

# smar - IR290

AUG / 13  
**IR290**  
VERSION 1

INSTRUCTIONS, OPERATION  
MAINTENANCE MANUAL

## 4 to 20 mA Remote Indicator



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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 need 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.

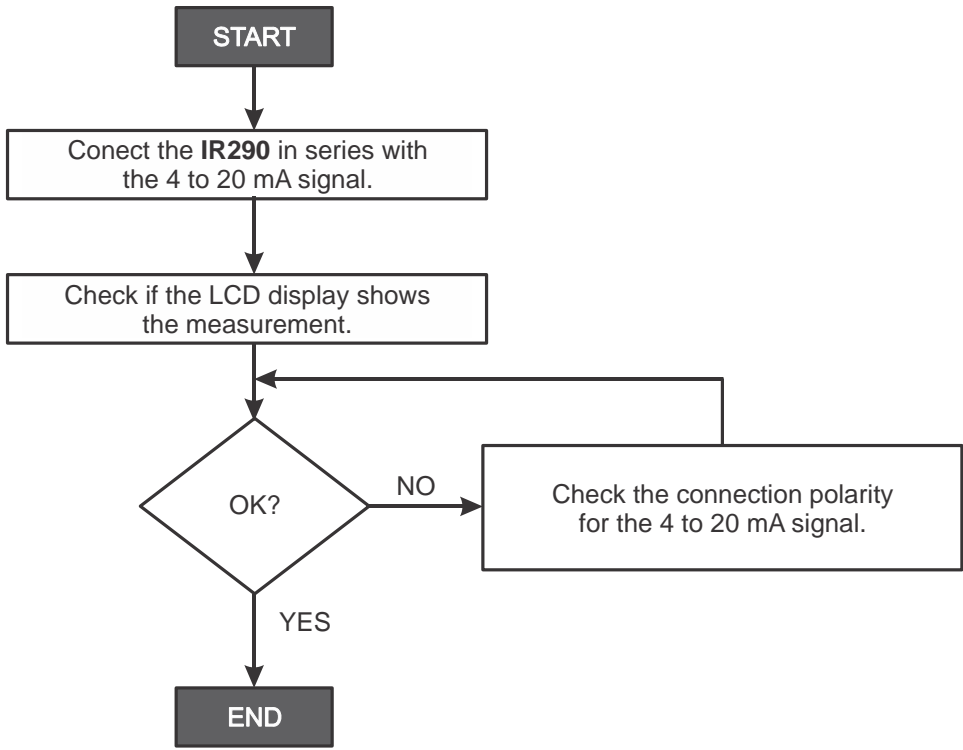
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# Installation Flowsheet

**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 (\*);
- DVD-ROM: Operation, maintenance and instructions manual (\*).

The number of items marked with (\*) must be in accordance with the number of **IR290** delivered.

### 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.

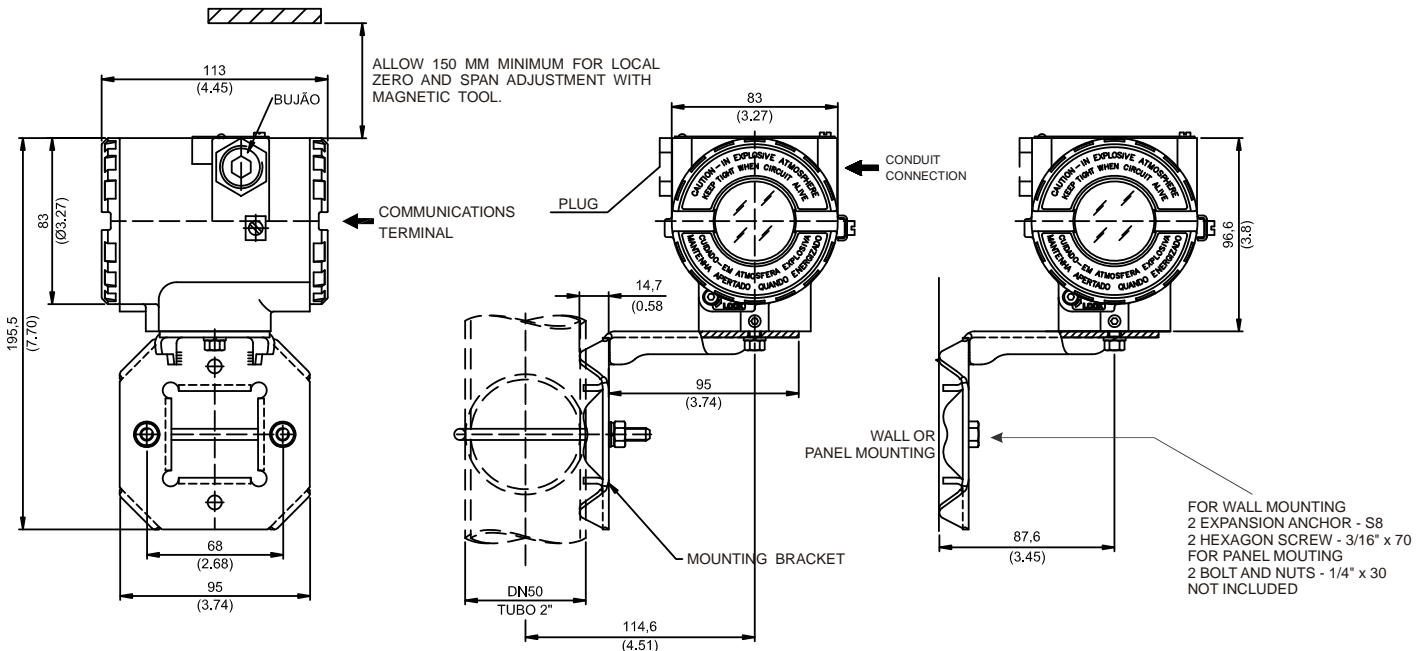


Figure 1.1 - Dimensional Drawing and Mounting Positions

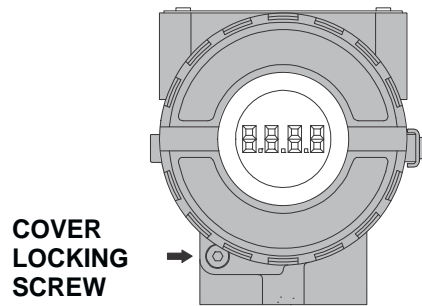


Figure 1.2 - Cover Locking Screw with Display LCD

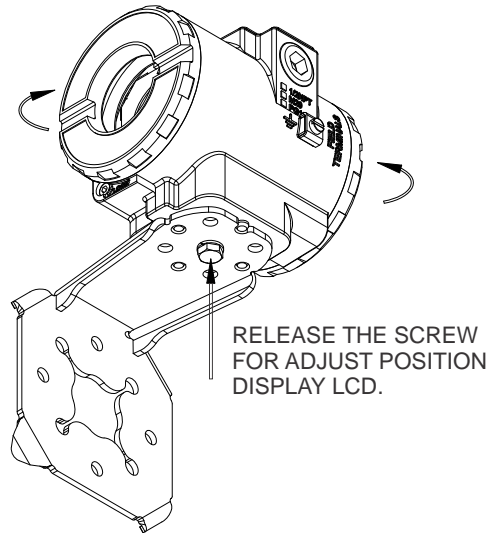


Figure 1.3 Display LCD Position Adjust

## 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.

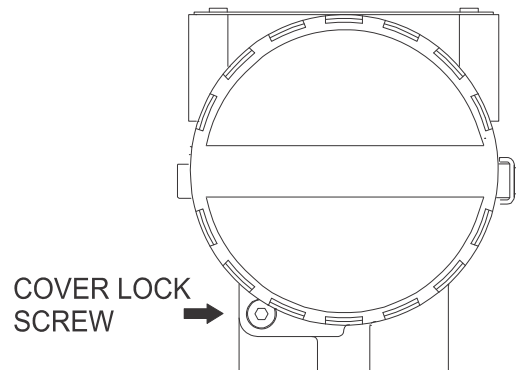


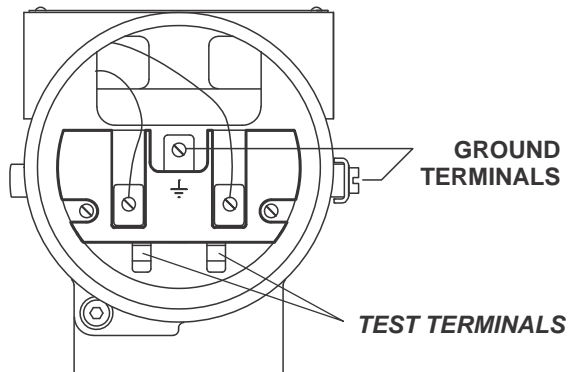
Figure 1.4 – Cover Locking Screw

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.

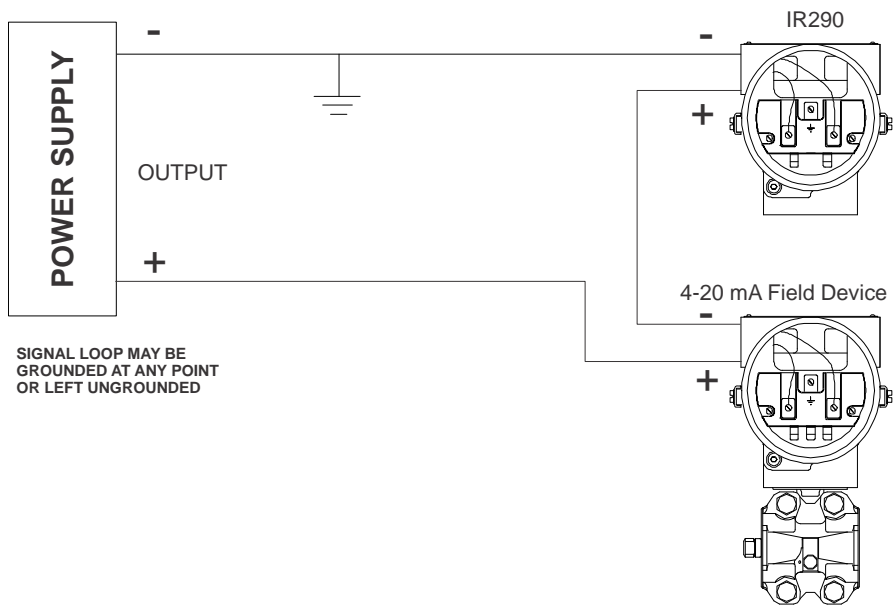


**WARNING**  
 The IR290 must be connected to the 4-20 mA current loop. A voltage source may damage the device.

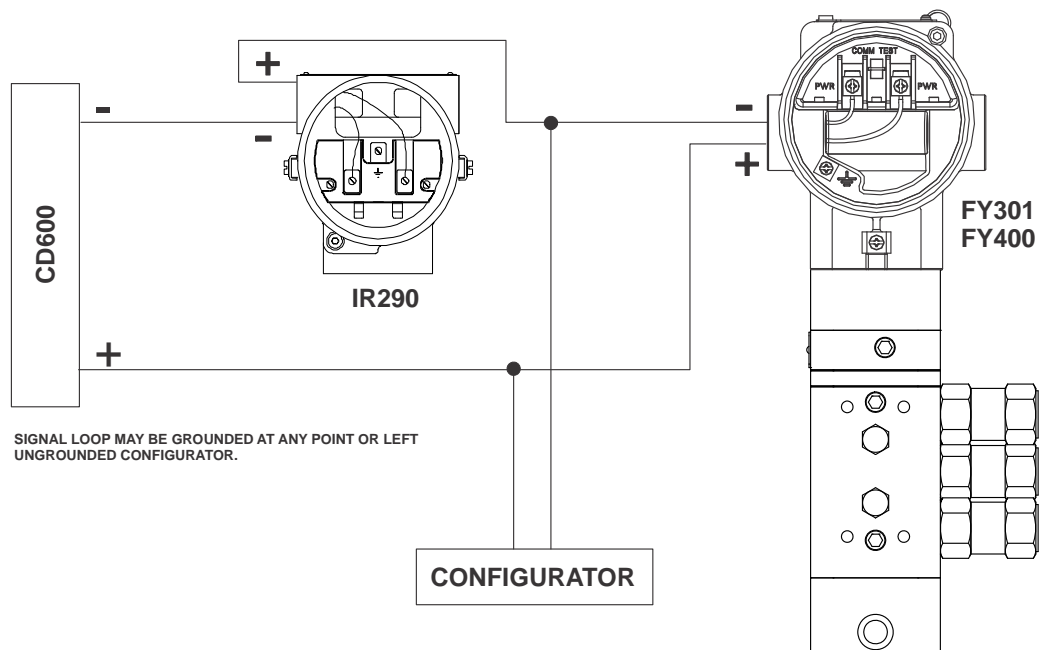
**Figure 1.5 – Wiring Block**

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**

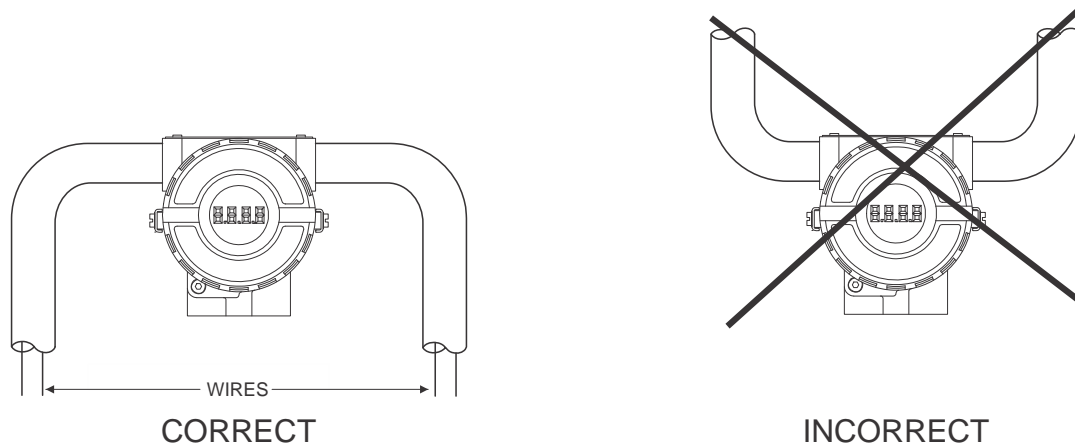


**Figure 1.7 - IR290 Wiring diagram, indicating the SP to FY301/FY400**

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**

<b>WARNING</b>
In hazardous areas with explosion proof requirements, the covers must be tightened at least 8 turns. In order to avoid the penetration of moisture or corrosive gases, tighten the O-ring until it touches the housing. Then tighten 1/3 turn (120°) more to guarantee sealing. Lock the covers using the locking screw.
In hazardous zones with intrinsically safe or non incandive 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.
Explosion proof, non incandive and intrinsic safety Factory Mutual certification are standard for IR290.
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.

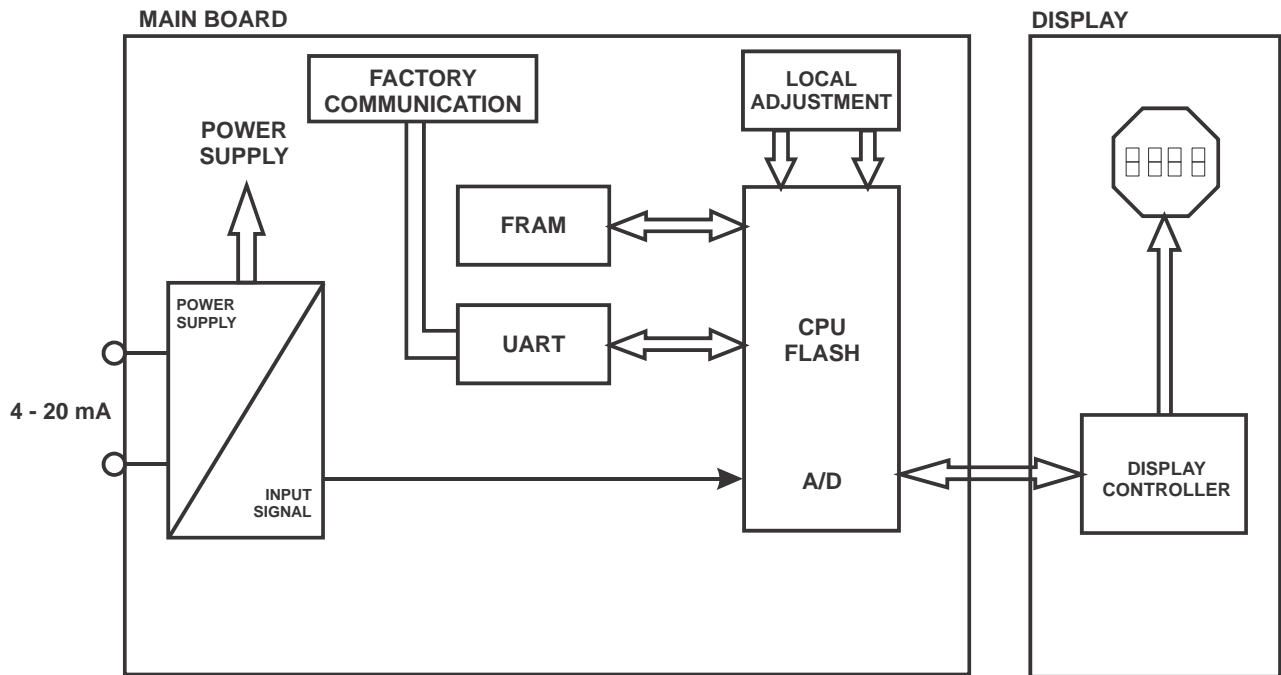


Figure 2.1 – *IR290 Block Diagram*

## 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

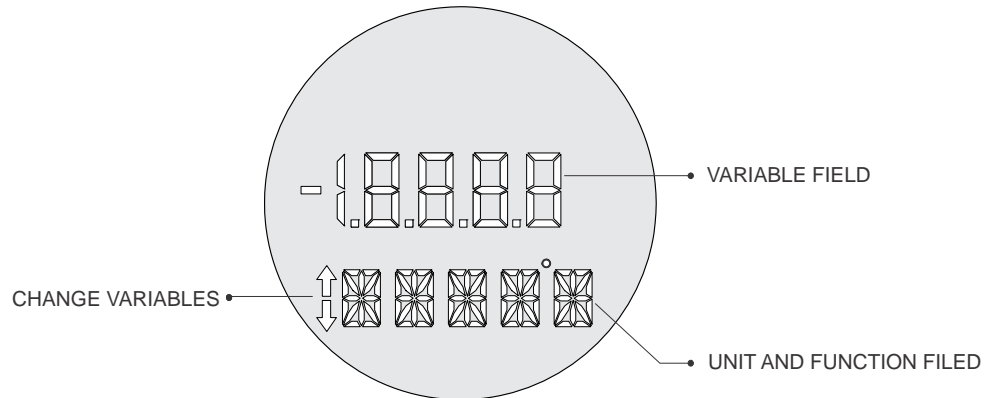


Figure 2.2 – Display

### Monitoring

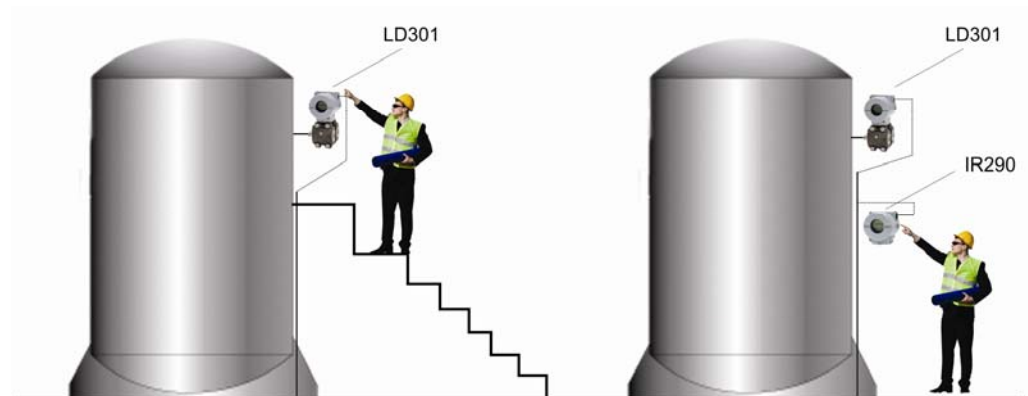
During normal operation, the IR290 works on monitoring mode. In this mode, the display will show engineering units and values.



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



A) On some situations, user-made process monitoring is impaired by the difficult access the equipment;

B) The IR290 allows increased visibility to the user, with easy access to the variables monitored.

Figure 2.4 – Example of Application

# Section 3

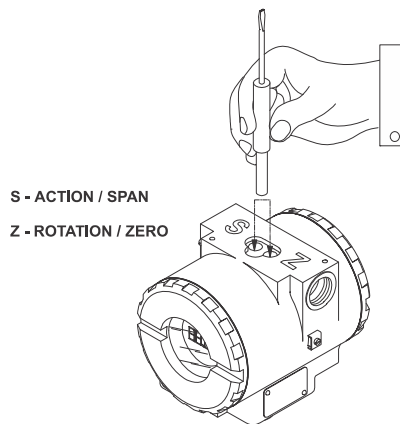
## CONFIGURATION

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 orifice 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 orifice marked “**S**”. See figures 3.1 and 3.3.

### The Magnetic Tool

The **IR290** has under the ID plate two orifices 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 orifices 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 Adjust and Write Protect Jumper's

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.

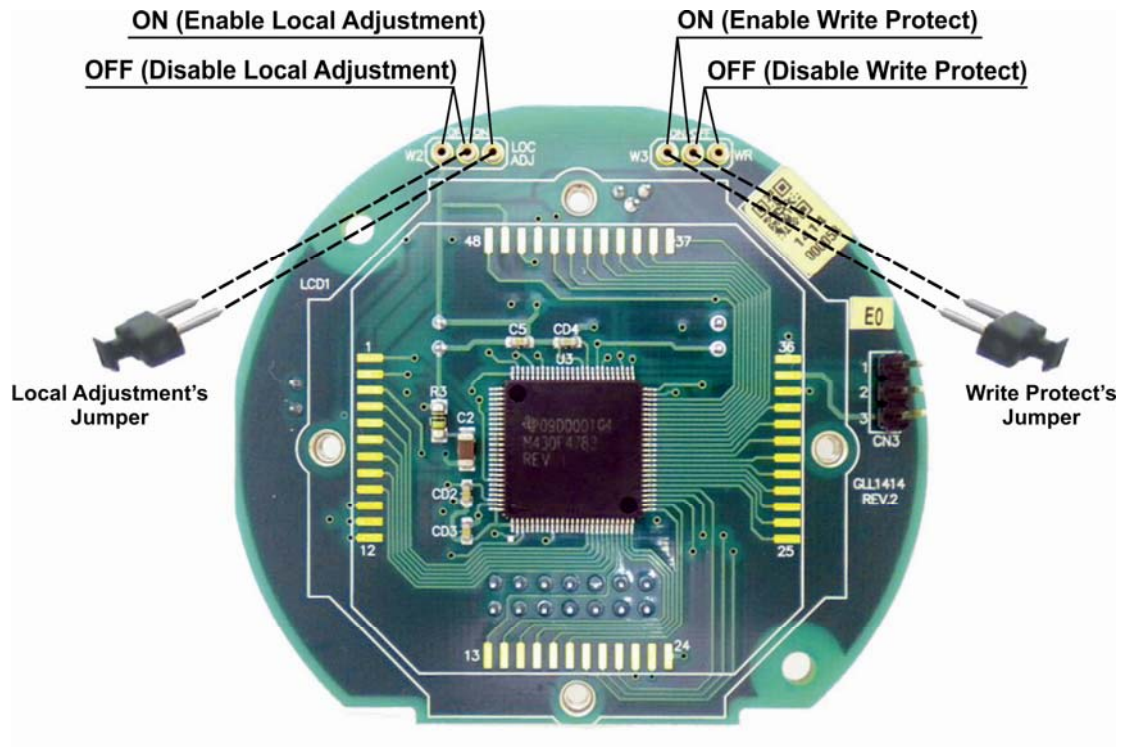


Figure 3.2 – Main Board with Jumpers

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**

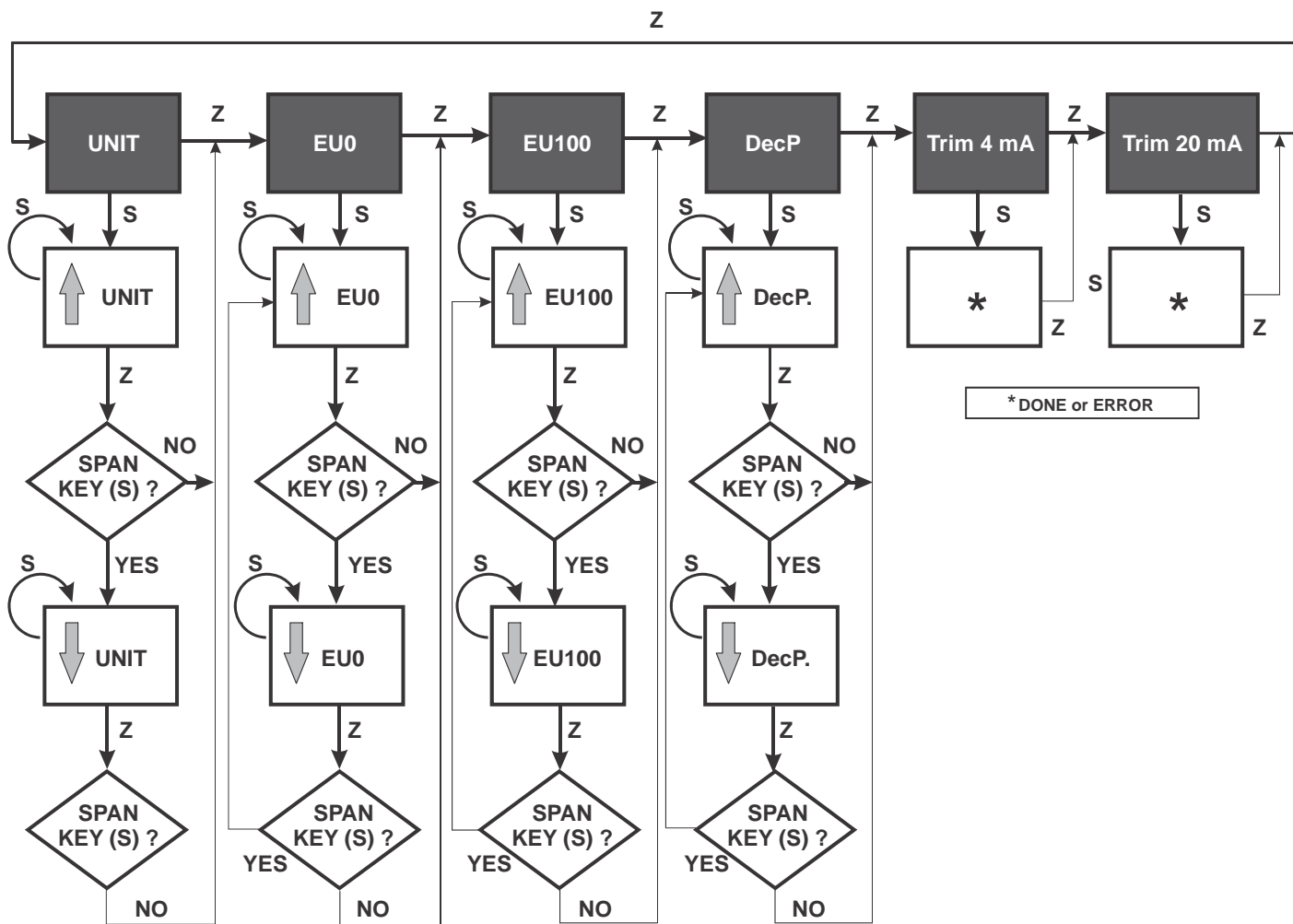
The jumpers **default conditions** are local adjustment **enabled** and write protect **disabled**.

Table 3.2 - Local Adjustment Selection

## Programming Tree Local Adjustment

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

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 disassemble.

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 packagings.

## 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 (6) in its position on the housing, making sure that the connection are sound;
- Mount the LCD (4) carefully according to its desired visualization position;
- Tighten the fixing screws (3);
- Tighten the equipment covers (1 and 14) adequately.

## Exploded View

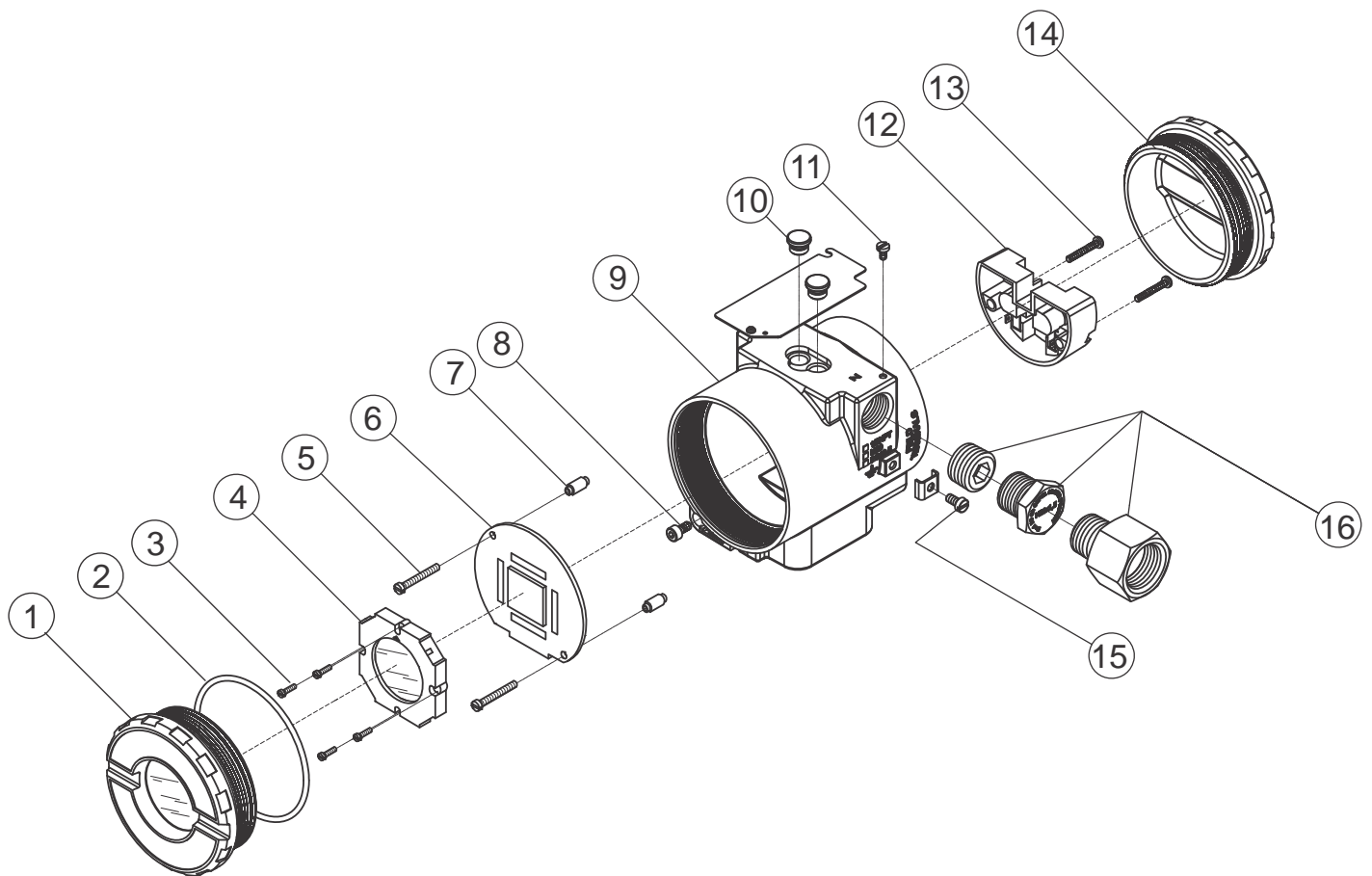


Figure 4.1 – IR290 Exploded View

## Spare Part List

SPARE PART LIST			
PART DESCRIPTION	POSITION (FIGURE 4.2)	CODE	CATEGORY (NOTE 3)
HOUSING ( <b>NOTE 2</b> )	9	( <b>NOTE 1</b> )	
COVER WITHOUT DISPLAY			
Aluminum (including O'ring)	14	204-0102	
Stainless Steel 316 (including O'ring)	14	204-0105	
COVER WITH DISPLAY			
Aluminum (including O'ring)	1	204-0103	
Stainless Steel 316 (including O'ring)	1	204-0106	
GASKET ( <b>NOTE 4</b> )			
Cover, BUNA-N	2	204-0122	B
MAIN BOARD FIXING KIT			
(Screws and Spacers)	5 e 7	400-0560	
TERMINAL BLOCK ISOLATOR FIXING SCREW			
HOUSING, Aluminum	13	304-0119	
HOUSING, Stainless Steel 316	13	204-0119	
EXTERNAL GROUND SCREW	15	204-0124	
DIGITAL INDICATOR (screws included)	3 e 4	400-0559	
MAIN BOARD	6	400-1245	A
COVER LOCKING SCREW	8	204-0120	
LOCAL ADJUSTMENT PROTECTION COVER (package with 6 units)	10	204-0114	
IDENTIFICATION PLATE SCREW	11	204-0116	
TERMINAL BLOCK ISOLATOR	12	400-0058	
ELECTRIC CONNECTION PLUG			
Internal 1/2 NPT hexagonal plug, Bichromatized BR Ex d Carbon Steel	16	400-0808	
Internal 1/2 NPT NPT, Stainless Steel 304 Ex d	16	400-0809	
External Hexagonal M20 X 1,5, Stainless Steel 316 BR Ex d	16	400-0810	
External Hexagonal PG13,5, Stainless Steel 316 BR Ex d	16	400-0811	
Internal 1/2 NPT hexagonal, Bichromatized 5AE 1020 Carbon Steel	16	400-0583-11	
Internal 1/2 NPT hexagonal, Stainless Steel 304	16	400-0583-12	
ELECTRIC CONNECTION REDUCTION BUSH			
¾ Female NPT for ½ Male NPT, stainless steel 316	16	400-0812	
MOUNTING BRACKET FOR 2" PIPE ( <b>NOTE 5</b> )			
Stainless Steel (SS accessories)	-	214-0801	
Stainless Steel 316 (SS 316 accessories)	-	214-0802	
Stainless Steel (SS 316 accessories)	-	214-0803	

### NOTE

- 1) To specify the housing, use HOUSING ORDER CODE table.
- 2) Includes terminal block, screws and ID plate without certification.
- 3) On category "A" the recommendation is to keep in inventory one set for each 25 installed parts and on category "B" on set for each 20 parts.
- 4) The gaskets are packaged with 12 units.
- 5) Includes "U" clamp, nuts, washers and fixing screws.

HOUSING ORDER CODE	
400-1255	HOUSING; IR290
<b>CODE</b>	<b>Electrical Connection</b>
0	½ - 14 NPT
A	M20 X 1,5
B	PG 13,5 DIN
<b>CODE</b>	<b>Housing</b>
H0	Aluminum Housing (IP/Type)
H1	316 SST Housing (IP/Type)
<b>CODE</b>	<b>Painting</b>
P0	Gray Munsell N 6.5 Polyester
P3	Black Polyester
P4	White Epoxy
P5	Yellow Polyester
P8	Without Painting
P9	Safety Blue Epoxy – Electrostatic Painting
PC	Blue Safety Polyesters – Electrostatic Painting

400-1255	*	*	*	← TYPICAL MODEL NUMBER
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\* Select item.

## Accessories

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

## Section 5

# 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 installed or fixed on the wall or panel.
<b>Weight</b>	0.99 kg.

### Ordering Code

MODE	
<b>IR290</b>	<b>4 to 20 mA REMOTE INDICATOR</b>
<b>CODE</b>	<b>Local Indicator</b>
1	With Digital Indicator
<b>CODE</b>	<b>Mounting Bracket for 2" Pipe Mounting</b>
0	Without Bracket
1	Carbon Steel Bracket
2	316 SST Bracket
<b>CODE</b>	<b>Electrical Connections</b>
0	1/2-14 NPT
A	M20 x 1,5
B	PG 13,5 DIN
<b>OPTIONS</b>	
H0	Housing - Aluminum (IP/TYP)E
H1	Housing - 316 SST (IP/TYP)E
A1	Bolts - 316 SST
ZZ	Special Options – Specify


<b>IR290</b>	-	<b>1</b>	<b>1</b>	<b>0</b>	/	<b>*</b>
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← **TYPICAL MODEL**

\* Leave it blank for no optional items.



# Appendix A

	<b>SRF – SERVICE REQUEST FORM</b>
	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:	( ) Yes, please specify: _____ ( ) No More details: _____
Interference types present in the area:	No interference ( )      Temperature ( )      Vibration ( )      Other: _____
Environment Temperature:	From _____ °C up to _____ °C.
<b>OCCURRENCE DESCRIPTION</b>	
_____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
<b>SERVICE SUGGESTION</b>	
Adjustment ( )      Cleaning ( )      Preventive Maintenance ( )      Update / Up-grade ( )	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="http://www.smar.com/contactus.asp">www.smar.com/contactus.asp</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.

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.