Z-8TC — **CONVERTER FOR THERMOCOUPLES WITH 6-POINT INSULATION**

General Description

The Z-8TC instrument is a digital converter for thermocouples, with eight measuring channels, which are insulated from the power supply and from the serial communication line up to 1.5 kV. The same 1.5 kV insulation is present among the input channels belonging to different groups of terminals. The instrument is therefore characterized by a six points global insulation. Furthermore, the module has:

- Facilitated wiring of power supply and serial bus by means of the bus housed in the DIN rail.
- Communication can be configured by DIP-switch or software.
- RS485 serial communication with MODBUS-RTU protocol, 32 nodes maximum.
- Inputs protected against ESD discharges up to 4 kV.
- High acquisition speed.
- Measurement of thermocouples: J, K, E, N, S, R, B, T.
- Measurement of the inputs available in the following formats: floating-point representation, reverse floating-point, fixed dot at 16 bits, in tenths degrees with sign for temperature, tenths of μV for voltage.
- Channels independently activable.
- Programmable value in case of fault or freezing of last reading.

For each pair of inputs belonging to the same group of terminals the following common settings are possible:

- Measurement in temperature or mV.
- Filter programmable at eight levels to stabilise reading.
- Rejection programmable at 50 Hz or 60 Hz.
- Three selectable acquisition speeds (two at 14 bits, one at 15 bits).
- Cold Junction Compensation.

Technical Specifications

Power Supply:	10..40 Vdc or 19..28 Vac (50..60 Hz).
Consumption :	max 0,6 W.
Serial Communication Ports :	-RS485, 1200..115200 Baud. -RS232, 2400 Baud, Address: 1, Parity: NO, Data bits: 8; Stop bits: 1.
Protocol :	MODBUS-RTU.

Inputs

Inputs :	Thermocouple types: J, K, E, N, S, R, B, T.
Tables :	EN60584-1 (ITS-90).
Temperature Range :	Dependent on the thermocouple type (see ***Thermocouples Range*** table).
Span mV:	-10,1..81,4 mV.
Impedance :	10 MΩ.
Total Error:	14 bits ADC and 50 Hz Rejection: "(0,040 % + 13 μV). 15 bits ADC and 50 Hz Rejection: "(0,035 % + 10 μV). 14 bits ADC and 60 Hz Rejection : "(0,045 % + 16 μV). 15 bits ADC and 60 Hz Rejection: "(0,040 % + 12 μV).

Test Current :	<50 nA.
CMRR [1] :	>155 dB (tested port towards all the other ones at GND).
DMRR [1] [2]:	>60 dB.

THERMOCOUPLES RANGE

TC TYPE	Allowed Range	Linearization Error	TC TYPE	Allowed 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

Other Features

ADC :	Settable to 14 or 15 bits.
Thermal Drift :	< 100 ppm/K.
Disturbance Rejection :	Settable to 50 Hz or 60 Hz.
Cold Junction Error :	<1 °C.
Insulation Voltage :	1500 Vac among input, power supply and communication ports. 1500 Vac among channels belonging to different groups of terminals.
Protection Degree :	IP20.
Environmental conditions :	Temperature -10..+65 °C, Saving of parameters in EEPROM guaranteed in range: 0..50 °C. Humidity 30..90 % not-condensing. Altitude: up to 2000 m a.s.l.
Storage temperature :	-20..+85 °C.
Signalling by LED :	Power Supply, Fail, RS485 Communication.
Connections :	-Removable 4-way screw terminals,, max 1.5 mm², 3.5 mm pitch. -Rear IDC10 connector for DIN rail. -3.5 mm stereophonic front jack for RS232 (COM) connection.
Box :	PBT, black.
Dimensions and weight :	100 x 112 x 17,5 mm, 140 g.
Standards :	EN61000-6-4/2002 (electromagnetic emission, industrial environment) EN61000-6-2/2005 (electromagnetic immunity, industrial environment) EN61010-1/2001 (safety). All circuits must be insulated from the other circuits under dangerous voltage with double insulation. The power supply transformer must comply with EN60742: "Insulated transformers and safety transformers".

CE

[1] The values are valid at the set rejection frequency, with the filter ON.
[2] For disturbance values such as the input signal peak does not exceed the limit of acceptability.
[3] Up to 250 °C: the input is considered equivalent to a null temperature.

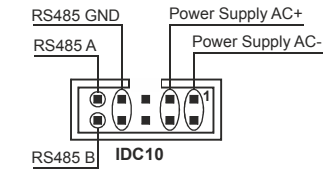
Installation rules

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.

Electric Connections

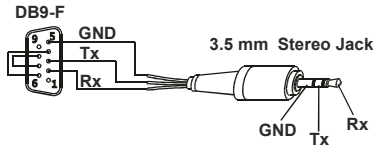
POWER SUPPLY AND RS485 COMMUNICATION PORT

The electric connections for power supply and RS485 bus can be made only by using the bus for the Seneca DIN rail.
The connections of the bus connector are described on the following figure.



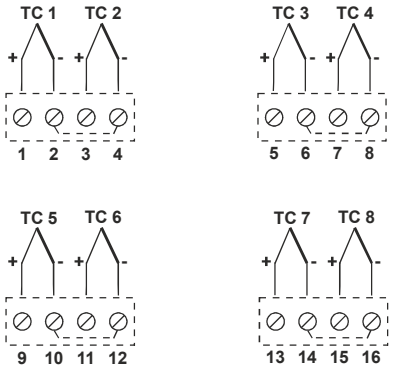
RS232 SERIAL PORT

Connection cable DB9 with a 3.5 mm stereo Jack, can be assembled as indicated in the following figure, or can be bought as an accessory.
We advise you that the GND of the RS232 is the same of RS485.



INPUTS

The module accepts, at input, the following types of thermocouples: J, K, E, N, S, R, B, T.
For the electrical connections, we advise you to use screened cables.



The pairs of channels belonging to the same group of terminals, have the GND terminal internally connected and are not insulated each other.
Instead a 1.5 kV insulation is present among the input channels belonging to different groups of terminals.

Indications by LED on the frontal panel

PWR LED (GREEN)	Meaning
Steady	Power Supply is present.

ERR LED (YELLOW)	Meaning
Steady	Fault: insufficient power supply, faulty channel, faulty TC, internal communication error (signalled if the channel has been activated).

RX LED (RED)	Meaning
Steady	Data are being received through the RS485 communication port.

TX LED (RED)	Meaning
Steady	Data are being transmitted through the RS485 communication port.

Serial interface

For detailed information on RS485 serial interface, consult the documentation provided by the website www.seneca.it, in the section **Prodotti/Serie Z-PC/MODBUS TUTORIAL**.

DIP-SWITCH SETTING

The instrument leaves the factory with all DIP-switches configured in position 0. The settings of the DIP-switches defines the module's communication parameters: address and speed.

In all the following tables, the indication ● corresponds to a DIP-switch set in 1 (ON); no indication is provided when the DIP-switch is set in 0 (OFF).

SPEED			
SW1	1	2	
			9600 Baud
		●	19200 Baud
	●		38400 Baud
	●	●	57600 Baud

ADDRESS								
SW1	3	4	5	6	7	8	
								Communication Parameters from EEPROM [4]
							●	Fixed Address: 01
						●		Fixed Address: 02
						●	●	Fixed Address: 03
				●				Fixed Address: 04
	X	X	X	X	X	X	X	Fixed Address, as from binary representation.
	●	●	●	●	●	●	●	Fixed Address: 63

NOT USED		
SW1	9	Not used.
		Leave to OFF position.

RS485 TERMINATOR	
SW1	10
	Terminator OFF.
●	Terminator ON.

[4] The default configuration is the following: Address 1, 38400, no parity, 1 stop bit.

DEFAULT SETTING OF INPUT CHANNELS

The default configuration, valid for each pair of channels, belogging to the same group of terminals is the following :

Enabling :	Both channels are enabled.
Type of returned Data :	°C
Cold junction Compensation :	Active
Rejection :	50 Hz
ADC / Filter :	ADC: 15 bit, Filter: average,
Thermocouple Type :	J for both channels.

FILTER SETTING

The filtering methods can be set for each pair of channels.
The filter consists of two independent low-pass filters:
-FIR Filter , in running average, able to increase the rejection of disturbances to the mains power line frequency and to reduce measuring noise.
-IIR exponential Filter, with programmable time constant, able to dampen fluctuations.

If an input variation higher than the threshold **T** is detected, both filters are forced to adapt rapidly to the new value, stabilising it only later on. The value of the threshold in voltage is fixed and equal to 0,75 mV. The filter is set with the three least significant bits of registers MODBUS 40054..57 (refer to section **MODBUS REGISTERS**).
The following is a table containing all settable filter types. The propagation time (90%) is indicated for each filter, i.e. the maximum time between the step variation of the input and the variation of the number which represents it in the Modbus register, including the interrogation time of the single register (at 115 kbaud). The times indicated are valid if both the following conditions are respected:

- Rejection set to 50 Hz. For 60 Hz rejection divide the times by 1,2.
- Only one of the two thermocouples of the same group is enabled. If both thermocouples are enabled, the propagation times approximately are doubled.

SET	SAMPLING		FILTER	PROP. TIME 90%	
	Bits ADC	Hz	TYPE	<T	>T
000	14	48	Not present	45 ms	45 ms
001	14	20	Average	236 ms	103 ms
010 [5]	15	11	Average	405 ms	179 ms
011	15	11	Average + exp	1 s	179 ms
100	15	11	Average + exp	3 s	179 ms
101	15	11	Average + exp	8 s	179 ms
110	15	11	Average + exp	24 s	179 ms
111	15	11	Average + exp	72 s	179 ms

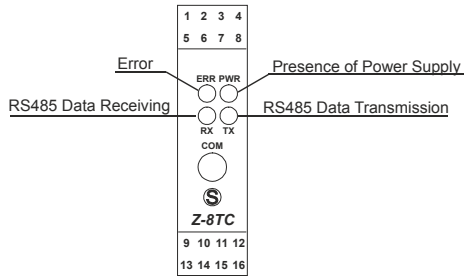
[5] Default Value.

Programming

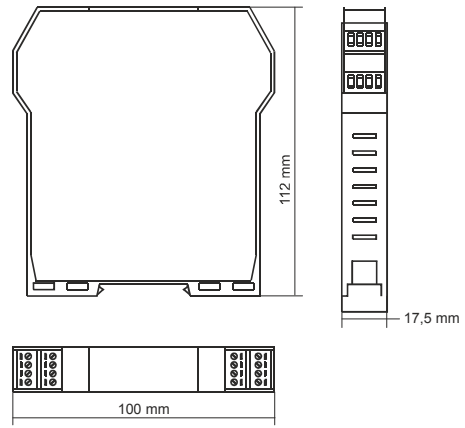
For the product's programming and/or configuration tools, consult the website www.seneca.it.
During initial programming, the EEPROM (SW3 ..8 in OFF position) default setting values originally programmed as follows can be used:
Address = 1, **SPEED = 38400 baud, PARITY = none**, **BIT NUMBER = 8**, **STOP BIT = 1**.

The module can also be programmed through the front connector (COM) while paying attention to set the following connection parameters:
Address = 1, Speed = 2400 Baud, **PARITY = none**, **STOP BIT = 1**.
The COM communication port behaves in the same way as the RS485 bus port except for the communication parameters described above. It also has priority over the RS485 serial port and closes after 3 seconds of inactivity.

Frontal Panel and Led Position



Dimensions and Overall dimensions



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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.

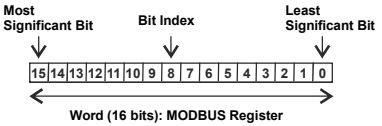
Supported MODBUS Commands

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:



Word (16 bits): MODBUS Register

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 7and 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 **OxFF** (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 communicati 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, refering 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, refering 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, refering 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).(8) Default: 2000,0.**	40059	R/W
VAL_FAULT_2 (6)	**Value loaded in case of fault on channel 2 (expressed as 40004).(8) Default: 2000,0.**	40060	R/W
VAL_FAULT_3 (6)	**Value loaded in case of fault on channel 3 (expressed as 40005).(8) Default: 2000,0.**	40061	R/W
VAL_FAULT_4 (6)	**Value loaded in case of fault on channel 4 (expressed as 40006).(8) Default: 2000,0.**	40062	R/W
VAL_FAULT_5 (6)	**Value loaded in case of fault on channel 5 (expressed as 40007).(8) Default: 2000,0.**	40063	R/W
VAL_FAULT_6 (6)	**Value loaded in case of fault on channel 6 (expressed as 40008).(8) Default: 2000,0.**	40064	R/W
VAL_FAULT_7 (6)	**Value loaded in case of fault on channel 7 (expressed as 40009).(8) Default: 2000,0.**	40065	R/W
VAL_FAULT_8 (6)	**Value loaded in case of fault on channel 8 (expressed as 40010).(8) 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	4	TC for Channels 1, 3, 5 or 7	3	2	1	0	TC for Channels 2, 4, 6 or 8
0	0	0	0	TC J	0	0	0	0	TC J
0	0	0	1	TC K	0	0	0	1	TC K
0	0	1	0	TC R	0	0	1	0	TC R
0	0	1	1	TC S	0	0	1	1	TC S
0	1	0	0	TC T	0	1	0	0	TC T
0	1	0	1	TC B	0	1	0	1	TC B
0	1	1	0	TC E	0	1	1	0	TC E
0	1	1	1	TC N	0	1	1	1	TC N
1	x	x	x	Not implemented	1	x	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.

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