

Z-PC-LINE **Z-8TC**

8 Ch.TC input module / RS485 Modbus

Z-PC LINE

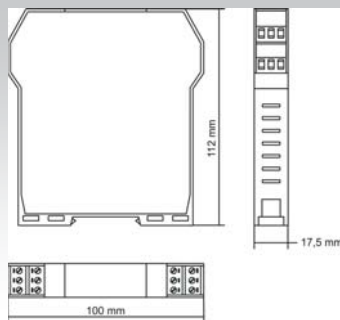
Analogue I/O modules



- ▶ INPUT: N.8 channels configurable as TC (J,K,E,N,S,R,B,T) or mV (-10,1..81,4mV)
- ▶ INTERFACE: RS485 serial communication with Modbus–RTU protocol,
- ▶ Each input is configured independently from the others
- ▶ Easy Dip-switch settings for address and baud rate
- ▶ ACCURACY: 0,05%
- ▶ Galvanic isolation @ 6-way
- ▶ Screw-fit terminals removable
- ▶ Din rail mounting
- ▶ Power supply: 10..40 Vdc, 19..28 Vac

TECHNICAL SPECIFICATIONS

Z-8TC_ 8 Ch. TC input module / RS485 Modbus



ELECTRICAL

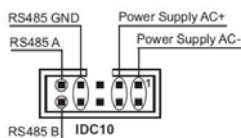
Power supply	10÷40Vdc, 19÷28 Vac
Max consumption	0,6 W
Isolation	6-way @ 1.500 Vac
Input protection	According norms in force
Supply protection	400 W/ms
Status indicators	Power Supply Error Data sending Data receiving
Installation class	II
Pollution rating	2
Protection rating	IP20

THERMOMECHANICS

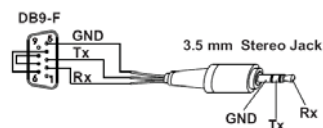
Operating temperature	-10..+65 °C
Storage temperature	-20..+85°C
Humidity	30..90% at +40°C (non condensing)
Dimensions	17,5 x 100 x 112 mm
Weight	140 g
Case	V0 self-extinguish fiber glass filled
Hot swapping	Yes
Connection	Plug-in screw clamp terminal blocks, wires up to 1,5 mm ² IDC10 backplane connector for DIN guide RS232 (COM) communication front jack
Mounting	35 mm DIN 46277

SERIAL CONNECTIONS

POWER SUPPLY AND RS485 SERIAL PORT



RS232 SERIAL PORT (DB9-stereo jack 3,5 mm connection cable)



ORDER CODES

Code	Description
Model	Z-8TC 8 TC input module / Rs485 ModBUS
Software	Z-PROG, Z-NET Configuration sw downloading from www.seneca.it
Bus accessories	Z-PC DINAL (Terminal block for power & RS485 communication) Z-PC DIN2 Z-PC DIN4 Z-PC DIN8 (2, 4, 8 slot block)
Cable	PM001600 cable for programming
K-LINE modules	K107A (RS485 repeater), K107B (RS232-RS485 converter), K107USB (USB-RS485 din rail mounting), S107USB (portable)

COMMUNICATION, PROCESSING, MEMORY

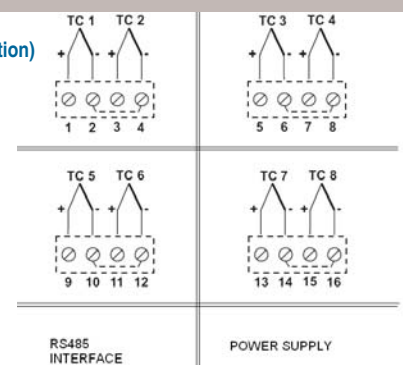
RS485 interface	2 wires, speed rate: 1.200..115 kbaud
RS232 interface	Jack port, baud rate 2.400, data 8 bit, no parity, 1 bit stop
Protocol	ModBUS RTU Slave
Disturbance rejection	Settable form 50 to 60 Hz
Max distance	1.200 m
Connectivity	Max 32 nodes
Data store	EEPROM, 40 years

SIGNALS, MEASURE, CONFIGURATION, NORMS

Input channels	8
Input type	4 clamp -Thermocouple types: J, K, E, N, S, R, B, T EN60584-1 (ITS-90). - mV: from -10,1..81,4mV
Thermal drift	< 100 ppm/K
Cold junction error	< 1°C
ADC resolution	14 or 15 bit
Impedance	10 MOhm
Temperature range	Dependent on Thermocouple type
Software configuration	Serial (RS232/485) or ethernet (Z-NET) paramaters setup
Other functions	Yes
DIP switch	Communication parameters
Norms	EN 61000-6-4/2002, EN 61000-6-2002, EN 61010, EN 60742

ELECTRICAL CONNECTIONS

INPUTS (6 way galvanic isolation)



MODBUS REGISTERS

Z-8TC has MODBUS 16 bits (words) registers, accessible by RS485 or RS232 serial communication. In the next paragraphs, we shall describe the supported MODBUS commands, and the functions of the registers.

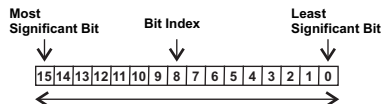
Supported MODBUS Commands

Code	Function	Description
03 (*)	Read Holding Registers	Reading of word registers up to 32 at a time.
04 (*)	Read Input Registers	Reading of word registers up to 32 at a time.
06	Write Single Register	Writing of a word register.
16	Write Multiple Registers	Writing of word registers up to 32 at a time.

(*) The two functions have the same effect.

Holding Registers

The 16-bit Holding Registers have the following structure:



In the table the notation Bit [x:y] indicates all bits from x to y. For example Bit [2:1] indicates bit 2 and bit 1, and serves to illustrate the meaning of the various united combinations of the values of the two bits. Remember that MODBUS functions 3, 4, 6 and 16, of single or multiple writing and reading, can be executed in the following registers. Default values are indicated with the * symbol.

REGISTER	Description	ADD.	R/W
MACHINE ID	Bit [15:8]: contain the module's ID: 24. Bit [7:0]: contain the firmware's revision.	40001	R
STATUS_INP	Status of input channels.	40002	R
Bit 15	1: Fault on channels 1 and 2.		
Bit 14	1: Fault on channels 3 and 4.		
Bit 13	1: Fault on channels 5 and 6.		
Bit 12	1: Fault on channels 7 and 8.		
Bit 11	1: Fault on the TC connected to channel 1.		

Bit 10	1: Fault on the TC connected to channel 2.		
Bit 9	1: Fault on the TC connected to channel 3.		
Bit 8	1: Fault on the TC connected to channel 4.		
Bit 7	1: Fault on the TC connected to channel 5.		
Bit 6	1: Fault on the TC connected to channel 6.		
Bit 5	1: Fault on the TC connected to channel 7.		
Bit 4	1: Fault on the TC connected to channel 8.		
Bit 3	1: Communication Error with channels 1 and 2.		
Bit 2	1: Communication Error with channels 3 and 4.		
Bit 1	1: Communication Error with channels 5 and 6.		
Bit 0	1: Communication Error with channels 7 and 8.		
CHAN1_TEN	Channel 1 measurement (tenths of °C or tenths of μV).	40003	R
Bit [15:0]	Temperature of channel 1 in tenths of °C (or voltage in tenths of μV).		
CHAN2_TEN	Channel 2 measurement (tenths of °C or tenths of μV).	40004	R
Bit [15:0]	Temperature of channel 2 in tenths of °C (or voltage in tenths of μV).		
CHAN3_TEN	Channel 3 measurement (tenths of °C or tenths of μV).	40005	R
Bit [15:0]	Temperature of channel 3 in tenths of °C (or voltage in tenths of μV).		
CHAN4_TEN	Channel 4 measurement (tenths of °C or tenths of μV).	40006	R
Bit [15:0]	Temperature of channel 4 in tenths of °C (or voltage in tenths of μV).		
CHAN5_TEN	Channel 5 measurement (tenths of °C or tenths of μV).	40007	R
Bit [15:0]	Temperature of channel 5 in tenths of °C (or voltage in tenths of μV).		
CHAN6_TEN	Channel 6 measurement (tenths of °C or tenths of μV).	40008	R
Bit [15:0]	Temperature of channel 6 in tenths of °C (or voltage in tenths of μV).		
CHAN7_TEN	Channel 7 measurement (tenths of °C or tenths of μV).	40009	R
Bit [15:0]	Temperature of channel 7 in tenths of °C (or voltage in tenths of μV).		

CHAN8_TEN	Channel 8 measurement (tenths of °C or tenths of μV).	40010	R
Bit [15:0]	Temperature of channel 8 in tenths of °C (or voltage in tenths of μV).		
CHAN1_FLOAT_H	Measurement of channel 1 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40011	R
Bit [15:0]	Temperature of channel 1 in °C or voltage in mV (MSW of the float).		
CHAN1_FLOAT_L	Measurement of channel 1 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40012	R
Bit [15:0]	Temperature of channel 1 in °C or voltage in mV (LSW of the float).		
CHAN2_FLOAT_H	Measurement of channel 2 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40013	R
Bit [15:0]	Temperature of channel 2 in °C or voltage in mV (MSW of the float).		
CHAN2_FLOAT_L	Measurement of channel 2 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40014	R
Bit [15:0]	Temperature of channel 2 in °C or voltage in mV (LSW of the float).		
CHAN3_FLOAT_H	Measurement of channel 3 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40015	R
Bit [15:0]	Temperature of channel 3 in °C or voltage in mV (MSW of the float).		
CHAN3_FLOAT_L	Measurement of channel 3 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40016	R
Bit [15:0]	Temperature of channel 3 in °C or voltage in mV (LSW of the float).		
CHAN4_FLOAT_H	Measurement of channel 4 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40017	R
Bit [15:0]	Temperature of channel 4 in °C or voltage in mV (MSW of the float).		
CHAN4_FLOAT_L	Measurement of channel 4 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40018	R
Bit [15:0]	Temperature of channel 4 in °C or voltage in mV (LSW of the float).		
CHAN5_FLOAT_H	Measurement of channel 5 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40019	R
Bit [15:0]	Temperature of channel 5 in °C or voltage in mV (MSW of the float).		

CHAN5_FLOAT_L	Measurement of channel 5 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40020	R
Bit [15:0]	Temperature of channel 5 in °C or voltage in mV (LSW of the float).		
CHAN6_FLOAT_H	Measurement of channel 6 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40021	R
Bit [15:0]	Temperature of channel 6 in °C or voltage in mV (MSW of the float).		
CHAN6_FLOAT_L	Measurement of channel 6 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40022	R
Bit [15:0]	Temperature of channel 6 in °C or voltage in mV (LSW of the float).		
CHAN7_FLOAT_H	Measurement of channel 7 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40023	R
Bit [15:0]	Temperature of channel 7 in °C or voltage in mV (MSW of the float).		
CHAN7_FLOAT_L	Measurement of channel 7 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40024	R
Bit [15:0]	Temperature of channel 7 in °C or voltage in mV (LSW of the float).		
CHAN8_FLOAT_H	Measurement of channel 8 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40025	R
Bit [15:0]	Temperature of channel 8 in °C or voltage in mV (MSW of the float).		
CHAN8_FLOAT_L	Measurement of channel 8 in floating point (see bit 15 of "AUX_SETTINGS" register: 40058).	40026	R
Bit [15:0]	Temperature of channel 8 in °C or voltage in mV (LSW of the float).		
STATUS_INP	Copy of register 40002 containing the status of the input channels.	40027	R
JUNCT_TEN_IN1_2	Cold Junction Temperature of channels 1 and 2.	40028	R
Bit [15:0]	Cold junction temperature of channels 1 and 2, in tenths of °C.		
JUNCT_TEN_IN3_4	Cold Junction Temperature of channels 3 and 4.	40029	R
Bit [15:0]	Cold junction temperature of channels 3 and 4, in tenths of °C.		
JUNCT_TEN_IN5_6	Cold Junction Temperature of channels 5 and 6.	40030	R
Bit [15:0]	Cold junction temperature of channels 5 and 6, in tenths of °C.		

JUNCT_TEN_IN7_8	Cold Junction Temperature of channels 7 and 8.	40031	R
Bit [15:0]	Cold junction temperature of channels 7 and 8, in tenths of °C.		
ERR_CH1-2_CH3-4	Errors: Channels 1, 2 (MSB), Channels 3, 4 (LSB).	40037	R
Bit 15	1: Power supply voltage error (channels 1 and 2).		
Bit 14	1: Reception Error (channels 1 and 2).		
Bit 13	1: EEPROM saving Error (channels 1 and 2).		
Bit 12	1: EEPROM saving blocked (channels 1 and 2).		
Bit [11:9]	Reserved.		
Bit 8	1: Reading Error CRC EEPROM (chan. 1 and 2).		
Bit 7	1: Power supply voltage error (channels 3 and 4).		
Bit 6	1: Reception Error (channels 3 and 4).		
Bit 5	1: EEPROM saving Error (channels 3 and 4).		
Bit 4	1: EEPROM saving blocked (channels 3 and 4).		
Bit [3:1]	Reserved.		
Bit 0	1: Reading Error CRC EEPROM (chan. 3 and 4).		
ERR_CH5-6_CH7-8	Errors: Channels 5, 6 (MSB), Channels 7, 8 (LSB).	40038	R
Bit 15	1: Power supply voltage error (channels 5 and 6).		
Bit 14	1: Reception Error (channels 5 and 6).		
Bit 13	1: EEPROM saving Error (channels 5 and 6).		
Bit 12	1: EEPROM saving blocked (channels 5 and 6).		
Bit [11:9]	Reserved.		
Bit 8	1: Reading Error CRC EEPROM (chan. 5 and 6).		
Bit 7	1: Power supply voltage error (channels 7 and 8).		
Bit 6	1: Reception Error (channels 7 and 8).		
Bit 5	1: EEPROM saving Error (channels 7 and 8).		
Bit 4	1: EEPROM saving blocked (channels 7 and 8).		
Bit [3:1]	Reserved.		
Bit 0	1: Reading Error CRC EEPROM (chan. 7 and 8).		
RESET	Module Reset.	40041	R/W
Bit [15:0]	Write value 0xCCCC to reset the module.		

ADDR ⁽⁶⁾⁽⁷⁾	Register for the setting of the module's address and parity control.	40052	R/W
Bit [15:8]	Set the module's address. Permissible values from 0x00 to 0xFF (decimal values in the interval of 0-255). Default address: 1.		
Bit [7:0]	Set the type of parity control: 00000000*: No parity (NONE) (Default) 00000001: Even parity (EVEN) 00000010: Odd parity (ODD)		
BAUDR ⁽⁶⁾⁽⁷⁾	Register for the setting of the baudrate and of the response delay time.	40053	R/W
Bit [15:8]	Set the value of the serial communication speed (baudrate): 00000000 (0x00): 4800 Baud 00000001 (0x01): 9600 Baud 00000010 (0x02): 19200 Baud 00000011* (0x03): 38400 Baud 00000100 (0x04): 57600 Baud 00000101 (0x05): 115200 Baud 00000110 (0x06): 1200 Baud 00000111 (0x07): 2400 Baud		
Bit [7:0]	Set the response delay time in characters that represents the number of pauses of 6 characters each to be entered between the end of the Rx message and the start of the Tx message. Default value: 0.		
CONF_CH1_CH2 ⁽⁶⁾	Configuration of Channels 1 and 2.	40054	R/W
Bit 15	Channel 1 Activation: 0: Channel 1 is not active. 1*: Channel 1 is active.		
Bit 14	Channel 2 Activation: 0: Channel 2 is not active. 1*: Channel 2 is active.		
Bit 13	Type of returned Data Item (Channels 1 and 2): 0*: Measurement in °C. 1: Measurement in mV.		
Bit 12	Cold Junction Compensation Channels 1 and 2: 0: not active 1*: active		
Bit 11	Rejection to mains frequency (Channels 1 and 2): 0*: 50 Hz 1: 60 Hz		

Bit [10:8]	Filter of channels 1 and 2 (for details, refer to the FILTER SETTING section): 000: Not present 001: Average filter Other settings in FILTER SETTING.		
Bit [7:4]	Thermocouple Type of Channel 1 (see THERMOCOUPLE TYPE Table). Default: Type J.		
Bit [3:0]	Thermocouple Type of Channel 2 (see THERMOCOUPLE TYPE Table). Default: Type J.		
CONF_CH3_CH4 ⁽⁶⁾	Configuration of Channels 3 and 4.	40055	R/W
Bit [15:0]	Register for the configuration of channels 3 and 4. See Register 40054, referring to channels 3 and 4 instead of channels 1 and 2.		
CONF_CH5_CH6 ⁽⁶⁾	Configuration of Channels 5 and 6.	40056	R/W
Bit [15:0]	Register for the configuration of channels 5 and 6. See Register 40054, referring to channels 5 and 6 instead of channels 1 and 2.		
CONF_CH7_CH8 ⁽⁶⁾	Configuration of Channels 7 and 8.	40057	R/W
Bit [15:0]	Register for the configuration of channels 7 and 8. See Register 40054, referring to channels 7 and 8 instead of channels 1 and 2.		
AUX_SETTINGS ⁽⁶⁾	Additional Configuration Register.	40058	R/W
Bit 15	Floating point interpretation: 0*: The high word of floating point is transmitted first, then the low word. 1: The low word of floating point is transmitted first, then the high word.		
Bit [14:8]	Reserved and not modifiable.		
Bit 7	Action in case of fault on channel 1: 0*: The temperature/voltage value is forced to the programmed fault value. 1: The temperature/voltage value is frozen at the last acquired value before fault is signalled.		
Bit 6	Action in case of fault on channel 2 (As Bit 7).		
Bit 5	Action in case of fault on channel 3 (As Bit 7).		
Bit 4	Action in case of fault on channel 4 (As Bit 7).		
Bit 3	Action in case of fault on channel 5 (As Bit 7).		
Bit 2	Action in case of fault on channel 6 (As Bit 7).		
Bit 1	Action in case of fault on channel 7 (As Bit 7).		
Bit 0	Action in case of fault on channel 8 (As Bit 7).		

VAL_FAULT_1 ⁽⁶⁾	Value loaded in case of fault on channel 1 (expressed as 40003) ⁽⁶⁾ Default: 2000.0.	40059	R/W
VAL_FAULT_2 ⁽⁶⁾	Value loaded in case of fault on channel 2 (expressed as 40004) ⁽⁶⁾ Default: 2000.0.	40060	R/W
VAL_FAULT_3 ⁽⁶⁾	Value loaded in case of fault on channel 3 (expressed as 40005) ⁽⁶⁾ Default: 2000.0.	40061	R/W
VAL_FAULT_4 ⁽⁶⁾	Value loaded in case of fault on channel 4 (expressed as 40006) ⁽⁶⁾ Default: 2000.0.	40062	R/W
VAL_FAULT_5 ⁽⁶⁾	Value loaded in case of fault on channel 5 (expressed as 40007) ⁽⁶⁾ Default: 2000.0.	40063	R/W
VAL_FAULT_6 ⁽⁶⁾	Value loaded in case of fault on channel 6 (expressed as 40008) ⁽⁶⁾ Default: 2000.0.	40064	R/W
VAL_FAULT_7 ⁽⁶⁾	Value loaded in case of fault on channel 7 (expressed as 40009) ⁽⁶⁾ Default: 2000.0.	40065	R/W
VAL_FAULT_8 ⁽⁶⁾	Value loaded in case of fault on channel 8 (expressed as 40010) ⁽⁶⁾ Default: 2000.0.	40066	R/W

TABLE: THERMOCOUPLE TYPE FOR THE SETTING OF REGISTERS 40054..40057											
BIT			THERMOCOUPLE TYPE	BIT			THERMOCOUPLE TYPE				
7	6	5	TC for Channels 1, 3, 5 or 7	2	1	0	TC for Channels 2, 4, 6 or 8				
0	0	0	TC J	0	0	0	TC J				
0	0	1	TC K	0	0	1	TC K				
0	0	1	TC R	0	0	1	TC R				
0	0	1	TC S	0	0	1	TC S				
0	1	0	TC T	0	1	0	TC T				
0	1	0	TC B	0	1	0	TC B				
0	1	1	TC E	0	1	1	TC E				
0	1	1	TC N	0	1	1	TC N				
1	x	x	Not implemented	1	x	x	Not implemented				

⁽⁶⁾The value is memorized in EEPROM memory.
⁽⁷⁾The effect is at the reset (hardware or software) of the module.
⁽⁸⁾The value in registers 40059..40066 is copied respectively in registers 40003..40010, when the corresponding bit in register 40058 is 0. The same value is converted in floating-point, and copied on the corresponding floating register.

Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection 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 and 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 this product, please contact your local city office, waste disposal service or the retail store where you purchased this product.