USER MANUAL

Z-8TC-SI

Z-8TC-SI-LAB

8-CHANNEL 24BIT ADC THERMOCOUPLE CONVERTER

SENECA S.r.l.
Via Austria 26 – 35127 – Z.I. - PADOVA (PD) - ITALY
Tel. +39.049.8705355 – 8705355 Fax +39 049.8706287
www.seneca.it

ORIGINAL INSTRUCTIONS

The content of this documentation refers to products and technologies described in it.
All technical data contained in the document may be changed without notice.
The content of this documentation is subject to periodic review.
To use the product safely and effectively, read the following instructions carefully before use.
The product must be used only for the use for which it was designed and manufactured: any other use is under the full responsibility of the user.
Installation, programming and set-up are allowed only to authorized, physically and intellectually suitable operators.
Set-up must be performed only after correct installation and the user must follow all the operations described in the installation manual carefully.
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Technical specifications are subject to change without notice.

CONTACT US	
Technical support	supporto@seneca.it
Product information	commerciale@seneca.it

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Document revisions

DATE	REVISION	NOTES	AUTHOR
12/10/2022	**0**	**First revision**	**MM**
19/12/2022	1	Summary fix	MM
20/12/2022	2	Modbus Register Fix	MM
30/03/2023	3	Added Modbus Registers	MM
30/11/2023	5	Added COMMAND Modbus Registers	MM

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1. INTRODUCTION

ATTENTION!

This user manual extends the information from the installation manual to the configuration of the device. Use the installation manual for more information.

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1.1. DESCRIPTION

Z-8TC-SI is a thermocouple converter with 8 independent and isolated measurement channels equipped with an analogue-digital converter with a 24-bit resolution.
The insulation relates to both the power supply and the RS485 communication port.

The device measures the value of the thermocouples and makes them available through the RS485 port using the Modbus RTU protocol.
The device is able to detect the sensor burnout.

ATTENTION!

Even at constant room temperature, the declared accuracies are achieved after at least 30 minutes from switching on the device.

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2. TYPE OF SUPPORTED THERMOCOUPLE

The supported sensors are:

SENSOR	STANDARD	MEASURING RANGE
J	EN 60584-1:1997	-210 ÷ +1200°C
K	EN 60584-1:1997	-200 ÷ +1372°C
R	EN 60584-1:1997	-50 ÷ +1768°C
S	EN 60584-1:1997	-50 ÷ +1768°C
T	EN 60584-1:1997	-200 ÷ +400°C
B	EN 60584-1:1997	+250 ÷ +1820°C
E	EN 60584-1:1997	-200 ÷ +1000°C
N	EN 60584-1:1997	-200 ÷ +1300°C
L	Gost 8.585-2001	-200 ÷ +800°C

Each channel is independent, therefore it is also possible to use different sensors in the 8 channels.

3. MEASUREMENT OF THE COLD JUNCTION

The measurement of the cold junction is carried out with 4 sensors positioned near the 4 measurement terminals. It is possible to activate or not the cold junction correction so that the measurement can also be corrected with any external equipment.

⚠ATTENTION!
It is necessary to adjust the cold junction compensation for each channel using the offset parameter. ***The internal cold junction compensation uses a sensor whose distance from the terminal varies in each channel, the use of this function can, therefore, lead to differences between the measured values of the channels.***

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4. RESPONSE MEASURES AND TIMES

4.1. SAMPLING TIMES AND MEASUREMENT UPDATE TIME

Sampling time is configurable from 25ms to 400ms per channel, in particular:

CHANNEL SAMPLING TIME
25 ms
50 ms
100 ms
200 ms
400 ms

To calculate the update time of a channel, consider the following example:

By activating 8 channels and setting a sampling time of 25 ms on all of them, you get an update of the measurements on channel 1 every: 25*8 = 200 ms.

4.2. FILTER

To each channel it is possible to insert a low pass filter to stabilize the measurement, it is a 10-sample moving average filter.

4.3. MODBUS RESPONSE TIME

Modbus Response Time: 5 ms (typical)

5. DEVICE CONFIGURATION

The device can be configured using the Easy Setup or Easy Setup 2 software, configurations are as follows:

SENSOR TYPE: allows you to select the type of sensor connected to the channel, it is also possible to disconnect the channel if it is not used.
IF CHARGE FAILURE: Allows you to replace (or not) the measured value with a temperature/mV safety value set by the user in the event of a fault. The failure can be caused by:

1) Sensor beyond measurement values
2) Sensor burnout

SAFETY VALUE It is the value that is displayed in case of fail.
COLD JUNCTION COMPENSATION: Activates or not the internal compensation of the cold junction.
FILTERING: Allows you to activate the filter on the selected channel, filtering allows you to obtain a slower but stable measurement.
CHANNEL SPEED: Allows you to set the channel sampling time
TERMINAL CONFIGURATION: Allows you to choose the configuration of the measurement terminals according to the Z-8TC-SI or Z-8TC-SI-LAB model.
INTERPRETATION OF FLOATING POINTS: Allows you to set whether the single precision (32 bit) Floating Point registers are to be interpreted with the most significant value on the high word or on the low word.

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CHANNEL OFFSET Allows you to set the measurement offset value.

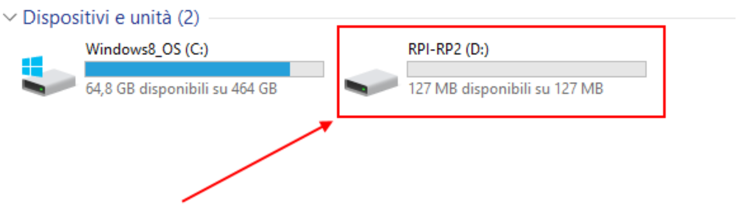
6. USB CONNECTION AND CONFIGURATION RESET

The front USB port allows a simple connection to configure the device via the configuration software.
If it is necessary to restore the instrument factory configuration, use the configuration software.

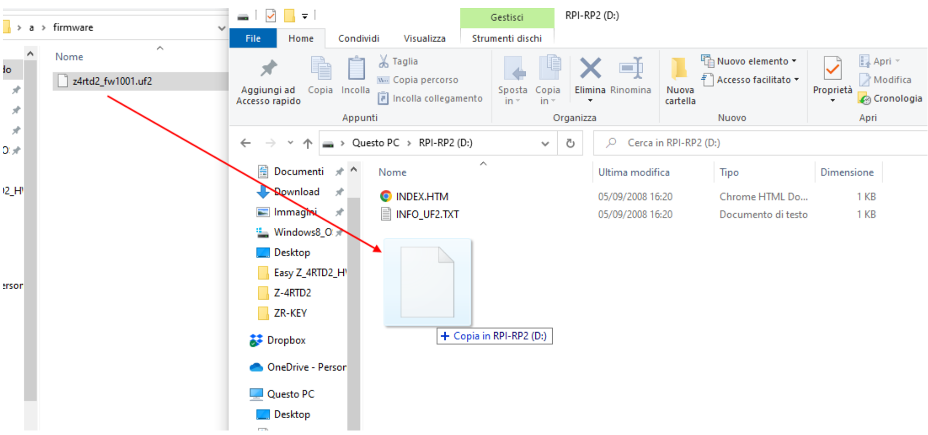
7. FIRMWARE UPDATE

Through the USB port it is possible to update the firmware.
To update the firmware:

1) Disconnect the device from the power supply;
2) Turn dip switch 9 to ON.
3) Now the device is in "firmware update" mode (the TX led stays on), connect the USB cable to the PC
4) Power up the device
5) The device will be displayed in the PC as an "RP1-RP2" external unit



6) Copy the new firmware (uf2 extension) to the root of the "RP1-RP2" unit



Once the firmware file has been copied, the device will automatically reboot

7) Remove power from the device
8) Turn dip switch 9 to OFF, the device is now in "normal operation" mode.
9) Power up the device
10) It is possible to check that the fw update was successful by connecting the device to the Easy Setup software, the firmware revision is shown in the bottom left:

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8. *MODBUS COMMUNICATION PROTOCOL*

The supported communication protocol is:

- Modbus RTU Slave (from both the RS485 and USB ports)

For more information on these protocols, see the website:
http://www.modbus.org/specs.php.

8.1. *SUPPORTED MODBUS FUNCTION CODES*

The following Modbus functions are supported:

- Read Holding Register (function 3)
- Write Single Register (function 6)
- Write Multiple registers (function 16)

ATTENTION!

All 32-bit values are contained in 2 consecutive registers

ATTENTION!

All 64-bit values are contained in 4 consecutive registers

ATTENTION!

Any registers with RW* (in flash memory) can be written up to about 10000 times
The programmer must make sure the PLC/Master Modbus does not exceed this limit

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9. MODBUS REGISTER TABLE

The following abbreviations are used in the register tables:

MS	Most Significant
LS	Least Significant
MSBIT	Most Significant Bit
LSBIT	Least Significant Bit
MMSW	"Most" Most Significant Word (16bit)
MSW	Most Significant Word (16bit)
LSW	Least Significant Word (16bit)
LLSW	"Least" Least Significant Word (16bit)
RO	Read Only
RW*	Read-Write: REGISTERS CONTAINED IN FLASH MEMORY: WRITABLE ABOUT 10,000 TIMES MAXIMUM
UNSIGNED 16 BIT	Unsigned integer register that can assume values from 0 to 65535
SIGNED 16 BIT	Signed integer register that can take values from -32768 to +32767
UNSIGNED 32 BIT	Unsigned integer register that can assume values from 0 to 4294967296
SIGNED 32 BIT	Signed integer register that can take values from -2147483648 to 2147483647
UNSIGNED 64 BIT	Unsigned integer register that can assume values from 0 to 18446744073709551615
SIGNED 64 BIT	Signed integer register that can assume values from -2^63 to 2^63-1
FLOAT 32 BIT	32-bit, single-precision floating-point register (IEEE 754) https://en.wikipedia.org/wiki/IEEE_754
BIT	Boolean register, which can take the values 0 (false) or 1 (true)

9.1. NUMBERING OF "0-BASED" OR "1-BASED" MODBUS ADDRESSES

According to the Modbus standard the Holding Registers are addressable from 0 to 65535, there are 2 different conventions for numbering the addresses: "0-BASED" and "1-BASED".
For greater clarity, Seneca shows its register tables in both conventions.

ATTENTION!

CAREFULLY READ THE DOCUMENTATION OF THE MODBUS MASTER DEVICE IN ORDER TO UNDERSTAND WHICH OF THE TWO CONVENTIONS THE MANUFACTURER HAS DECIDED TO USE

9.2. NUMBERING OF MODBUS ADDRESSES WITH "0-BASED" CONVENTION

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The numbering is:

HOLDING REGISTER MODBUS ADDRESS (OFFSET)	*MEANING*
0	FIRST REGISTER
1	SECOND REGISTER
2	THIRD REGISTER
3	FOURTH REGISTER
4	FIFTH REGISTER

Therefore, the first register is at address 0.
In the following tables, this convention is indicated with ***"ADDRESS OFFSET".***

9.3. *NUMBERING OF MODBUS ADDRESSES WITH "1 BASED" CONVENTION (STANDARD)*

The numbering is that established by the Modbus consortium and is of the type:

HOLDING REGISTER MODBUS ADDRESS 4x	*MEANING*
40001	FIRST REGISTER
40002	SECOND REGISTER
40003	THIRD REGISTER
40004	FOURTH REGISTER
40005	FIFTH REGISTER

In the following tables this convention is indicated with ***"ADDRESS 4x"*** since a 4 is added to the address so that the first Modbus register is 40001.
A further convention is also possible where the number 4 is omitted in front of the register address:

HOLDING MODBUS ADDRESS WITHOUT 4x	*MEANING*
1	FIRST REGISTER
2	SECOND REGISTER
3	THIRD REGISTER
4	FOURTH REGISTER
5	FIFTH REGISTER

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9.4. BIT CONVENTION WITHIN A MODBUS HOLDING REGISTER

A Modbus Holding Register consists of 16 bits with the following convention:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

For instance, if the value of the register in decimal is
12300
the value 12300 in hexadecimal is:
0x300C

the hexadecimal 0x300C in binary value is:
11 0000 0000 1100

So, using the above convention, we get:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0

9.5. MSB and LSB BYTE CONVENTION WITHIN A MODBUS HOLDING REGISTER

A Modbus Holding Register consists of 16 bits with the following convention:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

LSB Byte (Least Significant Byte) defines the 8 bits ranging from Bit 0 to Bit 7 included, we define MSB Byte (Most Significant Byte) the 8 bits ranging from Bit 8 to Bit 15 inclusive:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE MSB								BYTE LSB							

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9.6. REPRESENTATION OF A 32-BIT VALUE IN TWO CONSECUTIVE MODBUS HOLDING REGISTERS

The representation of a 32-bit value in the Modbus Holding Registers is made using 2 consecutive Holding Registers (a Holding Register is a 16-bit register). To obtain the 32-bit value it is therefore necessary to read two consecutive registers:
For example, if register 40064 contains the 16 most significant bits (MSW) while register 40065 contains the least significant 16 bits (LSW), the 32-bit value is obtained by composing the 2 registers:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
40064 MOST SIGNIFICANT WORD															

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
40065 LEAST SIGNIFICANT WORD															

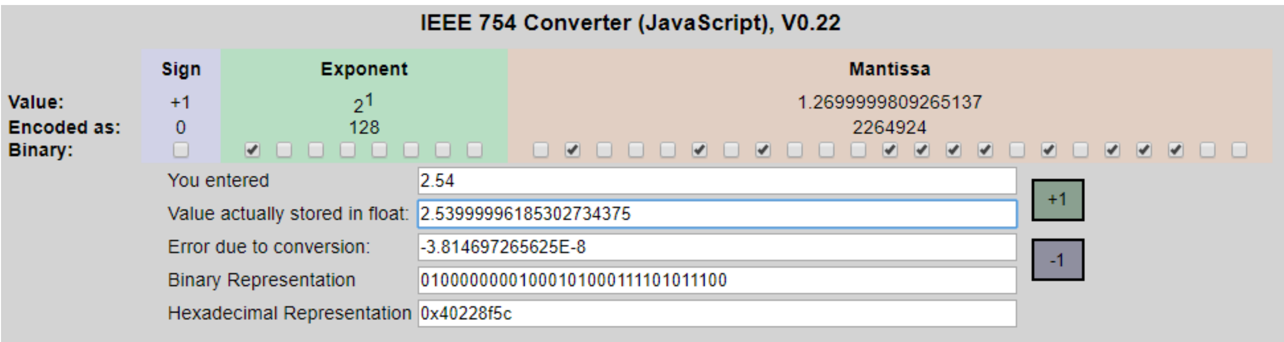
$$Value_{32bit} = Register_{LSW} + (Register_{MSW} * 65536)$$

In the reading registers it is possible to swap the most significant word with the least significant word, therefore it is possible to obtain 40064 as LSW and 40065 as MSW.

9.7. TYPE OF 32-BIT FLOATING POINT DATA (IEEE 754)

The IEEE 754 standard (https://en.wikipedia.org/wiki/IEEE_754) defines the format for representing floating point numbers.
As already mentioned, since it is a 32-bit data type, its representation occupies two 16-bit holding registers.
To obtain a binary/hexadecimal conversion of a floating point value it is possible to refer to an online converter at this address:

http://www.h-schmidt.net/FloatConverter/IEEE754.html



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Using the last representation the value 2.54 is represented at 32 bits as:

0x40228F5C

Since we have 16-bit registers available, the value must be divided into MSW and LSW:

0x4022 (16418 decimal) are the 16 most significant bits (MSW) while 0x8F5C (36700 decimal) are the 16 least significant bits (LSW).

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9.8. Z-8TC-SI: MODBUS 4X HOLDING REGISTERS TABLE (FUNCTION CODE 3)

ADDRESS (4x)	OFFSET	REGISTER	ORDER	CHANNEL	DESCRIPTION	R/W	TYPE
40001	0	MACHINE ID	-	-	Device identification	RO	UNSIGNED 16 BIT
40002	1	MEASURE ERRORS	-	1..8	Cold Junctions and Burnout/Out Of Range Errors (0 = OK, 1 = ERROR) Bit[15]=CJ Error IN1&IN2 Bit[14]=CJ Error IN3&IN4 Bit[13]=CJ Error IN5&IN6 Bit[12]=CJ Error IN7&IN8 Bit[11]=Burnout/Out of Range IN1 Bit[10]=Burnout/Out of Range IN2 Bit[9]= Burnout/Out of Range IN3 Bit[8]= Burnout/Out of Range IN4 Bit[7]= Burnout/Out of Range IN5 Bit[6]= Burnout/Out of Range IN6 Bit[5]= Burnout/Out of Range IN7 Bit[4]= Burnout/Out of Range IN8	RO	UNSIGNED 16 BIT
40003	2	INTEGER MEASURE	-	1	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40004	3	INTEGER MEASURE	-	2	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40005	4	INTEGER MEASURE	-	3	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40006	5	INTEGER MEASURE	-	4	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40007	6	INTEGER MEASURE	-	5	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40008	7	INTEGER MEASURE	-	6	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40009	8	INTEGER MEASURE	-	7	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT

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40010	9	INTEGER MEASURE	-	8	Integer measure [°C/10] or [10*mV]	RO	SIGNED 16 BIT
40011	10	FLOAT MEASURE	MSW	1	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40012	11		LSW				
40013	12	FLOAT MEASURE	MSW	2	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40014	13		LSW				
40015	14	FLOAT MEASURE	MSW	3	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40016	15		LSW				
40017	16	FLOAT MEASURE	MSW	4	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40018	17		LSW				
40019	18	FLOAT MEASURE	MSW	5	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40020	19		LSW				
40021	20	FLOAT MEASURE	MSW	6	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40022	21		LSW				
40023	22	FLOAT MEASURE	MSW	7	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40024	23		LSW				
40025	24	FLOAT MEASURE	MSW	8	Floating Point Measure [°C] or [mv]	RO	FLOAT 32
40026	25		LSW				
40027	26	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40028	27	MEASURE CJ	-	1, 2	Cold Junction measure [°C/10]	RO	SIGNED 16 BIT
40029	28	MEASURE CJ	-	3, 4	Cold Junction measure [°C/10]	RO	SIGNED 16 BIT
40030	29	MEASURE CJ	-	5, 6	Cold Junction measure [°C/10]	RO	SIGNED 16 BIT
40031	30	MEASURE CJ	-	7, 8	Cold Junction measure [°C/10]	RO	SIGNED 16 BIT
40032	31	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40033	32	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40034	33	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40035	34	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40036	35	FIRMWARE REVISION	-	-	-	-	UNSIGNED 16 BIT

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40037	36	FLASH ERRORS	-	1, 2, 3, 4	FLASH ERRORS (0 = OK, 1 = ERROR) Bit[13]= FLASH ERROR IN1&IN2 Bit[8]= CRC ERROR IN1&IN2 Bit[5]= FLASH ERROR IN3&IN4 Bit[0]= CRC ERROR IN3&IN4	RO	UNSIGNED 16 BIT
40038	37	FLASH ERRORS	-	5, 6, 7, 8	FLASH ERRORS (0 = OK, 1 = ERROR) Bit[13]= FLASH ERROR IN5&IN6 Bit[8]= CRC ERROR IN5&IN6 Bit[5]= FLASH ERROR IN7&IN8 Bit[0]= CRC ERROR IN7&IN8	RO	UNSIGNED 16 BIT
40039	38	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40040	39	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40041	40	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40042	41	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40043	42	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40044	43	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40045	44	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40046	45	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40047	46	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40048	47	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40049	48	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40050	49	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40051	50	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40052	51	ADDRESS_PARITY	-	-	Bit[15:8] Modbus Address RS485: 0..255 Bit[7:0] Parity : 0=none 1=even 2=odd	RW*	UNSIGNED 16 BIT
40053	52	BAUDRATE_RS485	-	-	Bit[15:8] Baudrate: 0=4800 1=9600 2=19200 3=38400	RW*	UNSIGNED 16 BIT

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					4=57600 5=115200 6=1200 7=2400		
40054	53	INPUTS CONFIG	-	1	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms	RW*	UNSIGNED 16 BIT
40055	54	INPUT USER CONFIG	-	2	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms	RW*	UNSIGNED 16 BIT
40056	55	INPUT USER CONFIG	-	3	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction	RW*	UNSIGNED 16 BIT

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					Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms		
40057	56	INPUT USER CONFIG	-	4	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms	RW*	UNSIGNED 16 BIT
40058	57	INPUT USER CONFIG	-	5	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms	RW*	UNSIGNED 16 BIT

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40059	58	INPUT USER CONFIG	-	6	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms	RW*	UNSIGNED 16 BIT
40060	59	INPUT USER CONFIG	-	7	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms	RW*	UNSIGNED 16 BIT
40061	60	INPUT USER CONFIG	-	8	CHANNEL CONFIGURATION Bit[12:10] Filter: 0=NO, 1=10 elements moving average Bit[9:6] TC TYPE : 0= J 1= K 2= R 3= S 4= T 5= B 6= E 7= N 8= L 9= mV Bit[4]: Cold Junction Compensation : 0= no 1= yes	RW*	UNSIGNED 16 BIT

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					Bit[2:0] Acquisition Speed: 0= disabled, 1= 25ms, 2= 50ms, 3= 100ms, 4= 200ms, 5= 400ms		
40062	61	CONFIGURATION	-	-	OTHERS CONFIGURATIONS Bit[15] Floating point 0= MSW First 1= LSW First Bit[7]= Load Fault Value IN1 (1 = ON, 0 = OFF) Bit[6]= Load Fault Value IN2 (1 = ON, 0 = OFF) Bit[5]= Load Fault Value IN3 (1 = ON, 0 = OFF) Bit[4]= Load Fault Value IN4 (1 = ON, 0 = OFF) Bit[3]= Load Fault Value IN5 (1 = ON, 0 = OFF) Bit[2]= Load Fault Value IN6 (1 = ON, 0 = OFF) Bit[1]= Load Fault Value IN7 (1 = ON, 0 = OFF) Bit[0]= Load Fault Value IN8 (1 = ON, 0 = OFF)	RW*	UNSIGNED 16 BIT
40063	62	FAULT VALUE	-	1	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40064	63	FAULT VALUE	-	2	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40065	64	FAULT VALUE	-	3	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT

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40066	65	FAULT VALUE	-	4	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40067	66	FAULT VALUE	-	5	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40068	67	FAULT VALUE	-	6	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40069	68	FAULT VALUE	-	7	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40070	69	FAULT VALUE	-	8	FAULT VALUE [°C/10] OR [mV/100]	RW*	SIGNED 16 BIT
40071	70	ERRORS2	-	-	BIT[15]=OVERRANGE IN1 BIT[14]=OVERRANGE IN2 BIT[13]=OVERRANGE IN3 BIT[12]=OVERRANGE IN4 BIT[11]=OVERRANGE IN5 BIT[10]=OVERRANGE IN6 BIT[9]=OVERRANGE IN7 BIT[8]=OVERRANGE IN8 BIT[7]=BURNOUT IN1 BIT[6]=BURNOUT IN2 BIT[5]=BURNOUT IN3 BIT[4]=BURNOUT IN4 BIT[3]=BURNOUT IN5 BIT[2]=BURNOUT IN6 BIT[1]=BURNOUT IN7 BIT[0]=BURNOUT IN8	-	UNSIGNED 16 BIT
40072	71	CONNECTION TYPE	-	-	THERMOCOUPLES CONNECTION TYPE Bit[0] 0= Z-8TC-SI 1= Z-8TC-SI-LAB	RW*	UNSIGNED 16 BIT
40073	72	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40074	73	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40075	74	RESERVED	-	-	-	-	FLOAT 32
40076	75						
40077	76	COMMAND	-	-	Write: 49568 (decimal) for Save the actual configuration in Flash then perform a reboot 52428 (decimal) for perform a reboot	RW	UNSIGNED 16 BIT
40078	77	RESERVED	-	-	-	-	UNSIGNED 16 BIT

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40079	78	DIPSWITCH	-	-	DIP SWITCH STATE	RO	UNSIGNED 16 BIT
40080	79	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40081	80	RESERVED	-	-	-	-	UNSIGNED 16 BIT
40082	81	RESERVED	MSW	-	RESERVED	RO	UNSIGNED 32 BIT
40083	82		LSW	-			
40084	83	RESERVED	MSW	-	RESERVED	RO	UNSIGNED 32 BIT
40085	84		LSW	-			
40086	85	RESERVED	MSW	-	RESERVED	RO	UNSIGNED 32 BIT
40087	86		LSW	-			
40088	87	ADC RAW VALUE	MSW	1	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40089	88		LSW				
40090	89	ADC RAW VALUE	MSW	2	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40091	90		LSW				
40092	91	ADC RAW VALUE	MSW	3	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40093	92		LSW				
40094	93	ADC RAW VALUE	MSW	4	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40095	94		LSW				
40096	95	ADC RAW VALUE	MSW	5	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40097	96		LSW				
40098	97	ADC RAW VALUE	MSW	6	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40099	98		LSW				
40100	99	ADC RAW VALUE	MSW	7	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40101	100		LSW				
40102	101	ADC RAW VALUE	MSW	8	RAW ADC VALUE	RO	UNSIGNED 32 BIT
40103	102		LSW				
40104	103	UPTIME	MSW	-	DEVICE UPTIME [ms]	RO	UNSIGNED 32 BIT
40105	104		LSW				
40106	105	RESERVED	-	-	-	RO	FLOAT 32
40107	106		-	-			
40108	107	RESERVED	-	-	-	RO	FLOAT 32
40109	108		-	-			
40110	109	RESERVED	-	-	-	RO	FLOAT 32
40111	110		-	-			
40112	111	RESERVED	-	-	-	RO	FLOAT 32
40113	112		-	-			
40114	113	RESERVED	-	-	-	RO	FLOAT 32
40115	114		-	-			
40116	115	RESERVED	-	-	-	RO	FLOAT 32
40117	116		-	-			
40118	117	RESERVED	-	-	-	RO	FLOAT 32
40119	118		-	-			
40120	119	RESERVED	-	-	-	RO	FLOAT 32

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40121	120		-	-			
40122	121	RESERVED	-	-	-	RO	FLOAT 32
40123	122		-	-			
40124	123	RESERVED	-	-	-	RO	FLOAT 32
40125	124		-	-			
40126	125	RESERVED	-	-	-	RO	FLOAT 32
40127	126		-	-			
40128	127	RESERVED	-	-	-	RO	FLOAT 32
40129	128		-	-			
40130	129	RESERVED	-	-	-	RO	FLOAT 32
40131	130		-	-			
40132	131	RESERVED	-	-	-	RO	FLOAT 32
40133	132		-	-			
40134	133	RESERVED	-	-	-	RO	FLOAT 32
40135	134		-	-			
40136	135	RESERVED	-	-	-	RO	FLOAT 32
40137	136		-	-			
40138	137	MEASURE OFFSET	MSW	1	MEASURE OFFSET [°C]	RW*	FLOAT 32
40139	138		LSW				
40140	139	MEASURE OFFSET	MSW	2	MEASURE OFFSET [°C]	RW*	FLOAT 32
40141	140		LSW				
40142	141	MEASURE OFFSET	MSW	3	MEASURE OFFSET [°C]	RW*	FLOAT 32
40143	142		LSW				
40144	143	MEASURE OFFSET	MSW	4	MEASURE OFFSET [°C]	RW*	FLOAT 32
40145	144		LSW				
40146	145	MEASURE OFFSET	MSW	5	MEASURE OFFSET [°C]	RW*	FLOAT 32
40147	146		LSW				
40148	147	MEASURE OFFSET	MSW	6	MEASURE OFFSET [°C]	RW*	FLOAT 32
40149	148		LSW				
40150	149	MEASURE OFFSET	MSW	7	MEASURE OFFSET [°C]	RW*	FLOAT 32
40151	150		LSW				
40152	151	MEASURE OFFSET	MSW	8	MEASURE OFFSET [°C]	RW*	FLOAT 32
40153	152		LSW				
40154	153	COLD JUNCTION OFFSET	MSW	1-2	COLD JUNCTION OFFSET [°C]	RW*	FLOAT 32
40155	154		LSW				
40156	155	COLD JUNCTION OFFSET	MSW	3-4	COLD JUNCTION OFFSET [°C]	RW*	FLOAT 32
40157	156		LSW				
40158	157	COLD JUNCTION OFFSET	MSW	5-6	COLD JUNCTION OFFSET [°C]	RW*	FLOAT 32
40159	158		LSW				
40160	159	COLD JUNCTION OFFSET	MSW	7-8	COLD JUNCTION OFFSET [°C]	RW*	FLOAT 32
40161	160		LSW				

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