

FOSTEN

AUTOMATION



F500-ECO

ECONOMIC PRESSURE TRANSMITTER

HART
COMMUNICATION PROTOCOL



www.fosten.com.br

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1. GENERAL DESCRIPTION

The F500-ECO economic pressure transmitter, is designed for use in industrial environments, offering reliable, accurate and stable measurement of liquids, gases and vapors. Compact construction, robust and easy to install, in addition to excellent precision, are some of the features that complete the F500-ECO to meet the requirements of the most critical industrial processes.

2. MAIN APPLICATIONS

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

3. MAIN CHARACTERISTICS

- Diaphragm in Stainless Steel
- Low financial cost
- Compact size
- Easy installation and configuration via software

4. TECHNICAL CHARACTERISTICS

The following are the main technical characteristics of the F500ECO economic pressure transmitter.

Type of sensor	Piezo resistivo
Rangeability	-1 to 250 bar
Exit sign	4 to 20 Ma
Communication Protocol	Hart
Feeding	9 to 32 Vcc
Operating Temperature	-20 °C to 85 °C
Accuracy	±0,2%
Degree of protection	IP66
Thermal stability	< 0,2% F.E / year

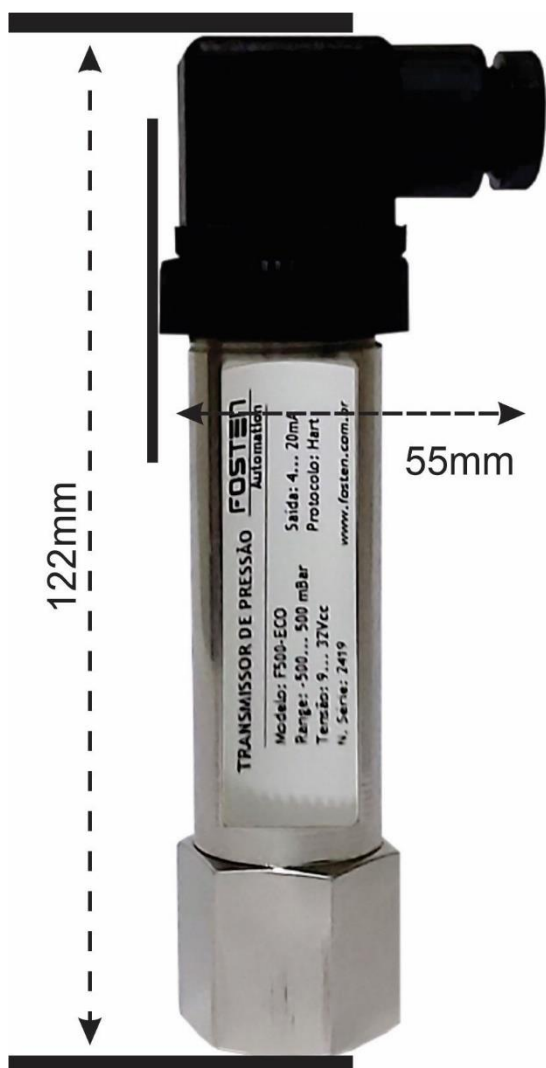
5. TYPES OF TRANSMITTERS

The economic pressure transmitter **F500** can be supplied in three versions:

- Manometric (**F500-ECO**)
- Level (**F500-ECOL**)
- Sanitary (**F500-ECOS**).

As you run through this manual, we will have the details of these models.

6. DIMENSIONAL



7. F500-ECO ECONOMIC MANOMETRIC PRESSURE TRANSMITTER

The F500-ECO economic manometric pressure transmitter is ideal for applications where there is a need for direct mounting in the process. For greater ease and agility in the field, it can be supplied from the factory with a male or female connection, thus making it easy to be installed by the user.

Below we have the sale codes for purchasing.



PRODUCT						
F500-ECO	: Economic Manometric Pressure Transmitter					
.	COMMUNICATION PROTOCOL					
.	H	: 4 to 20 mA Hart				
.	.	CALIBRATION RANGE				
.	.	1	: -1 to 1 bar			
.	.	2	: -1 to 10 bar			
.	.	3	: -1 to 50 bar			
.	.	4	: -1 to 100 bar			
.	.	5	: -1 to 250 bar			
.	.	Z	: Special			
.	.	.	STRUCTURE MATERIAL			
.	.	.	I	: Stainless Steel Tube		
.	.	.	.	DIAPHRAGM MATERIAL		
.	.	.	.	I	: Stainless Steel	
.	.	.	.	.	ELECTRICAL CONNECTION	
.	.	.	.	D	: DIN Connector	
.	.	.	.	.	PROCESS CONNECTION	
.	.	.	.	.	M	: 1/2 NPT Male
.	.	.	.	.	F	: 1/2 NPT Female
F500-ECO	H	1	I	I	D	M

8. F500-ECOL ECONOMIC FLANGED LEVEL AND PRESSURE TRANSMITTER

The economic flanged level and pressure transmitter F500 can be made with different types of level socket. A wide variety of flange sizes, pressure class, diaphragm sheet material and filling fluid allow for precise specification of the best service or process to be controlled.



Flange size	1", 2", 3", 4", Special
Pressure class	150#, 300#, 600#
Extension length	00 mm, 50 mm, 100 mm, 150 mm, 200 mm, Special
Diaphragm sheet	Stainless Steel, Hastelloy, Moxnel 400, Tantalum, Stainless Steel with Halar or Tefzel coating
Filling fluid	Silicon DC704, Silicon DC200, Neobee

Below we have the sale codes for purchasing.

PRODUCT										
F500-ECOL	: Economic Pressure And Level Transmitter									
	COMMUNICATION PROTOCOL									
	H	: 4 to 20 mA Hart								
	CALIBRATION RANGE									
	1	: -1 to 1 bar								
	2	: -1 to 10 bar								
	3	: -1 to 50 bar								
	4	: -1 to 100 bar								
	5	: -1 to 250 bar								
	Z	: Special								
	STRUCTURE MATERIAL									
	I	: Stainless Steel Tube								
	DIAPHRAGM MATERIAL									
	I	: Stainless Steel								
	ELECTRICAL CONNECTION									
	D	DIN Connector								
	LEVEL FLANGE CONNECTION									
	1	: 1" 150 # (ANSI B16.5)	A	: 4" 150 # (ANSI B16.5)						
	2	: 1" 300 # (ANSI B16.5)	B	: 4" 300 # (ANSI B16.5)						
	3	: 1" 600 # (ANSI B16.5)	C	: 4" 600 # (ANSI B16.5)						
	4	: 2" 150 # (ANSI B16.5)	D	: DN25 PN 10/40						
	5	: 2" 300 # (ANSI B16.5)	E	: DN40 PN 10/40						
	6	: 2" 600 # (ANSI B16.5)	F	: DN50 PN 10/40						
	7	: 3" 150 # (ANSI B16.5)	G	: DN80 PN 10/40						
	8	: 3" 300 # (ANSI B16.5)	H	: DN100 PN 10/16						
	9	: 3" 600 # (ANSI B16.5)	Z	: Special						
	LEVEL FLANGE EXTENSION SIZE									
	0	: 00 mm								
	1	: 50 mm								
	2	: 100 mm								
	3	: 150 mm								
	4	: 200 mm								
	Z	: Special								
	LEVEL FLANGE MATERIAL									
	1	: Stainless Steel								
	LEVEL FLANGE DIAPHRAGM MATERIAL									
	1	: Stainless Steel								
	2	: Hastelloy								
	3	: Monel 400								
	4	: Tantalum								
	5	: Hallar Coating								
	6	: Tefzel Coating								
	LEVEL FLANGE FILLING OIL									
	1	: Silicone DC704								
	2	: Silicone DC200								
	3	: Neobee								
	Z	: Special								
F500-ECOL	H	3	I	I	D	7	0	1	1	1

9. F500-ECOS ECONOMIC PRESSURE AND SANITARY TRANSMITTER

The economic pressure and sanitary transmitter F500-ECOS can be made with different types of sanitary connection. A wide variety of flange sizes, pressure class, diaphragm sheet material and filling fluid allow for precise specification of the best service or process to be controlled.



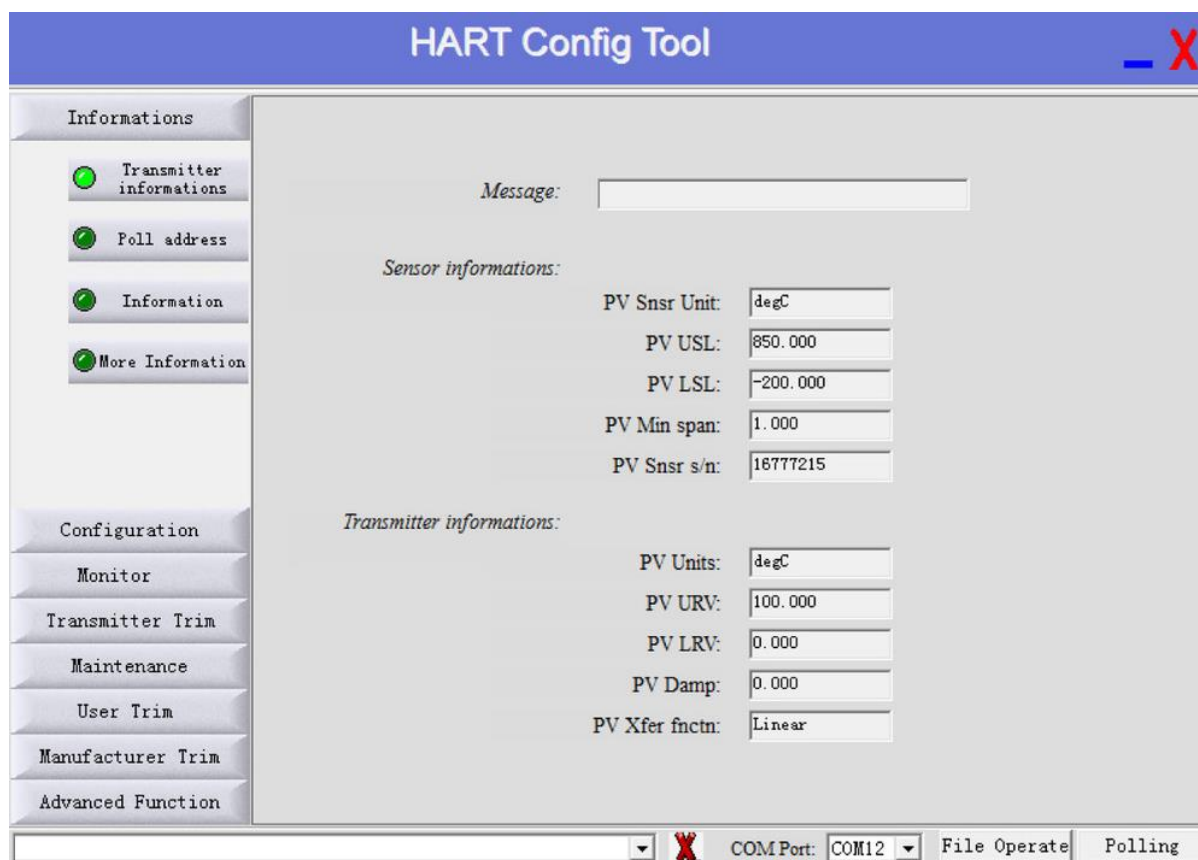
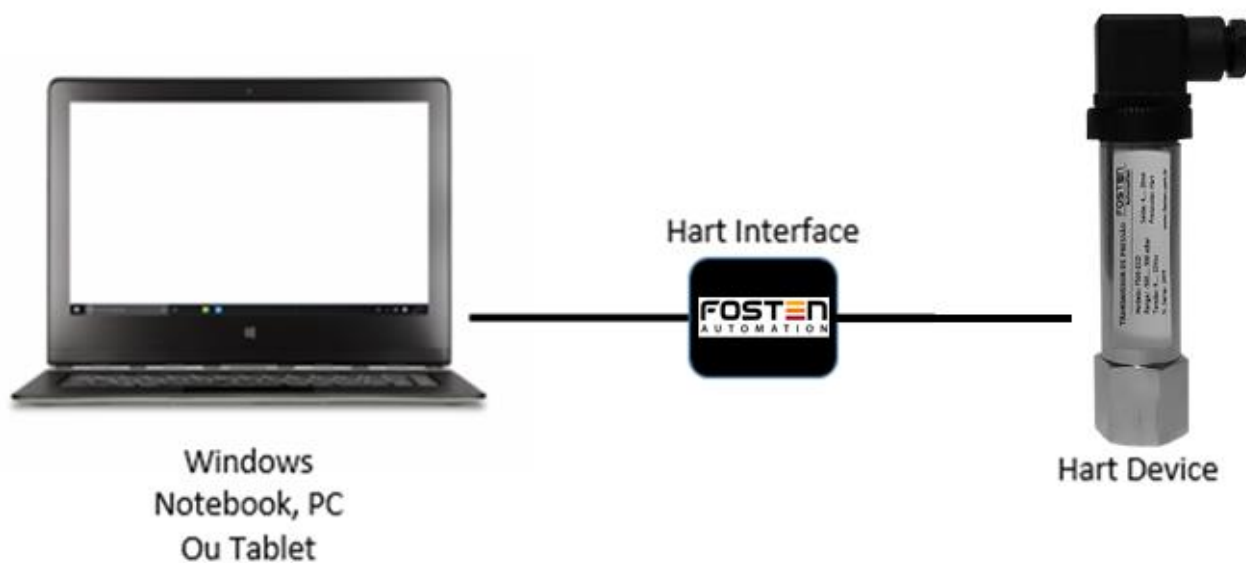
Types of connection	Tri – Clamp, SMS, IDF, RJT
Diaphragm sheet	Stainless Steel, Hastelloy, Moxnel 400, Tantalum, Stainless Steel with Halar or Tefzel coating
Filling fluid	Silicon DC704, Silicon DC200, Neobee

Below we have the sale codes for purchasing.

PRODUCT											
F500-ECOS		: Economic Pressure And Sanitary Transmitter									
		COMMUNICATION PROTOCOL									
		H	: 4 to 20 mA Hart								
		CALIBRATION RANGE									
		1	: -1 to 1 bar								
		2	: -1 to 10 bar								
		3	: -1 to 50 bar								
		4	: -1 to 100 bar								
		5	: -1 to 250 bar								
		Z	: Special								
		STRUCTURE MATERIAL									
		I	: Stainless Steel Tube								
		DIAPHRAGM MATERIAL									
		I	: Stainless Steel								
		ELECTRICAL CONNECTION									
		D	: DIN Connector								
		SANITARY FLANGE CONNECTION									
		1	: Tri-Clamp 1 1/2" Without Extension				B	: IDF 2" With Extension			
		2	: Tri-Clamp 2" With Extension				C	: IDF 2" Without Extension			
		3	: Tri-Clamp 2" Without Extension				D	: IDF 3" With Extension			
		4	: Tri-Clamp 3" With Extension				E	: IDF 3" Without Extension			
		5	: Tri-Clamp 3" Without Extension				F	: RJT 2" With Extension			
		6	: SMS 1 1/2" Without Extension				G	: RJT 2" Without Extension			
		7	: SMS 2" With Extension				H	: RJT 3" With Extension			
		8	: SMS 2" Without Extension				I	: RJT 3" Without Extension			
		9	: SMS 3" With Extension				Z	: Special			
		A	: SMS 3" Without Extension								
		SANITARY FLANGE MATERIAL									
		1	: Stainless Steel								
		SANITARY FLANGE DIAPHRAGM MATERIAL									
		1	: Stainless Steel								
		2	: Hastelloy								
		3	: Monel 400								
		4	: Tantalum								
		5	: Hallar Coating								
		6	: Tefzel Coating								
		SANITARY FLANGE FILLING OIL									
		1	: Silicone DC704								
		2	: Silicone DC200								
		3	: Neobee								
		Z	: Special								
F500-ECOS	H	3	I	I	D	5	1	1	1		

10. 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.



10.1. 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.
By choosing the "Information" button, all the information contained in the instrument will appear.

Information
Configuration
Monitor
Transmitter Adjustment
Transmitter Test
Maintenance
User Calibration
Manufacturer Calibration
Advanced Functions

Message:

Sensor Information:

PV (Process Variable) Sensor Unit:

PV USL (Upper Sensor Limit):

PV LSL (Lower Sensor Limit):

PV Min Span:

PV Sensor S/N:

Transmitter Information:

PV Unit:

PV URV (Upper Range Value):

PV LRV (Lower Range Value):

PV Damp:

Xfer Functn(Transfer Function):

COM: COM1 File Polling Polling 0

10.2. CALIBRATION

To adjust the calibration range, just choose the "Configuration" button.
In the "Range" sub-option, 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 pressure or minimum value) and the URV boxes (high pressure or maximum value). Making change, click on the "Write" button to confirm and save.

Information
Configuration
Monitor
Transmitter Adjustment
Transmitter Test
Maintenance
User Calibration
Manufacturer Calibration
Advanced Functions

Range
Zero/Span Setup
Output
Fault Protection

Sensor Information:

PV Sensor S/N:

PV USL: PV LSL:

PV Sensor Unit: PV Min Span:

Transmitter Output Range:

PV Unit:

PV URV:

PV LRV:

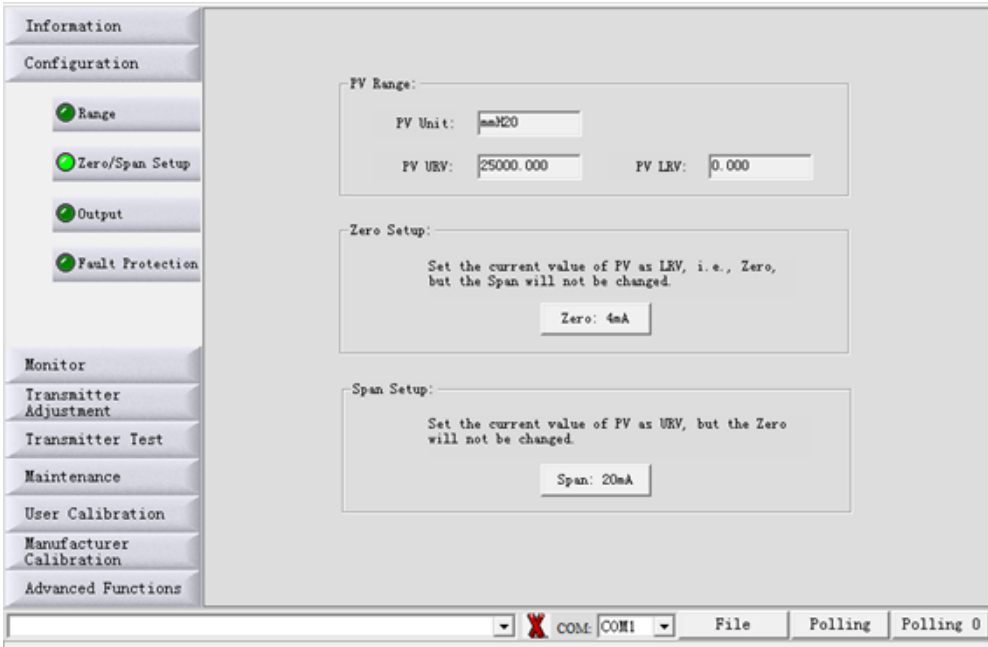
Read Write

COM: COM1 File Polling Polling 0

10.3. CURRENT TRIM

To perform the current trim, choose the “Configuration” button and the “Zero / Span Setup” sub-option.

On the next screen that will open, choose the “Zero: 4mA” button to adjust the current value to 4 mA, taking the minimum value (LRV) as a reference. Choose the “Span: 4mA” button to adjust the current value to 20 mA, having as reference the maximum value (URV).

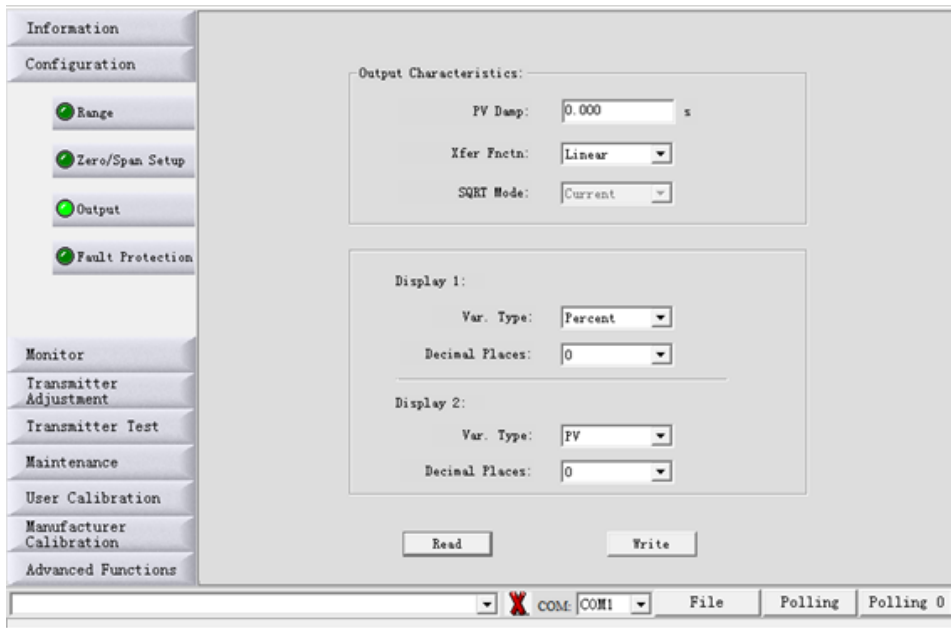


10.4. DAMP, LINEAR OUTPUT OR SQUARE ROOT AND USER UNIT

To adjust options such as Damp, output to linear type or square root extraction, 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 in the “Output Characteristics” box the options for Damp, linear function, or square root.

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

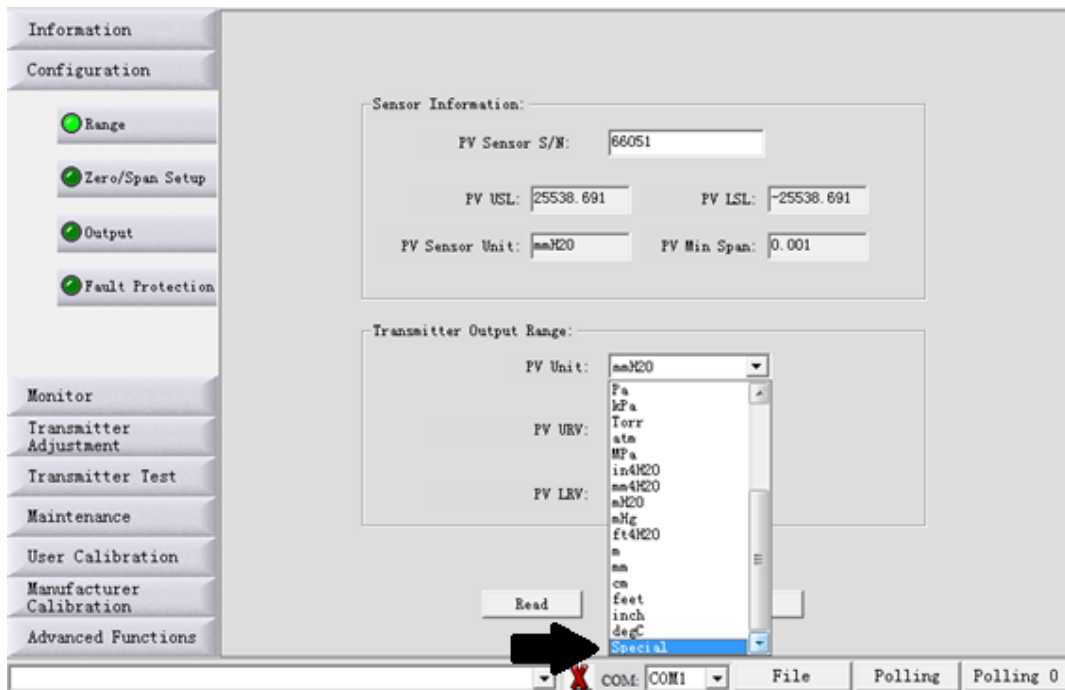


10.5. INCLUDING USER UNIT

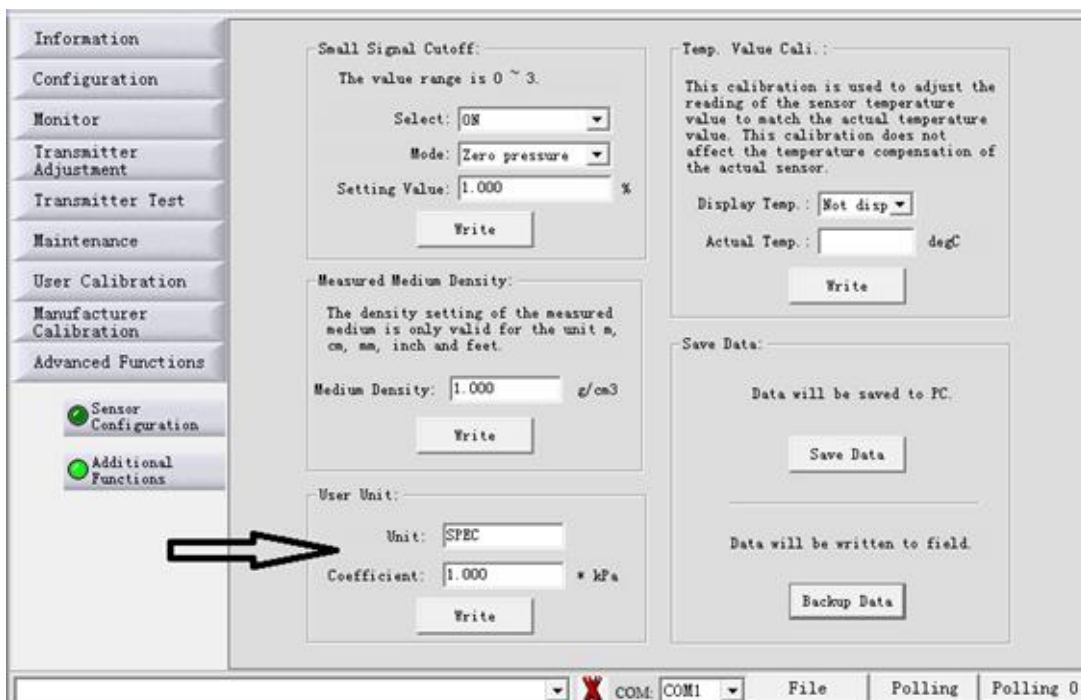
To include a user unit (drive), choose the "Configuration" button and the sub-option: "Range". In the box "Transmitter Output Range", option "PV Unit", select the desired unit.

If the unit to be chosen is not listed for choice, it will be necessary to make a simple adjustment as described below:

a) In the "PV Unit" select "Special". At this time, the calibration value will automatically be converted to kpa.



b) Go to the last button "Advanced Functions" and choose the sub-option: "Additional Functions" as shown on the following screen.



In the "User Unit" box, indicated by the arrow in the previous figure, write the user unit you want to use.
Enter the value of the "Coefficient", which must always be the maximum value of the calibration range divided by the maximum value of the user unit range.

Example:

The instrument works from 0 to 25000 mmH₂O, which transformed into Kpa will be from 0 to 244727 kpa.

The user unit you want to work with is from 0 to 200 m³/h.

So, the value of the "Coefficient" will be 244727 ÷ 200, which will result in 1223.63 (or 1224 rounded off to the decimal point).

$$\frac{\text{Maximum range value}}{\text{Maximum unit value}}$$

From this setting, the user unit m³/h, which did not exist in the selection list, starts to appear on the display of the instrument.

The screenshot shows a software interface for instrument configuration. On the left is a sidebar with menu items: Information, Configuration, Monitor, Transmitter Adjustment, Transmitter Test, Maintenance, User Calibration, Manufacturer Calibration, and Advanced Functions. Under 'Advanced Functions', 'Sensor Configuration' and 'Additional Functions' are marked with green checkmarks. The main panel contains several configuration sections:

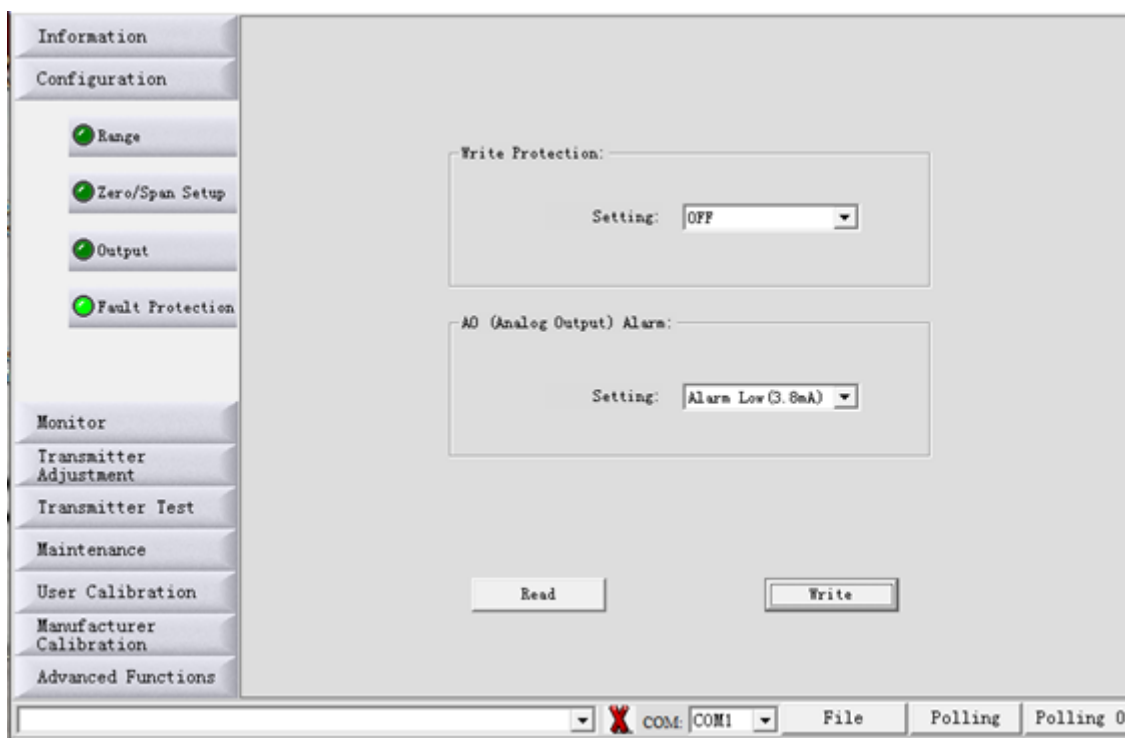
- Small Signal Cutoff:** The value range is 0 ~ 3. Select: ON (dropdown), Mode: Zero pressure (dropdown), Setting Value: 1.000 (%). A 'Write' button is present.
- Measured Medium Density:** The density setting of the measured medium is only valid for the unit m, cm, mm, inch and feet. Medium Density: 1.000 (g/cm³). A 'Write' button is present.
- User Unit:** Unit: m³/h (dropdown), Coefficient: 1.224 (* kPa). A 'Write' button is present. A large black arrow points to this section.
- Temp. Value Cali.:** This calibration is used to adjust the reading of the sensor temperature value to match the actual temperature value. This calibration does not affect the temperature compensation of the actual sensor. Display Temp.: Not disp (dropdown), Actual Temp.: (input field) degC. A 'Write' button is present.
- Save Data:** Data will be saved to PC. A 'Save Data' button is present. Data will be written to field. A 'Backup Data' button is present.

At the bottom, there is a status bar with a dropdown menu, a red 'X' icon, 'COM: COM1', and buttons for 'File', 'Polling', and 'Polling 0'.

10.6. WRITING AND ALARM PROTECTION

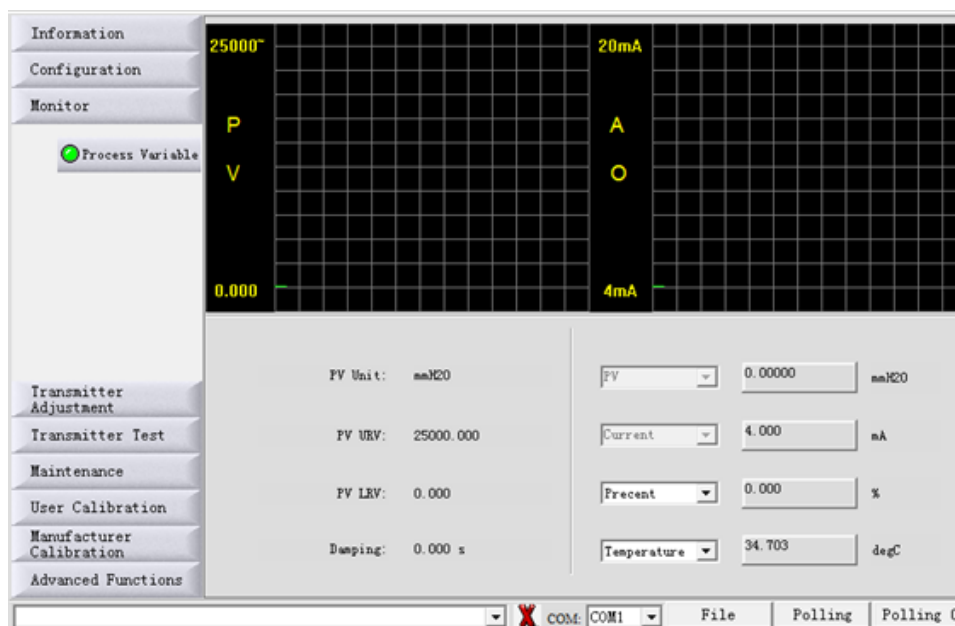
To enable the writing protection, preventing allowed changes to the configuration already made and saved in the memory of the instrument, simply choose the "Configuration" button and the sub-option: "Fault Protection".

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.



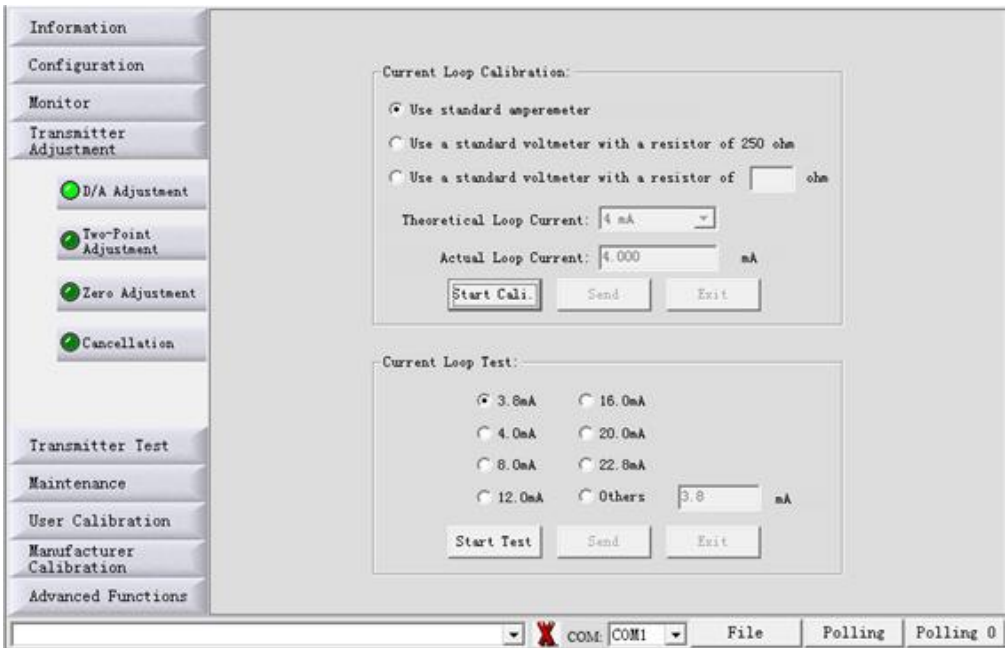
10.7. MONITORING VARIABLES

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.



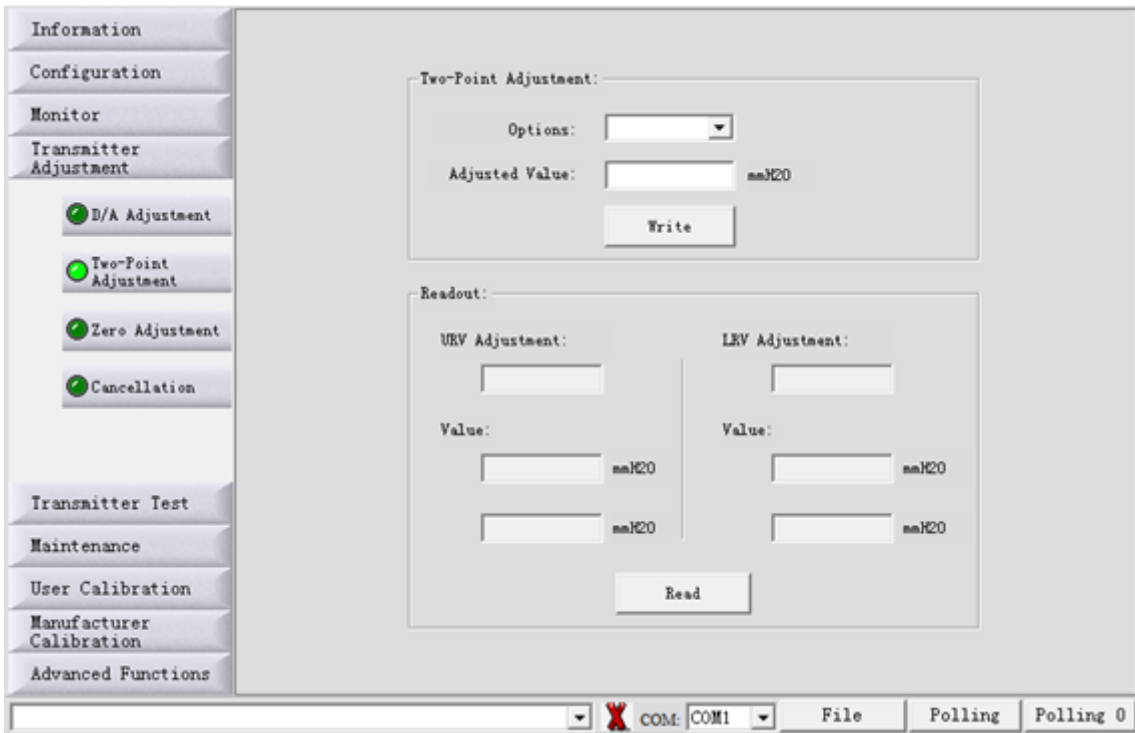
10.8. CURRENT TRIM AND LOOP

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.

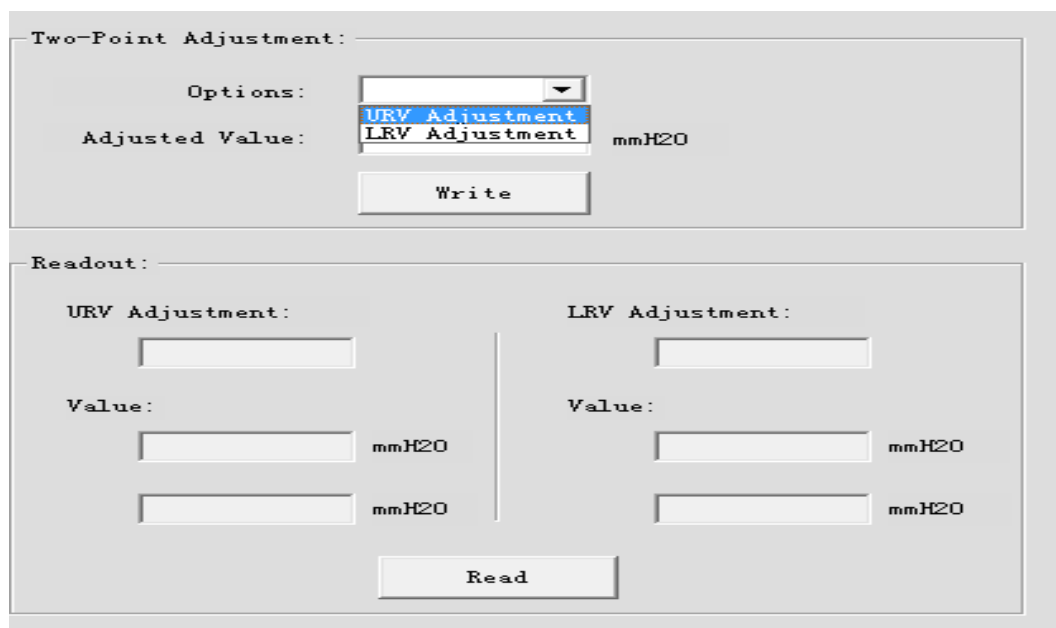


10.9. LOWER TRIM AND UPPER TRIM

To perform the pressure trims, choose the “Transmitter Adjustment” button and the sub-option: “Two-Point Adjustment”.



In the "Options" selection box, you can choose whether you want to make a lower trim or a higher trim.

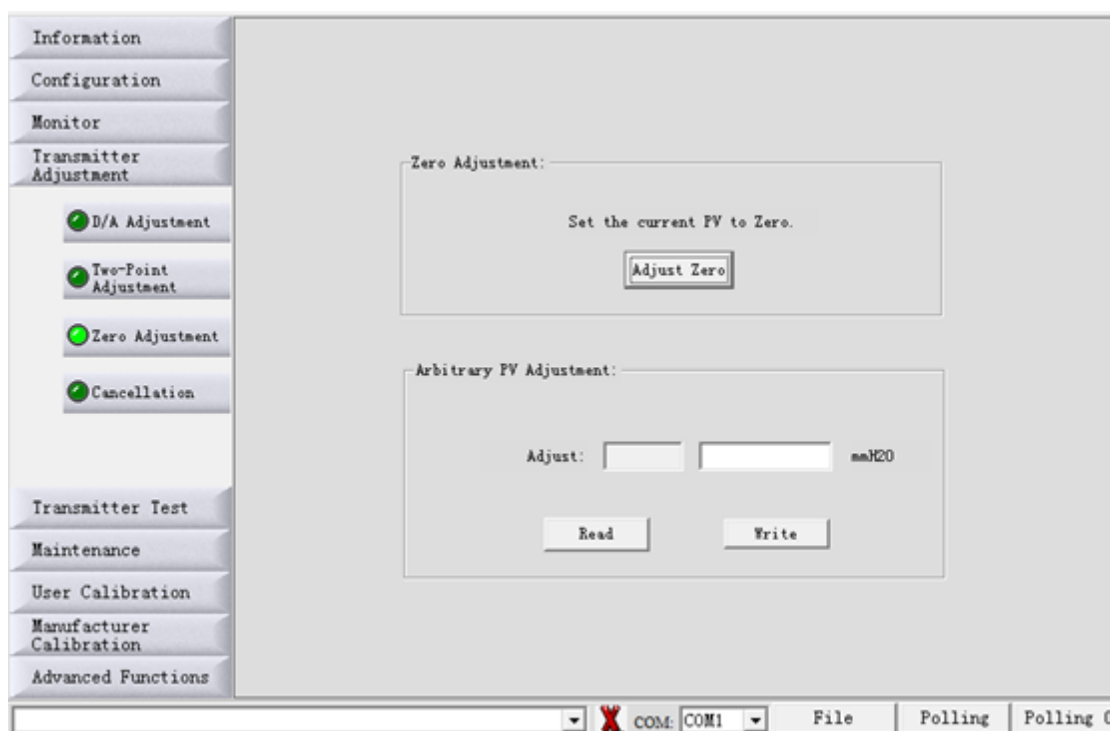


The "Two-Point Adjustment" dialog box contains the following elements:

- Options:** A dropdown menu with "URV Adjustment" and "LRV Adjustment" options. "URV Adjustment" is currently selected.
- Adjusted Value:** A text input field.
- Unit:** A label "mmH2O".
- Write:** A button to save the adjustment.
- Readout:** A section with two columns:
 - URV Adjustment:** Includes a "Value:" label, a text input field, and a "mmH2O" unit label.
 - LRV Adjustment:** Includes a "Value:" label, a text input field, and a "mmH2O" unit label.
- Read:** A button to refresh the readout values.

10.10. ZERO TRIM

To perform the zero trim, choose the "Transmitter Adjustment" button and the sub-option: "Zero Adjustment".



The "Transmitter Adjustment" dialog box features a sidebar menu and a main content area:

- Sidebar Menu:** Includes "Information", "Configuration", "Monitor", "Transmitter Adjustment" (selected), "Transmitter Test", "Maintenance", "User Calibration", "Manufacturer Calibration", and "Advanced Functions". Under "Transmitter Adjustment", there are four sub-options: "D/A Adjustment", "Two-Point Adjustment", "Zero Adjustment" (selected), and "Cancellation".
- Main Content Area:**
 - Zero Adjustment:** A section with the instruction "Set the current PV to Zero." and an "Adjust Zero" button.
 - Arbitrary PV Adjustment:** A section with an "Adjust:" label, two text input fields, and a "mmH2O" unit label. Below this are "Read" and "Write" buttons.
- Status Bar:** At the bottom, it shows a dropdown menu, a red "X" icon, "COM: COM1", and buttons for "File", "Polling", and "Polling 0".

11. WARRANTY

O transmissor econômico **F500-ECO** possui garantia de 12 meses.

Tal garantia torna-se inválida uma vez detectadas as situações a seguir:

- Instalação incorreta do instrumento
- Utilização em aplicações indevidas
- Danos mecânicos por impactos
- Danos elétricos por consequências de avarias oriundas de outros instrumentos da planta industrial

The **F500-ECO** Economic Pressure 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.

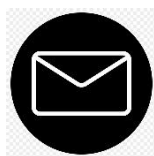


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