

Installation Manual

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General Specifications

- Sixteen 16 V_{DC} self-powered digital inputs with shared negative pole.
- Eight inputs settable as 32-bit counters with 10 kHz maximum frequency.
- Eight Mosfet Digital Outputs with shared negative pole, 5 - 30 V_{DC} collectively supplied.
- Digital outputs available both by terminals and IDC10 connector to facilitate the connection to external relays.
- Can Interface with CANopen protocol up to 1 Mbps speed or MODBUS RS485 Interface up to 115 Kbit/s speed.
- CANopen/MODBUS Baud rate and Node ID configurability by DIP-switches or software.
- RS232 Serial Communication with MODBUS-RTU protocol.
- Facilitated power supply and CANopen/MODBUS bus wiring by means of the bus housed in the DIN rail.
- 1500 V_{AC} Isolation among input/output, power supply and CAN/MODBUS interface circuits.
- Counters increment individually configurable on the rising or falling edges of the corresponding digital input.
- Overflow indication available for each counter.
- Preset value configurable for each counter.
- Reset and preset commands individually executable on each counter.
- Overtemperature and short-circuit to ground of digital outputs continuous monitoring and consequent fault condition signalling.
- Outputs value in case of no communication or fault condition: programmable value or last set value.
- Leds Signallings: Power Supply, Digital Inputs/Outputs State, CAN/MODBUS Communication, MODBUS-RTU Communication, Outputs fault.

Technical Specifications

INPUTS		OUTPUTS	
Polarity (EN 61131-2 type 2)	Sink (pnp)	Channels	8
Channels	16	Outputs Type	Mosfet (Open Source)
Counters (if enabled)	8 (32 bit)	Power Supply Voltage	5 - 30 V _{DC}
U _L (state OFF)	0 - 7 V _{DC}	Maximum current (for each output)	0.5 A (connection from terminals)
U _H (state ON)	11 - 30 V _{DC}		25 mA (connection from IDC10 connector)
Absorbed Current (for each input)	3 mA	RDS on	0,75 Ω
V _{MAX}	30 V _{DC}	ON/OFF Delay	Max 1 ms
Minimum pulse width	350 μs	Counters frequency	Max 10 KHz
ON/OFF Delay	Typical: 1,2 ms Max: 3 ms		

POWER SUPPLY	
Voltage	10 - 40 V _{DC} or 19 - 28 V _{AC}
Consumption	Typical: 1.5 W, Max: 2.5 W
ENVIRONMENTAL CONDITIONS	
Temperature	-10 - + 65°C
Humidity	30 - 90% at 40°C non condensing
Altitude	up 2000 m a.s.l.
Storage Temperature	-20 - +85°C
Protection	IP20

CONNECTIONS	
Removable Terminals	4-way screw terminals (3.5 mm pitch): inputs/outputs.
Rear IDC10 Connector	CAN/MODBUS Interface and power supply (for DIN rail).
IDC10 Connector on the rear	Digital Outputs (alternatively to terminals).
Stereophonic frontal jack	3.5 mm: RS232 (COM).

DIMENSIONS / BOX	
Dimensions	L: 100 mm, H: 112 mm, W: 35 mm
Box	PBT, black

ISOLATIONS / STANDARDS

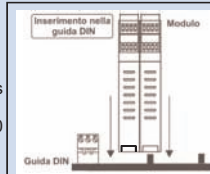
<p>Isolation Diagram</p>	<p>Standards</p> <p>CE The module complies with the following standards:</p> <p>EN61000-6-4/2002-10 (electromagnetic emission, industrial environment).</p> <p>EN61000-6-2/2006-10 (electromagnetic immunity, industrial environment).</p> <p>EN61010-1/2001 (safety). All circuits 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".</p>
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Installation Rules

The module is designed to be installed in vertical position on a DIN 46277 rail. In order to ensure optimum performance and the longest working life, the module(s) must be supplied adequate ventilation and no raceways or other objects that obstruct the ventilation slots. Never install modules above sources of heat; we recommend installation in the lower part of the control panel.

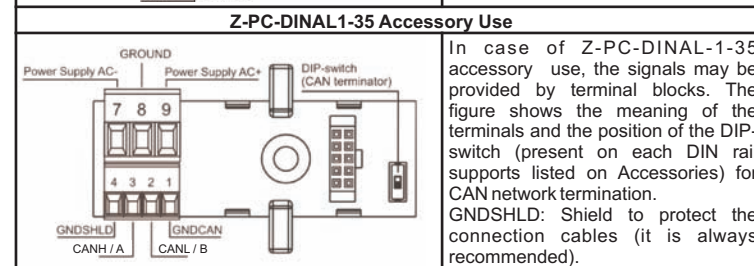
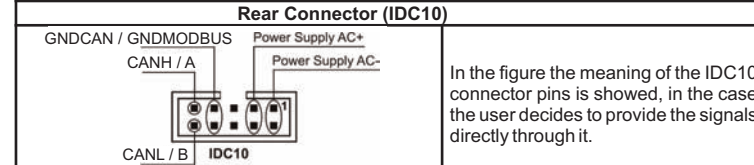
Inserting on the DIN rail

- As it is illustrated in the figure:
- 1) Insert the rear IDC10 connector on a DIN rail free slot (the inserting is univocal since the connectors are polarized).
 - 2) Tighten the four locks placed at the sides of the rear IDC10 connector to fix the module.



Electrical Connections

POWER SUPPLY AND CAN/MODBUS INTERFACE	
Power Supply and CAN/MODBUS interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL1-35 accessory.	



CAN bus Connection Rules

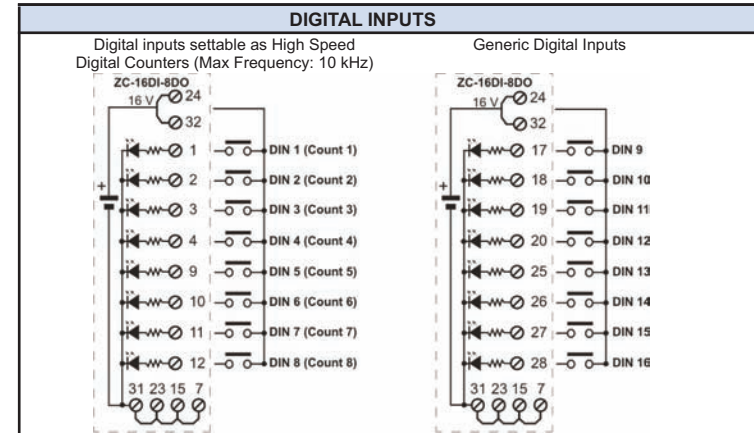
- 1) Install the modules on the DIN rail (max 120).
- 2) Connect the remote modules using cables of proper length. On the table the following data about the cables length are provided:
 - Bus Length: CAN network maximum length as a function of the Baud rate. It is the length of the cables which connect the two bus terminators modules (see Scheme 1).
 - Drop Length: maximum length of a drop line (see Scheme 1) as a function of the Baud Rate.

Baud rate	Bus Length	Drop Length
20 kbps	2500 m	150 m
50 kbps	1000 m	60 m
125 kbps	500 m	5 m
250 kbps	250 m	5 m
500 kbps	100 m	5 m
800 kbps	50 m	3 m
1000 kbps	25 m	0,3 m

Scheme 1

For the best performances, the use of special shielded cables is recommended (BELDEN 9841 cable for example).

3) Terminate the two ends of the CANbus network by setting to ON the DIP-switch present on the DIN rail connection supports (see Accessories) where the two ends are inserted.



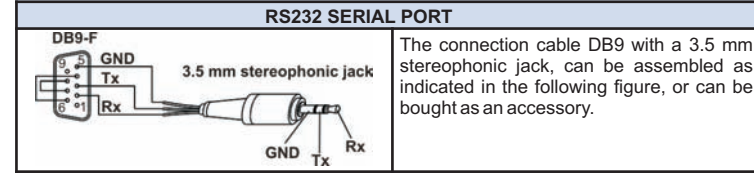
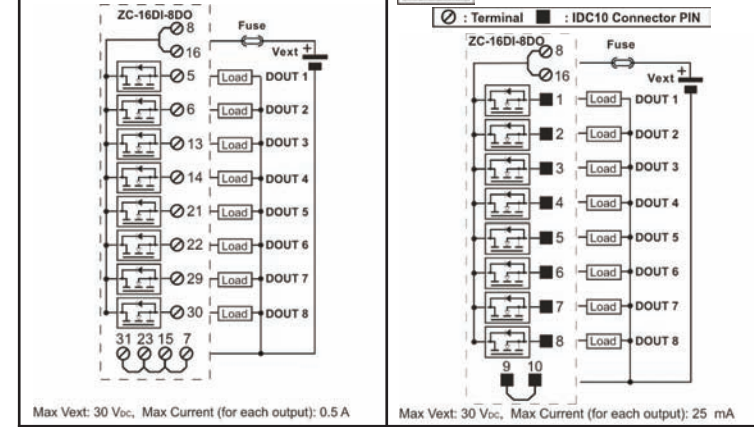
DIGITAL OUTPUTS

Digital Outputs from Terminals

The total current entering on power supply terminal must be limited to 4 A with quick-break fuse or equivalent protection.

Digital Outputs from IDC10 connector

Connection suggested to supply 24 V terminals. The total current entering on power supply terminal must be limited to 0.2 A with quick-break fuse or equivalent protection.



DIP-switches Settings

The DIP-switches position defines the module CAN/MODBUS communication parameters: Address and Baud Rate. In the following figure the Baud Rate and Address values are listed as a function of the DIP-switches position:

BAUD RATE (kbps)	ADDRESS	Type of communication
SOFTWARE PROGRAMMED	SOFTWARE PROGRAMMED	Protocol SW2 SW4
CANopen ModBus	00000001	ModBus
20	00000010	CANopen
2.4	00000011	
4.8	00000100	
9.6	00000101	
19.2	00001000	
38.4	00001001	
57.6	
115.2	11111111	

ModBus TERMINATOR

SW3	State
ENABLE	
DISABLE	

KEY: ON

We underline that on all the DIN rail supports a DIP-switch is present and if it is set to ON position the CAN network termination is inserted.

Programming

PROGRAMMING THROUGH CAN/MODBUS INTERFACE

The module may be programmed/configured through the CAN/MODBUS interface; refer to the User Manual for details about the communication.

Factory Parameters

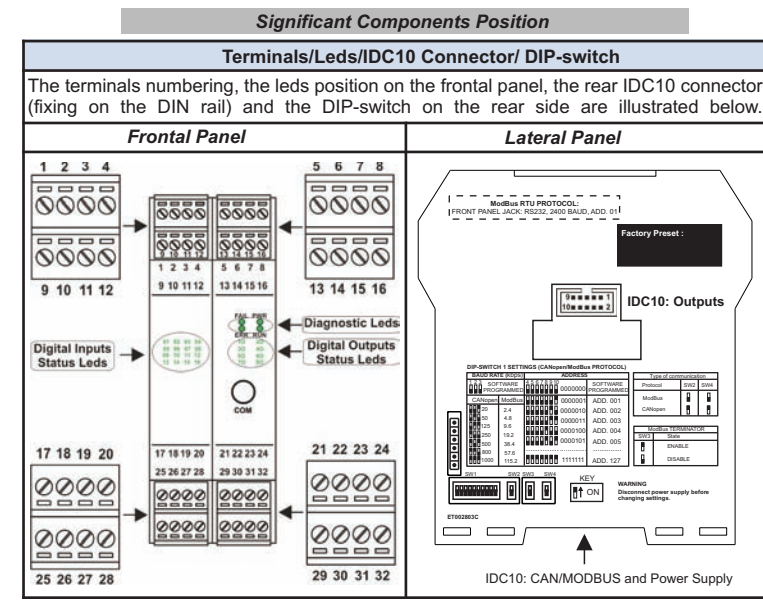
With all the DIP-switches in OFF position (values from memory), the module is originally programmed as follows:

MODBUS, Baud Rate: 38400, Bit: 8, Parity: None, Stop bit: 1, Address: 1
To switching ON SW2 & SW4: CANOPEN, Baud Rate: 20 kbps, Address: 127.

PROGRAMMING THROUGH RS232 (FRONTAL JACK)

The module may be programmed/configured through the RS232 interface by using MODBUS-RTU protocol; refer to the User Manual for details about the communication. The connection parameters are the following:

Address: 1, Baud Rate: 2400 Baud, Parity: none, Stop bit: 1.



LEDs Signallings

LED ERR E RUN: CANOPEN / MODBUS COMMUNICATION STATE

The meaning of leds ERR and RUN is described below; refer to the User Manual for details about the possible state and the flashing modes of the two leds.

LED ERR (Red)	STATE	LED (Red) ERR (CANOPEN) Meaning
OFF	No error	The Device is in working condition.
Single flash	Warning limit reached	At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).
Double flash	Error Event	A guard event (NMT-Slave or NMT-master).
Triple flash	Sync Error	The SYNC message has not been received within the communication cycle period time out.
ON	Bus off	The CAN controller is bus off.

LED ERR (Red)	LED (Red) Rx (MODBUS) Meaning
ON	The device is receiving.

LED RUN (Green)	STATE	LED (Green) RUN (CANOPEN) Meaning
Single flash	Stop	The Device is in STOPPED state.
Blinking	Pre-operational	The Device is in the PRE-OPERATIONAL state.
Acceso	Operational	The Device is in the OPERATIONAL state.

LED RUN (Green)	LED (Green) Tx (MODBUS) Meaning
ON	The device is transmitting.

LEDS FAIL AND PWR: GENERAL SYSTEM DIAGNOSTICS

LED PWR (Green)	Meaning	LED FAIL (Yellow)	Meaning
ON	Power Supply Presence	ON / Blinking	- Data reception on the RS232 port (COM). - At least an output in Fault

DIGITAL INPUTS / OUTPUTS STATE LEDS

LED 10..80 (Green)	Meaning
ON	The correspondent digital output (10..80) ON
LED 01..16 (Green)	Meaning
ON	-01..08: If counters are enabled: the correspondent counter is ON. Otherwise it signals the state of the correspondent generic digital input. -09..16: The correspondent generic digital input is ON.

FACTORY SETTINGS

All DIP-switch OFF:

- MODBUS Protocol / - Communication parameters: 38400 8,N,1 Addr. 1
- Filter active on the 16 Digital inputs / - Filter value = 100Hz
- In case of fail, outputs go low.
- Modbus communication monitoring, not active.

All dip switch OFF except SW2 (ON) and SW4 (ON):

- CANopen Protocol / - Communication parameters: 20K Addr. 127
- Filter active on the 16 Digital inputs / - Filter value = 100Hz
- In case of fail, outputs go low.

Variations of standard parameters are possible by using configuration softwares Z-NET and EASY-Z-PC (www.seneca.it).

