

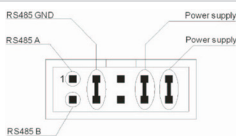
### General Features



The Z-10-D-IN data acquisition module accepts up to 10 digital inputs from a wide variety of standard sensors. High speed and robust ModBus RS485 serial communications offers almost universal connectivity. Connections to inputs are via high quality plug in screw terminals. Power and comms connections are made using the innovative "QuickFix" bus system. This passive bus clips into standard DIN rail and provides both the power and serial communications connections. Modules can be freely added and removed from the bus without interruption of the communications or power to other modules

### Electrical connections

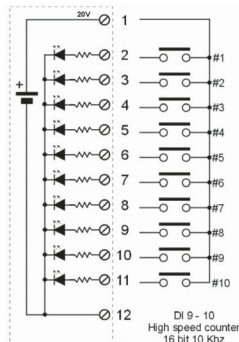
#### Power & serial interface



#### QuickFix Bus

The Power and Serial interface connections are available on a recessed plug in the base of the unit. The QuickFix bus clips into 35mm DIN rail and is designed to allow fast, easy installation of a group of modules. It also allows convenient hot swapping of modules. The bus pinouts are shown for information only. Supply must be within the specified tolerance of 19 to 40 Vdc (not polarity conscious), or 19 to 28 Vac. **Failure to observe these precautions will result in serious damage to the instrument.** The equipment must be protected by a suitably sized fuse.

#### Inputs



The inputs may be powered from the supply at Terminal 1. The negative side of all the inputs are commoned together internally and brought out on terminal 12(GND). The current draw of a closed input is 7mA

### Technical Specifications

ELECTRICAL		MECHANICAL DATA	
<b>Power Supply</b>	19 – 40 Vdc / 19 – 28 Vac / 50-60 Hz; 9-28 Vdc option	<b>Operating Temperature</b>	0 ~ +55 °C
<b>Power Consumption</b>	Max 2.5W; 1.6W @ 24 Vdc	<b>Storage Temperature</b>	-20 ~ +70 °C
<b>Isolation</b>	1,500 Vac between inputs // all other low voltage circuits	<b>Humidity</b>	30 ~ 90% @ +40 °C (non condensing)
<b>Overload Protection</b>	Inputs protected transients up to 400 W/ms	<b>Dimensions</b>	17.5 x 100 x 112 mm (WxHxD)
<b>Power Supply Transients</b>	Transient protection to 400 W/ms	<b>Weight</b>	140 g Approx
<b>Transducer Power Supply</b>	20 Vdc @80mA max	<b>Case</b>	Nylon 6, 30% fibreglass filled – Self Extinguishing class V0
<b>Status Indicators</b>	<ul style="list-style-type: none"> <li>Power ON</li> <li>Error</li> <li>Data Transmit (Tx)</li> <li>Data Receive (Rx)</li> <li>10 Input status</li> </ul>	<b>Hot swapping</b>	Yes
<b>Installation Category</b>	II	<b>Connections</b>	Plug in, screw terminals for 2.5mm <sup>2</sup> conductors (max)
<b>Pollution Category</b>	2	<b>Mounting</b>	Symmetrical 35mm DIN rail (Top Hat section)
<b>Ingress Protection</b>	IP20		
COMMUNICATIONS, PROCESSING, MEMORY		SIGNALS & MEASUREMENT	
<b>Interface</b>	2 wire RS485 serial comms	<b>Number of Channels</b>	10 optoisolated inputs
<b>Baud Rates</b>	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600 bps	<b>Type</b>	<ul style="list-style-type: none"> <li>10 optoisolated inputs suitable for reed switches, PNP &amp; NPN Proximity switches, contact closure.</li> <li>8 inputs with 16 bit counters at a max frequency of 100Hz</li> <li>2 inputs with 32 bit counters at a max frequency of 10kHz</li> </ul>
<b>Parity</b>	Selectable as None, Even, Odd	<b>Range</b>	
<b>Protocol</b>	ModBUS RTU slave	<b>Input Impedance</b>	
<b>Message turn round time</b>	< 10 ms (@ 38,400 baud)	<b>Resolution</b>	
<b>Input Sample Time</b>	-	<b>Accuracy</b>	
<b>Communication Distance</b>	1, 200 m maximum without line repeater	<b>Linearity</b>	
<b>Connectivity</b>	Max 32 nodes	<b>Stability</b>	
<b>Data Retention</b>	EEPROM storage of configuration parameters, minimum 10 years retention	<b>Response time</b>	
		<b>Other Features</b>	<ul style="list-style-type: none"> <li>Measures Frequency to 10 kHz</li> <li>Measures Period, Frequency, Ton and Toff to 100Hz</li> <li>Count on leading or trailing edge</li> <li>Overflow indication on all counters</li> </ul>
Configurations & standards			
<b>Programming software</b>	Configure and set online parameters via the serial connection with the Z-PROG package or Ethernet with the Z-NET package	<b>Standards CE</b>	EN50081-2, EN 55011, EN 50082-2, EN 61000-2-2/4, EN 50140/141, EN 61010-1, EN 60742

# Z-PC Line

## Z-10-D-IN

### RS485 Modbus Module 10 Digital Inputs

## Installation Manual



- Contents:**
- General Specifications
  - Technical Specifications
  - Installation Rules
  - Electrical connections
  - Modbus connection rules
  - DIP-switches settings
  - Digital inputs
  - Leds Signallings
  - Factory Settings

**SENECA s.r.l.**  
Via Germania, 34 - 35127 - Z.I. CAMIN - PADOVA - ITALY  
Tel. +39.049.8705355 - 8705359 - Fax +39.049.8706287  
For a manuals and configuration software, see [www.seneca.it](http://www.seneca.it)

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### General Specifications

- 10 digital inputs with self-powered 16V DC shared negative pole.
- Removable terminals with section of 2.5 mm<sup>2</sup>
- Input protection by 600W/ms TVS transient current suppressers..
- 8 inputs with 16 bit contactor with 100 Hz max. frequency.
- 2 inputs with 32 bit contactor with 10 kHz max. frequency.
- Frequency measurement for 10 kHz inputs.
- Period, frequency and TON, TOFF measurement for 100 Hz inputs.
- Possibility to set total counters for forward or backward counting.
- Overflow indication for each total counter.
- Possibility of ON-LINE configuration.
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- 150V<sub>ac</sub> input insulation with respect to remaining low voltage circuits.
- Power supply and serial connection wiring facilitated by means of a bus that can be housed in the DIN guide.
- Insertion and extraction of bus without interruption of communication or system power supply.
- Communication times below 10 ms (@ 38400 Baud).
- Connection distance up to 1200 m.
- DIP-Switch settings for Modbus speed and address, and for RS485 line termination.

### Technical Specifications

INPUTS	
Type input	Reed, Contact, Proximity PNP, NPN (with external resistor) etc...
Number of Channels	8 + 2
Maximum Counters frequency	10 kHz only for 9 e 10 inputs
U <sub>L</sub> (state OFF)	0 ..10 V <sub>DC</sub> , I < 2 mA
U <sub>H</sub> (state ON)	12 ..30 V <sub>DC</sub> , I > 3 mA
Absorbed Current	3 mA (for each input)
Minimum Pulse width	4 ms for 1 ..8 inputs, and 50 μs for 9 ..10 inputs
Measurement error and resolution	Frequency: 2% of the value for inputs 9 e 10, ± 2 Hz for inputs 1 ..8. Period, Ton, Toff.: Resolution 1 ms error = 2%

POWER SUPPLY	
Voltage	10 ..40 V <sub>DC</sub>
	19 ..28 V <sub>AC</sub> a 50 ..60 Hz
Consumption	Typical: 1.5 W, Max: 2.5 W

ENVIRONMENTAL CONDITION	
Temperature	-10 ..+65°C (-10 ..+55 °C UL)
Humidity	30 ..90% a 40°C non condensing
Altitude	Up to 2000 m a.s.l.
Storage Temperature	-20 ..+85°C
Protection	IP20

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

DIMENSIONS / BOX	
Dimension	L: 100 mm; H: 112 mm; W: 17,5 mm
Box	PBT, Black

ISOLATIONS	
1500 V	

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 2.5A shall be installed in the field.

### 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 next 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 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-DINAL2-1,75 accessory.

**Rear Connector (IDC10)**

In the figure the meaning of the IDC10 connector pins is showed, in the case the user decides to provide the signals directly through it.

**Z-PC-DINAL2-1,75 Accessory Use**

In case of Z-PC-DINAL2-1,75 accessory use, the signals may be provided by terminal blocks. The figure shows the meaning of the terminals and the position of the DIP-switch (present on each DIN rail supports listed on Accessories) for network termination (not used in case of Modbus network).  
GNDSHLD: Shield to protect the connection cables (recommended).

### DIGITAL INPUTS

REED, PROXIMITY PNP, NPN, and contact-type sensors can be connected to the input terminals. The power supply for these sensors can be taken directly from Terminal 1 (+16V). All the inputs are connected in shared connection to Terminal 12 (GND). The current that flows through a closed input is approx. 3 mA.

Inputs #1.. #8: 0..100 Hz      Input #9 and #10: 0.. 10kHz

### Modbus 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: Modbus 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 2 m(see Scheme 1).

Bus lenght	Drop lenght
1200 m	2 m

**Scheme 1**

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

### DIP-switch settings

The DIP-switches position defines the module 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:

DIP SWITCH STATUS			
POSITION	BAUD RATE	POSITION	ADDRESS
00xxxxxxx	9600	xx000001xx	# 1
01xxxxxxx	19200	xx000010xx	# 2
10xxxxxxx	38400	.....	.....
11xxxxxxx	57600	xx111111xx	# 63

POSITION	BAUD RATE	POSITION	ADDRESS
xx000000	From EEprom	xx000000	From EEprom

**Note:** when switches from 3 to 8 are in OFF, communication settings are retrieved from EEprom

### Digital Inputs

#### MODBUS REGISTERS

Registers	Name	Description
40002	OVERFLOW, INPUT	Input status is available in the following bits: Input 1: 40002.0 Input 2: 40002.1 Input 3: 40002.2 Input 4: 40002.3 Input 5: 40002.4 Input 1: 40002.5 Input 2: 40002.6 Input 3: 40002.7 Input 4: 40002.8 Input 5: 40002.9
40003	TOTAL 1	16 bit totalizer of input 1 . The overflow is signalled on bit 40015.0
40004	TOTAL 2	16 bit totalizer of input 2 . The overflow is signalled on bit 40015.1
40005	TOTAL 3	16 bit totalizer of input 3 . The overflow is signalled on bit 40015.2

40006	TOTAL 4	16 bit totalizer of input 4 . The overflow is signalled on bit 40015.3
40007	TOTAL 5	16 bit totalizer of input 5 . The overflow is signalled on bit 40015.4
40008	TOTAL 6	16 bit totalizer of input 6 . The overflow is signalled on bit 40015.5
40009	TOTAL 7	16 bit totalizer of input 7 . The overflow is signalled on bit 40015.6
40010	TOTAL 8	16 bit totalizer of input 8 . The overflow is signalled on bit 40015.7
40011	TOTAL 9 Parte bassa	Lower part of the total counter with 32 bit (signed) for input 9
40012	TOTAL 9 Parte alta	Upper part of the total counter with 32 bit (signed) for input 9. Overflow is signalled on bit 40015.8
40013	TOTAL 10 Parte bassa	Lower part of the total counter with 32 bit (signed) for input 10
40014	TOTAL 10 Parte alta	Upper part of the total counter with 32 bit (signed) for input 10. Overflow is signalled on bit 40015.9
40015	OVERFLOW	Overflow of the total counters is available in the following bits: input 1: 40015.0 input 5: 40015.4 input 9: 40015.8 input 2: 40015.1 input 6: 40015.5 input 10: 40015.9 input 3: 40015.2 input 7: 40015.6 input 4: 40015.3 input 8: 40015.7 NOTE: The overflow bit MUST BE reset by the master.

### Inputs status

Registers	Name	Description
10001	INPUT 1	Active status input 1. See 40002.0
10002	INPUT 2	Active status input 2. See 40002.0
10003	INPUT 3	Active status input 3. See 40002.0
10004	INPUT 4	Active status input 4. See 40002.0
10005	INPUT 5	Active status input 5. See 40002.0
10006	INPUT 6	Active status input 6. See 40002.0
10007	INPUT 7	Active status input 7. See 40002.0
10008	INPUT 8	Active status input 8. See 40002.0
10009	INPUT 9	Active status input 9. See 40002.0
10010	INPUT 10	Active status input 10. See 40002.0

### Coil registers

### Registers

Registers	Name	Description
00017	OFFTOTAL 1	Overflow input 1 totalizer.
00018	OFFTOTAL 2	Overflow input 2 totalizer.
00019	OFFTOTAL 3	Overflow input 3 totalizer.
00020	OFFTOTAL 4	Overflow input 4 totalizer.
00021	OFFTOTAL 5	Overflow input 5 totalizer.
00022	OFFTOTAL 6	Overflow input 6 totalizer.
00023	OFFTOTAL 7	Overflow input 7 totalizer.
00024	OFFTOTAL 8	Overflow input 8 totalizer.
00025	OFFTOTAL 9	Overflow input 9 totalizer.
00026	OFFTOTAL 10	Overflow input 10 totalizer.

### LEDS Signallings

LED	STATE	Meaning of LEDS
PWR	On	Power supply presence.
FAIL	Blinking	Error settings.
	On	Fault/Failure.
RX	Blinking	Received data from RS485.
	On	Verify the connection.
TX	Blinking	Received data from RS485.
	On	Verify the connection.

### Factory settings

- All DIP-switch OFF:**
- Modbus Protocol / - Communication parameters: 38400 8,N,1 Addr. 1
  - Inversion input status : DISABLE
  - Digital filter : 3 ms
  - Totalizators : UP counter
  - Modbus latency time : 5 ms

Variation of standard parameters are possible by using configuration software Z-NET and EASY-Z-PC [www.seneca.it](http://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 product 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 disposed 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.