Signal modules digital

Structure and Function

Signal modules (SM) to connect sensors and actuators are the interfaces of the system to the process. Digital signal modules acquire the binary control signals to and from the process level.

A variety of different digital signal modules provides exactly the I/O modules, which are required for each task. The digital modules differ in the number of channels, voltage and current ranges, isolation, and diagnostic and alarm capability.

Each signal module consists of a terminal and an electronic module.

The terminal module (TM) contains the receptacle for the electronic module (EM), the backplane connectors and contacts for the distribution of the load power supply electronics, the modular connection to DC 24 V load power supply and the staircase-shaped terminal block for wiring.

Furthermore the terminal module processes a locking system for fixing to a profile rail. The SLIO system can also be constructed "block by block" outside the cabinet and later assembled as a complete system in the control cabinet.

The functionality of the signal module is defined via the electronics module that is connected by a secure sliding mechanism to the terminal module.

During service the defective electronic module can be replaced without detaching the wiring.

Characteristics

- Electrically isolated digital inputs and outputs to the backplane bus
- 2, 4 or 8 channel
- Various modules, suitable for switches and proximity switches as well as for measuring transducers
- Direct mapping and readability of the channel conditions via status LEDs
- Safe and time-saving installation by the terminal assignment mounted on the module
- When changing the module equipment identification (BMK) is retained on the TM
- Individual single-channel lettering on insertion strip
- 24 month warranty

Overview

Order no.	Name/Description	Page
Digital input modules		
021-1BB00	**SM 021 - Digital input** › 2 inputs	**29**
021-1BB10	**SM 021 - Digital input** › 2 fast inputs › Input filter time delay parameterizable 2 µs...4 ms	**29**
021-1BB50	**SM 021 - Digital input** › 2 inputs › Active low input	**29**
021-1BB70	**SM 021 - Digital input** › 2 inputs › Time stamp	**29**
021-1BD00	**SM 021 - Digital input** › 4 inputs	**32**
021-1BD10	**SM 021 - Digital input** › 4 fast inputs › Input filter time delay parameterizable 2 µs...4 ms	**32**
021-1BD40	**SM 021 - Digital input** › 4 inputs › Connect 2/3-wire	**32**
021-1BD50	**SM 021 - Digital input** › 4 inputs › Active low input	**32**
021-1BD70	**SM 021 - Digital input** › 4 inputs › Time stamp	**35**
021-1BF00	**SM 021 - Digital input** › 8 inputs	**35**
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021-1SD00	**SM 021 - Digital input** › 4 inputs › Safety	**35**
Digital output modules		
022-1BB00	**SM 022 - Digital output** › 2 outputs › Output current 0.5 A	**38**
022-1BB20	**SM 022 - Digital output** › 2 outputs › Output current 2 A	**38**
022-1BB50	**SM 022 - Digital output** › 2 Low-Side outputs › Output current 0.5 A	**38**
022-1BB70	**SM 022 - Digital output** › 2 outputs › Time stamp › Output current 0.5 A	**38**
022-1BB90	**SM 022 - Digital output** › 2 outputs › PWM	**41**
022-1BD00	**SM 022 - Digital output** › 4 outputs › Output current 0.5 A	**41**
022-1BD20	**SM 022 - Digital output** › 4 outputs › Output current 2 A	**41**
022-1BD50	**SM 022 - Digital output** › 4 Low-Side outputs › Output current 0.5 A	**41**
022-1BD70	**SM 022 - Digital output** › 4 outputs › Time stamp › Output current 0.5 A	**44**
022-1BF00	**SM 022 - Digital output** › 8 outputs › Output current 0.5 A	**44**

Overview

Order no.	Name/Description	Page
022-1BF50	**SM 022 - Digital output** › 8 Low-Side outputs › Output current 0.5 A	**44**
022-1HB10	**SM 022 - Digital output** › 2 relay outputs › DC 30 V/ AC 230 V › Output current 3 A	**44**
022-1SD00	**SM 022 - Digital output** › 4 outputs › Safety › Output current 0.5 A	**47**

Digital input modules

Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

Order number	021-1BB00	021-1BB10	021-1BB50	021-1BB70
Figure				
Type	SM 021	SM 021	SM 021	SM 021
Module ID	0001 9F82	000A 1F02	0002 9F82	0F01 47C1
General information				
Note	-	-	-	-
Features	› 2 inputs	› 2 fast inputs › Input filter time delay parameterizable 2 µs...4 ms	› 2 inputs › Active low input	› 2 inputs › Time stamp
Current consumption/power loss				
Current consumption from backplane bus	55 mA	95 mA	60 mA	85 mA
Power loss	0.5 W	0.9 W	0.5 W	0.9 W
Technical data digital inputs				
Number of inputs	2	2	2	2
Cable length, shielded	1000 m	1000 m	1000 m	1000 m
Cable length, unshielded	600 m	600 m	600 m	600 m
Rated load voltage	-	DC 20.4...28.8 V	-	DC 24 V
Current consumption from load voltage L+ (without load)	-	12 mA	-	10 mA
Rated value	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Input voltage for signal "0"	DC 0...5 V	DC 0...5 V	DC 15...28.8 V	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V	DC 15...28.8 V	DC 0...5 V	DC 15...28.8 V
Input voltage hysteresis	-	-	-	-
Frequency range	-	-	-	-
Input resistance	-	-	-	-
Input current for signal "1"	3 mA	3 mA	3 mA	3 mA
Connection of Two-Wire-BEROs possible	✓	✓	✓	✓
Max. permissible BERO quiescent current	0.5 mA	0.5 mA	0.5 mA	0.5 mA
Input delay of "0" to "1"	3 ms	parameterizable 2µs - 3ms	3 ms	parameterizable 2µs - 3ms
Input delay of "1" to "0"	3 ms	parameterizable 2µs - 3ms	3 ms	parameterizable 2µs - 3ms
Number of simultaneously utilizable inputs horizontal configuration	2	2	2	2
Number of simultaneously utilizable inputs vertical configuration	2	2	2	2
Input characteristic curve	IEC 61131, type 1	IEC 61131, type 1	-	IEC 61131, type 1
Initial data size	2 Bit	2 Bit	2 Bit	60 Byte
Status information, alarms, diagnostics				
Status display	green LED per channel	green LED per channel	green LED per channel	green LED per channel
Interrupts	no	yes, parameterizable	no	no
Process alarm	no	yes, parameterizable	no	no
Diagnostic interrupt	no	yes, parameterizable	no	no

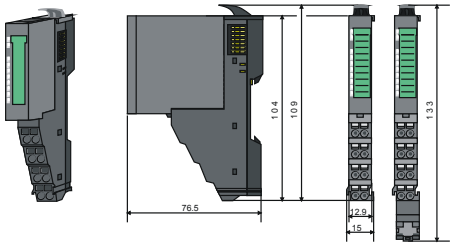
Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

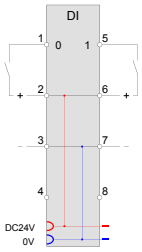
Order number	021-1BB00	021-1BB10	021-1BB50	021-1BB70
Diagnostic functions	no	yes	no	no
Diagnostics information read-out	none	possible	none	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	none	none	none	none
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Safety				
Safety protocol	-	-	-	-
Safety requirements	-	-	-	-
Secure user address	-	-	-	-
Watchdog	-	-	-	-
Two channels	-	-	-	-
Test pulse outputs	-	-	-	-
Datasizes				
Input bytes	1	1	1	20 / 60
Output bytes	0	0	0	0
Parameter bytes	0	9	0	10
Diagnostic bytes	0	20	0	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

Connections, Interfaces

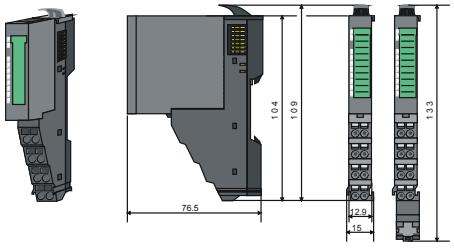
Signal modules digital | Digital input modules						
021-1BB00	021-1BD00	021-1BD70				
021-1BB10	021-1BD10	021-1BF00				
021-1BB50	021-1BD40	021-1BF50				
021-1BB70	021-1BD50	021-1SD00				

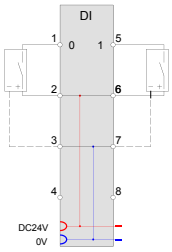
021-1BB00





021-1BB10





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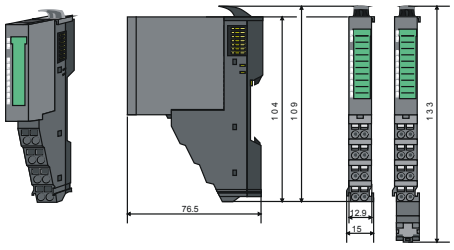

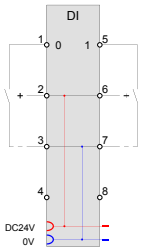

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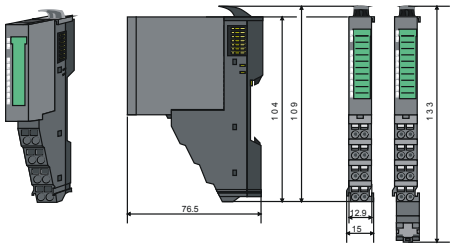
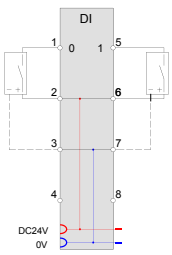




Digital input modules

Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

Order number	021-1BD00	021-1BD10	021-1BD40	021-1BD50
Figure				
Type	SM 021	SM 021	SM 021	SM 021
Module ID	0003 9F84	0009 1F04	0008 9F84	0004 9F84
General information				
Note	-	-	-	-
Features	› 4 inputs	› 4 fast inputs › Input filter time delay parameterizable 2 µs...4 ms	› 4 inputs › Connect 2/3-wire	› 4 inputs › Active low input
Current consumption/power loss				
Current consumption from backplane bus	55 mA	95 mA	55 mA	65 mA
Power loss	0.6 W	0.95 W	0.6 W	0.6 W
Technical data digital inputs				
Number of inputs	4	4	4	4
Cable length, shielded	1000 m	1000 m	1000 m	1000 m
Cable length, unshielded	600 m	600 m	600 m	600 m
Rated load voltage	-	DC 20.4...28.8 V	-	-
Current consumption from load voltage L+ (without load)	-	15 mA	-	-
Rated value	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Input voltage for signal "0"	DC 0...5 V	DC 0...5 V	DC 0...5 V	DC 15...28.8 V
Input voltage for signal "1"	DC 15...28.8 V	DC 15...28.8 V	DC 15...28.8 V	DC 0...5 V
Input voltage hysteresis	-	-	-	-
Frequency range	-	-	-	-
Input resistance	-	-	-	-
Input current for signal "1"	3 mA	3 mA	3 mA	3 mA
Connection of Two-Wire-BEROs possible	✓	✓	✓	✓
Max. permissible BERO quiescent current	0.5 mA	0.5 mA	0.5 mA	0.5 mA
Input delay of "0" to "1"	3 ms	parameterizable 2µs - 3ms	3 ms	3 ms
Input delay of "1" to "0"	3 ms	parameterizable 2µs - 3ms	3 ms	3 ms
Number of simultaneously utilizable inputs horizontal configuration	4	4	4	4
Number of simultaneously utilizable inputs vertical configuration	4	4	4	4
Input characteristic curve	IEC 61131, type 1	IEC 61131, type 1	IEC 61131, type 1	-
Initial data size	4 Bit	4 Bit	4 Bit	4 Bit
Status information, alarms, diagnostics				
Status display	green LED per channel	green LED per channel	green LED per channel	green LED per channel
Interrupts	no	yes, parameterizable	no	no
Process alarm	no	yes, parameterizable	no	no
Diagnostic interrupt	no	yes, parameterizable	no	no

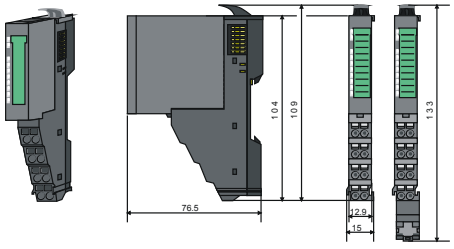
Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

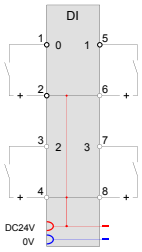
Order number	021-1BD00	021-1BD10	021-1BD40	021-1BD50
Diagnostic functions	no	yes	no	no
Diagnostics information read-out	none	possible	none	none
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	none	none	none	none
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Safety				
Safety protocol	-	-	-	-
Safety requirements	-	-	-	-
Secure user address	-	-	-	-
Watchdog	-	-	-	-
Two channels	-	-	-	-
Test pulse outputs	-	-	-	-
Datasizes				
Input bytes	1	1	1	1
Output bytes	0	0	0	0
Parameter bytes	0	11	0	0
Diagnostic bytes	0	20	0	0
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

Connections, Interfaces

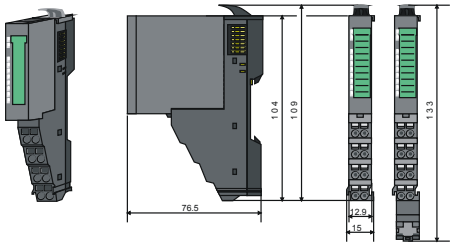
Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

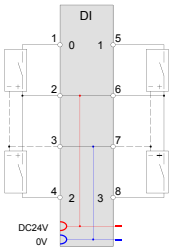
021-1BD00



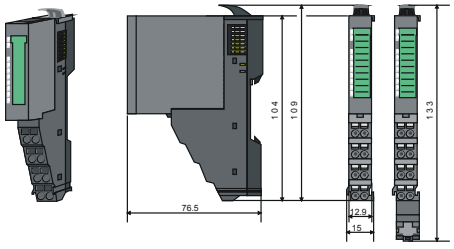


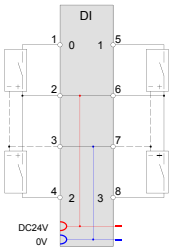
021-1BD10



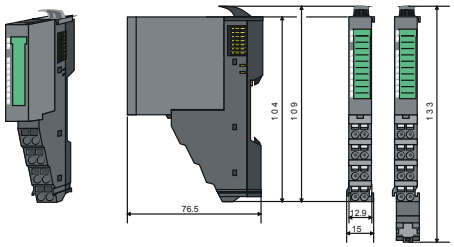


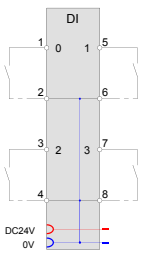
021-1BD40





021-1BD50





Digital input modules

Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

Order number	021-1BD70	021-1BF00	021-1BF50	021-1SD00
Figure				
Type	SM 021	SM 021	SM 021	SM 021
Module ID	0F03 47C2	0005 9FC1	0007 9FC1	0C41 2E00
General information				
Note	-	-	-	-
Features	› 4 inputs › Time stamp	› 8 inputs	› 8 inputs › Active low input	› 4 inputs › Safety
Current consumption/power loss				
Current consumption from backplane bus	85 mA	60 mA	65 mA	80 mA
Power loss	0.95 W	0.9 W	0.9 W	0.8 W
Technical data digital inputs				
Number of inputs	4	8	8	4
Cable length, shielded	1000 m	1000 m	1000 m	1000 m
Cable length, unshielded	600 m	600 m	600 m	600 m
Rated load voltage	DC 24 V	-	-	-
Current consumption from load voltage L+ (without load)	15 mA	-	-	-
Rated value	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Input voltage for signal "0"	DC 0...5 V	DC 0...5 V	DC 15...28.8 V	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V	DC 15...28.8 V	DC 0...5 V	DC 15...28.8 V
Input voltage hysteresis	-	-	-	-
Frequency range	-	-	-	-
Input resistance	-	-	-	-
Input current for signal "1"	3 mA	3 mA	3 mA	3 mA
Connection of Two-Wire-BEROs possible	✓	✓	✓	✓
Max. permissible BERO quiescent current	0.5 mA	0.5 mA	0.5 mA	1.5 mA
Input delay of "0" to "1"	parameterizable 2µs - 3ms	3 ms	3 ms	parameterizable 1ms - 1s
Input delay of "1" to "0"	parameterizable 2µs - 3ms	3 ms	3 ms	parameterizable 1ms - 1s
Number of simultaneously utilizable inputs horizontal configuration	4	8	8	4
Number of simultaneously utilizable inputs vertical configuration	4	8	8	4
Input characteristic curve	IEC 61131, type 1	IEC 61131, type 1	-	IEC 61131, type 3
Initial data size	60 Byte	8 Bit	8 Bit	4 Bit
Status information, alarms, diagnostics				
Status display	green LED per channel	green LED per channel	green LED per channel	green LED per channel
Interrupts	no	no	no	yes, parameterizable
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	no	yes, parameterizable
Diagnostic functions	no	no	no	yes, parameterizable
Diagnostics information read-out	possible	none	none	possible

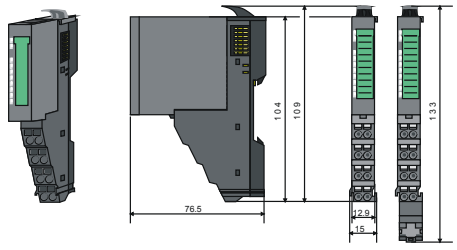
Signal modules digital | Digital input modules						
021-1BB00 021-1BB10 021-1BB50 021-1BB70	021-1BD00 021-1BD10 021-1BD40 021-1BD50	021-1BD70 021-1BF00 021-1BF50 021-1SD00				

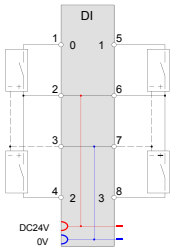
Order number	021-1BD70	021-1BF00	021-1BF50	021-1SD00
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	none	none	none	none
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Safety				
Safety protocol	-	-	-	PROFIsafe V2
Safety requirements	-	-	-	SIL CL 3 and PL e
Secure user address	-	-	-	1 - 4095
Watchdog	-	-	-	parameterizable 10ms - 1s
Two channels	-	-	-	Each 2 of 4 inputs switchable
Test pulse outputs	-	-	-	4
Datasizes				
Input bytes	20 / 60	1	1	5
Output bytes	0	0	0	5
Parameter bytes	12	0	0	44
Diagnostic bytes	20	0	0	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PC / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	in preparation

Connections, Interfaces

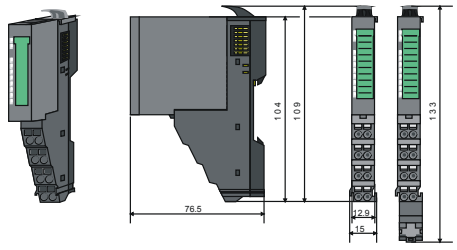
Signal modules digital | Digital input modules						
021-1BB00	021-1BD00	021-1BD70				
021-1BB10	021-1BD10	021-1BF00				
021-1BB50	021-1BD40	021-1BF50				
021-1BB70	021-1BD50	021-1SD00				

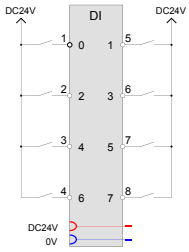
021-1BD70





021-1BF00





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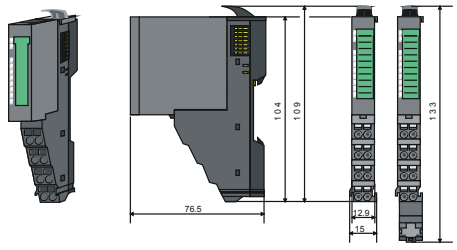

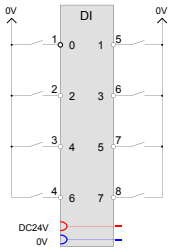

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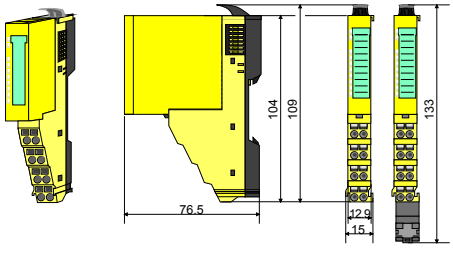
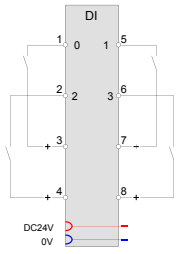




Digital output modules

Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

Order number	022-1BB00	022-1BB20	022-1BB50	022-1BB70
Figure				
Type	SM 022	SM 022	SM 022	SM 022
Module ID	0101 AF90	0102 AF90	0103 AF90	0F41 57E1
General information				
Note	-	-	-	-
Features	› 2 outputs › Output current 0.5 A	› 2 outputs › Output current 2 A	› 2 Low-Side outputs › Output current 0.5 A	› 2 outputs › Time stamp › Output current 0.5 A
Current consumption/power loss				
Current consumption from backplane bus	55 mA	60 mA	60 mA	85 mA
Power loss	0.4 W	0.55 W	0.4 W	0.95 W
Technical data digital outputs				
Number of outputs	2	2	2	2
Cable length, shielded	1000 m	1000 m	1000 m	1000 m
Cable length, unshielded	600 m	600 m	600 m	600 m
Rated load voltage	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	5 mA	10 mA	2.5 mA	15 mA
Total current per group, horizontal configuration, 40°C	1 A	4 A	1 A	1 A
Total current per group, horizontal configuration, 60°C	1 A	4 A	1 A	1 A
Total current per group, vertical configuration	1 A	4 A	1 A	1 A
Output current at signal "1", rated value	0.5 A	2 A	0.5 A	0.5 A
Output delay of "0" to "1"	30 µs	100 µs	30 µs	max. 100 ns
Output delay of "1" to "0"	175 µs	250 µs	100 µs	max. 100 ns
Minimum load current	-	-	-	-
Lamp load	10 W	10 W	10 W	10 W
Parallel switching of outputs for redundant control of a load	not possible	not possible	not possible	not possible
Parallel switching of outputs for increased power	not possible	not possible	not possible	not possible
Actuation of digital input	✓	✓	✓	✓
Switching frequency with resistive load	max. 1000 Hz	max. 1000 Hz	max. 1000 Hz	max. 40 kHz
Switching frequency with inductive load	max. 0.5 Hz	max. 0.5 Hz	max. 0.5 Hz	max. 40 kHz
Switching frequency on lamp load	max. 10 Hz	max. 10 Hz	max. 10 Hz	max. 40 kHz
Internal limitation of inductive shut-off voltage	L+ (-52 V)	L+ (-52 V)	+45 V	L+ (-52 V)
Short-circuit protection of output	yes, electronic	yes, electronic	yes, electronic	yes, electronic, and only highside
Trigger level	1 A	2.7 A	1.7 A	2.5 A
Number of operating cycle of relay outputs	-	-	-	-

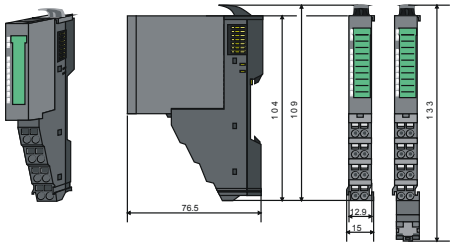
Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

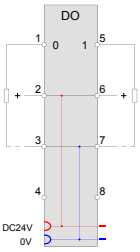
Order number	022-1BB00	022-1BB20	022-1BB50	022-1BB70
Switching capacity of contacts	-	-	-	-
Output data size	2 Bit	2 Bit	2 Bit	60 Byte
Status information, alarms, diagnostics				
Status display	green LED per channel	green LED per channel	green LED per channel	green LED per channel
Interrupts	no	no	no	no
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	no	no
Diagnostic functions	no	no	no	no
Diagnostics information read-out	none	none	none	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	none	none	none	none
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Safety				
Safety protocol	-	-	-	-
Safety requirements	-	-	-	-
Secure user address	-	-	-	-
Watchdog	-	-	-	-
Two channels	-	-	-	-
Test pulse length	-	-	-	-
Circuit monitoring	-	-	-	-
Datasizes				
Input bytes	0	0	0	4
Output bytes	1	1	1	20 / 60
Parameter bytes	0	0	0	6
Diagnostic bytes	0	0	0	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

Connections, Interfaces

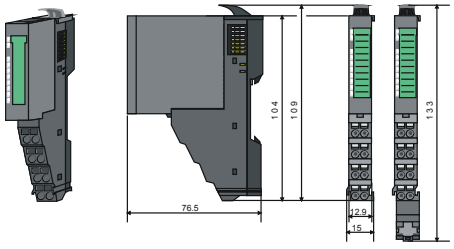
Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

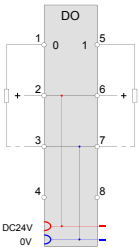
022-1BB00



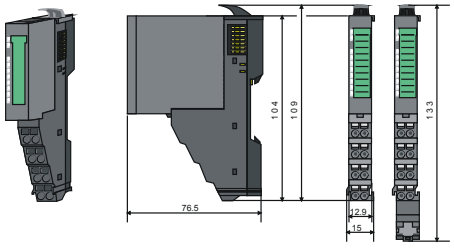


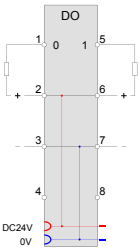
022-1BB20





022-1BB50





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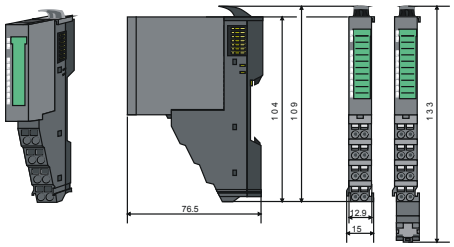
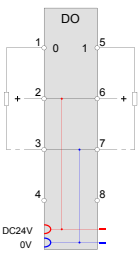




Digital output modules

Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

Order number	022-1BB90	022-1BD00	022-1BD20	022-1BD50
Figure				
Type	SM 022	SM 022	SM 022	SM 022
Module ID	0901 4880	0104 AFA0	0108 AFA0	0105 AFA0
General information				
Note	-	-	-	-
Features	› 2 outputs › PWM	› 4 outputs › Output current 0.5 A	› 4 outputs › Output current 2 A	› 4 Low-Side outputs › Output current 0.5 A
Current consumption/power loss				
Current consumption from backplane bus	85 mA	55 mA	65 mA	65 mA
Power loss	0.95 W	0.5 W	0.8 W	0.5 W
Technical data digital outputs				
Number of outputs	2	4	4	4
Cable length, shielded	1000 m	1000 m	1000 m	1000 m
Cable length, unshielded	600 m	600 m	600 m	600 m
Rated load voltage	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Current consumption from load voltage L+ (without load)	15 mA	10 mA	20 mA	5 mA
Total current per group, horizontal configuration, 40°C	1 A	2 A	4 A	2 A
Total current per group, horizontal configuration, 60°C	1 A	2 A	4 A	2 A
Total current per group, vertical configuration	1 A	2 A	4 A	2 A
Output current at signal "1", rated value	0.5 A	0.5 A	2 A	0.5 A
Output delay of "0" to "1"	max. 100 ns	30 µs	100 µs	30 µs
Output delay of "1" to "0"	max. 100 ns	175 µs	250 µs	100 µs
Minimum load current	-	-	-	-
Lamp load	10 W	10 W	10 W	10 W
Parallel switching of outputs for redundant control of a load	not possible	not possible	not possible	not possible
Parallel switching of outputs for increased power	not possible	not possible	not possible	not possible
Actuation of digital input	✓	✓	✓	✓
Switching frequency with resistive load	max. 40 kHz	max. 1000 Hz	max. 1000 Hz	max. 1000 Hz
Switching frequency with inductive load	max. 40 kHz	max. 0.5 Hz	max. 0.5 Hz	max. 0.5 Hz
Switching frequency on lamp load	max. 40 kHz	max. 10 Hz	max. 10 Hz	max. 10 Hz
Internal limitation of inductive shut-off voltage	L+ (-52 V)	L+ (-52 V)	L+ (-52 V)	+45 V
Short-circuit protection of output	yes, electronic, and only highside	yes, electronic	yes, electronic	yes, electronic
Trigger level	2.5 A	1 A	2.7 A	1.7 A
Number of operating cycle of relay outputs	-	-	-	-
Switching capacity of contacts	-	-	-	-

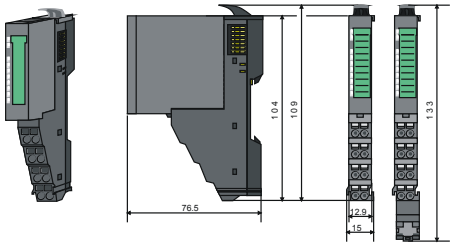
Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

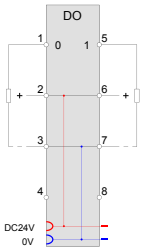
Order number	022-1BB90	022-1BD00	022-1BD20	022-1BD50
Output data size	12 Byte	4 Bit	4 Bit	4 Bit
Status information, alarms, diagnostics				
Status display	green LED per channel	green LED per channel	green LED per channel	green LED per channel
Interrupts	no	no	no	no
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	no	no
Diagnostic functions	no	no	no	no
Diagnostics information read-out	possible	none	none	none
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red SF LED	red SF LED	red SF LED
Channel error display	none	none	none	none
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Safety				
Safety protocol	-	-	-	-
Safety requirements	-	-	-	-
Secure user address	-	-	-	-
Watchdog	-	-	-	-
Two channels	-	-	-	-
Test pulse length	-	-	-	-
Circuit monitoring	-	-	-	-
Datasizes				
Input bytes	4	0	0	0
Output bytes	12	1	1	1
Parameter bytes	12	0	0	0
Diagnostic bytes	20	0	0	0
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

Connections, Interfaces

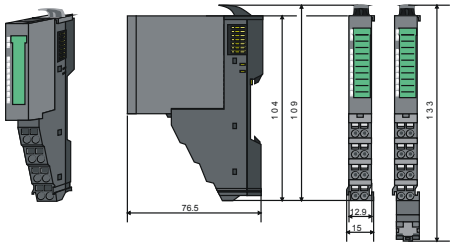
Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

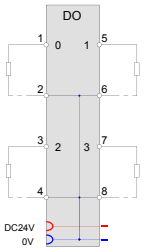
022-1BB90



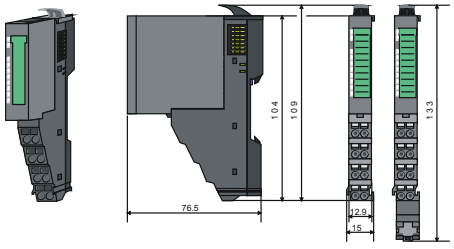


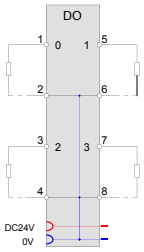
022-1BD00



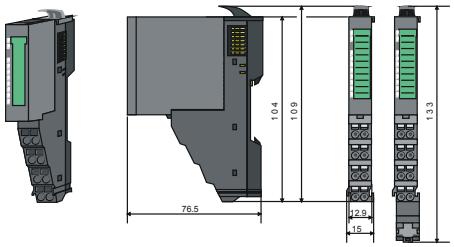


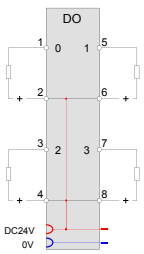
022-1BD20





022-1BD50





Digital output modules

Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

Order number	022-1BD70	022-1BF00	022-1BF50	022-1HB10
Figure				
Type	SM 022	SM 022	SM 022	SM 022
Module ID	0F43 57E2	0106 AFC8	0107 AFC8	0109 AF90
General information				
Note	-	-	-	-
Features	› 4 outputs › Time stamp › Output current 0.5 A	› 8 outputs › Output current 0.5 A	› 8 Low-Side outputs › Output current 0.5 A	› 2 relay outputs › DC 30 V/ AC 230 V › Output current 3 A
Current consumption/power loss				
Current consumption from backplane bus	90 mA	65 mA	70 mA	130 mA
Power loss	0.95 W	0.7 W	0.6 W	0.7 W
Technical data digital outputs				
Number of outputs	4	8	8	2
Cable length, shielded	1000 m	1000 m	1000 m	-
Cable length, unshielded	600 m	600 m	600 m	-
Rated load voltage	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 30 V/ AC 230 V
Current consumption from load voltage L+ (without load)	25 mA	15 mA	10 mA	-
Total current per group, horizontal configuration, 40°C	2 A	4 A	2.5 A	-
Total current per group, horizontal configuration, 60°C	2 A	4 A	2.5 A	-
Total current per group, vertical configuration	2 A	4 A	2.5 A	-
Output current at signal "1", rated value	0.5 A	0.5 A	0.5 A	3 A
Output delay of "0" to "1"	max. 100 ns	30 µs	30 µs	-
Output delay of "1" to "0"	max. 100 ns	175 µs	100 µs	-
Minimum load current	-	-	-	-
Lamp load	10 W	10 W	10 W	-
Parallel switching of outputs for redundant control of a load	not possible	not possible	not possible	-
Parallel switching of outputs for increased power	not possible	not possible	not possible	-
Actuation of digital input	✓	✓	✓	-
Switching frequency with resistive load	max. 40 kHz	max. 1000 Hz	max. 1000 Hz	max. 100 Hz
Switching frequency with inductive load	max. 40 kHz	max. 0.5 Hz	max. 0.5 Hz	-
Switching frequency on lamp load	max. 40 kHz	max. 10 Hz	max. 10 Hz	-
Internal limitation of inductive shut-off voltage	L+ (-52 V)	L+ (-52 V)	+45 V	-
Short-circuit protection of output	yes, electronic, and only highside	yes, electronic	yes, electronic	-
Trigger level	2.5 A	1 A	1.7 A	-
Number of operating cycle of relay outputs	-	-	-	-

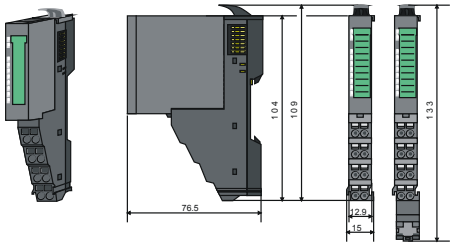
Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

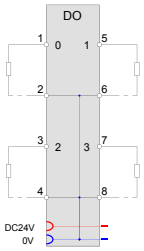
Order number	022-1BD70	022-1BF00	022-1BF50	022-1HB10
Switching capacity of contacts	-	-	-	3 A
Output data size	60 Byte	8 Bit	8 Bit	2 Bit
Status information, alarms, diagnostics				
Status display	green LED per channel	green LED per channel	red LED per channel	red LED per channel
Interrupts	no	no	no	no
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	no	no
Diagnostic functions	no	no	no	no
Diagnostics information read-out	possible	none	none	none
Module state	green LED	green LED	green LED	green LED
Module error display	red SF LED	red SF LED	red LED	red LED
Channel error display	none	none	none	none
Isolation				
Between channels	-	-	-	✓
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Safety				
Safety protocol	-	-	-	-
Safety requirements	-	-	-	-
Secure user address	-	-	-	-
Watchdog	-	-	-	-
Two channels	-	-	-	-
Test pulse length	-	-	-	-
Circuit monitoring	-	-	-	-
Datasizes				
Input bytes	4	0	0	0
Output bytes	20 / 60	1	1	1
Parameter bytes	6	0	0	0
Diagnostic bytes	20	0	0	0
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

Connections, Interfaces

Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

022-1BD70





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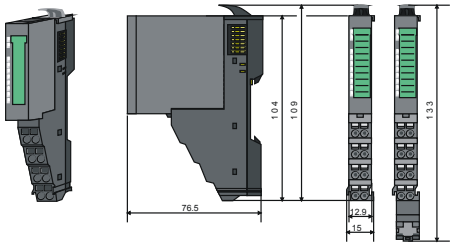

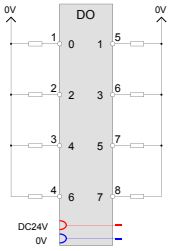

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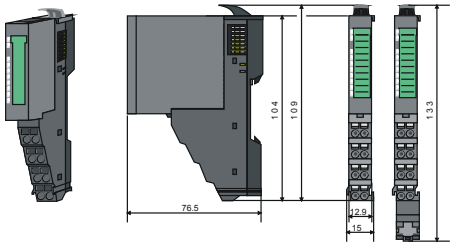
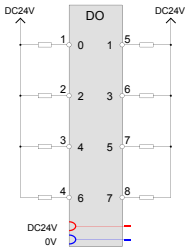
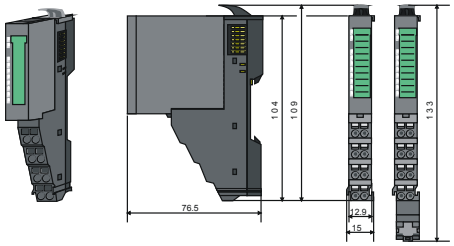
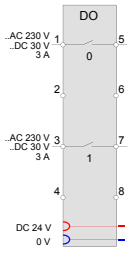




022-1HB10





Digital output modules

Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

Order number	022-1SD00			
Figure				
Type	SM 022			
Module ID	0C81 1E00			
General information				
Note	-			
Features	› 4 outputs › Safety › Output current 0.5 A			
Current consumption/power loss				
Current consumption from backplane bus	80 mA			
Power loss	1.2 W			
Technical data digital outputs				
Number of outputs	4			
Cable length, shielded	1000 m			
Cable length, unshielded	600 m			
Rated load voltage	DC 20.4...28.8 V			
Current consumption from load voltage L+ (without load)	10 mA			
Total current per group, horizontal configuration, 40°C	2 A			
Total current per group, horizontal configuration, 60°C	2 A			
Total current per group, vertical configuration	2 A			
Output current at signal "1", rated value	0.5 A			
Output delay of "0" to "1"	100 µs			
Output delay of "1" to "0"	175 µs			
Minimum load current	-			
Lamp load	5 W			
Parallel switching of outputs for redundant control of a load	not possible			
Parallel switching of outputs for increased power	not possible			
Actuation of digital input	✓			
Switching frequency with resistive load	max. 100 Hz			
Switching frequency with inductive load	max. 0.5 Hz			
Switching frequency on lamp load	max. 10 Hz			
Internal limitation of inductive shut-off voltage	L+ (-52 V)			
Short-circuit protection of output	yes, electronic			
Trigger level	1.7 A			
Number of operating cycle of relay outputs	-			
Switching capacity of contacts	-			

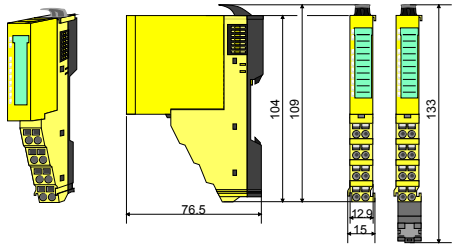
Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

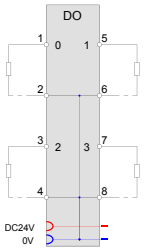
Order number	**022-1SD00**			
Output data size	4 Bit			
Status information, alarms, diagnostics				
Status display	green LED per channel			
Interrupts	yes, parameterizable			
Process alarm	no			
Diagnostic interrupt	yes, parameterizable			
Diagnostic functions	yes, parameterizable			
Diagnostics information read-out	possible			
Module state	green LED			
Module error display	red SF LED			
Channel error display	none			
Isolation				
Between channels	-			
Between channels of groups to	-			
Between channels and backplane bus	✓			
Insulation tested with	DC 500 V			
Safety				
Safety protocol	PROFIsafe V2			
Safety requirements	SIL CL 3 and PL e			
Secure user address	1 - 4095			
Watchdog	parameterizable 10ms - 1s			
Two channels	Each 2 of 4 outputs switchable			
Test pulse length	parameterizable 500µs - 16ms			
Circuit monitoring	✓			
Datasizes				
Input bytes	5			
Output bytes	5			
Parameter bytes	44			
Diagnostic bytes	20			
Housing				
Material	PC / PPE GF10			
Mounting	Profile rail 35 mm			
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm			
Weight	60 g			
Environmental conditions				
Operating temperature	0 °C to 60 °C			
Storage temperature	-25 °C to 70 °C			
Certifications				
UL508 certification	in preparation			

Connections, Interfaces

Signal modules digital | Digital output modules						
022-1BB00 022-1BB20 022-1BB50 022-1BB70	022-1BB90 022-1BD00 022-1BD20 022-1BD50	022-1BD70 022-1BF00 022-1BF50 022-1HB10	022-1SD00			

022-1SD00





Signal modules analog

Structure and Function

Signal modules (SM) to connect sensors and actuators are the interfaces of the system to the process. Analog signal modules acquire the analog control signals (e.g. measurement data) to and out of the process level. Depending on the application and type the control signals are acquired from the process level and converted into interpretable signals for controlling. Analog output modules convert the internal control signals into signals suitable for the process level.

A variety of different analog signal modules accurately provide the inputs and outputs that are required for each task. The analog modules differ in the number of channels, voltage and current ranges, isolation, and diagnostic and alarm capability.

Each signal module consists of a terminal and an electronics module.

The terminal module (TM) contains the retainer for the electronic module (EM), the backplane connectors and contacts for the distribution of the load power supply electronics, the modular connection to DC 24 V load power supply and the staircase-shaped terminal block for the wiring.

Furthermore the terminal module processes a locking system for fixing to a profile rail. The SLIO system can also be constructed "block by block" outside the cabinet and later assembled as a complete system in the control cabinet.

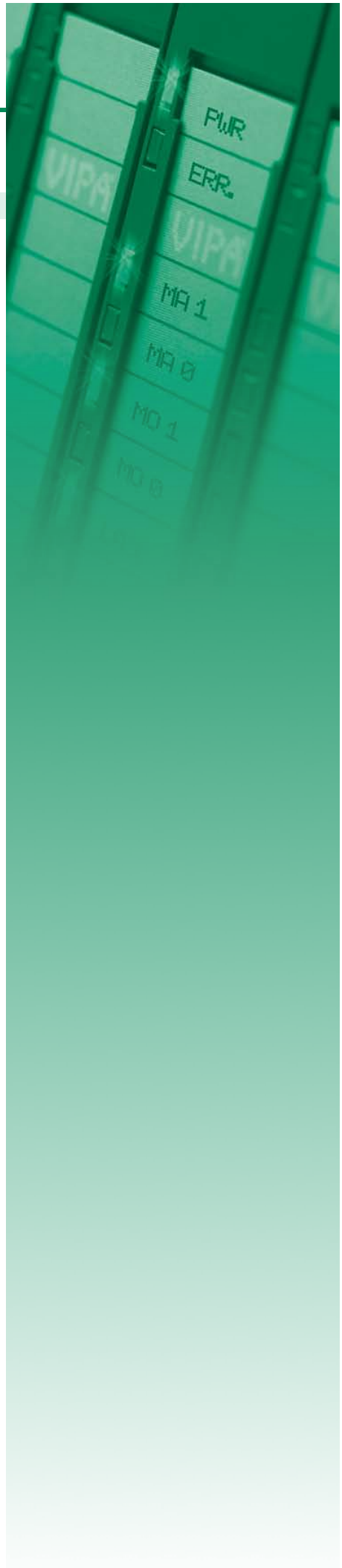
The functionality of the signal module is defined via the electronics module that is connected by a secure sliding mechanism to the terminal module.

During service the defective electronic module can be replaced without detaching the wiring.

Characteristics

- 2 or 4 channel
- 12 bit or 16 bit resolution
- Functions of the inputs / outputs programmable
- Most various assemblies, suitable for measuring transducers (current/ voltage, resistance or temperature sensors)
- Direct mapping and readability of the channel conditions via status LEDs
- Safe and time-saving installation by the terminal assignment mounted on the module
- When changing the module equipment identification (BMK) is retained on the TM
- Individual single-channel lettering on insertion strip
- 24 month warranty

Overview



Order no.	Name/Description	Page
Analog input modules		
031-1BB10	**SM 031 - Analog input** › 2 inputs 12Bit › Current 4...20 mA › 2 wire	**53**
031-1BB30	**SM 031 - Analog input** › 2 inputs 12Bit › Voltage 0...10 V	**53**
031-1BB40	**SM 031 - Analog input** › 2 inputs 12Bit › Current 0(4)...20 mA	**53**
031-1BB60	**SM 031 - Analog input** › 2 inputs 12Bit › Current 4...20 mA › 2 wire	**53**
031-1BB70	**SM 031 - Analog input** › 2 inputs 12Bit › Voltage -10 V...+10 V	**57**
031-1BB90	**SM 031 - Analog input** › 2 inputs 16Bit › Thermocouple › Voltage -80mV...+80mV	**57**
031-1BD30	**SM 031 - Analog input** › 4 inputs 12Bit › Voltage 0...10 V	**57**
031-1BD40	**SM 031 - Analog input** › 4 inputs 12Bit › Current 0(4)...20 mA	**57**
031-1BD70	**SM 031 - Analog input** › 4 inputs 12Bit › Voltage -10 V...+10 V	**61**
031-1BD80	**SM 031 - Analog input** › 4 inputs 16Bit › 0 .. 3000 ohm resistance › Resistance measurment with 2, 3, and 4-wires	**61**
031-1CB30	**SM 031 - Analog input** › 2 inputs 16Bit › Voltage 0...10 V	**61**
031-1CB40	**SM 031 - Analog input** › 2 inputs 16Bit › Current 0(4)...20 mA	**61**
031-1CB70	**SM 031 - Analog input** › 2 inputs 16Bit › Voltage -10 V...+10 V	**65**
031-1CD30	**SM 031 - Analog input** › 4 inputs 16Bit › Voltage 0...10 V	**65**
031-1CD40	**SM 031 - Analog input** › 4 inputs 16Bit › Current 0(4)...20 mA	**65**
031-1CD70	**SM 031 - Analog input** › 4 inputs 16Bit › Voltage -10 V...+10 V	**65**
031-1LB90	**SM 031 - Analog input** › 2 inputs 16Bit › Thermocouple › Voltage -80mV...+80mV	**69**
031-1LD80	**SM 031 - Analog input** › 4 inputs 16Bit › 0 .. 3000 ohm resistance › Resistance measurment with 2, 3, and 4-wires	**69**
Analog output modules		
032-1BB30	**SM 032 - Analog output** › 2 outputs 12Bit › Voltage 0...10 V	**73**
032-1BB40	**SM 032 - Analog output** › 2 outputs 12Bit › Current 0(4)...20 mA	**73**

Overview

Order no.	Name/Description	Page
032-1BB70	**SM 032 - Analog output** › 2 outputs 12Bit › Voltage -10 V...+10 V	**73**
032-1BD30	**SM 032 - Analog output** › 4 outputs 12Bit › Voltage 0...10 V	**73**
032-1BD40	**SM 032 - Analog output** › 4 outputs 12Bit › Current 0(4)...20mA	**76**
032-1BD70	**SM 032 - Analog output** › 4 outputs 12Bit › Voltage -10 V...+10 V	**76**
032-1CB30	**SM 032 - Analog output** › 2 outputs 16Bit › Voltage 0...10 V	**76**
032-1CB70	**SM 032 - Analog output** › 2 outputs 16Bit › Voltage -10 V...+10 V	**76**
032-1CD30	**SM 032 - Analog output** › 4 outputs 16Bit › Voltage 0...10 V	**79**
032-1CD70	**SM 032 - Analog output** › 4 outputs 16Bit › Voltage -10 V...+10 V	**79**

Analog input modules

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1BB10	031-1BB30	031-1BB40	031-1BB60
Figure				
Type	SM 031	SM 031	SM 031	SM 031
Module ID	0411 1543	0401 15C3	0402 15C3	0407 15C3
General information				
Note	-	-	-	-
Features	› 2 inputs 12Bit › Current 4...20 mA › 2 wire	› 2 inputs 12Bit › Voltage 0...10 V	› 2 inputs 12Bit › Current 0(4)...20 mA	› 2 inputs 12Bit › Current 4...20 mA › 2 wire
Current consumption/power loss				
Current consumption from backplane bus	50 mA	70 mA	70 mA	50 mA
Power loss	0.7 W	0.7 W	0.7 W	0.7 W
Technical data analog inputs				
Number of inputs	2	2	2	2
Cable length, shielded	200 m	200 m	200 m	200 m
Rated load voltage	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Current consumption from load voltage L+ (without load)	20 mA	15 mA	15 mA	15 mA
Voltage inputs	-	✓	-	-
Min. input resistance (voltage range)	-	100 kΩ	-	-
Input voltage ranges	-	0 V ... +10 V	-	-
Operational limit of voltage ranges	-	+/-0.3%	-	-
Operational limit of voltage ranges with SFU	-	-	-	-
Basic error limit voltage ranges	-	+/-0.2%	-	-
Basic error limit voltage ranges with SFU	-	-	-	-
Current inputs	✓	-	✓	✓
Min. input resistance (current range)	60 Ω	-	110 Ω	110 Ω
Input current ranges	+4 mA ... +20 mA 0 mA ... +20 mA	-	0 mA ... +20 mA +4 mA ... +20 mA	0 mA ... +20 mA +4 mA ... +20 mA
Operational limit of current ranges	+/-0.5%	-	+/-0.3% ... +/-0.5%	+/-0.5%
Operational limit of current ranges with SFU	-	-	-	-
Basic error limit current ranges	+/-0.3%	-	+/-0.2% ... +/-0.3%	+/-0.3%
Basic error limit current ranges with SFU	-	-	-	-
Resistance inputs	-	-	-	-
Resistance ranges	-	-	-	-
Operational limit of resistor ranges	-	-	-	-
Basic error limit	-	-	-	-
Resistance thermometer inputs	-	-	-	-
Resistance thermometer ranges	-	-	-	-
Operational limit of resistance thermometer ranges	-	-	-	-

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1BB10	031-1BB30	031-1BB40	031-1BB60
Operational limit of resistor ranges with SFU	-	-	-	-
Basic error limit thermoresistor ranges	-	-	-	-
Operational limit of resistor ranges with SFU	-	-	-	-
Thermocouple inputs	-	-	-	-
Thermocouple ranges	-	-	-	-
Operational limit of thermocouple ranges	-	-	-	-
Operational limit of thermocouple ranges with SFU	-	-	-	-
Basic error limit thermoelement ranges	-	-	-	-
Basic error limit thermoelement ranges with SFU	-	-	-	-
Programmable temperature compensation	-	-	-	-
External temperature compensation	-	-	-	-
Internal temperature compensation	-	-	-	-
Resolution in bit	12	12	12	12
Measurement principle	successive approxi-mation	successive approxi-mation	successive approxi-mation	successive approxi-mation
Basic conversion time	1.15 ms all channels	2 ms all channels	2 ms all channels	2 ms all channels
Noise suppression for frequency	>80dB (UCM<20V)	>50dB at 50Hz (UCM<2V)	>50dB at 50Hz (UCM<2V)	>50dB at 50Hz (UCM<2V)
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	yes, parameterizable	no	no	no
Process alarm	yes, parameterizable	no	no	no
Diagnostic interrupt	yes, parameterizable	no	no	no
Diagnostic functions	yes	yes	yes	yes
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	red LED per channel	red LED per channel	red LED per channel	red LED per channel
Isolation				
Between channels	✓	-	-	-
Between channels of groups to	1	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	✓	✓	✓	-
Max. potential difference between circuits	DC 75 V/ AC 60 V	-	-	-
Max. potential difference between inputs (Ucm)	DC 75 V/ AC 60 V	DC 2 V	DC 2 V	-
Max. potential difference between Mana and Mintern (Uiso)	-	-	-	-
Max. potential difference between inputs and Mana (Ucm)	DC 75 V/ AC 60 V	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V
Max. potential difference between Mintern and outputs	-	-	-	-

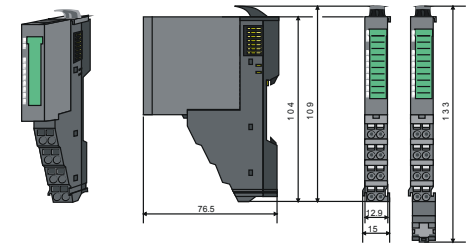
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

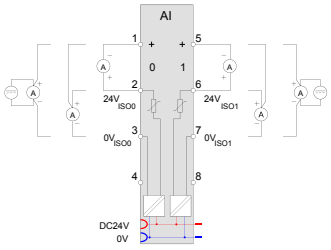
Order number	**031-1BB10**	**031-1BB30**	**031-1BB40**	**031-1BB60**
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Datasizes				
Input bytes	4	4	4	4
Output bytes	0	0	0	0
Parameter bytes	15	6	6	6
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	in preparation	yes	yes	in preparation

Connections, Interfaces

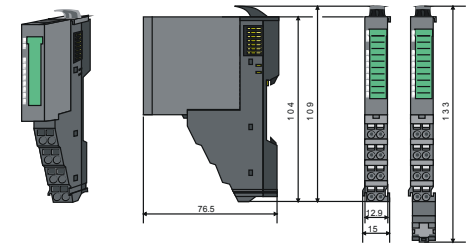
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

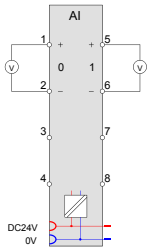
031-1BB10



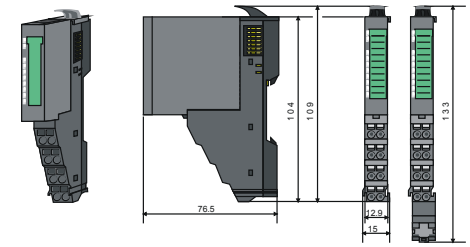


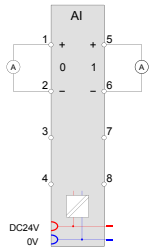
031-1BB30



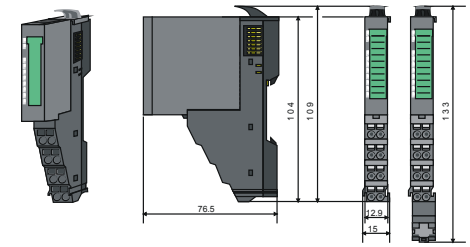


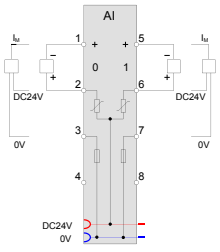
031-1BB40





031-1BB60





Analog input modules

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1BB70	031-1BB90	031-1BD30	031-1BD40
Figure				
Type	SM 031	SM 031	SM 031	SM 031
Module ID	0408 15C3	0403 1543	0404 15C4	0405 15C4
General information				
Note	-	-	-	-
Features	› 2 inputs 12Bit › Voltage -10 V...+10 V	› 2 inputs 16Bit › Thermocouple › Voltage -80mV...+80mV	› 4 inputs 12Bit › Voltage 0...10 V	› 4 inputs 12Bit › Current 0(4)...20 mA
Current consumption/power loss				
Current consumption from backplane bus	50 mA	75 mA	70 mA	70 mA
Power loss	0.5 W	1.1 W	0.7 W	0.7 W
Technical data analog inputs				
Number of inputs	2	2	4	4
Cable length, shielded	200 m	200 m	200 m	200 m
Rated load voltage	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Current consumption from load voltage L+ (without load)	15 mA	30 mA	15 mA	15 mA
Voltage inputs	✓	-	✓	-
Min. input resistance (voltage range)	100 kΩ	10 MΩ	100 kΩ	-
Input voltage ranges	-10 V ... +10 V	-80 mV ... +80 mV	0 V ... +10 V	-
Operational limit of voltage ranges	+/-0.3%	±0.3%	+/-0.3%	-
Operational limit of voltage ranges with SFU	-	±0.1%	-	-
Basic error limit voltage ranges	+/-0.2%	±0.25%	+/-0.2%	-
Basic error limit voltage ranges with SFU	-	±0.05%	-	-
Current inputs	-	-	-	✓
Min. input resistance (current range)	-	-	-	110 Ω
Input current ranges	-	-	-	0 mA ... +20 mA +4 mA ... +20 mA
Operational limit of current ranges	-	-	-	+/-0.3% ... +/-0.5%
Operational limit of current ranges with SFU	-	-	-	-
Basic error limit current ranges	-	-	-	+/-0.2% ... +/-0.3%
Basic error limit current ranges with SFU	-	-	-	-
Resistance inputs	-	-	-	-
Resistance ranges	-	-	-	-
Operational limit of resistor ranges	-	-	-	-
Basic error limit	-	-	-	-
Resistance thermometer inputs	-	-	-	-
Resistance thermometer ranges	-	-	-	-
Operational limit of resistance thermometer ranges	-	-	-	-

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1BB70	031-1BB90	031-1BD30	031-1BD40
Operational limit of resistor ranges with SFU	-	-	-	-
Basic error limit thermoresistor ranges	-	-	-	-
Operational limit of resistor ranges with SFU	-	-	-	-
Thermocouple inputs	-	✓	-	-
Thermocouple ranges	-	type B type C type E type J type K type L type N type R type S type T	-	-
Operational limit of thermocouple ranges	-	Type E, L, T, J, K, N: ±2.5K / Type B, C, R, S: ±8.0K	-	-
Operational limit of thermocouple ranges with SFU	-	Type E, L, T, J, K, N: ±1.5K / Type B, C, R, S: ±4.0K	-	-
Basic error limit thermoelement ranges	-	Type E, L, T, J, K, N: ±2.0K / Type B, C, R, S: ±7.0K	-	-
Basic error limit thermoelement ranges with SFU	-	Type E, L, T, J, K, N: ±1.0K / Type B, C, R, S: ±3.0K	-	-
Programmable temperature compensation	-	✓	-	-
External temperature compensation	-	✓	-	-
Internal temperature compensation	-	✓	-	-
Resolution in bit	12	16	12	12
Measurement principle	successive approximation	Sigma-Delta	successive approximation	successive approximation
Basic conversion time	2 ms all channels	4.2...324.1 ms (50 Hz) 3.8...270.5 ms (60 Hz) per channel	4 ms all channels	4 ms all channels
Noise suppression for frequency	>50dB at 50Hz (UCM<2V)	>90dB at 50Hz (UCM<10V)	>50dB at 50Hz (UCM<2V)	>50dB at 50Hz (UCM<2V)
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	no	yes	no	no
Process alarm	no	yes, parameterizable	no	no
Diagnostic interrupt	no	yes, parameterizable	no	no
Diagnostic functions	yes	yes	yes	yes
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	red LED per channel	red LED per channel	red LED per channel	red LED per channel
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓

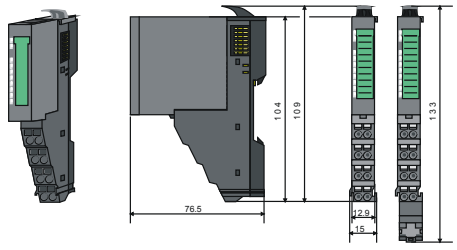
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

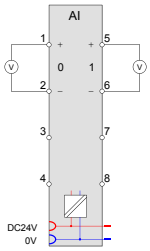
Order number	031-1BB70	031-1BB90	031-1BD30	031-1BD40
Between channels and power supply	✓	-	✓	✓
Max. potential difference between circuits	-	-	-	-
Max. potential difference between inputs (Ucm)	DC 2 V	DC 140 V/ AC 60 V	DC 2 V	DC 2 V
Max. potential difference between Mana and Mintern (Uiso)	-	-	-	-
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Datasizes				
Input bytes	4	4	8	8
Output bytes	0	0	0	0
Parameter bytes	6	22	8	8
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	in preparation	yes	yes	yes

Connections, Interfaces

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

031-1BB70





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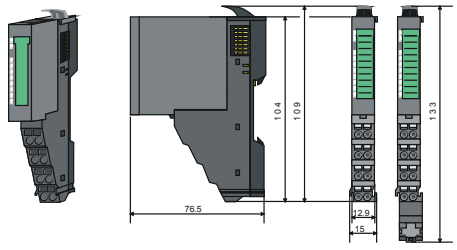
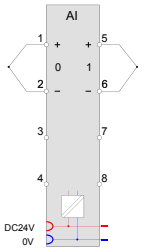
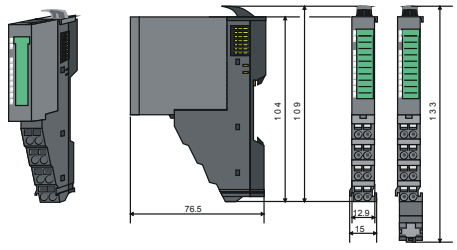
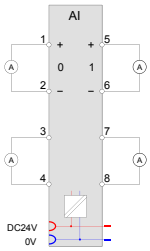


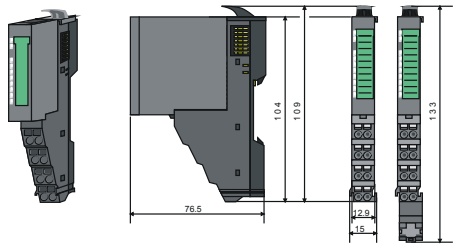


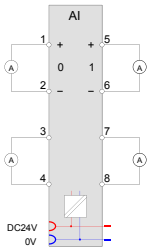
031-1BD30





031-1BD40





Analog input modules

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1BD70	031-1BD80	031-1CB30	031-1CB40
Figure				
Type	SM 031	SM 031	SM 031	SM 031
Module ID	0409 15C4	0406 1544	040A 1543	040B 1543
General information				
Note	-	-	-	-
Features	‣ 4 inputs 12Bit ‣ Voltage -10 V...+10 V	‣ 4 inputs 16Bit ‣ 0 .. 3000 ohm resistance ‣ Resistance measurment with 2, 3, and 4-wires	‣ 2 inputs 16Bit ‣ Voltage 0...10 V	‣ 2 inputs 16Bit ‣ Current 0(4)...20 mA
Current consumption/power loss				
Current consumption from backplane bus	50 mA	75 mA	60 mA	60 mA
Power loss	0.5 W	1 W	0.8 W	0.7 W
Technical data analog inputs				
Number of inputs	4	4	2	2
Cable length, shielded	200 m	200 m	200 m	200 m
Rated load voltage	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Current consumption from load voltage L+ (without load)	15 mA	30 mA	20 mA	15 mA
Voltage inputs	✓	-	✓	-
Min. input resistance (voltage range)	100 kΩ	-	200 kΩ	-
Input voltage ranges	-10 V ... +10 V	-	0 V ... +10 V	-
Operational limit of voltage ranges	+/-0.3%	-	+/-0.2%	-
Operational limit of voltage ranges with SFU	-	-	-	-
Basic error limit voltage ranges	+/-0.2%	-	+/-0.1%	-
Basic error limit voltage ranges with SFU	-	-	-	-
Current inputs	-	-	-	✓
Min. input resistance (current range)	-	-	-	60 Ω
Input current ranges	-	-	-	0 mA ... +20 mA +4 mA ... +20 mA
Operational limit of current ranges	-	-	-	+/-0.2%
Operational limit of current ranges with SFU	-	-	-	-
Basic error limit current ranges	-	-	-	+/-0.1%
Basic error limit current ranges with SFU	-	-	-	-
Resistance inputs	-	✓	-	-
Resistance ranges	-	0 ... 60 Ohm 0 ... 600 Ohm 0 ... 3000 Ohm	-	-
Operational limit of resistor ranges	-	+/- 0.4 %	-	-
Basic error limit	-	+/- 0.2 %	-	-
Resistance thermometer inputs	-	✓	-	-

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1BD70	031-1BD80	031-1CB30	031-1CB40
Resistance thermometer ranges	-	Pt100 Pt1000 Ni100 Ni1000	-	-
Operational limit of resistance thermometer ranges	-	+/- 0.4 %	-	-
Operational limit of resistor ranges with SFU	-	-	-	-
Basic error limit thermoresistor ranges	-	+/- 0.2 %	-	-
Operational limit of resistor ranges with SFU	-	-	-	-
Thermocouple inputs	-	-	-	-
Thermocouple ranges	-	-	-	-
Operational limit of thermocouple ranges	-	-	-	-
Operational limit of thermocouple ranges with SFU	-	-	-	-
Basic error limit thermoelement ranges	-	-	-	-
Basic error limit thermoelement ranges with SFU	-	-	-	-
Programmable temperature compensation	-	-	-	-
External temperature compensation	-	-	-	-
Internal temperature compensation	-	-	-	-
Resolution in bit	12	16	16	16
Measurement principle	successive approximation	Sigma-Delta	successive approximation	successive approximation
Basic conversion time	4 ms all channels	4.2...324.1 ms (50 Hz) 3.8...270.5 ms (60 Hz) per channel	240 µs all channels	240 µs all channels
Noise suppression for frequency	>50dB at 50Hz (UCM<2V)	>80dB at 50Hz (UCM<6V)	>80dB at 50Hz (UCM<9V)	>80dB (UCM<4V)
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	no	yes, parameterizable	yes, parameterizable	yes, parameterizable
Process alarm	no	yes, parameterizable	yes, parameterizable	yes, parameterizable
Diagnostic interrupt	no	yes, parameterizable	yes, parameterizable	yes, parameterizable
Diagnostic functions	yes	yes	yes	yes
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	red LED per channel	red LED per channel	red LED per channel	red LED per channel
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	✓	-	✓	✓
Max. potential difference between circuits	-	-	-	-
Max. potential difference between inputs (Ucm)	DC 2 V	DC 6 V	DC 9 V	DC 4 V
Max. potential difference between Mana and Mintern (Uiso)	-	-	-	-

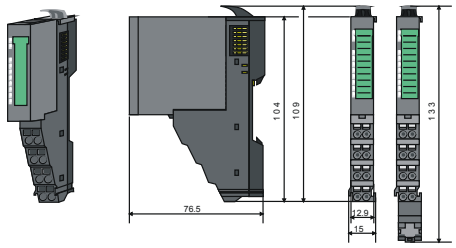
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

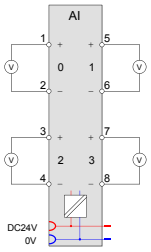
Order number	031-1BD70	031-1BD80	031-1CB30	031-1CB40
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Datasizes				
Input bytes	8	8	4	4
Output bytes	0	0	0	0
Parameter bytes	8	34	20	20
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	in preparation	yes	in preparation	in preparation

Connections, Interfaces

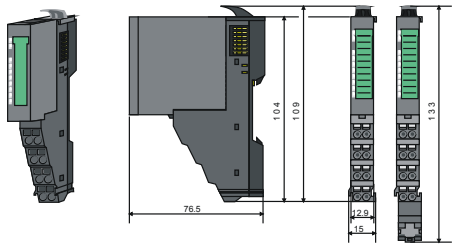
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

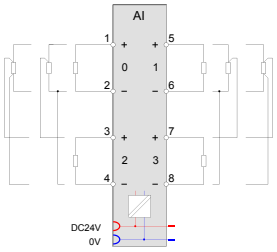
031-1BD70



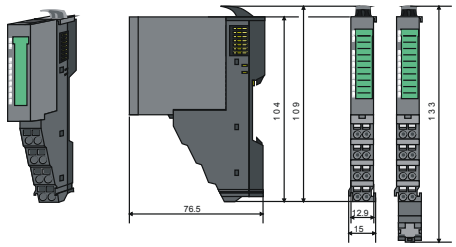


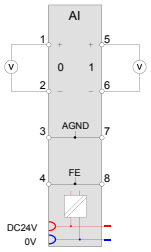
031-1BD80



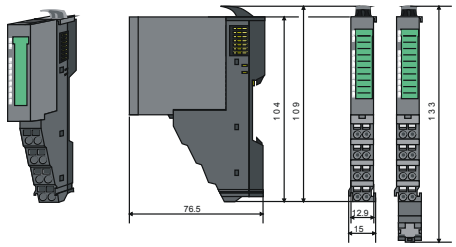


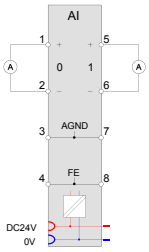
031-1CB30





031-1CB40





Analog input modules

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1CB70	031-1CD30	031-1CD40	031-1CD70
Figure				
Type	SM 031	SM 031	SM 031	SM 031
Module ID	040C 1543	040D 1544	0411 1544	040E 1544
General information				
Note	-	-	-	-
Features	› 2 inputs 16Bit › Voltage -10 V...+10 V	› 4 inputs 16Bit › Voltage 0...10 V	› 4 inputs 16Bit › Current 0(4)...20 mA	› 4 inputs 16Bit › Voltage -10 V...+10 V
Current consumption/power loss				
Current consumption from backplane bus	60 mA	60 mA	60 mA	60 mA
Power loss	0.8 W	0.9 W	0.8 W	0.9 W
Technical data analog inputs				
Number of inputs	2	4	4	4
Cable length, shielded	200 m	200 m	200 m	200 m
Rated load voltage	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Current consumption from load voltage L+ (without load)	20 mA	25 mA	20 mA	25 mA
Voltage inputs	✓	✓	-	✓
Min. input resistance (voltage range)	200 kΩ	200 kΩ	-	200 kΩ
Input voltage ranges	-10 V ... +10 V	0 V ... +10 V	-	-10 V ... +10 V
Operational limit of voltage ranges	+/-0.2%	+/-0.2%	-	+/-0.2%
Operational limit of voltage ranges with SFU	-	-	-	-
Basic error limit voltage ranges	+/-0.1%	+/-0.1%	-	+/-0.1%
Basic error limit voltage ranges with SFU	-	-	-	-
Current inputs	-	-	✓	-
Min. input resistance (current range)	-	-	60 Ω	-
Input current ranges	-	-	0 mA ... +20 mA +4 mA ... +20 mA	-
Operational limit of current ranges	-	-	+/-0.2%	-
Operational limit of current ranges with SFU	-	-	-	-
Basic error limit current ranges	-	-	+/-0.1%	-
Basic error limit current ranges with SFU	-	-	-	-
Resistance inputs	-	-	-	-
Resistance ranges	-	-	-	-
Operational limit of resistor ranges	-	-	-	-
Basic error limit	-	-	-	-
Resistance thermometer inputs	-	-	-	-
Resistance thermometer ranges	-	-	-	-
Operational limit of resistance thermometer ranges	-	-	-	-
Operational limit of resistor ranges with SFU	-	-	-	-

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1CB70	031-1CD30	031-1CD40	031-1CD70
Basic error limit thermoresistor ranges	-	-	-	-
Operational limit of resistor ranges with SFU	-	-	-	-
Thermocouple inputs	-	-	-	-
Thermocouple ranges	-	-	-	-
Operational limit of thermocouple ranges	-	-	-	-
Operational limit of thermocouple ranges with SFU	-	-	-	-
Basic error limit thermoelement ranges	-	-	-	-
Basic error limit thermoelement ranges with SFU	-	-	-	-
Programmable temperature compensation	-	-	-	-
External temperature compensation	-	-	-	-
Internal temperature compensation	-	-	-	-
Resolution in bit	16	16	16	16
Measurement principle	successive approxi-mation	successive approxi-mation	successive approxi-mation	successive approxi-mation
Basic conversion time	240 µs all channels	480 µs all channels	240 µs all channels	480 µs all channels
Noise suppression for frequency	>80dB at 50Hz (UCM<9V)	>80dB at 50Hz (UCM<9V)	>80dB (UCM<4V)	>80dB at 50Hz (UCM<35V)
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	yes, parameterizable	yes, parameterizable	yes, parameterizable	yes, parameterizable
Process alarm	yes, parameterizable	yes, parameterizable	yes, parameterizable	yes, parameterizable
Diagnostic interrupt	yes, parameterizable	yes, parameterizable	yes, parameterizable	yes, parameterizable
Diagnostic functions	yes	yes	yes	yes
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	red LED per channel	red LED per channel	red LED per channel	red LED per channel
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	✓	✓	✓	✓
Max. potential difference between circuits	-	-	-	-
Max. potential difference between inputs (Ucm)	DC 9 V	DC 9 V	DC 4 V	DC 9 V
Max. potential difference between Mana and Mintern (Uiso)	-	-	-	-
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V

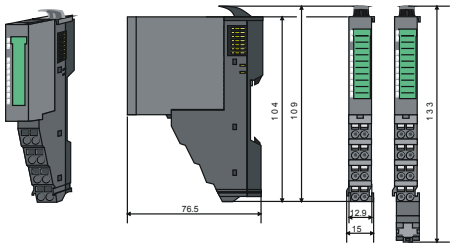
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

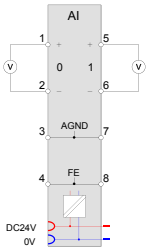
Order number	031-1CB70	031-1CD30	031-1CD40	031-1CD70
Datasizes				
Input bytes	4	8	4	8
Output bytes	0	0	0	0
Parameter bytes	20	32	32	32
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	in preparation	in preparation	in preparation	in preparation

Connections, Interfaces

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

031-1CB70





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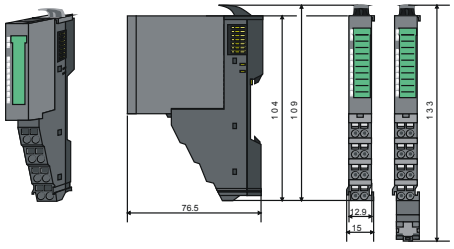

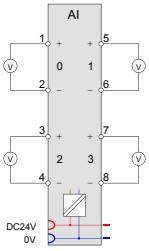

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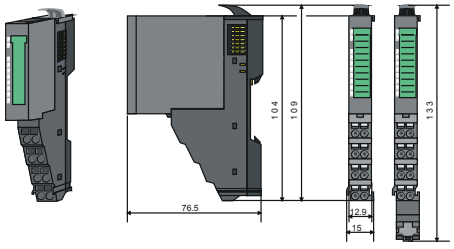
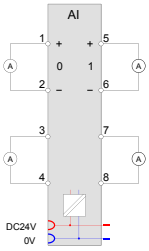
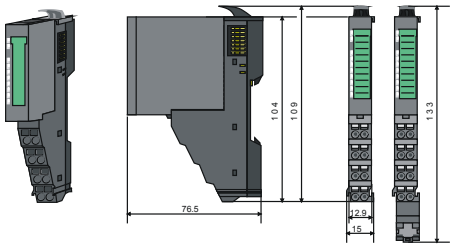
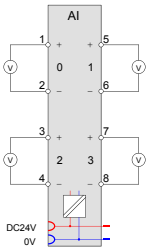




031-1CD70





Analog input modules

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1LB90	031-1LD80		
Figure				
Type	SM 031	SM 031		
Module ID	040F 1543	0410 1544		
General information				
Note	-	-		
Features	› 2 inputs 16Bit › Thermocouple › Voltage -80mV...+80mV	› 4 inputs 16Bit › 0 .. 3000 ohm resistance › Resistance measurment with 2, 3, and 4-wires		
Current consumption/power loss				
Current consumption from backplane bus	55 mA	55 mA		
Power loss	1 W	1 W		
Technical data analog inputs				
Number of inputs	2	4		
Cable length, shielded	200 m	200 m		
Rated load voltage	DC 24 V	DC 24 V		
Current consumption from load voltage L+ (without load)	30 mA	30 mA		
Voltage inputs	-	-		
Min. input resistance (voltage range)	10 MΩ	-		
Input voltage ranges	-80 mV ... +80 mV	-		
Operational limit of voltage ranges	±0.3%	-		
Operational limit of voltage ranges with SFU	±0.1%	-		
Basic error limit voltage ranges	±0.25%	-		
Basic error limit voltage ranges with SFU	±0.05%	-		
Current inputs	-	-		
Min. input resistance (current range)	-	-		
Input current ranges	-	-		
Operational limit of current ranges	-	-		
Operational limit of current ranges with SFU	-	-		
Basic error limit current ranges	-	-		
Basic error limit current ranges with SFU	-	-		
Resistance inputs	-	✓		
Resistance ranges	-	0 ... 60 Ohm 0 ... 600 Ohm 0 ... 3000 Ohm		
Operational limit of resistor ranges	-	+/- 0.4 %		
Basic error limit	-	+/- 0.2 %		
Resistance thermometer inputs	-	✓		

Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

Order number	031-1LB90	031-1LD80		
Resistance thermometer ranges	-	Pt100 Pt1000 Ni100 Ni1000		
Operational limit of resistance thermometer ranges	-	+/- 0.4 %		
Operational limit of resistor ranges with SFU	-	-		
Basic error limit thermoresistor ranges	-	+/- 0.2 %		
Operational limit of resistor ranges with SFU	-	-		
Thermocouple inputs	✓	-		
Thermocouple ranges	type B type C type E type J type K type L type N type R type S type T	-		
Operational limit of thermocouple ranges	Type E, L, T, J, K, N: ±2.5K / Type B, C, R, S: ±8.0K	-		
Operational limit of thermocouple ranges with SFU	Type E, L, T, J, K, N: ±1.5K / Type B, C, R, S: ±4.0K	-		
Basic error limit thermoelement ranges	Type E, L, T, J, K, N: ±2.0K / Type B, C, R, S: ±7.0K	-		
Basic error limit thermoelement ranges with SFU	Type E, L, T, J, K, N: ±1.0K / Type B, C, R, S: ±3.0K	-		
Programmable temperature compensation	✓	-		
External temperature compensation	✓	-		
Internal temperature compensation	✓	-		
Resolution in bit	16	16		
Measurement principle	Sigma-Delta	Sigma-Delta		
Basic conversion time	84.2 ms (50 Hz) 70.5 ms (60 Hz) per channel	4.2...324.1 ms (50 Hz) 3.8...270.5 ms (60 Hz) per channel		
Noise suppression for frequency	>90dB at 50Hz (UCM<10V)	>80dB at 50Hz (UCM<6V)		
Status information, alarms, diagnostics				
Status display	yes	yes		
Interrupts	yes	yes, parameterizable		
Process alarm	no	no		
Diagnostic interrupt	yes, parameterizable	yes, parameterizable		
Diagnostic functions	yes	yes		
Diagnostics information read-out	possible	possible		
Module state	green LED	green LED		
Module error display	red LED	red LED		
Channel error display	red LED per channel	red LED per channel		

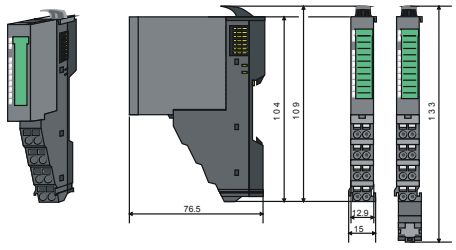
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

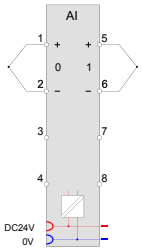
Order number	031-1LB90	031-1LD80		
Isolation				
Between channels	-	-		
Between channels of groups to	-	-		
Between channels and backplane bus	✓	✓		
Between channels and power supply	-	-		
Max. potential difference between circuits	-	-		
Max. potential difference between inputs (Ucm)	DC 140 V/ AC 60 V	DC 6 V		
Max. potential difference between Mana and Mintern (Uiso)	-	-		
Max. potential difference between inputs and Mana (Ucm)	-	-		
Max. potential difference between inputs and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V		
Max. potential difference between Mintern and outputs	-	-		
Insulation tested with	DC 500 V	DC 500 V		
Datasizes				
Input bytes	4	8		
Output bytes	0	0		
Parameter bytes	10	12		
Diagnostic bytes	20	20		
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10		
Mounting	Profile rail 35 mm	Profile rail 35 mm		
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm		
Weight	60 g	60 g		
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C		
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C		
Certifications				
UL508 certification	in preparation	in preparation		

Connections, Interfaces

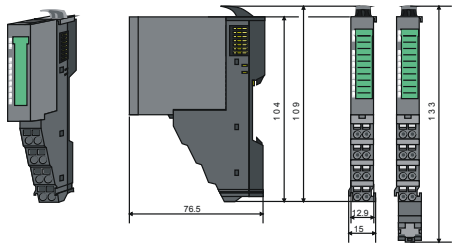
Signal modules analog | Analog input modules						
031-1BB10 031-1BB30 031-1BB40 031-1BB60	031-1BB70 031-1BB90 031-1BD30 031-1BD40	031-1BD70 031-1BD80 031-1CB30 031-1CB40	031-1CB70 031-1CD30 031-1CD40 031-1CD70	031-1LB90 031-1LD80		

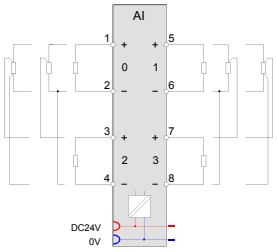
031-1LB90





031-1LD80





Analog output modules

Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

Order number	032-1BB30	032-1BB40	032-1BB70	032-1BD30
Figure				
Type	SM 032	SM 032	SM 032	SM 032
Module ID	0501 25D8	0502 25D8	0505 25D8	0503 25E0
General information				
Note	-	-	-	-
Features	› 2 outputs 12Bit › Voltage 0...10 V	› 2 outputs 12Bit › Current 0(4)...20 mA	› 2 outputs 12Bit › Voltage -10 V...+10 V	› 4 outputs 12Bit › Voltage 0...10 V
Current consumption/power loss				
Current consumption from backplane bus	80 mA	80 mA	60 mA	80 mA
Power loss	1.2 W	0.8 W	0.8 W	1.2 W
Technical data analog outputs				
Number of outputs	2	2	2	4
Cable length, shielded	200 m	200 m	200 m	200 m
Rated load voltage	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Current consumption from load voltage L+ (without load)	-	-	-	-
Voltage output short-circuit protection	✓	-	✓	✓
Voltage outputs	✓	-	✓	✓
Min. load resistance (voltage range)	5 kΩ	-	5 kΩ	5 kΩ
Max. capacitive load (current range)	1 µF	-	1 µF	1 µF
Output voltage ranges	0 V ... +10 V	-	-10 V ... +10 V	0 V ... +10 V
Operational limit of voltage ranges	+/-0.3%	-	+/-0.3%	+/-0.3%
Basic error limit voltage ranges with SFU	+/-0.2%	-	+/-0.2%	+/-0.2%
Current outputs	-	✓	-	-
Max. in load resistance (current range)	-	350 Ω	-	-
Max. inductive load (current range)	-	10 mH	-	-
Output current ranges	-	0 mA ... +20 mA +4 mA ... +20 mA	-	-
Operational limit of current ranges	-	+/-0.4% ... +/-0.5%	-	-
Basic error limit current ranges with SFU	-	+/-0.2% ... +/-0.3%	-	-
Settling time for ohmic load	1.5 ms	0.25 ms	1.5 ms	1.5 ms
Settling time for capacitive load	2 ms	-	2 ms	2 ms
Settling time for inductive load	-	1.5 ms	-	-
Resolution in bit	12	12	12	12
Conversion time	2 ms all channels	2 ms all channels	2 ms all channels	2 ms all channels
Substitute value can be applied	no	no	no	no
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	no	no	no	no
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	no	no
Diagnostic functions	yes	yes	yes	yes

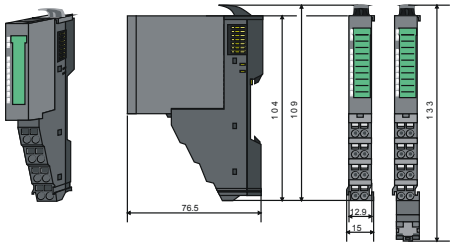
Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

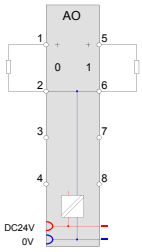
Order number	032-1BB30	032-1BB40	032-1BB70	032-1BD30
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	red LED per channel	red LED per channel	red LED per channel	red LED per channel
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	✓	✓	✓	✓
Max. potential difference between circuits	-	-	-	-
Max. potential difference between inputs (Ucm)	-	-	-	-
Max. potential difference between Mana and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	-	-	-	-
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Datasizes				
Input bytes	0	0	0	0
Output bytes	4	4	4	8
Parameter bytes	8	8	8	10
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	in preparation	yes

Connections, Interfaces

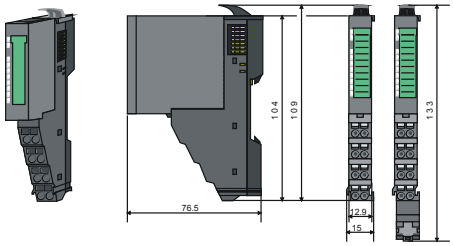
Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

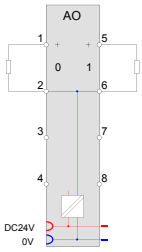
032-1BB30



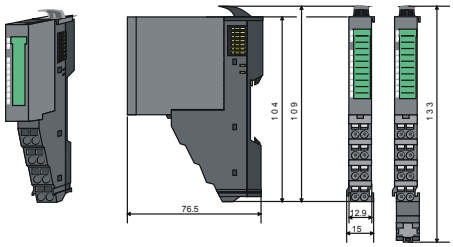


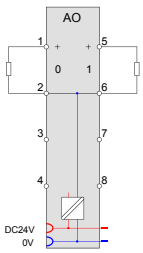
032-1BB40



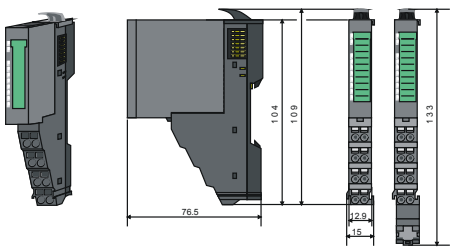


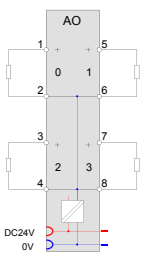
032-1BB70





032-1BD30





Analog output modules

Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

Order number	032-1BD40	032-1BD70	032-1CB30	032-1CB70
Figure				
Type	SM 032	SM 032	SM 032	SM 032
Module ID	0504 25E0	0506 25E0	0507 2558	0508 2558
General information				
Note	-	-	-	-
Features	› 4 outputs 12Bit › Current 0(4)...20mA	› 4 outputs 12Bit › Voltage -10 V...+10 V	› 2 outputs 16Bit › Voltage 0...10 V	› 2 outputs 16Bit › Voltage -10 V...+10 V
Current consumption/power loss				
Current consumption from backplane bus	80 mA	60 mA	60 mA	60 mA
Power loss	0.8 W	0.8 W	0.8 W	0.8 W
Technical data analog outputs				
Number of outputs	4	4	2	2
Cable length, shielded	200 m	200 m	200 m	200 m
Rated load voltage	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Current consumption from load voltage L+ (without load)	-	-	-	-
Voltage output short-circuit protection	-	✓	✓	✓
Voltage outputs	-	✓	✓	✓
Min. load resistance (voltage range)	-	5 kΩ	5 kΩ	5 kΩ
Max. capacitive load (current range)	-	1 µF	1 µF	1 µF
Output voltage ranges	-	-10 V ... +10 V	0 V ... +10 V	-10 V ... +10 V
Operational limit of voltage ranges	-	+/-0.3%	+/-0.2%	+/-0.2%
Basic error limit voltage ranges with SFU	-	+/-0.2%	+/-0.1%	+/-0.1%
Current outputs	✓	-	-	-
Max. in load resistance (current range)	350 Ω	-	-	-
Max. inductive load (current range)	10 mH	-	-	-
Output current ranges	0 mA ... +20 mA +4 mA ... +20 mA	-	-	-
Operational limit of current ranges	+/-0.4% ... +/-0.5%	-	-	-
Basic error limit current ranges with SFU	+/-0.2% ... +/-0.3%	-	-	-
Settling time for ohmic load	0.25 ms	1.5 ms	150 µs	150 µs
Settling time for capacitive load	-	2 ms	1 ms	1 ms
Settling time for inductive load	1.5 ms	-	-	-
Resolution in bit	12	12	16	16
Conversion time	2 ms all channels	2 ms all channels	200 µs all channels	200 µs all channels
Substitute value can be applied	no	no	no	no
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	no	no	no	no
Process alarm	no	no	no	no
Diagnostic interrupt	no	no	no	no
Diagnostic functions	yes	yes	yes	yes

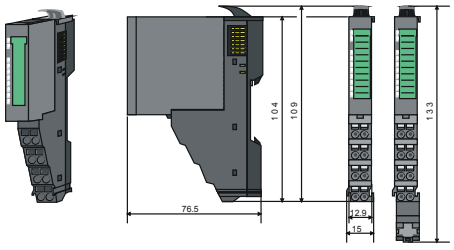
Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

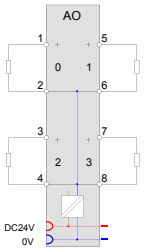
Order number	032-1BD40	032-1BD70	032-1CB30	032-1CB70
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	red LED per channel	red LED per channel	red LED per channel	red LED per channel
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	✓	✓	✓	✓
Max. potential difference between circuits	-	-	-	-
Max. potential difference between inputs (Ucm)	-	-	-	-
Max. potential difference between Mana and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	-	-	-	-
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Datasizes				
Input bytes	0	0	0	0
Output bytes	8	8	4	4
Parameter bytes	10	10	8	8
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	in preparation	in preparation	in preparation

Connections, Interfaces

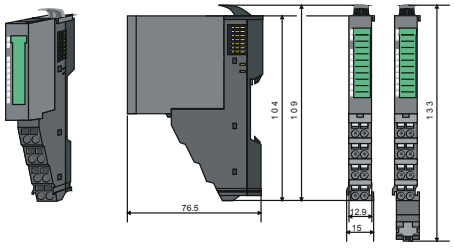
Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

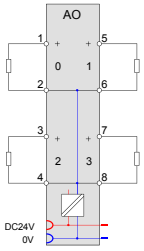
032-1BD40



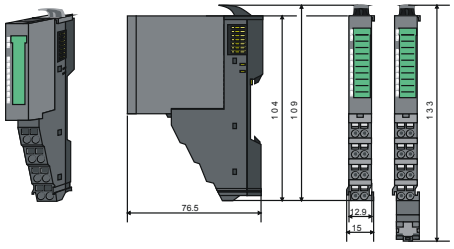


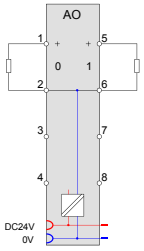
032-1BD70





032-1CB30





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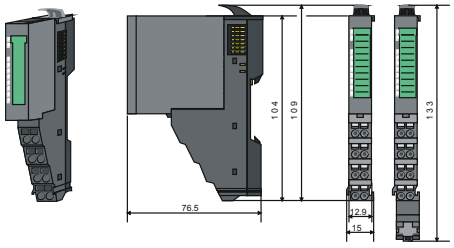
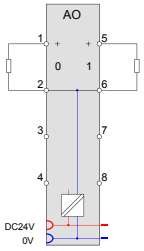




Analog output modules

Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

Order number	032-1CD30	032-1CD70		
Figure				
Type	SM 032	SM 032		
Module ID	0509 2560	050A 2560		
General information				
Note	-	-		
Features	› 4 outputs 16Bit › Voltage 0...10 V	› 4 outputs 16Bit › Voltage -10 V...+10 V		
Current consumption/power loss				
Current consumption from backplane bus	60 mA	60 mA		
Power loss	0.8 W	0.8 W		
Technical data analog outputs				
Number of outputs	4	4		
Cable length, shielded	200 m	200 m		
Rated load voltage	DC 24 V	DC 24 V		
Current consumption from load voltage L+ (without load)	-	-		
Voltage output short-circuit protection	✓	✓		
Voltage outputs	✓	✓		
Min. load resistance (voltage range)	5 kΩ	5 kΩ		
Max. capacitive load (current range)	1 µF	1 µF		
Output voltage ranges	0 V ... +10 V	-10 V ... +10 V		
Operational limit of voltage ranges	+/-0.2%	+/-0.2%		
Basic error limit voltage ranges with SFU	+/-0.1%	+/-0.1%		
Current outputs	-	-		
Max. in load resistance (current range)	-	-		
Max. inductive load (current range)	-	-		
Output current ranges	-	-		
Operational limit of current ranges	-	-		
Basic error limit current ranges with SFU	-	-		
Settling time for ohmic load	150 µs	150 µs		
Settling time for capacitive load	1 ms	2 ms		
Settling time for inductive load	-	-		
Resolution in bit	16	16		
Conversion time	200 µs all channels	200 µs all channels		
Substitute value can be applied	no	no		
Status information, alarms, diagnostics				
Status display	yes	yes		
Interrupts	no	no		
Process alarm	no	no		
Diagnostic interrupt	no	no		
Diagnostic functions	yes	yes		
Diagnostics information read-out	possible	possible		

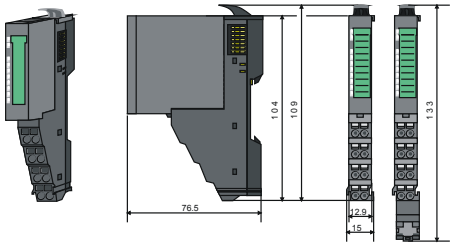
Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

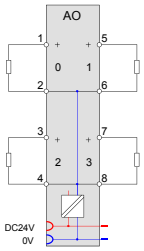
Order number	032-1CD30	032-1CD70		
Module state	green LED	green LED		
Module error display	red LED	red LED		
Channel error display	red LED per channel	red LED per channel		
Isolation				
Between channels	-	-		
Between channels of groups to	-	-		
Between channels and backplane bus	✓	✓		
Between channels and power supply	✓	✓		
Max. potential difference between circuits	-	-		
Max. potential difference between inputs (Ucm)	-	-		
Max. potential difference between Mana and Mintern (Uiso)	DC 75 V/ AC 60 V	DC 75 V/ AC 60 V		
Max. potential difference between inputs and Mana (Ucm)	-	-		
Max. potential difference between inputs and Mintern (Uiso)	-	-		
Max. potential difference between Mintern and outputs	-	-		
Insulation tested with	DC 500 V	DC 500 V		
Datasizes				
Input bytes	0	0		
Output bytes	8	8		
Parameter bytes	10	10		
Diagnostic bytes	20	20		
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10		
Mounting	Profile rail 35 mm	Profile rail 35 mm		
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm		
Weight	60 g	60 g		
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C		
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C		
Certifications				
UL508 certification	in preparation	in preparation		

Connections, Interfaces

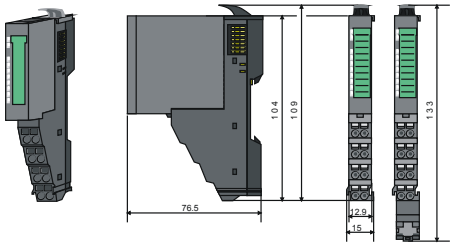
Signal modules analog | Analog output modules						
032-1BB30 032-1BB40 032-1BB70 032-1BD30	032-1BD40 032-1BD70 032-1CB30 032-1CB70	032-1CD30 032-1CD70				

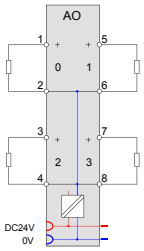
032-1CD30





032-1CD70





Communication processors

Structure and Function

Communications processors are used to connect different target and source systems, e.g. via Ethernet to higher-level ERP systems or serially to scanners, printers and other peripherals.

CP 040

The communication processors CP 040 enable the serial process coupling to different target and source systems. Depending on the module they have a RS232 or a RS422/485 interface.

Characteristics

- Support for all standard protocols ASCII, STX/ETX, 3964(R) and Modbus (master, slave)
- Internal communication via VIPA FBs
- Compact design
- LED status indicator
- Electrically isolated to the backplane bus
- Assembly with 35 mm profile rail
- 24 month warranty

Overview

Order no.	Name/Description	Page
RS232/422/485 and other CPs		
040-1BA00	**CP 040 - Communication processor** › RS232 interface	**84**
040-1CA00	**CP 040 - Communication processor** › RS422/485 interface	**84**

RS232/422/485 and other CPs

Communication processors | RS232/422/485 and other CPs						
040-1BA00 040-1CA00						

Order number	040-1BA00	040-1CA00		
Figure				
Type	CP 040 RS232	CP 040 RS422/485		
Module ID	0E01 0700	0E41 1700		
General information				
Note	-	-		
Features	› RS232 interface	› RS422/485 interface		
Current consumption/power loss				
Current consumption from backplane bus	100 mA	100 mA		
Current consumption from load voltage L+ (without load)	10 mA	10 mA		
Power loss	1 W	1 W		
Status information, alarms, diagnostics				
Status display	yes	yes		
Interrupts	yes, parameterizable	yes, parameterizable		
Process alarm	no	no		
Diagnostic interrupt	yes, parameterizable	yes, parameterizable		
Diagnostic functions	yes, parameterizable	yes, parameterizable		
Diagnostics information read-out	possible	possible		
Supply voltage display	green LED	green LED		
Group error display	red LED	red LED		
Channel error display	red LED	red LED		
Point-to-point communication				
PtP communication	✓	✓		
Interface isolated	✓	✓		
RS232 interface	✓	-		
RS422 interface	-	✓		
RS485 interface	-	✓		
Connector	Terminal module	Terminal module		
Transmission speed, min.	150 bit/s	150 bit/s		
Transmission speed, max.	115.2 kbit/s	115.2 kbit/s		
Cable length, max.	15 m	1200 m		
Point-to-point protocol				
ASCII protocol	✓	✓		
STX/ETX protocol	✓	✓		
3964(R) protocol	✓	✓		
RK512 protocol	-	-		
USS master protocol	-	-		
Modbus master protocol	✓	✓		
Modbus slave protocol	✓	✓		
Special protocols	-	-		

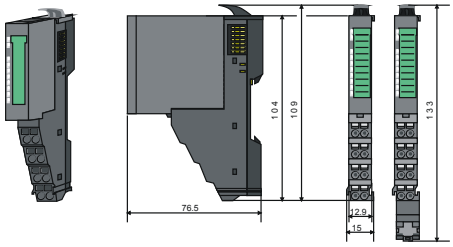
Communication processors | RS232/422/485 and other CPs						
040-1BA00 040-1CA00						

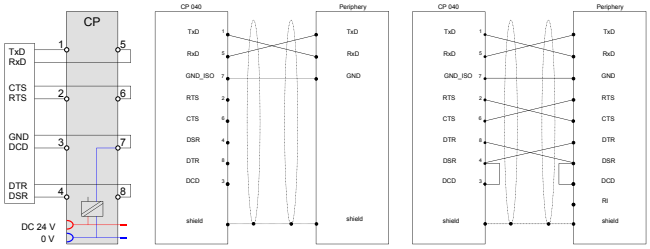
Order number	040-1BA00	040-1CA00		
Datasizes				
Input bytes	8 / 20 / 60	8 / 20 / 60		
Output bytes	8 / 20 / 60	8 / 20 / 60		
Parameter bytes	21	23		
Diagnostic bytes	20	20		
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10		
Mounting	Profile rail 35 mm	Profile rail 35 mm		
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm		
Weight	60 g	60 g		
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C		
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C		
Certifications				
UL508 certification	yes	yes		

Connections, Interfaces

Communication processors | RS232/422/485 and other CPs						
040-1BA00 040-1CA00						

040-1BA00





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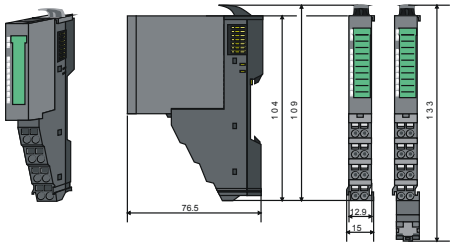
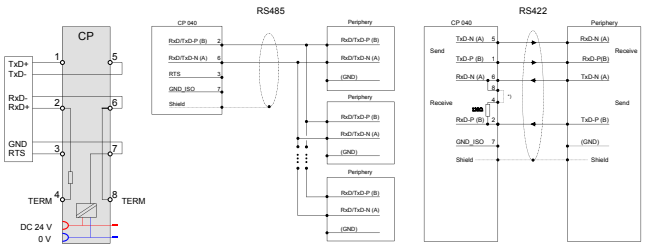
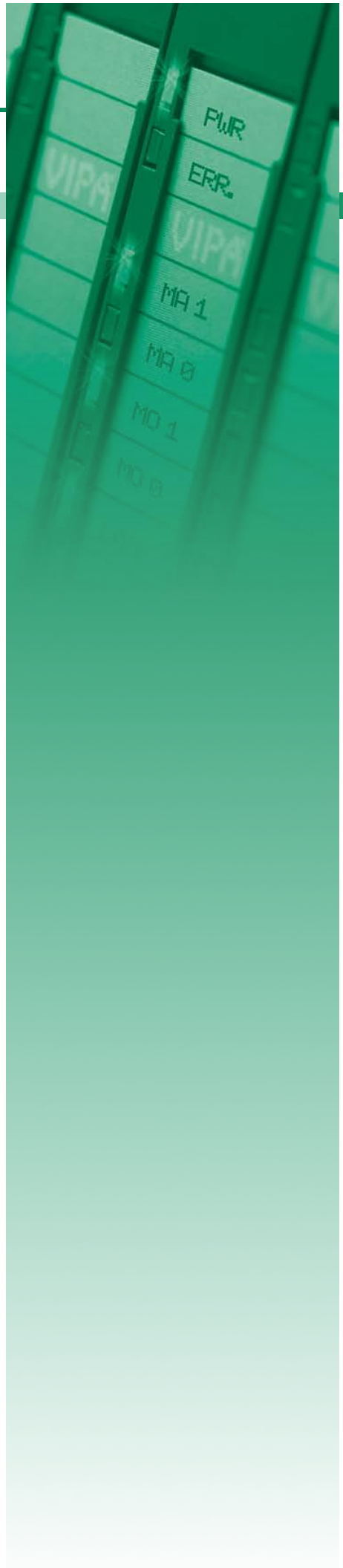




Function modules



Structure and Function

Function modules (FM) are intelligent modules that perform technological tasks such as position determination, counting and positioning, and other complex functions in the automation independently. They are used when there are high demands on accuracy and dynamic in the starting of automation tasks.

Different functional modules, for example counter modules, SSI modules provide exactly the functions that are required for the respective tasks.

Each functional module consists of a terminal and an electronic module.

The terminal module (TM) contains the retainer for the electronic module (EM), the backplane connectors and contacts for the distribution of the load power supply electronics, the modular connection to DC 24 V load power supply and the staircase-shaped terminal block for the wiring.

Furthermore the terminal module processes a locking system for fixing to a profile rail. The SLIO system can also be constructed "block by block" outside the cabinet and later assembled as a complete system in the control cabinet.

The functionality of the signal module is defined via the electronic module that is connected by a secure sliding mechanism to the terminal module.

During service the defective electronic module can be replaced without detaching the wiring.

Characteristics

- Supports fast counter systems up to 1 MHz
- Counting direction invertible
- Integrated digital outputs
- For direct connection of incremental encoders
- Electrically isolated to the backplane bus
- Direct mapping and readability of the channel conditions via status LEDs
- Safe and time-saving installation by the terminal assignment mounted on the module
- When changing the module equipment identification (BMK) is retained on the TM
- Individual single-channel lettering on insertion strip
- 24 month warranty

Overview

Order no.	Name/Description	Page
Counter modules		
050-1BA00	**FM 050 - Counter module** › 1 Counter 32 Bit (AB) › DC 24 V	**90**
050-1BA10	**FM 050 - Counter module** › 1 Counter 32 Bit (AB) › DC 5 V	**90**
050-1BB00	**FM 050 - Counter module** › 2 Counter 32 Bit (AB) › DC 24 V	**90**
050-1BB30	**FM 050 - Counter module** › 2 Counter 32 Bit (AB) › DC 24 V	**90**
SSI modules		
050-1BS00	**FM 050S - SSI module** › SSI - Encoder › Master or slave mode › Encoder frequency 125 kHz...2 MHz › µs time stamp for encoder value	**94**

Counter modules

Function modules | Counter modules						
050-1BA00 050-1BA10 050-1BB00 050-1BB30						

Order number	050-1BA00	050-1BA10	050-1BB00	050-1BB30
Figure				
Type	FM 050	FM 050	FM 050	FM 050
Module ID	08C1 3800	08C2 3801	08C3 380A	08C4 388B
General information				
Note	-	-	-	-
Features	› 1 Counter 32 Bit (AB) › DC 24 V	› 1 Counter 32 Bit (AB) › DC 5 V	› 2 Counter 32 Bit (AB) › DC 24 V	› 2 Counter 32 Bit (AB) › DC 24 V
Current consumption/power loss				
Current consumption from backplane bus	75 mA	70 mA	75 mA	75 mA
Power loss	1 W	0.85 W	0.9 W	0.9 W
Technical data digital inputs				
Number of inputs	5	-	4	4
Cable length, shielded	100 m	100 m	100 m	100 m
Cable length, unshielded	-	-	-	-
Rated load voltage	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Reverse polarity protection of rated load voltage	-	-	-	-
Current consumption from load voltage L+ (without load)	20 mA	20 mA	15 mA	15 mA
Rated value	DC 20.4...28.8 V	-	DC 20.4...28.8 V	DC 20.4...28.8 V
Input voltage for signal "0"	DC 0...5 V	Differential signal RS422	DC 0...5 V	DC 0...5 V
Input voltage for signal "1"	DC 15...28.8 V	Differential signal RS422	DC 15...28.8 V	DC 15...28.8 V
Input voltage hysteresis	-	-	-	-
Frequency range	-	-	-	-
Input resistance	-	120 Ω	-	-
Input current for signal "1"	3 mA	-	3 mA	3 mA
Connection of Two-Wire-BEROs possible	✓	-	✓	✓
Max. permissible BERO quiescent current	0.5 mA	-	0.5 mA	0.5 mA
Input delay of "0" to "1"	0,8 µs	0,8 µs	0,8 µs	0,8 µs
Input delay of "1" to "0"	0,8 µs	0,8 µs	0,8 µs	0,8 µs
Number of simultaneously utilizable inputs horizontal configuration	5	-	4	4
Number of simultaneously utilizable inputs vertical configuration	5	-	4	4
Input characteristic curve	IEC 61131, type 1	-	IEC 61131, type 1	IEC 61131, type 1
Initial data size	12 Byte	8 Byte	12 Byte	12 Byte
Technical data digital outputs				
Number of outputs	1	-	-	-
Cable length, shielded	100 m	-	-	-
Cable length, unshielded	100 m	-	-	-
Rated load voltage	DC 20.4...28.8 V	-	-	-

Function modules | Counter modules						
050-1BA00 050-1BA10 050-1BB00 050-1BB30						

Order number	050-1BA00	050-1BA10	050-1BB00	050-1BB30
Current consumption from load voltage L+ (without load)	-	-	-	-
Output delay of "0" to "1"	30 µs	-	-	-
Output delay of "1" to "0"	30 µs	-	-	-
Minimum load current	-	-	-	-
Lamp load	10 W	-	-	-
Parallel switching of outputs for redundant control of a load	not possible	-	-	-
Parallel switching of outputs for increased power	not possible	-	-	-
Actuation of digital input	✓	-	-	-
Switching frequency with resistive load	max. 10 kHz	-	-	-
Switching frequency with inductive load	max. 0.5 Hz	-	-	-
Switching frequency on lamp load	max. 10 kHz	-	-	-
Internal limitation of inductive shut-off voltage	L+ (-52 V)	-	-	-
Short-circuit protection of output	yes, electronic	-	-	-
Trigger level	1 A	-	-	-
Number of operating cycle of relay outputs	-	-	-	-
Switching capacity of contacts	-	-	-	-
Output data size	10 Byte	10 Byte	12 Byte	4 Byte
Technical data counters				
Number of counters	1	1	2	2
Counter width	32 Bit	32 Bit	32 Bit	32 Bit
Maximum input frequency	100 kHz	500 kHz	100 kHz	100 kHz
Maximum count frequency	400 kHz	2 MHz	400 kHz	400 kHz
Mode incremental encoder	✓	✓	✓	✓
Mode pulse / direction	✓	✓	✓	✓
Mode pulse	-	-	-	-
Mode frequency counter	-	-	-	-
Mode period measurement	-	-	-	-
Gate input available	✓	-	-	-
Latch input available	✓	-	-	-
Reset input available	✓	✓	-	-
Counter output available	✓	-	-	-
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	yes, parameterizable	yes, parameterizable	yes, parameterizable	no
Process alarm	yes, parameterizable	yes, parameterizable	yes, parameterizable	no
Diagnostic interrupt	yes, parameterizable	yes, parameterizable	yes, parameterizable	no
Diagnostic functions	yes, parameterizable	yes, parameterizable	yes, parameterizable	no
Diagnostics information read-out	possible	possible	possible	possible
Module state	green LED	green LED	green LED	green LED
Module error display	red LED	red LED	red LED	red LED
Channel error display	none	none	none	none

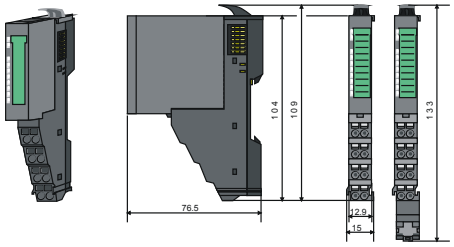
Function modules | Counter modules						
050-1BA00 050-1BA10 050-1BB00 050-1BB30						

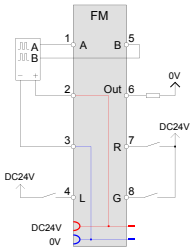
Order number	050-1BA00	050-1BA10	050-1BB00	050-1BB30
Isolation				
Between channels	-	-	-	-
Between channels of groups to	-	-	-	-
Between channels and backplane bus	✓	✓	✓	✓
Between channels and power supply	-	-	-	-
Max. potential difference between circuits	-	-	-	-
Max. potential difference between inputs (Ucm)	-	-	-	-
Max. potential difference between Mana and Mintern (Uiso)	-	-	-	-
Max. potential difference between inputs and Mana (Ucm)	-	-	-	-
Max. potential difference between inputs and Mintern (Uiso)	-	-	-	-
Max. potential difference between Mintern and outputs	-	-	-	-
Insulation tested with	DC 500 V	DC 500 V	DC 500 V	DC 500 V
Datasizes				
Input bytes	12	8	12	12
Output bytes	10	10	12	4
Parameter bytes	25	23	45	12
Diagnostic bytes	20	20	20	20
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm	12.9 mm x 109 mm x 76.5 mm
Weight	60 g	60 g	60 g	60 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

Connections, Interfaces

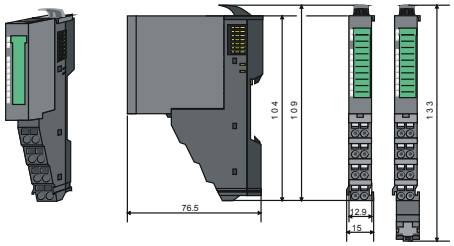
Function modules | Counter modules						
050-1BA00 050-1BA10 050-1BB00 050-1BB30						

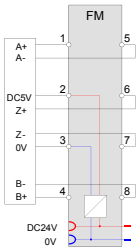
050-1BA00



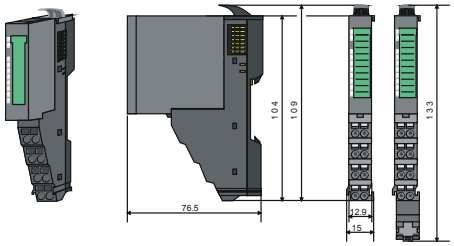


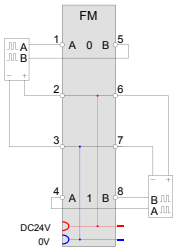
050-1BA10



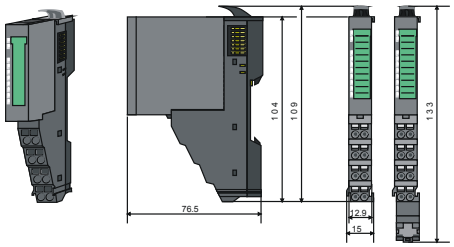


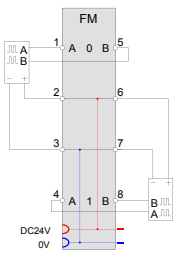
050-1BB00





050-1BB30





SSI modules

Function modules | SSI modules						
050-1BS00						

Order number	050-1BS00			
Figure				
Type	FM 050			
Module ID	09C1 7800			
General information				
Note	-			
Features	› SSI - Encoder › Master or slave mode › Encoder frequency 125 kHz...2 MHz › µs time stamp for encoder value			
Current consumption/power loss				
Current consumption from backplane bus	70 mA			
Power loss	1 W			
Parallel switching of outputs for increased power	-			
Status information, alarms, diagnostics				
Status display	yes			
Interrupts	yes, parameterizable			
Process alarm	no			
Diagnostic interrupt	yes, parameterizable			
Diagnostic functions	yes, parameterizable			
Diagnostics information read-out	possible			
Module state	green LED			
Module error display	red LED			
Channel error display	none			
Isolation				
Between channels	-			
Between channels of groups to	-			
Between channels and backplane bus	✓			
Between channels and power supply	-			
Max. potential difference between circuits	-			
Max. potential difference between inputs (Ucm)	-			
Max. potential difference between Mana and Mintern (Uiso)	-			
Max. potential difference between inputs and Mana (Ucm)	-			
Max. potential difference between inputs and Mintern (Uiso)	-			
Max. potential difference between Mintern and outputs	-			
Insulation tested with	DC 500 V			

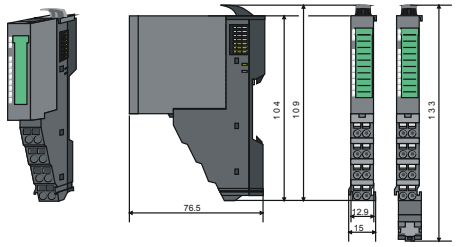
Function modules | SSI modules						
050-1BS00						

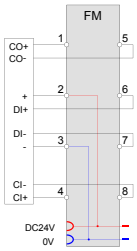
Order number	050-1BS00			
Datasizes				
Input bytes	6			
Output bytes	0			
Parameter bytes	17			
Diagnostic bytes	20			
Housing				
Material	PPE / PPE GF10			
Mounting	Profile rail 35 mm			
Mechanical data				
Dimensions (WxHxD)	12.9 mm x 109 mm x 76.5 mm			
Weight	60 g			
Environmental conditions				
Operating temperature	0 °C to 60 °C			
Storage temperature	-25 °C to 70 °C			
Certifications				
UL508 certification	yes			

Connections, Interfaces

Function modules | SSI modules						
050-1BS00						

050-1BS00





Interface modules

Structure and Function

Interface modules (IM) form the interface between process level and parent bus system. All control signals are transmitted through the internal backplane bus to the electronics module (EM).

In the case of the interface module the bus interface and power module (PM) are integrated in a single casing. Both the bus interface and the electronics of the connected peripheral modules are supplied with power via the integrated power module.

Up to 64 I/O modules can be operated on the interface module.

Characteristics

- Support for various fieldbus systems
- Functional DIP switches for address setting for the PROFIBUS-DP and CANopen with transparent cover
- MAC address on the front in plain text
- Electrical isolation between fieldbus and input/output field
- Integrated DC 24 V power module to the electronic and load voltage supply of the peripheral modules
- Easy to maintain, replaceable power module
- Up to 64 signal and function modules per interface module
- 24 month warranty

Overview

Order no.	Name/Description	Page
Fieldbus slave modules without I/Os		
053-1CA00	**IM 053CAN - CANopen slave** › CANopen slave › 16 Rx and 16 Tx PDOs › 2 SDOs › PDO linking › PDO mapping: fix › max. 64 peripheral modules	**100**
053-1DN00	**IM 053DN - DeviceNet slave** › DeviceNet slave › Group 2 only device › Poll only device › Baud rate: 125, 250 and 500kbit/s › max. 64 peripheral modules	**100**
053-1DP00	**IM 053DP - PROFIBUS-DP slave** › PROFIBUS-DP slave (DP-V0, DP-V1) › 244 Byte input and 244 Byte output data › 64 peripheral modules max.	**100**
053-1EC00	**IM 053EC - EtherCAT slave** › EtherCAT slave › RJ45 jack 100BaseTX › 64 peripheral modules max.	**100**
053-1MT00	**IM 053MT - Modbus/TCP slave** › Modbus/TCP slave › I/O configuration via fieldbus › Adjustable I/O cycle (0.5...4 ms) › max. 64 peripheral modules	**103**
053-1PN00	**IM 053PN - PROFINET-IO slave** › PROFINET-IO slave › Transfer rate 100Mbit/s › max. 64 peripheral modules	**103**

Fieldbus slave modules without I/Os

Interface modules | Fieldbus slave modules without I/Os						
053-1CA00 053-1DN00 053-1DP00 053-1EC00	053-1MT00 053-1PN00					

Order number	053-1CA00	053-1DN00	053-1DP00	053-1EC00
Figure				
Type	IM 053CAN	IM 053DN	IM 053DP	IM 053EC
Module ID	-	-	-	-
General information				
Note	-	-	-	-
Features	› CANopen slave › 16 Rx and 16 Tx PDOs › 2 SDOs › PDO linking › PDO mapping: fix › max. 64 peripheral modules	› DeviceNet slave › Group 2 only device › Poll only device › Baud rate: 125, 250 and 500kbit/s › max. 64 peripheral modules	› PROFIBUS-DP slave (DP-V0, DP-V1) › 244 Byte input and 244 Byte output data › 64 peripheral modules max.	› EtherCAT slave › RJ45 jack 100BaseTX › 64 peripheral modules max.
Technical data power supply				
Power supply (rated value)	DC 24 V	DC 24 V	DC 24 V	DC 24 V
Power supply (permitted range)	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V	DC 20.4...28.8 V
Reverse polarity protection	✓	✓	✓	✓
Current consumption (no-load operation)	90 mA	90 mA	90 mA	95 mA
Current consumption (rated value)	0.95 A	0.95 A	0.95 A	0.95 A
Inrush current	3.9 A	3.9 A	3.9 A	3.9 A
I^2t	0.14 A^2s	0.14 A^2s	0.14 A^2s	0.14 A^2s
Max. current drain at backplane bus	3 A	3 A	3 A	3 A
Max. current drain load supply	10 A	10 A	10 A	10 A
Power loss	3 W	3 W	3 W	3 W
Status information, alarms, diagnostics				
Status display	yes	yes	yes	yes
Interrupts	yes, parameterizable	-	yes, parameterizable	yes, parameterizable
Process alarm	no	-	yes, parameterizable	yes, parameterizable
Diagnostic interrupt	yes, parameterizable	-	yes, parameterizable	yes, parameterizable
Diagnostic functions	yes, parameterizable	-	yes, parameterizable	yes, parameterizable
Diagnostics information read-out	possible	possible	possible	possible
Supply voltage display	green LED	green LED	green LED	green LED
Service Indicator	-	-	-	-
Group error display	red LED	red SF LED	red LED	red SF LED
Channel error display	none	none	none	none
Hardware configuration				
Racks, max.	1	1	1	1
Modules per rack, max.	64	64	64	64
Number of digital modules, max.	64	64	64	64
Number of analog modules, max.	64	64	64	64

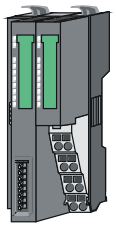
Interface modules | Fieldbus slave modules without I/Os						
053-1CA00 053-1DN00 053-1DP00 053-1EC00	053-1MT00 053-1PN00					

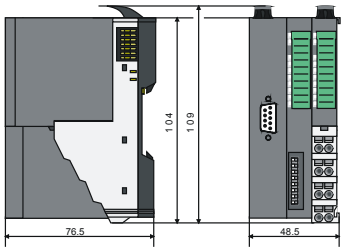
Order number	053-1CA00	053-1DN00	053-1DP00	053-1EC00
Communication				
Fieldbus	CANopen	DeviceNet	PROFIBUS-DP to EN 50170	EtherCAT
Type of interface	CAN	CAN	RS485 isolated	Ethernet 100 MBit
Connector	Sub-D, 9-pin, male	5-pin Open Style Connector	Sub-D, 9-pin, female	2 x RJ45
Topology	Linear bus with bus termination at both ends	Linear bus with bus termination at both ends	Linear bus with bus termination at both ends	-
Electrically isolated	✓	✓	✓	✓
Number of participants, max.	127	64	125	65535
Node addresses	1 - 127	0 - 63	1 - 125	-
Transmission speed, min.	10 kbit/s	125 kbit/s	9.6 kbit/s	100 Mbit/s
Transmission speed, max.	1 Mbit/s	500 kbit/s	12 Mbit/s	100 Mbit/s
Address range inputs, max.	128 Byte	256 Byte	244 Byte	4 KB
Address range outputs, max.	128 Byte	256 Byte	244 Byte	4 KB
Number of TxPDOs, max.	16	-	-	-
Number of RxPDOs, max.	16	-	-	-
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10	PPE / PPE GF10
Mounting	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm	Profile rail 35 mm
Mechanical data				
Dimensions (WxHxD)	48.5 mm x 109 mm x 76.5 mm	48.5 mm x 109 mm x 76.5 mm	48.5 mm x 109 mm x 76.5 mm	48.5 mm x 109 mm x 76.5 mm
Weight	155 g	155 g	155 g	155 g
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C	0 °C to 60 °C
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C	-25 °C to 70 °C
Certifications				
UL508 certification	yes	yes	yes	yes

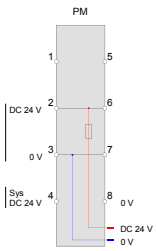
Connections, Interfaces

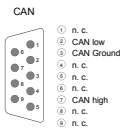
Interface modules | Fieldbus slave modules without I/Os						
053-1CA00 053-1DN00 053-1DP00 053-1EC00	053-1MT00 053-1PN00					

053-1CA00

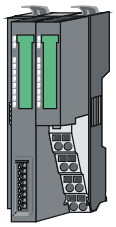


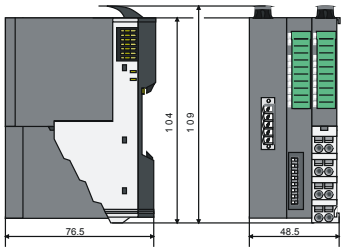


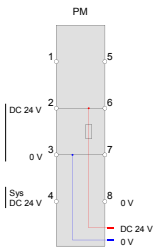


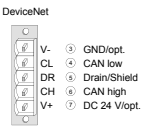


053-1DN00

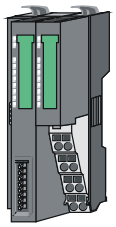


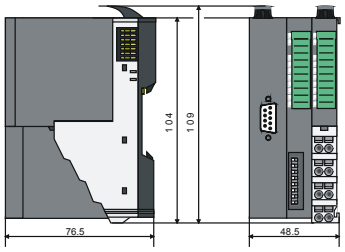


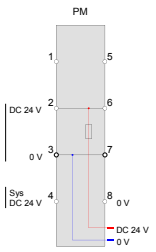


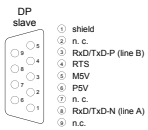


053-1DP00

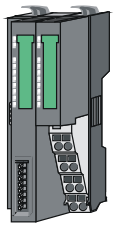


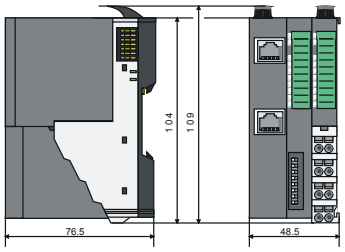


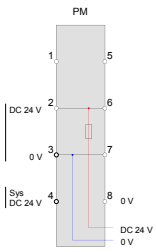


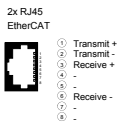


053-1EC00









Fieldbus slave modules without I/Os

Interface modules | Fieldbus slave modules without I/Os						
053-1CA00 053-1DN00 053-1DP00 053-1EC00	053-1MT00 053-1PN00					

Order number	053-1MT00	053-1PN00		
Figure				
Type	IM 053MT	IM 053PN		
Module ID	-	-		
General information				
Note	-	-		
Features	› Modbus/TCP slave › I/O configuration via fieldbus › Adjustable I/O cycle (0.5...4 ms) › max. 64 peripheral modules	› PROFINET-IO slave › Transfer rate 100Mbit/s › max. 64 peripheral modules		
Technical data power supply				
Power supply (rated value)	DC 24 V	DC 24 V		
Power supply (permitted range)	DC 20.4...28.8 V	DC 20.4...28.8 V		
Reverse polarity protection	✓	✓		
Current consumption (no-load operation)	95 mA	95 mA		
Current consumption (rated value)	0.95 A	0.95 A		
Inrush current	3.9 A	3.9 A		
I^2t	0.14 A^2s	0.14 A^2s		
Max. current drain at backplane bus	3 A	3 A		
Max. current drain load supply	10 A	10 A		
Power loss	3 W	3 W		
Status information, alarms, diagnostics				
Status display	yes	yes		
Interrupts	yes, parameterizable	yes, parameterizable		
Process alarm	yes, parameterizable	yes, parameterizable		
Diagnostic interrupt	yes, parameterizable	yes, parameterizable		
Diagnostic functions	yes, parameterizable	yes, parameterizable		
Diagnostics information read-out	possible	possible		
Supply voltage display	green LED	green LED		
Service Indicator	yellow LED	yellow LED		
Group error display	red SF LED	red SF LED		
Channel error display	none	none		
Hardware configuration				
Racks, max.	1	1		
Modules per rack, max.	64	64		
Number of digital modules, max.	64	64		
Number of analog modules, max.	64	64		
Communication				
Fieldbus	Modbus / TCP/IP	PROFINET-IO		
Type of interface	Ethernet 10/100 MBit	Ethernet 100 MBit		
Connector	RJ45	2 x RJ45		

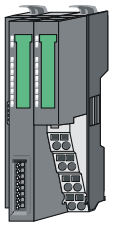
Interface modules | Fieldbus slave modules without I/Os						
053-1CA00 053-1DN00 053-1DP00 053-1EC00	053-1MT00 053-1PN00					

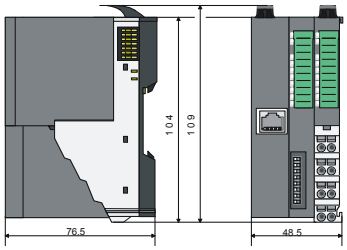
Order number	053-1MT00	053-1PN00		
Topology	-	-		
Electrically isolated	✓	✓		
Number of participants, max.	-	-		
Node addresses	-	-		
Transmission speed, min.	10 Mbit/s	100 Mbit/s		
Transmission speed, max.	100 Mbit/s	100 Mbit/s		
Address range inputs, max.	1 KB	512 Byte		
Address range outputs, max.	1 KB	512 Byte		
Number of TxPDOs, max.	-	-		
Number of RxPDOs, max.	-	-		
Housing				
Material	PPE / PPE GF10	PPE / PPE GF10		
Mounting	Profile rail 35 mm	Profile rail 35 mm		
Mechanical data				
Dimensions (WxHxD)	48.5 mm x 109 mm x 76.5 mm	48.5 mm x 109 mm x 76.5 mm		
Weight	155 g	155 g		
Environmental conditions				
Operating temperature	0 °C to 60 °C	0 °C to 60 °C		
Storage temperature	-25 °C to 70 °C	-25 °C to 70 °C		
Certifications				
UL508 certification	yes	yes		

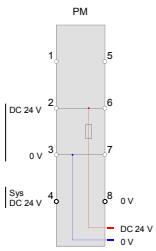
Connections, Interfaces

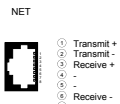
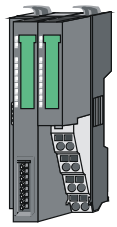
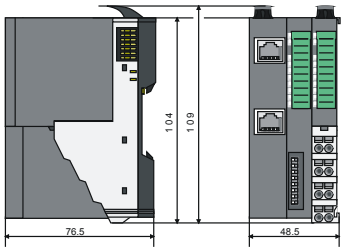
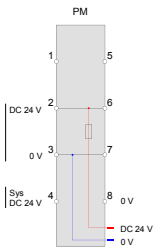
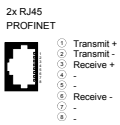
Interface modules | Fieldbus slave modules without I/Os						
053-1CA00 053-1DN00 053-1DP00 053-1EC00	053-1MT00 053-1PN00					

053-1MT00









053-1PN00