FOSTEN
AUTOMATION

F500T

Temperature Transmitter.

HART
COMMUNICATION PROTOCOL

INDEX

1. GENERAL DESCRIPTION

The **F500T** intelligent temperature transmitter is designed to be used in industrial environments, offering reliable, accurate and stable measurement. Robust construction and easy installation, in addition to good precision, are some of the features that complete the F500T to meet the requirements of the most critical industrial processes. It can be used for the sensors of the types: RTD, TC, Ohm and mV. It has an incorporated display with backlight technology and has a Hart protocol that allows easy access to configurations, tests and all parameters of the transmitter.

2. MAIN APPLICATIONS

- Sugar and Alcohol
- Fertilizers
- Chemistry
- Food and Beverages
- Petrochemical
- Pharmaceutical
- Energy
- Plastic
- Among others

3. TECHNICAL CHARACTERISTICS

The following are the main technical characteristics of the head mount **F500T** temperature transmitter .
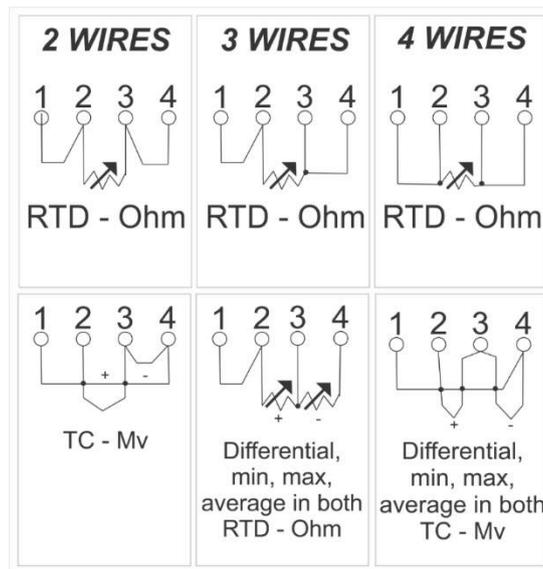
Types of sensors	RTD, TC, Ohm, mV
Exit sign	4 to 20 mA
Communication Protocol	Hart
Feeding	9 to 32 Vcc
Operation temperature	-40 °C to 85 °C
Degree of protection	IP66

4. DIMENSIONAL

5. TYPES OF CONNECTIONS

The following are the different types of connections that can be used for the F500T Intelligent Temperature Transmitter.

6. SALE CODES

Below we have the sale codes for purchasing:

PRODUCT						
F500T	: Intelligent Temperature Transmitter					
.	**COMMUNICATION PROTOCOL**					
.	H	: 4 to 20 mA Hart				
.	.	**ELECTRICAL CONNECTION**				
.	.	1	: 1/2 NPT Thread			
.	.	.	**SENSOR TYPE**			
.	.	.	1 : RTD - PT100	C : Thermocouple - Type K		
.	.	.	2 : RTD - PT50	D : Thermocouple - Type N		
.	.	.	3 : RTD - PT200	E : Thermocouple - Type R		
.	.	.	4 : RTD - PT500	F : Thermocouple - Type T		
.	.	.	5 : RTD - PT1000	G : Thermocouple - Type DIN L		
.	.	.	6 : RTD - COBRE	H : Thermocouple - Type U		
.	.	.	7 : RTD - NIQUEL (Ni120)	I : Thermocouple - Type W5RE26		
.	.	.	8 : RTD - OHMS (R)	J : Thermocouple - Type GOST L		
.	.	.	9 : Thermocouple - Type E	K : Thermocouple - mV -120 to 120		
.	.	.	A : Thermocouple - Type J	L : Thermocouple - mV -1000 to 1000		
.	.	.	B : Thermocouple - Type B			
.	.	.	.	**MOUNTING BRACKET**		
.	.	.	.	0	: Without Mounting Bracket	
.	.	.	.	1	: With Mounting Bracket - Type L	
.	.	.	.	.	**PAINT**	
.	.	.	.	.	0	: Standard Sensor Br (Synthetic Liquid Paint)
.	.	.	.	.	1	: Special
.	.	.	.	.	.	
F500T	**H**	**1**	**1**	**1**	**0**	

7. LOCAL ADJUSTMENT

KEY CONFIGURATION

The **F500** temperature transmitter can also be configured via keys on the main board.

Remove the display cover and start the procedures below as needed.

SHOWING THE VARIABLES ON DISPLAY

You can change the display variables easily by pressing the **S** key.

Example:

Assuming that the display variable is current (mA) and it needs to be set to alternately display PV and percentage (%).

Setting the first display variable.

Press the S key and wait until the PV variable is displayed, and then release the S key. At this time the LCD shows "PV" and "current" alternately.

Setting the second display variable.

Press the S key when the screen is displayed, wait until the percentage variable (%) is displayed, then release the S key. At this time the LCD will alternately show "PV" and "%".

ABOUT THE KEYS

The transmitter has two operating modes with two keys and three keys.

Two-key operation mode:

Z Key - triggers navigation among different configuration keys.

Changing the current edit position to the next in edit mode.

S Key - Enter edit mode.

Adds value at the current edit position.

Save the data.

Three-key operating mode:

Z Key - triggers navigation among diferente configuration keys.

Changing the current edit position to the next in edit mode.

S Key - Enter edit mode.

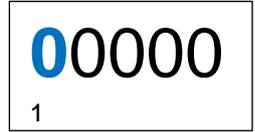Adds value at the current edit position.

Save the data.

C Key - Save the data.

NOTE:

1. In the two-key operation mode, you can press the C key to immediately save the data.

2. In three-key operation mode, you can press the Z key to save data when the "down arrow" is flashing.

CONFIGURATION OF THE PV UNIT.

Press Z key to enter the menu mode.

| **0**0000 |
| 1 |

The lower left side of the display shows the operation code 1 to indicate the "Input Operation Code" function. The first 0 will start flashing.

Press the Z key to shift until the last 0 starts flashing.

| 0000**2** |
| 1 |

Press the S key to change the value.

| 0000**2** |
| 1 |

| 0.000 |
| 2   ºC |

MINIMUM RANGING CONFIGURATION.

Enter the operation code to execute the corresponding function, respectively. After setting the value for the PV unit, enter the value of the lower PV range.

| 0.0000 |
| 3   ºC |
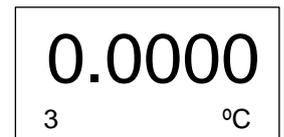
Input **** 3 (* means a random number), Input Value Definition of The Lower PV range.

| 100.00 |
| 4   ºC |
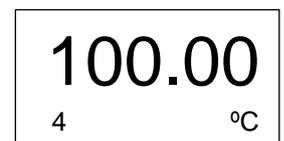
Input **** 4 (* means a random number), enter in Damping Adjustment. will enter "Setting the value of the upper range of the PV"

| 2.0000 |
| 5   S |

Input **** **5** (* means a random number), will enter Damping Adjustment

MAXIMUM RANGE CONFIGURATION.

After completing the setting of the lower PV value, enter the Upper range value
of the PV.
The way to enter an upper value is the same as for entering the lower value

| 100.00 |
| 4   °C |

DAMPING CONFIGURATION.

Enter the operation code 5 to enter damping adjustment, or it will enter
automatically on "Damping".

The way to enter the damping value is the same as for entering a lower value.

| 2.0000 |
| 5   S |

ZERO TRIM ADJUSTMENT

Enter operation code "6". The operation code "6" is displayed at the bottom
left side of the display

| 0.000 |
| 6   ºC |

Press "S" key and then the DISPLAY symbol will flash, indicating entering in the selection mode, allowing the
adjustment of the value.

Press the M or Z key to save or complete the setting.

| 0.000 |
| 6   ºC |

1. Pressing the "S" and "Z" keys simultaneously, and keeping them pressed for about 5 seconds.

2. Enter operation code 7.

3. In this mode, the operation code 7 is displayed on the lower left side of the display and the type of sensor is displayed "PT100" on the lower right side. Press the S key as many times as necessary until the type of sensor is selected.

Press the Z key to save the output and complete the setup.

Below is a list of supported sensors.

This code will indicate if the sensor will have 2, 3 or 4 wires.

2 wires – 2.W
3 wires – 3.W
4 wires – 4.W

Press S key to change between 2-3 wire values, indicated on the display.

Selecting the type of sensor thermocouple (TC), the display will direct to the operation code "10".

This code will indicate if there will be a cold joint compensation.

NO – no
EXT – external
IN - internal

Press the S key to change the values, indicated in the lower right side of the display.

Press the C or Z key to confirm the change and end the calibration.

8. CONFIGURATION VIA SOFTWARE

The F500 line transmitters are configured using the Hart Config Tool software, which is free and available on the website. A Hart communication interface of any model/manufacturer is required.
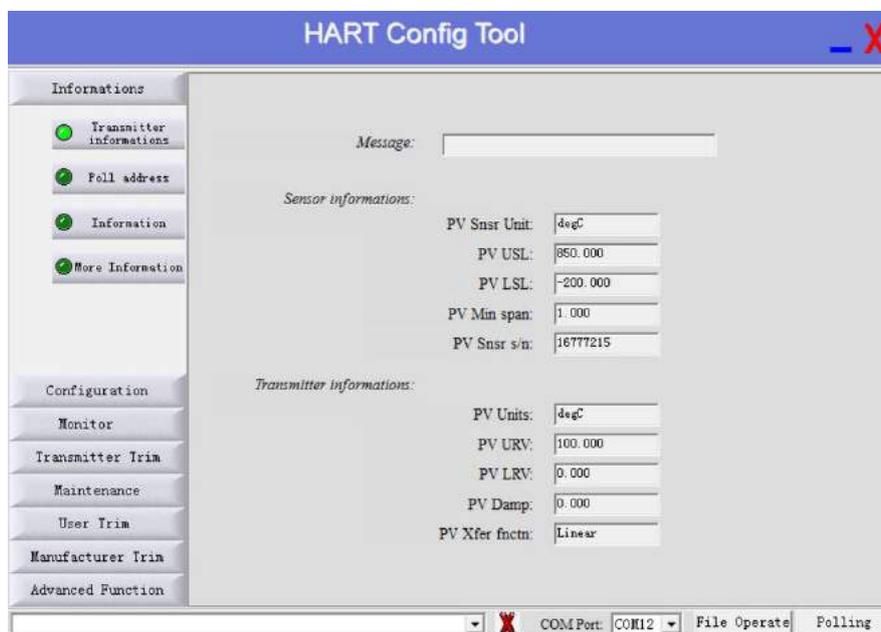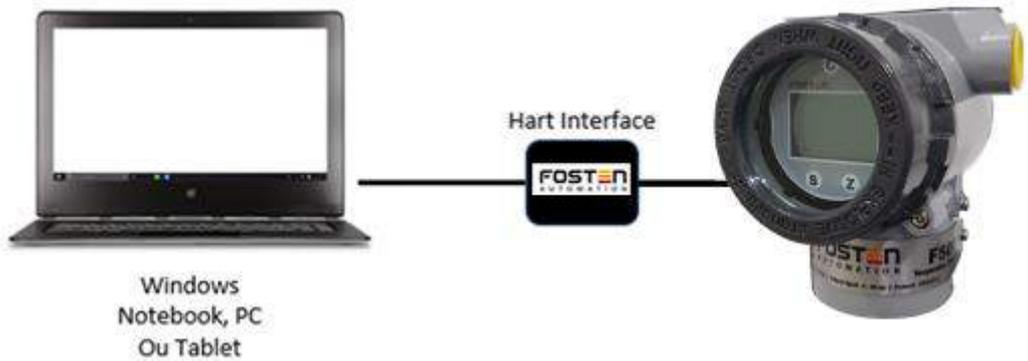
8.1 CONNECTING THE INSTRUMENT

Make sure the instrument and the Hart interface are turned on.
Access the Hart Config Tool software and click on the "Polling 0" button in the lower right corner.

IMPORTANT

If necessary, a resistor must be connected in series with the positive pole in the instrument.

By choosing the "Information" button, all the information contained in the instrument will appear
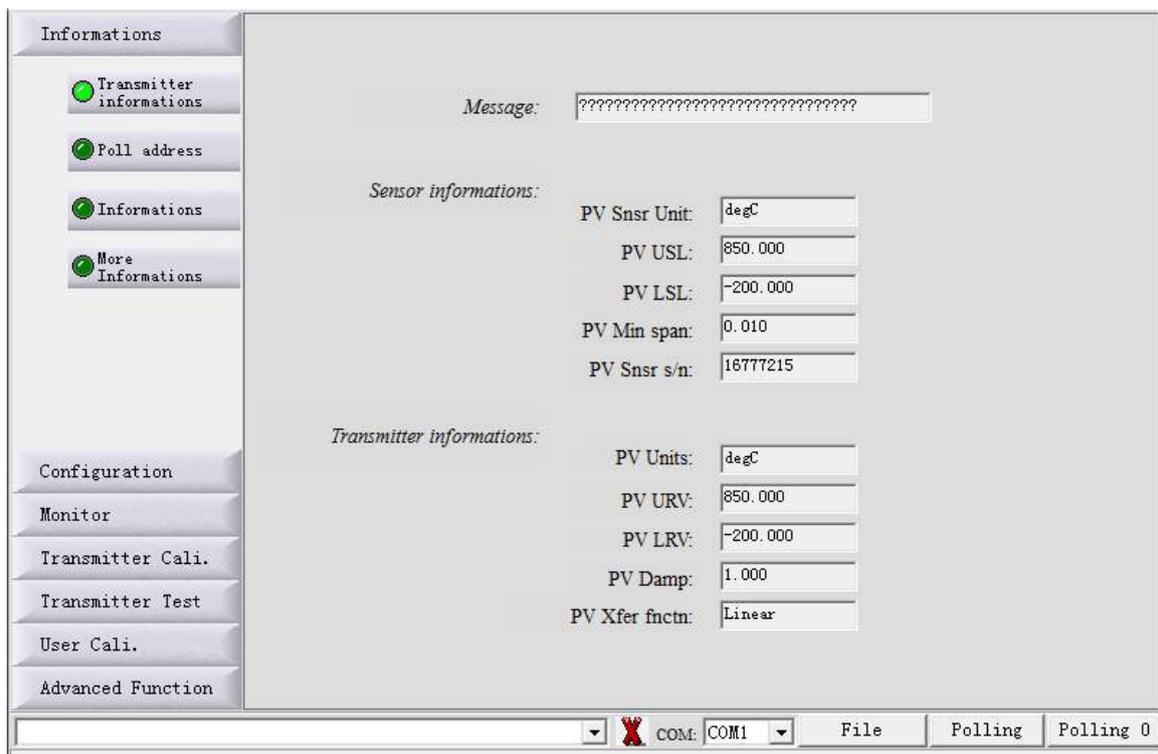
8.2. WORK RANGE

To adjust the working range, just choose the "Configuration" button.
In the sub-option "Range", the minimum and maximum ranges will be displayed ("Sensor Information" box) and then the working range in which the instrument is configured ("Output Range" box).

To change this range and adjust it, just select the LRV (low temperature or minimum value) and URV (high temperature or maximum value) boxes. Making change, click the "Write" button to confirm and save.

8.3. DAMP E OPÇÕES DE INDICAÇÃO DO DISPLAY

To adjust options such as Damping, as well as choose the units to be shown on the display, choose the "Configuration" button and then the sub-option "Output".

On the next screen that opens, choose the options for Damp and linear function in the "Output Characteristics" box.

In the table below, select the desired one for Display 1 and Display 2.

8.4. WRITING AND ALARM PROTECTION

To enable the writing protection, preventing allowed changes to the configuration already made and saved in the memory of the instrument, simply choose the "Configuration" button and the sub-option: "Fault Protection".

On this same screen, there is also the possibility of setting the alarm, in which you can select an option for very low or very high current to send an alarm signal.
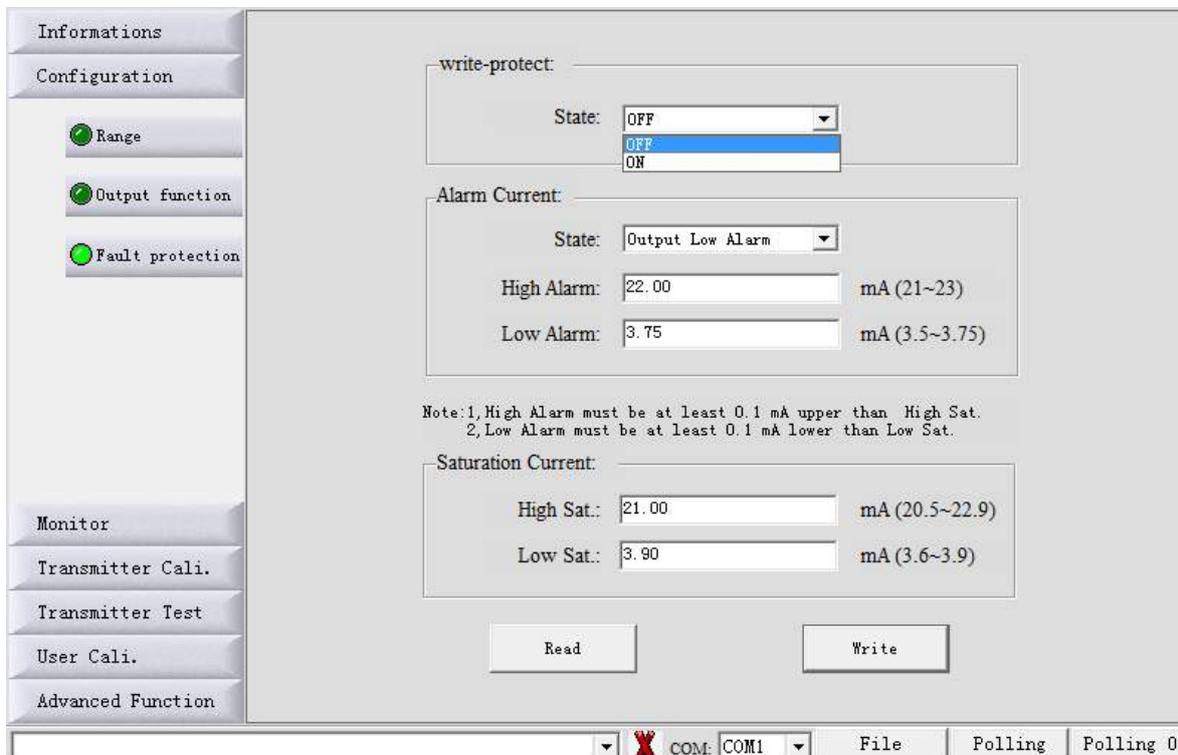
8.5. MONITORING VARIABLES

Choose the "Monitor" button and the "Process Variable" sub-option. A screen will be available in which the variables can be selected to be monitored and displayed in a graph.
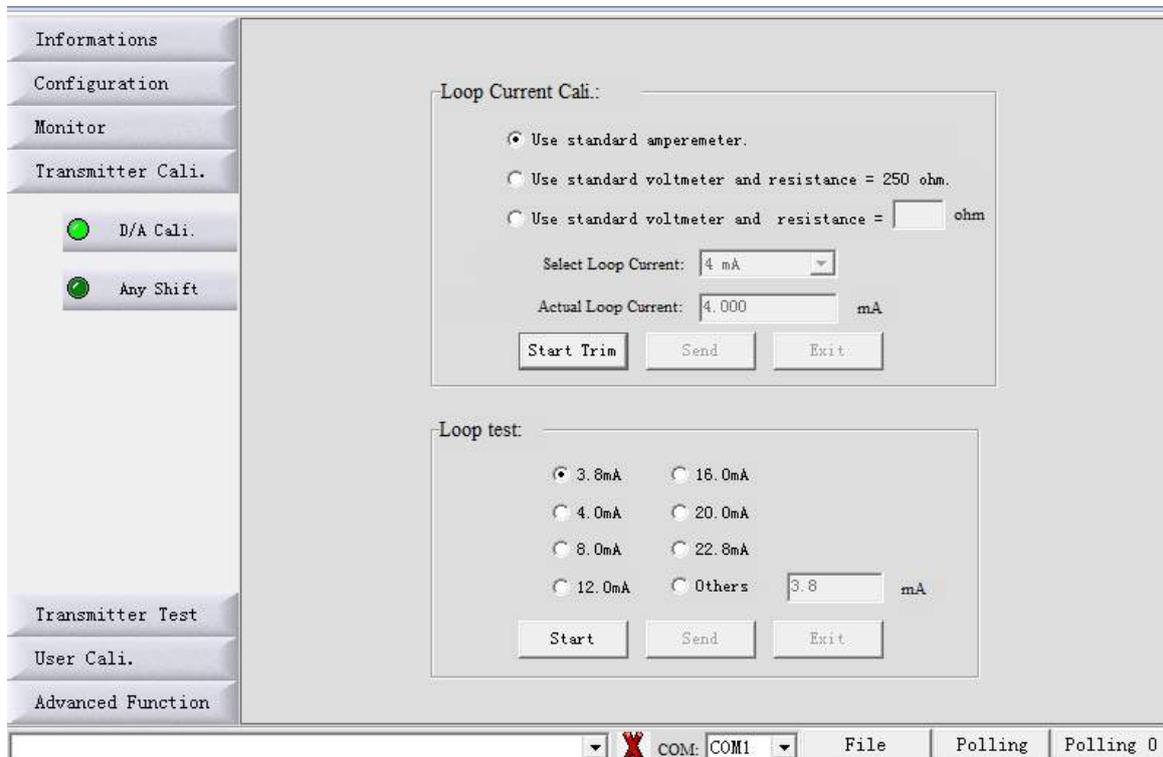
8.6. CURRENT TRIM AND LOOP

Choose the "Transmitter Adjustment" button and the "D/A Adjustment" sub-option to perform the current trim (4 to 20 mA), using a multimeter as a reference. To perform a simulation and test with various current values, see the options in the "Current Loop Test" table.

8.7. CALIBRATION UNTIL 5 POINTS

To carry out the calibration of the temperature transmitter, it will be necessary to have as a reference a resistance generator in Ohms to change the resistance, or a generator to change the current or millivolts.
Choose the "User Cali" button. and in the frame that opens, choose in the "Trim Point:" box: the number of points at which you want to calibrate it.


After selecting the number of points at which you want to calibrate your transmitter, click on the "Equal division" button, which will distribute the points to be trimmed and adjusted. It will automatically distribute and equalize the points according to the requested number.

Using the resistance generator in Ohms as a reference, or another calibrator that makes the change within the range that you want to perform the point-to-point calibration, always click on the "Collect" button for each point performed. After making all the points, choose the "Write" button to record the calibration performed and the points generated.

8.8 CHANGING THE TYPE OF SENSOR AND THE QUANTITY OF WIRE

To change the type of sensor you are going to use, be it thermocouple (TC) or PT100 (RTD), choose the "Advanced Function" button and the sub-option "Sensor Setup", it will make the Sensor Type options (RTD and TC) available.
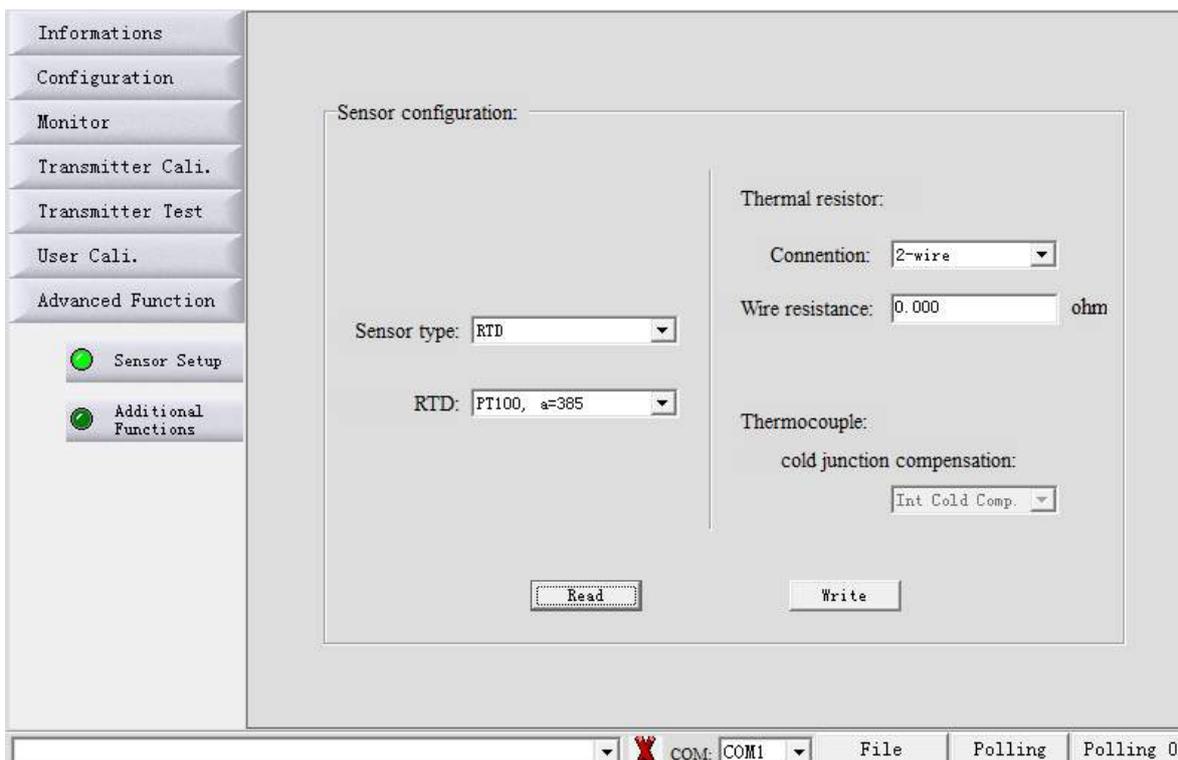
On this same screen you can also choose the number of wires for your PT100 or thermocouple, being able to change the options contained in the "Connention" box in the "Thermal Resistor" box.

Selecting the RTD option (PT100) in the box, it will provide the available options below.
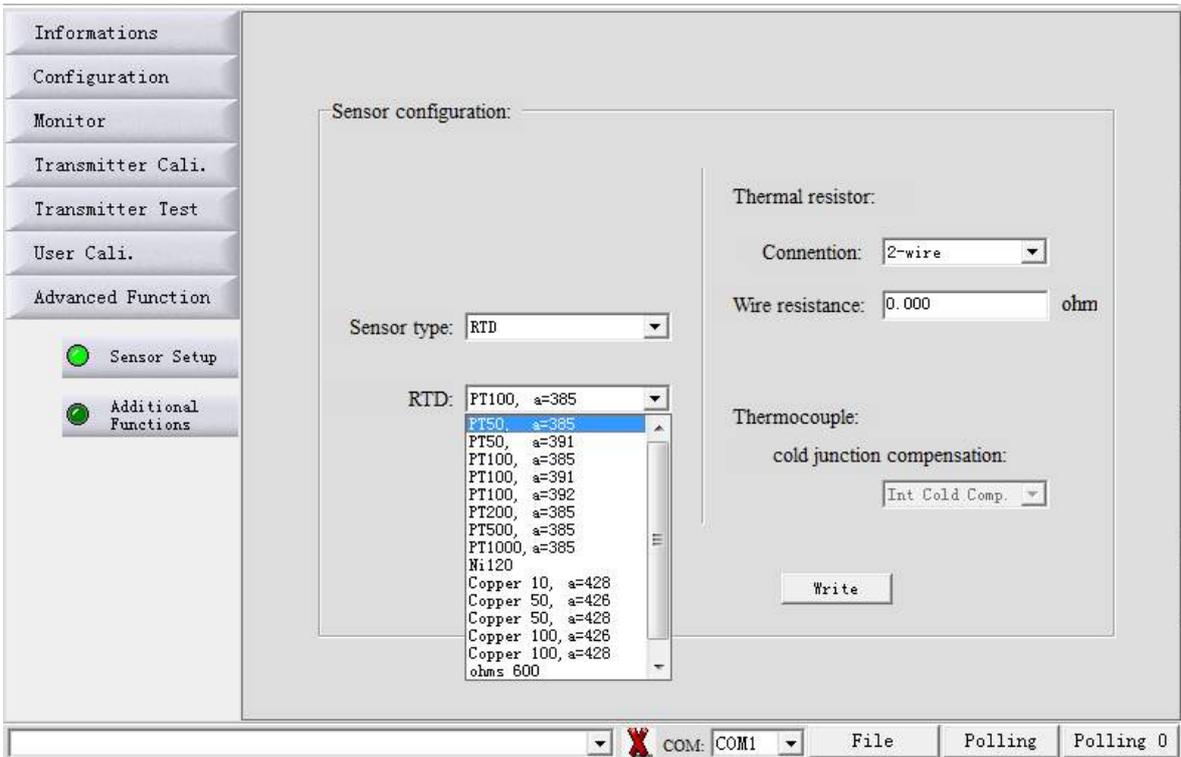
Selecting the TC (Thermocouple) option, it will provide the available options in the box below.
Remembering that in the TC option, it also releases the Clearing Board option.
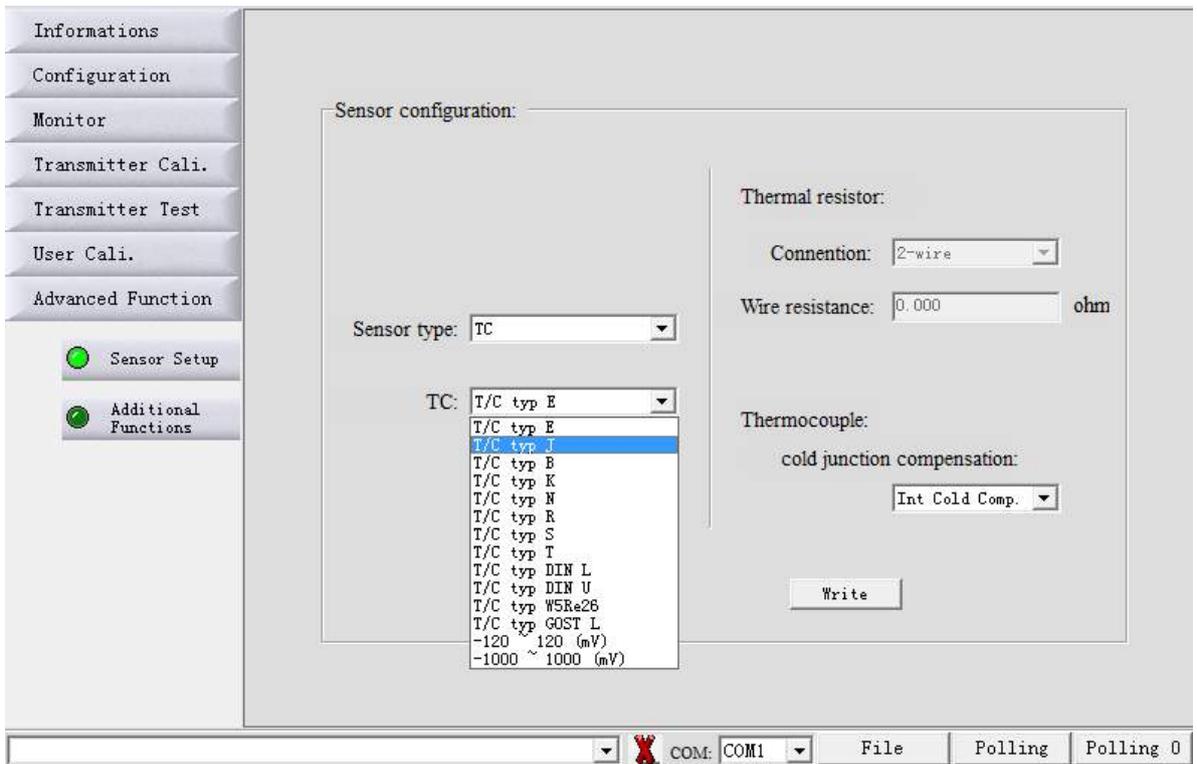
Whenever selected and made the change as desired, then choose the "Write" button to save.

9. SPARE PARTS

The **F500** instrument line, in its Temperature version, offers a wide variety of single pieces, also called spare parts. Practically all items can be purchased separately, through the list of codes below.

PRODUCT			
500-0010	: Blind Cover - Universal		
.	**MATERIAL**		
.	A	: Aluminum	
.	.	**PAINTING**	
.	.	1	: Standard
.	.	Z	: Special (see notes)
.	.	.	
500-0010	**A**	**1**	

PRODUCT			
500-0012	: Cover with Viewfinder - Universal		
.	**MATERIAL**		
.	A	: Alumimum	
.	.	**PAINTING**	
.	.	1	: Standard
.	.	Z	: Special (see notes)
.	.	.	
500-0012	**A**	**1**	

PRODUCT			
500-0018	: Housing with Hart terminal block for Temperature Transmitter (without cover)		
.	**MATERIAL**		
.	A	: Aluminum	
.	.	**PAINTING**	
.	.	1	: Standard
.	.	Z	: Special (see notes)
.	.	.	
500-0018	**A**	**1**	

PRODUCT	
500-0022	: Hart Terminal Block for Temperature Transmitter

PRODUCT		
500-0026	: L-type mounting support	
.	**MATERIAL**	
.	1	: Carbon steel
	2	: Stainless steel
.	.	
500-0026	**1**	

PRODUCT	
500-0070	: Hart Main Board for Temperature Transmitter

PRODUCT	
500-0014	: sealing ring for blind cover / with viewfinder – Buna N 7750

PRODUTO	
500-0016	: sealing ring for the electrical connection plug – Buna N 2117

10. WARRANTY

The **F500T** Intelligent Temperature Transmitter has a 12 month warranty.
Such warranty becomes invalid once the following situations are detected:
- Incorrect installation of the instrument
- Use in inappropriate applications
- Mechanical damage by impacts

Electrical damage as a result of damage from other instruments in the industrial plant.

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