SENECA

Z-PC Line

EN

Z-8AI

8 ANALOG INPUT voltage-current with Modbus RS485

Installation Manual

Contents:

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For manuals and configuration software, see www.seneca.it

GENERAL SPECIFICATIONS

- Voltage or current inputs with programmable range: ± 2 Vdc,± 10 Vdc e ± 20 mA with 16 bits resolution.
- ***NEW*** module auxiliary power supply can be supplied to all 8 current loop at the same time.
- ***NEW*** Modbus address and Baud rate can be set through DIP-switches
- Current input with internal shunt can be imposed through DIP-switch.
- Current input impedance ~ 50 Ω.
- 1500 Vac output isolation compared with other low voltage circuits.
- Easy connections for power supply and serial communication by seneca bus that can be mounted on standard DIN 46277 rail.
- Removable terminals with section of 2.5 mm^2.
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- Module insertion or extraction from seneca bus without interruptions for communication and power suupply.
- Connection distance up to 1200 m.
- RS232 communication with jack 3,5 mm connector on frontal.

TECHNICAL FEATURES

Inputs

Voltage inputs	Bipolar with programmable FS at ± 2,5 Vdc, and ± 10 Vdc input impedance: >100 kΩ
Current inputs	Bipolar with programmable FS at ± 20 mA. The 50 Ω internal shunt are selected from DIP-switches. Available power supply of 90 + 90 mA at 13 V.
Number of input channel	8
Protection inputs	± 30 Vdc or 25 mA
Inputs resolution	15 bit + 1 bit sign
Voltage and current accuracy	Initial: 0.1% of full scale, Linearity: 0.03% of range. Zero: 0.05% of range. TC: 100 ppm; EMI: 1 %
Sampling time	10 / 20 / 40 / 120 ms/channel

Power supply

Voltage	10 ..40 V_{DC} 19 ..28 V_{AC} @ 50 ..60 Hz
Consumption	Typical: 1.5 W, Maximum: 3.5 W

Environmental condition

Temperature	-10 ..+65°C (UL: -10 ..55°C)
Humidity	30 ..90% a 40°C not condensing
Storage Temperature	-20 ..+85°C
Degree protection	IP20

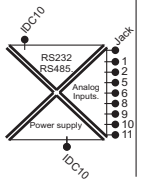
Connections

Connections	Removable 3-way screw terminals, 5,08 pitch
	Rear IDC10 connector for DIN 46277 rail
	Frontal jack 3.5 mm

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 (electromagnetic emission, industrial environment).

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

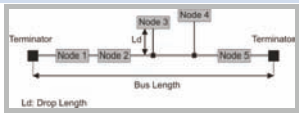
EN61010-1/2001 (safety). All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742: "Isolated transformers and safety transformers".

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

MODBUS CONNECTIONS RULES

1) Connect the module into the DIN rail (max 120)
2) Use a cable with a suitable length to connect the remote modules. In the following table there are data relative to:
- Maximum length of the Modbus bus: It defines the connection length between two modules that have bus terminator dip switch on . (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 shielded cable, as an example BELDEN 9841.

INSTALLATION RULES

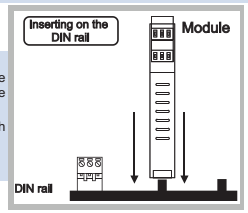
The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best module performance and duration, avoid to place cables raceways and other objects that could obstruct ventilation slits.
Never install the modules near heat sources. The module installation is adviced in the bottom of the control panel.

Inserting in the DIN rail

How the picture shows:

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

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

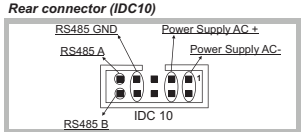


ELECTRICAL CONNECTIONS

Power supply and Modbus interface

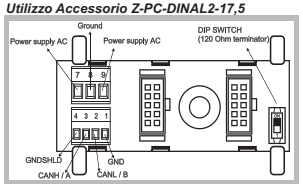
Power Supply and Modbus interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL2-17.5 accessory..

Rear connector (IDC10)



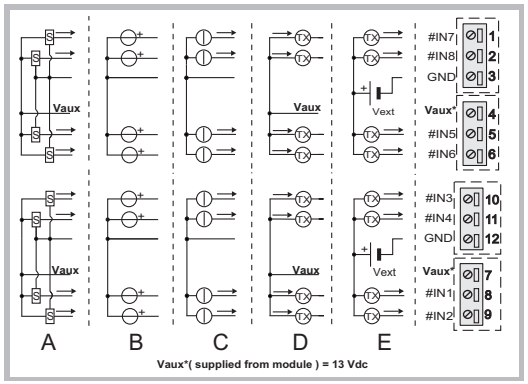
The picture shows the meaning of the IDC10 connector pins.
This connector can be used in alternative to the screw terminals blocks

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 that set the 120 Ω terminator is used only for CAN communication.
GNDSHLD: Shield to protect the connection cables (recommended)..

Input



Vaux*(supplied from module) = 13 Vdc

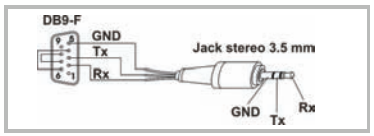
A) **Voltage** input with **sensor's power supply from MODULE (13 Vdc)**
B) **Voltage** input with **sensor's power supply NOT from MODULE**
C) **Current** input with **sensor's power supply NOT from MODULE**
D) **Current** input with **sensor's power supply from MODULE (13 Vdc)**
E) **Current** input with **external power supply for sensors.**

RS232

RS232 port can be used to communicate and also to program the module.
Z-NET or EASY Z-PC are the Seneca configuration softwares. RS232 communication use the following communication parameters :

2400,8,N,1

RS232 and RS485 port use the same Modbus protocol. When RS232 communication is established, the serial RS485 bus network will be not enable. The RS485 port will return automatically active some seconds after the last data packed received from RS232 port.
The 3,5 mm DB9 jack stereo connector for RS232 communication can either be assembled as indicated in the following figure or purchased as an accessory (cod. PM001601).



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		

POSITION	BAUD RATE	POSITION	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.

DIP-switches for inputs setting

CHANNEL	VOLTAGE	CURRENT
CH1	**0**0000000	**1**0000000
CH2	0**0**000000	0**1**000000
CH3	00**0**00000	00**1**00000
CH4	000**0**0000	000**1**0000

CHANNEL	VOLTAGE	CURRENT
CH5	0000**0**000	0000**1**000
CH6	00000**0**00	00000**1**00
CH7	000000**0**0	000000**1**0
CH8	0000000**0**	0000000**1**

The dip switch selection must be compatible with the Modbus register setting.
The description of Modbus registers are avaiable on USER MANUAL.

KEY 1 0 ON

MODBUS REGISTER AND LED SIGNALLINGS

Holding register

Register	Name	Description
40003	**NCH 1**	Measured value of input channel .
40004	**NCH 2**	See before.
40005	**NCH 3**	See before.
40006	**NCH 4**	See before.
40007	**NCH 5**	See before.
40008	**NCH 6**	See before.
40009	**NCH 7**	See before.
40010	**NCH 8**	See before.

LEDs signallings

LED	STATE	*Meaning of LEDs*
PWR	On	Power supply presence.
FAIL	Blinking	Error settings .
RX	Blinking	Received data.
	On	Verify the connection.
TX	Blinking	Trasmitted data.

FACTORY SETTING AND ADVANCED SETTING

Factory settings

Tutti i DIP-switch in OFF:

- Parametri di comunicazione: 38400 8,N,1 Addr. 1
- Ingresso canale 1 : VOLTAGE ± 10 V
- Ingresso canale 2 : VOLTAGE ± 10 V
- Ingresso canale 3 : VOLTAGE ± 10 V
- Ingresso canale 4 : VOLTAGE ± 10 V
- Ingresso canale 5 : VOLTAGE ± 10 V
- Ingresso canale 6 : VOLTAGE ± 10 V
- Ingresso canale 7 : VOLTAGE ± 10 V
- Ingresso canale 8 : VOLTAGE ± 10 V
- Numeric representation of measure : ± 10000 mV
- Sampling time: 10 ms

Advanced settings

- Input channels are settable in current or voltage.
- Possibility to set the scale of measure with value IS (start scale) and FS (full scale) : ± 10000 mV or 0 ..20000 µA.
- Possibility to set the representation of the measure with an IST (start technical scale) and FST (full technical scale) value : ± 32000
- Possibility to enable or disable every single channel.

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

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.

USER MANUAL

ZC-16DI-8DO

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MI002700

Seneca Z-PC Line module: **ZC-16DI-8DO**

The module ZC-16DI-8DO:

- acquires 16 single-ended digital signals, it converts them to a digital format (IN 1-16 state) and it counts the input-pulse number (pulse counter for IN 1-8);

- controls 8 digital outputs (OUT1-OUT8), each of them (by MOSFET) actives/deactivates a output load.

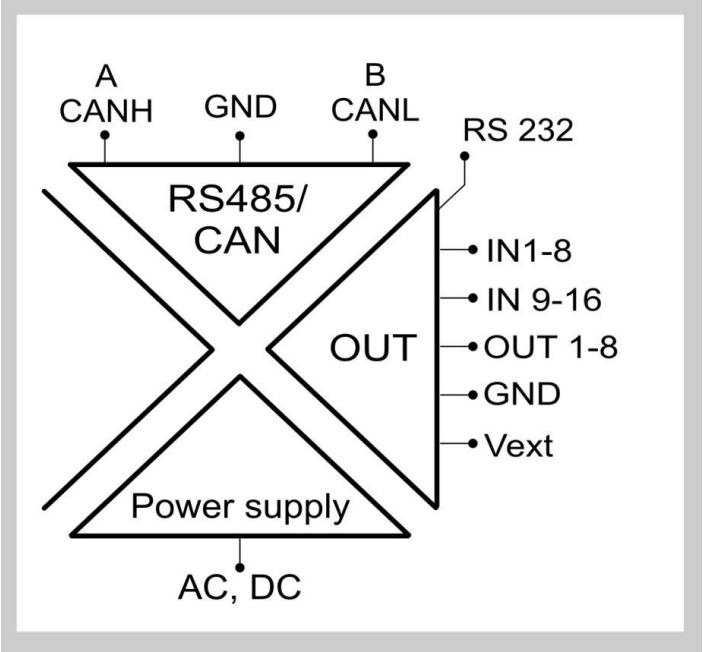
General characteristics

- Acquisition of digital signals from sensor: reed, NPN, PNP, proximity, contact, etc...
- Configuration of a filter applied to input signals IN1-IN8 (noise filter) to attenuate the noise overlapped to the digital signals
- Pulse counters for digital signals IN1-IN8, with max frequency equal to 10kHz, 32bit-registers
- Advanced management of the pulse counters for digital signals IN1-IN8 (for each pulse counter: overflow, preset value and reset/preset command are available)
- Power of 16 sensors using internal supply voltage (Vaux=16V)
- Outputs are available on 8 screw terminals or IDC 10 connectors, to facilitate the connection of 24V-relays
- It is possible to manage the output state if the interval time of RS485-bus communication failure is greater than a configurable time (up to 25.5sec): output is kept at the previous value or output is overwritten on register
- It is possible to manage the output state if there is a over-temperature or short-circuited (towards ground)
- Configuration of the module (node) address and baud-rate by Dip-Switches
- It is possible to add/remove the module to/from RS485-bus without disconnecting the communication or power supply
- It is possible to switch automatically RS485 to RS232 or vice versa
- CAN interface with CANOpen protocol: max 1Mbps

Features

INPUT	
Number	16
Type	Polarity (EN 61131 – 2 type 2): sink (pnp)
Equivalent low-pass-filter cut-off frequency	Configurable between: 16 Hz and 2.1kHz
Pulse min duration (ton)	350µs
Sensor=off (input threshold)	The sensor is detected «off» if: acquired signal voltage between 0Vdc and 7 Vdc
Sensor=on (input threshold)	The sensor is detected «on» if: acquired signal voltage between 11Vdc and 30Vdc
Switching delay	Typical: 1.2ms; max: 3ms
Adsorbed current	3mA (for each input)
Internal supply Vaux	The screw terminals 24-32 (Vaux) supply 16 V with reference to the screw terminal 7-15-23-31 (GND)

OUTPUT	
Number	8
Type	MOSFET (Open source)
Max current through each load	0.5A. The supplied currents sum through all loads (these currents are inwards with reference to the screw terminals 8-16):<4A, using a fuse or equivalent protection (if the connection is performed through screw terminals)
	25mA. The supplied currents sum through all loads (these currents are inwards with reference to the screw terminals 8-16):<0.2A, using a fuse or equivalent protection (if the connection is performed through IDC10 connector)
Max state-switching frequency for each load	2Hz
MOSFET protection	The MOSFETs are protected against: load short-circuited, over-temperature
MOSFET supply	With reference to the screw terminals 7-15-23-32 (GND), power the MOSFETs by screw terminals 8 or 16 (Vext): min5V, max30V
MOSFET max energy	40mJ with inductive load
MOSFET response time	5/2ms
R_{DSON}	0.75Ω
Switching delay	1ms (max)
CONNECTIONS	
RS485 interface	IDC10 connector for DIN 46277 rail (back-side panel)
1500 Vac ISOLATIONS	
	Between: power supply, ModBUS RS485, digital outputs



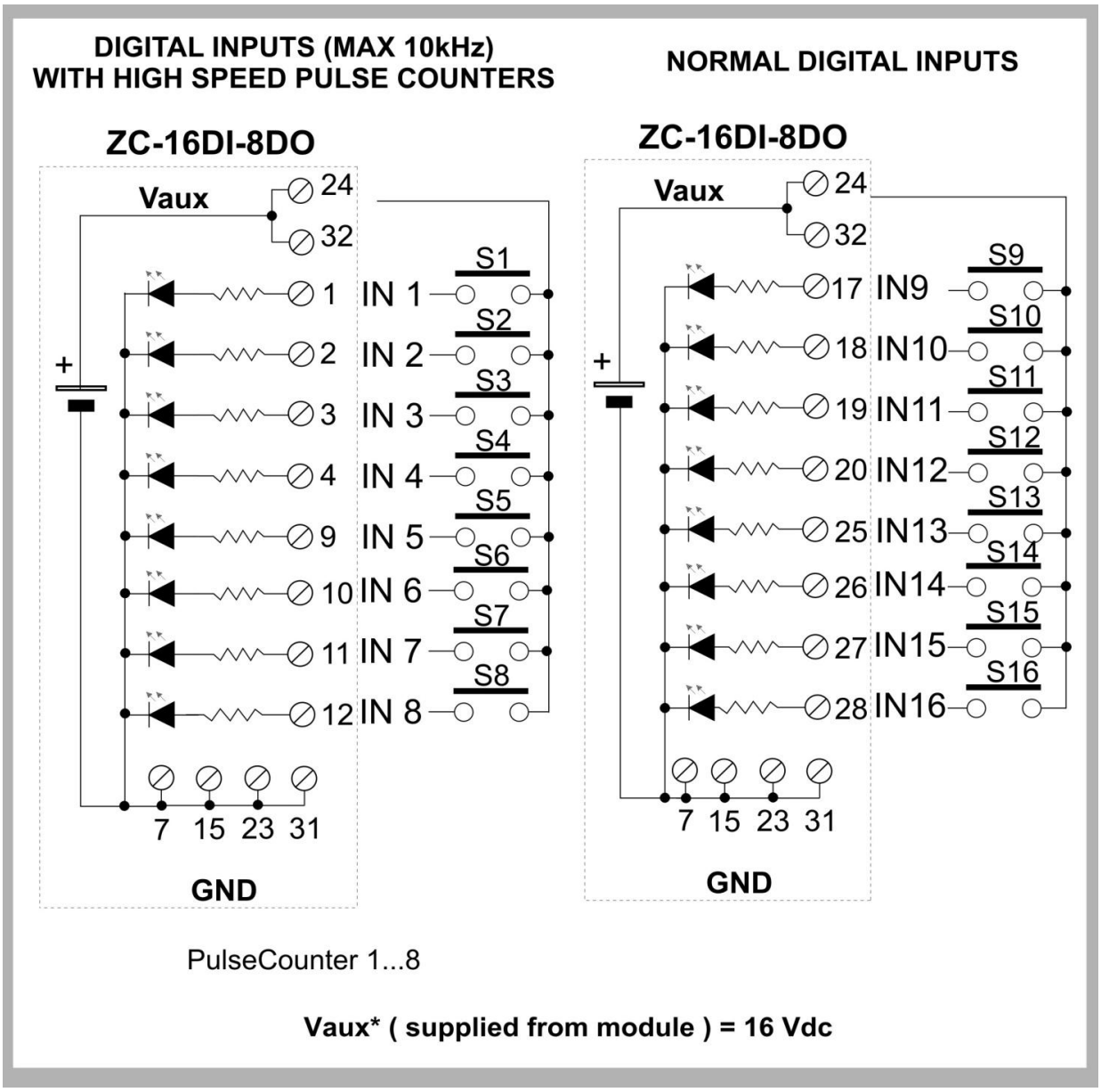
POWER SUPPLY	
Supply voltage	10 – 40 Vdc or 19 – 28 Vac (50Hz - 60Hz)
Power consumption	Typical: 1.5W; Max: 2.5W

The power supply transformer necessary to supply the module must comply with EN60742 (Isolated transformers and safety transformers requirements). To protect the power supply, it is recommended to install a fuse.

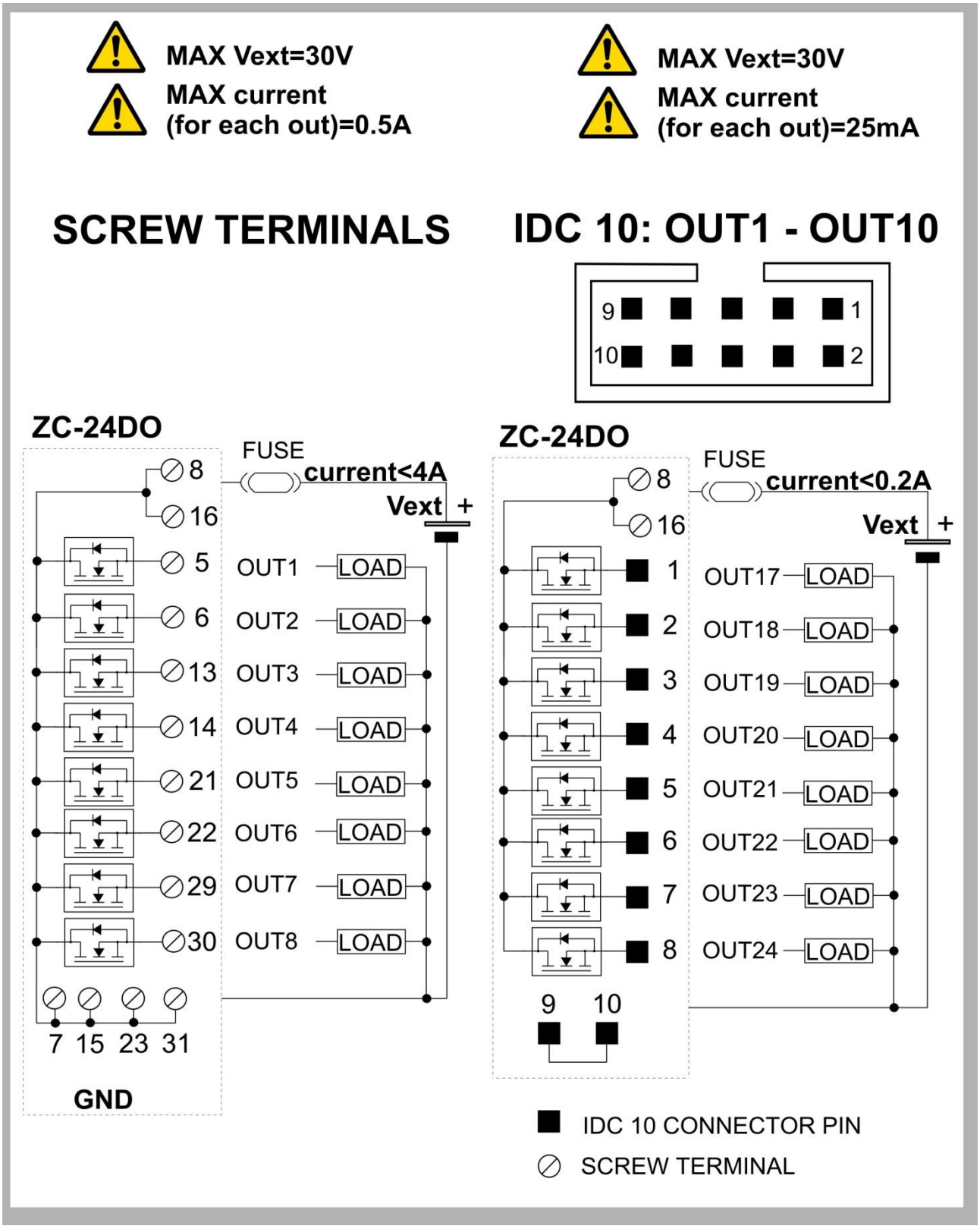
MODULE CASE	
Case-type	PBT, black
Dimensions	Width W = 100 mm, Height H = 112mm, Depth D = 35 mm
Terminal board	Removable 4-way screw terminals: pitch 3.5mm, sections 2.5mm^2
Protection class	IP20 (International Protection)

Input connections

Power on the module with < 40 Vdc or < 28 Vac voltage supply. These upper limits must not be exceeded to avoid serious damage to the module.



Output connections



Dip-switches table

Power off the module before configuring it by Dip-Switches to avoid serious damage due to electrostatic discharges.

In the following tables: box without circle means Dip-Switch=0 (OFF state); box with circle means Dip-Switch=1 (ON state).

BAUD-RATE (Dip-Switches: SW1)			
1	2	3	Meaning
			Only Baud-Rate is acquired from memory(EEPROM)
		●	Baudrate=2400
	●		Baudrate=4800
	●	●	Baudrate=9600
●			Baudrate=19200
●		●	Baudrate=38400
●	●		Baudrate=57600
●	●	●	Baudrate=115200

ADDRESS (Dip-Switches: SW1)							
4	5	6	7	8	9	10	Meaning
							Only address is acquired from memory(EEPROM)
						●	Address=1
					●		Address=2
					●	●	Address=3
				●			Address=4
				●		●	Address=5
X	X	X	X	X	X	X	……
●	●	●	●	●	●	●	Address=127

RS485 TERMINATOR (Dip-Switches: SW3)	
1	Meaning
	RS485 terminator disabled
●	RS485 terminator enabled

COMMUNICATION PROTOCOL (Dip-Switch: SW2 and SW4)		
SW2	**SW4**	
1	1	
		Protocol is ModBUS
●	●	Protocol is CANOPEN

RS485 Register table

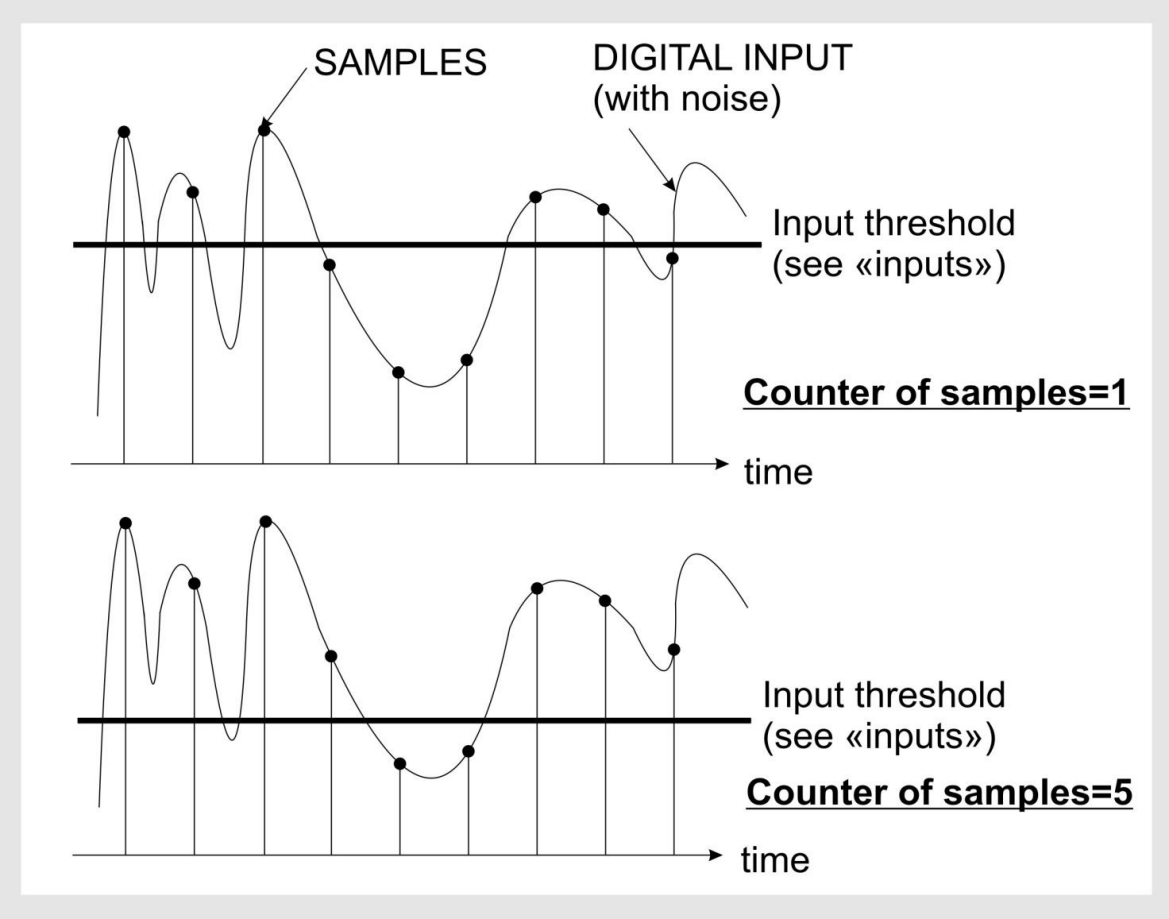
Name	Range	Interpretation of register	R/W	Default	Address
MachineID	/	MSB, LSB	R		40001
	Id_Code (Module ID)			0x22 (34 decimal)	Bit [15:8]
	Ext_Rev (Module version)				Bit [7:0]
FWREV	/	Word	R		40002
	Firmware Code				
Command	/	Word	R/W		40201
Reg.40201=0x5Cnn (preset counter values are loaded into pulse counters, using a bit interpretation to mask the inputs): load 40025,40026…40039,40040 into 40009, 40010…40023,40024. Examples: 0x5C01 allows to load PresetCounter1 into PulseCounter1 0x5C02 allows to load PresetCounter2 into PulseCounter2 0x5C03 allows to load PresetCounter1 into PulseCounter1 **and** PresetCounter2 into PulseCounter2 (**not** PresetCounter3 into PulseCounter3) and so on 0x5CFF allows to load every PresetCounter into corresponding PulseCounter					
Reg.40201=0x5Dnn (pulse counters value are loaded with zero values, using a bit interpretation to mask the inputs) Examples: 0x5D01 allows to load PulseCounter1 with zero value 0x5D02 allows to load PulseCounter2 with zero value 0x5D03 allows to load PulseCounter1 **and** PresetCounter2 with zero value (**not** PresetCounter3 with zero value) and so on 0x5DFF allows to load every PulseCounter with zero value					
Reg.40201=0x5Enn (counter overflows reset, using a bit interpretation to mask the inputs) Examples: 0x5E01 allows to reset PulseCounter1 overflow 0x5E02 allows to reset PulseCounter2 overflow 0x5E03 allows to reset PulseCounter2 overflow **and** to reset PulseCounter2 overflow (**not** to reset PulseCounter3 overflow) and so on 0x5EFF allows to reset every PulseCounter overflow					
Reg.40201=0xBAB0 (save data in EEPROM memory)					
Reg.40201=0xC1A0 (module reset)					
Reg.40201=0x6BAC (the module writes the Dip-Switches-state in reg.40202)					
Command aux		Bit	R		40202
	These bits aren't used			/	Bit [15:10]
	Dip-Switches "SW1 [4:10]" state. They correspond to the module baud-rate			/	Bit [9:3]
	Dip-Switches "SW1 [1:3]" state. They correspond to the module address			/	Bit [2:0]
Errors	/	Word	R		40006
	These bits aren't used			/	Bit [15:8]
	Memory error (EEPROM): 0=there isn't; 1=there is			/	Bit 7
	These bits aren't used			/	Bit [6:4]
	Over-temperature error: 0=there isn't; 1=there is			/	Bit 3
	These bits aren't used			/	Bit [2:0]
Filter[IN1-8] masked	/	Word	R/W		40043
	These bits aren't used			/	Bit [15:8]
	Filter activation for inputs IN1-IN8 using a bit interpretation to mask the inputs: 0=filter is deactivated; 1=filter is activated (for each input)			0xFF	Bit [7:0]

Filter[IN9-16] masked	/	Word	R/W		40044
	These bits aren't used			/	Bit [15:8]
	Filter activation for inputs IN9-IN16 using a bit interpretation to mask the inputs: 0=filter is deactivated; 1=filter is activated (for each input)			0xFF	Bit [7:0]
Filter Number Of Samples	From 0 to 255	Word	R/W		40045
	These bits aren't used				Bit [15:8]
	Number of samples for filter			0x28 (40 decimal)	Bit [7:0]
Filter Sup	From 0 to 255	Word	R/W		40046
	These bits aren't used				Bit [15:8]
	Inferior threshold for filter			0x14 (20 decimal)	Bit [7:0]
Filter Inf	From 0 to 255	Word	R/W		40047
	These bits aren't used				Bit [15:8]
	Superior threshold for filter			0x14 (20 decimal)	Bit [7:0]


Default equivalent filter value is 100Hz (cut-off frequency).

Filter functioning

Input filter operates in the following way: the module samples the digital input with a frequency equal to 20kHz, and some samples are captured (in the following figure there are 9 samples).



If counter of samples is greater than (or equal to) reg.40046 (Filter Sup), input signal is detected as “1”.

If counter of samples is less than (or equal to) reg.40047 (Filter Inf), input signal is detected as “0”.

If counter of samples is between reg.40047 (Filter Inf) and reg.40046 (Filter Sup), filter value is kept stored at the previous value.

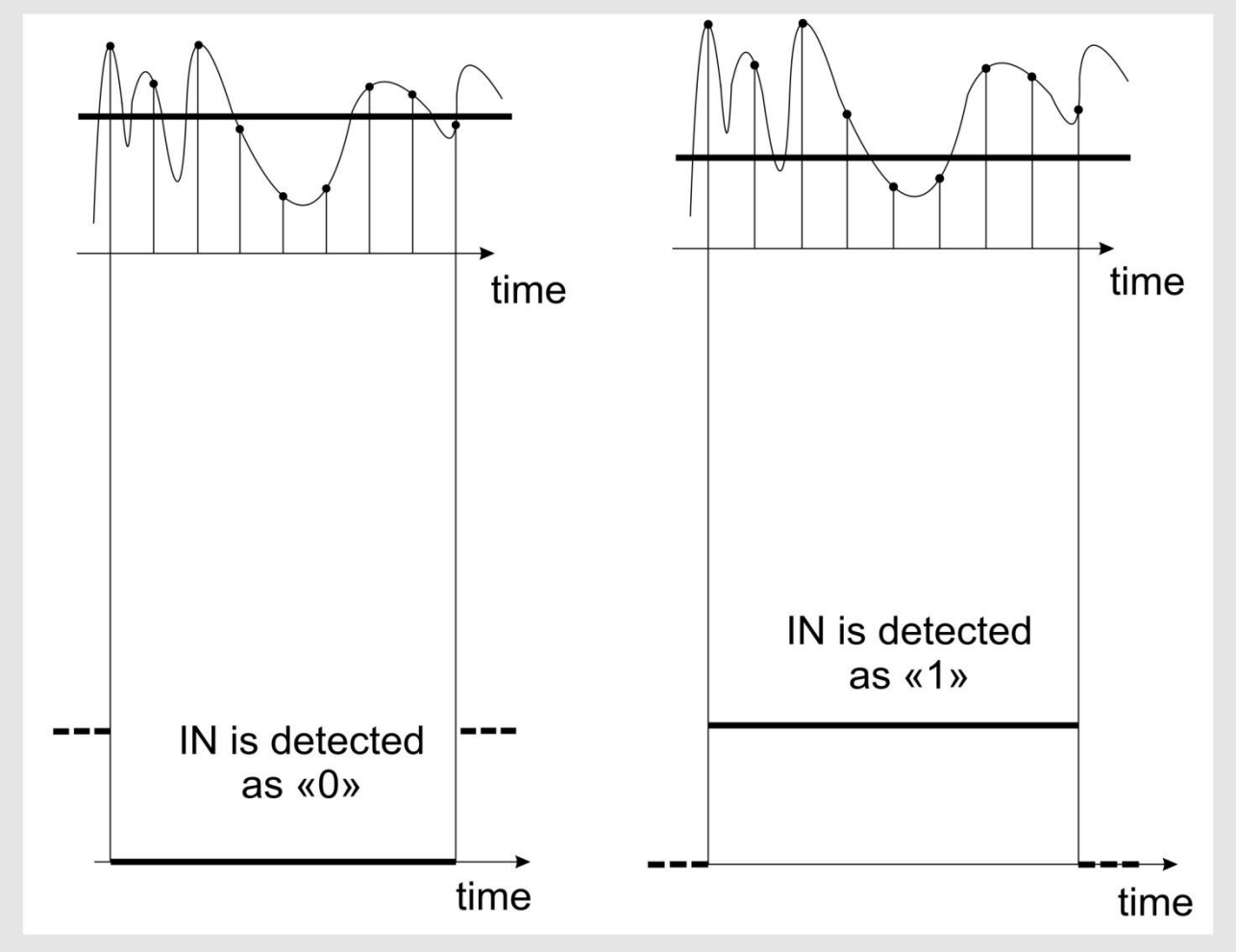
Example: with reference to the previous figure

A) Counter of samples (for superior figure)=0+1+1+1-1-1-1+1+1-1=**1**

If Filter Inf =2, Filter Sup=4: 1 ≥ 4 is false, 1 < 2 is true. So input is detected as “0”

B) Counter of samples (for inferior figure)=0+1+1+1+1-1-1+1+1+1=**5**

If Filter Inf =2, Filter Sup=4: 5 ≥ 4 is true, 5 < 2 is false. So input is detected as “1”



To deactivate the filter, write: reg.40045=0x01, reg.40046=0x00, reg.40047=0x00.

This filter action is described in configuration software as a low pass digital filter, with cut-off frequency from 16Hz to 2.1kHz.

Address Parity	Address: from 0x01=1 to 0xFF=255	MSB, LSB	R/W		40050
	Address for RS485 (address of module/node if parameters are configurated by memory modality)			1	Bit [15:8]
	Parity for RS485: 0=no parity; 1=even; 2=odd			0	Bit [7:0]
Baudrate Delay	Delay: from 0x00=0 to 0xFF=255	MSB, LSB	R/W		40051
	Baud-rate for RS485 (baud-rate of module/node if parameters are configurated by memory modality): 1=2400; 2=4800; 3=9600; 4=19200; 5=38400; 6=57600; 7=115200			38400	Bit [15:8]
	Delay for RS485 (delay of communication response: pauses between the end of Rx message and the start of Tx message)			0	Bit [7:0]
State IN1-IN16		Bit	R		40301
	IN16 state: 0=S16 open; 1=S16 closed			/	Bit 15
	IN15 state: 0=S15 open; 1=S15 closed			/	Bit 14

	IN14 state: 0=S14 open; 1=S14 closed			/	Bit 13
	IN13 state: 0=S13 open; 1=S13 closed			/	Bit 12
	IN12 state: 0=S12 open; 1=S12 closed			/	Bit 11
	IN11 state: 0=S11 open; 1=S11 closed			/	Bit 10
	IN10 state: 0=S10 open; 1=S10 closed			/	Bit 9
	IN9 state: 0=S9 open; 1=S9 closed			/	Bit 8
	IN8 state: 0=S8 open; 1=S8 closed			/	Bit 7
	IN7 state: 0=S7 open; 1=S7 closed			/	Bit 6
	IN6 state: 0=S6 open; 1=S6 closed			/	Bit 5
	IN5 state: 0=S5 open; 1=S5 closed			/	Bit 4
	IN4 state: 0=S4 open; 1=S4 closed			/	Bit 3
	IN3 state: 0=S3 open; 1=S3 closed			/	Bit 2
	IN2 state: 0=S2 open; 1=S2 closed			/	Bit 1
	IN1 state: 0=S1 open; 1=S1 closed			/	Bit 0
State IN1-IN8		Bit	R		40003
	These bits aren't used			/	Bit [15:8]
	IN8 state: 0=S8 open; 1=S8 closed			/	Bit 7
	IN7 state: 0=S7 open; 1=S7 closed			/	Bit 6
	IN6 state: 0=S6 open; 1=S6 closed			/	Bit 5
	IN5 state: 0=S5 open; 1=S5 closed			/	Bit 4
	IN4 state: 0=S4 open; 1=S4 closed			/	Bit 3
	IN3 state: 0=S3 open; 1=S3 closed			/	Bit 2
	IN2 state: 0=S2 open; 1=S2 closed			/	Bit 1
	IN1 state: 0=S1 open; 1=S1 closed			/	Bit 0
State IN9-IN16		Bit	R		40004
	These bits aren't used			/	Bit [15:8]
	IN16 state: 0=S16 open; 1=S16 closed			/	Bit 7
	IN15 state: 0=S15 open; 1=S15 closed			/	Bit 6
	IN14 state: 0=S14 open; 1=S14 closed			/	Bit 5
	IN13 state: 0=S13 open; 1=S13 closed			/	Bit 4
	IN12 state: 0=S12 open; 1=S12 closed			/	Bit 3
	IN11 state: 0=S11 open; 1=S11 closed			/	Bit 2
	IN10 state: 0=S10 open; 1=S10 closed			/	Bit 1
	IN9 state: 0=S9 open; 1=S9 closed			/	Bit 0
PulseCounter1 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40009
PulseCounter1 LSW		FP32bit-LSW	R		40010
	32-bit pulse counter for input 1				
PresetCounter 1 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40025
PresetCounter 1 LSW		FP32bit-LSW	R/W		40026
	Preset counter value of PulseCounter1			0	
PulseCounter2 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40011
PulseCounter2 LSW		FP32bit-LSW	R		40012
	32-bit pulse counter for input 2				
PresetCounter 2 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40027
PresetCounter 2 LSW		FP32bit-LSW	R/W		40028
	Preset counter value of PulseCounter2			0	
PulseCounter3 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40013
PulseCounter3 LSW		FP32bit-LSW	R		40014

	32-bit pulse counter for input 3				
PresetCounter 3 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40029
PresetCounter 3 LSW		FP32bit-LSW	R/W		40030
	Preset counter value of PulseCounter3			0	
PulseCounter4 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40015
PulseCounter4 LSW		FP32bit-LSW	R		40016
	32-bit pulse counter for input 4				
PresetCounter 4_MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40031
PresetCounter 4_LSW		FP32bit-LSW	R/W		40032
	Preset counter value of PulseCounter4			0	
PulseCounter5 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40017
PulseCounter5 LSW		FP32bit-LSW	R		40018
	32-bit pulse counter for input 5				
PresetCounter 5 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40033
PresetCounter 5 LSW		FP32bit-LSW	R/W		40034
	Preset counter value of PulseCounter5			0	
PulseCounter6 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40019
PulseCounter6 LSW		FP32bit-LSW	R		40020
	32-bit pulse counter for input 6				
PresetCounter 6 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40035
PresetCounter 6 LSW		FP32bit-LSW	R/W		40036
	Preset counter value of PulseCounter6			0	
PulseCounter7 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40021
PulseCounter7 LSW		FP32bit-LSW	R		40022
	32-bit pulse counter for input 7				
PresetCounter 7 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40037
PresetCounter 7 LSW		FP32bit-LSW	R/W		40038
	Preset counter value of PulseCounter7			0	
PulseCounter8 MSW	Between:0; (2^31)-1	FP32bit-MSW	R		40023
PulseCounter8 LSW		FP32bit-LSW	R		40024
	32-bit pulse counter for input 8				
PresetCounter 8 MSW	Between:0; (2^31)-1	FP32bit-MSW	R/W		40039
PresetCounter 8 LSW		FP32bit-LSW	R/W		40040
	Preset counter value of PulseCounter8			0	
Overflow		Bit	R		40008
	These bits aren’t used			/	
	Pulse counter 8 overflow: 0=there isn’t; 1=there is			/	

	Pulse counter 7 overflow: 0=there isn't; 1=there is	/	
	Pulse counter 6 overflow: 0=there isn't; 1=there is	/	
	Pulse counter 5 overflow: 0=there isn't; 1=there is	/	
	Pulse counter 4 overflow: 0=there isn't; 1=there is	/	
	Pulse counter 3 overflow: 0=there isn't; 1=there is	/	
	Pulse counter 2 overflow: 0=there isn't; 1=there is	/	
	Pulse counter 1 overflow: 0=there isn't; 1=there is	/	

Errors Out1-8	/	Bit	R		40007
	These bits aren't used			/	Bit [15:8]
	Output 8 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 7
	Output 7 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 6
	Output 6 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 5
	Output 5 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 4
	Output 4 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 3
	Output 3 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 2
	Output 2 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 1
	Output 1 over-temperature error or short-circuited: 0=there isn't; 1=there is			/	Bit 0
Errors Out1-8 behavior	/	Bit	R/W		40041
	These bits aren't used			/	Bit [15:8]
	Output 8 behavior if bit40007.7=1: 0=output is kept at the previous value; 1=bit40042.7 is overwritten on bit40005.7 and reg.00024			1	Bit 7
	Output 7 behavior if bit40007.6=1: 0=output is kept at the previous value; 1=bit40042.6 is overwritten on bit40005.6 and reg.00023			1	Bit 6
	Output 6 behavior if bit40007.5=1: 0=output is kept at the previous value; 1=bit40042.5 is overwritten on bit40005.5 and reg.00022			1	Bit 5
	Output 5 behavior if bit40007.4=1: 0=output is kept at the previous value; 1=bit40042.4 is overwritten on bit40005.4 and reg.00021			1	Bit 4
	Output 4 behavior if bit40007.3=1: 0=output is kept at the previous value; 1=bit40042.3 is overwritten on bit40005.3 and reg.00020			1	Bit 3
	Output 3 behavior if bit40007.2=1: 0=output is kept at the previous value; 1=bit40042.2 is overwritten on bit40005.2 and reg.00019			1	Bit 2
	Output 2 behavior if bit40007.1=1: 0=output is kept at the previous value; 1=bit40042.1 is overwritten on bit40005.1 and reg.00018			1	Bit 1
	Output 1 behavior if bit40007.0=1: 0=output is kept at the previous value; 1=bit40042.0 is overwritten on bit40005.0 and reg.00017			1	Bit 0
Errors Out1-8 safe values	/	Bit	R/W		40042
	These bits aren't used			/	Bit [15:8]

	Output 8 safe value: 0; 1	0	Bit 7
	Output 7 safe value: 0; 1	0	Bit 6
	Output 6 safe value: 0; 1	0	Bit 5
	Output 5 safe value: 0; 1	0	Bit 4
	Output 4 safe value: 0; 1	0	Bit 3
	Output 3 safe value: 0; 1	0	Bit 2
	Output 2 safe value: 0; 1	0	Bit 1
	Output 1 safe value: 0; 1	0	Bit 0

State OUT1-OUT8		Bit	R/W		40005
	These bits aren't used			/	Bit [15:8]
	Output OUT8 state: 0=LOAD8 is deactivated (there is no current through LOAD8); 1=LOAD8 is activated (there is current through LOAD8)			0	Bit 7
	Output OUT7 state: 0=LOAD7 is deactivated (there is no current through LOAD7); 1=LOAD7 is activated (there is current through LOAD7)			0	Bit 6
	Output OUT6 state: 0=LOAD6 is deactivated (there is no current through LOAD6); 1=LOAD6 is activated (there is current through LOAD6)			0	Bit 5
	Output OUT5 state: 0=LOAD5 is deactivated (there is no current through LOAD5); 1=LOAD5 is activated (there is current through LOAD5)			0	Bit 4
	Output OUT4 state: 0=LOAD4 is deactivated (there is no current through LOAD4); 1=LOAD4 is activated (there is current through LOAD4)			0	Bit 3
	Output OUT3 state: 0=LOAD3 is deactivated (there is no current through LOAD3); 1=LOAD3 is activated (there is current through LOAD3)			0	Bit 2
	Output OUT2 state: 0=LOAD2 is deactivated (there is no current through LOAD2); 1=LOAD2 is activated (there is current through LOAD2)			0	Bit 1
	Output OUT1 state: 0=LOAD1 is deactivated (there is no current through LOAD1); 1=LOAD1 is activated (there is current through LOAD1)			0	Bit 0
Timeout enabling		Bit	R/W		40052
	These bits aren't used			/	Bit [15:1]
	RS485-bus communication failure diagnostics: 0=deactivated; 1=activated			0	Bit 0
Timeout	From 0x00=0 to 0xFF=255 (=25.5 sec)	Bit	R/W		40053
	These bits aren't used			/	Bit [15:8]
	Timeout [sec/10] (if reg.40052 is "1"): it is the interval time of RS485-bus communication failure, after which the bit 40042.X is overwritten in the bit 40005.X (with X=0;7)			100 (=10sec)	Bit [7:0]

The «Coil Status»-type registers used for ZC-16DI-8DO module are shown in the following table:

Name	Range	Interpretation of register	R/W	Default	Address
State IN1	0-1	Bit	R		00001
	IN1 state: 0=S1 open; 1=S1 closed			/	
State IN2	0-1	Bit	R		00002

	IN2 state: 0=S2 open; 1=S2 closed			/	
State IN3	0-1	Bit	R		00003
	IN3 state: 0=S3 open; 1=S3 closed			/	
State IN4	0-1	Bit	R		00004
	IN4 state: 0=S4 open; 1=S4 closed			/	
State IN5	0-1	Bit	R		00005
	IN5 state: 0=S5 open; 1=S5 closed			/	
State IN6	0-1	Bit	R		00006
	IN6 state: 0=S6 open; 1=S6 closed			/	
State IN7	0-1	Bit	R		00007
	IN7 state: 0=S7 open; 1=S7 closed			/	
State IN8	0-1	Bit	R		00008
	IN8 state: 0=S8 open; 1=S8 closed			/	
State IN9	0-1	Bit	R		00009
	IN9 state: 0=S9 open; 1=S9 closed			/	
State IN10	0-1	Bit	R		00010
	IN10 state: 0=S10 open; 1=S10 closed			/	
State IN11	0-1	Bit	R		00011
	IN11 state: 0=S11 open; 1=S11 closed			/	
State IN12	0-1	Bit	R		00012
	IN12 state: 0=S12 open; 1=S12 closed			/	
State IN13	0-1	Bit	R		00013
	IN13 state: 0=S13 open; 1=S13 closed			/	
State IN14	0-1	Bit	R		00014
	IN14 state: 0=S14 open; 1=S14 closed			/	
State IN15	0-1	Bit	R		00015
	IN15 state: 0=S15 open; 1=S15 closed			/	
State IN16	0-1	Bit	R		00016
	IN16 state: 0=S16 open; 1=S16 closed			/	
State OUT1	0-1	Bit	R/W		00017
	Output OUT1 state: 0=LOAD1 is deactivated (there is no current through LOAD1); 1=LOAD1 is activated (there is current through LOAD1)			0	
State OUT2	0-1	Bit	R/W		00018
	Output OUT2 state: 0=LOAD2 is deactivated (there is no current through LOAD2); 1=LOAD2 is activated (there is current through LOAD2)			0	
State OUT3	0-1	Bit	R/W		00019
	Output OUT3 state: 0=LOAD3 is deactivated (there is no current through LOAD3); 1=LOAD3 is activated (there is current through LOAD3)			0	
State OUT4	0-1	Bit	R/W		00020
	Output OUT4 state: 0=LOAD4 is deactivated (there is no current through LOAD4); 1=LOAD4 is activated (there is current through LOAD4)			0	
State OUT5	0-1	Bit	R/W		00021
	Output OUT5 state: 0=LOAD5 is deactivated (there is no current through LOAD5); 1=LOAD5 is activated (there is current through LOAD5)			0	
State OUT6	0-1	Bit	R/W		00022
	Output OUT6 state: 0=LOAD6 is deactivated (there is no current through LOAD6); 1=LOAD6 is activated (there is current through LOAD6)			0	
State OUT7	0-1	Bit	R/W		00023
	Output OUT7 state: 0=LOAD7 is deactivated (there is no current through LOAD7); 1=LOAD7 is activated (there is current through LOAD7)			0	

State OUT8	0-1	Bit	R/W		00024
	Output OUT8 state: 0=LOAD8 is deactivated (there is no current through LOAD8); 1=LOAD8 is activated (there is current through LOAD8)			0	

LEDs for signalling

In the front-side panel there are 28 LEDs and their state refers to important operating conditions of the module.

LED	LED status	Meaning
PWR	Constant light	The power is on
FAIL	Constant light	The module received a data packet through RS232 port
	Blinking light	The module has at least one of the errors described in RS485 Registers table (at least one output over-temperature error or short-circuited)
ERR (TX)	Constant light	Verify if the bus connection is corrected
	Blinking light	The module sent a data packet
RUN (RX)	Blinking light	The module received a data packet
	Constant light	Verify if the bus connection is corrected
1-16	Constant light	IN1-16 state equal to «1»
	No light	IN1-16 state equal to «0» (if the power is on)
1O-8O	Constant light	OUT1-8 state equal to «1»
	No light	OUT1-8 state equal to «0» (if the power is on and the outputs are supplied)

Easy-SETUP

To configure the Seneca Z-PC Line modules, it is possible to use Easy-SETUP software,

Free-downloadable from the www.seneca.it; the configuration can be performed by RS232 or RS485 bus communication.