

- ❖ 8x 24 V Digital Inputs
- ❖ 4x 230 V NO Relay Outputs
- ❖ 2x PUSH-PULL Transistor Outputs
- ❖ 1x Slot for IF Module
- ❖ Operating Range -40°C to $+70^{\circ}\text{C}$
- ❖ 600 W Integrated Surge Protections



BOX Version



PCB Version

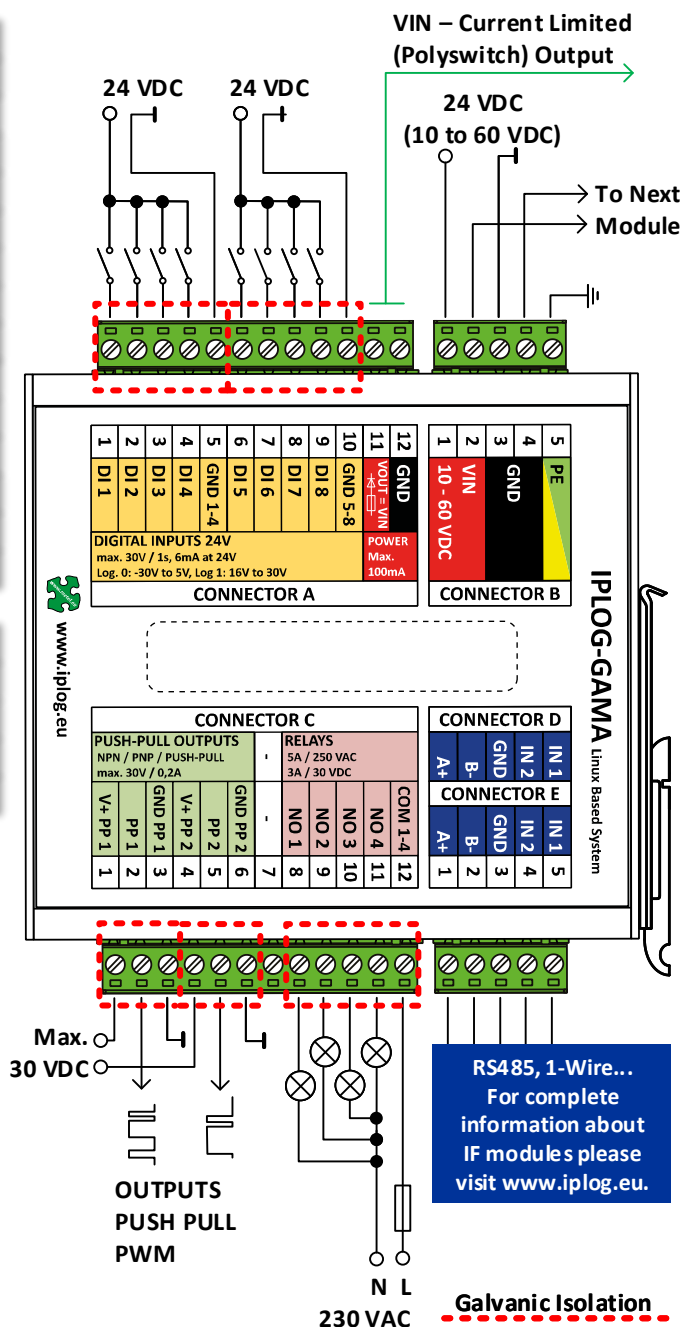
DI8.1 is an industrial module which can be easily adapted for a wide range of tasks. It can be used as IPLOG-G submodule or as standalone addressable module at MODBUS RTU bus.

PRODUCT NAME	CODE	NOTE	ORDERING
DI8.1-01-BOX	5000-0101	2x RS485	
DI8.1-01G-BOX	5000-0102	2x RS485 (isolated)	
DI8.1-PCB	0000-0100	PCB Module	

For a Full Range of Interfaces Please Visit www.iplog.eu.

DEVICE	PARAMETER	VALUES	NOTE
	Power Supply	12, 24, 48 VDC	10 to 60 VDC
	Consumption	Max. 1.5 W	
	Surge Protection	600 W	10/1000 μs
	Operating Range	-40 to $+70^{\circ}\text{C}$	
	Storage Range	-40 to $+70^{\circ}\text{C}$	
	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
	Degree of pollution	II	EN 60664-1
	Connections	Screw Terminals	
Conduct. cross-section	Max. 2.5 mm ²		

CPU	PARAMETER	VALUES	NOTE
	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 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.

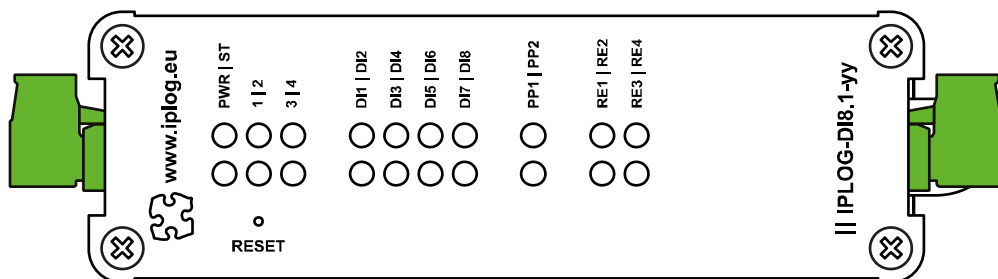
CONNECTOR A			LEDS	
12	GND	Ground		
11	VOUT	Power Output Max. 100 mA, VOUT = VIN – 0.7 V		
10	GND 5-8	Common Ground Terminal of Digit. inputs 5 to 8		
9	DI 8	Digital Input 24 V - DC / AC	DI8	Log. 1 = Lights
8	DI 7	Digital Input 24 V - DC / AC	DI7	Log. 1 = Lights
7	DI 6	Digital Input 24 V - DC / AC	DI6	Log. 1 = Lights
6	DI 5	Digital Input 24 V - DC / AC	DI5	Log. 1 = Lights
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	PWR	Power is Connected, LED Lights Up.
3		Terminals are Internally Interconnected		
2	VIN	Power Input – Plus Terminals		
1	10-60 V DC	Terminals are Internally Interconnected		

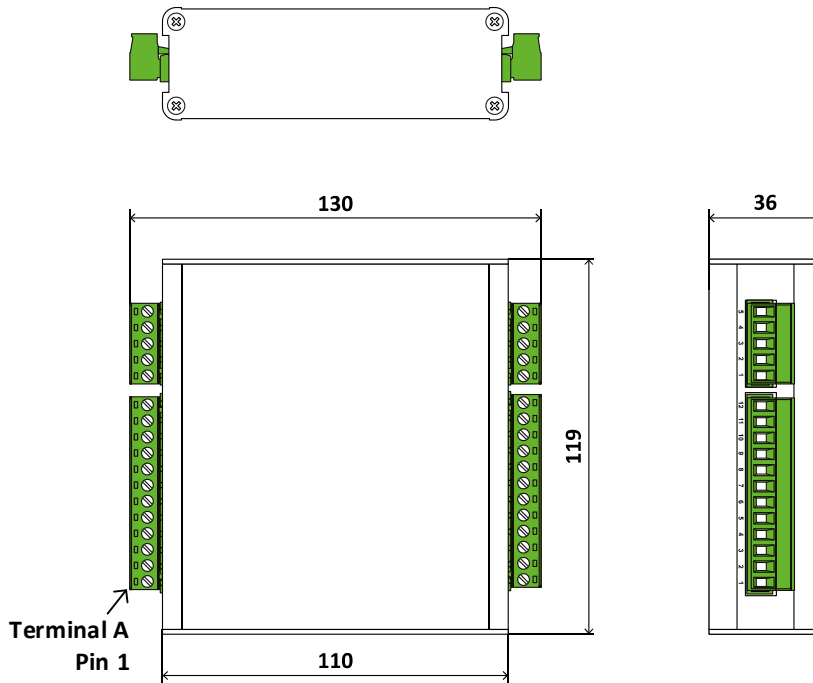
CONNECTOR C			LEDS	
12	COM 1-4	Common terminal of NO Relays 1 - 4		
11	NO 4	Normally Open High Voltage Relay	RE4	Closed = Log. 1 = Lights
10	NO 3	Normally Open High Voltage Relay	RE3	Closed = Log. 1 = Lights
9	NO 2	Normally Open High Voltage Relay	RE2	Closed = Log. 1 = Lights
8	NO 1	Normally Open High Voltage Relay	RE1	Closed = Log. 1 = Lights
7	-	Not used		
6	GND PP 2	External Power - Minus Pole	PP2	Closed = Log. 1 = Lights
5	PP 2	Push-Pull Output		
4	V+ PP 2	External Power - Plus pole		
3	GND PP 1	External Power - Minus Pole	PP1	Closed = Log. 1 = Lights
2	PP 1	Push-Pull Output		
1	V+ PP 1	External power - Plus Pole		

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

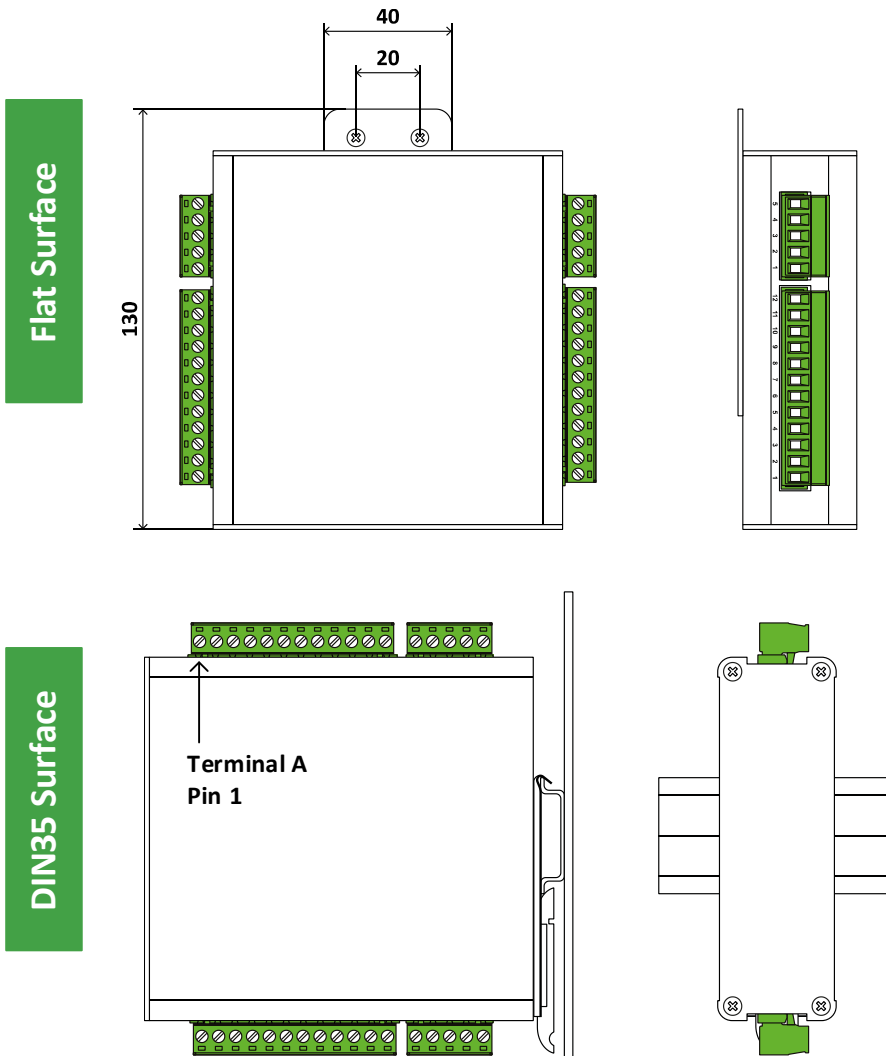
Galvanic Isolation



BOX Version Dimensions



BOX Version Installation



For installation we recommend using M3 screws and a flat surface holder from accessories.

For installation we recommend using M3 screws and DIN35 holder from accessories.

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	3033
	Balanced Input 2 _{BIN}	DI#34	bit	R	1 = active	3034
	Balanced Input 1	AI#33	u16	R	1000 = 1000 Ω	5033
	Balanced Input 2	AI#34	u16	R	0 = 0 Ω	5034

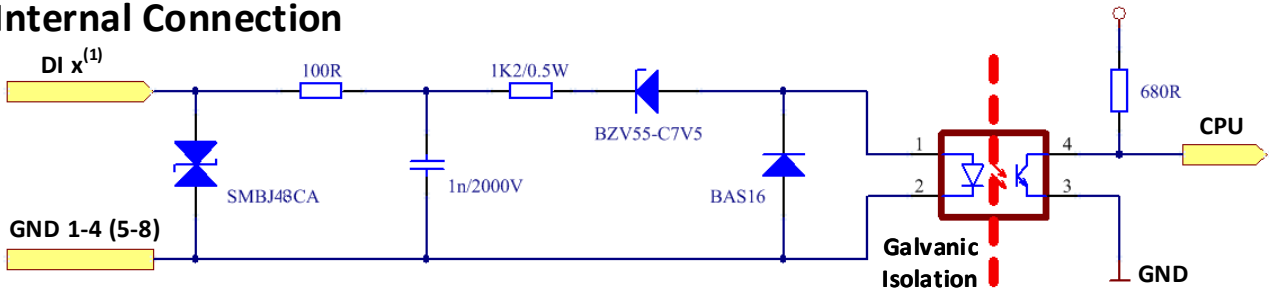
Subject	Channel	Type	R/W	Value	Offset	
States of Digital Inputs and Relay Outputs	Digital Input 1	DI#01	bit	R	0 = inactive 1 = active	3001
	Digital Input 2	DI#02	bit	R		3002
	Digital Input 3	DI#03	bit	R		3003
	Digital Input 4	DI#04	bit	R		3004
	Digital Input 5	DI#05	bit	R		3005
	Digital Input 6	DI#06	bit	R		3006
	Digital Input 7	DI#07	bit	R		3007
	Digital Input 8	DI#08	bit	R		3008
	COIL Relay 1	DI#09	bit	R		3009
	COIL Relay 2	DI#10	bit	R		3010
	COIL Relay 3	DI#11	bit	R		3011
	COIL Relay 4	DI#12	bit	R		3012
	Inputs	DI#16 - DI#01	u16	R	0x0000 - 0x0FFF	3001

Subject	Channel	Type	R/W	Value	Offset	
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
	Digital Input 5	DI#05 mode	u16	RW		3105
	Digital Input 6	DI#06 mode	u16	RW		3106
	Digital Input 7	DI#07 mode	u16	RW		⁽¹⁾ Default
	Digital Input 8	DI#08 mode	u16	RW	3108	
Counter	Digital Input 1	DI#01 counter	u16	RW		3201 - 02
	Digital Input 2	DI#02 counter	u16	RW		3203 - 04
	Digital Input 3	DI#03 counter	u16	RW		3205 - 06
	Digital Input 4	DI#04 counter	u16	RW		3207 - 08
	Digital Input 5	DI#05 counter	u16	RW		3209 - 10
	Digital Input 6	DI#06 counter	u16	RW		3211 - 12
	Digital Input 7	DI#07 counter	u16	RW		3213 - 14
	Digital Input 8	DI#08 counter	u16	RW		3215 - 16

Subject	Channel	Type	R/W	Value	Offset	
Relay and Push-Pull Outputs	Relay Output 1	DO#01	bit	RW	0 = inactive 1 = active	4001
	Relay Output 2	DO#02	bit	RW		4002
	Relay Output 3	DO#03	bit	RW		4003
	Relay Output 4	DO#04	bit	RW		4004
	Push-Pull Output 1	DO#05	bit	RW		4005
	Push-Pull Output 2	DO#06	bit	RW		4006
	Outputs	DO#16 - DO#01	u16	RW	0x0000 - 0x003F	4001
Modes of Outputs	Push-Pull Output 1	DO#05	u16	RW	0 = None (default) 1 = Push (PNP) 2 = Pull (NPN)	4105
	Push-Pull Output 2	DO#06	u16	RW		4106

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 count 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 signaled by a relevant LED diode on the front panel.

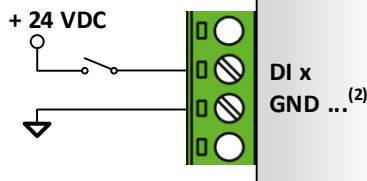
Internal Connection



Examples of Connections

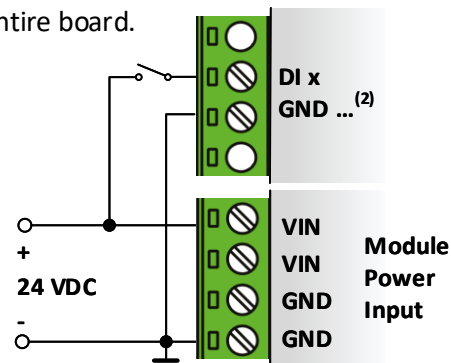
Optically Isolated Sinking Input

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

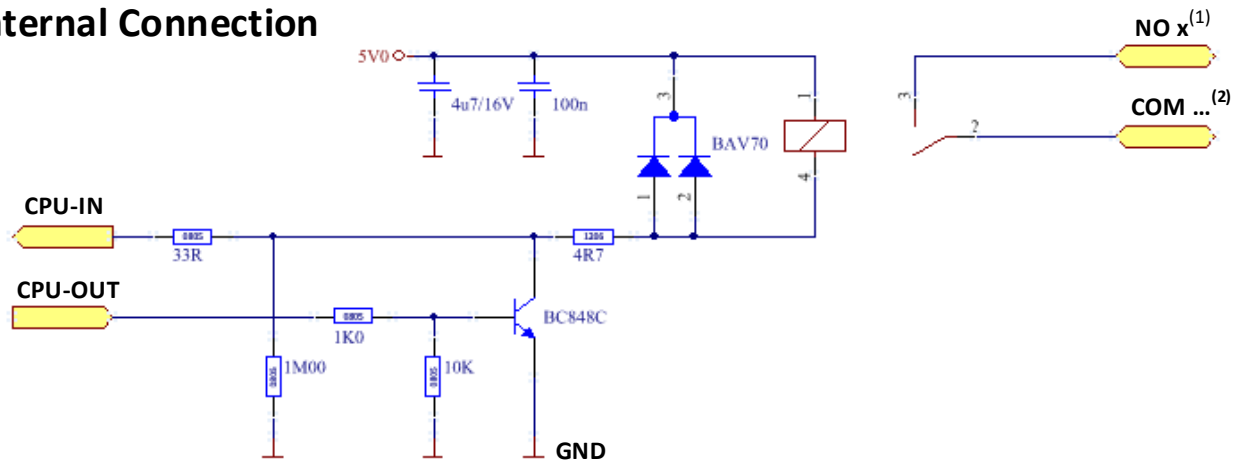
(1) The letter „x“ replaces the input numbers.

(2) Common ground terminal is shared by group of digital inputs. „...“ replaces the input numbers.

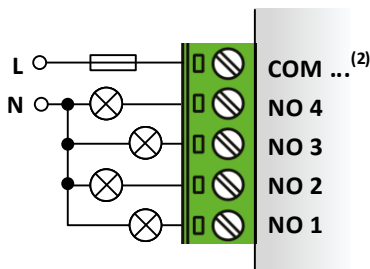
Relay outputs are capable for switching loads with either AC or DC voltage.

 In case of inductive load switching, it is recommended to use external snubber protection circuits

Internal Connection



Examples of Connections



Relay NO (Normally Open) outputs NO 1 to NO 4 have a common terminal COM 1-4. Two state relays can switch both AC and DC voltages to load. In the non-voltage state are relay terminals NO x⁽¹⁾ - COM...⁽²⁾ disconnected. The relay is turned on when the program set logic 1 at its coil. When the relay is turned on, corresponding REx⁽¹⁾ LED diode on the front side lights up.



Relay terminals must be protected with an external circuit breaker to prevent the rated current of the terminal or the load being exceeded.

When switching inductive load it is recommended to protect relay outputs with an appropriate external component (e.g. varistor, RC circuit, or diode).

Technical Parameters

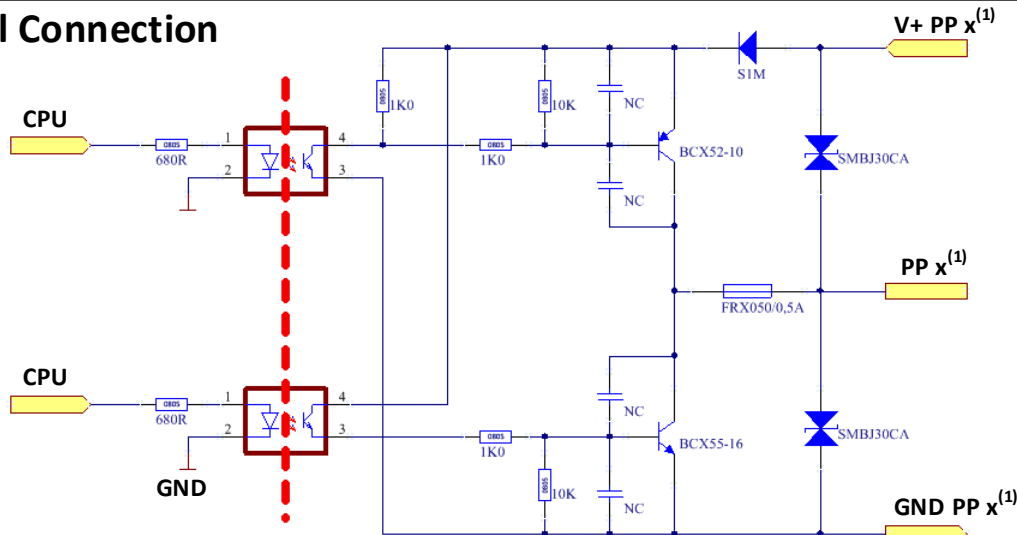
Parameter	Value	Note
Contact Type	NO	Normally Open
Number of Poles	1	
Max. Load	5 A / 250 VAC	Resistive Load
	3 A / 30 VDC	Resistive Load
Common Terminal Current	10 A	COM 1-4
Electrical Lifetime	100,000 Operations	At 250 VAC / 5A
Isolation Voltage	2.500 Vrms / 1 min.	Terminals to Electronic or Case

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

(2) Common ground terminal is shared by group of relay outputs. „...“ replaces the output numbers.

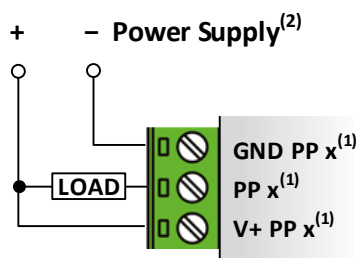
Outputs are capable for switching low DC voltage loads. Outputs can be programmed as open PNP sourcing, NPN sinking outputs or as a push-pull sink / source outputs if alternately switching output transistors. To each output is assigned a programmable LED diode. Outputs are optically isolated which makes it easier to protect the system from the occurrence of ground loops. For this purpose an external isolated source must be used, otherwise the outputs can be powered from the IO module power supply

Internal Connection

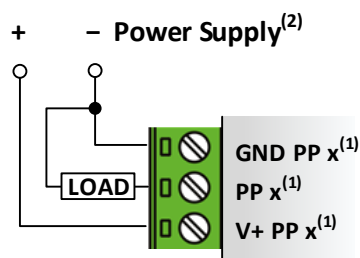


Examples of Connections

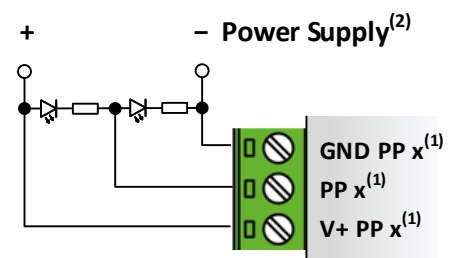
NPN Open Collector



PNP Open Collector



Push-Pull Output



Technical Parameters

Parameter	Value	Note
Output Type	Open Collector NPN or PNP	Software Selectable
	Push-Pull	
Galvanic Isolation	2.500 V _{RMS}	PP x ⁽¹⁾ output / CPU
Shortcut Protection	Yes	Polyswitch
Maximum Load	30 V / 0.25 A	
Switching Frequency	Max. 10 kHz	
Surge Protection	600 W	10 / 1000 μs

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

(2) For applications requiring galvanic isolation, use an isolated source, otherwise the IO module power supply can be used.

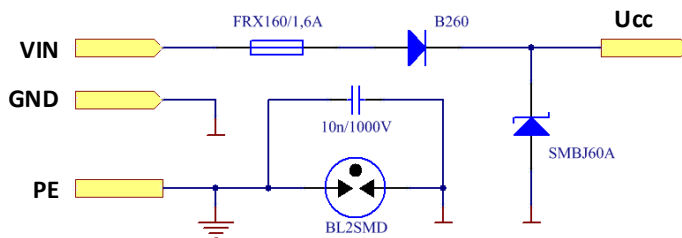



The PE terminal must be earthed according to the applicable standards in the country of installation. Correct grounding protects personnel against electric shock and improves device immunity from interferences. If dangerous voltage is applied to the terminals, only personnel with appropriate electrical 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



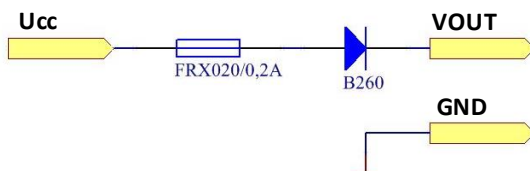
 The cover of the device is galvanically connected to the PE terminal which is galvanically isolated from the device electronic. It allows the user to use the device even in systems with a grounded + pole.

Parameter	Value	Note
Input Voltage Range	10 to 60 VDC	
Surge Protection	600 W	10 / 1000 μ s
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

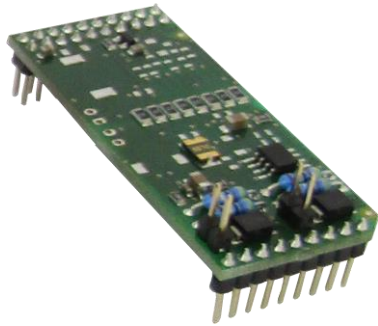


Parameter	Value	Note
Output Voltage	$V_{OUT} = V_{IN} - 0.7 \text{ V}$	
Surge Protection	600 W	10 / 1000 μ s
Short Circuit Protection	Polyswitch	
Reverse Polarity Protection	Diode	

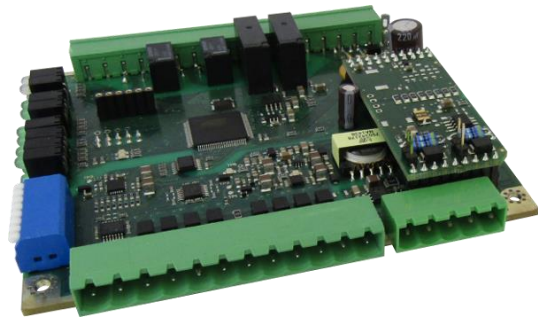
IO modules include one IF slot which can be used for IF modules. The main purposes of the IF modules are to provide:

- ❖ RS485 connectivity if the IO module board is used in the standalone addressable IO module communicating with PLC via the RS485 bus
- ❖ Provides serial interfaces for communication with other systems
- ❖ Additional inputs and outputs into system

Standalone IF Module



IF module Installed on a IO Module



📖 IF modules must be plugged into the IF slot when the power is turned off. After, the power is turned on the new IF module is automatically detected.

📖 When ordering, we recommend using the online configurator available at www.iplog.eu.

Overview Table of IF Modules

ORDERING		CONNECTOR D				
NAME	DESCRIPTION	1	2	3	4	5
IF-01	2x RS485	A1+	B1-	GND	B2-	A2+
IF-01G	2x RS485 ISO	A1+	B1-	GND-ISO	B2-	A2+
IF-02	2x RS232	Rx1	Tx1	GND	Rx2	Tx2
IF-02G	2x RS232 ISO	Rx1	Tx1	GND-ISO	Rx2	Tx2
IF-03	RF 868 MHz	TBD	TBD	TBD	TBD	TBD
IF-04G	RS485 ISO, DALI	A+	B-	GND-ISO	-D BUS	+D BUS
IF-05	RS485, 2x INPUTS ⁽¹⁾	A+	B-	GND	BI 2	BI 1
IF-06	AUDIO	OUT R	OUT L	GND	IN R	IN L
IF-07G	RS485 ISO, 1-Wire	A+	B-	GND-ISO	1-Wire	5V0-ISO
IF-08G	Profibus	A	B	GND-ISO	GND-ISO	5V0-ISO
IF-09	M-Bus	M-Bus+	M-Bus+	GND	M-Bus-	M-Bus-
IF-10	KNX	BUS+	BUS+	NC	BUS-	BUS-
IF-11	Wiegand, 2x INPUTS ⁽¹⁾	Data 0	Data 1	GND	BI 2	BI 1
IF-12	4x INPUTS ⁽¹⁾	BI 4	BI 3	GND	BI 2	BI 1
IF-13	RS232 (CTS, RTS, Rx, Tx)	CTS	RTS	GND	Rx	Tx
IF-13G	RS232 (CTS, RTS, Rx, Tx) ISO	CTS	RTS	GND-ISO	Rx	Tx
IF-14G	4x DIGITAL INPUTS (24V)	ISO DI 4	ISO DI 3	GND-ISO	ISO DI 2	ISO DI 1
IF-15	4x OC (NPN) OUTPUTS	OC 4	OC 3	GND	OC 2	OC 1
IF-15G	4x OC (NPN) OUTPUTS ISO	ISO OC 4	ISO OC 3	GND-ISO	ISO OC 2	ISO OC 1
IF-18G	1x LORA-EP1, 1x RS485	A+	B-	GND-ISO	Tx/Rx	VCC

⁽¹⁾ Alarm / 5V Digital Inputs. It does not apply to combination with the BI-8.1 module, where they only work as digital.

ISO = Isolated, TBD = To be Determined

IF- That way labeled IF modules are suitable for standalone IO modules. They are always connected to a PLC or LAN-RING switch via the RS485 bus.