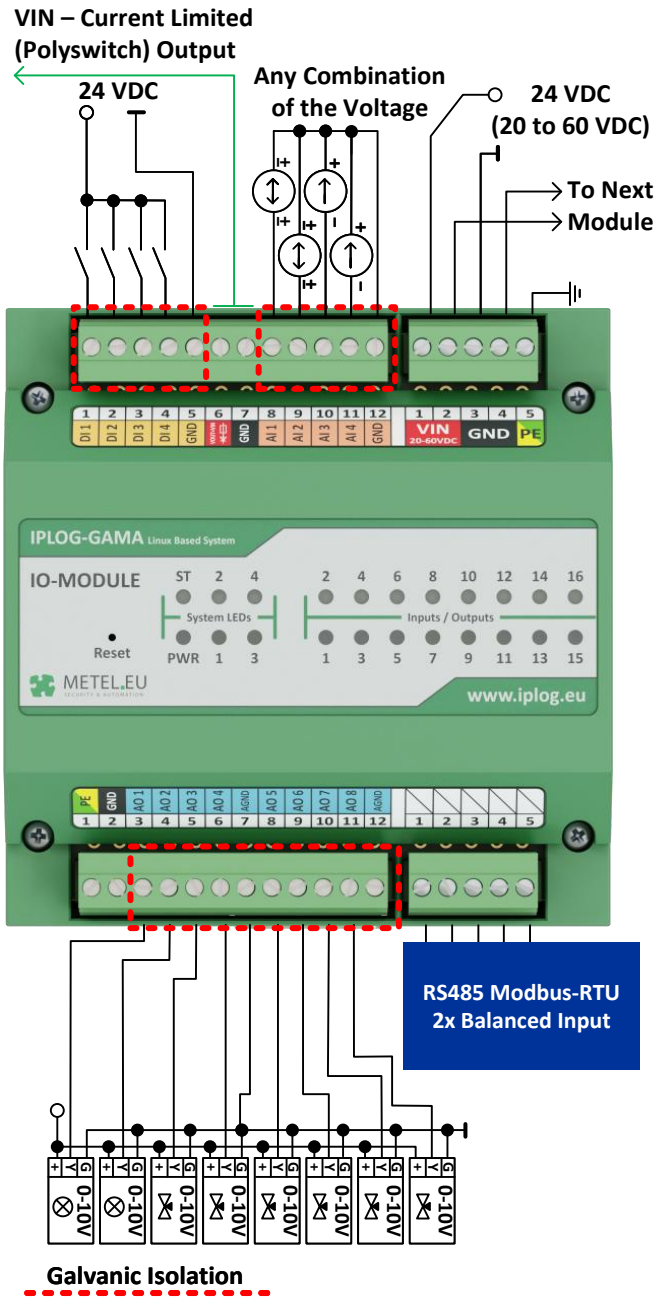
- 8x 12-bit Analog Outputs
- 4x 12-bit Analog U Inputs
- 4x Digital 24V Inputs
- 1x Slot for IF Module
- Operating Range –40°C to +70°C
- 600 W Integrated Surge Protections

PRODUCT NAME	CODE	NOTE
AO8.1-05-DIN	6000-0607	1x RS485, 2x ALARM IN

AO8.1 is an industrial module which can be easily adapted for a wide range of tasks. It can be used as IPLOG-G submodule or as standalone addressable module at MODBUS RTU bus.

	PARAMETER	VALUES	NOTE
DEVICE	Power Supply	24, 48 VDC	20 to 60 VDC
	Consumption	Max. 1.5 W	
	Surge Protection	600 W	10/1000 µs
	Operating Range	–40 to +70 °C	
	Storage Range	–40 to +70 °C	
	Humidity	Max. 95 %	No-condensing
	Dimension	35 x 110 x 119 mm	W x H x D
	Weight	Max. 0.38 kg	
	Installation	DIN35 or Flat Surface	
	Device Class	I	EN 61140
	Ingress Protection	IP 20	EN 60529
	Cover Material	ABS UL94 V0	
	Degree of pollution	II	EN 60664-1
	Connections	Screw Terminals	
	Conduct. cross-section	Max. 2.5 mm²	

	PARAMETER	VALUES	NOTE
CPU	Series	32-bit MCU	
	Frequency	64 MHz	
	Flash	512 kB	
	RAM	64 kB	



Safety Precautions

If dangerous voltage is applied to the terminals, only personnel with appropriate electrical education may perform installation and servicing of the equipment. In the event of a fault, the device must be sent to the producer for repair. The device must be earthed in accordance with national standards. We recommend the manipulation of terminal blocks, only in the event they are not in the presence of dangerous voltage. Failure to comply with this recommendation may result in the risk of electrical shock.

Location and Designation of Connectors and LEDs

NOTE: The order of the terminal numbers in the table below corresponds to the order of the terminal numbers found on the device.

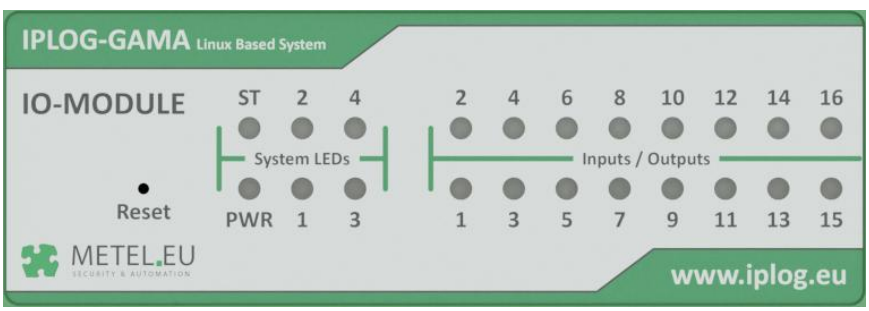
CONNECTOR A			LEDS	
12	AGND	Analog Ground		
11	AI 4	Analog Input, Voltage	AI4	Flashing = Connected Voltage to Input
10	AI 3	Analog Input, Voltage	AI3	Flashing = Connected Voltage to Input
9	AI 2	Analog Input, Voltage	AI2	Flashing = Connected Voltage to Input
8	AI 1	Analog Input, Voltage	AI1	Flashing = Connected Voltage to Input
7	GND	Ground		
6	VOUT	Power Output Max. 100 mA, VOUT = VIN – 0.7 V		
5	GND 1-4	Common Ground Terminal of Digit, Inputs 1 to 4		
4	DI 4	Digital Input 24 V - DC / AC	DI4	Log 1 = Lights
3	DI 3	Digital Input 24 V - DC / AC	DI3	Log 1 = Lights
2	DI 2	Digital Input 24 V - DC / AC	DI2	Log 1 = Lights
1	DI 1	Digital Input 24 V - DC / AC	DI1	Log 1 = Lights

CONNECTOR B			LEDS	
5	PE	Earthing Terminal		
4	GND	Power Input – Minus Terminals Terminals are Internally Interconnected	PWR	Power is Connected, LED Lights Up
3				
2	VIN 20-60 V DC	Power Input – Plus Terminals Terminals are Internally Interconnected		
1				

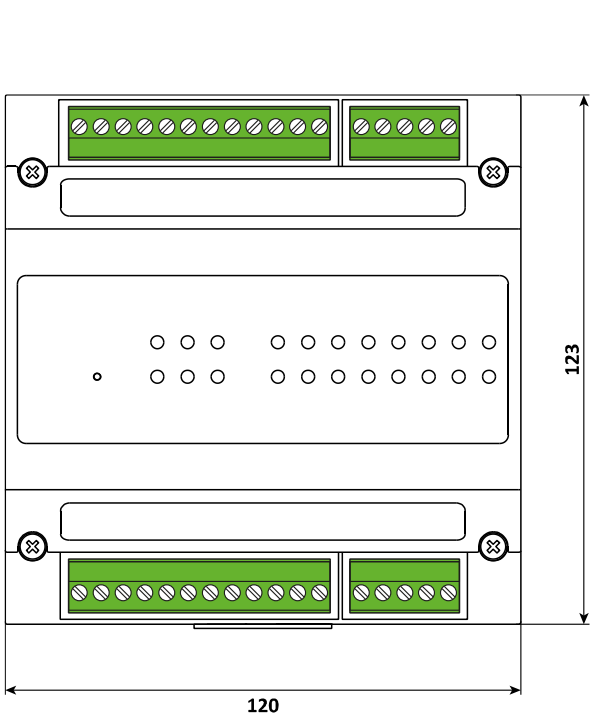
CONNECTOR C			LEDS	
12	AGND	Analog Ground		
11	AO8	Analog Output	AO8	Flashing = Set Value > 0
10	AO7	Analog Output	AO7	Flashing = Set Value > 0
9	AO6	Analog Output	AO6	Flashing = Set Value > 0
8	AO5	Analog Output	AO5	Flashing = Set Value > 0
7	AGND	Analog Ground		
6	AO4	Analog Output	AO4	Flashing = Set Value > 0
5	AO3	Analog Output	AO3	Flashing = Set Value > 0
4	AO2	Analog Output	AO2	Flashing = Set Value > 0
3	AO1	Analog Output	AO1	Flashing = Set Value > 0
2	GND	Ground		
1	PE	Earthing Terminal		

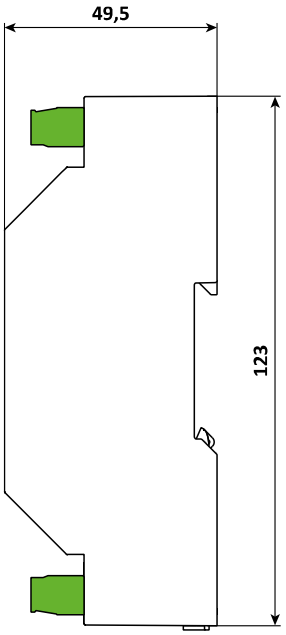
LED		LED	
1	BUS 1 (Tx = Red / Rx = Green)	3	IF05 Input BI1 Sabotage Short = Log. 1 = Lights
2	BUS 2 (Tx = Red / Rx = Green)	4	IF05 Input BI2 Sabotage Short = Log. 1 = Lights
LED 1 – 4 flashing red = power input of IO module is lower than 20VDC			

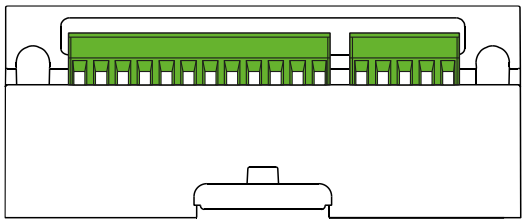
Galvanic Isolation

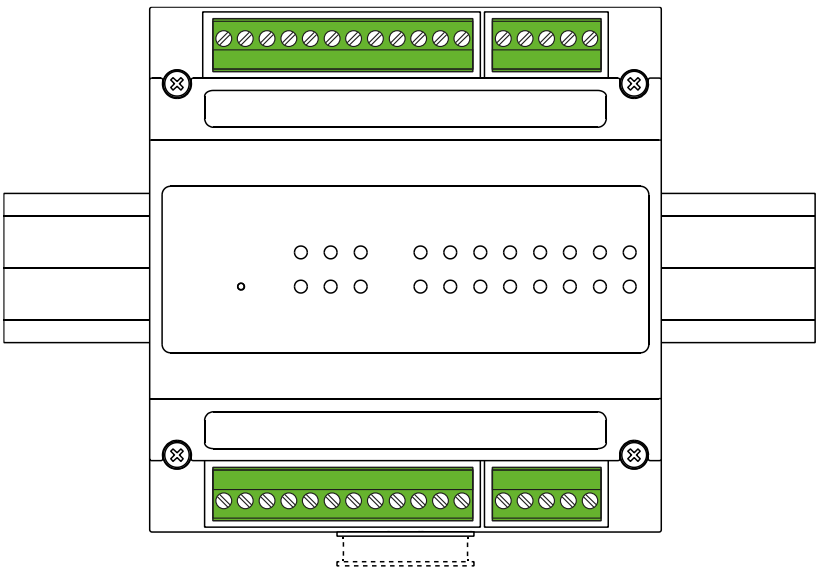


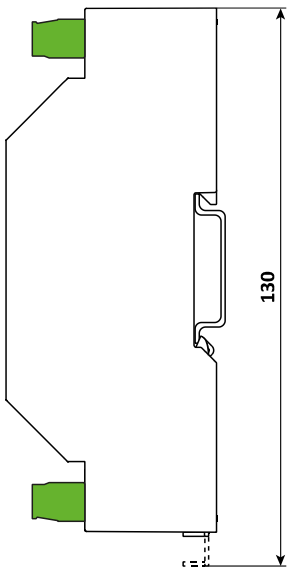
Dimensions and Installation of DIN Version











Default Settings of MODBUS Communication

Device ID: **1** | Speed: **115 200** | Parity: **None** | Data bits: **8** | Stop bits: **1**

Modbus registers

	Subject	Type	R/W	Value	Offset
Device Identification	Product Type	u8[3]	R		1002–04
	Serial Number	u32	R		1005–06
	PCB Version	u32	R		1007–08
	PCB Revision	u16	R		1009
	FW Version Major	u16	R		1010
	FW Version Minor	u16	R		1011
	FW Version - Revision	u32	R		1012–13
	IF#01 Slot State	u16	R	0 = N/A 1 = IF#01 not Inserted 2 = IF#01 Inserted, CRC error 3 = IF#01 Inserted, CRC OK	1021
	IF#01 Product Type	u8[3]	R		1022–24
	IF#01 Serial Number	u32	R		1025–26
	IF#01 PCB Version	u32	R		1027–28
	IF#01 PCB Revision	u16	R		1029
Device Control	Reset	u16	RW	55203 = To Reboot	1201
	Bootloader / Application	u16	R	0x00A – Application, 0x00B – Bootloader	1203
	Restart to Bootloader [1]	u16	RW	617 = To Bootloader else = deactivate bootloader	1204
Device Status	Board Power Voltage	u16	R	105 = 10,5V	1311
	Board Temperature	s16	R	-200 = -20,0°C 250 = 25,0°C	1321

[1] To activate the bootloader, it is necessary to write a value of 617 in the registry and restart the device. To reactivate the application, enter any value other than 617 in the appropriate registry and restart the device. If the device is in the bootloader, the LED 1 will flash red.

	Subject	Type	R/W	Value	Offset
BUS 1 Settings	Baudrate	u16	RW	192 = 19 200 bps 1152 = 115 200 bps 9216 = 921 600 bps 10000 = 1 000 000 bps	2110
	Databits	u16	RW	8 = 8b, 9 = 9b	2111
	Parity	u16	RW	78 = None 69 = Even 79 = Odd	2112
	Stopbits	u16	RW	10=1, 20=2, 15=1,5	2113
	MODBUS address	u16	RW	1 - 247	2120

	Subject	Channel	Type	R/W	Value	Offset
IF-05 States of Inputs	Balanced Input 1 $_{BIN}$	DI#33	bit	R	0 = inactive 1 = active	3033
	Balanced Input 2 $_{BIN}$	DI#34	bit	R		3034
	Balanced Input 1	AI#33	u16	R	1000 = 1000 Ω 0 = 0 Ω	5033
	Balanced Input 2	AI#34	u16	R		5034

	Subject	Channel	Type	R/W	Value	Offset
States of Digital Inputs	Digital Input 1	DI#01	bit	R	0 = inactive 1 = active	3001
	Digital Input 2	DI#02	bit	R		3002
	Digital Input 3	DI#03	bit	R		3003
	Digital Input 4	DI#04	bit	R		3004
	Inputs	DI#16 - DI#01	u16	R	0x0000 - 0x000F	3001
Input Mode	Digital Input 1	DI#01 mode	u16	RW	0 = None(1) 1 = Falling Edge 2 = Rising Edge 3 = Change Edge	3101
	Digital Input 2	DI#02 mode	u16	RW		3102
	Digital Input 3	DI#03 mode	u16	RW		3103
	Digital Input 4	DI#04 mode	u16	RW		3104
Counter	Digital Input 1	DI#01 counter	u32	RW		3201 - 02
	Digital Input 2	DI#02 counter	u32	RW		3203 - 04
	Digital Input 3	DI#03 counter	u32	RW		3205 - 06
	Digital Input 4	DI#04 counter	u32	RW		3207 - 08

	Subject	Channel	Type	R/W	Value	Offset
Output Value Setting	Analog Output 1	AO#01	s16	RW	1000 = 1 V 0 = 0 V -1000 = -1 V	6001
	Analog Output 2	AO#02	s16	RW		6002
	Analog Output 3	AO#03	s16	RW		6003
	Analog Output 4	AO#04	s16	RW		6004
	Analog Output 5	AO#05	s16	RW		6005
	Analog Output 6	AO#06	s16	RW		6006
	Analog Output 7	AO#07	s16	RW		6007
	Analog Output 8	AO#08	s16	RW		6008
Output Value Correction Setting	Analog Output 1 offset	AO#01 Par.	s16	RW	1000 = 1 V 0 = 0 V -1000 = -1 V	6101
	Analog Output 2 offset	AO#02 Par.	s16	RW		6102
	Analog Output 3 offset	AO#03 Par.	s16	RW		6103
	Analog Output 4 offset	AO#04 Par.	s16	RW		6104
	Analog Output 5 offset	AO#05 Par.	s16	RW		6105
	Analog Output 6 offset	AO#06 Par.	s16	RW		6106
	Analog Output 7 offset	AO#07 Par.	s16	RW		6107
	Analog Output 8 offset	AO#08 Par.	s16	RW		6108
Output Value Gain Setting	Analog Output 1 gain	AO#11 Par.	s16	RW	1 = 1/100% 0 = 0% (1) -1 = -1/100%	6111
	Analog Output 2 gain	AO#12 Par.	s16	RW		6112
	Analog Output 3 gain	AO#13 Par.	s16	RW		6113
	Analog Output 4 gain	AO#14 Par.	s16	RW		6114
	Analog Output 5 gain	AO#15 Par.	s16	RW		6115
	Analog Output 6 gain	AO#16 Par.	s16	RW		6116
	Analog Output 7 gain	AO#17 Par.	s16	RW		6117
	Analog Output 8 gain	AO#18 Par.	s16	RW		6118
Default Value	Analog Output 1 default	AO#21 Par.	s16	RW	1 = 1/100% 0 = 0% (1) -1 = -1/100%	6121
	Analog Output 2 default	AO#22 Par.	s16	RW		6122
	Analog Output 3 default	AO#23 Par.	s16	RW		6123
	Analog Output 4 default	AO#24 Par.	s16	RW		6124
	Analog Output 5 default	AO#25 Par.	s16	RW		6125
	Analog Output 6 default	AO#26 Par.	s16	RW		6126
	Analog Output 7 default	AO#27 Par.	s16	RW		6127
	Analog Output 8 default	AO#28 Par.	s16	RW		6128

(1) Default Settings

Subject		Channel	Type	R/W	Value	Offset
Measured Input Values	Analog Input 1	AI#01	s16	R	1000 = 1 V 0 = 0 V -1000 = -1 V	5001
	Analog Input 2	AI#02	s16	R		5002
	Analog Input 3	AI#03	s16	R		5003
	Analog Input 4	AI#04	s16	R		5004
Input Correction (Parameter 1)	Analog Input 1 offset	AI#01 Param.	s16	RW	1000 = 1 V 0 = 0 V [1] -1000 = -1 V	5101
	Analog Input 2 offset	AI#02 Param.	s16	RW		5102
	Analog Input 3 offset	AI#03 Param.	s16	RW		5103
	Analog Input 4 offset	AI#04 Param.	s16	RW		5104
Input Gain Correction (Parameter 1)	Analog Input 1 gain	AI#11 Param.	s16	RW	1 = 1/100% 0 = 0% [1] -1 = -1/100%	5111
	Analog Input 2 gain	AI#12 Param.	s16	RW		5112
	Analog Input 3 gain	AI#13 Param.	s16	RW		5113
	Analog Input 4 gain	AI#14 Param.	s16	RW		5114

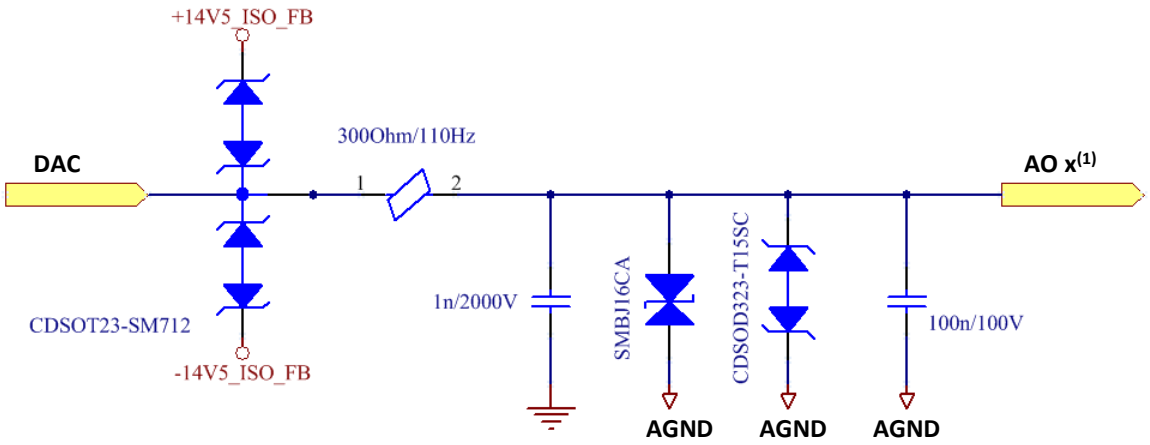
[1] Default Settings

REVISION: 201912 – Default
202111 - Updated list of IF modules
202606 – DIN version

Analog voltage outputs serve in the controlling of external devices such as valves, heat exchangers or LED lights. Controled devices must be connected to the screw terminal of AO x[1]. The following illustrations demonstrate connection of external devices to analog outputs. The outputs are galvanically isolated, which increases system reliability and prevents ground loops in the system. Output range is ±10V.

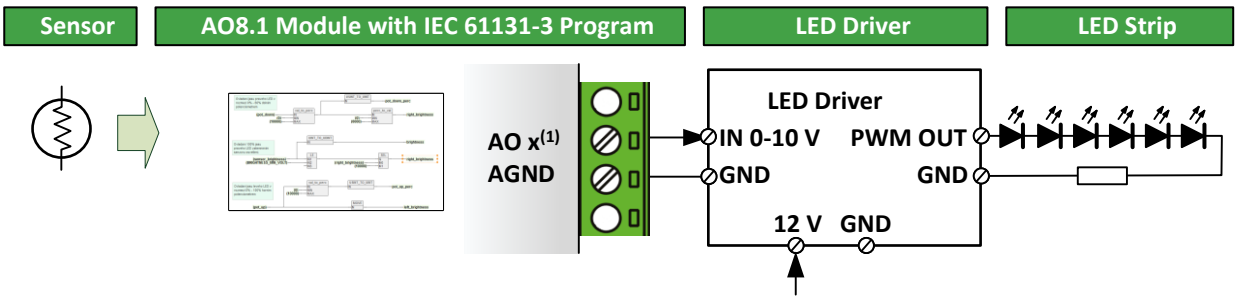
🕮 **METEL IEC 61131-3 IDE is a highly efficient programming tool. Required output levels are programmed directly in mV. No special calculations are needed.**

Internal Connection

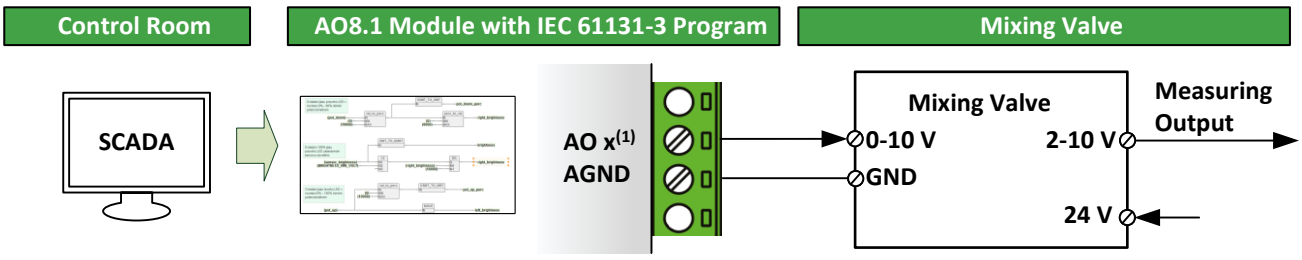


Examples of Connections

LED Lights Control



Mixing Valve Control



Technical Parameters

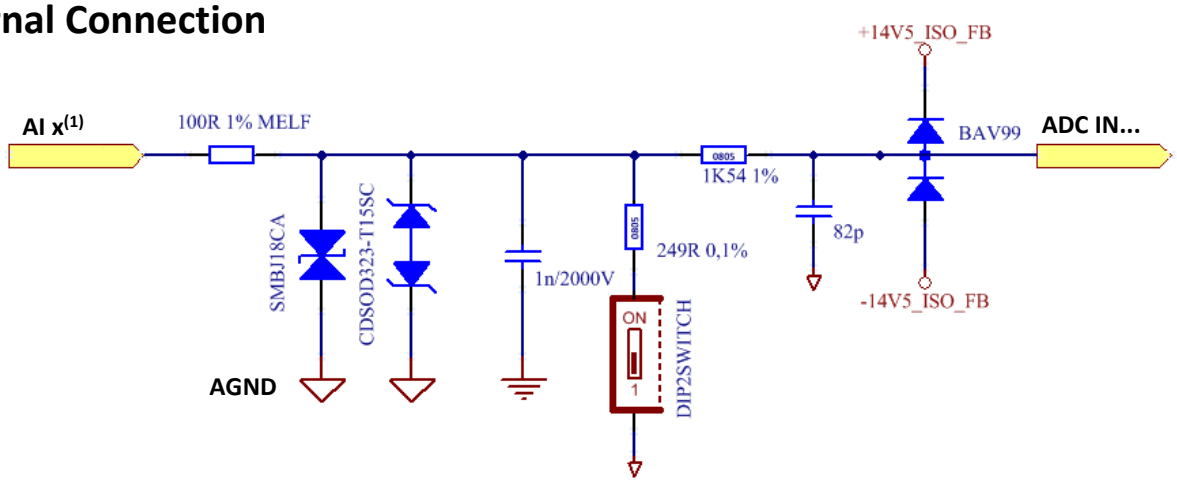
Parameter	Value	Note
Voltage Ranges	±10 V	
Output Current	10 mA	
Sampling Rate	1 kSps	
Resolution	12-bit	
Galvanic Isolation	1.000 V_{RMS}	AO x / CPU[1]
	No	Between AO x[1]
Surge Protection	600 W	10 / 1000 µs

(1) The letter „x“ replaces the output number.

Analog inputs usually serve for the reading of voltages from sensors. The inputs are galvanically isolated, which increases measurement reliability and prevents ground loops in the system. Measurement ranges are configured in SIMULand applications separately for each input.

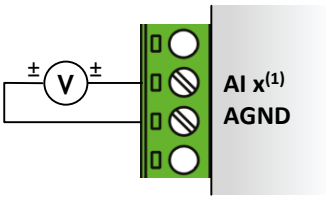
🕮 **Measured values are passed to the control program directly in mV. Therefore, it is not necessary to recalculate measured values from the hexadecimal values in the program.**

Internal Connection



Examples of Connections

Voltage Input Mode



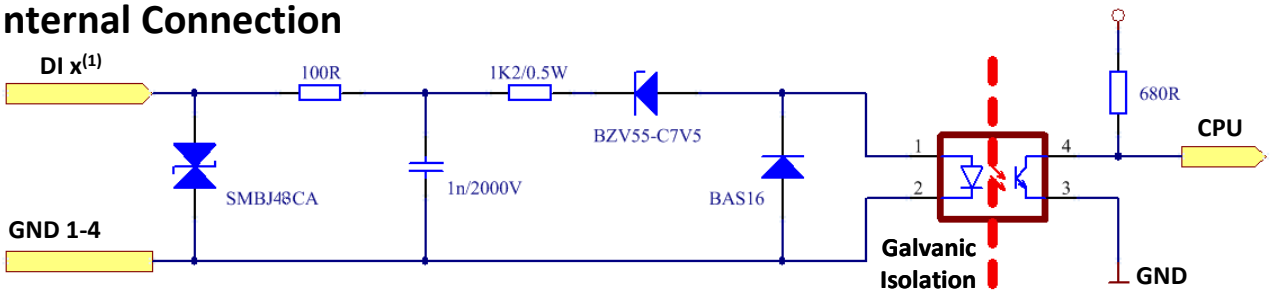
Technical Parameters

Parameter	Value	Note
Voltage Ranges	±2.5 V, ±5 V, ±10 V	
	0 V to 5 V, 0 V to 10 V	
Maximum Input Voltage	Up to ±12V	
Sampling Rate	1 kSps	Adaptive
Resolution	12-bit	
Galvanic Isolation	1.000 V_{RMS}	AIx / CPU
	No	Between AIx
Surge Protection	600 W	10 / 1000 µs

(1) The letter „x“ replaces the input number.

Optically isolated inputs are optimised for 24V DC/AC levels. They can be connected to external devices such as sensors, switches, buttons, door contacts etc. Each input serves also to counter functions where local CPU counts pulses into the internal memory accessible from METEL IEC 61131-3 IDE or directly from Linux scripts. Inputs are divided into groups with common GND terminals. For details please see the table „Location and Designation of Connectors and LEDs “. Logic state 1 of each input is signalized by a relevant LED diode on the front panel.

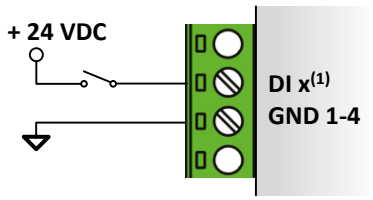
Internal Connection



Examples of Connections

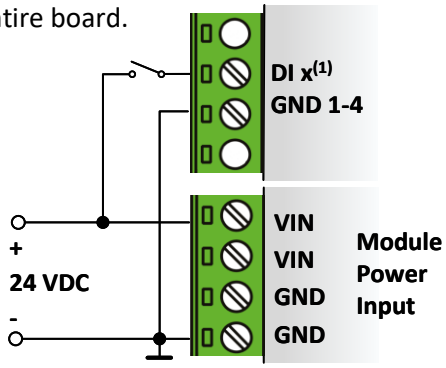
Optically Isolated Sinking Input

The input is powered from an external optically isolated power source. This wiring protects the system from the occurrence of ground loops.



Non-isolated DI Sinking Input

The input is powered from the same source as the entire board.



Technical Parameters

Parameter	Value	Note
Input Voltage DC / AC	Log. 0: –30 V to 5 V	
	Log. 1: +15 V to 30 V	Max. 50 V / 1 s
Digital Input Type	2 (24 VDC)	IEC 61131-2
Input Current	12 mA at 24 VDC	
Galvanic Isolation	2.500 V_{RMS}	DIx / CPU
	1.000 V_{RMS}	Between Groups of DI
Surge Protection	600 W	10 / 1000 µs
Max. Counting Frequency	20 kHz	Duty Cycle 1:1

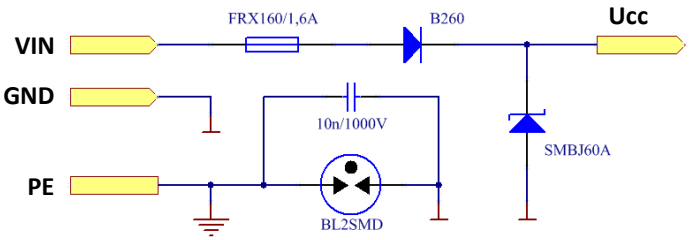
(1) The letter „x“ replaces the input numbers.

The PE terminal must be earthed according to the applicable standards in the country of installation. Correct grounding protects personnel against electric shock and improves device immunity from interferences. If dangerous voltage is applied to the terminals, only personnel with appropriate electrical education may perform installation and servicing of the equipment. Before any manipulation with the device, including disconnecting and connecting the terminals, the dangerous voltage must be disconnected.

POWER INPUT

The supply voltage is connected to VIN and GND terminals. The terminals are doubled for easier connection between the modules installed side by side.

Internal Connection of POWER INPUT



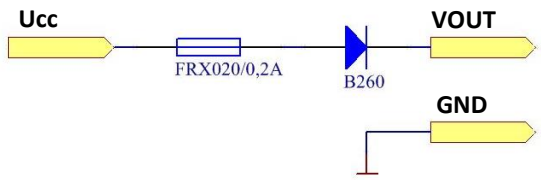
🕮 **The cover of the device is galvanically connected to the PE terminal which is galvanically isolated from the device electronic. It allows the user to use the device even in systems with a grounded + pole.**

Parameter	Value	Note
Input Voltage Range	20 to 60 VDC	
Surge Protection	600 W	10 / 1000 µs
Short Circuit Protection	Polyswitch	
Reverse Polarity Protection	Diode	

POWER OUTPUT

The power output VOUT provides an auxiliary supply voltage corresponding to the input voltage connected to the VIN input. Output current is limited to max. 100mA by a polytron

Internal Connection of POWER OUTPUT



Parameter	Value	Note
Output Voltage	VOUT = VIN – 0.7 V	
Surge Protection	600 W	10 / 1000 µs
Short Circuit Protection	Polyswitch	
Reverse Polarity Protection	Diode	