SENECA

Z-PC Line

EN

ZC-24DI

CANopen/MODBUS I/O Module
24 Digital Inputs

Installation Manual

Contents:

- General Specifications
- Technical Specifications
- Installation Rules
- Electrical connections
- CAN Bus connection rules
- DIP-switches settings
- Programming
- Significant Components Position
- Leds Signallings
- Factory Settings
- Decommissioning and disposal



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Manuals and configuration software are available at www.seneca.it

CERTIFICATE N. 9115.SENE - REGISTRATION NUMBER IT-827
CSQ IQNet CERTIFIED MANAGEMENT SYSTEM
azienda con sistema di gestione per la qualità certificato
ISO 9001:2008

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GENERAL SPECIFICATIONS

- Twentyfour self-powered 16V⎓ digital inputs with shared negative pole.
- Eight inputs settable as 32-bit counters with 10 kHz maximum frequency.
- Can Interface with CANopen protocol up to 1 Mbps speed or MODBUS RS485 Interface up to 115 Kbit/s speed.
- CANopen Baud rate, MODBUS Baud rate and Node ID configurables by DIP-switches or by software.
- Micro-USB communication port for the device configuration.
- Power supply and Canopen/MODBUS wiring connections facilitated by means of a bus that can be housed in the DIN rail IEC EN 60715.
- 1500 V∿ Isolation among input/output, power supply and CAN/MODBUS interface.
- Increments of counters 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.
- LEDs signallings: power supply, digital inputs, CAN/MODBUS and MODBUS-RTU communication.
- Node guarding o heartbeat.

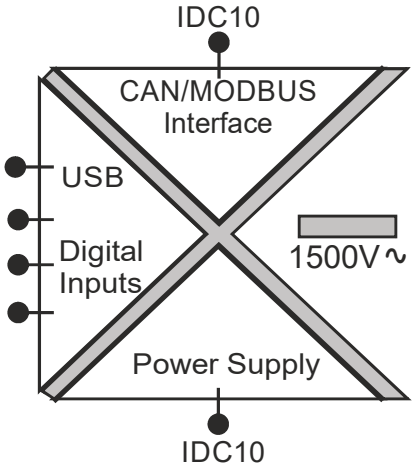
TECHNICAL SPECIFICATIONS

Inputs	
Channels	24
Polarity (EN 61131-2 type 2)	Sink (pnp)
Counters (if enabled)	8 (32 bit)
U_L (state OFF)	0 – 7 V⎓
U_H (state ON)	11 – 30 V⎓
Absorbed Current	3 mA (for each input)
V Max	30V⎓
Minimum pulse width	250 µs
ON/OFF Delay	Typical: 1.2 ms, Max: 3 ms
Counters frequency	Max: 10 kHz
Power Supply	
Voltage	10 – 40 V⎓; 19 - 28 V∿ 50 – 60 Hz
Consumption	Typical: 1,5 W, Max 2,5 W
Environmental Conditions	
Temperature	-20 / + 65 °C
Humidity	30 – 90 % a 40 °C not condensing
Altitude	Up 2000 m a.s.l.
Storage Temperature	-40 / +85 °C
Protection Degree	IP20

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Connections	
Digital Inputs	Removable 4way screw terminals (3.5 mm pitch)
Power Supply and CAN/MODBUS Interface	Rear IDC10 connector for DIN rail IEC EN 60715
USB interface	micro-USB connector (frontal panel)
Dimensions / Box	
Dimensions	L: 100 mm; H: 112 mm; W: 35 mm
Box	PA6, black

Isolations 1500 V∼



Standards

The module complies with the following standards:

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

EN61000-6-2 (electromagnetic immunity, industrial environment).

EN61010-1 (safety).

One maximum 2.5A fuse must be installed near the module.

ADDITIONAL NOTES :
Use in environment with 2 or less pollution degree.

INSTALLATION RULES

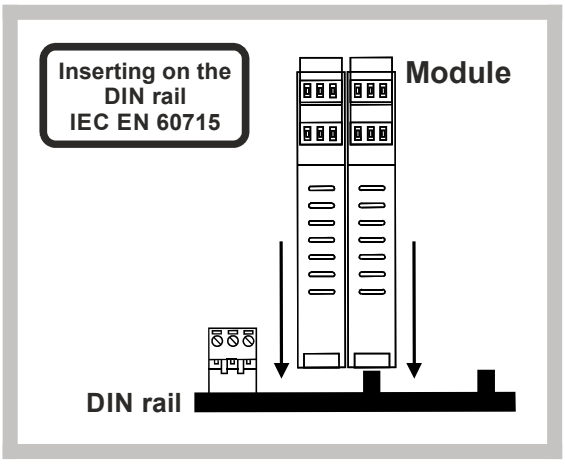
The module is designed to be installed, in vertical position, on DIN rail IEC EN 60715. In order to ensure optimum performance and a longest working life, the module(s) must be provided with adequate ventilation and no raceways or other objects that obstruct the ventilation slots. **Never install the modules near heat sources**. We recommend installation in the lower part of the control panel.

Inserting on the DIN rail IEC EN 60175

Like the picture shows:

1) Insert the module rear IDC10 connector on a DIN rail free slot (there's only one way to insert the module because of polarized connector).

2) The module can be fixed on the DIN rail by pressing the four hooks located on the rear of the module.

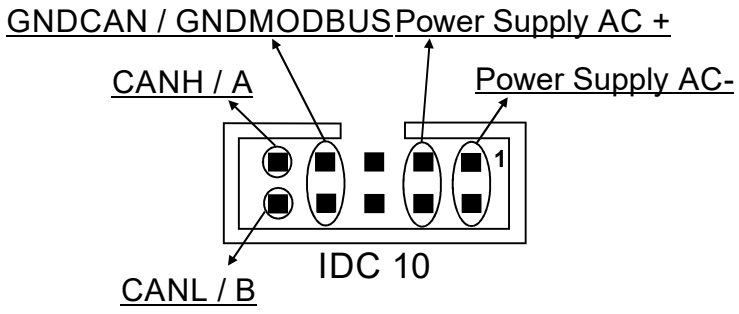


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ELECTRICAL CONNECTIONS

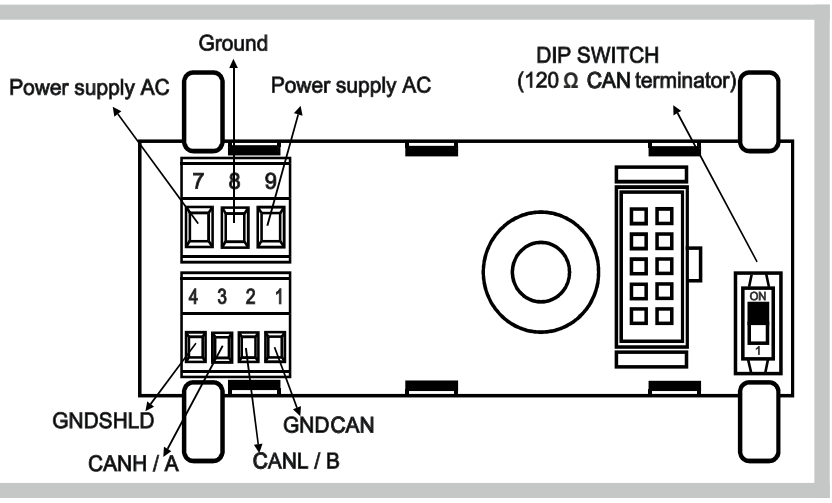
Power Supply and CAN / MODBUS Interface

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.



Rear Connector (IDC10)

In the figure you can see the meaning of the IDC10 connector pins if you want to provide signals through them.



Z-PC-DINAL1-35 Accessory

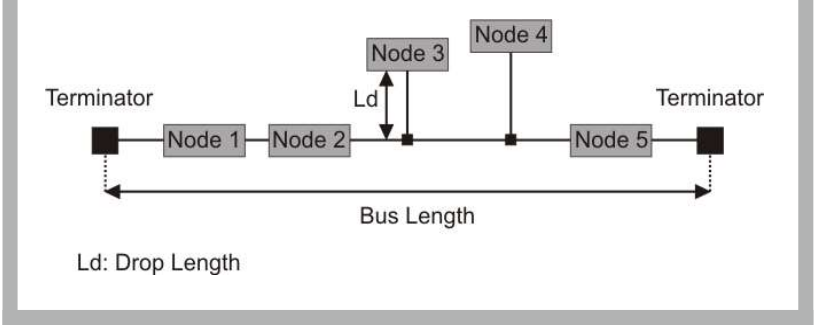
When Z-PC-DINAL1-35 accessory is used, the power supply and communication signals may be provided by the terminals block into the DIN rail support. The figure shows the meaning of the terminal blocks and the position of the DIP-switch for CAN (not for MODBUS) network termination. GNDSHLD: Shield to protect the signals inside the connection cables against interference (recommended).

CAN BUS CONNECTIONS RULES

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

Baud rate	Bus Lenght	Drop Lenght
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

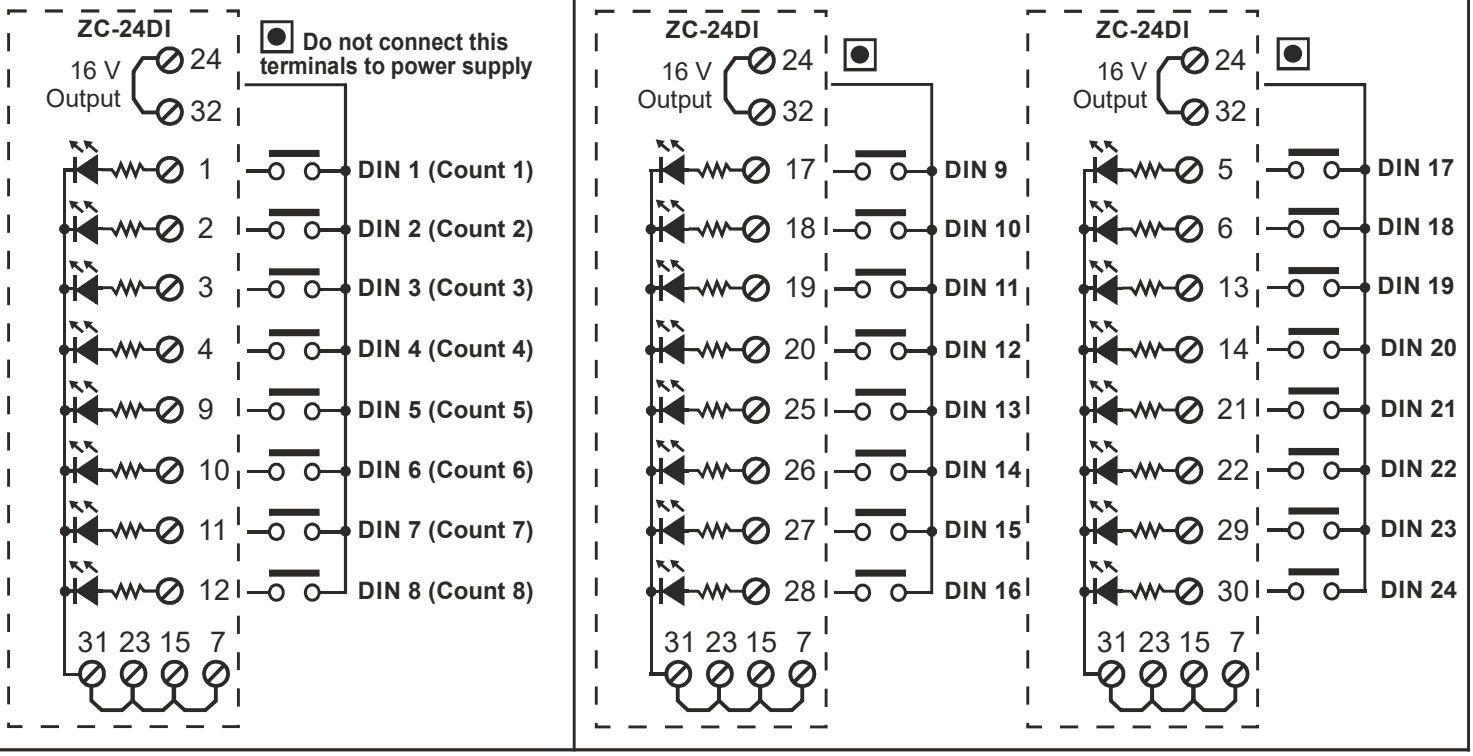
Scheme 1



NOTE: For the best performances, the use of special shielded cables is recommended (BELDEN 9841 cable for example). Terminate the two ends of CANbus network by setting to ON the DIP-switches, present on the DIN rail connection supports, where the two modules ends are inserted.

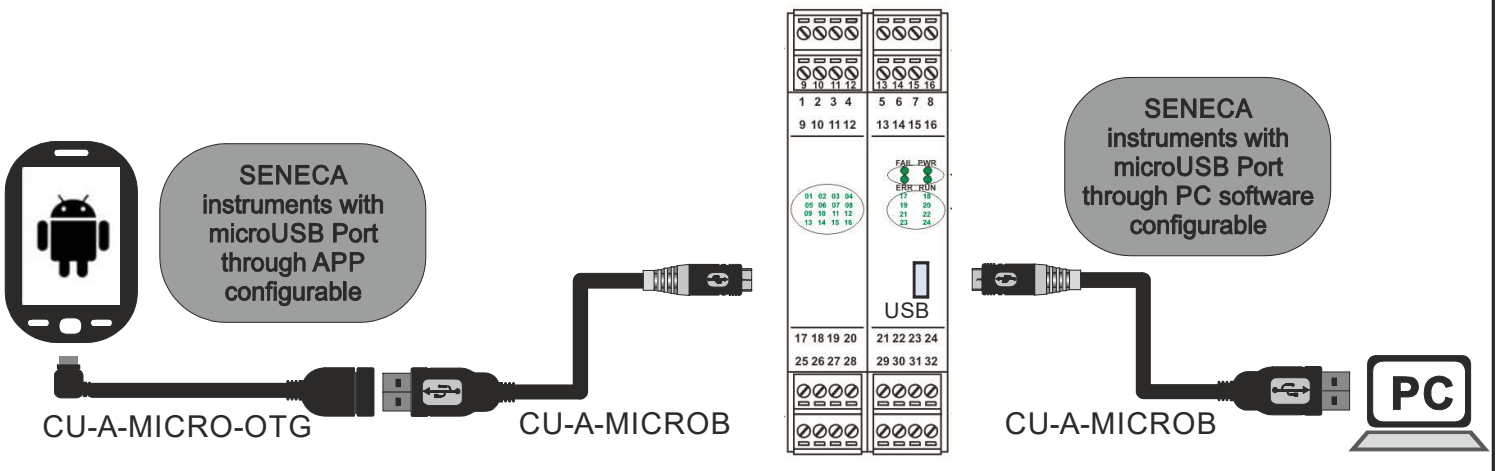
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High speed, configurable, digital input counters (Max Frequency: 10 kHz)	Generic digital inputs



USB Interface

The module has a microUSB connector, you can configure it through APP and/or software. For more information please see www.seneca.it/products//zc-24di.



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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:

SW1 POSITION	CANopen	ModBus	SW1 POSITION	Address	Address
1 2 3 4 5 6 7 8 9 10	Baud Rate (kbps)		1 2 3 4 5 6 7 8 9 10	binary #	number
▪ ▪ ▫ x x x x x x x	20	2.4	x x x ▪ ▪ ▪ ▪ ▪ ▪ ▪	0000001	ADD.001
▪ ▫ ▪ x x x x x x x	50	4.8	x x x ▪ ▪ ▪ ▪ ▪ ▫ ▪	0000010	ADD.002
▪ ▫ ▫ x x x x x x x	125	9.6	x x x ▪ ▪ ▪ ▪ ▪ ▫ ▫	0000011	ADD.003
▫ ▪ ▪ x x x x x x x	250	19.2	x x x ▪ ▪ ▪ ▪ ▫ ▪ ▪	0000100	ADD.004
▫ ▪ ▫ x x x x x x x	500	38.4	x x x ▪ ▪ ▪ ▪ ▫ ▪ ▫	0000101	ADD.005
▫ ▫ ▪ x x x x x x x	800	57.6	.....	.....	.....
▫ ▫ ▫ x x x x x x x	1000	115.2	x x x ▪ ▪ ▪ ▪ ▪ ▪ ▪	1111111	ADD.127
▪ ▪ ▪ x x x x x x x	Software programmed		x x x ▪ ▪ ▪ ▪ ▪ ▪ ▪	Software programmed	

Note: When the DIP-Switches, from 3 to 8, are on OFF position the communication settings are loaded from memory (EEPROM).

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.

Type of communication			ModBus terminator		KEY	
Protocol	SW2	SW4	State	SW3	ON	OFF
ModBus	▪	▪	Disabled	▫	▪↑	▫↓
CANopen	▫	▫	Enabled	▪		

PROGRAMMING

CAN / MODBUS Interface Programming

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

Factory Default Paramenters

All the DIP-switches in OFF position (values from memory)
The module is default programmed as follows:
MODBUS, Baud Rate: 38400, Bit: 8, Parity: None, Stop bit: 1, Address: 1
SW2 and SW4 in ON position: CANopen, Baud Rate: 20 kbps, Address: 127.

Programming via micro-USB (front)

The instrument can be programmed/configured via the micro-USB interface on the front panel (for details on communication, refer to the User Manual).

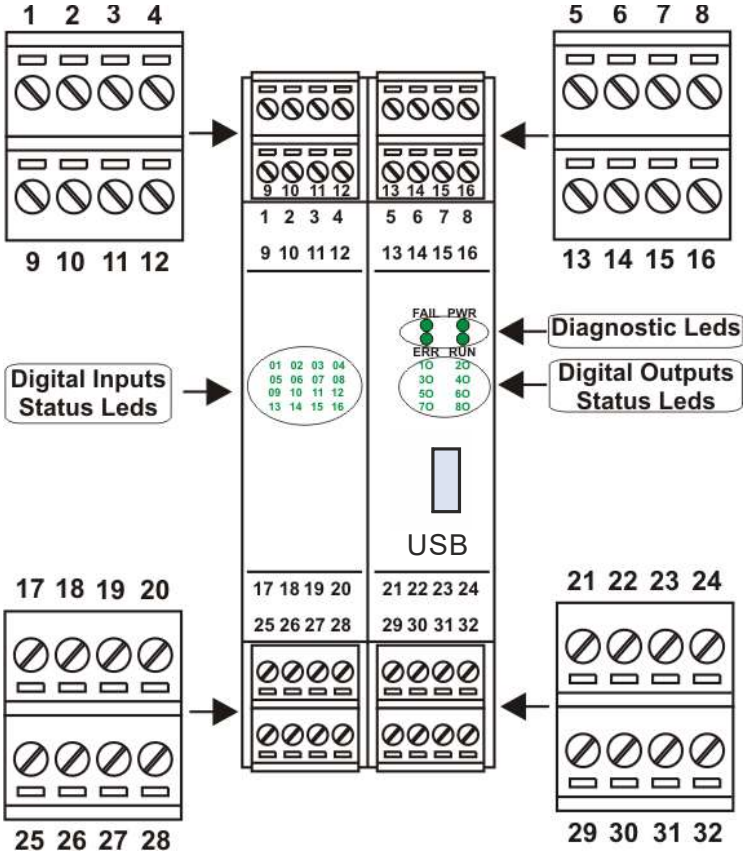
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SIGNIFICANT COMPONENTS POSITION

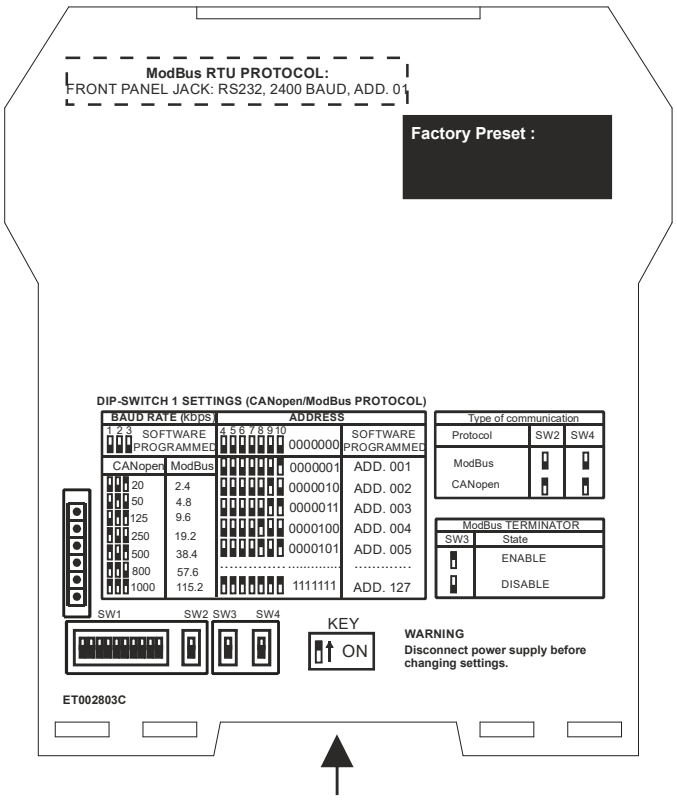
Screw terminals / LED / IDC10 Connector IDC10 / DIP-Switches

The screw terminals numbering, the LEDs position on frontal panel, the rear IDC10 connector (for DIN rail connection) and the DIP-Switch on the side are illustrated below.

Frontal Panel



Side Panel



IDC10: CAN/MODBUS and Power Supply

LEDs SIGNALLINGS

LED ERR and RUN: CANopen / ModBus COMMUNICATION STATE

The meaning of LEDs ERR and RUN is described below; For details about the state and the flashing modes of the two leds: please see the User Manual.

LED ERR (Red)	STATE	CANopen state LED 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)		**ModBus state LED meaning**
ON		The device is receiving.

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LED RUN (Green)	STATE	CANopen state LED meaning
Single flash	Stop	The Device is in STOPPED state.
Blinking	Pre-operational	The Device is in the PRE-OPERATIONAL state.
ON	Operational	The Device is in the OPERATIONAL state.
LED RUN (Green)		**ModBus state LED meaning**
ON		The device is transmitting.

LED FAIL and PWR: General System Diagnostics	
LED PWR (Green)	**Meaning**
ON	Power Supply Presence
LED FAIL (Yellow)	**Meaning**
ON	RS232 port (COM) data reception.

LED 01 – 24: Digital Inputs State	
LED 1 – 24 (Green)	**Meaning**
ON	**01 – 08**: If counters are enabled: the correspondent counter is ON. Otherwise it signals the state of the correspondent digital input. **09 – 24**: 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 24 Digital inputs and Filter value = 100Hz

All dip switch OFF except **SW2 (ON)** and **SW4 (ON)**
- CANopen Protocol / Communication parameters: 20K Addr. 127
- Filter active on the 24 Digital inputs / Filter value = 100Hz

Variations of standard parameters are possible by EASY SETUP software (please see: www.seneca.it download area).
For more information about a list of all register and their function Pease see:
USER manual.

DECOMISSIONING AND DISPOSAL



Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collections programs). This symbol, found on your producr or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical & electronic equipment. By ensuring this product is didposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of the product, please contact your local city office, waste disposal service of the retail store where you purchased this product.

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