SENECA

Z-PC Line

EN

Z-10-D-OUT

Modbus module with 10 MOSFET digital outputs

Installation Manual

Contents:

- General specifications
- Technical specifications
- Modbus connections rules
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For manuals, and configuration software, see www.seneca.it

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GENERAL SPECIFICATIONS

• 10 MOSFET outputs with shared negative pole, the outputs can be collectively connected an external supply with maximum 30 Vdc and minimum 6 Vdc.
• Digital output carrying capacity: 0,5 A inductive load and 0,5 A resistive load with maximum switch-on / switch-off cycle frequency of 2 cycles/second.
• Removable terminals with section of 2.5 mm^2.
• Outputs protected against short-circuit.
• Outputs safety status setting at power on and in case of lacking communication.
• Safety time can be set from 33 ms to 2184 s.
• Diagnostic for short-circuits.
• Measurement of the load power supply voltage.
• Possibility of ON-LINE configuration.
• RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
• 1500 Vac output isolation compared with other low voltage circuits.
• Easy connections for power supply and serial communication from seneca bus for standards DIN 46277 rail.
• Module insertion or extraction from seneca bus without interruptions for communication and power supply.
• Communication time below 10 ms (@ 38400 Baud).
• Connection distance up to 1200 m.
• Set the Modbus address and the Baud rate with DIP-Switch.

TECHNICAL SPECIFICATIONS

Outputs

Type output	MOSFET with shared negative pole.
Digital output carrying capacity	0.5 A resistive load
External power supply	30 Vdc
Number of channel	10
Maximum rated current of Mosfet	0,5 A
Maximum rated voltage of Mosfet	30 VDC
Maximum output clamp energy capability	40 mJ with inductive load
Time delay mosfet	5/2 ms

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Power supply

Voltage	10 ..40 V_{DC} 19 ..28 V_{AC} @ 50 ..60 Hz
Consumption	Typical: 1.5 W, Maximum: 2.5 W

Environmental condition

Temperature	-10 ..+65°C, (-10 ..55°C UL)
Humidity	30 ..90% a 40°C not condensing
Altitude	Up to 2000 m a.s.l.
Storage Temperature	-20 ..+85°C
Degree protection	IP20

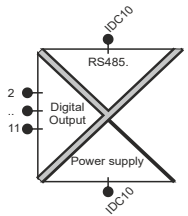
Connections

Connections	Removable 3-way screw terminals, 5,08 pitch
	Rear IDC10 connector for DIN 46277 rail

Box / Dimensions

Dimensions	L: 100 mm; H: 112 mm; W: 17,5 mm
Box	PBT, Black

Isolations 1500 V



Standards

The module complies with the following standards:

EN61000-6-4/2002-10 (electromagnetic emission, industrial environment).

EN61000-6-2/2006-10 (electromagnetic immunity, industrial environment)

EN61010-1/2001 (safety). All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742: “Isolated transformers and safety transformers”.

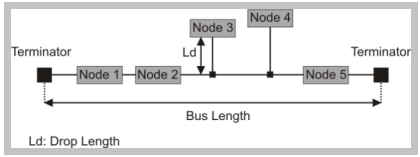
ADDITIONAL NOTES :
Use in Pollution Degree 2 Environment .
Power Supply must be Class 2.
When supplied by an Isolated Limited Voltage/Limited Current power supply a fuse rated max 2.5 A shall be installed in the field.

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MODBUS CONNECTIONS RULES

1) Connect the module into the DIN rail (max 120)
2) Use a suitable lenght cable to connect the remote modules. In the table below the relative data to the lenght of the bus and lenght of the cable are reported.
-Bus lenght: Maximum lenght of the Modbus network. The bus lenght is determined from the lenght of network that has the two modules who has been switched on the bus terminator. (see scheme 1).
-Drop lenght: Maximum lenght of branch (see scheme 1).

Bus lenght	Drop lenght
1200 m	2 m



Scheme 1

For the maximum performances it's recommended to use a specific schielded cable, as an example BELDEN 9841.

INSTALLATION RULES

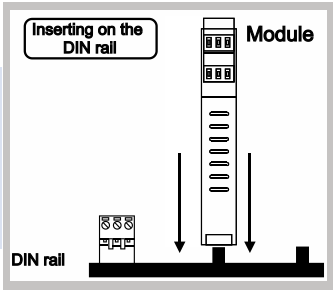
The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best performance and long life cycle the cables raceways and other objects in the control panel must be placed not to obstruct the slits of the module that must be ventilated.
Never install the modules near heat sources. it's adviced the installation of the module in the lower part of the control panel.

Inserting in the DIN rail

As it is illustrated in the next figure:

1) Insert the module IDC10 rear connnector on the DIN rail free slot (the inserting is unequivocal because the connectors are polarized).

2) The module can be fixed on the DIN rail through the clench of the two hooks in the lower part of it.



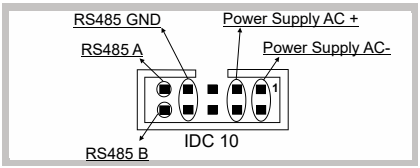
ELECTRICAL CONNECTIONS

Power supply and Modbus interface

From IDC10 (rear connector of the module) or Z-PC-DINAL2-17,5 (optional) are avaiable power supply and Modbus interface. In the next page are shown the use specifications of IDC10 and Z-PC-DINAL2-17,5.

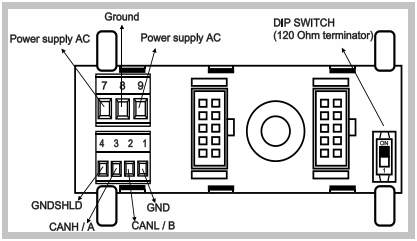
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Rear connector (IDC10)



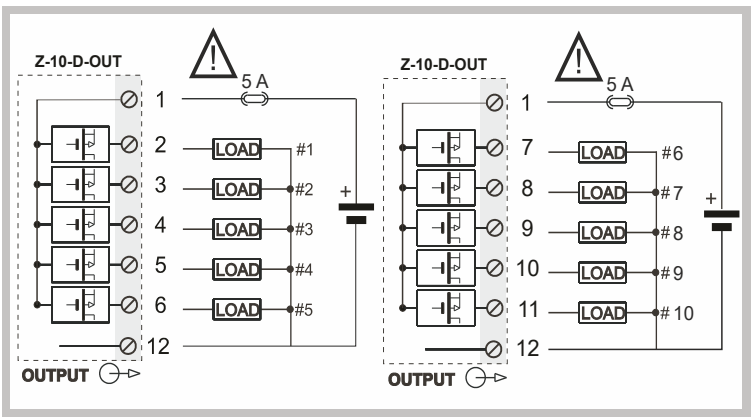
In the figure the meaning of the IDC10 connector pins is showed.
This connector can be used in alternative to the screw terminals blocks

Utilizzo Accessorio Z-PC-DINAL2-17,5



If Z-PC-DINAL2-17,5 accessory is used, the power supply signals and communication signals may be provided by the terminals block into the DIN rail support. In the figure are shown the meaning and the position of the terminal blocks. The DIP-switch set the 120 Ω terminator is used only for CAN communication.
GNDSHLD: Shield to protect the connection cables (recommended).

Digital Outputs



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Warnings:

• The power supply for these loads **MUST** be provided directly from terminal 1 (maximum 30 Vdc). The return currents of the loads **MUST** be connected together and to the terminal 12.

• The total current, the sum of the maximum peak currents of all the loads that can enter from terminal 1 **MUST BE LIMITED TO 5 A** with quick-break fuse or equivalent protection.

• In order to obtain recognition of the output short-circuit, the power supply to the loads must withstand the short-circuit current, without permitting the voltage to fall below 6 V.

• The digital outputs can be activated only for a external voltage supply higher than 6 V in the screw terminals 1 and 12.

• It is mandatory to use a protection DIODE for coils/relays in inductive loads, otherwise there is a risk of device failure and voiding of the manufacturer's warranty. The DIODE is usually provided as an accessory by manufacturers of coils, relays, etc.

DIP-SWITCHES SETTING

The DIP-switches positions defines the Modbus communication parameter: Address and Baud rate. In the following table the Baud rate and address value are listed as a function of the DIP-switches position:

DIP-switches table

POSITION	BAUD RATE	POSITION	ADDRESS	POSITION	TERMINATOR
00xxxxxxxx	9600	xx000001xx	# 1	xxxxxxxxx0	Disable
01xxxxxxxx	19200	xx000010xx	# 2	xxxxxxxxx1	Enable
10xxxxxxxx	38400	.....	.....		
11xxxxxxxx	57600	xx111111xx	# 63		

POSIZION	BAUD RATE	POSIZION	ADDRESS
xx000000	From EEprom	xx000000	From EEprom

Note: when DIP-switches from 3 to 8 are in OFF, comunication settings are retrieved from EEprom

Nota 2: The termination of RS485 communication must be enabled only to the ends of the communication line.

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MODBUS BASIC REGISTER AND LED SIGNALLINGS

Holding register

Register	Name	Description
40003	OUTPUT	Set the bit in the register to control the relative output: Output 1: 40003.0 Output 2: 40003.1 Output 3: 40003.2 Output 4: 40003.3 Output 5: 40003.4 Output 6: 40003.5 Output 7: 40003.6 Output 8: 40003.7 Output 9: 40003.8 Output 10: 40003.9

Coil registers

Registers	Name	Description
10001	OUTPUT1	as bit 0 of register 40003
10002	OUTPUT2	as bit 1 of register 40003
10003	OUTPUT3	as bit 2 of register 40003
10004	OUTPUT4	as bit 3 of register 40003
10005	OUTPUT5	as bit 4 of register 40003
10006	OUTPUT6	as bit 5 of register 40003
10007	OUTPUT7	as bit 6 of register 40003
10008	OUTPUT8	as bit 7 of register 40003
10009	OUTPUT9	as bit 8 of register 40003
10010	OUTPUT10	as bit 9 of register 40003

LEDs signallings

LED	STATE	*Meaning of LEDs*
PWR	On	Power supply presence.
FAIL	Blinking	*See advanced settings.
RX	Blinking On	Recived data. Error connection.
TX	Blinking	Recived data.

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FACTORY SETTING AND ADVANCED SETTING

Factory settings

Tutti i DIP-switch in OFF:

- Modbus protocol: - Communication parameters : 38400 8,N,1 Addr. 1
- Digital Outputs : NORMAL OPEN
- Safety state : ENABLE
- Safety timer : DISABLE
- Reversal of status relay : DISABLE
- Dealy short-circuit recognition: up to 1s
- Control supply voltage output: ENABLE

Advanced settings

• Constant control of the outputs short-circuit with a settable diagnostic modbus register .

• Control the outputs short-circuit with a settable timer in the modbus register.

• Control and set the blinking of fail LED with a settable modbus resgister .

• Set a timer to regulate the time after that the output will be set in the short-circuite state.

⚠ Set a safety timer to regulate the time that the outputs will be set in the safety state.

⚠ Set the outputs safety state that will be enabled in case of lost communication for a time equal to setted safety timer.

Variations of standard parameters are possible by using configuration softwares Z-NET and EASY-Z-PC (www.seneca.it).
For more information about a list of all register and their function consult the USER manual



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