

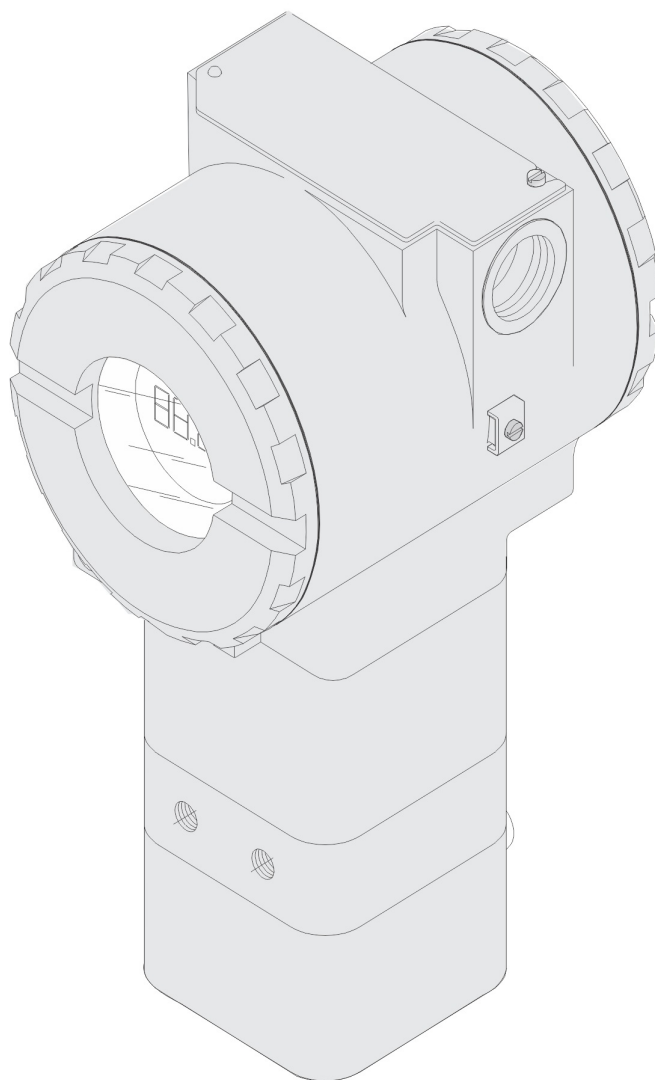
smar - TP290

JUN/21
TP290
VERSION 1

OPERATION AND MAINTENANCE
INSTRUCTION MANUAL

POSITION TRANSMITTER

4 to 20 mA



TP290ME



Specificatinos and information are subject to change without notice.
Up-to-date address information is available on our website.

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INTRODUCTION

The TP290 is from the well-know family of SMAR's devices. It is a transmitter for position measurements. It can measure displacement or movement of rotary or linear type. The digital technology provide an easy interface between the field and control room and several interesting features that considerably reduce the installation, operation and maintenance costs.

The TP290 is versatile and reliable, and has very high accuracy. It may be used for control valve stem position measurement, or in any other position sensing application such as louvers, dampers, crushers, etc.

The TP290 is very versatile, users can standardize one position indicator for all different kinds of control valves and other machines, keeping spares and training to a minimum.

The TP290, besides the normal function of position measurement and 4-20mA output generation, offers the following functions:

- ✓ Linear or Rotary Travel type;
- ✓ 0.1% F.S.;
- ✓ Position Calibration (4 and 20 mA points) via Local Adjustment or Remote Calibration via Hand Held Terminal;
- ✓ Non contact position sensing;
- ✓ Optional LCD indicator;
- ✓ Diagnostics and Configuration via adjust local.

Get the best results of the TP290 by carefully reading these instructions.

NOTE

This manual is compatible with version 1.XX, where 1 denotes software version and XX software release. The indication 1.XX means that this manual is compatible with any release of software version 1.

Waiver of responsibility

The contents of this manual abides by the hardware and software used on the current equipment version. Eventually there may occur divergencies between this manual and the equipment. The information from this document are periodically reviewed and the necessary or identified corrections will be included in the following editions. Suggestions for their improvement are welcome.

Warning

For more objectivity and clarity, this manual does not contain all the detailed information on the product and, in addition, it does not cover every possible mounting, operation or maintenance cases.

Before installing and utilizing the equipment, check if the model of the acquired equipment complies with the technical requirements for the application. This checking is the user's responsibility.

If the user needs more information, or on the event of specific problems not specified or treated in this manual, the information should be sought from Smar. Furthermore, the user recognizes that the contents of this manual by no means modify past or present agreements, confirmation or judicial relationship, in whole or in part.

All of Smar's obligation result from the purchasing agreement signed between the parties, which includes the complete and sole valid warranty term. Contractual clauses related to the warranty are not limited nor extended by virtue of the technical information contained in this manual.

Only qualified personnel are allowed to participate in the activities of mounting, electrical connection, startup and maintenance of the equipment. Qualified personnel are understood to be the persons familiar with the mounting, electrical connection, startup and operation of the equipment or other similar apparatus that are technically fit for their work. Smar provides specific training to instruct and qualify such professionals. However, each country must comply with the local safety procedures, legal provisions and regulations for the mounting and operation of electrical installations, as well as with the laws and regulations on classified areas, such as intrinsic safety, explosion proof, increased safety and instrumented safety systems, among others.

The user is responsible for the incorrect or inadequate handling of equipments run with pneumatic or hydraulic pressure or, still, subject to corrosive, aggressive or combustible products, since their utilization may cause severe bodily harm and/or material damages.

The field equipment referred to in this manual, when acquired for classified or hazardous areas, has its certification void when having its parts replaced or interchanged without functional and approval tests by Smar or any of Smar authorized dealers, which are the competent companies for certifying that the equipment in its entirety meets the applicable standards and regulations. The same is true when converting the equipment of a communication protocol to another. In this case, it is necessary sending the equipment to Smar or any of its authorized dealer. Moreover, the certificates are different and the user is responsible for their correct use.

Always respect the instructions provided in the Manual. Smar is not responsible for any losses and/or damages resulting from the inadequate use of its equipments. It is the user's responsibility to know and apply the safety practices in his country.

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INSTALLATION

General

NOTE
The installation carried out in hazardous areas should follow the recommendations of the IEC60079-14 standard.

NOTE
See appendix "A" Hazardous Area Certifications.

The overall accuracy of measurement and control depends on several variables. Although the converter has an outstanding performance, proper installation is essential, in order to maximize its performance.

Among all factors, which may affect converter accuracy environmental conditions are the most difficult to control. There are, however, ways of reducing the effects of temperature, humidity and vibration.

In warm environments, the transmitter should be installed to avoid, as much as possible, direct exposure to the sun. Installation close to lines and vessels subjected to high temperatures should also be avoided. Use of sun shades or heat shields to protect the transmitter from external heat sources should be considered, if necessary.

Humidity is fatal to electronic circuits. In areas subjected to high relative humidity, the o-rings for the electronics cover must be correctly placed. Removal of the electronics cover in the field should be reduced to the minimum necessary, since each time it is re-moved, the circuits are exposed to the humidity.

The electronic circuit is protected by a humidity proof coating, but frequent exposures to humidity may affect the protection provided. It is also important to keep the covers tightened in place. Every time they are removed, the threads are exposed to corrosion, since these parts cannot be protected by painting. Code approved sealing methods on conduit entering the transmitter should be employed.

Although the transmitter is virtually insensitive to vibration, installation close pumps, turbines or other vibrating equipment should be avoided.

Mounting

The **TP290** mounting depends on the type movement, linear or rotary. Two brackets are required for mounting, one for the magnet and the other for the transmitter itself.

NOTE
Make sure that arrow engraved on the magnet coincides with the arrow engraved on the Position Transmitter when the system is in mid travel. When mounting the the Position Transmitter, consider that:
1 . There is no friction between the internal magnet face and the position sensor salience all over the travel (rotary or linear).
2. A minimum distance of 2 mm to of 4 mm distance is recommended between the magnet external face and the Position Transmitter face.

Should the transmitter installation change, or magnet change, or should any other modification, the transmitter will require a re-calibration.

IMPORTANT
If the self diagnostics detect a transmitter failure, for example the loss of the power, the analog signal will go to 3.9 mA or to 21.0 mA to alert the user (High or low alarm signal is user selectable).

The following Figures 1.1 and 1.3 show both linear and rotary typical mounting:

Rotary Movement

Install the magnet on the valve stem using the magnet mounting bracket.

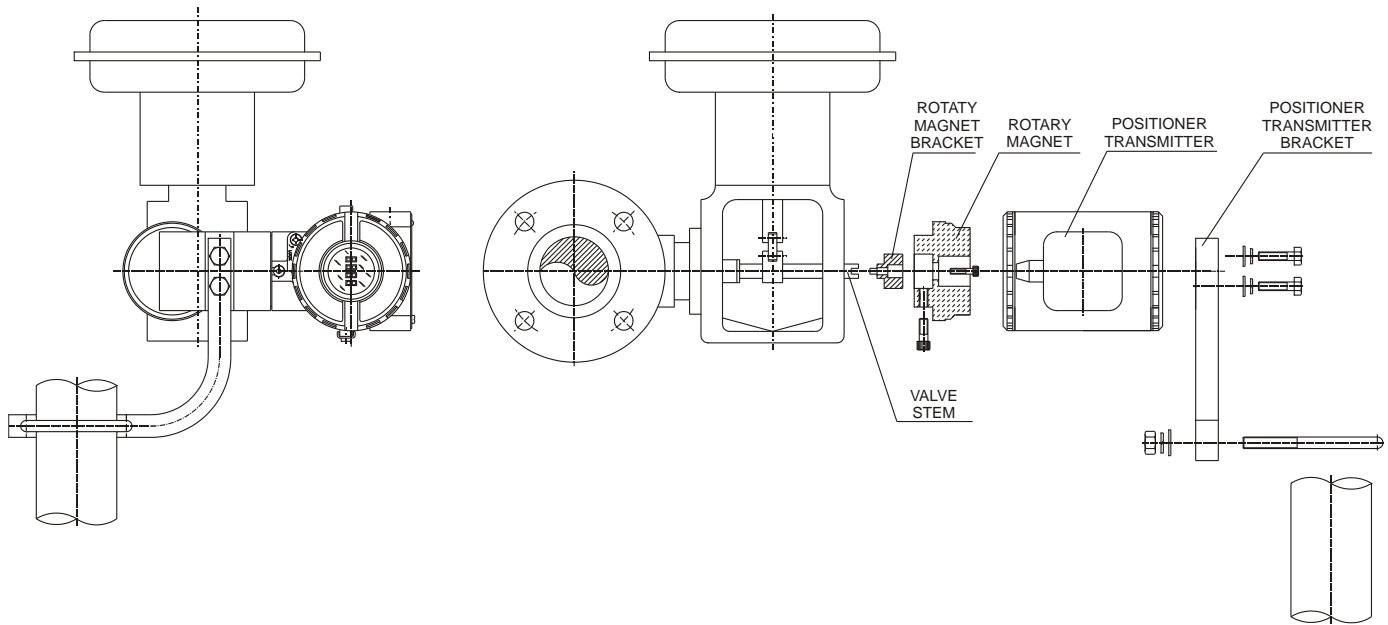


Figure 1.1 - Transmitter on a Rotary Actuator

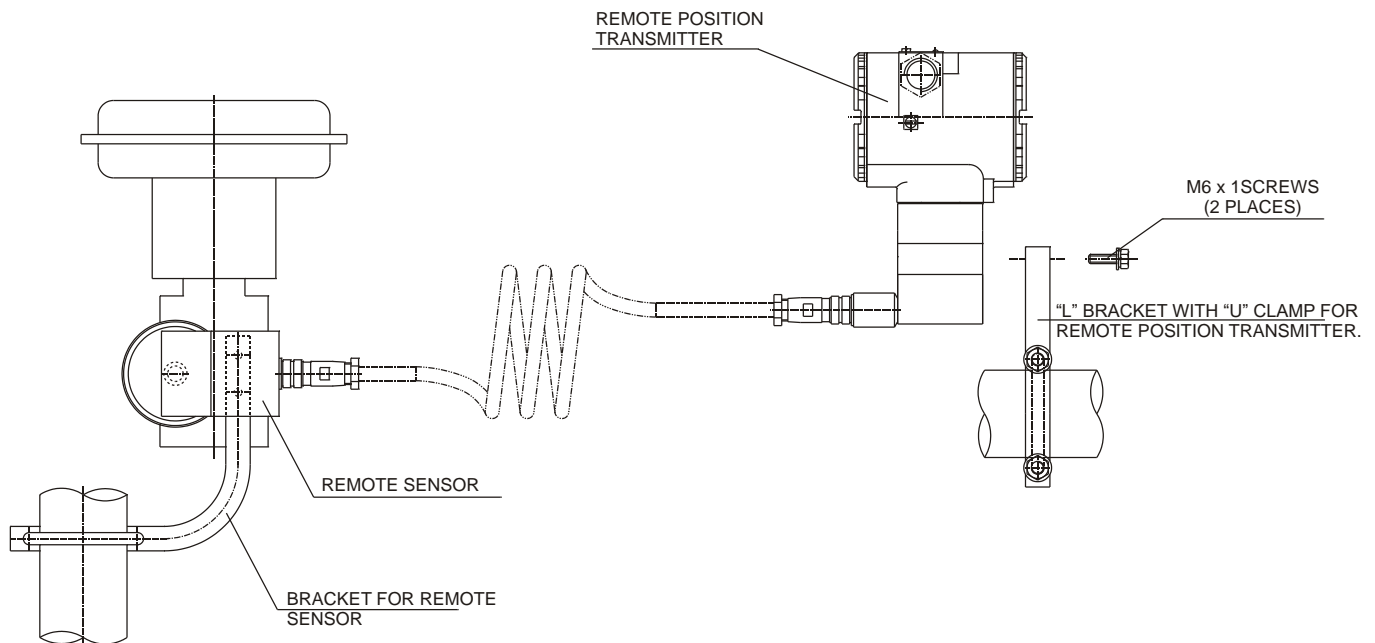


Figure 1.2 – Position Transmitter on Rotary Actuator with Remote Position Sensor

Linear Movement

Install the magnet on the valve stem using the magnet mounting bracket.

The linear magnet movement must be orthogonal in relation to the main axis of the position transmitter. For example, if the linear magnet movement is vertical, the transmitter main axis must be horizontal, as show in Figure 1.3.

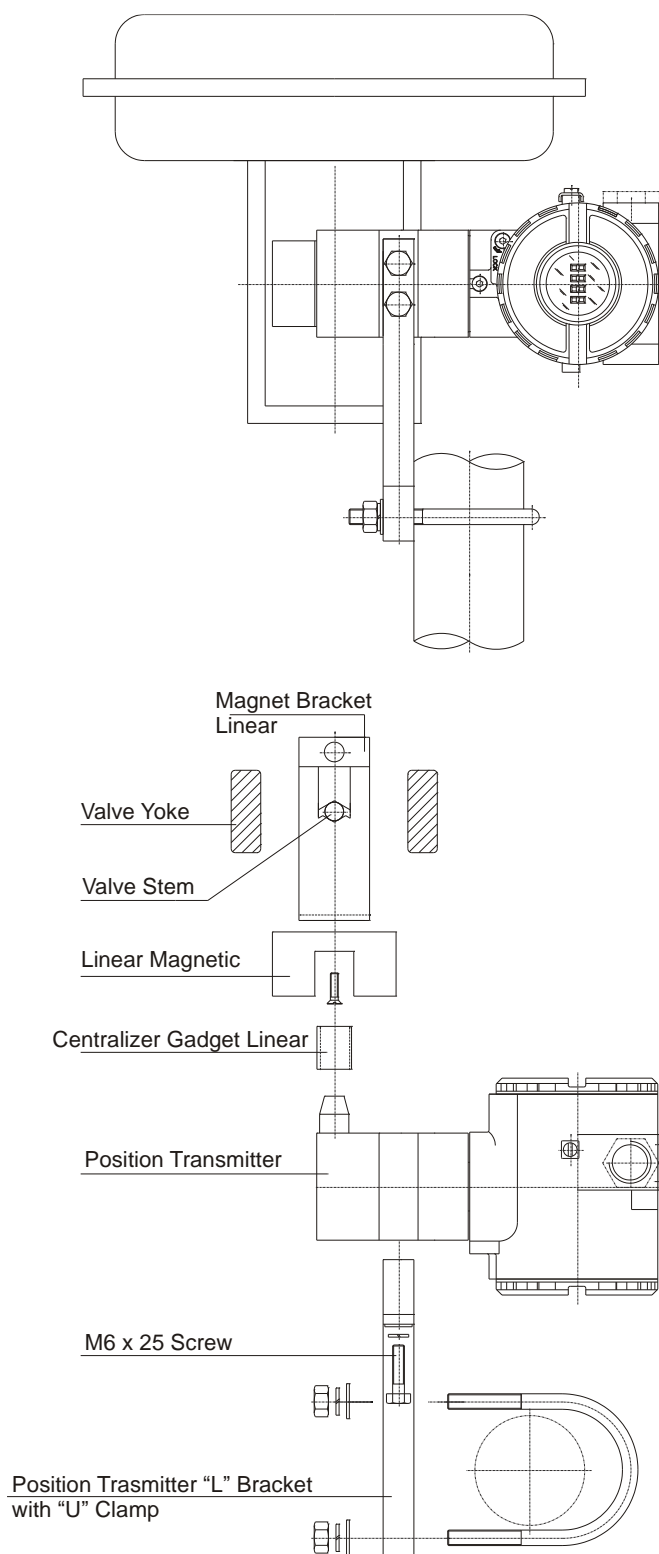


Figure 1.3 - Transmitter on a Linear Actuator

NOTE

Follows the centering device of the linear magnet on the packaging. See Figure 1.12.

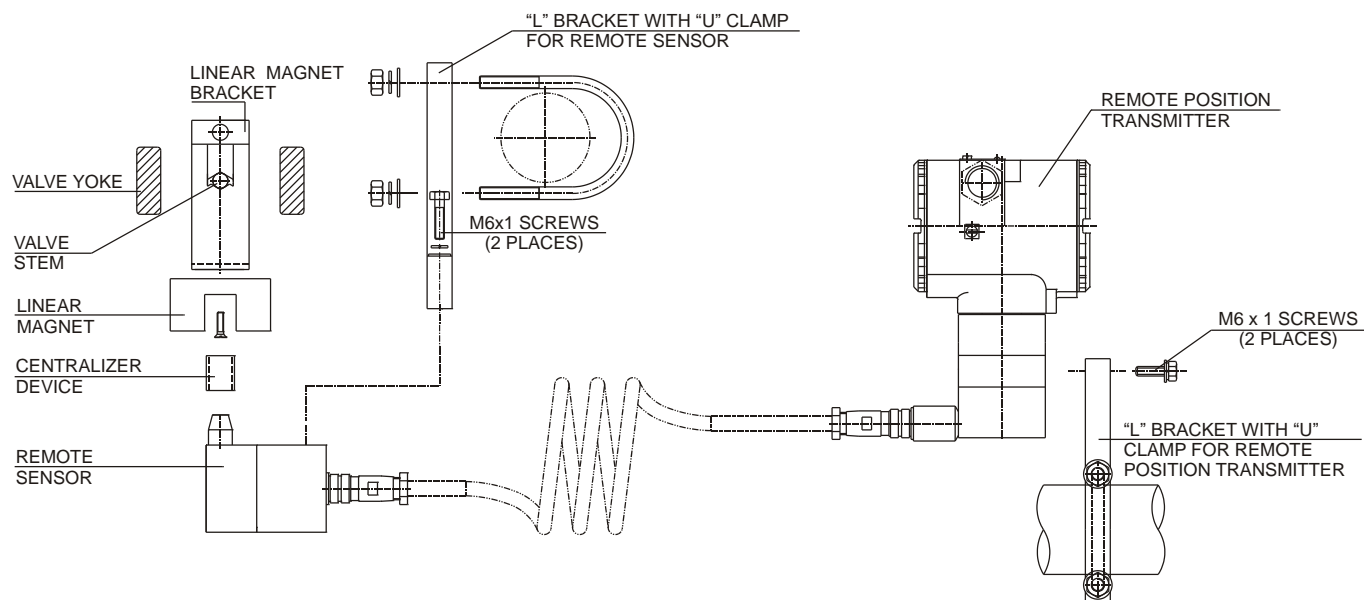
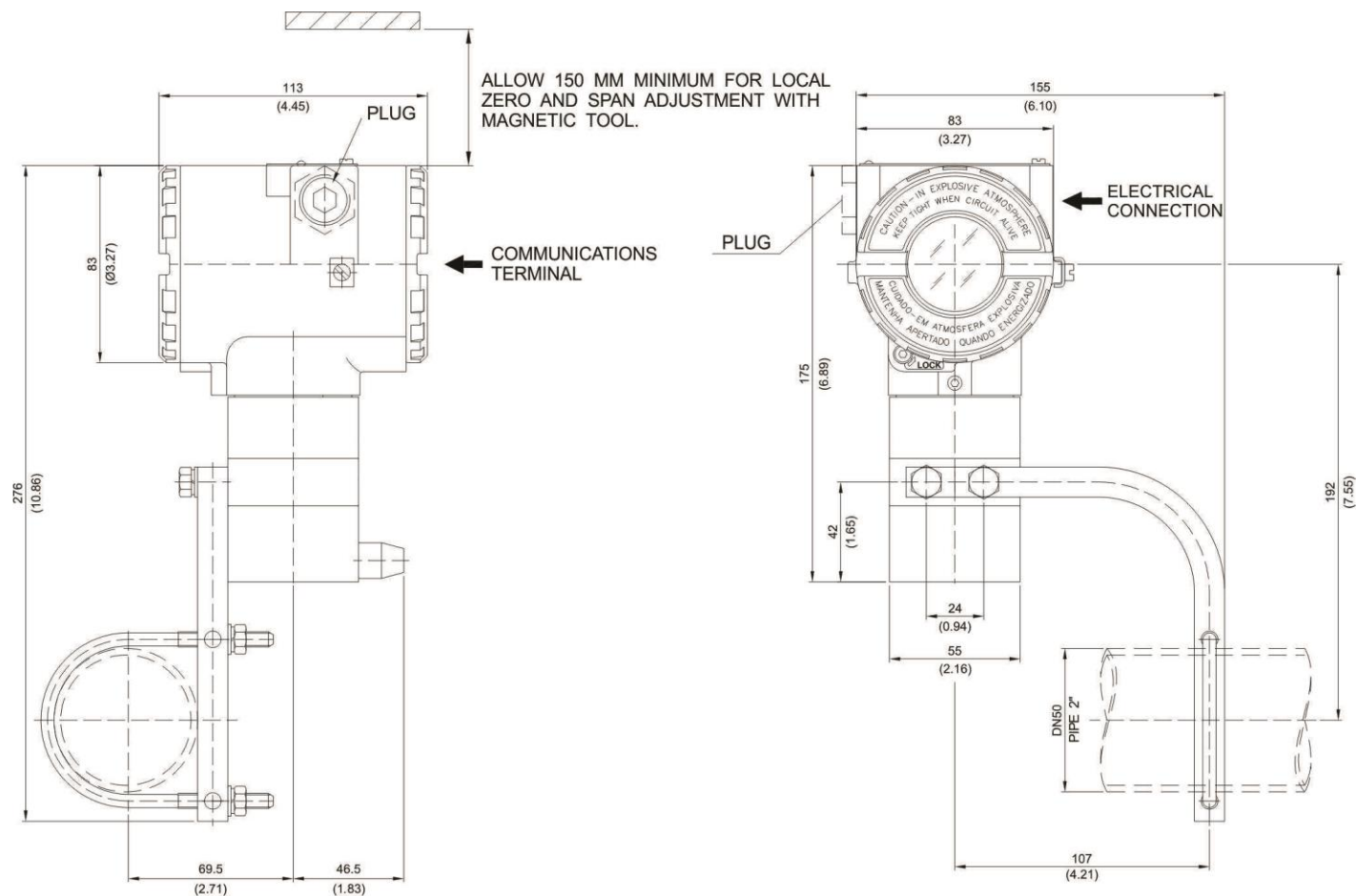
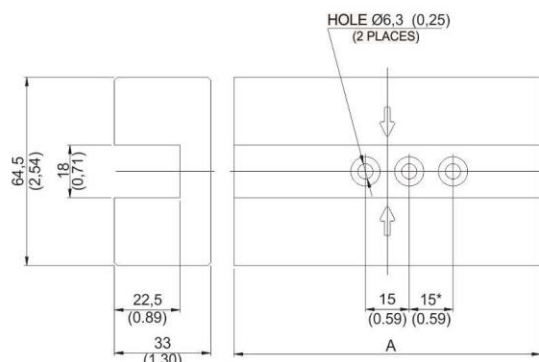


Figure 1.4 – Position Transmitter on Linear Actuator with Remote Position Sensor

See below the **TP290**, dimensional drawings.



LINEAR MAGNET



*ONLY FOR 50 AND 100 mm TRAVELS.

ROTARY MAGNET

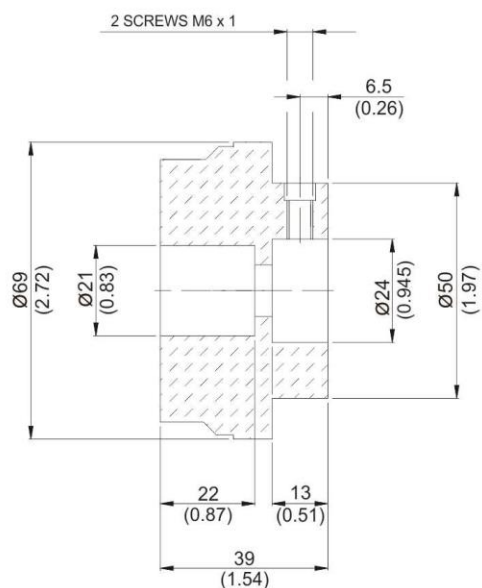


Figure 1.5 – TP290 Dimensional Drawing / Magnets Dimensional Drawing

REMOTE SENSOR

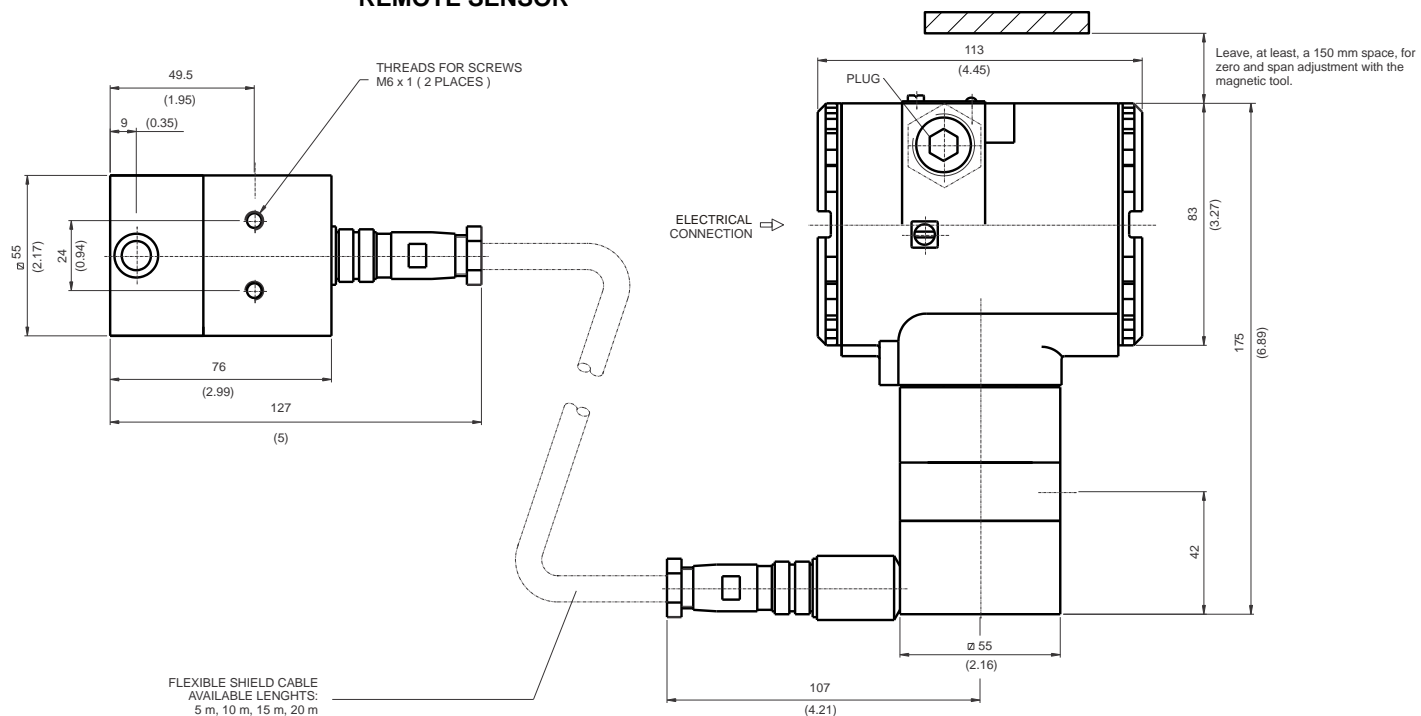


Figure 1.5.a – Remote Sensor Dimensional Drawing

SPECIAL MOUNTING BRACKET – ROTARY VDI / VDE NAMUR

Mounting bracket of the position transmitter for rotary valves actuated via type actuators rack and pinion, designed to comply with NAMUR VDI/VDE.

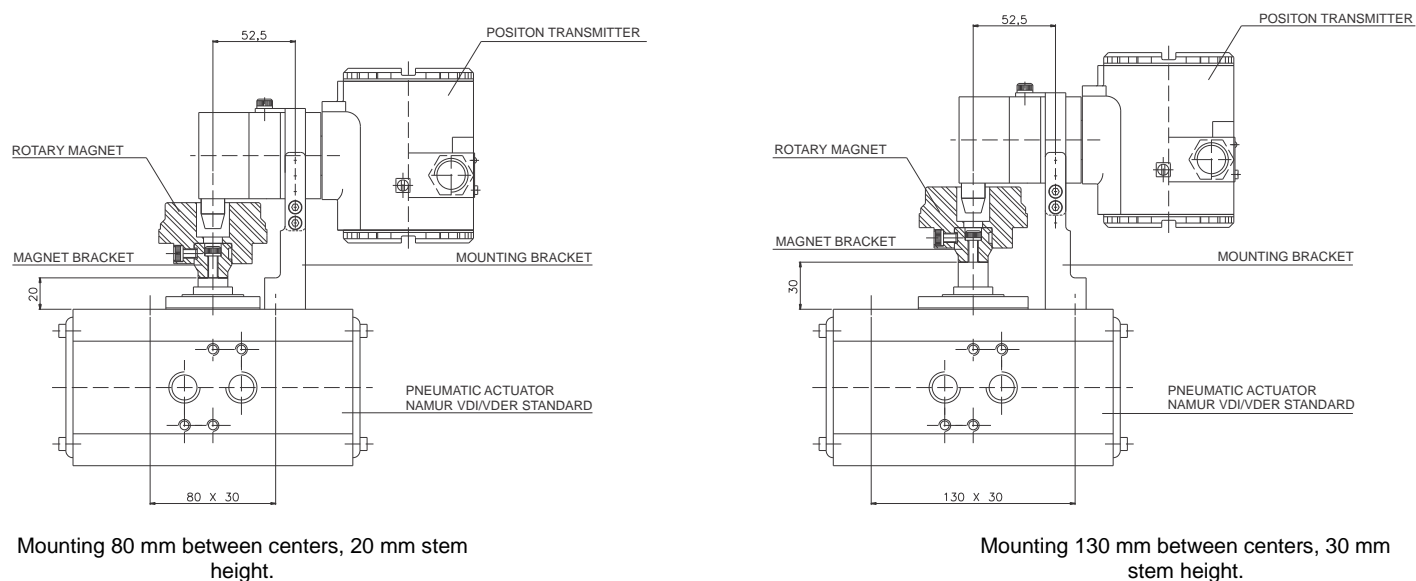


Figure 1.5.b – Special Mounting Bracket Dimensional Drawing - Rotary VDI / VDE NAMUR

Electronic Housing Rotating

The electronic housing rotates for a better digital display reading. To rotate it, release the housing rotation screw.

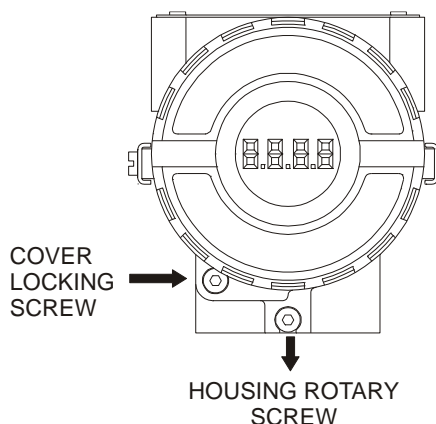


Figure 1.6 - Cover Locking and Housing Rotation Set Screw

The digital display also rotates for better reading. See Section 4. To access the terminal block for electronic connections, remove the cover locking screw.

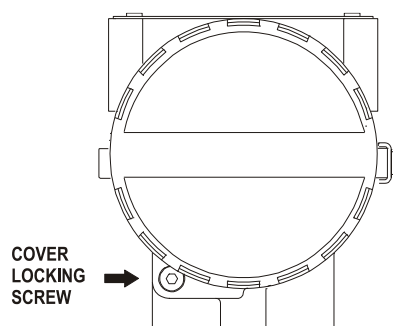


Figure 1.7 - Cover Locking Screw

Electric Wiring

The terminal block accepts forks or eye-type connectors. **Test terminals** allow measuring the current in the 4 - 20 mA loop, without opening it. To measure it, connect a multimeter in the mA scale in the "-" and "+" terminals.

For convenience there are two ground terminals: one inside the cover and one external, located close to the conduit entries.

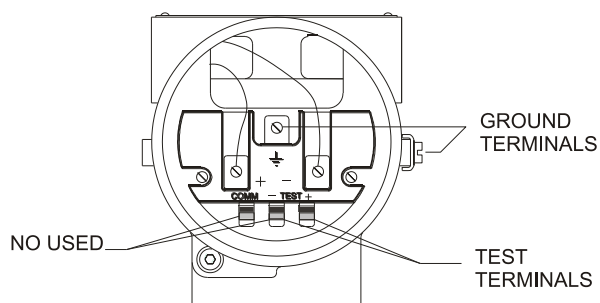


Figure 1.8 - Wiring Block

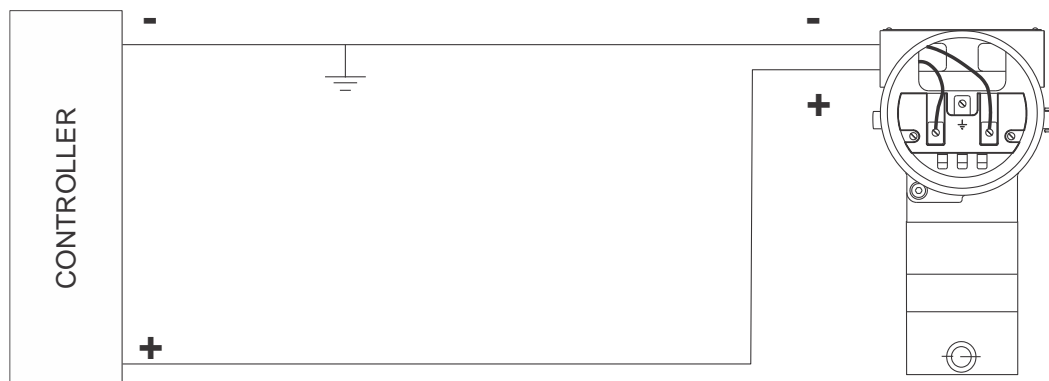
Use of twisted pair (22 AWG or greater than) cables is recommended. Avoid routing signal wiring cables close to power cables or switching equipment.

The **TP290** is protected against reverse polarity, and supports $\square 50$ mA without damage.

The following figures show the possibilities for **TP290** connections.

The **TP290** connection could be done conform the figure 1.9 and 1.10.

It is also recommended to ground the shield of shielded cables at one end only. The non grounded end must be carefully isolated.



SIGNAL LOOP MAY BE GROUNDED AT ANY POINT OR LEFT UNGROUNDED.

Figure 1.9 - TP290 Wiring Diagram

NOTE

Make sure that the transmitter is operating within the operating area as shown on the load curve (Figure 1.10).

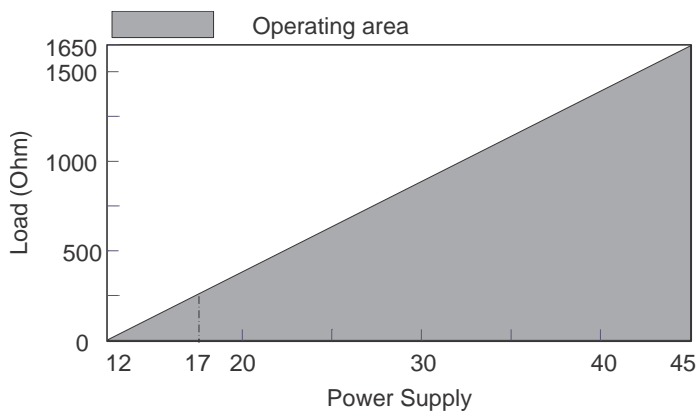


Figure 1.10 - Load Curve

Recommendations for mounting Approved Equipment with the IP66/68 W certifications (“W” indicates certification for use in saline atmospheres)

NOTE

This **TP290** certification is valid for stainless steel transmitter manufactured, approved with the certification IP66/68 W. All transmitter external material, such as plugs, connections etc., should be made in stainless steel.
The electrical connection with 1/2” – 14NPT thread must use a sealant. A non-hardening silicone sealant is recommended.
The instrument modification or replacement parts supplied by other than authorized representative of Smar is prohibited and will void the certification.

Rotary and Linear Magnet

The Figure 1.11 shows typical shapes for both magnets. For better transmitter performance, the linear magnet is presented with different lengths. Consult the ordering code table for the best choice.

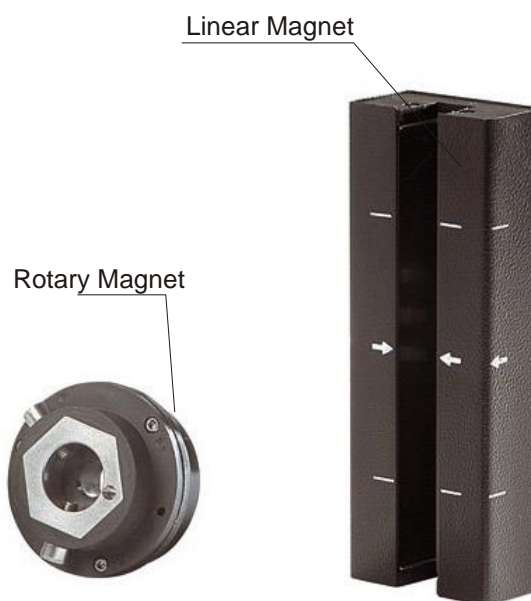


Figure 1.11 – Linear and Rotary Magnet Models

Centering Device of the Linear Magnet



NOTE

Centralizing device of the linear magnet is used for any model of linear mounting bracket.

Figura 1.12 - Centralizing device of the linear magnet

Remote Position Sensor

The remote magnetic position sensor, based on hall effect, is recommended for high temperature or extreme vibration applications. It prevents excessive wear of the equipment and, consequently, increasing the transmitter lifetime

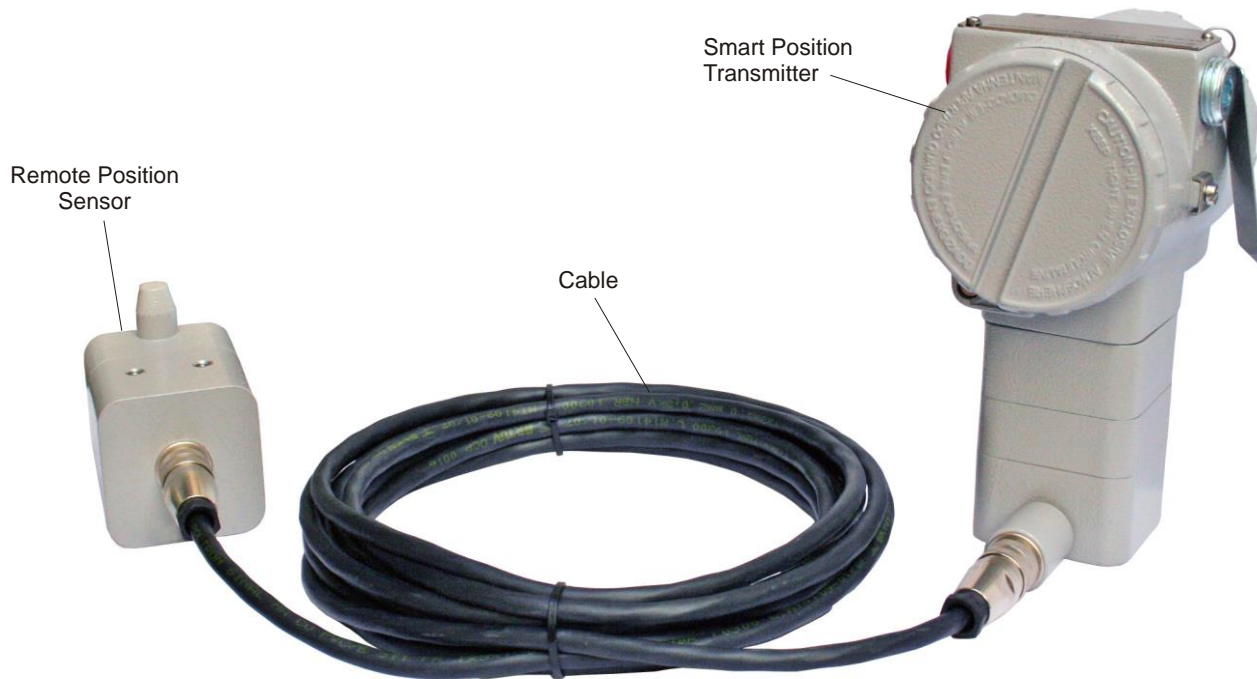


Figure 1.13 - Remote Position Sensor

The electric signals on the remote sensor's cable and connections are of low intensity. Therefore, when installing the cable inside the conduit (maximum limit 20 (meters) length), keep it away from possible sources of induction and/or magnetic interference. The cable supplied by Smar is shielded with excellent protection against electromagnetic interference, but despite of this protection, it is recommended to avoid the cable sharing the same conduit with other cables.

The connector for Remote Position Sensor is easy to handle and simple to install.

See the installation procedure:

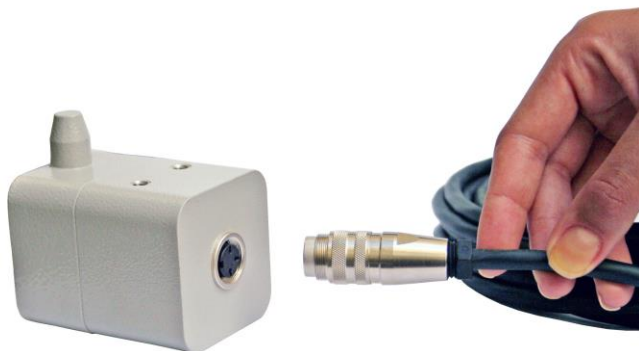


Figure 1.14 - Connecting the Cable to the Remote Position Sensor



Figure 1.15 - Connecting the Cable to the Position Transmitter

Installation in Hazardous Areas

Consult the Appendix A for Hazardous Location Approvals.

Section 2

OPERATION

Functional Description – Hall Sensor

The Position Sensor supplies an output voltage proportional to the applied magnetic field. This magnetic sensor, based on hall effect, is ideal for sensing linear or rotative position. The mechanical vibrations do not affect Position Sensor.

Functional Description-Electronics

Refer to the block diagram (Figure 2.1). The function of each block is described below.

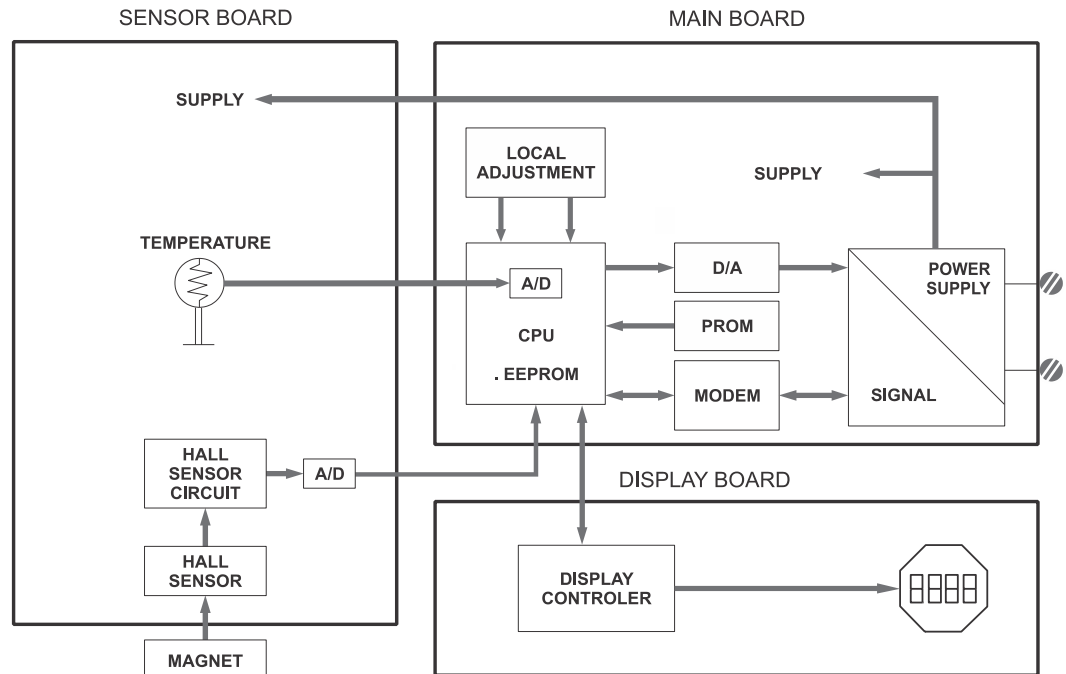


Figure 2.1 – TP290 Block Diagram

A/D

Receives the 4 - 20 mA signal and converts it in the digital format for the CPU.

D/A

Receives the signal from the CPU and converts it to an analog voltage proportional the measurement position.

Hall Effect Sensor

Measures the actual position.

Temperature Sensor

Measures the temperature of the control circuit and inform the CPU.

CPU Central Processing Unit, RAM, PROM and EEPROM

The CPU is the intelligent portion of the transmitter, being responsible for the management and operation of block execution, self-diagnostics and communication. The program is stored in PROM. For temporary storage of data there is a RAM. The data in the RAM is lost if the power is switched off, however the device also has a nonvolatile EEPROM where data that must be retained is stored. Examples of such data are: calibration and **TP290** configuration.

Power Supply

The transmitter circuit receives supply from a 4 - 20 mA power supply or take power of Loop_Line to power the transmitter circuit this is, of course, limited to 3.8 mA.

Display Controller

Receives data from the CPU and drives the (LCD) Liquid Crystal Display.

Local Adjustment

Local adjustment is provided by means of two magnetically actuated switches with no external electric or mechanical contact, by using a magnetic screwdriver.

THE LOCAL INDICATOR

The local indicator is required for signaling and operation in local adjustment.

Normal Indicator

During normal operation, the **TP290** remains in the monitoring mode and the display indicates the valve position, either as a percentage or as a current readout. The magnetic tool activates the local programming mode, by inserting it in orifice Z on the housing.

The possible configuration and monitoring operation are shown on Figure 2.2.

Upon receiving power, the **TP290** initializes the position indication on the display, by showing model **TP290** and its software version (X.XX). Should the indication be higher than □19999 it will be displayed as a two digit and an exponent.

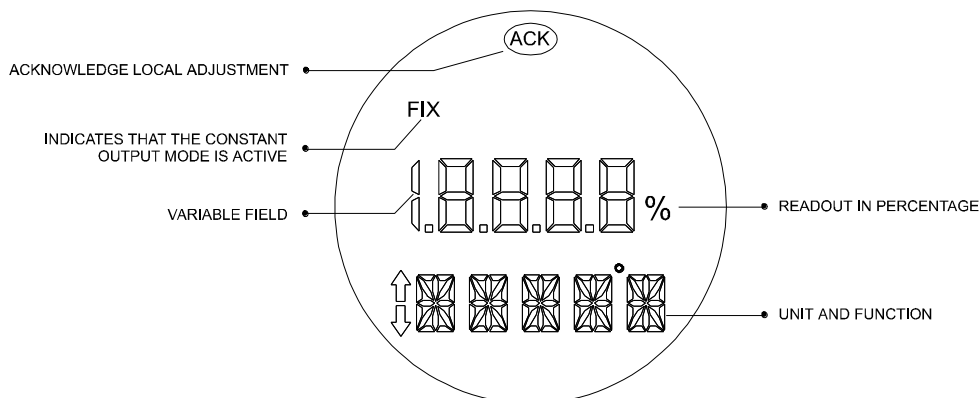


Figure 2.2 – Normal Indicator

Monitoring

During normal operation, TP290 remains in the monitoring mode. Figure 2.3 shows the positioning.

The display simultaneously shows a readout and some other information.

Normal displaying is interrupted when the magnetic tool is placed in office Z (Local Adjustment), entering the programming mode local adjustment.

The above mentioned figure shows the result of tool insertion in orifices Z and S, which inform, respectively, movement and actuation of the selected options.

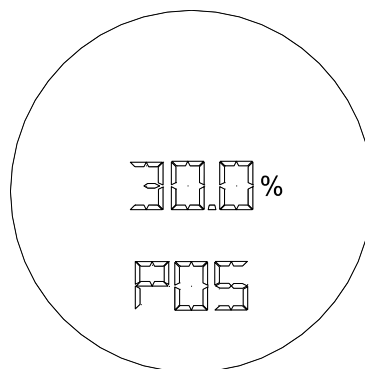


Figure 2.3 – Typical Indicator

PROGRAMMING USING LOCAL ADJUSTMENT

To enable local adjustment, the jumper “W1” located on top of the main board shall be connected to the pins where the word “ON” is engraved on the circuit board.

There are two orifices on the Transmitter, under the nameplate, identified by “S” and “Z” respectively, which provide access to two magnetic switches actuated by means of a magnetic tool (Refer to Figure 3.1).

NOTE

In this section the “Magnetic Tool” will be referred to as “TOOL”, and the orifices identified by “S” and “Z” will be “ORIFICE S” and “ORIFICE Z”, respectively.

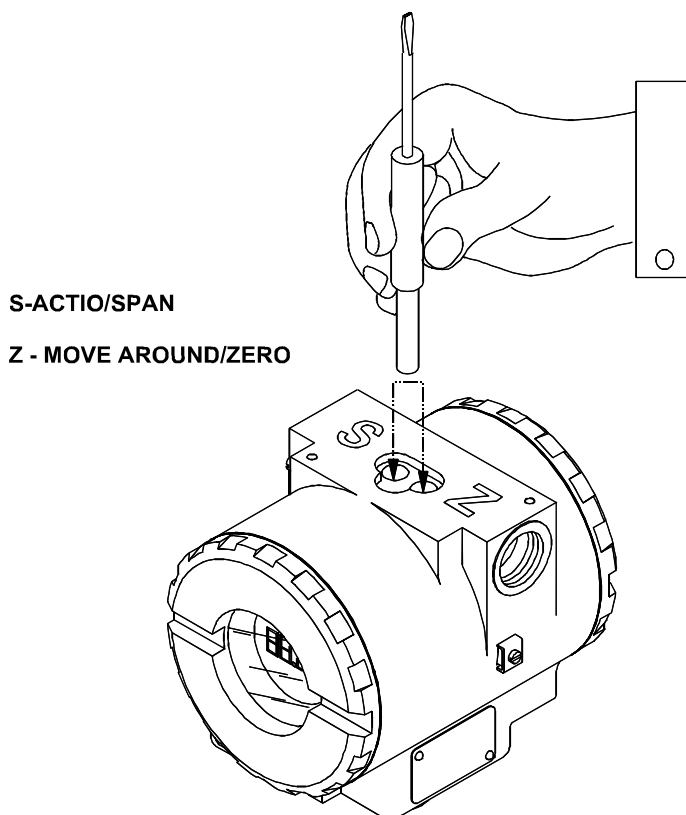


Figure 3.1 – Orifices of the Local Adjust

Table 3.1- shows the results of what actions on “Z” and “S” cause on the TP290.

ORIFICE	ACTION
Z	Function browsing.
S	Selects the displayed function.

Table 3.1 - Orifices on the Case

Jumper Connection

Jumper W2 connected in SI

If the jumper W2 is connected in SI, simple local adjustment enabled, the calibration can be done at the position of 0% inserting the cable of the key in the hole Z and 100% inserting it in the hole S.

Jumper W2 Connected in COM

With the jumper connected in COM, complete local adjustment enabled, it is allowed to alter the unit to be shown, the Direct or Reverse indication and to calibrate the lower position (LOPOS) or the upper position (UPPOS).

NOTE

After gauging these values, we advised to leave the jumper W2 in OFF (disabled) to avoid that somebody for negligence adjusts the transmitter erroneously.

Local Programming Tree

The programming tree is a tree shaped structure with a menu of all available software functions, as shown on Figure 3.2.

While in local Adjustment, it is possible to browse through all configuration options by keeping the magnetic tool in orifice “Z”. Upon choosing the option as described, place the tool in orifice “S” in order to actuate.

By keeping the tool in orifice “S” it is possible to continuously actuate the selected parameter, since this is a numeric valve. Actions by increment are performed by repeatedly placing and removing the magnetic tool until reaching the desired value.

NOTE

Every parameter actuation shall be performed judiciously, since actuation writes configuration parameters on a permanent basis and does not require confirmation by the use. Once an actuation is performed it is assumed to be the desired configuration.

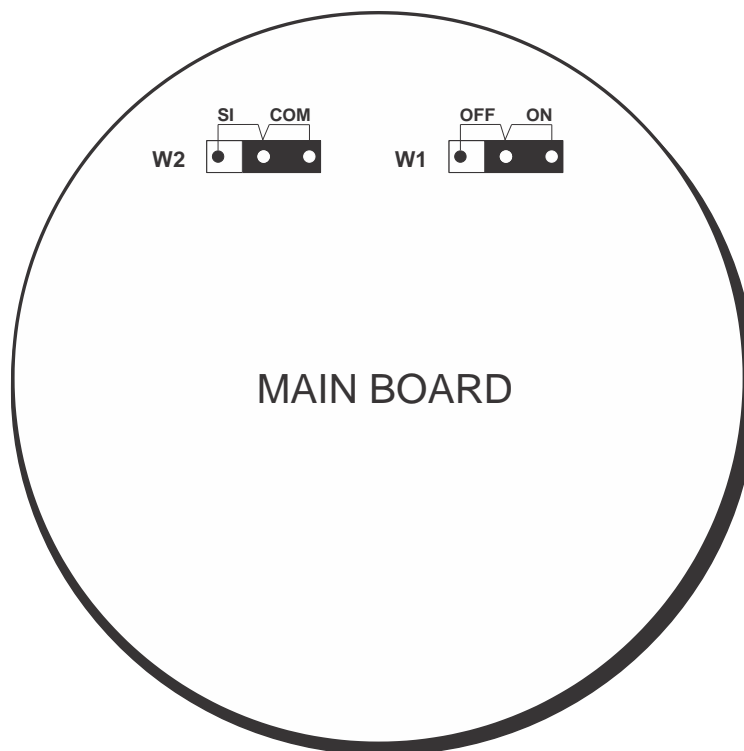


Figure 3.2 – Jumpers W2 and W1

Procedure to Calibrate the Position Transmitter

Calibration Using the Jumper in Simple Local Adjustment

If the Simple Local adjustment is enabled, only the Lower and Upper Position can be adjusted. To adjust them position the magnet in the lower point of the stroke and insert the magnet part of the tool in the hole **Z**. To adjust the upper value, position the magnet in the upper point and insert the tool in the hole **S**. After this, move the magnet and check the indications of other positions. Repeat the procedures if necessary.

Calibration using the jumper in Complete Local Adjustment

If the Complete Local adjustment is enabled, the unit and the direct or reverse indication can be configured and the lower and upper positions of the stroke can be adjusted. To adjust the lower and upper position, refer to the procedures of the calibration of the Simple Local Adjustment. The Figure 3.3 shows how to travel the options.

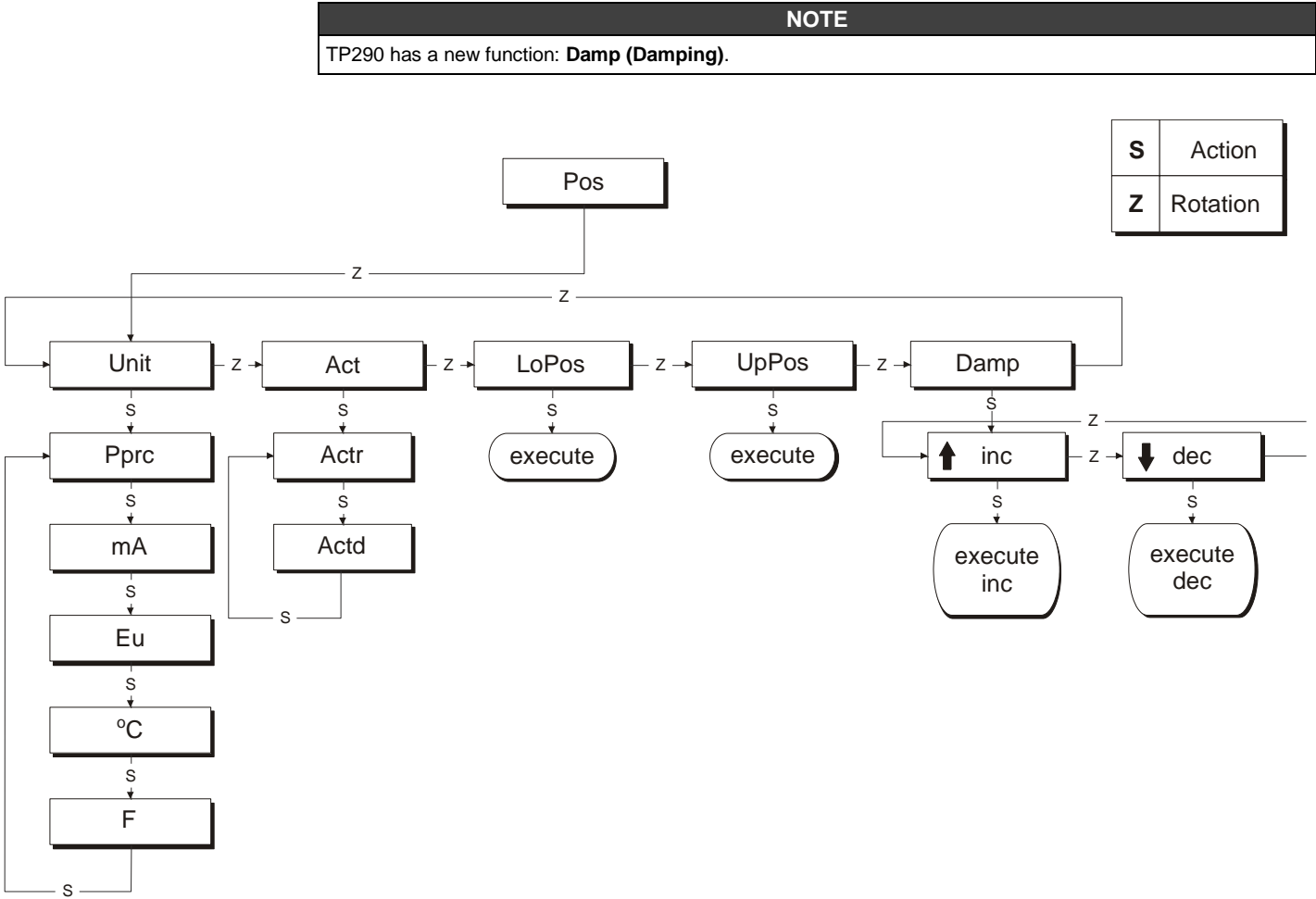


Figure 3.3 – Local Adjustment Configuration Tree

NOTE

Remove the Magnetic Tool of the orifice to Save (to execute) the selected option.
When the display shows the symbol **ACK**: option was accepted

DESCRIPTION OF THE PARAMETERS OF THE LOCAL ADJUSTMENT CONFIGURATION TREE

POS – Position in Percentage

Unit - Engineering Unit or Percentage

Pprc - Position in Percentage.

mA (Mile Ampere) - Current.

Eu (End User's choice) - Position.

°C (Degrees Celsius) - Temperature.

F (Degrees Fahrenheit) - Temperature.

Act - Action

Actr - Reverse action.

Actd - Direct action.

LoPos (0% Position) - TRIM of inferior position.

UpPos (100% Position) - TRIM of Superior Position.

Damp (Damping) - reduction function.

Inc - Increment.

Dec - Decrement.

Section 4

MAINTENANCE PROCEDURES

General

SMAR **TP290** to read Position are extensively tested and inspected before delivery to the end user. Nevertheless, during their design and development, consideration was given to the possibility of repairs by the end user, if necessary.

In general, it is recommended that the end user do not try to repair printed circuit boards. Instead, he should have spare circuit boards, which may be ordered from **SMAR** whenever necessary.

Recommendations for mounting Approved Equipment with the IP66/68 W certifications ("W" indicates certification for use in saline atmospheres)

NOTE
The certification is valid for stainless steel transmitter manufactured, approved with the certification IP66/68 W. All transmitter external material, such as plugs, connections etc., should be made in stainless steel. The electrical connection with 1/2" – 14NPT thread must use a sealant. A non-hardening silicone sealant is recommended. The instrument modification or replacement parts supplied by other than authorized representative of Smar is prohibited and will void the certification.

Diagnostics

In order to carry out the diagnostics, refer to table 4.1.

DIAGNOSTICS	
SYMPTOM	PROBABLE ERROR SOURCE:
POSITION IS NOT DISPLAY	<ul style="list-style-type: none">▪ Position Transmitter Connections.• Check wiring polarity and continuity.▪ Power Supply• Check load curve.• Check power supply output.• Voltage should be between 12 Vdc and 45 Vdc at the transmitter terminals.▪ Electronic Circuit Failure• Check the boards for malfunctions and faulty boards for spare ones.
NO RESPONSE FOR THE INPUT SIGNAL	<ul style="list-style-type: none">▪ Calibration• Check the Position Transmitter calibration points.

Table 4.1 - TP290 Diagnostics Without the Programmer

Disassembly Procedure

Refer to **TP290** Exploded View figure 4.3. Make sure to disconnect power supply before disassembling the position transmitter.

NOTE
The numbers indicated between parentheses refer to Figure 4.3 – Exploded View.

Transducer

To remove the transducer from the electronic housing, disconnect before the electrical connections (in the field terminal side) and the main board.

Loosen the hex screw **(6)** and carefully unscrew the electronic housing from the transducer, observing that the flat cable is not excessively twisted.

Electronic Circuit

To remove the circuit board **(5)** and indicator **(4)**, first loose the cover locking **(7)** on the side not marked "Field Terminals", then unscrew the cover **(1)**.

WARNING

The boards have CMOS components which may be damaged by electrostatic discharges. Observe correct procedures for handling CMOS components. It is also recommended to store the circuit boards in electrostatic-proof cases.

CAUTION

Do not rotate the electronic housing more than 270° without disconnecting the electronic circuit from the power supply.

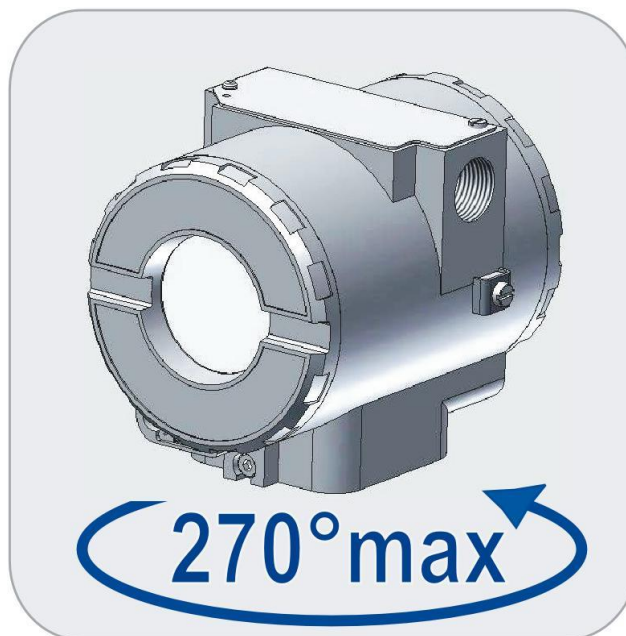


Figure 4.1 – Transducer Rotation Stopper

Loosen the two screws **(3)** that anchors the indicator and the main circuit board. Gently pull out the indicator, and then the main board **(5)**.

Reassembly Procedure

WARNING

Do not assemble the main board with power on.

Transducer

Mount the transducer to the housing turning clockwise until it stops. Then turn it counterclockwise until it faces the square of electronic housing to the square of transducer. Tighten the hex screw **(6)** to lock the housing to the transducer.

Electronic Circuit

Plug transducer connector and power supply connector to main board **(5)**. Attach the display to the main board. Observe the four possible mounting positions. The ↑ mark indicates up position.

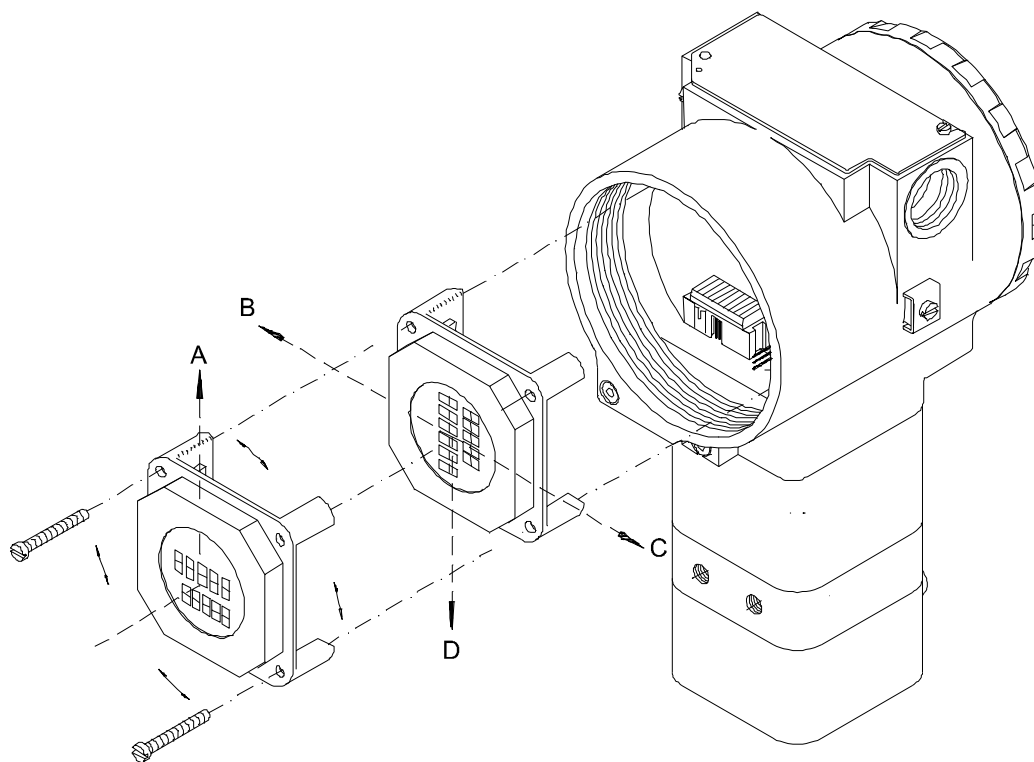


Figure 4.2 – Four Possible Positions of the Indicator

Anchor the main board (5) in the housing (8) with their screws (3). After tightening the protective cover (1), mounting procedure is complete. The transmitter is ready to be energized and tested.

Interchangeability

Main board can be replaced by a similar new one keeping the operational features unchanged. The transducer EEPROM has all the information related to the TRIM and factory default configuration.

Exploded View

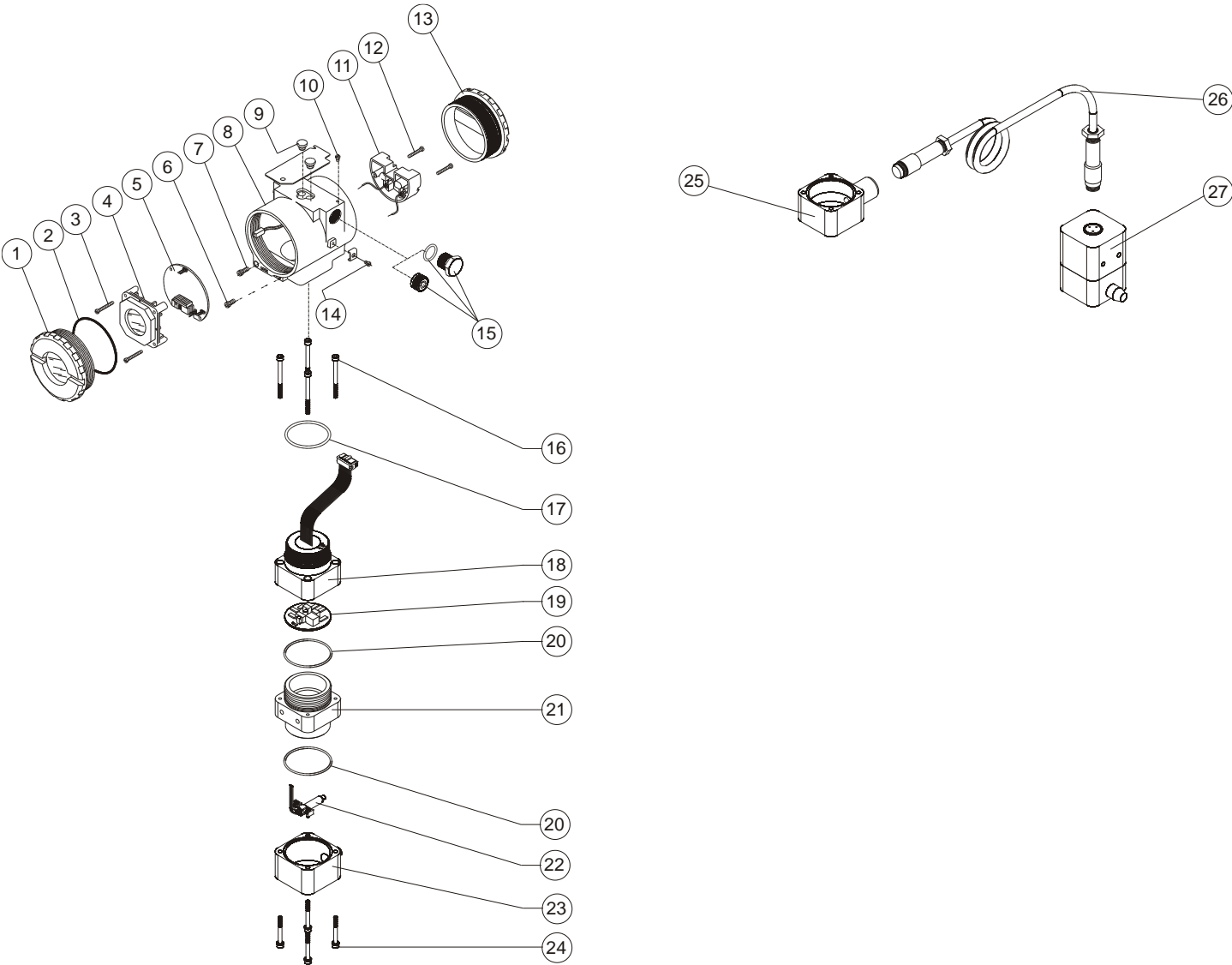


Figure 4.3 – TP290 Exploded View

Accessories

ACCESSORIES	
ORDERING CODE	DESCRIPTION
SD-1	Magnetic Tool for Local Adjustment.
400-1176	Teflon guide for linear magnet.
400-1177	Teflon guide for rotary magnet.

Spare Parts List

SPARE PARTS LIST				
DESCRIPTION OF PARTS		POSITION	CODE	CATEGORY (NOTE 1)
COVER WITH WINDOW	. Aluminum	1	204-0103	
	. 316 SS	1	204-0106	
COVER O-RING (NOTE 3)	. Buna-N	2	204-0122	B
ALUMINUM HOUSING MAIN BOARD SCREW	. Units with indicator	3	304-0118	
	. Units without indicator	3	304-0117	
STAINLESS STEEL HOUSING MAIN BOARD SCREW	. Units with indicator	3	204-0118	
	. Units without indicator	3	204-0117	
DIGITAL INDICATOR		4	214-0108	
MAIN ELECTRONIC CIRCUIT BOARD		5	400-0100	A
HOUSING LOCKING SCREW	. M4 Screw	6	204-0121	
	. M6 Without Head Screw	6	400-1121	
COVER LOCKING SCREW		7	204-0120	
HOUSING (NOTE 2)		8	(NOTE 5)	
LOCAL ADJUSTMENT PROTECTION CAP		9	204-0114	
IDENTIFICATION PLATE SCREW		10	204-0116	
TERMINAL BLOCK ISOLATOR		11	400-0058	
TERMINAL BLOCK HOLDING BOLT	. Cover Aluminum	12	304-0119	
	. Cover 316 SS	12	204-0119	
COVER WITHOUT WINDOW	. Aluminum	13	204-0102	
	. 316 SS	13	204-0105	
EXTERNAL GROUND BOLT		14	204-0124	
SIX-SIDED INTERNAL PLUG	. 1/2" NPT Bichromatized Carbon Steel BR-EX D	15	400-0808	
	. 1/2" NPT 304 SST BR-EX D	15	400-0809	
SIX-SIDED INTERNAL PLUG	. 1/2" NPT Bichromatized Carbon Steel	15	400-0583-11	
	. 1/2" NPT 304 SST	15	400-0583-12	
SIX-SIDED EXTERNAL PLUG	. M20 X 1.5 316 SST	15	400-0810	
	. PG13.5 316 SST	15	400-0811	
RETAINING BUSHING	. 3/4" NPT 316 SST	15	400-0812	
CONNECTION COVER SCREW		16	400-0883	
CONNECTION COVER SET	. Aluminum	16, 17, 18, 19	400-0884	
	. 316 SS	16, 17, 18, 19	400-0885	
O-RING, Neck (NOTE 3)	. Buna-N	17	204-0113	B
CONNECTION COVER	. Aluminum	18	400-0074	
	. 316 SS	18	400-0391	
ANALOG BOARD		19	400-0637	
UNION BLOCK O-RING		20	400-0085	B
UNION BLOCK	. Aluminum	21	400-0386	
	. 316 SS	21	400-0387	
POSITION SENSOR COVER SET	. Aluminum	22, 23, 24	400-0656	
	. 316 SS	22, 23, 24	400-0657	
POSITION SENSOR BRACKET + POSITION SENSOR SENSOR + FLAT CABLE		22	400-0090	
POSITION SENSOR COVER	. Aluminum	23	400-0089	
	. 316 SS	23	400-0396	
POSITION SENSOR COVER BOLT		24	400-0092	
REMOTE POSITION SENSOR COVER SET(NOTE 4)	. Aluminum	25	400-0853	
	. 316 SS	25	400-0854	

SPARE PARTS LIST				
DESCRIPTION OF PARTS		POSITION	CODE	CATEGORY (NOTE 1)
CABLE SET + CONNECTOR	. 5 M	26	400-0857	
	. 10 M	26	400-0858	
	. 15 M	26	400-0859	
	. 20 M	26	400-0860	
REMOTE EXTENSION SET	. Aluminum	27	400-0855	
	. 316 SS	27	400-0856	
TRANSDUCER SET	. Aluminum	16 a 24	400-0038	
	. 316 SS	16 a 24	400-0400	
MOUNTING BRACKET, "L" + CLAMP "U" TO PIPE 2"	. Carbon Steel	-	400-0339	
	. 316 SS	-	400-0340	
MAGNETS	. Linear up to 50 mm	-	400-0035	
	. Linear up to 100 mm	-	400-0036	
	. Linear up to 30 mm	-	400-0748	
	. Rotary	-	400-0037	

NOTA

- Note 1:** For category **A** it is recommended to keep in stock 25 parts installed for each set and 50 for category **B**.
- Note 2:** Includes terminal block isolator, bolts (cover locking, ground and terminal block isolator) and identification plate without certification.
- Note 3:** O-rings are packaged with 12 units.
- Note 4:** Includes cover, position sensor flat cable, and extension cable connector.
- Note 5:** To specify the housing, use HOUSING ORDER CODE table.

HOUSING ORDER CODE						
400-1314	HOUSING					
	COD.	Product				
	5	TP290				
		COD.	Communications Protocol			
		0	4-20 mA			
			COD.	Electrical Connection		
			0	½ NPT		
			A	M20 X 1.5		
			B	PG13.5		
				COD.	Housing Material	
				H0	Aluminum Housing (IP/Type)	
				H1	316 SST Housing (IP/Type)	
				H2	Aluminum for saline atmosphere (IPW/TYPE X)	
				H4	Copper Free Aluminium (IPW/TYPEX)	
				COD.	Painting	
				P0	Gray Munsell N 6.5 Polyester	
				P3	Black Polyester	
				P8	Without Painting	
				P9	Safety Blue Epoxy – Electrostatic Painting	
				COD.	Manufacturing Standard	
				S0	Smar	

400-1314	5	0	*	*	*	*
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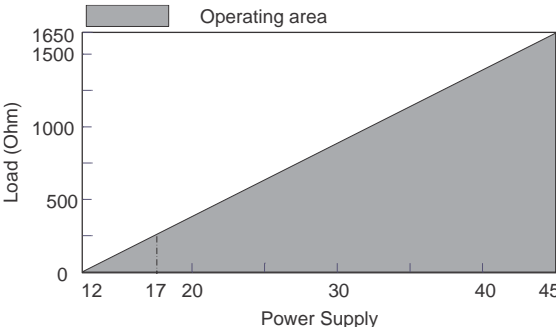
TYPICAL MODEL NUMBER

* Select item.

Section 5

TECHNICAL CHARACTERISTICS

Function Specifications

Travel	Linear Motion: 3 to 100 mm. Rotary Motion: 30° to 120° rotation angle.
Output Signal	Two-wire, 4 to 20 mA.
Reverse Polarity Protection	12 to 45 Vdc.
Load Limitation	
Indicator	Optional 4½ - digit numerical and 5-character alphanumeric LCD indicator.
Hazardous Area Certifications	Explosion-proof and intrinsically safe (ATEX (NEMKO and DEKRA EXAM), FM, CEPEL and CSA). Designed to comply with European regulations ATEX 94/9/EC and LVD 2006/95/EC standards.
Zero and Span Adjustments	Non-interactive, via local adjustment or digital communication.
Temperature Limits	Ambient: - 40 to 85 °C (- 40 to 185 °F) Storage: - 40 to 90 °C (- 40 to 194 °F) Digital Display: - 10 to 75 °C (14 to 167 °F) operation; - 40 to 85 °C (- 40 to 185 °F) without damage. Remote Sensor: - 40 to 105°C (- 40 to 221°F)
Failure Alarm	In case of sensor or circuit failure, the self-diagnostics drivers the output to 3.9 or 21.0 mA, according to the user's choice.
Turn-on Time	Performs within specifications in less than 5.0 seconds after power is applied to the transmitter.
Update Time	Approximately 150 ms.
Humidity Limits	0 to 100% RH.
Output Action	Direct or Reverse.
Actual Position Sensing	Magnetic (Non-contact) via Hall Effect.
Configuration	Can be done through local adjust.

Performance Specifications

Reference conditions: range starting at zero, temperature 25°C (77°F), power supply of 24 Vdc.

Accuracy	Linearity, hysteresis and repeatability effects are included.
Resolution	≤ 0.1% F.S.
Repeatability	≤ 0.5% F.S.
Hysteresis	≤ 0.2% F.S.
Stability	± 0.1% of F.S. for 12 months.
Temperature Effect	± 0.8%/20°C of F.S.
Power Supply Effect	± 0.005% of calibrated F.S. per volt.
Electromagnetic Interface Effect	Designed to comply with European Directive EMC 2004/108/EC.

Physical Specifications

Electrical Connection	1/2 - 14 NPT, PG 13.5, or M20 x 1.5 metric.
Material of Construction	Injected low copper aluminum with polyester painting or 316 Stainless Steel housing, with BUNA-N O-rings on cover.
Mounting Bracket	Plated carbon steel with polyester painting or 316 SST.
Identification Plate	316 SST.
Approximate Weights	<ul style="list-style-type: none"> • TP 1.5 kg in Aluminum (without mounting bracket); 3.3 kg in Stainless Steel (without mounting bracket). • Remote sensor: 0.58 kg in Aluminum. 1.5 kg in Stainless Steel. • Cable and remote sensor connectors: Cable 0.045 kg/m; 0.05 kg for each connector.

Ordering Code

MODEL	POSITION TRANSMITTER														
TP290	4 to 20 mA														
	COD.	Local Display													
	1	With Local Display													
	COD.	Mounting Bracket													
	0	Without Bracket													
	1	Carbon Steel, "L" + clamp "U" pipe 2". (3)													
	2	Stainless Steel, "L" + clamp "U" pipe 2". (3)													
	3	Carbon Steel, rotary - VDI / VDE NAMUR													
	4	Stainless Steel, rotary - VDI / VDE NAMUR													
	7	Carbon Steel, "L" + clamp "U" pipe 2" - (316 SST) accessories. (3)													
	COD.	Electrical Connection													
	0	1/2" - 14 NPT				3	1/2" - 14 NPT X 1/2 BSP (316 SST) - with adapter								
	1	1/2" - 14 NPT X 3/4 NPT (316 SST) - with adapter				A	M20 X 1.5								
	2	1/2" - 14 NPT X 3/4 BSP (316 SST) - with adapter				B	PG 13.5 DIN								
	COD.	Type of Actuator													
	1	Rotary													
	5	Linear Stroke up to 50 mm													
	7	Linear Stroke up to 100 mm													
	A	Linear Stroke up to 30 mm													
	SPECIAL OPTIONS (1)														
	COD.	Housing													
	H0	Aluminum (IP/TYPE)				H2	Aluminum for saline atmosphere (IPW/TYPE X)								
	H1	316 Stainless Steel (IP/TYPE)				H4	Copper Free Aluminium (IPW/TYPEX)								
	COD.	Identification Plate													
	I1	FM: XP, IS, NI, DI				I6	Without certification								
	I4	EXAM (DMT): Ex-ia, IP				IJ	NEMKO - Ex-d								
	I5	CEPEL: Ex-d, Ex-ia, IP													
	COD.	Painting													
	P0	Gray Munsell N 6.5 Polyester													
	P3	Black Polyester													
	P8	Without Painting													
	P9	Blue Safety Epoxy – Electrostatic Painting													
	COD.	TAG Plate													
	J0	With TAG													
	J1	Blank													
	J2	According to user's notes													
	COD.	Sensor Mounting (2)													
	R0	Full Mounting													
	R1	Remote sensor - 5 m cable													
	R2	Remote sensor - 10 m cable													
	R3	Remote sensor - 15 m cable													
	R4	Remote sensor - 20 m cable													
	COD.	Special													
	ZZ	See notes													
TP290	-	1	0	-	0	1	*	-	*	*	*	*	*	*	*

TYPICAL MODEL NUMBER



TYPICAL MODEL NUMBER

NOTE

- 1) Leave it blank when there are not optional items.
- 2) Consult us for classified areas applications.
- 3) Magnet mounting bracket not supplied with the TP.

CERTIFICATIONS INFORMATION

European Directive Information

Consult www.Smar.com for the EC declarations of conformity and certificates.

Authorized representative/importer located within the Community:

Smar Europe BV De Oude Wereld 116 2408 TM Alphen aan den Rijn Netherlands

ATEX Directive 2014/34/EU - "Equipment for explosive atmospheres"

The EC-Type Examination Certificate is released by DNV GL Presafe AS (CE2460) and DEKRA Testing and Certification GmbH (CE0158).

Designated certification body that monitors manufacturing and released QAN (Quality Assurance Notification) and QAR (Quality Assessment Report) is Nemko AS (CE0470).

LVD Directive 2014/35/EU – "Low Voltage"

According the LVD directive Annex II, electrical equipment for use in an explosive atmosphere is outside the scope of this directive.

According to IEC standard: IEC 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements.

ROHS Directive 2011/65/EU - "Restriction of the use of certain hazardous substances in electrical and electronic equipment"

For the evaluation of the products the following standards were consulted: EN 50581.

EMC Directive 2014/30/EU - "Electromagnetic Compatibility"

For products evaluation, the standard IEC 61326-1 were consulted and to comply with the EMC directive the installation must follow these special conditions:

Use shielded, twisted-pair cable for powering the instrument and signal wiring.

Keep the shield insulated at the instrument side, connecting the other one to the ground.

Hazardous locations general information

Ex Standards:

IEC 60079-0 General Requirements

IEC 60079-1 Flameproof Enclosures "d"

IEC 60079-7 Increased Safe "e"

IEC 60079-11 Intrinsic Safety "i"

IEC 60079-18 Encapsulation "m"

IEC 60079-26 Equipment with equipment protection level (EPL) Ga

IEC 60079-31 Equipment dust ignition protection by enclosure "t"

IEC 60529 Classification of degrees of protection provided by enclosures (IP Code)

IEC 60079-10 Classification of Hazardous Areas

IEC 60079-14 Electrical installation design, selection and erection

IEC 60079-17 Electrical Installations, Inspections and Maintenance

IEC 60079-19 Equipment repair, overhaul and reclamation

ISO/IEC80079-34 Application of quality systems for equipment manufacture

Warning:

Explosions could result in death or serious injury, besides financial damage.

Installation of this instrument in hazardous areas must be in accordance with the local standards and type of protection. Before proceedings with installation make sure that the certificate parameters are in accordance with the classified hazardous area.

Maintenance and Repair

The instrument modification or replaced parts supplied by any other supplier than authorized representative of Smar is prohibited and will void the Certification.

Marking Label

The instrument is marked with type of protection options. The certification is valid only when the type of protection is indicated by the user. Once a particular type of protection is installed, do not reinstall it using any other type of protection.

Intrinsic Safety / Non Incendive application

In hazardous areas with intrinsic safety or or non-incendive requirements, the circuit entity parameters and applicable installation procedures must be observed.

The instrument must be connected to a proper intrinsic safety barrier. Check the intrinsically safe parameters involving the barrier and equipment including the cable and connections. Associated apparatus ground bus shall be insulated from panels and mounting enclosures. Shield is optional, when using shielded cable, be sure to insulate the end not grounded.

Cable capacitance and inductance plus Ci and Li must be smaller than Co and Lo of the Associated Apparatus.

It is recommended do not remove the housing covers when powered on.

Explosionproof / Flameproof application

Only use Explosionproof/Flameproof certified Plugs, Adapters and Cable glands.

The electrical connections entries must be connected using a conduit with sealed unit or closed using metal cable gland or metal blanking plug with at least IP66.

Do not remove the housing covers when powered on.

Enclosure

The electronic housing and sensor threads installed in hazardous areas must have a minimum of 6 fully engaged threads.

The covers must be tightening with at least 8 turns, to avoid the penetration of humidity or corrosive gases, and until it touches the housing. Then, tighten more 1/3 turn (120°) to guarantee the sealing.

Lock the housing and covers using the locking screw.

Degree of Protection of enclosure (IP)

IPx8: Second numeral meaning continuous immersion in water under special condition defined as 10m for a period of 24 hours (Ref: IEC60529).

IPW/ TypeX: Supplementary letter W or X meaning special condition defined as saline environment tested in saturated solution of NaCl 5% w/w at 35°C for a period of 200 hours (Ref: NEMA 250/ IEC60529).

For enclosure with IP/IPW/TypeX applications, all NPT threads must apply a proper water-proof sealant (a non-hardening silicone group sealant is recommended).

Hazardous Locations Approvals

FM Approvals

FM 3010145 / FM 3007267

IS Class I, II, III Division 1, Groups A, B, C and D, E, F, G

XP Class I, Division 1, Groups A, B, C, D

DIP Class II, III Division 1, Groups E, F, G

NI Class I, Division 2, Groups A, B, C, D

Option: Type 4X or Type 4

Entity Parameters:

Vmax = 30 Vdc, Imax = 110 Ma, Ci = 5 nF, Li = 12 uH

Temperature Class: T4

Ambient Temperature: 60°C (-20 to 60 °C)

Drawing 102A-0604, 102A-1235, 102A-1348, 102A-1954, 102A-1955

ATEX DNV GL Presafe AS

Explosion Proof (PRESAFE 21 ATEX 17657X)

II 2G Ex db IIC T6 Gb

Ta -20 °C to +60 °C

Options: IP66/68W or IP66/68

Special Conditions for Safe Use

ATEX and IECEx certified cable gland to be used.

Repairs of the flameproof joints must be made in compliance with the structural specifications provided by the manufacturer. Repairs must not be made on the basis of values specified in tables 3 of EN/IEC 60079-1.

The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2018 General Requirements

EN 60079-1:2014 Flameproof Enclosures “d”

Drawing 102A-1449, 102A-1505

IECEx DNV GL Presafe A/S

Explosion Proof (IECEx PRE 21.0015X)

Ex db IIC T6 Gb

Ta -20 °C to +60 °C

Options: IP66/68W or IP66/68

Special Conditions for Safe Use

ATEX and IECEx certified cable gland to be used.

Repairs of the flameproof joints must be made in compliance with the structural specifications provided by the manufacturer. Repairs must not be made on the basis of values specified in tables 3 of EN/IEC 60079-1.

The Essential Health and Safety Requirements are assured by compliance with:

IEC 60079-0:2017 General Requirements

IEC 60079-1:2014-06 Equipment protection by flameproof enclosures “d”

Drawing 102A2163, 102A2164

DEKRA Testing and Certification GmbH

Intrinsic Safety (DMT 00 ATEX E 085)

Group I, Category M2, Ex ia, Group I, EPL Mb

Group II, Category 2 G, Ex ia, Group IIC, Temperature Class T4/T5/T6, EPL Gb

Supply and signal circuit intended for connection to an intrinsically safe 4-20 mA current loop:

Ui = 28 Vdc, Ii = 93 mA, Ci ≤ 5 nF Li = Neg

Maximum Permissible power:

Max. Ambient temperature Ta	Temperature Class	Power Pi
85°C	T4	700 mW
75°C	T4	760 mW
44°C	T5	760 mW
50°C	T5	700 mW
55°C	T5	650 mW
60°C	T5	575 mW
65°C	T5	500 mW
70°C	T5	425 mW
40°C	T6	575 mW

Ambient Temperature: $-40^{\circ}\text{C} \leq T_a \leq +85^{\circ}\text{C}$

The Essential Health and Safety Requirements are assured by compliance with:


EN 60079-0:2012 + A11:2013 General Requirements

EN 60079-11:2012 Intrinsic Safety “i”


Drawing 102A-1449, 102A-1505, 102A-1578, 102A-1579

CEPEL (Centro de Pesquisa de Energia Elétrica)

Segurança Intrínseca (CEPEL 07.1501X)

<div style="text-align: center;"> Segurança  CEPEL 07.1501X Ex ia IIC T5 Ga </div>	
IP66W/IP68W (aço inox e alumínio Copper Free)	IP66/IP68 (alumínio)
Ui = 30 V Ii = 100 mA Pi = 0,7 W Ci = 6,4 nF Li = desp	
T _{amb} : -20 °C a +50 °C para T5	

Prova de Explosão (CEPEL 01.0016)

<div style="text-align: center;">  <p>Segurança</p> <p>CEPEL 01.0016 Ex db IIC T6 Gb Ex tb IIIC T85 °C Db</p> </div>	
IP66W/IP68W (aço inox e alumínio Copper Free)	IP66/IP68 (alumínio)

Observações:

A validade deste Certificado de Conformidade está atrelada à realização das avaliações de manutenção e tratamento de possíveis não conformidades, de acordo com as orientações do Cepel, previstas no Regulamento de Avaliação da Conformidade. Para verificação da condição atualizada de regularidade deste Certificado de Conformidade deve ser consultado o banco de dados de produtos e serviços certificados do Inmetro.

O número do certificado é finalizado pela letra "X" para indicar que para a versão do Transmissor de Posição, Intrinsecamente Seguro, modelos TP290, TP301, TP302 e TP303 equipado com invólucro fabricado em liga de alumínio, somente pode ser instalado em "Zona 0", se durante a instalação for excluído o risco de ocorrer impacto ou fricção entre o invólucro e peças de ferro/aço.

A tampa do invólucro possui uma plaqueta de advertência com a seguinte inscrição: "ATENÇÃO - NÃO ABRA ENQUANTO ENERGIZADO", ou similar tecnicamente equivalente.

O produto adicionalmente marcado com a letra suplementar "W" indica que o equipamento foi ensaiado em uma solução saturada a 5% de NaCl p/p, à 35 °C, pelo tempo de 200 h e foi aprovado para uso em atmosferas salinas, condicionado à utilização de acessórios de instalação no mesmo material do equipamento e de bujões de aço inoxidável ASTM-A240, para fechamento das entradas roscadas não utilizadas. Os materiais de fabricação dos equipamentos aprovados para letra "W" são: aço inoxidável AISI 316 e alumínio Copper Free SAE 336 pintados (Procedimento P-CQ-FAB764-10) com tinta Resina Poliéster ou Resina Epoxy com espessura da camada de tinta de 70 a 150 µm e 120 a 200 µm, respectivamente, ou pintados com o plano de pintura P1 e P2 (Procedimento P-CQ-FAB-765-05) com tinta Resina Epoxy ou Poliuretano Acrílico Alifático com espessura de camada de tinta de 290 µm a 405 µm e 185 µm a 258 µm, respectivamente.

Os planos de pintura P1 e P2 são permitidos apenas para equipamento fornecido com plaqueta de identificação com marcação para grupo de gás IIB.

O grau de proteção IP68 só é garantido se nas entradas roscadas de ½" NPT for utilizado vedante não endurecível à base de silicone conforme Procedimento P-DM-FAB277-07.

O segundo numeral oito indica que o equipamento foi ensaiado para uma condição de submersão de dez metros por vinte e quatro horas. O acessório deve ser instalado em equipamentos com grau de proteção equivalente.

Este certificado é válido apenas para os produtos dos modelos avaliados. Qualquer modificação nos projetos, bem como a utilização de componentes ou materiais diferentes daqueles definidos pela documentação descritiva dos produtos, sem a prévia autorização do Cepel, invalidará este certificado.

É responsabilidade do fabricante assegurar que os produtos fornecidos ao mercado nacional estejam de acordo com as especificações e documentação descritiva avaliada, relacionadas neste certificado.

As atividades de instalação, inspeção, manutenção, reparo, revisão e recuperação dos equipamentos são de responsabilidade dos usuários e devem ser executadas de acordo com os requisitos das normas técnicas vigentes e com as recomendações do fabricante.

A marcação é executada conforme a Norma ABNT NBR IEC 60079-0:2013 e o Requisito de Avaliação da Conformidade de Equipamentos Elétricos para Atmosferas Explosivas nas Condições de Gases e Vapores Inflamáveis (RAC), e é fixada na superfície externa do equipamento, em local visível. Esta marcação é legível e durável, levando-se em conta possível corrosão química.

Normas Aplicáveis:

ABNT NBR IEC 60079-0:2013 Atmosferas explosivas - Parte 0: Equipamentos – Requisitos gerais

ABNT NBR IEC 60079-1:2016 Atmosferas explosivas - Parte 1: Proteção de equipamento por invólucro à prova de explosão "d"

ABNT NBR IEC 60079-11:2013 Atmosferas explosivas - Parte 11: Proteção de equipamento por segurança intrínseca "i"

ABNT NBR IEC 60079-26:2016 Equipamentos elétricos para atmosferas explosivas - Parte 26: Equipamentos com nível de proteção de equipamento (EPL) Ga

ABNT NBR IEC 60079-31:2014 Atmosferas explosivas - Parte 31: Proteção de equipamentos contra ignição de poeira por invólucros "t"

ABNT NBR IEC 60529:2017 Graus de proteção para invólucros de equipamentos elétricos (Código IP)

Desenhos 102A1377, 102A1304, 102A2062, 102A2061, 102A2096

Identification Plates

FM Approvals

smar TP290 Position Transmitter
BR - 14160
Made in Brazil

Temp. Class:	T4
Tamb.	60°C max.
Vmax.	30 VDC
I max.	110 mA
Ci	5 nF
Li	12 uH

XP CL I, DIV 1, GP A,B,C,D.
DIP CL II,III, DIV 1, GP E,F,G.
IS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G.
NI CL I, DIV 2, GP A,B,C,D.
Per inst. dwg 102A0604.

FM APPROVED **Type 4X**

0044333 - 2007

CE 123500

smar TP290 Position Transmitter
BR - 14160
Made in Brazil

Temp. Class:	T4
Tamb.	60°C max.
Vmax.	30 VDC
I max.	110 mA
Ci	5 nF
Li	12 uH

XP CL I, DIV 1, GP A,B,C,D.
DIP CL II,III, DIV 1, GP E,F,G.
IS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G.
NI CL I, DIV 2, GP A,B,C,D.
Per inst. dwg 102A0604.

FM APPROVED **Type 4**

0044333 - 2007

CE 134800

smar TP290 Position Transmitter
TX - 77040
Made in USA

Temp. Class:	T4
Tamb.	60°C max.
Vmax.	30 VDC
I max.	110 mA
Ci	5 nF
Li	12 uH

XP CL I, DIV 1, GP A,B,C,D.
DIP CL II,III, DIV 1, GP E,F,G.
IS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G.
NI CL I, DIV 2, GP A,B,C,D.
Per inst. dwg 102A0604.

FM APPROVED **Type 4**

0000000 - 0000

CE 195400

smar TP290 Position Transmitter
TX - 77040
Made in USA

Temp. Class:	T4
Tamb.	60°C max.
Vmax.	30 VDC
I max.	110 mA
Ci	5 nF
Li	12 uH

XP CL I, DIV 1, GP A,B,C,D.
DIP CL II,III, DIV 1, GP E,F,G.
IS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G.
NI CL I, DIV 2, GP A,B,C,D.
Per inst. dwg 102A0604.

FM APPROVED **Type 4X**

0000000 - 0000

CE 195500

DNV GL Presafe A/S / DEKRA Testing and Certification GmbH

smar TP290 Position Transmitter
Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex II 2G Ex ia IIC T4/T5/T6 Gb DMT 00 ATEX E 085 ()
Pi = 760 mW (T4, Ta = 75°C) -40°C ≤ Ta ≤ +85°C
700 mW (T4, Ta = 85°C) Ui = 28 VDC li = 93 mA
575 mW (T5, Ta = 60°C) Li = neg Ci ≤ 5 nF
575 mW (T6, Ta = 40°C)

IP66
IP68 10m/24h

Ex II 2G Ex db IIC T6 Gb PRESAFE 21 ATEX 17657X ()
Tamb = -20° to 60°C U = 28 VDC

0000000 - 0000

CE 0470 144905

smar TP290 Position Transmitter
Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex II 2G Ex ia IIC T4/T5/T6 Gb DMT 00 ATEX E 085 ()
Pi = 760 mW (T4, Ta = 75°C) -40°C ≤ Ta ≤ +85°C
700 mW (T4, Ta = 85°C) Ui = 28 VDC li = 93 mA
575 mW (T5, Ta = 60°C) Li = neg Ci ≤ 5 nF
575 mW (T6, Ta = 40°C)

IP66W
IP68W 10m/24h

Ex II 2G Ex db IIC T6 Gb PRESAFE 21 ATEX 17657X ()
Tamb = -20° to 60°C U = 28 VDC

0000000 - 0000

CE 0470 150505

smar TP290 Position Transmitter
Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex db IIC T6 Gb IECEX PRE 21.0015X ()
Tamb = -20°C to 60°C
U = 28 VDC

IP66
IP68 10m/24h

0000000 - 0000

CE 216301

smar TP290 Position Transmitter
Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex db IIC T6 Gb IECEX PRE 21.0015X ()
Tamb = -20°C to 60°C
U = 28 VDC

IP66W
IP68W 10m/24h

0000000 - 0000

CE 216401

smar TP290 Position Transmitter
BR - 14160
Sertãozinho
Brazil

Ex I M2 Ex ia I Mb DMT 00 ATEX E 085
-40°C ≤ Ta ≤ +85°C
Pi = 700 mW (Ta = 85°C)
Ui = 28 VDC li = 93 mA Li = neg Ci ≤ 5 nF

IP 66 68

0000000 - 0000

CE 0470 157801

smar TP290 Position Transmitter
BR - 14160
Sertãozinho
Brazil

Ex I M2 Ex ia I Mb DMT 00 ATEX E 085
-40°C ≤ Ta ≤ +85°C
Pi = 700 mW (Ta = 85°C)
Ui = 28 VDC li = 93 mA Li = neg Ci ≤ 5 nF

IP 66W 68W

0000000 - 0000

CE 0470 157901

CEPEL (Centro de Pesquisa de Energia Elétrica)

smar TP290 Transmissor de Posição

Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex db IIC T6 Gb CEPEL 01.0016 ()
Ex ia IIC T5 Ga CEPEL 07.1501 X ()

Tamb= -20° a 50°C
Ui= 30V li= 100mA Pi= 0,7W
Ci= 6,4nF Li= desp

Segurança
Eletronas
INMETRO

IP 66 68

0000000 - 0000

CE 137702

smar TP290 Transmissor de Posição

Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex db IIC T6 Gb CEPEL 01.0016 ()
Ex ia IIC T5 Ga CEPEL 07.1501 X ()

Tamb= -20° a 50°C
Ui= 30V li= 100mA Pi= 0,7W
Ci= 6,4nF Li= desp

Segurança
Eletronas
INMETRO

IP 66W 68W

0000000 - 0000

CE 130402

smar TP290 Transmissor de Posição

Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex db IIB T6 Gb CEPEL 01.0016 ()
Ex ia IIB T5 Ga CEPEL 07.1501 X ()

Tamb= -20° a 50°C
Ui= 30V li= 100mA Pi= 0,7W
Ci= 6,4nF Li= desp

Segurança
Eletronas
INMETRO

IP 66 68
P1/P2 Pintura

0000000 - 0000

CE 206201

smar TP290 Transmissor de Posição

Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex db IIB T6 Gb CEPEL 01.0016 ()
Ex ia IIB T5 Ga CEPEL 07.1501 X ()

Tamb= -20° a 50°C
Ui= 30V li= 100mA Pi= 0,7W
Ci= 6,4nF Li= desp

Segurança
Eletronas
INMETRO

IP 66W 68W
P1/P2 Pintura

0000000 - 0000

CE 206101

smar TP290 Transmissor de Posição

Nova Smar S/A
Av. Dr. Antônio Furlan Jr
1028 Sertãozinho-SP
14170-480
Brazil

Ex tb IIIC T85°C Db CEPEL 01.0016 ()
Ex ia IIIC T100°C Da CEPEL 07.1501 X ()

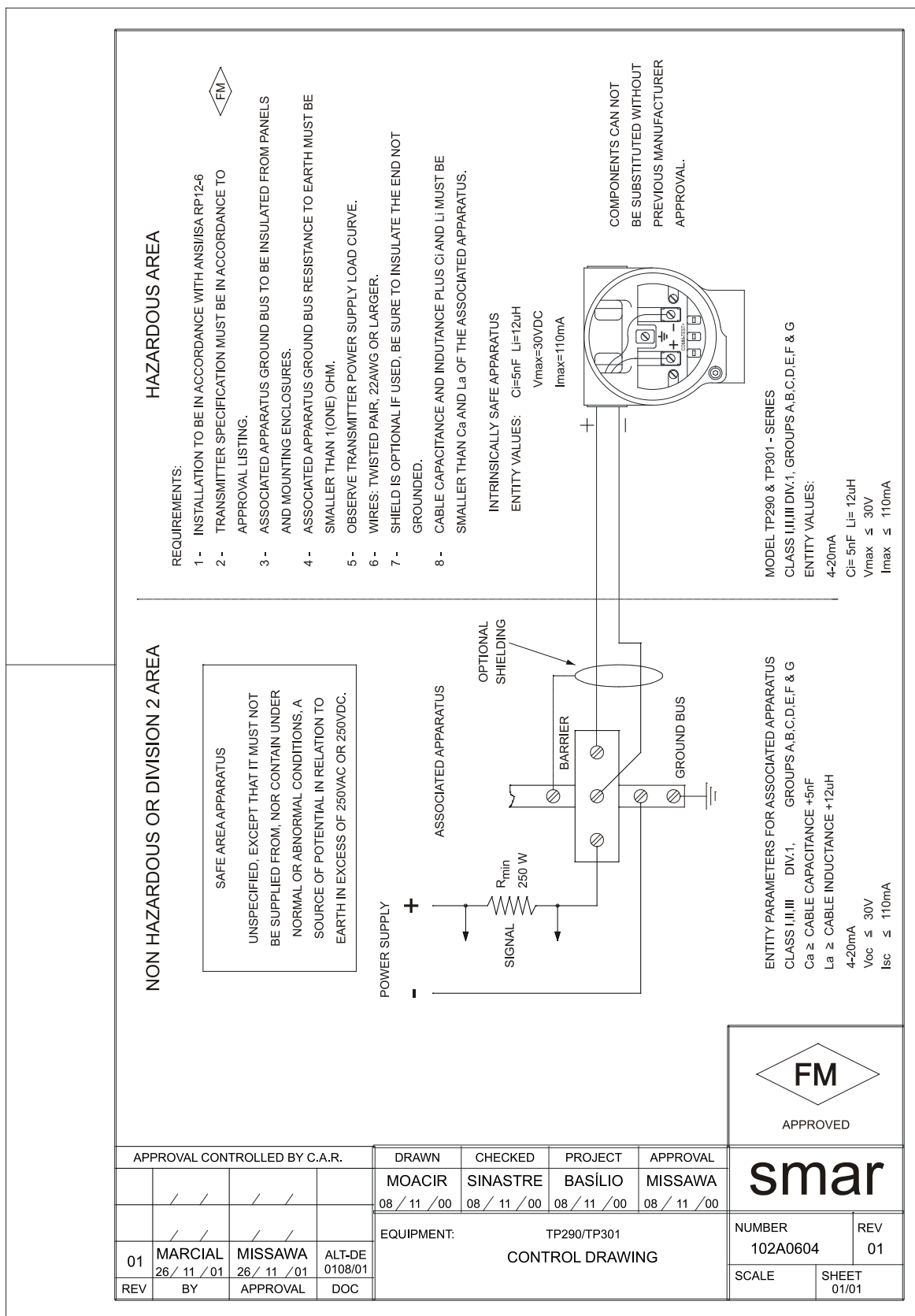
Tamb= -20° a 50°C
Ui= 30V li= 100mA Pi= 0,7W
Ci= 6,4nF Li= desp

Segurança
Eletronas
INMETRO


IP 66 68

0000000 - 0000

CE 209601



Appendix B

	<h2>SRF – Service Request Form</h2>			
	TP Position Transmitter			
GENERAL DATA				
Model:	TP290 () Firmware Version: _____		TP301 () Firmware Version: _____	
	TP302 () Firmware Version: _____		TP303 () Firmware Version: _____	
Serial Number:	Sensor Number: _____			
TAG:	_____			
Remote Position Sensor?	Yes () No ()			
Action:	Rotary () Linear ()			
Travel:	30 mm () 50 mm () 100 mm () Other: _____ mm			
Configuration:	Magnetic Tool () Palm () Psion () PC () Software: _____ Version: _____			
INSTALLATION DATA				
Type:	Valve + Atuador () Other: _____			
Size:	_____			
Travel:	_____			
Manufacturer:	_____			
Model:	_____			
PROCESS DATA				
Hazardous Area Classification	Non-Classified () Chemical () Explosive () Other: _____			
Interference Types	Vibration () Temperature () Electromagnetic () Others: _____			
SITUATION DESCRIPTION				
SERVICE SUGGESTION				
Adjustment () Cleaning () Preventive Maintenance () Update / Up-grade ()				
Other: _____				
USER INFORMATION				
Company: _____				
Contact: _____				
Title: _____				
Section: _____				
Phone: _____				Extension: _____
E-mail: _____				Date: ____/____/____
<p>For warranty or non-warranty repair, please contact your representative.</p> <p>Further information about address and contacts can be found on www.smar.com/contactus.asp.</p>				

Returning Materials

Should it become necessary to return the transmitter and/or configurator to **SMAR**, simply contact our office, informing the defective instrument serial number, and return it to our factory.

In order to speed up analysis and solution of the problem, the defective item should be returned with a description of the failure observed, with as much details as possible. Other information concerning the instrument operation, such as service and process conditions, is also helpful.

Instruments returned or to be revised outside the guarantee term should be accompanied by a purchase order or a quote request.