

ISOLATED  
SIGNAL  
CONVERTER

# Series ISC

SIGNAL CONVERTERS  
WITH GALVANIC ISOLATION

FEMA ELECTRÓNICA



MODEL  
ISC-POT for Potentiometers  
ISC-RES for Resistances



FEMA ELECTRÓNICA, S. A.

USER'S MANUAL

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## GENERAL INFORMATION

The ISC series of Isolated Signal Converters, allow to convert process signals, temperatures, electrical signals, etc, to current loops or voltage signals for further retransmission, while introducing into the system galvanic isolation barriers between the input, the output and the power supply circuits.

The ISC series of Isolated Signal Converters, offer an excellent relation between signal conversion speed and measure accuracy. Offering up to a 0.2% accuracy and down to 70ms response time, these units can process information coming from probes or transducers, in such a way that can be quickly retransmitted in a fast and accurate form to remote data acquisition systems or PLC's. The isolated signal converters of the ISC series are ideal to integrate into 12 bit data acquisition systems.

Its powerful galvanic isolation of 3.500 V introduces high security to the measuring systems, preventing the propagation of those phenomenon which usually cause damage, such as transient peaks or energy shocks in any of the circuits of the system. The galvanic isolation also acts as a strong CE barrier. The decoupling created between the circuits avoids pernicious effects on the output, such as ground loops or signal leaks, which distort the acquired data and are extremely difficult to isolate once introduced into the signal.

The isolation offered by the ISC series of Isolated Signal Converters is a 3 way isolation. Thus, all the benefits exposed above are applicable to any of the three circuits composing the instrument : input, output and power.

Recalibration of the instruments is realized in a fast and easy way. Opening the frontal cover grants access to the configuration jumpers. Additional Span and Offset potentiometers are directly accessible from the frontal part. These potentiometers are highly decoupled, minimizing the iterations needed to obtain a correct adjustment.

In order to obtain a higher and quickest benefit of the ISC units, we recommend you to read carefully the information provided in this manual before proceeding to the installation of the instrument. In this manual you will find all technical data, both electrical and mechanical, needed for a correct instalation and utilization.

**Note : The units of the ISC Isolated Signal Converters have attached a characteristics label on the side of the instrument. Check that this information matches with your requirements for this specific application, and very specially check the value and type of the Power Supply.**

## QUICKGUIDE

The ISC units have a frontal cover which can be opened down. This cover gives access to the Span and Offset potentiometers, and to the selection jumpers for input and output signal ranges.

To open the frontal cover, press slightly the sides of the cover at the upper side, close to the OUTPUT terminals, as indicated on Figure1.

The cover is free to open down, as shown on Figure2.

## POWER SUPPLY CONNECTIONS

ISC units are powered through the plug-in terminal positioned on the upper side of the instrument. This terminal is placed in a transverse axis, different from the other terminals. Close to the power supply terminal there is a small yellow label with indications on the connections for AC and DC

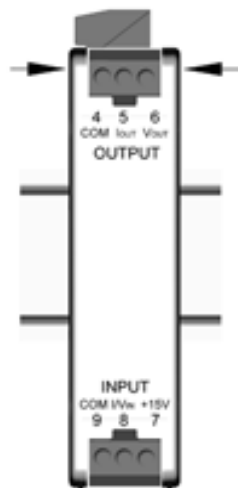
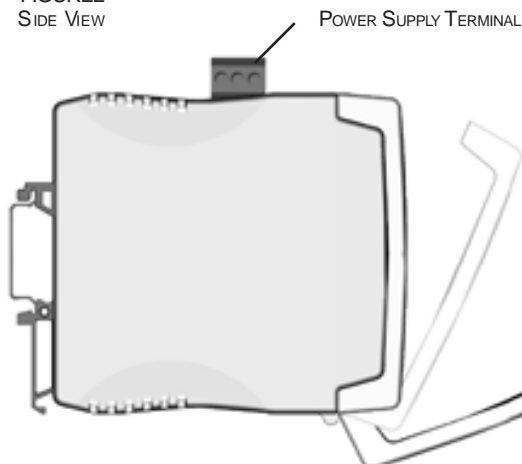


FIGURE1  
FRONT VIEW WITH COVER

**IMPORTANT !!** Check that the power supply indicated on the white label attached to the side of the instrument, matches with the power supply you want to connect.

For more accurate information on the power supply connections, please see page 6 of this manual.

FIGURE2  
SIDE VIEW



FRONT COVER OPENING:  
ACCESS TO JUMPERS FOR  
INPUT AND OUTPUT RANGE  
SELECTION, AND ACCESS TO  
SPAN AND OFFSET ADJUST  
POTENTIOMETERS

## SIGNAL ADJUSTMENT

To proceed to adjust a range of input and output signals, first select with the appropriate jumpers, the signal ranges

which include your desired adjustment. Then proceed to the adjustment.

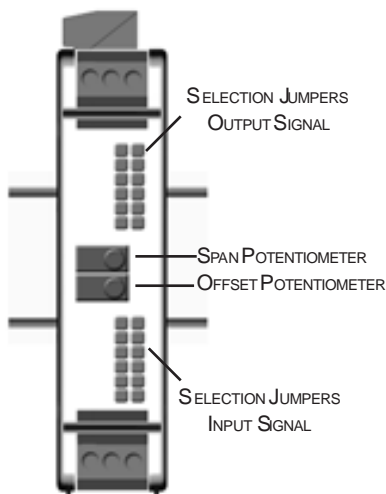
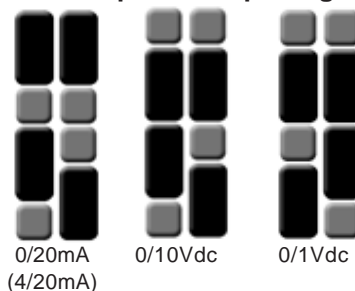


FIGURE 3  
FRONT VIEW  
WITHOUT COVER

### Selection Jumpers : Output Signal Range



### Selection Jumpers : Input Signal Range (See next page)

## Adjustment Example for unit ISC-POT

- 1.- Connect potentiometer to input terminals (8 «term+», 9 «term-» and 7 «signal»)
- 2.- Connect a multimeter to the output signal terminals (4 and 5 for mA or 4 and 6 for Vdc).

(Values in brackets are examples for a calibration  $0/100\% = 0/10Vdc$ )

- 3.- Input a zero signal (0 %).  
Operate offset potentiometer until getting a zero output (0Vdc).
- 4.- Input the difference between the high and low input levels ( $100-0=100\% Aac$ ).  
Operate span potentiometer until

getting an output which is the difference between the high and low output levels ( $10-0=10Vdc$ ).

- 5.- Input low input level (0 %).  
Operate offset potentiometer until getting the low level output (0Vdc).
- 6.- Input high input level and check that that the output also matches the desired level ( $100\% = 10Vdc$ ).

If more accurate measure is needed, repeate steps 5 and 6.

Most of the input / output combinations will be properly adjusted within the instrument accuracy after these steps. Close frontal cover once calibration is finished.

## SELECTION JUMPERS : INPUT SIGNAL RANGE

### ISC-POT for POTENCIÓMETRIC SIGNALS



Range : 100% FS



Range : 25% FS



Range : 50% FS



Range : 12.5% FS

### ISC-RES for RESISTANCE SIGNALS



Range : 10 KOHms  
Range Min : 5 KOHms



Range : 3 KOHms  
Range Min : 1.5 KOHms

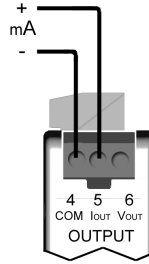
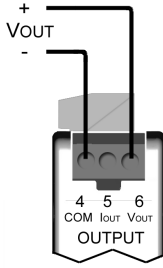
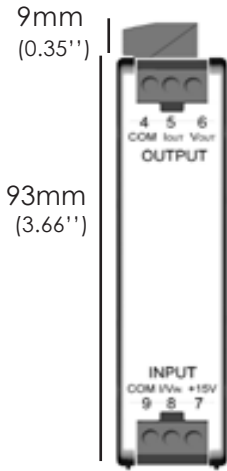


Range : 5 KOHms  
Range Min : 3 KOHms

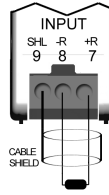
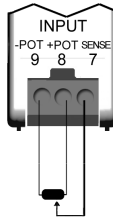


Range : 1.5 KOHms  
Range Min : 750 Ohms

## DIMENSIONS AND CONNECTIONS



Output Connections

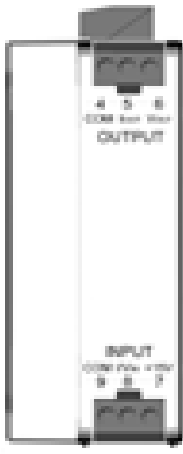


Input Connections

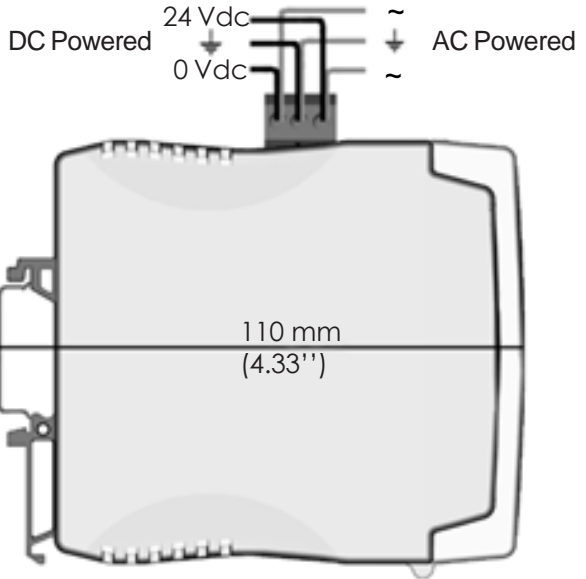
POTENTIOMETER

RESISTANCE

Special Wide for  
AC Power models



37mm  
(1.46")



## TECHNICAL DATA : Unit ISC-POT and ISC-RES

### INPUT SIGNAL for POTENTIOMETER

<b>RANGES</b>	0/100 %
	0/50 %
	0/25 %
	0/12.5%
	(minimum 8%)

Potentiometer value min 100Ohms  
max 1MOhm

System 3 wire  
Excitation 1 Vdc

### INPUT SIGNAL in RESISTANCE

<b>RANGES</b>	0/10 KOhms
	0/5 KOhms
	0/3 KOhms
	0/1.5 KOhms
	(minimum 750 Ohms)

System 2 wire  
Excitation 0.2 mA

### OUTPUT SIGNAL in VDC

<b>RANGES</b>	0/10 Vdc
	0/1 Vdc
Max Output	11Vdc approx.
Min Output	-1Vdc approx.
Min Load R	≥1KOhm

### OUTPUT SIGNAL in mA

<b>RANGES</b>	0/20mA (4/20mA)
Max Output	22mA approx.
Min Output	-1.5mA approx.
Max Load R	≤400 Ohms

### POWER SUPPLY

DC Power	24Vdc ±10%
AC Power	230Vac ±10% 50/60 Hz
	115Vac ±10% 50/60 Hz
Consumption	<3.8VA

### MECHANICAL DIMENSIONS

DC Units	22.5 x 93 x 110 mm
AC Units	37.0 x 93 x 110 mm
Weight DC	120 gr.
Weight AC	200 gr.

Standard DIN rail mounting, as specified  
on DIN46277 and DIN EN 50022  
37.5 x 7.5 mm (1.38 x 0.3 ``)

### GALVANIC ISOLATION LEVELS

DC Units	
Input - Output	3K5 (60 seconds)
Power-Input	3K5 (60 seconds)
Power-Output	1K V (60 seconds)

AC Units	
Input - Output	3K5 (60 seconds)
Power-Input	3K5 (60 seconds)
Power - Output	3K5 (60 seconds)

All isolation levels are tested during a  
time of 60 seconds, with current leaks  
<1mA

Note : Indicated isolation levels are also  
indicated sometimes named as  
STRENGTHENED ISOLATION levels,  
for systems with Pollution Level 2

### MATERIALS

Box and Cover in Poliamide PA6 UL94  
V-2 blue color  
Terminals in Poliamide UL94 V-0

**GENERAL CHARACTERISTICS**

Accuracy	<0.2% F.S. Optimized for 12 bit systems
Linearity	<0.1% F.S.
Thermal Drift	<250 ppm/°C Typical
Response Time	<70mS (90% of signal)
Electrical Connections	Plug-In Screw Terminals
Maximum Wire Section	2.5 mm <sup>2</sup>
Protection	IP-30
Operating Temperature	from 0 to 60°C
Storage Temperature	from -20 to +70°C

**CE DECLARATION OF CONFORMITY**

**Manufactured by :** FEMA ELECTRÓNICA, S.A.  
**Address :** Centro Industrial Santiga

Altimira 14 (Talleres 14, Nave 2)  
 E 08210-Barberà del Vallès (Spain)

**We hereby declare under our responsibility, that the equipments identified below comply with the following specifications :**

**Series:** Isolated Signal Converter of the ISC Series  
**Models :** P, PT100, TJ, TK, TE, TT, TR, TS,  
 VAC, VDC, IAC, IDC, POT, RES, HZ, LC

**DIRECTIVES**

**EUROPEAN DIRECTIVE FOR LOW VOLTAGE D73/23/CEE AMENDED BY D93/68/CEE.** Equipments powered from 50 to 1000 Vac and/or from 75 to 1500 Vdc.

**EUROPEAN DIRECTIVE FOR PRODUCT SAFETY D92/59/CEE**

**ELECTROTECHNICAL REGULATION FOR LOW VOLTAGE (RBT) ITC21, ITC 29, ITC 35.** For equipments with power supply lower than 50Vac and/or 75Vdc.

**EUROPEAN DIRECTIVE FOR ELECTROMAGNETIC COMPATIBILITY D89/336/CEE AMENDED BY D93/68CEE, ACCORDING TO RD1950/1995 (01/12)**

**REGULATIONS**

**ELECTRICAL SECURITY:** EN61010-1

**SUSCEPTIBILITY:** EN 50082-2  
 IEC 1000-4-2, EN 61000-4-2, IEC 801-2  
 ENV 50140, EN 61000-4-4, IEC 801-4 (level 3)  
 ENV 50204 (level 3)

**EMISSION:** EN 50081-2  
 EN 55011, EN 55014, EN 55022

**UNE 21352-76: CEI 359-71**

Operating quality expressions for electronic equipments.

**UNE 20652-80: CEI 284-68**

Behaviour rules inherent to the handling of electronic equipments and other similar technics.

Signed : D.Juncà  
 Quality Manager  
 Barberà del Vallès, 2002

## CAUTIONS, WARNINGS AND NOTES

### INSTALLATION

**PRECAUTIONS.**- The installation and the future use of this unit must be done by qualified personnel. The unit has not AC (mains) switch, neither internal protection fuse. It will be in operation as soon as power is connected. The installation must incorporate an external mains switch with a protection fuse and also the necessary devices to protect the operator and the process when using the unit to a control machine or process where injury to personnel or damage to equipment or process may occur as a result of failure of the unit.



### RECOMMENDED FUSES

24 Vdc	230 Vac	115 Vac
250mA	70 mA	100 mA

All fuses .-Time Lag Fuse

**SAFETY PRESCRIPTIONS.**- The unit has been designed and tested under EN-61010-1 rules and is delivered in good conditions. This User's Manual contains useful information the user has to respect in order to warrant a proper function of the unit, and good security conditions. The unit is designed for internal applications, with good ventilation to avoid excessive heating. It can **occasionally** be applied to temperatures down to 10°C or up to 70°C without security degradation. Do all connections before applying power to the unit. Do not make wiring changes until power is disconnected from the unit.



Install the unit far from elements generating electric noise, or magnetic

fields, such as power relays, electrical engines, speed regulators, etc. Do not use until installation is completed.

**POWER SUPPLY.**- The power supply must be connected to the adequate terminals 1, 2 and 3. The characteristics of the power supply are shown on the side label. Please make sure that the unit is correctly connected to a power supply of the correct voltage and frequency. Do not connect the unit to lines which are overloaded or which provide power to systems working on ON-OFF cycles or inductive loads.

**ATTENTION :** If the power supply is DC voltage, be careful with the polarity indicated for each terminal.

**SIGNAL WIRING .-** Certain considerations must be given when installing the signal input wires. If the wires are long, they can act as an antenna introducing electrical noise into the unit. Therefore :

Do not install the signal input wires in the same conduit with power lines, heaters, solenoids, SCR controls, etc ... and always far from these elements.

When shielded wires are used, leave unconnected the shield on the transmitter side and connect the other end of the shield to the ground terminal of the machine.

**EXCITATION VOLTAGE.**- Model ISC-P incorporates an internal power supply for transducers. The output of this power supply is connected to terminals 7 and 9. Do not connect these terminals to an external power supply, because both units will be permanently damaged.

**SAFETY CONSIDERATIONS**

**PRESCRIPTION.**- Before starting any operation of adjustment, r e p l a c e m e n t , maintenance or repair, the unit must be disconnected from any kind of power supply. Keep the unit clean, to assure good functioning and performance. To prevent electrical or fire hazard, do not expose the unit to excessive moisture. Do not operate the unit in the presence of flammable gases or fumes, such an environment definitely constitutes a safety hazard. The unit is designed to be mounted on a metal panel.



If the unit shows signs of damage, is not able to show the expected measures, has

been stored in a bad conditions or a protection failure happened, then do not attempt to operate, keep the unit out of service and send for repair.

**IN CASE OF FIRE**

- 1.- Disconnect the unit from the power supply
- 2.- Give the alarm according to the local rules
- 3.- Switch off all air conditioning devices
- 4.- Attack the fire with carbonic snow, do not use water in any case



**WARNING: In closed areas do not use systems with vaporized liquids.**

**WARRANTY**

**FEMA ELECTRÓNICA, S.A.** warrants this unit to be free of manufacturing defects for a period of 24 MONTHS from shipment date. This warranty covers both materials and manufacturing processes.

This warranty is VOID if the unit shows evidence of damages as a result of misapplication, accident, misuse or if the product had been tampered or repaired by personnel or companies without the official authorization of **FEMA ELECTRÓNICA, S.A.** This warranty is also VOID for damages caused by defective or inappropriate applications.

In case of malfunction, the unit should be sent to the manufacturer for its evaluation.

**RETURN FOR REPAIR**

Ship free of charges and properly packed to the address indicated below :

**FEMA ELECTRÓNICA, S.A.**

Pol.Ind.Santiga (Altimira 14, T-14, N-2)  
E-08210 BARBERÀ DEL VALLÈS (SPAIN)

Within the warranty period, and always previous examination from **FEMA ELECTRÓNICA, S.A.**, the unit will be repaired or replaced to the discretion of the manufacturer.

Limitation of liability : **FEMA ELECTRÓNICA, S.A.** shall not be responsible for any damage or loss to other equipment however caused, which may be experienced as a result of the installation or use of this product. **FEMA ELECTRÓNICA, S.A.** liability shall not exceed the purchase price paid of the product upon which liability is based. In no event shall **FEMA ELECTRÓNICA, S.A.** be liable for consequential, incidental or special damages

**WARRANTY DATA**

Serial Number :  
Series - Model :  
Input Signal :  
Output Signal :  
Power Supply :  
Supplied by :

Date and Stamp

**LARGE DISPLAYS**

- COUNTERS
- PROCESS SIGNALS
- TEMPERATURES
- RATEMETERS
- SERIAL CODE REPEATERS
- CLOCKS
- CHRONOMETERS



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**PANEL INDICATION**

- AC ELECTRICAL SIGNALS
- DC ELECTRICAL SIGNALS
- TEMPERATURES
- LOAD CELLS
- PROCESS
- RATEMETERS
- COUNTERS

**DIN RAIL CONVERTERS ISOLATORS**

- AC ELECTRICAL SIGNALS
- DC ELECTRICAL SIGNALS
- TEMPERATURES
- LOAD CELLS
- PROCESS
- INTEGRATORS PULSES / FREQUENCY

*DISTRIBUTED BY :*