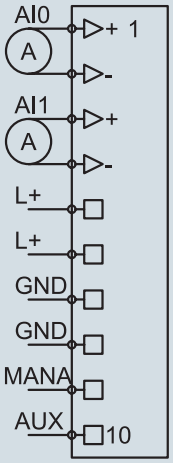
Analog In
Analog Out

AI 2 x I, 0/4–20 mA, ±20 mA, 12-Bit



AI 2 x I, 0/4–20 mA, ±20 mA, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	L+, 24 VDC
6	L+, 24 VDC
7	L-, GND
8	L-, GND
9	Mana
10	AUX



General characteristics

- 2 analog inputs for measuring current (electrically isolated from the backplane bus)
- 2 process input words
- Measuring ranges of 0–20 mA, 4–20 mA, ±20 mA, individually configurable for each channel
- Measurement resolution of 12 bits + sign
- Diagnostic messages
- Wire break detection (for 4–20 mA)
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

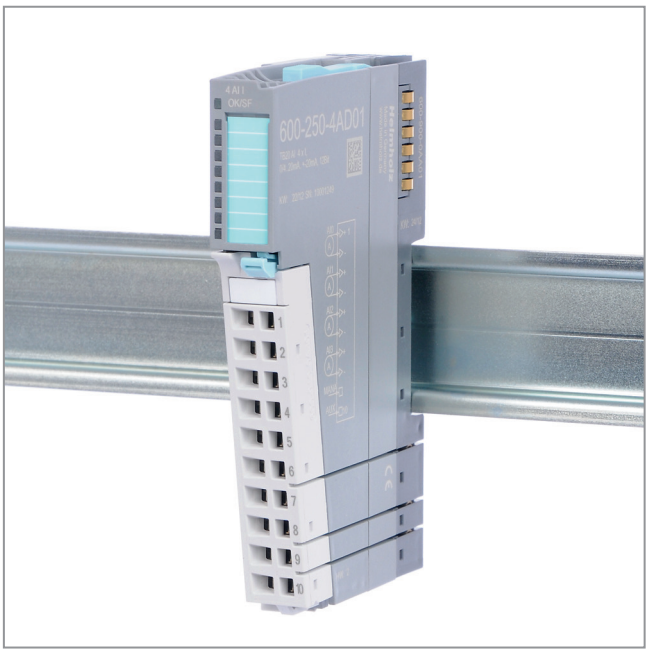
Parameters for each channel

- Wire break detection (for 4–20 mA only): ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range:
  Disabled | 0–20 mA | 4–20 mA | ±20 mA
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

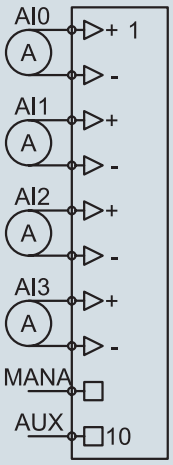
Technical data/Ordering data	
Analog Input Module – AI 2 x I, 0/4–20 mA, ±20 mA, 12-Bit	**600-250-4AB01**
Number of inputs	2
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 95 mA
Power dissipation	Max. 0.7 W
Measuring ranges/load resistance	0–20 mA/50 ohms 4–20 mA/50 ohms ±20 mA/50 ohms
Measuring method	Integration
Measurement resolution	12 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Wire break (for 4–20 mA only) Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	12 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AI 4 x I, 0/4–20 mA, ±20 mA, 12-Bit



AI 4 x I, 0/4–20 mA, ±20 mA, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	AI2 +
6	AI2 -
7	AI3 +
8	AI3 -
9	Mana
10	AUX



General characteristics

- 4 analog inputs for measuring current (electrically isolated from the backplane bus)
- 4 process input words
- Measuring ranges of 0–20 mA, 4–20 mA, ±20 mA, individually configurable for each channel
- Measurement resolution of 12 bits + sign
- Diagnostic messages
- Wire break detection (for 4–20 mA)
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

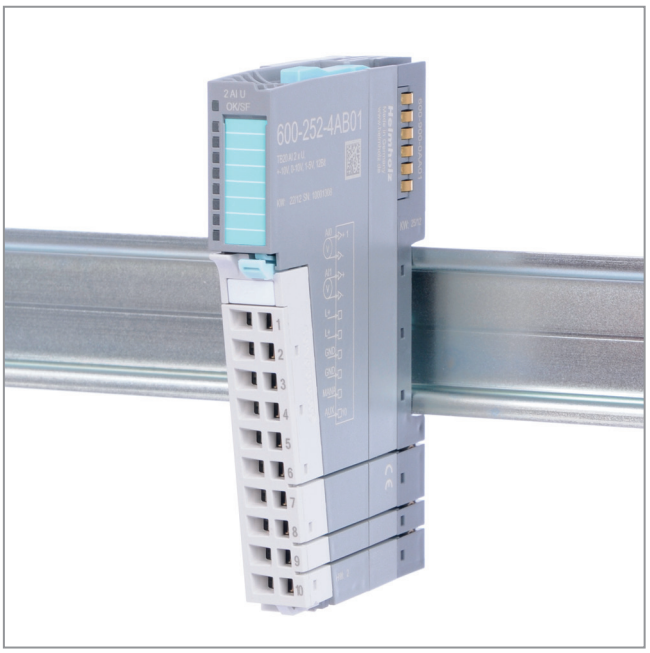
Parameters for each channel

- Wire break detection (for 4–20 mA only): ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range:
  Disabled | 0–20 mA | 4–20 mA | ±20 mA
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

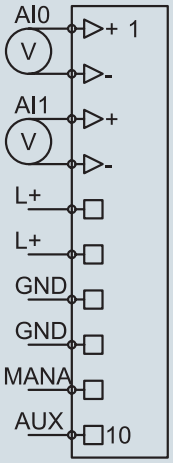
Technical data/Ordering data	
Analog Input Module – AI 4 x I, 0/4–20 mA, ±20 mA, 12-Bit	**600-250-4AD01**
Number of inputs	4
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 95 mA
Power dissipation	Max. 0.7 W
Measuring ranges/load resistance	0–20 mA/50 ohms 4–20 mA/50 ohms ±20 mA/50 ohms
Measuring method	Integration
Measurement resolution	12 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Wire break (for 4–20 mA only) Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	22 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AI 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit



AI 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	L+, 24 VDC
6	L+, 24 VDC
7	L-, GND
8	L-, GND
9	Mana
10	AUX



General characteristics

- 2 analog inputs for measuring voltage (electrically isolated from the backplane bus)
- 2 process input words
- Measuring ranges of 0–10 V, 1–5 V, ±10 V, ±5 V, ±2.5 V, individually configurable for each channel
- Measurement resolution of 12 bits + sign
- Diagnostic messages
- Wire break detection (for 1–5 V)
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

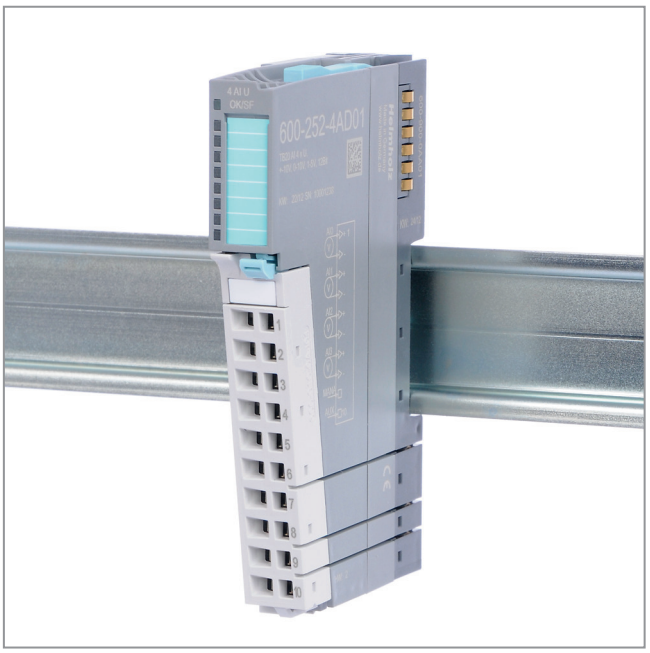
Parameters for each channel

- Wire break detection (for 1–5 V only): ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range:
  Disabled | 0–10 V | 1–5 V | ±10 V | ±5 V | ±2.5 V
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

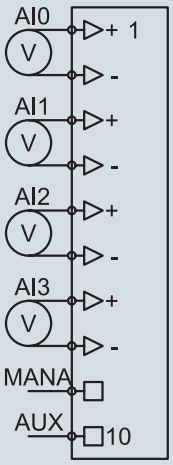
Technical data/Ordering data	
Analog Input Module – AI 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit	**600-252-4AB01**
Number of inputs	2
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 95 mA
Power dissipation	Max. 0.7 W
Measuring ranges/load resistance	0–10 V/10 Mohms 1–5 V/10 Mohms ±10 V/10 Mohms ±5 V/10 Mohms ±2.5 V/10 Mohms
Measuring method	Integration
Measurement resolution	12 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Wire break (for 1–5 V only) Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	12 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AI 4 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit



AI 4 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	AI2 +
6	AI2 -
7	AI3 +
8	AI3 -
9	Mana
10	AUX



General characteristics

- 4 analog inputs for measuring voltage (electrically isolated from the backplane bus)
- 4 process input words
- Measuring ranges of 0–10 V, 1–5 V, ±10 V, ±5 V, ±2.5 V, individually configurable for each channel
- Measurement resolution of 12 bits + sign
- Diagnostic messages
- Wire break detection (for 1–5 V)
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

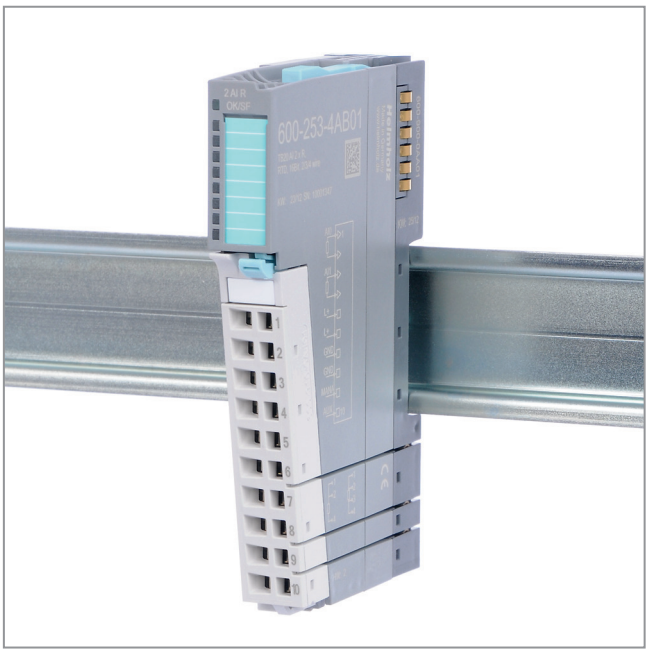
Parameters for each channel

- Wire break detection (for 1–5 V only): ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range:
  Disabled | 0–10 V | 1–5 V | ±10 V | ±5 V | ±2.5 V
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

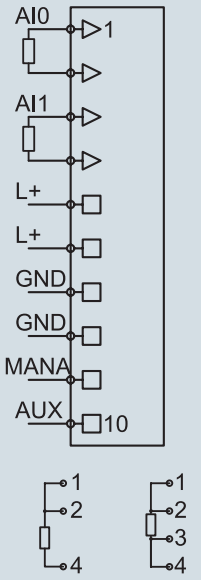
Technical data/Ordering data	
Analog Input Module – AI 4 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit	**600-252-4AD01**
Number of inputs	4
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 95 mA
Power dissipation	Max. 0.7 W
Measuring ranges/load resistance	0–10 V/10 Mohms 1–5 V/10 Mohms ±10 V/10 Mohms ±5 V/10 Mohms ±2.5 V/10 Mohms
Measuring method	Integration
Measurement resolution	12 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Wire break (for 1–5 V only) Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	22 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AI 1/2 x R, RTD, 16-Bit, 2/3/4-wire



AI 1/2 x R, RTD, 16-Bit, 2/3/4-wire

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	L+, 24 VDC
6	L+, 24 VDC
7	L-, GND
8	L-, GND
9	Mana
10	AUX



General characteristics

- 1/2 inputs for measuring resistance (electrically isolated from the backplane bus)
- 2 process input words
- Measuring ranges: 150 ohms, 300 ohms, 600 ohms, 3000 ohms, 6000 ohms, PT100, PT1000, Ni100, Ni1000, LG-Ni1000, individually configurable for each channel
- Can accommodate 2/3/4-wire sensors
- Measurement resolution of 15 bits + sign
- Diagnostic messages
- Wire break detection
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5
- Temperature unit:
  Celsius x 10 | Fahrenheit x 10 | Kelvin x 10

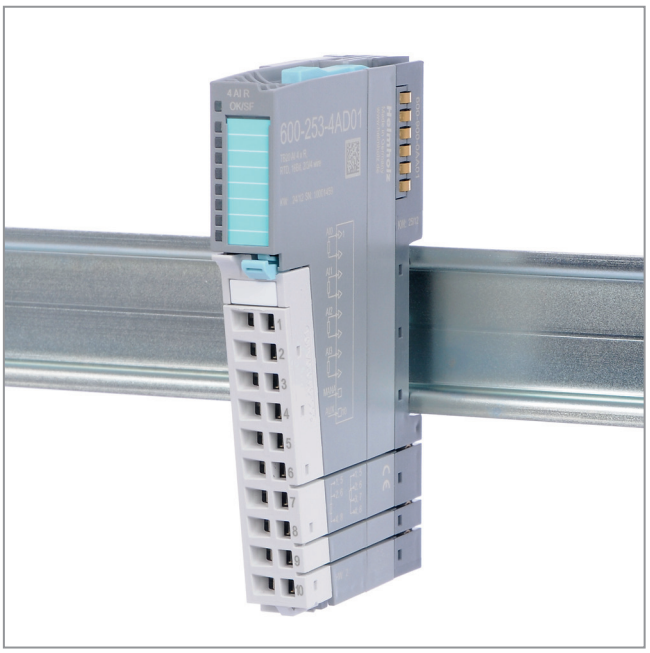
Parameters for each channel

- Wire break detection: ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range:
  150 ohms | 300 ohms | 600 ohms | 3000 ohms | 6000 ohms | PT100 | PT1000 | Ni100 | Ni1000| LG-Ni1000
- Sensor type: Disabled | 2-wire | 3-wire (channel 0 only) | 4-wire (channel 0 only)
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

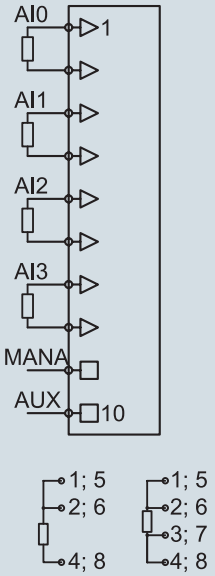
Technical data/Ordering data	
Analog Input Module – AI 1/2 x R, RTD, 16-Bit, 2/3/4-wire	**600-253-4AB01**
Number of inputs	1/2
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 140 mA
Verlustleistung	Max. 1.0 W
Measuring ranges	150 ohms 300 ohms 600 ohms 3,000 ohms 6,000 ohms PT100 PT1000 Ni100 Ni1000 LG-Ni1000
Measuring method	Integration
Measurement resolution	15 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Wire break Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	14 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AI 2/4 x R, RTD, 16-Bit, 2/3/4-wire



AI 2/4 x R, RTD, 16-Bit, 2/3/4-wire

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	AI2 +
6	AI2 -
7	AI3 +
8	AI3 -
9	Mana
10	AUX



General characteristics

- 2/4 inputs for measuring resistance (electrically isolated from the backplane bus)
- 4 process input words
- Measuring ranges: 150 ohms, 300 ohms, 600 ohms, 3000 ohms, 6000 ohms, PT100, PT1000, Ni100, Ni1000, LG-Ni1000, individually configurable for each channel
- Can accommodate 2/3/4-wire sensors
- Measurement resolution of 15 bits + sign
- Diagnostic messages
- Wire break detection
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5
- Temperature unit:
  Celsius x 10 | Fahrenheit x 10 | Kelvin x 10

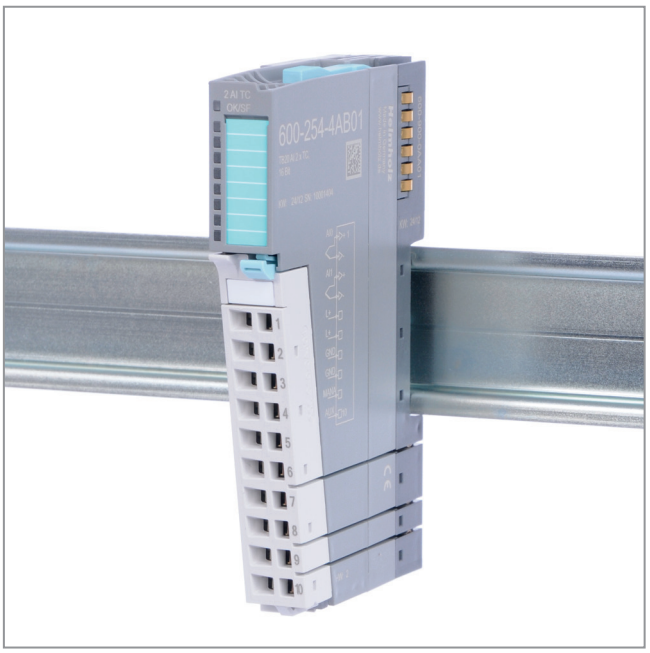
Parameters for each channel

- Wire break detection: ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range:
  150 ohms | 300 ohms | 600 ohms | 3,000 ohms | 6,000 ohms | PT100 | PT1000 | Ni100 | Ni1000 | LG-Ni1000
- Sensor type: Disabled | 2-wire | 3-wire (channels 0 & 2 only) | 4-wire (channels 0 & 2 only)
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

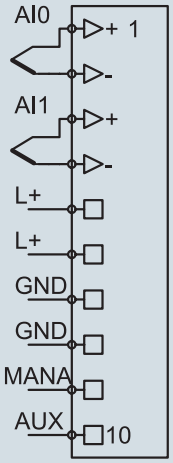
Technical data/Ordering data	
Analog Input Module – AI 2/4 x R, RTD, 16-Bit, 2/3/4-wire	**600-253-4AD01**
Number of inputs	2/4
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 140 mA
Verlustleistung	Max. 1.0 W
Measuring ranges	150 ohms 300 ohms 600 ohms 3,000 ohms 6,000 ohms PT100 PT1000 Ni100 Ni1000 LG-Ni1000
Measuring method	Integration
Measurement resolution	15 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Wire break Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	26 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AI 2 x TC, 16-Bit



AI 2 x TC, 16-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	L+, 24 VDC
6	L+, 24 VDC
7	L-, GND
8	L-, GND
9	Mana
10	AUX



General characteristics

- 2 inputs (electrically isolated from the backplane bus)
- 2 process input words
- 2 process output words (for temperature compensation)
- Measuring range of ±80 mV
- Supported thermocouples: E, J, K, N, R, S, T, B, C, L
- Measurement resolution of 15 bits + sign
- External or internal temperature compensation
- Diagnostic messages
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

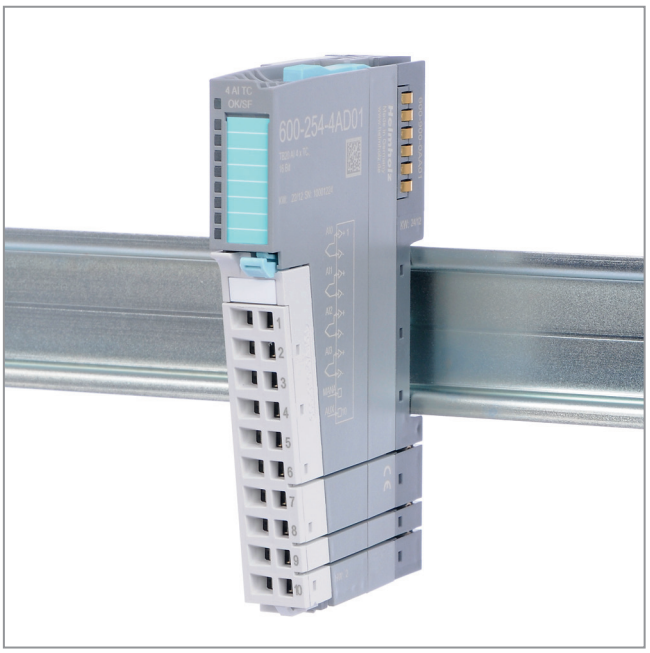
- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values:
  SIMATIC* S7 | SIMATIC* S5 (for ±80 mV only)
- Temperature unit:
  Celsius x 10 | Fahrenheit x 10 | Kelvin x 10

Parameters for each channel

- Wire break detection: ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range: ±80 mV
- Thermocouples: E | J | K | N | R | S | T | B | C | L
- Temperature compensation:
  Internal | External | Process data-based
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

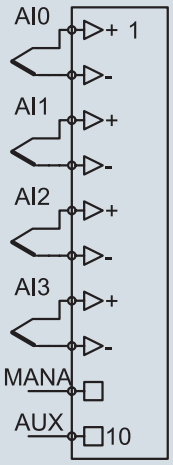
* SIMATIC is a registered trademark of Siemens AG.

Technical data/Ordering data	
Analog Input Module – AI 2 x TC, 16-Bit	**600-254-4AB01**
Number of inputs	2
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 95 mA
Power dissipation	Max. 0.7 W
Measuring ranges	±80 mV
Thermocouples	E (-270 °C to 990 °C) J (-210 °C to 1,200 °C) K (-270 °C to 1,380 °C) N (-270 °C to 1,320 °C) R (-50 °C to 1,775 °C) S (-50 °C to 1,775 °C) T (-270 °C to 405 °C) B (0 °C to 1,800 °C) C (0 °C to 2,320 °C) L (0 °C to 900 °C)
Measuring method	Integration
Measurement resolution	15 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	26 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



AI 4 x TC, 16-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AI0 +
2	AI0 -
3	AI1 +
4	AI1 -
5	AI2 +
6	AI2 -
7	AI3 +
8	AI3 -
9	Mana
10	AUX



General characteristics

- 4 inputs (electrically isolated from the backplane bus)
- 4 process input words
- 4 process output words (for temperature compensation)
- Measuring range of ±80 mV
- Supported thermocouples: E, J, K, N, R, S, T, B, C, L
- Measurement resolution of 15 bits + sign
- External or internal temperature compensation
- Diagnostic messages
- Limit value alarms for each channel
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Overflow/underflow diagnosis: ON | OFF
- Representation values:
  SIMATIC* S7 | SIMATIC* S5 (for ±80 mV only)
- Temperature unit:
  Celsius x 10 | Fahrenheit x 10 | Kelvin x 10

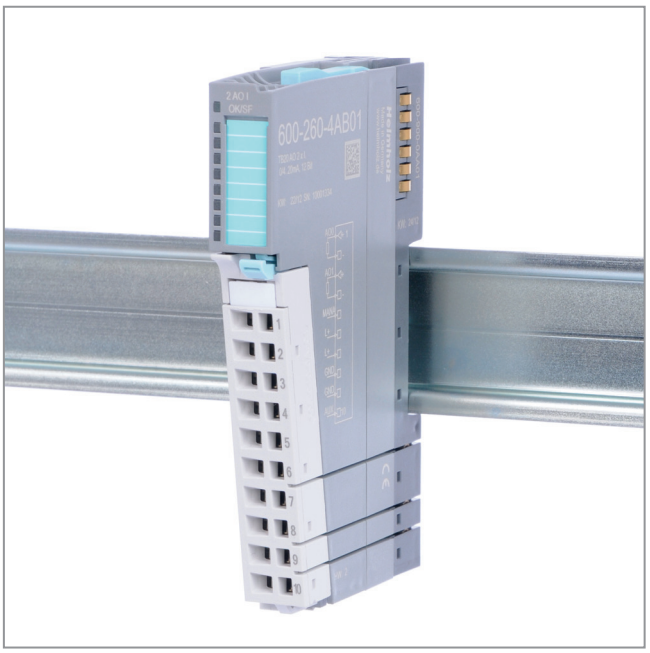
Parameters for each channel

- Wire break detection: ON | OFF
- Interference frequency suppression:
  None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
- Measuring range: ±80 mV
- Thermocouples: E | J | K | N | R | S | T | B | C | L
- Temperature compensation:
  Internal | External | Process data-based
- Limit value alarms enabled: ON | OFF
- Upper/lower limit: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

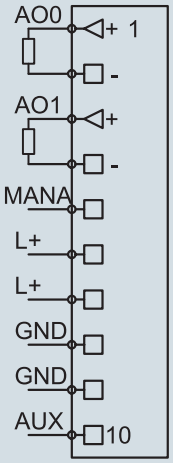
Technical data/Ordering data	
Analog Input Module – AI 4 x TC, 16-Bit	**600-254-4AD01**
Number of inputs	4
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Not required Max. 95 mA
Power dissipation	Max. 0.7 W
Measuring ranges	±80 mV
Thermocouples	E (-270 °C to 990 °C) J (-210 °C to 1,200 °C) K (-270 °C to 1,380 °C) N (-270 °C to 1,320 °C) R (-50 °C to 1,775 °C) S (-50 °C to 1,775 °C) T (-270 °C to 405 °C) B (0 °C to 1,800 °C) C (0 °C to 2,320 °C) L (0 °C to 900 °C)
Measuring method	Integration
Measurement resolution	15 bits + sign
Interf. frequency suppression	None | 10 Hz | 50 Hz | 60 Hz | 400 Hz
Diagnoses	Upper measuring range limit exceeded (overflow) Lower measuring range limit fallen below (underflow) Parameter assignment error
Process alarms	Upper and lower limit per channel
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	26 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AO 2 x I, 0/4–20 mA, 12-Bit



AO 2 x I, 0/4–20 mA, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AO0 +
2	AO0 -
3	AO1 +
4	AO1 -
5	Mana
6	L+, 24 VDC
7	L+, 24 VDC
8	L-, GND
9	L-, GND
10	AUX



General characteristics

- 2 analog outputs (electrically isolated from the backplane bus)
- 2 process output words (4 bytes)
- Output range of 0–20 mA, 4–20 mA
- Resolution of 12 bits
- Substitute value functionality
- Diagnostic messages
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

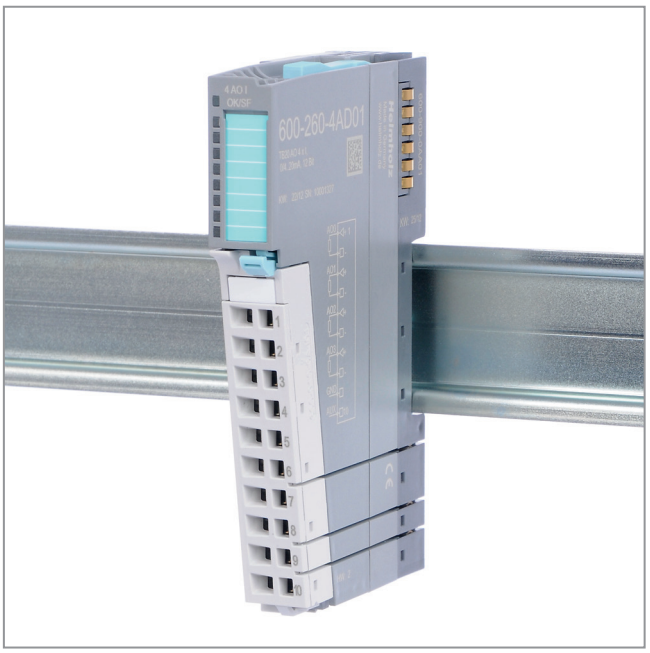
Parameters for each channel

- Wire break detection: ON | OFF
- Output range: 0–20 mA | 4–20 mA
- Available substitute value options: Outputs de-energized | Retain last value | Apply substitute value
- Substitute value: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

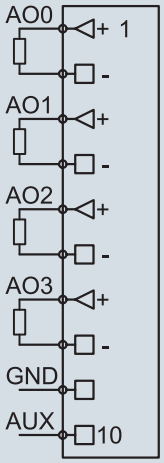
Technical data/Ordering data	
Analog Output Module – AO 2 x I, 0/4–20 mA, 12-Bit	**600-260-4AB01**
Number of outputs	2
Output ranges	0–20 mA 4–20 mA
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 60 mA Max. 26 mA
Power dissipation	Max. 1.9 W
Connection for actuators	2-wire connection
Load resistance	Max. 600 ohms
Inductive load	Max. 100 mH
No-load voltage	Max. 18 V
Reading calculation	
· Resolution	12 bits
· Settling time	0.2 ms for resistive loads 2.2 ms for capacitive loads 0.5 ms for inductive loads (<=1 mH) 3.3 ms for inductive loads (<=3.3 mH)
Diagnoses	External reference voltage missing (L+) Wire break Parameter assignment error
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	7 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AO 4 x I, 0/4–20 mA, 12-Bit



AO 4 x I, 0/4–20 mA, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AO0 +
2	AO0 -
3	AO1 +
4	AO1 -
5	AO2 +
6	AO2 -
7	AO3 +
8	AO3 -
9	GND
10	AUX



General characteristics

- 4 analog outputs (electrically isolated from the backplane bus)
- 4 process output words (8 bytes)
- Output range of 0–20 mA, 4–20 mA
- Resolution of 12 bits
- Substitute value functionality
- Diagnostic messages
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

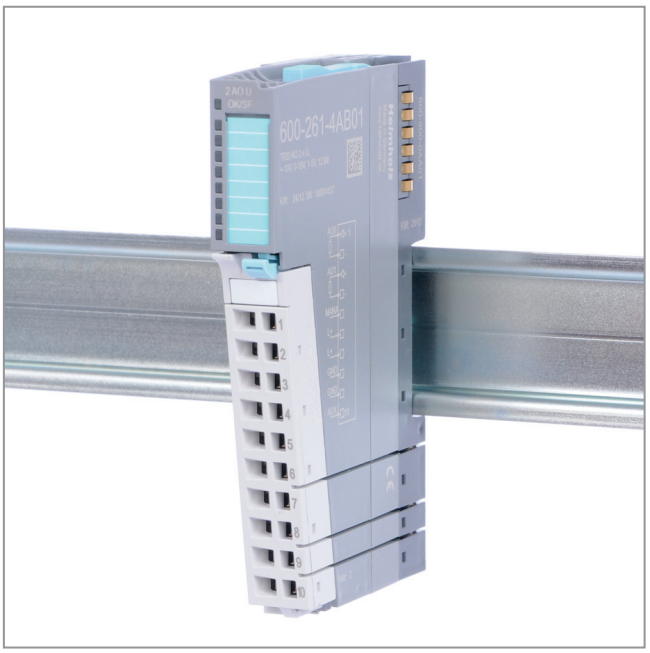
Parameters for each channel

- Wire break detection: ON | OFF
- Output range: 0–20 mA | 4–20 mA
- Available substitute value options: Outputs de-energized | Retain last value | Apply substitute value
- Substitute value: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

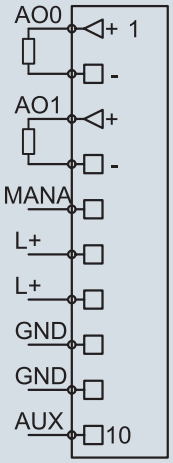
Technical data/Ordering data	
Analog Output Module – AO 4 x I, 0/4–20 mA, 12-Bit	**600-260-4AD01**
Number of outputs	4
Output ranges	0–20 mA 4–20 mA
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 100 mA Max. 26 mA
Power dissipation	Max. 3 W
Connection for actuators	2-wire connection
Load resistance	Max. 600 ohms
Inductive load	Max. 100 mH
No-load voltage	Max. 18 V
Reading calculation	
· Resolution	12 bits
· Settling time	0.2 ms for resistive loads 2.2 ms for capacitive loads 0.5 ms for inductive loads (<=1 mH) 3.3 ms for inductive loads (<=3.3 mH)
Diagnoses	External reference voltage missing (L+) Wire break Parameter assignment error
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	13 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AO 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit



AO 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AO0 +
2	AO0 -
3	AO1 +
4	AO1 -
5	Mana
6	L+, 24 VDC
7	L+, 24 VDC
8	L-, GND
9	L-, GND
10	AUX



General characteristics

- 2 analog outputs (electrically isolated from the backplane bus)
- 2 process output words (4 bytes)
- Output range of ±10 V, 0–10 V, 1–5 V
- Resolution of 12 bits + sign
- Substitute value functionality
- Diagnostic messages
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

- Diagnostic alarm: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

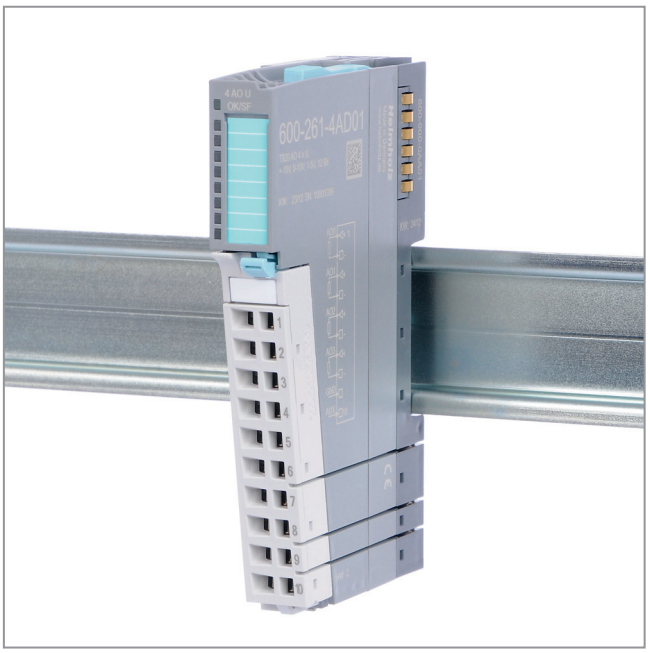
Parameters for each channel

- Wire break detection: ON | OFF
- Output range: ±10 V | 0–10 V | 1–5 V
- Available substitute value options: Outputs de-energized | Retain last value | Apply substitute value
- Substitute value: 16-bit analog value (±27648)

* SIMATIC is a registered trademark of Siemens AG.

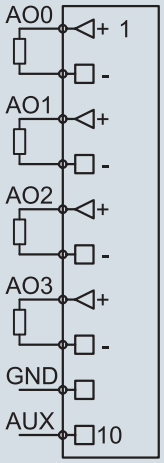
Technical data/Ordering data	
Analog Output Module – AO 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit	**600-261-4AB01**
Number of outputs	2
Output ranges	±10 V 0–10 V 1–5 V
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 45 mA Max. 24 mA
Power dissipation	Max. 1.6 W
Connection for actuators	2-wire connection
Load resistance	Min. 1 kohm
Capacitive load	Max. 1 µF
Short-circuit protection	Yes
Short-circuit current	Max. 25 mA
Reading calculation	
· Resolution	12 bits + sign
· Settling time	0.2 ms for resistive loads 2.2 ms for capacitive loads 0.5 ms for inductive loads (<=1 mH) 3.3 ms for inductive loads (<=3.3 mH)
Diagnoses	External reference voltage missing (L+) Short circuit to GND Parameter assignment error
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	7 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

AO 4 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit



AO 4 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit

Terminal Assignment	
Terminal	**Assignment**
1	AO0 +
2	AO0 -
3	AO1 +
4	AO1 -
5	AO2 +
6	AO2 -
7	AO3 +
8	AO3 -
9	GND
10	AUX



General characteristics

- 4 analog outputs (electrically isolated from the backplane bus)
- 4 process output words (8 bytes)
- Output range of ±10 V, 0–10 V, 1–5 V
- Resolution of 12 bits + sign
- Substitute value functionality
- Diagnostic messages
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Module parameters

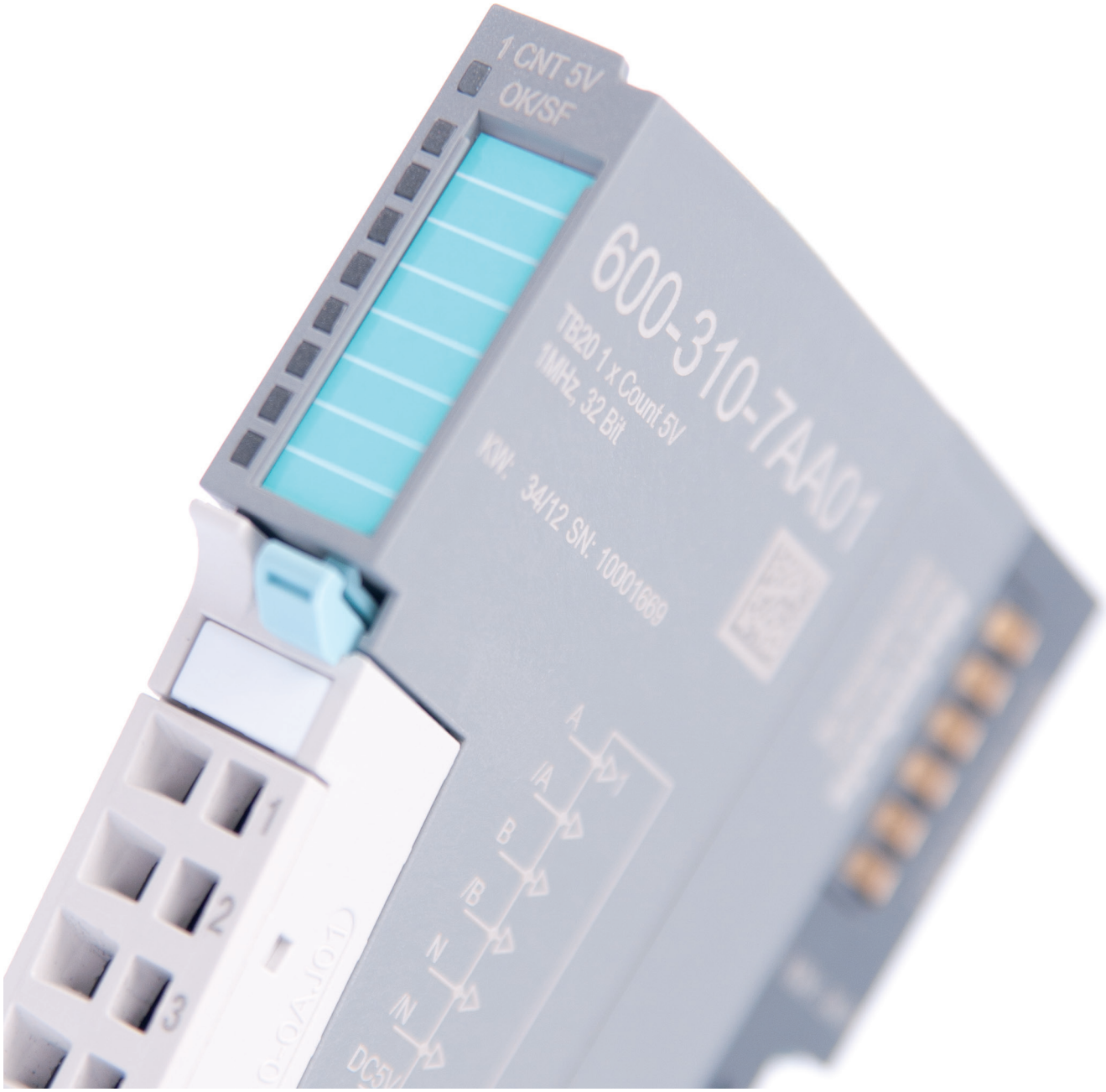
- Diagnostic alarm: ON | OFF
- Representation values: SIMATIC* S7 | SIMATIC* S5

Parameters for each channel

- Wire break detection: ON | OFF
- Output range: ±10 V | 0–10 V | 1–5 V
- Available substitute value options: Outputs de-energized | Retain last value | Apply substitute value
- Substitute value: 16-bit analog value (±27648)

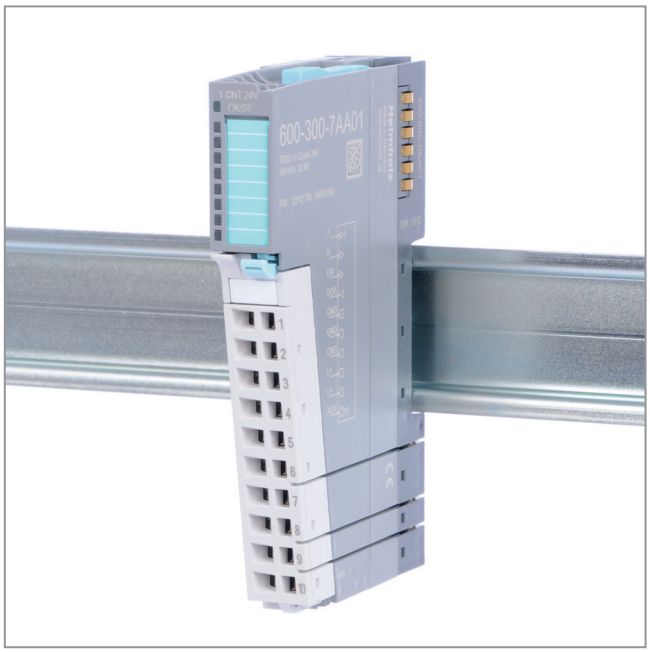
* SIMATIC is a registered trademark of Siemens AG.

Technical data/Ordering data	
Analog Output Module – AO 4 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit	**600-261-4AD01**
Number of outputs	4
Output ranges	±10 V 0–10 V 1–5 V
Electrically isolated from backplane bus	Yes
Channels electrically isolated from each other	No
Current draw · External · Internal	 Max. 75 mA Max. 24 mA
Power dissipation	Max. 2.4 W
Connection for actuators	2-wire connection
Load resistance	Min. 1 kohm
Capacitive load	Max. 1 µF
Short-circuit protection	Yes
Short-circuit current	Max. 25 mA
Reading calculation	
· Resolution	12 bits + sign
· Settling time	0.2 ms for resistive loads 2.2 ms for capacitive loads 0.5 ms for inductive loads (<=1 mH) 3.3 ms for inductive loads (<=3.3 mH)
Diagnoses	External reference voltage missing (L+) Short circuit to GND Parameter assignment error
Error limits	
· Operational error limit	±0.5 % within the entire temperature range, relative to the nominal range
· Basic error limit	±0.3 %, operational error limit at 25 °C, relative to the nominal range
· Temperature error	±0.005 %/K relative to the nominal range
· Linearity error	±0.05 %/K relative to the nominal range
· Repeating accuracy in steady state at 25 °C	±0.05 %/K relative to the nominal range
Parameter configuration length	13 bytes
Group error indicator	Red LED
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



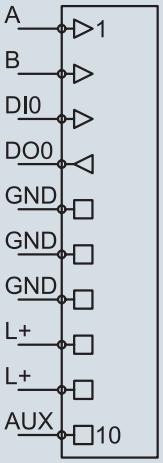
Function Modules

Counter



1 x Counter 24 V, 500 kHz, 32-Bit

Terminal Assignment	
Terminal	**Assignment**
1	A
2	B
3	Input 0
4	Output 0
5	GND
6	GND
7	GND
8	L+, 24 VDC
9	L+, 24 VDC
10	AUX

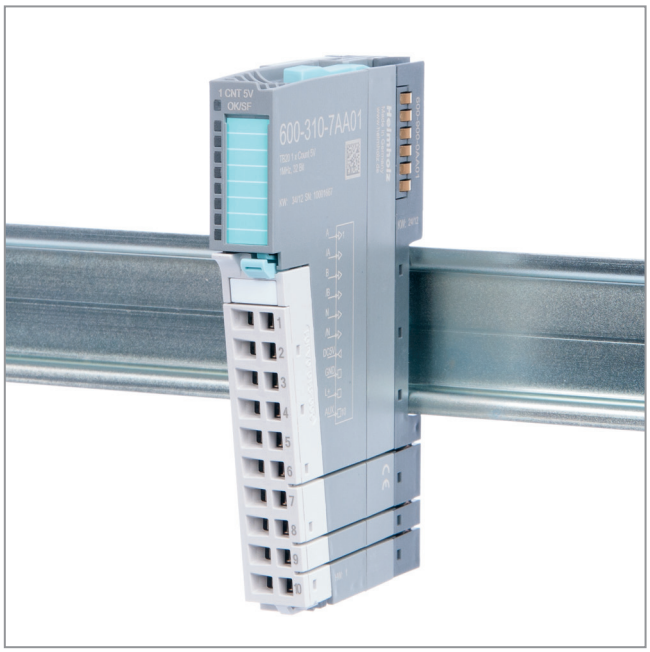


Counters are used to detect pulses that are faster than a controller's cycles, i.e., signals that the controller will be unable to detect properly and that therefore need to be preprocessed. This counter module detects the edges of 24-V signals as pulses, which can be counted or converted in the form of a frequency, rotational speed, or period duration.
This counter module features an additional 24-V input and a 24-V output for a direct response to start pulses and to quick system state changes.

General characteristics

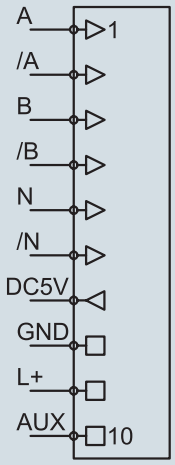
- 32-bit counter
- Up to 500 KHz (quadruple evaluation)
- Accommodates 24-V incremental encoders and sensors
- Capturing modes:
  - Pulse & direction
  - Rotary encoder with single evaluation
  - Rotary encoder with double evaluation
  - Rotary encoder with quadruple evaluation
- Counter modes:
  - Endless counting
  - Count once
  - Count periodically
- Measuring modes:
  - Frequency measurement
  - Rotational speed measurement
  - Period measurement
- Programmable input:
  - PLC input
  - Enable (HW gate)
  - Synchronization
  - Periodic synchronization
  - Latch
  - Latch & retrigger
  - Can be inverted
- Programmable output:
  - PLC output
  - Counter reading >= Reference value
  - Counter reading <= Reference value
  - Counter reading = Reference value
  - Apply substitute value at STOP
- Filter: 10/50/100/500 KHz
- All inputs can be inverted
- Limits for counter and readings
- Hysteresis for input
- Pulse duration for output
- Refresh rate/averaging time for measuring modes
- 8 bytes of input data (counter value and status)
- 8 bytes of output data (preset counter value and commands)

Technical data/Ordering data	
Function Module – 1 x Counter 24 V, 500 kHz, 32-Bit	**600-300-7AA01**
Number of counters	1
Counter bit depth	32 bits
Input frequency	Max. 125 KHz
Counting frequency	Max. 500 KHz (for quadruple evaluation)
Input voltage	24 VDC
Electrically isolated from backplane bus	Yes
Inputs/outputs electrically isolated from each other	No
· Current draw · External · Internal	 10 mA + load Max. 86 mA
Power dissipation	0.8 W
Input characteristic curve	Type 2, EN 61131-2
Output current · Rated · Leakage current	 500 mA Max. 0.5 mA
Short-circuit protection	Electronic
Parameter configuration length	16 bytes
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



1 x Counter 5 V, 4 MHz, 32-Bit

Terminal Assignment	
Terminal	**Assignment**
1	A
2	-A
3	B
4	-B
5	N
6	-N
7	5 VDC
8	GND
9	L+ 24 VDC
10	AUX

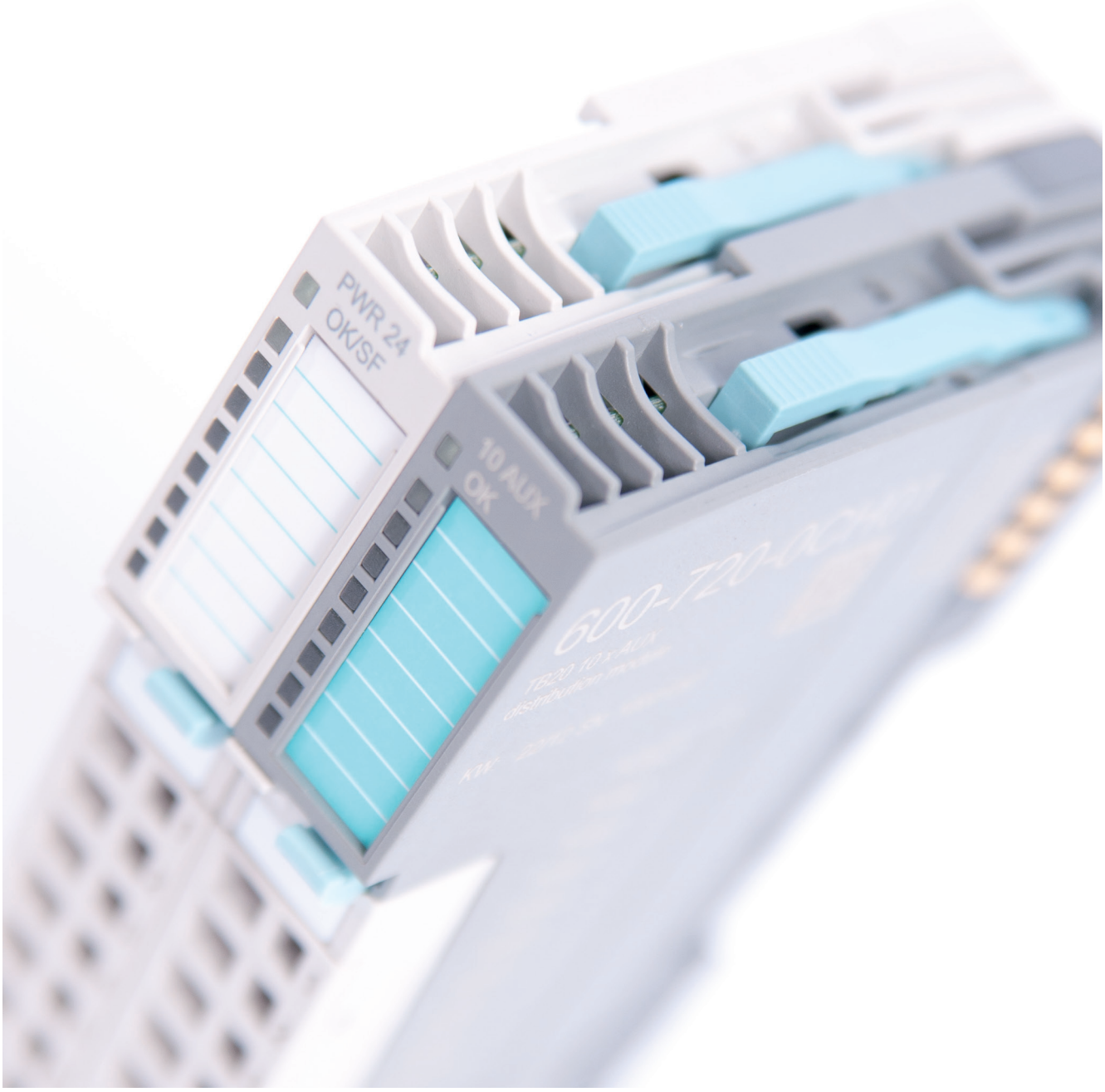


Counters are used to detect pulses that are faster than a controller's cycles, i.e., signals that the controller will be unable to detect properly and that therefore need to be preprocessed. This counter module detects the edges of 5-V differential signals (as per the RS-422 standard) as pulses. This transmission method, i.e., differential signaling, is particularly well-suited to high transmission frequencies due to its high degree of noise immunity. Pulses can be counted or converted as a frequency, rotational speed, or period duration

General characteristics

- 32-bit counter
- Up to 4 MHz (quadruple evaluation)
- Accommodates 5-V incremental encoders (RS-422)
- Index input
- 5 V supply for sensors
- Capturing modes:
  - Pulse & direction
  - Rotary encoder with double evaluation
  - Rotary encoder with quadruple evaluation
- Counter modes:
  - Endless counting
  - Count once
  - Count periodically
- Measuring modes:
  - Frequency measurement
  - Rotational speed measurement
  - Period measurement
- Filter: 100 KHz/500 KHz/1 MHz/2 MHz
- Limits for counter and readings
- Refresh rate/averaging time for measuring modes
- 8 bytes of input data (counter value and status)
- 8 bytes of output data (preset counter value and commands)

Technical data/Ordering data	
Function Module – 1 x Counter 5 V, 4 MHz, 32-Bit	**600-310-7AA01**
Number of counters	1
Counter bit depth	32 bits
Input frequency	Max. 1 MHz
Counting frequency	Max. 4 MHz (for quadruple evaluation)
Input voltage	5 VDC, RS-422 differential signal
Electrically isolated from backplane bus	Yes
Sensor supply	5 V ±10 %, 190 mA
Current draw · External · Internal	 50 mA 86 mA
Power dissipation	1 W
Parameter configuration length	15 bytes
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



System Modules

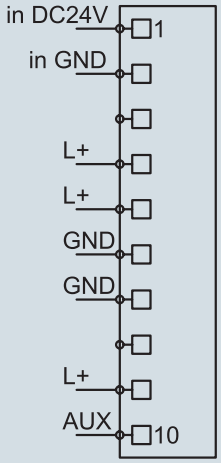
Power modules
Power and isolation modules
Potential distributors

Power Module 24 VDC



Power Module 24 VDC

Terminal Assignment	
Terminal	**Assignment**
1	24 VDC IN
2	GND IN
3	-
4	L+, 24 VDC
5	L+, 24 VDC
6	GND
7	GND
8	-
9	L+, 24 VDC
10	AUX



The 24 VDC power module provides a new supply voltage for the backplane bus and also serves as a power and isolation module for the power bus' 24 VDC, GND, and AUX.

General characteristics

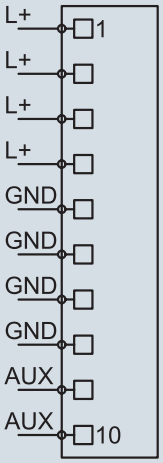
- New supply voltage for the backplane bus
- 2.5 A, 5 VDC output current for the backplane bus
- Powers the power bus to the right
- Segments the power bus on the left
- A green LED indicates the 24 VDC status
- Diagnostic messages in the event of a loss of voltage or short circuit on the backplane bus
- A bi-color LED (blue/red) indicates the module's operating status and any malfunctions

Technical data/Ordering data	
System Module – Power Module 24 VDC	**600-700-0AA01**
Electrically isolated from backplane bus	No
Current draw · External · Internal	 Max. 10 mA + load Max. 35 mA
24 VDC supply	18–30 VDC
Rated input current	Max. 8 A, overcurrent protection device
Reverse polarity protection	Up to 60 V, electronic
Power dissipation	Max. 0.7 W
Load · Per contact · Total load, 24 VDC · Total load, GND · Total load, AUX	 8 A 8 A 8 A 8 A
Group error indicator	Red LED
Hot-pluggable	No
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g



Power and Isolation Module 24 VDC, 8 A

Terminal Assignment	
Terminal	**Assignment**
1	L+, 24 VDC
2	L+, 24 VDC
3	L+, 24 VDC
4	L+, 24 VDC
5	GND
6	GND
7	GND
8	GND
9	AUX
10	AUX



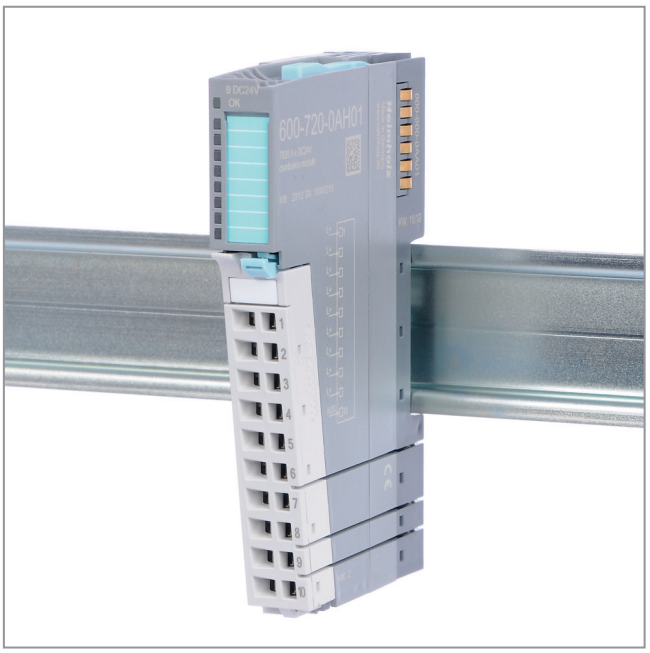
The 24 VDC, 8 A power and isolation module serves as a power supply module for the power bus' 24 VDC, GND, and AUX to the right, while segmenting the power bus on the left.
This module can be used to subdivide the power bus into individual segments.

General characteristics

- Powers the power bus to the right
- Segments the power bus on the left
- A green LED indicates the 24 VDC status
- A blue LED indicates the module's operating status

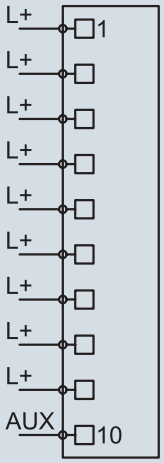
Technical data/Ordering data	
System Module – Power and Isolation Module 24 VDC, 8 A	**600-710-0AA01**
Electrically isolated from backplane bus	Yes
Current draw · External · Internal	 Max. 22 mA Max. 5 mA
Power dissipation	Max. 0.3 W
Load · Per contact · Total 24 VDC supply · Total GND supply · Total AUX supply	 8 A 8 A 8 A 8 A
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

Potential Distributor 9 x 24 VDC



Potential Distributor 9 x 24 VDC

Terminal Assignment	
Terminal	**Assignment**
1	L+, 24 VDC
2	L+, 24 VDC
3	L+, 24 VDC
4	L+, 24 VDC
5	L+, 24 VDC
6	L+, 24 VDC
7	L+, 24 VDC
8	L+, 24 VDC
9	L+, 24 VDC
10	AUX



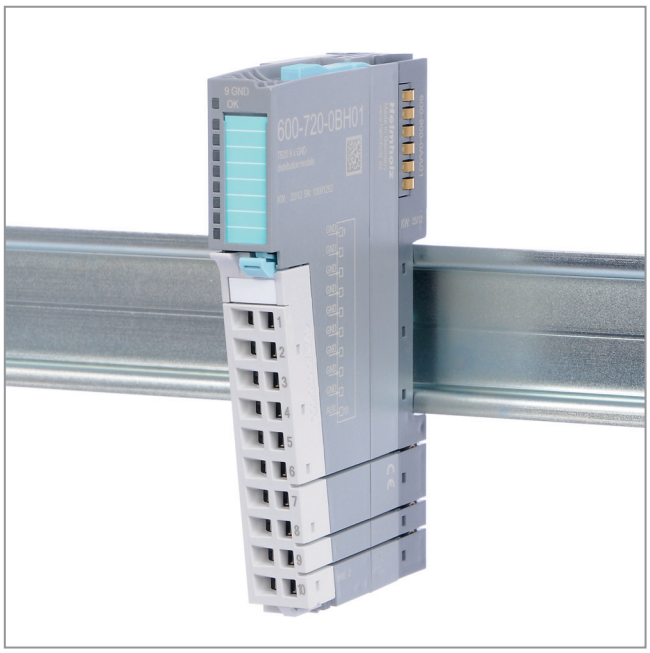
The 9 x 24 VDC potential distributor makes the 24 VDC supply from the power bus available on the front connector.

General characteristics

- Max. 8 A supply load
- Supplies its outputs using the power bus
- A blue LED indicates the module's operating status

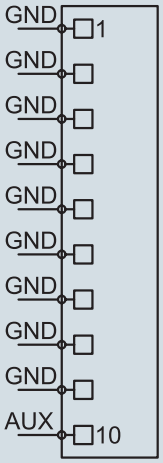
Technical data/Ordering data	
System Module – Potential Distributor 9 x 24 VDC	**600-720-0AH01**
Number of outputs	9
Electrically isolated from backplane bus	Yes
Current draw · External · Internal	 0 mA Max. 22 mA
Power dissipation	Max. 0.1 W
Load · Per contact · Total load	 8 A 8 A
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

Potential Distributor 9 x GND



Potential Distributor 9 x GND

Terminal Assignment	
Terminal	**Assignment**
1	GND
2	GND
3	GND
4	GND
5	GND
6	GND
7	GND
8	GND
9	GND
10	AUX



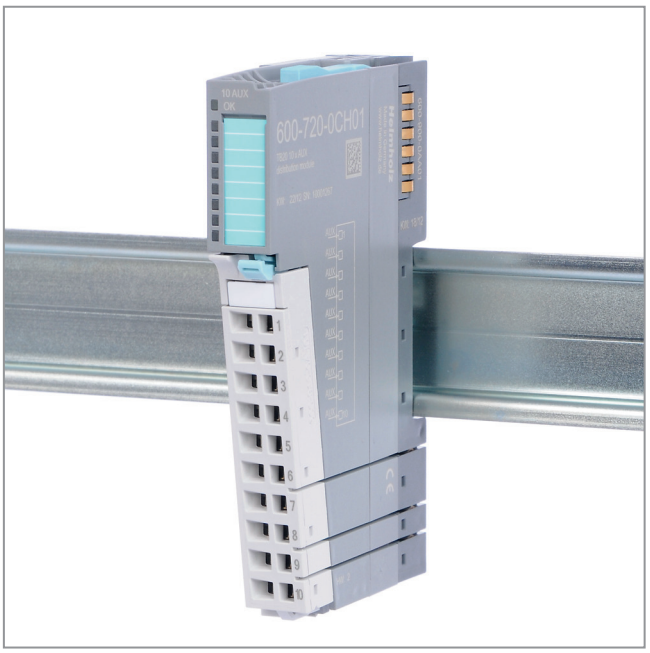
The 9 x GND potential distributor makes the GND connection from the power bus available on the front connector.

General characteristics

- Max. 8 A supply load
- Supplies its outputs using the power bus
- A blue LED indicates the module's operating status

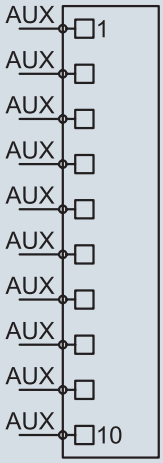
Technical data/Ordering data	
System Module – Potential Distributor 9 x GND	**600-720-0BH01**
Number of outputs	9
Electrically isolated from backplane bus	Yes
Current draw · External · Internal	 0 mA Max. 22 mA
Power dissipation	Max. 0.1 W
Load · Per contact · Total load	 8 A 8 A
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

Potential Distributor 10 x AUX



Potential Distributor 10 x AUX

Terminal Assignment	
Terminal	**Assignment**
1	AUX
2	AUX
3	AUX
4	AUX
5	AUX
6	AUX
7	AUX
8	AUX
9	AUX
10	AUX



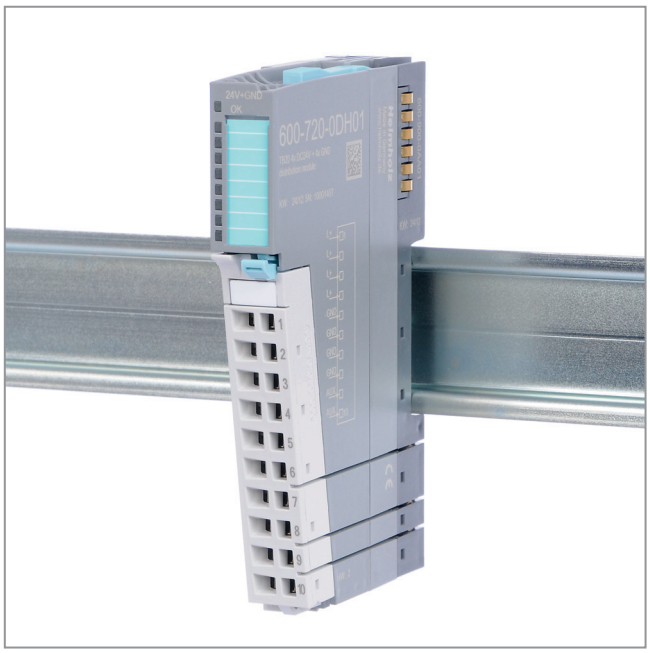
The 10 x AUX potential distributor makes the AUX connection from the power bus available on the front connector.

General characteristics

· Max. 8 A supply load
· Supplies its outputs using the power bus
· A blue LED indicates the module's operating status

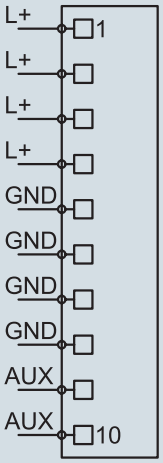
Technical data/Ordering data	
System Module – Potential Distributor 10 x AUX	**600-720-0CH01**
Number of outputs	10
Electrically isolated from backplane bus	Yes
Current draw · External · Internal	 0 mA Max. 22 mA
Power dissipation	Max. 0.1 W
Load · Per contact · Total load	 8 A 8 A
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 70 g

Potential Distributor 4 x 24 VDC + 4 x GND



Potential Distributor 4 x 24 VDC + 4 x GND

Terminal Assignment	
Terminal	**Assignment**
1	L+, 24 VDC
2	L+, 24 VDC
3	L+, 24 VDC
4	L+, 24 VDC
5	GND
6	GND
7	GND
8	GND
9	AUX
10	AUX



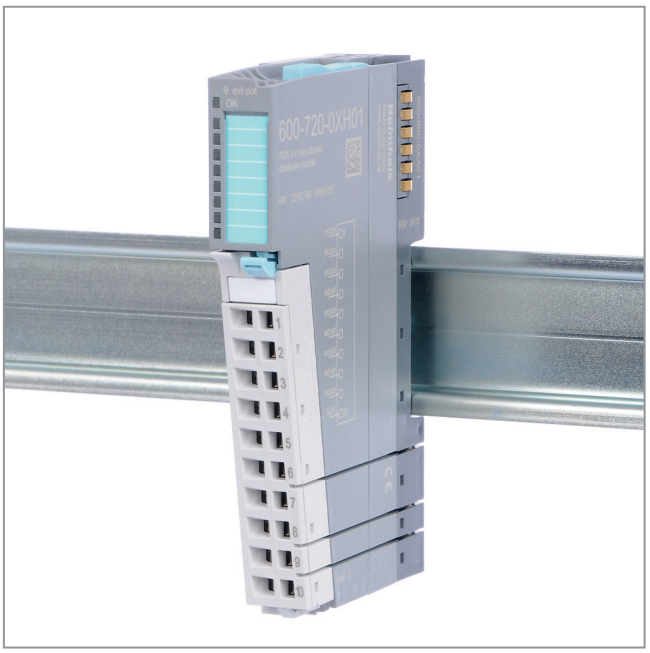
The 4 x 24 VDC + 4 x GND potential distributor makes the 24 VDC supply and the GND connection from the power bus available on the front connector.

General characteristics

- Max. 8 A supply load
- Supplies its outputs using the power bus
- A blue LED indicates the module's operating status

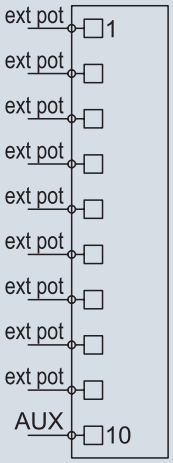
Technical data/Ordering data	
System Module – Potential Distributor 4 x 24 VDC + 4 x GND	**600-720-0DH01**
Number of outputs	10, in three groups: 4 x 24 VDC, 4 x GND, 2 x AUX
Electrically isolated from backplane bus	Yes
Current draw · External · Internal	 0 mA Max. 22 mA
Power dissipation	Max. 0.1 W
Load · Per contact · Total load, 24 VDC · Total load, GND · Total load, AUX	 8 A 8 A 8 A 8 A
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 60 g

Potential Distributor 9 x Free pot.



Potential Distributor 9 x Free pot.

Terminal Assignment	
Terminal	**Assignment**
1	External pot.
2	External pot.
3	External pot.
4	External pot.
5	External pot.
6	External pot.
7	External pot.
8	External pot.
9	External pot.
10	AUX



The “9 x free” potential distributor makes 9 contacts that are connected to each other available on the front connector.
The potential distributed through these contacts can be freely chosen.

General characteristics

- Max. 8 A supply load
- Can accommodate any supply potential
- A blue LED indicates the module’s operating status

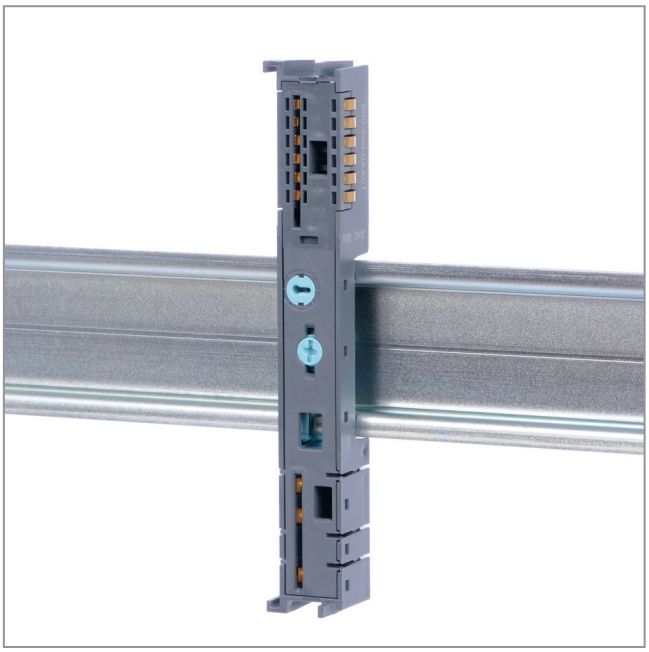
Technical data/Ordering data	
System Module – Potential Distributor 9 x Free pot.	**600-720-0XH01**
Number of outputs	9
Electrically isolated from backplane bus	Yes
Current draw · External · Internal	 0 mA Max. 22 mA
Power dissipation	Max. 0.1 W
Load · Per contact · Total load	 8 A 8 A
Permissible potential difference relative to GND	48 VAC
Hot-pluggable	Yes
Dimensions (H x W x D)	110 mm x 14 mm x 73 mm
Weight	Approx. 60 g



Spare Parts/Accessories

Base modules
Front connectors
Final bus covers
Label sheets

Base Modules



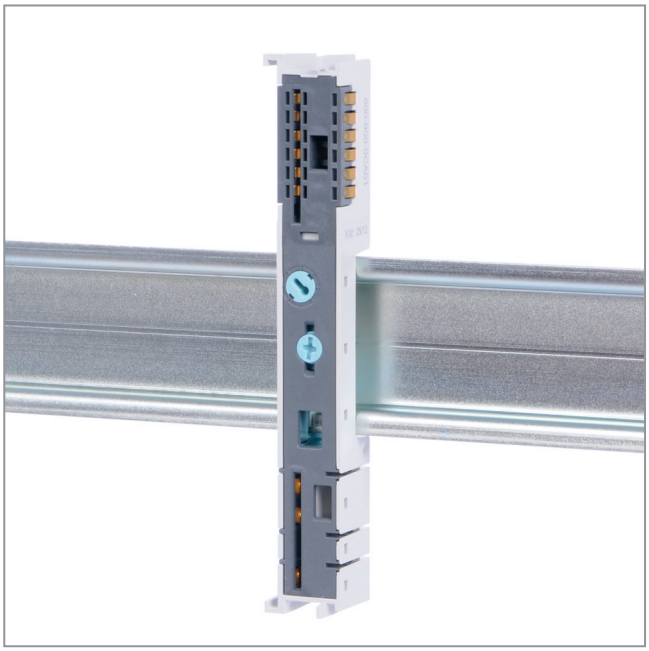
Base Module, 14 mm-width Standard



Base Module, 25 mm-width



Base Module for Power and Isolation Modules



Base Module for Power Modules and Bus Couplers

The base modules for the TB20 system are as spare parts available in sets of five.

Hint
Modules are delivered as complete assembled units with front connector and base module and can be installed immediately.

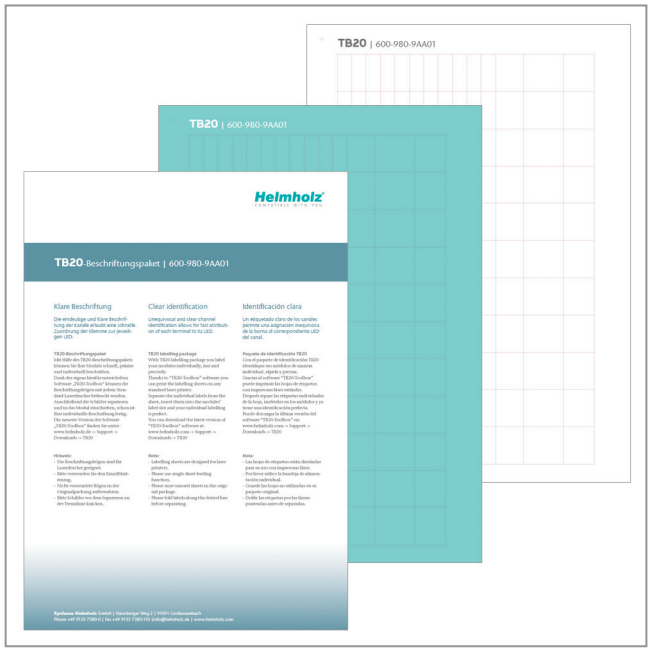
Ordering data	
Base Module, 14 mm-Width Standard (set of five)	600-900-9AA01
Base Module, 25 mm-Width (set of five)	600-900-9AA21
Base Module, for Power and Isolation Module (set of five)	600-900-9BA01
Base Module, for Power Module or Bus Coupler (set of five)	600-900-9CA01



10-Terminal Front Connector, 20-Terminal Front Connector, Final Bus Cover

The front connectors and the final bus cover for the TB20 system are available as spare parts in sets of five.

Hint
Modules are delivered as complete assembled units with front connector and base module and can be installed immediately.



TB20 Labelling Package

The TB20 labelling package allows users to label their modules quickly, accurately, and according to their specific needs.
Our proprietary TB20 ToolBox program makes it possible to print out label sheets with laser printers, after which you will only need to separate the labels, slide them into the relevant module, and voilà! Your custom labels will be ready and in place.
To download the latest version of TB20 ToolBox, please visit: www.helmholz.com -> Support -> Downloads -> TB20

Contents
Each label package includes the following:
- Title page/quick start guide
- Eight green A4 label sheets
- Two white A4 label sheets

Each A4 label sheet includes:
- 121 labels for 14-mm modules
- 11 labels for 25-mm modules
- 11 labels for bus couplers
- 11 labels for communication modules

General characteristics

- Unique, clear channel labeling
- Makes it possible to quickly determine which terminals correspond to which LEDs
- Compatible with laser printers
- Free TB20 ToolBox software

Ordering data	
10-Terminal Front Connector (set of five)	600-910-9AJ01
20-Terminal Front Connector (set of five)	600-910-9AT21
Final Bus Cover (set of five)	600-920-9AA01
TB20 Labelling Package	600-980-9AA01

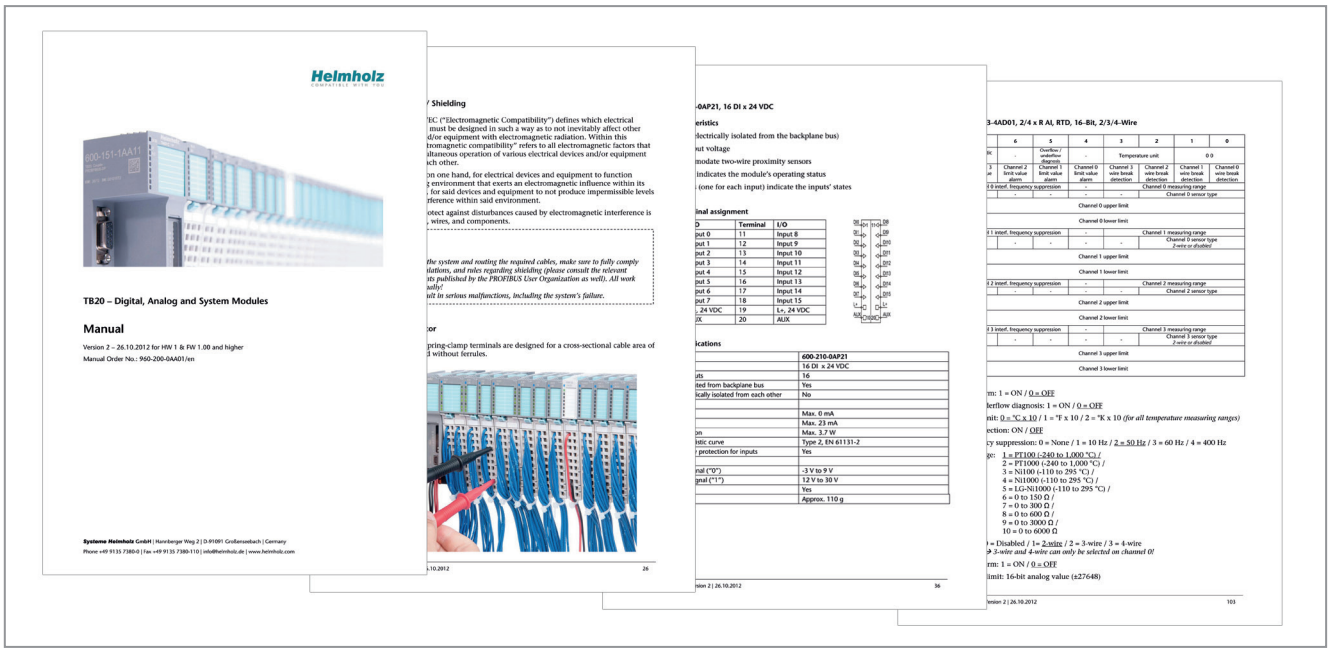
TB20 Starter Kit for PROFIBUS-DP



TB20 Starter Kit for PROFIBUS-DP

The TB20 starter kit will enable you to become familiar with the new TB20 system and test it extensively without breaking the bank. This starter kit includes the most common modules, all required software, and the accessories you will need to get started.

Ordering data	
TB20 Starter Kit, PROFIBUS-DP	**600-990-STRT1**
Each starker kit comes with the following:	
· 1 x Bus Coupler PROFIBUS-DP	600-151-1AA11
· 1 x Digital Input Module – DI 4 x 24 VDC	600-210-0AD01
· 1 x Digital Input Module – DI 16 x 24 VDC	600-210-0AP21
· 1 x Digital Output Module – DO 8 x 24 VDC, 500 mA	600-220-0AH01
· 1 x System Module – 24 VDC, 8 A Power and Isolation Module	600-710-0AA01
· 1 x System Module – 9 x 24 VDC Potential Distributor	600-720-0AH01
· 1 x Analog Input Module – AI 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit	600-252-4AB01
· 1 x Analog Output Module – AO 2 x U, ±10 V, 0–10 V, 1–5 V, 12-Bit	600-261-4AB01
· 1 x PROFIBUS cable ready-to-use, flexible, 1-m (2 x PROFIBUS connectors with PG port)	700-970-2VK01
· 1 x Mini-USB cable	700-755-8VK11
· 1 x DIN rail	
· 1 x USB flash drive with software and manuals	
· 1 x Transportation case	



TB20 Manuals

The technical documentation for the TB20 system is made up of several manuals. These manuals are subdivided by module and coupler type.
Each manual contains all necessary hardware and programming information, including a detailed description of the relevant individual modules.
In addition, each manual also includes instructions for correctly assembling and installing the relevant modules.

Ordering data	
TB20 Manual – PROFIBUS DP Coupler, German/English	**960-151-1AA11**
TB20 Manual – CANopen® Slave Coupler, German/English	**960-160-1AA11**
TB20 Manual – PROFINET IO Coupler, German/English	**960-180-1AA11**
TB20 Manual – Digital, Analog, and System Modules, German/English	**960-200-0AA01**



PROFIBUS connectors
Systeme Helmholz GmbH has a comprehensive range of PROFIBUS connectors that can be used with TB20 couplers.

For detailed information, ordering information, and technical specifications, please consult our main catalog or visit us at www.helmholz.com.



PROFIBUS repeaters
Repeaters are needed in applications that involve large PROFIBUS networks with more than 32 nodes or long cable distances. Systeme Helmholz GmbH has a wide variety of repeaters available. FLEXtra® multiRepeater enable users, for example, to set up star topologies in PROFIBUS.
For detailed information, ordering information, and technical specifications, please consult our main catalog or visit us at www.helmholz.com.



PROFIBUS FO
The devices in the FLEXtra® FO and OPTopus series enable users to convert electrical PROFIBUS signals into optical signals. This makes it possible to take advantage of all the benefits provided by optical signal transmissions in industrial automation applications (e.g., in spatially large networks and environments vulnerable to EMC) without the need for complex technical solutions.
For detailed information, ordering information, and technical specifications, please consult our main catalog or visit us at www.helmholz.com.



CAN Bus communication modules
The various CAN Bus modules available from Systeme Helmholz GmbH make up a wide range of products that can be used to connect automation devices to CAN Buses. Additional functions, as well as customer-specific features, further increase their value.

For detailed information, ordering information, and technical specifications, please consult our main catalog or visit us at www.helmholz.com.



CAN bus connectors
Systeme Helmholz GmbH has a comprehensive range of CAN connectors that can be used with TB20 couplers.
For detailed information, ordering information, and technical specifications, please consult our main catalog or visit us at www.helmholz.com.



CAN Bridge
Systeme Helmholz GmbH's CAN Bridge makes it possible to connect two CAN networks of the same type or of different types. It can be used as a message repeater to expand network distances, as well as to connect different CAN networks together.
For detailed information, ordering information, and technical specifications, please consult our main catalog or visit us at www.helmholz.com.

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