

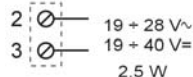
General Features



The Z-4TC data acquisition module allows the simultaneous acquisition of up to 4 thermocouple or low level voltage signals. Each channel can be configured to a different thermocouple type and selectable software filters ensure reliable values from real world applications. High speed and robust ModBus RS485 serial communications offers almost universal connectivity. Connections are via quality, plug in screw terminals although enormous savings can be 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

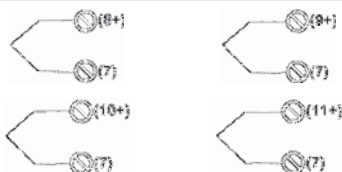
Electrical connections

Power



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

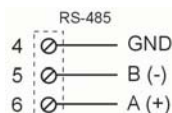


Please Note:- the negative terminals (7 & 12) are internally connected, so care must be taken to maintain electrical isolation between the thermocouple hot junctions. This is normally achieved by using standard isolated junction thermocouple assemblies, or by careful installation of grounded junction sensors.

Serial Interface

QuickFix Bus

The Power and Serial interface connections are also 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. Also allows hot swapping of modules.



Technical Specifications

ELECTRICAL

Power Supply	19 – 40 Vdc / 19 – 28 Vac / 50-60 Hz 9-28 Vdc option
Power Consumption	Max 2.5W; 1.6W @ 24 Vdc
Isolation	1,500 Vac between inputs // all other low voltage circuits
Overload Protection	Inputs protected against overloads to 60 V
Power Supply Transients	Transient protection to 400 W/ms
Transducer Power Supply	None
Status Indicators	<ul style="list-style-type: none"> Power ON Error Data Transmit (Tx) Data Receive (Rx)
Installation Category	II
Pollution Category	2
Ingress Protection	IP20

MECHANICAL DATA

Operating Temperature	0 ~ +55 °C
Storage Temperature	-20 ~ +70 °C
Humidity	30 ~ 90% @ +40 °C (non condensing)
Dimensions	17.5 x 100 x 112 mm (W x H x D)
Weight	140 g Approx
Case	Nylon 6, 30% fibreglass filled – Self Extinguishing class V0
Hot swapping	Yes
Connections	Plug in, screw terminals for 2.5mm ² conductors (max)
Mounting	Symmetrical 35mm DIN rail (Top Hat section)

COMMUNICATIONS, PROCESSING, MEMORY

Interface	2 wire RS485 serial comms
Baud Rates	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600 bps
Parity	None, even, odd
Protocol	ModBUS RTU slave
Message turn round time	< 20 ms (@ 38400 baud)
Input Sample Time	200 / 400 ms (to update all 4 channels))
Communication Distance	1, 200 m maximum without line repeater
Connectivity	Max 32 nodes
Data Retention	EEPROM storage of configuration parameters, minimum 10 years retention

SIGNALS & MEASUREMENT

Number of Channels	4
Type	<ul style="list-style-type: none"> Thermocouples: J, K, R, S, T, B, E, N Voltage: Bipolar
Range	± 80 mVdc
Input Impedance	> 10MΩ
Resolution	5µV (10µV @ 14 bit)
Accuracy	0.1% of range
Linearity	0.02%
Stability	<ul style="list-style-type: none"> Thermal stability : 0.01%/°C
Response time	-
Other Features	Thermocouple burnout detection Cold Junction Compensation Selectable input filter (1-60 sec)

Configurations & standards

Programming software	Configure and set online parameters via serial connection with the Z-Setup package or Ethernet with the Z-NET package (requires Z-TWS)														
DIP Switch	Force default communication parameters														
Accessories & options	9-28Vdc														
Standards CE	<table border="0"> <tr> <td>EN50081-2</td> <td>EN</td> </tr> <tr> <td>55011</td> <td></td> </tr> <tr> <td>EN 50082-2</td> <td>EN</td> </tr> <tr> <td>61000-2-2/4</td> <td></td> </tr> <tr> <td>EN 50140/141</td> <td>EN</td> </tr> <tr> <td>61010-1</td> <td></td> </tr> <tr> <td>EN 60742</td> <td></td> </tr> </table>	EN50081-2	EN	55011		EN 50082-2	EN	61000-2-2/4		EN 50140/141	EN	61010-1		EN 60742	
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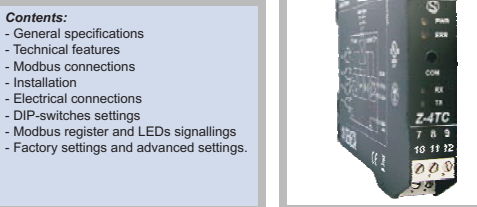
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Z-PC Line

Z-4TC

4 ANALOG INPUT for Thermocouple with Modbus RS485

Installation Manual



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GENERAL SPECIFICATIONS

- Up to 4 input for measuring thermocouples type J, K, E, N, S, R, B, T.
- Up to 4 input for measuring mV voltage input.
- Sampling time for channels at 240 ms or 480 ms for all channels.
- 1500 V_{ac} input 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 mm²
- RS485 serial communication with Modbus-Rtu protocol, maximum 64 nodes.
- Module insertion or extraction from seneca bus without interruption for serial communication and power supply.
- Connection distance up to 1200 m.
- RS232 connection on front from 3.5 mm jack connector.
- Low consumption.
- NEW** Modbus address and baud rate can be set through DIP-switches.
- Input measure can be set in temperature or mV.
- Programmable filters to stabilize the measured input.
- Cold junction compensation internal.
- Mains electric network frequency rejection > 54 dB.

TECHNICAL FEATURES

Thermocouples inputs	
Thermocouples input	J, K, E, N, S, R, B, T.
Number of channel	4
Cold junction error	< 2 °C between 0 .. 50 °C
Input impedance	>10 MΩ
Current test (TC open)	< 200 nA, disactivable
DMRR	> 60 dB (50 Hz); > 54 dB (60 Hz).
Thermal Drift	< 50 ppm/K
Thermocouples Errors	Calibration : 0.1% d.l.; Thermal sense : 0.01%/°C; EMC : 1% d.s.
Sampling time	60 ms / channel o 120 ms / channel
mV-input	
Voltage input	Bipolar with ± 160 mV range
Input impedance	> 10MΩ
Resolution	5 μV
mV error	Calibration : 0.1% d.l.; Thermal sense : 0.01%/°C; EMC : 1% d.s.

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
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

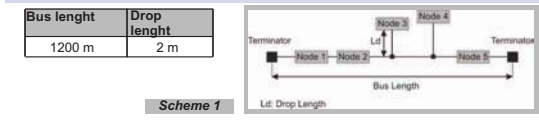
Isolations 1500 V	

Standards	
	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".

SUPPLEMENTARY NOTE FOR USE:
Use in environment with 2 or less pollution degree.

MODBUS CONNECTIONS

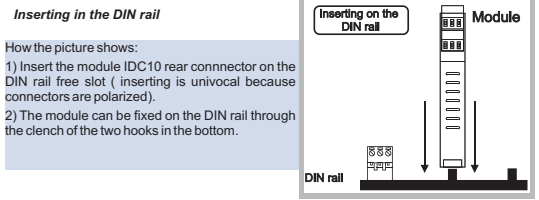
1) Connect the module into the DIN rail (max 120)
2) Use a cable with a suitable length to connect the remote modules. In the following table there are data relative to:
- Maximum length of the Modbus bus: it defines the connection length between two modules that have bus terminator dip switch on. (see scheme 1).
- Drop length: Maximum length of branch (see scheme 1).



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

INSTALLATION

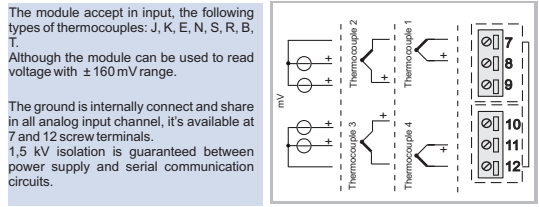
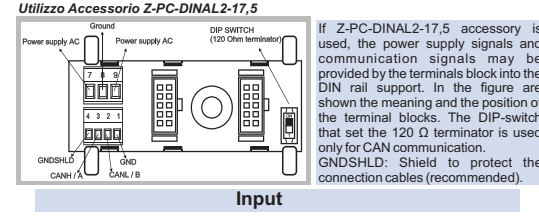
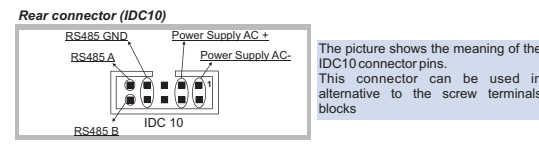
The module is designed to be installed, in vertical position, on DIN 46277 rail. For the best module performance and duration, avoid to place cables raceways and other objects that could obstruct ventilation slits.
Never install the modules near heat sources. The module installation is adviced in the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



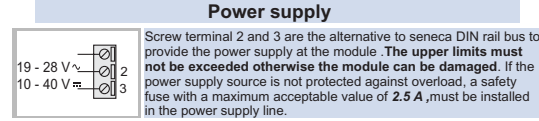
ELECTRICAL CONNECTIONS

Power supply and Modbus interface

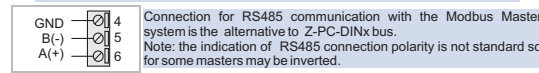
Power Supply and Modbus interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL2-17.5 accessory.



NOTE: To avoid measurement errors caused by external disturbances are recommended short-circuit the thermocouple input channels not used.



RS485

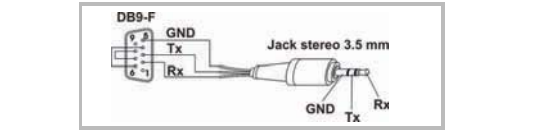


RS232

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 not be 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
00xxxxxxx	9600	xx00001xx	# 1
01xxxxxxx	19200	xx000010xx	# 2
10xxxxxxx	38400
11xxxxxxx	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, communication settings are retrieved from EEprom
Note 2: The termination of RS485 communication must be enabled only to the ends of the communication line.

MODBUS REGISTER AND LED SIGNALLINGS

Holding register

Register	Name	Description
40013	CH 1	Measured value of channel selected input. 1 bit = 5 μ or 0.1 °C
40014	CH 2	See before.
40015	CH 3	See before.
40016	CH 4	See before.

LEDs signalling

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	Transmitted data from RS485.
	On	Out of order

FACTORY SETTING AND ADVANCED SETTING

Factory settings

Tutti i DIP-switch in OFF.
- Modbus protocol: - Communication parameters: 38400 8,N,1 Addr. 1
- Input channel 1 : mV
- Input channel 2 : mV
- Input channel 3 : mV
- Input channel 4 : mV
- Signal sampling time for all channels: 280 ms

Advanced settings

- Inputs channels can be sete in current or voltage.
- Signal sampling time can be set at 240 ms or 480 ms.
- Possibility to set a filters for the inputs measured.
- Possibility to disable the current test for thermocouples.

THERMOCOUPLE RANGE

TC TYPE	Admitted Range	Linearization Error	TC TYPE	Admitted Range	Linearization Error
J	-210..1200 °C	0,05 °C	S	-50..1768 °C	0,02 °C
K	-200..1372 °C	0,05 °C	R	-50..1768 °C	0,02 °C
E	-200..1000 °C	0,02 °C	B	250..1820 °C ⁽³⁾	0,03 °C
N	-200..1300 °C	0,04 °C	T	-200..400 °C	0,04 °C

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

