

# MANUAL

INSTALLATION | OPERATION | MAINTENANCE

## 4 TO 20 MA REMOTE INDICATOR **IR290**



AUG/24 - VERSION 1

**smar**  
Technology Company

# IR290

4 to 20 mA Remote Indicator

Consult our  
subsidiary



Rua Dr. Antônio Furlan Junior, 1028 - Sertãozinho, SP - CEP: 14170-480  
[insales@smar.com.br](mailto:insales@smar.com.br) | +55 (16) 3946-3599 | [www.smar.com](http://www.smar.com)

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# INTRODUCTION

The **IR290 (4 to 20 mA Remote Indicator)** is ideal to work with any 4 to 20mA device without a LCD display or in a hard access area, making the monitoring of this device easier. When connected in series with any 4 to 20 mA equipment it shows great versatility and easy handling.

Eliminates, for example, the user needs to be near the device, in the case of a device installed on an upper tank level or even on a hazardous area.

No external power supply is required, as it is connected in series with the equipment that generates the 4 to 20 mA signal. The **IR290** is a compact device, easy to use, and requires less room in panels when compared to other solutions.

**For better results using the IR290 read carefully these instructions.**

**ATTENTION**

This manual is compatible with the 1.XX version, where 1 indicates software version and XX the release. Therefore, this manual is compatible with all version 1 releases.

**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.

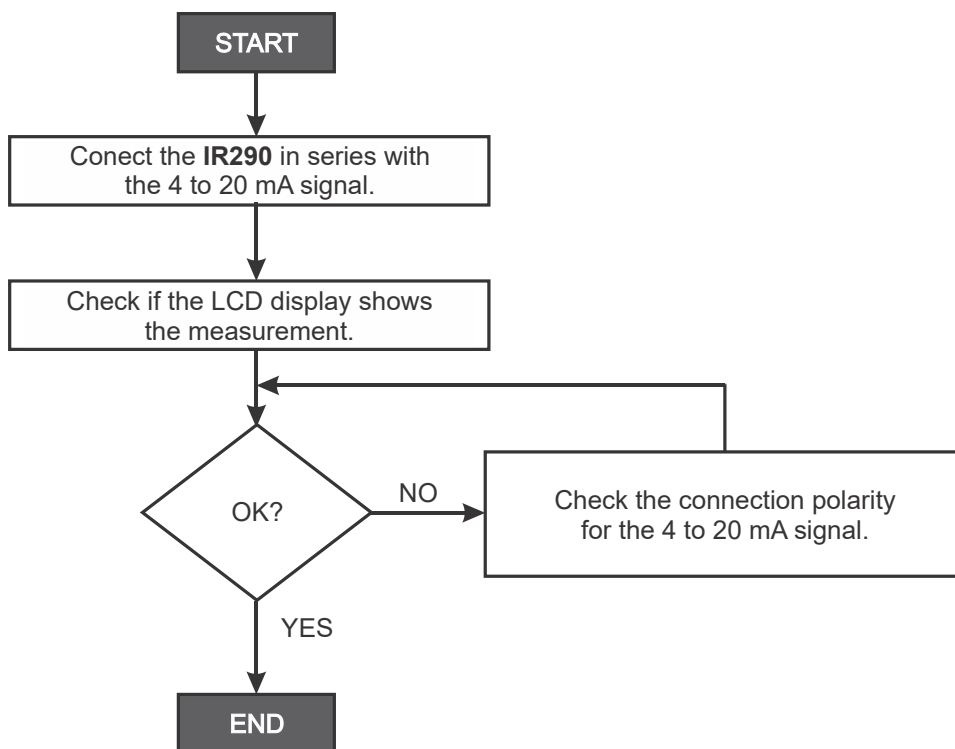
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## Installation Flowsheet

**ATTENTION**

For better results read the  
**IR290** complete manual.



More information can be found on Section 1 on **IR290** installation, configuration and maintenance manual.

# Section 1

---

## INSTALLATION

### *Package Content*

Check the package content:

- **IR290** (Indicador Remoto 4 to 20 mA);
- **IR290** Mounting Screws;
- Magnetic tool for local adjustment (\*);

(\*) the quantity supplied must be in accordance with the number of IR290 - Remote Indicator purchased.

### *General*

The overall accuracy of a control measurement depends on several variables. Although the **IR290** has an outstanding performance, proper installation is essential to maximize its performance.

Among all factors, which may affect **IR290** accuracy, environmental conditions are the most difficult to control. There are, however, ways of reducing the temperature, humidity and vibration effects.

Locating the **IR290** in areas protected from extreme environmental changes can minimize temperature fluctuation effects.

The **IR290** should be installed in a way to avoid, as much as possible, direct exposure to the sun or any source of irradiated heat.

The electronic circuit is protected by a humidity proof varnish, but frequent exposure to humidity may affect this protection. It is also important to keep the covers tightened in place. Every time they are removed, the threads are exposed to corrosion, since painting cannot protect these parts. Code-approved sealing methods should be employed on conduit entering the transmitter. The unused outlet connection should be plugged accordingly.

## Dimensional Drawing and Mounting Positions

The **IR290** has been designed to be rugged and lightweight at the same time. This makes its mounting easier; mounting positions are shown in Figure 1.1.

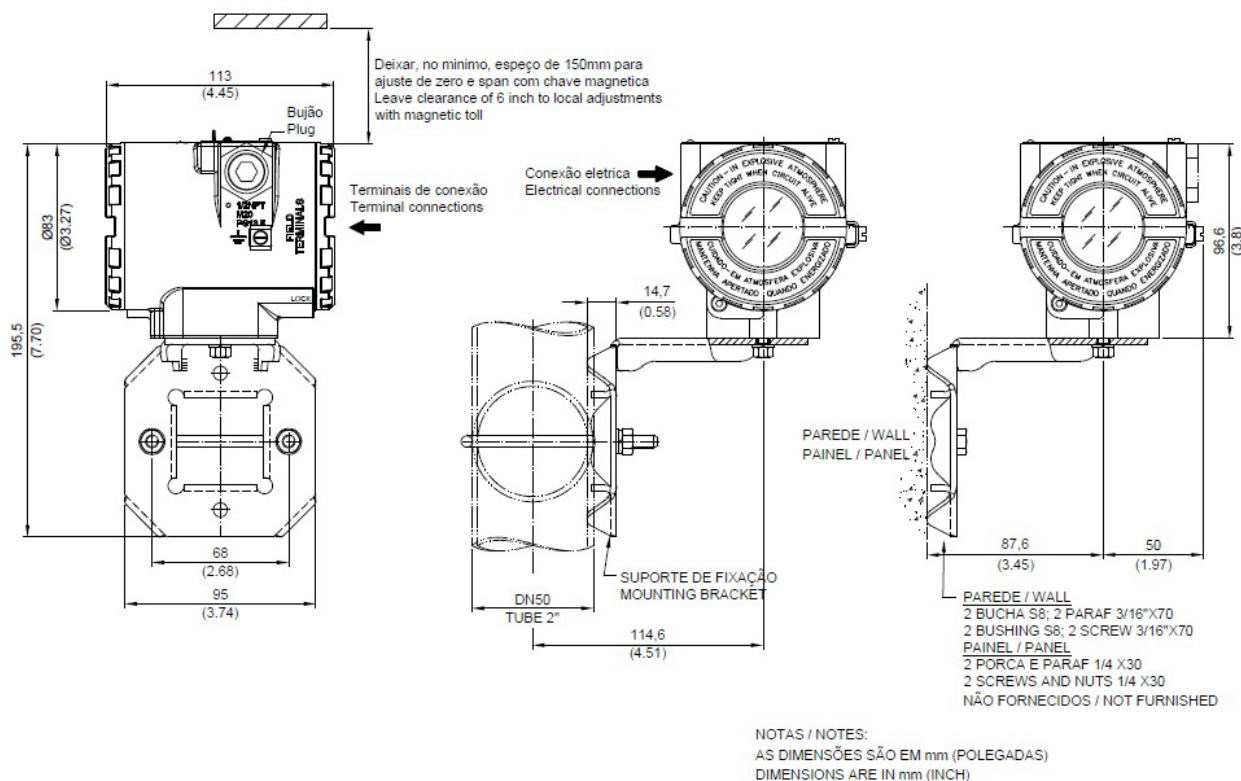


Figure 1.1 - Dimensional Drawing and Mounting Positions

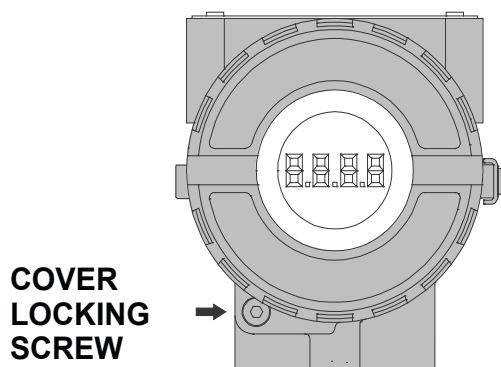
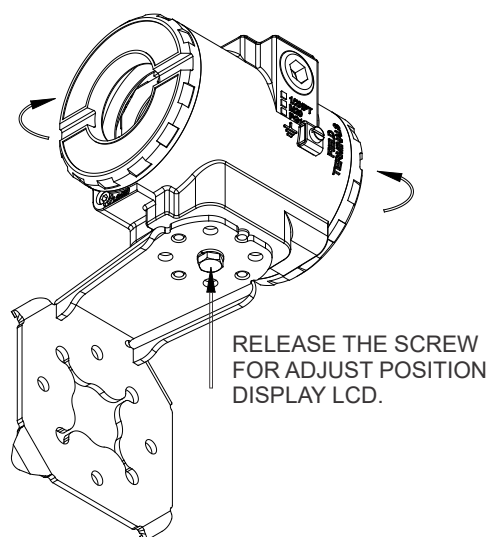


Figure 1.2 - Cover Locking Screw with Display LCD

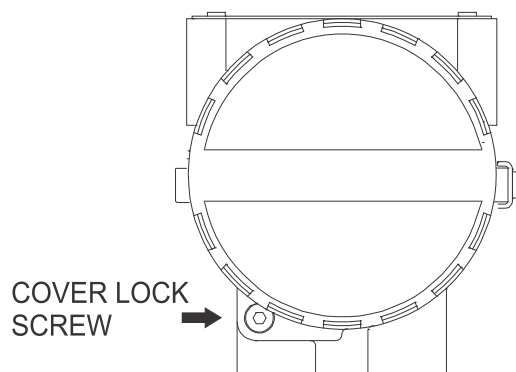




**Figure 1.3 Display LCD Position Adjust**

## Electric Wiring

Reach the wiring block by removing the Electrical Connection Cover. This cover can be locked closed by the cover locking screw (Figure 1.4). To release the cover, rotate the locking screw clockwise.

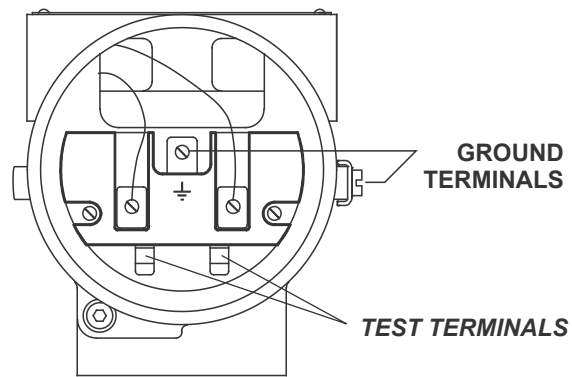


**Figure 1.4 – Cover Locking Screw**

The wiring block has screws on which fork or ring-type terminals can be fastened. See Figure 1.5.

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, near the terminal block and another one external near the outlet connection. See Figure 1.5 for the terminals and see the electrical connection in the figures 1.6 and 1.7.



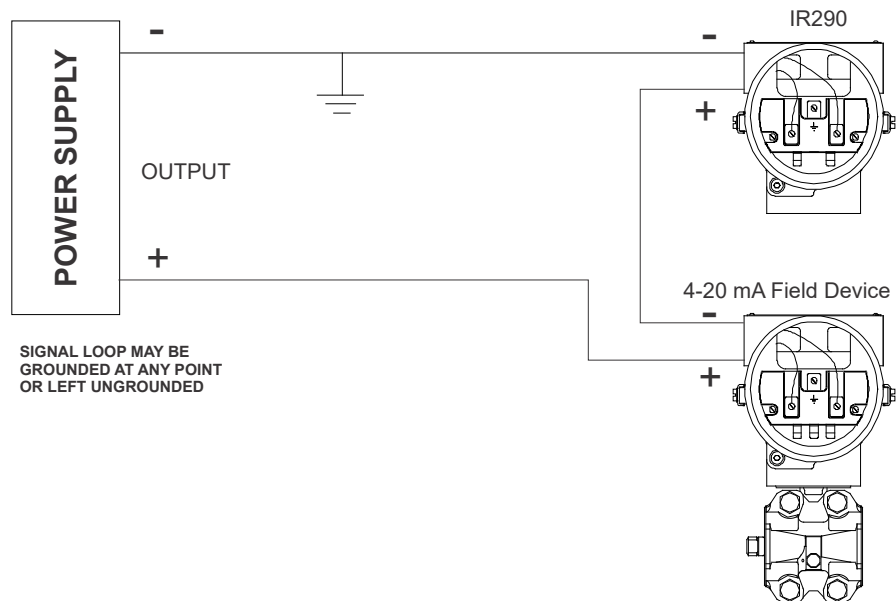
**WARNING**

The **IR290** must be connected to the 4-20 mA current loop. A voltage source may damage the device.

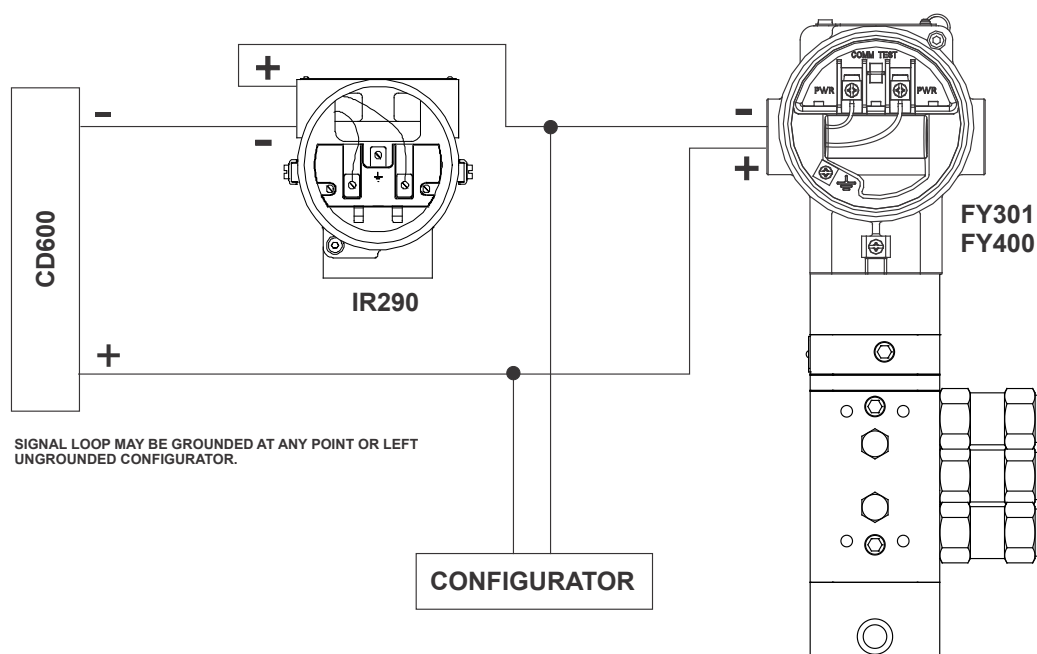
**Figure 1.5 – Wiring Block**

Use of twisted pair (22 AWG or greater than) cables is recommended.

Avoid routing signal wiring close to power cables or switching equipment.



**Figure 1.6 - Wiring diagram in series with the 4-20 mA current loop**

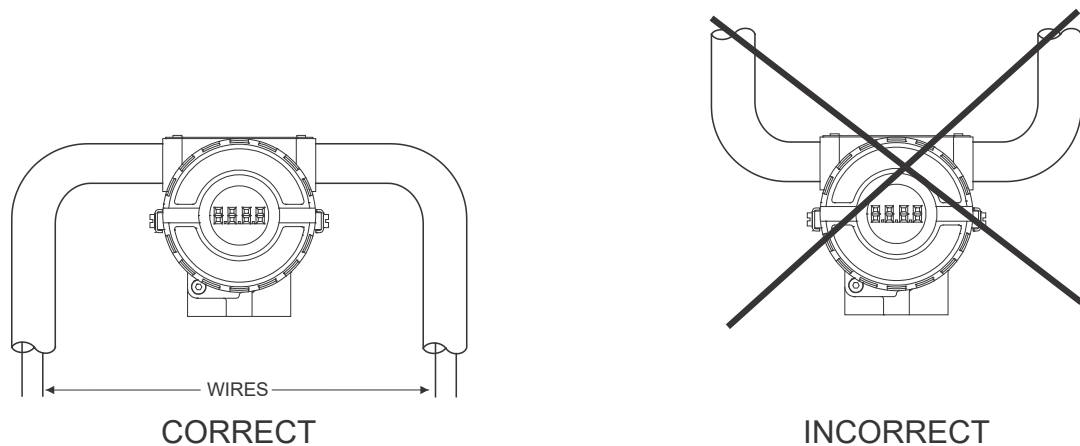


**Figure 1.7 - IR290 Wiring diagram, indicating the SP to FY301/FY400**

The unused outlet connection should be plugged and sealed accordingly.

The **IR290** is protected against reverse polarity. However, it will not work in this situation.

The Figure 1.8 shows the correct installation of the conduit, in order to avoid penetration of water, or other substance, which may cause malfunctioning of the equipment.



**Figure 1.8 - Conduit Installation Diagram**

**WARNING**

In hazardous zones with intrinsically safe or non incendive requirements, the circuit entity parameters and applicable installation procedures must be observed.

Cable access to wiring connections is obtained by one of the two conduit outlets. Conduit threads should be sealed by means of code-approved sealing methods. The unused outlet connection should be plugged and sealed accordingly.

Should other certifications be necessary, refer to the certification or specific standard for installation limitations.



## Section 2

# OPERATION

The IR290 allows easy integration between equipment without LCD display and facilitates field monitoring.

## Functional Electronic Description

See the block diagram (Figure 2.1 – *IR 290 Block Diagram*). Each block function is described below.

### Central Processing Unit (CPU)

The CPU is the **IR290** intelligent part, being responsible for measure of the 4 to 20 mA signal, signal characterization according to the user unit and saving the user and factory calibration data on a FRAM memory.

### FRAM memory

It is responsible for saving **IR290** configuration data.

### Power Source

The **IR290** uses the 4 to 20 mA loop as power source.

### Factory Communication

It allows serial communication to program factory data (available only for Smar procedures).

### Local Adjustment

There are two hall sensor switches that can be magnetically activated. They can be activated by magnetic tools without mechanical or electric contact.

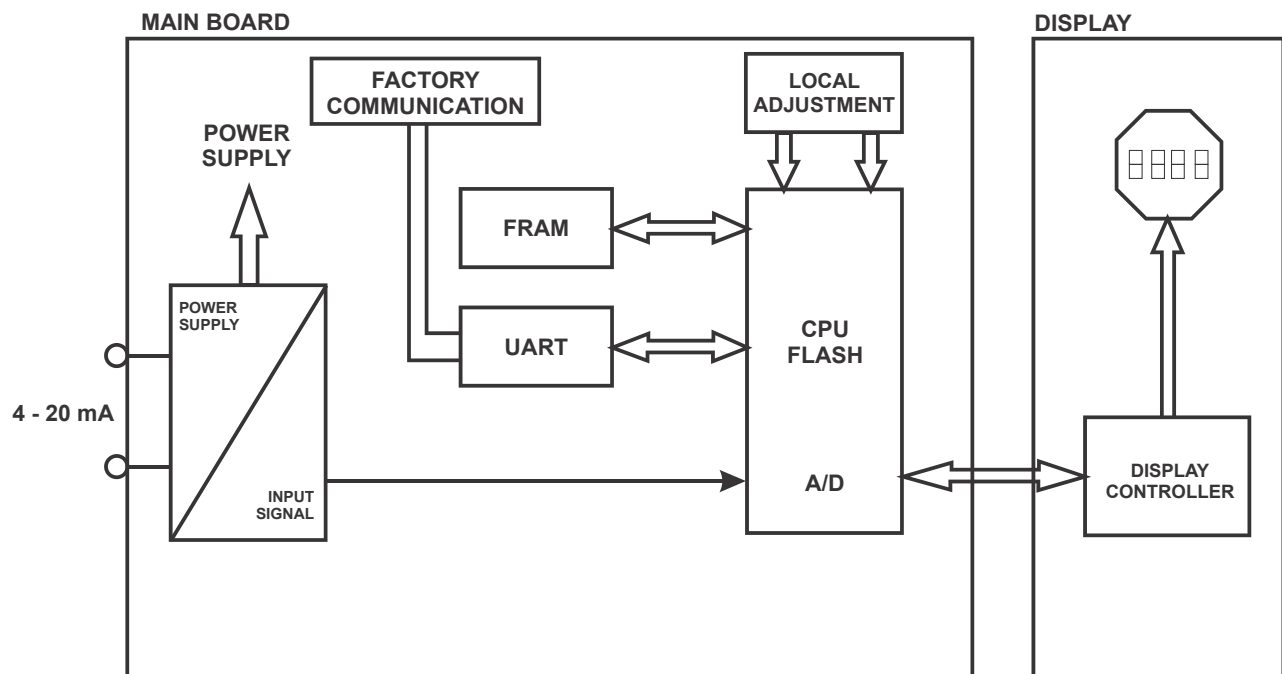
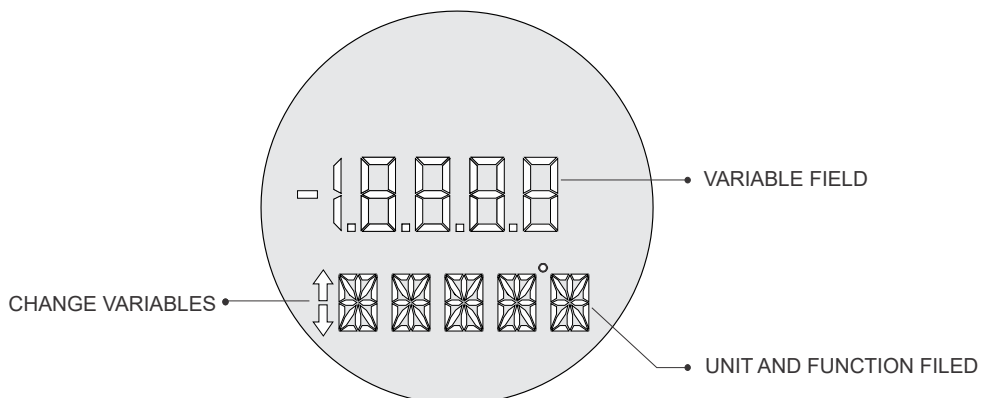


Figure 2.1 – IR290 Block Diagram

## Liquid Crystal Display

The Liquid Crystal Display shows the 4 to 20 mA process variable selected by the user.

The LCD is formed by a field of 4 ½ numerical digits, a field of 5 alpha-numerical digits and an information field, as shown on Figure 2.2



**Figure 2.2 – Display**

### Monitoring

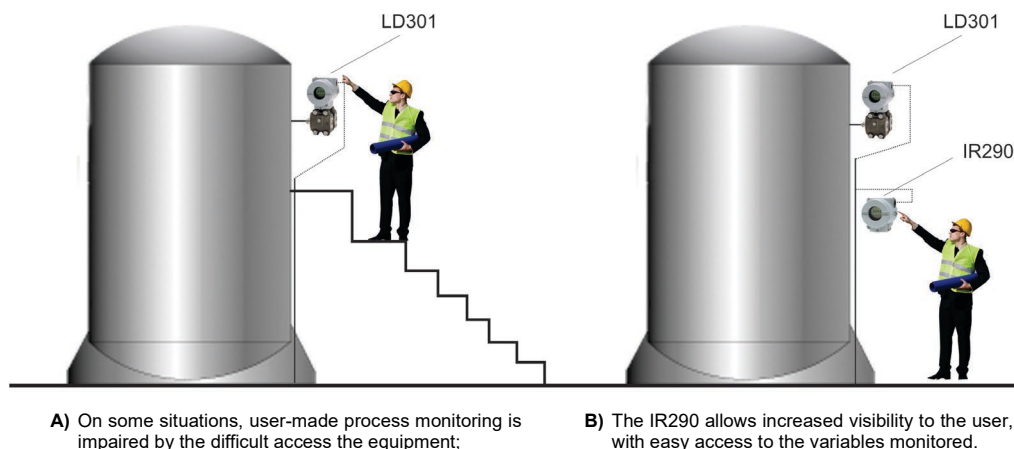
During normal operation, the IR290 works on monitoring mode. In this mode, the display will show engineering units and values.



**Figure 2.3 – Typical Monitoring Mode displaying the 25,00 mmH<sub>2</sub>O value**

The monitoring mode stops when the user is executing local adjustment.

## Example of Application



**Figure 2.4 – Example of Application**

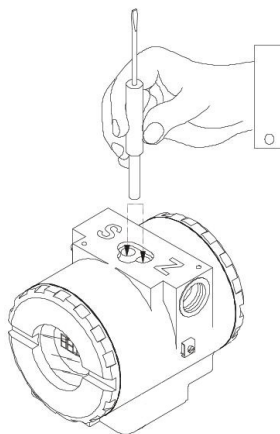
# CONFIGURATION

The **IR290** configuration can be made in a very simple way, through local adjustment, using magnetic tool.

To visualize the configuration parameters on the Local Adjustment Programming Tree, the magnetic tool must be inserted on the hole marked with letter “**Z**”, located on the housing upper part, under the identification plate. To act on the Local Adjustment Programming Tree parameters, insert the magnetic tool on the hole marked “**S**”. See figures 3.1 and 3.3.

## The Magnetic Tool

The **IR290** has under the ID plate two holes that allow to activate both magnetic switches on the main board by inserting the magnetic tool (See Figure 3.1).



**Figure 3.1 – Zero and Span Local Adjustment and local adjustment switches**

The holes are marked with **Z** (Zero) and **S** (Span) and from now on will be designated by their respective initial letters.

Table 3.1 shows the action performed by the magnetic tool when inserted in **Z** and **S** according to the type of adjustment selected.

ORIFICES	ACTION
<b>Z</b>	Moves between functions.
<b>S</b>	Selects the indicator function.

**Table 3.1 – Housing Orifices**

The rotation over the functions and their branches works in the following way:

- 1 - Insert the magnetic tool handle on **Z**. The **IR290** goes from the normal state to the configuring state. The **IR290** automatically starts indicating the function available on the display, in a cyclical way.
- 2 - To go until the desired option, rotate between the options, wait for the display to show it and move the magnetic tool from **Z** to **S**. See Figure 3.3 – Programming Tree Via local adjustment to know the position of the option to be chosen. Change the magnetic tool to **Z** to rotate between the new options, though inside the new branch.
- 3 - The process to reach the desired option is the same as described on the previous item for all the programming tree hierarchy level.

## Local Adjustment and Write Protect Jumpers

To select the mode of the local adjustment and write protect, configure the jumpers located at the top of the main circuit board.

Figure 3.2 shows the location of the local adjustment female pins to connect the local adjustment and write protect jumpers.

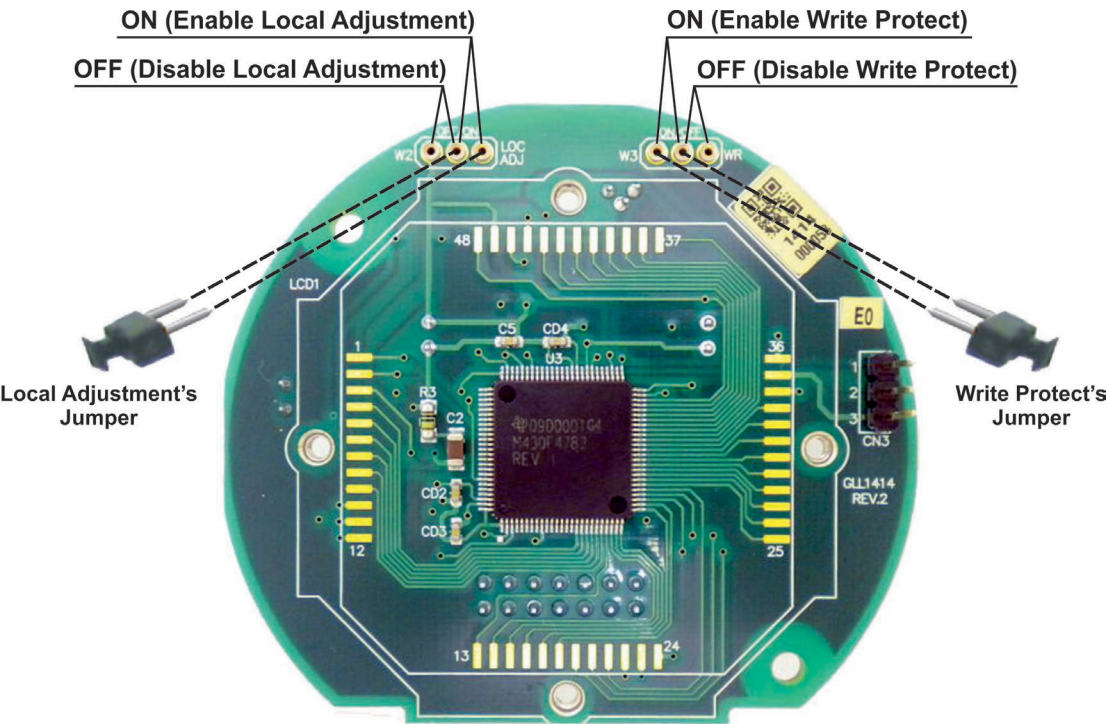


Figure 3.2 – Main Board with Jumpers

Table 3.2 indicates the configure jumpers' positions of local adjustment and write protect.

W2	ADJ LOC	LOCAL ADJUSTMENT	W3	WR	WRITE PROTECT
OFF/ON			ON/OFF		
<input type="radio"/>	<input checked="" type="radio"/>	Enable	<input checked="" type="radio"/>	<input type="radio"/>	Enable
<input checked="" type="radio"/>	<input type="radio"/>	Disable	<input type="radio"/>	<input checked="" type="radio"/>	Disable

NOTE	
The jumpers <b>default conditions</b> are local adjustment <b>enabled</b> and write protect <b>disabled</b> .	

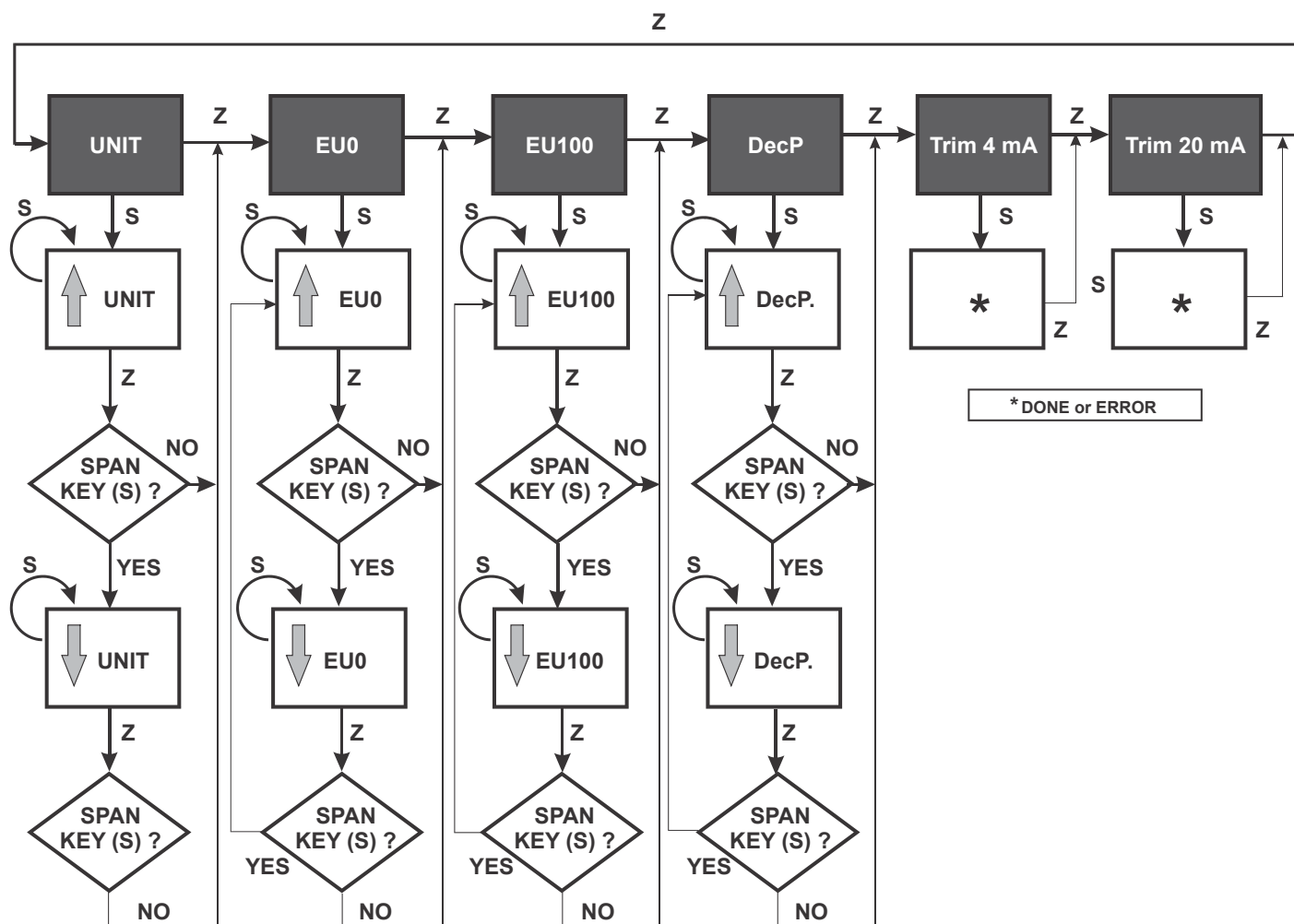
Table 3.2 - Local Adjustment Selection



## Programming Tree Local Adjustment

Position the magnetic tool on hole **Z** to select one of the following options:

- **Unit** - See Table 3.3;
- **EU0** - Value corresponding to 4.0 mA;
- **EU100** - Value corresponding to 20.0 mA;
- **DecP** - Maximum number of decimal places after the point;
- **Trim 4 mA** - Adjusts current read on 4.0 mA;
- **Trim 20 mA** - Adjusts current read on 20.0 mA.



### NOTE

\* **DONE**: Trim executed successfully. **ERROR**: Error when executing Trim.

**WPROT**: When is displayed, instead of DONE and SAVED, means that the device **write protect** is ON and will not save the data.

When the user is on an other-than-Trim menu, he can change the order he navigates on Local Adjustment. For example, if incrementing the **EU0** value and insert the tool in **Zero (Z)**, the arrow direction will be inverted and will decrement the value when the key is inserted in **Span (S)**. The saving occurs in 1 second after magnetic key is removed from **Span (S)**. The time to leave Local Adjustment and return to Monitoring is 4 seconds. Execution time: **Zero (Z)** = 1.5 seconds and **Span (S)** = 2.5 seconds.

Figure 3.3 – Programming Tree Via Local Adjustment

## IR290 Unit Codes

CODE	UNIT DESCRIPTION	CODE	UNIT DESCRIPTION
0	Percentage (%)	42	Liter per second (l/s)
1	Milliampere (mA)	43	Liter per minute (l/min)
2	Celsius degree (°C)	44	Liter per hour (l/h)
3	Fahrenheit degree (°F)	45	Cubic foot per second (CFS)
4	Millimeter of water (mmH <sub>2</sub> O)	46	Cubic foot per minute (CFM)
5	Pound per square inch (psi)	47	Cubic foot per hour (CFH)
6	Bar (bar)	48	Cubic foot per day (ft <sup>3</sup> /d)
7	Millibar (mbar)	49	Gallon per second (gal/s)
8	Kilogram per square centimeter (kgf/cm <sup>2</sup> )	50	Gallon per minute (GPM)
9	Pascal (Pa)	51	Gallon per hour (gal/h)
10	Megapascal (MPa)	52	Gallon per day (gal/d)
11	Kilopascal (kPa)	53	Barrel per second (bbl/s)
12	Torr (Torr)	54	Barrel per minute (bbl/min)
13	Atmosphere (atm)	55	Barrel per hour (bbl/h)
14	Gram per square centimeter (gf/cm <sup>2</sup> )	56	Barrel per day (bbl/d)
15	Inch of water (inH <sub>2</sub> O)	57	Kilogram per cubic meter (kg/m <sup>3</sup> )
16	Foot of water (ftH <sub>2</sub> O)	58	Gram per cubic centimeter (g/cm <sup>3</sup> )
17	Inch of mercury (inHg)	59	Pound per cubic foot (lb/ft <sup>3</sup> )
18	Millimeter of mercury (mmHg)	60	Baume degree (Baume)
19	Kelvin (K)	61	Brix degree (Brix)
20	Rankine degree (°R)	62	Percentage of solids by weight (%sol/wt)
21	Millivolt (mV)	63	Plato degree (Plato)
22	Volt (V)	64	GL degree (GL)
23	Ohm (Ohm)	65	INPM degree (INPM)
24	Gram per second (g/s)	66	API degree (API)
25	Gram per minute (g/min)	67	Concentration (Concentration)
26	Gram per hour (g/h)	68	Ton per cubic meter (t/m <sup>3</sup> )
27	Kilogram per second (kg/s)	69	Meter of water column (mH <sub>2</sub> O)
28	Kilogram per minute (kg/min)	70	Liter (l)
29	Kilogram per hour (kg/h)	71	Cubic meter (m <sup>3</sup> )
30	Kilogram per day (kg/d)	72	Gallon (gal)
31	Ton per minute (t/min)	73	Cubic foot (ft <sup>3</sup> )
32	Ton per hour (t/h)	74	Kilogram (kg)
33	Ton per day (t/d)	75	Ton (t)
34	Pound per second (lb/s)	76	Pound (lb)
35	Pound per minute (lb/min)	77	Millimeter (mm)
36	Pound per hour (lb/h)	78	Centimeter (cm)
37	Pound per day (lb/d)	79	Inch (inch)
38	Cubic meter per second (m <sup>3</sup> /s)	80	Foot (ft)
39	Cubic meter per minute (m <sup>3</sup> /min)	81	Meter (m)
40	Cubic meter per hour (m <sup>3</sup> /h)	82	UNIT
41	Cubic meter per day (m <sup>3</sup> /d)		

Table 3.3 – IR290 Unit Code

## Factory Reset

To restore the equipment factory parameters, activate simultaneously **Z** and **S** with the **IR290** turned off, connecting it immediately after. A counter will be displayed with the word **FACT**. When the count reaches zero, the factory parameters will be restored.

## Section 4

# MAINTENANCE PROCEDURES

### General

#### NOTE

Equipment installed in explosive atmospheres must be inspected in compliance with NBR/IEC60079-17 standard.

The **IR290 4 to 20 mA Remote Indicator** is thoroughly tested and inspected before being shipped to user. In addition, it was designed to foresee the possibility of being repaired by the user, if necessary.

Generally, the user is recommended not to repair the printed circuit boards. Instead, keep backup sets or acquire them at SMAR, when necessary.

### Diagnostics via Display

DIAGNÓSTICOS	
SINTOMA	PROBABLE ERROR SOURCE
WITHOUT LINE CURRENT	<ul style="list-style-type: none"><li>▪ <b>IR290 connection</b> Check wiring polarity and continuity; Check short circuit or grounded loops; Check if the power source connector is connected to the main board.</li><li>▪ <b>Power Supply</b> Check the signal input current.</li><li>▪ <b>Electronic Circuit Failure</b> Check if the main board is defective using a spare board.</li></ul>
INCORRECT INDICATION	<ul style="list-style-type: none"><li>▪ <b>IR290 connections</b> Check if the serial connection with the 4 to 20 mA is adequate.</li><li>▪ <b>0% and 100% adjustment</b> Check if values configured on EU0 and EU100 match the values indicated by the current signal</li><li>▪ <b>Trim</b> Check if the current trim is correct, injecting 4.0 and 20.0 mA, by checking the indication.</li></ul>
DISPLAY WITHOUT INDICATION	<ul style="list-style-type: none"><li>▪ <b>LCD display connection on the main board</b> Check the display connection to the electronic board.</li></ul>

### Disassembling Procedure

#### NOTE

Make sure the 4 to 20mA signal source is disconnected before disassembling.

Figure 4.1 shows an **IR290** exploded view and will help to understand the explanation below. Numbers between parameters correspond to the parts enhanced on the mentioned drawing.

#### ATTENTION

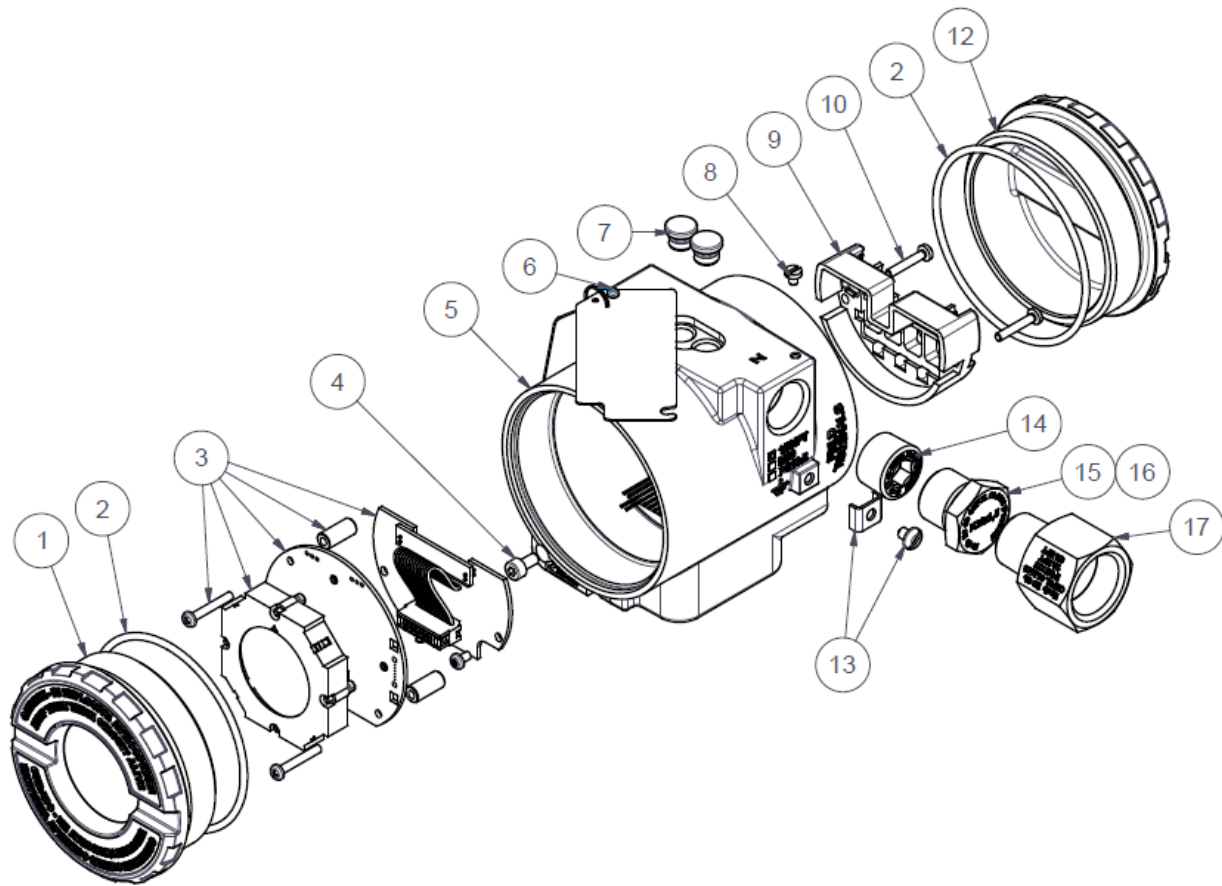
The boards have CMOS components that can be damaged by electrostatic discharges. Observe the right procedures to manipulate these components. Also, store the circuit boards in electrostatic discharge-proof packaging.

## Assembling Procedure

Refer to Figure 4.1 – **IR290** exploded view to help understand what is exposed below. Numbers between parameters correspond to the parts enhanced on drawing.

- Install carefully the main board (3) in its position on the housing, making sure that the connections are sound;
- Mount the LCD carefully according to its desired visualization position;
- Tighten the fixing screws;
- Tighten the equipment covers (1 and 12) adequately.

## Exploded View



17	01	¾ NPT REDUCING BUSHING	400-0812
16	01	PG13,5 PLUG	400-0811
15	01	M20 PLUG EXD	400-0810
14	01	½ NPT PLUG EXD	400-1484
13	02	EXTERNAL GROUND SET	204-0124
12	01	COVER WITHOUT WINDOW (300 LINE)	400-1307-0X
10	01	TERMINAL BLOCK FIXATION SCREW	204-0119
09	01	TERMINAL BLOCK INSULATOR	400-0058
08	01	IDENTIFICATION PLATE SCREW	204-0116
07	02	LOCAL ADJUSTMENT PROTECTION COVER (Z AND S)	204-0114
06	01	RIVET U 3/16"	400-0834
05	01	ELECTRONIC HOUSING	400-1315-5X
04	02	COVER LOCKING SCREW	204-0120
03	01	GLL1414 AND GLL1404: (DISPLAY+MOUNTING SET)	400-1245
02	02	COVER O-RINGS	204-0122
01	01	COVER WITH WINDOW (300 LINE)	400-1307-1X
ITEM	QUANT	DESCRIPTION	CODE

Figure 4.1 – IR290 Exploded View

## Spare Part List

SPARE PART LIST	
PART DESCRIPTION	CODE
MOUNTING BRACKET FOR 2" PIPE ( <b>NOTE 6</b> )	
Carbon Steel (Carbon Steel Accessories)	214-0801
316 SST (316 SST Accessories)	214-0802
Carbon Steel (316 SST Accessories)	214-0803

NOTES
<ol style="list-style-type: none"> <li>Item 5: To specify the housing, use HOUSING ORDER CODE table.</li> <li>Item 5: Includes terminal block, screws and ID plate without certification.</li> <li>Item 3: The recommendation is to keep in stock one set for each 25 installed parts.</li> <li>Item 14: The spare part 400-1484, Internal Hexagonal Plug 1/2" NPT SST316 BR-Ex-d, was standardized in SST316 material and will be used in all line of housings (aluminum, copper free aluminum or SST316). With or without CEPEL certificate.</li> <li>The sealing rings are packaged in 12 units. It is recommended to keep one set in stock for every 50 pieces installed.</li> <li>Includes "U" clamp, nuts, washers and fixing screws.</li> </ol>

## Detailed Code for Ordering Spare Parts

400-1315-5	HOUSING IR290					
	COD.	Communication Protocol				
	0	4-20 mA				
	COD.	Electrical Connection				
	0	½ NPT				
	A	M20x1,5				
	B	PG13,5 DIN				
	COD.	Material				
	H0	Aluminum				
	H1	316 SST				
	H2	Aluminum for Saline Atmosphere				
	H4	Cooper Free Aluminum				
	COD.	Painting				
	P0	Gray Munsell N6.5				
	P2	Safety Blue Epoxy – Atmospheric Zone - Petrobras N1021				
	P3	Black Polyester				
	P8	Without Painting				
	P9	Blue Safety Epoxy				
	COD.	Manufacturing Standard				
	S0	Smar				
	COD.	Applicable Certification				
	I0	All except CSA				
400-1315-5	0	0	H0	P0	S0	I0

400-1307 COVER	
COD.	Type
0	Without Window
1	With Window
COD.	Material
H0	Aluminum (IP/TYPE)
H1	316 SST (IP/TYPE)
COD.	Painting
P0	Gray Munsell N6.5
P2	Safety Blue Epoxy – Atmospheric Zone - Petrobras N1021
P8	Without Painting
P9	Blue Safety Epoxy

400-1307	1	H0	P0
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## Accessories

ACCESSORIES	
ORDERING CODE	DESCRIPTION
SD1	Magnetic tool for configuration via local adjustment.

## Isolation Test on Equipment Housings

1. Power off the equipment in the field, remove its back cover and disconnect all field cables from the transmitter terminal block, isolating them safely.
2. It is not necessary to remove the main board and display.
3. Jumper (connect) the power terminals (positive and negative) with the cable coming from the Megohmmeter (megger).
4. Configure the megohmmeter for 500 Vdc scale and check the isolation between the housing and the cable that short-circuits all the terminals.

ATTENTION	
	Never test with a voltage greater than 500 Vdc.

5. The value obtained must be greater than or equal to  $2G\Omega$  and the voltage application time must be at least 1 second and at most 5 seconds.
6. If the value obtained by the megohmmeter is below  $2G\Omega$ , the possibility of moisture entering the electrical connection compartment must be analysed.
7. It is possible to loosen the two screws that secure the terminal block to the housing and carry out a superficial cleaning and dry the surface well. Afterwards, the isolation can be tested again.
8. If the isolation test still shows that the isolation has been compromised, the housing must be replaced and sent to Nova Smar S.A. for analysis and retrieval.

IMPORTANT	
a)	For equipment certified Exd and Exi (Explosion Proof and Intrinsically Safe) the standards advise not to carry out repairs in the field of the housing electronic components, only at Nova Smar S.A.
b)	In normal use, the housing components must not cause failures that affect its isolation. For this reason, it is important to verify whether there are traces of water entering the housing and, if so, an assessment of the electrical installations and the sealing rings of the covers must be carried out. Nova Smar S.A. has a team ready to support the assessment of facilities, if necessary.

## Section 5

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# TECHNICAL CHARACTERISTICS

### General

<b>Power Supply</b>	Power supply via 4 to 20 mA current loop. The <b>IR290</b> is connected in series with the 4 to 20 mA signal to be measured.
<b>Input impedance</b>	150 Ohms.
<b>Accuracy</b>	0.1% of span.
<b>Temperature effect</b>	0.1%/20 °C.
<b>Configuration</b>	The user may choose via local adjustment the unit to be exhibited on the LCD display, the 100% and 0% values proportional to the measured current, calibrate the input current and restore the Factory Reset parameters.
<b>Indication</b>	LCD Indicator with 4½ numerical digits and 5 alphanumerical liquid crystal characters.
<b>Housing material</b>	Injected aluminum with low copper content and polyester paint or stainless steel 316 finish, with cover Buna N O'Rings (NEMA 4X, IP67).
<b>Temperature limits</b>	Process: -20 to 75°C; Storage: -40 to 85°C.
<b>Humidity limit</b>	0 to 100% R.H.
<b>Mounting</b>	With an optional mounting bracket, a 2" pipe can be installed or fixed on the wall or panel.
<b>Weight</b>	0.99 kg.

## Ordering Code


MODEL									
IR290	4 to 20 mA REMOTE INDICATOR								
	COD.	Local Indicator							
	1	With digital Indicator							
		COD.	Mounting Bracket for 2" Pipe Mounting						
		0	Without Bracket						
		1	Carbon Steel Bracket						
		2	316 SST Bracket						
		7	Carbon Steel Bracket, accessories in 316 SST						
		COD.	Electrical Connection						
		0	1/2" - 14 NPT (1)						
		1	1/2" - 14 NPT X 3/4 NPT (316 SST) – With adapter (2)						
		2	1/2" - 14 NPT X 3/4 BSP (316 SST) – With adapter (3)						
		3	1/2" - 14 NPT X 1/2 BSP (316 SST) – With adapter (3)						
		A	M20 x 1.5 (1)						
		B	PG 13.5 DIN (3)						
		Z	Special – See notes						
		COD.	Housing						
		H0	Aluminum (IP/Type)						
		H1	316 SST (IP/Type)						
		H2	Aluminum for Saline Atmosphere (IPWType X) (4)						
		H3	316 SST for Saline Atmosphere (IPWType X) (4)						
		H4	Aluminum Copper Free (IPWType X) (4)						
		COD.	Identification Plate						
		I6	Without certification						
		COD.	Painting						
		P0	Gray Munsell N 6,5 Polyester						
		P1	Safety Blue N4845 (1374 Standard Petrobras)						
		P2	Safety Blue Epoxy – Atmospheric Zone - Petrobras N1021						
		P3	Black Polyester						
		P7	Beige Epoxy						
		P8	Without Painting						
		P9	Safety Blue Epoxy						
		PZ	See notes						
		COD.	Manufacturing Standard						
		S0	Smar						
		COD.	Tag Plate (5)						
		J0	With tag						
		J1	Blank						
		ZZ	See notes						
IR290	1	2	0	H1	I6	P0	S0	J0	TYPICAL MODEL

### NOTES

- (1) Certification Ex-d for FM / ATEX / IECEx / INMETRO.
- (2) Certification Ex-d for INMETRO.
- (3) Options not certified for use in explosive atmospheres.
- (4) IPW/Type tested for 200 hours in accordance with NBR 8094 / ASTM B 117.
- (5) Rectangular plate in 316 Stainless Steel.



# Appendix A

	<h2>SRF – SERVICE REQUEST FORM</h2>			
	4 to 20 mA Remote Indicator			
<b>GENERAL DATA</b>				
Model:	IR290			
Serial Number:	_____			
TAG:	_____			
Software:	_____	Version:	_____	
<b>INSTALLATION DATA AND ENVIRONMENT</b>				
Hazardous Area Classification:	<input type="checkbox"/> Yes, please specify: _____ <input type="checkbox"/> No More details: _____			
Interference types present in the area:	No interference <input type="checkbox"/> Temperature <input type="checkbox"/> Vibration <input type="checkbox"/> Other: _____			
Environment Temperature:	From _____ °C up to _____ °C.			
<b>OCCURRENCE DESCRIPTION</b>				
_____ _____ _____ _____ _____ _____ _____ _____ _____				
<b>SERVICE SUGGESTION</b>				
Adjustment <input type="checkbox"/>	Cleaning <input type="checkbox"/>	Preventive Maintenance <input type="checkbox"/>	Update / Up-grade <input type="checkbox"/>	
Other: _____				
<b>USER INFORMATION</b>				
Company: _____				
Contact: _____				
Title: _____				
Section: _____				
Phone: _____			Extension: _____	
E-mail: _____			Date: ____ / ____ / ____	
For warranty or non-warranty repair, please contact your representative. Further information about address and contacts can be found on <a href="https://www.smar.com.br/en/contact-us">https://www.smar.com.br/en/contact-us</a> .				

## ***Returning Materials***

If necessary to return the **IR290** to SMAR, simply contact our office, informing the defective instrument serial number, and return it to our factory.

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 warranty term should be accompanied by a purchase order or a quote request.