ISC Series

SIGNAL CONVERTERS
WITH GALVANIC ISOLATION

MODEL
ISC-P for Process

FEMA ELECTRÓNICA®

1-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 retransmision, 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 measurement accuracy. Offering a 0.2% accuracy and up to a 70ms response time depending on the model, 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 to the remote system, 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 input, output and power 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 front 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 ISC Isolated Signal Converter instruments have a characteristics label attached on the side of the instrument. Check that the information indicated on the label matches with your application requirements, and specially check that the value and type of the power supply needed matches the value and type of the power supply availble on your installation.

2-INSTALLATION

Before installing the instrument check the characteristics label attached to the side of the unit. Specially check that the value of the power supply needed, matches the power supply available on your installation.

The characteristics label also indicates the input/output signal relation for the instrument. Remember to take note of the new input/ output relation if you proceed to readjust the instrument.

To access the selection jumpers for input and output ranges, and the Span and Offset potentiometers, slightly press the A-A points of the front cover as indicated on Figure1.

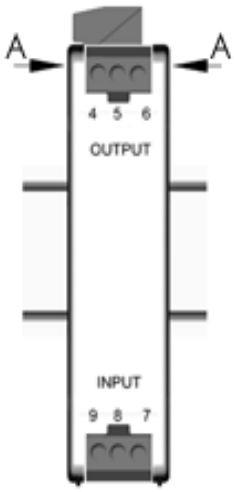


FIGURE 1

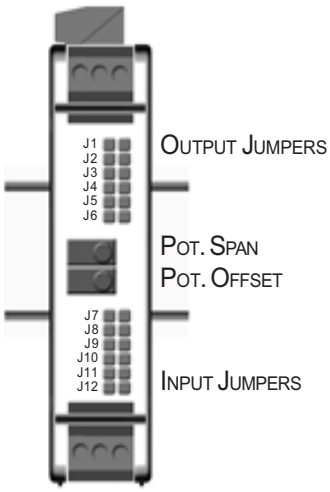


FIGURE 2

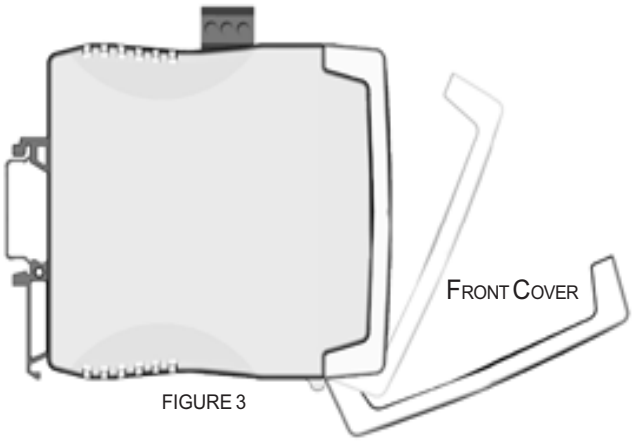


FIGURE 3

The instrument must be installed in such a way that it remains in vertical position as indicated on Figure4.

To help dissipate the heat, a free space of 2mm must be left available on both sides of the instrument.

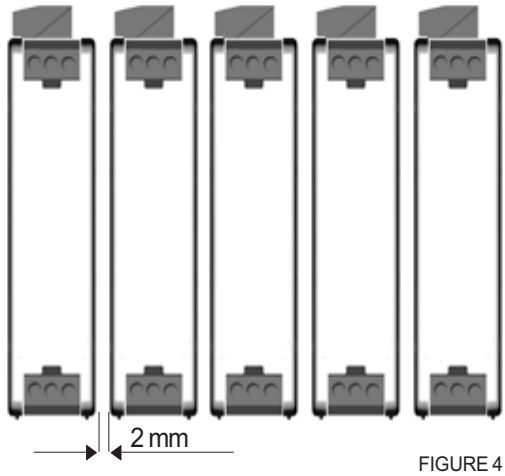
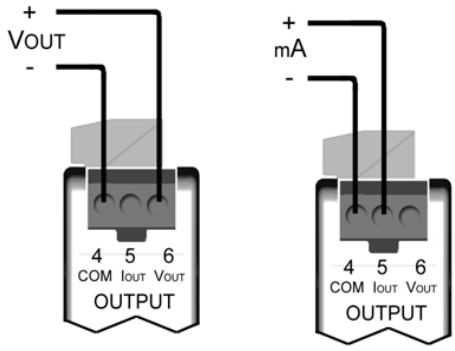


FIGURE 4

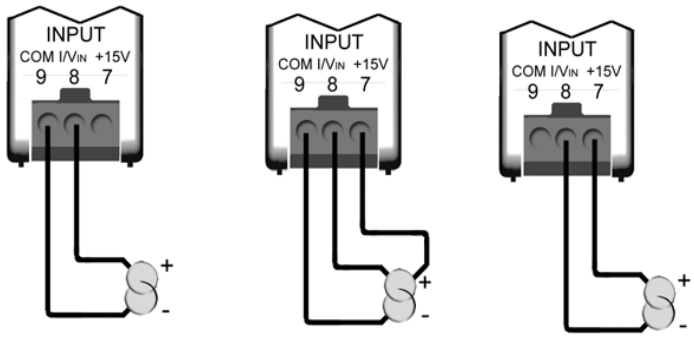
IMPORTANT - Opening the front cover may grant access to areas with dangerous voltages. Operations must be performed by qualified technical staff.

3-DIMENSIONS AND CONNECTIONS

Output Connections



Input Connections

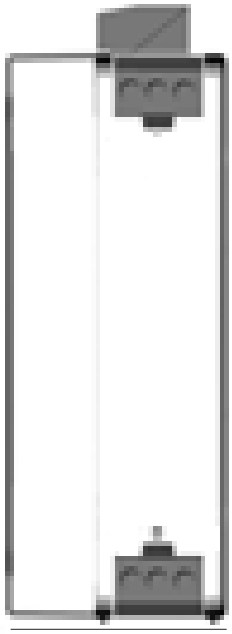


VOLTAGE OR CURRENT GENERATOR

3 WIRE TRANSDUCER

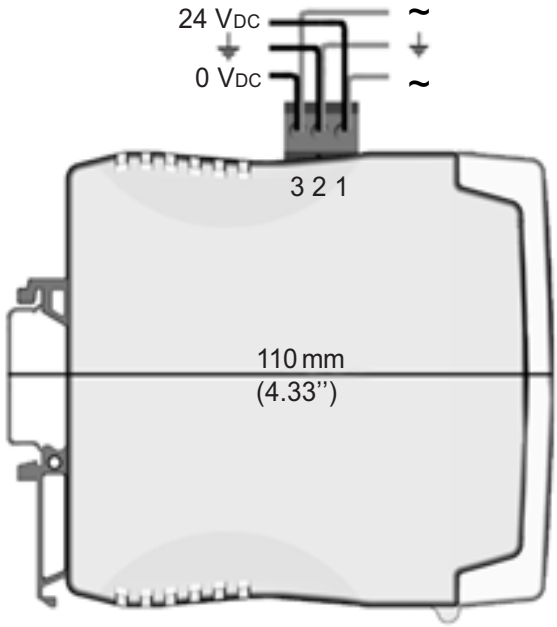
2 WIRE TRANSDUCER

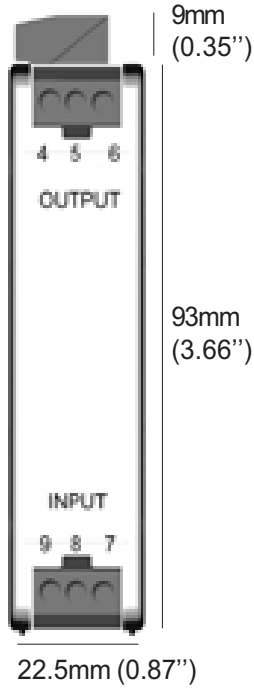
HOUSING WIDTH FOR AC POWERED INSTRUMENTS



DC POWERED CONNECTIONS

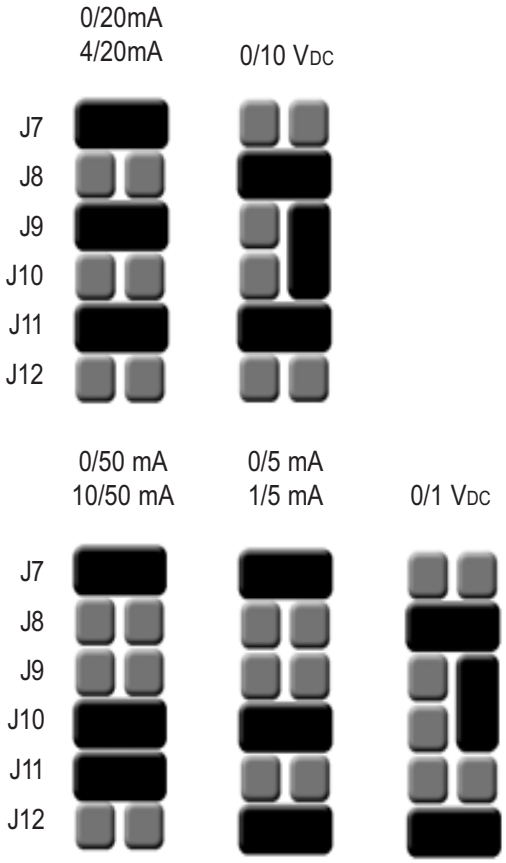
AC POWERED CONNECTIONS





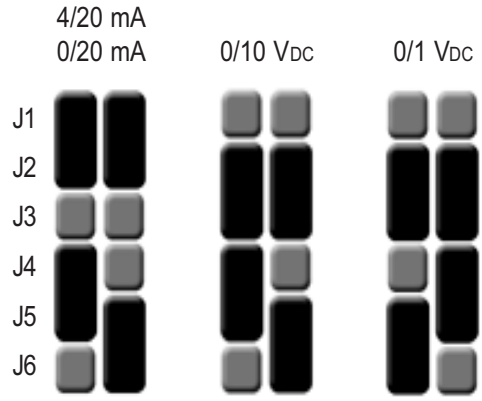
4-SIGNAL INPUT JUMPERS

The position of the input jumpers selects the range for the input signal as indicated below.



5-SIGNAL OUTPUT JUMPERS

The position of the output jumpers selects the range for the output signal as indicated below.



6-READJUSTING INPUT / OUTPUT

To change the input/output relation of the instrument, proceed as indicated below :

1.- Open the front cover

2.- Select the required input jumpers *(Section 4, page 6)*

3.- Select the required output jumpers *(Section 5, page 6)*

4.- Connect a signal generator to the input terminals *(8 signal and 9 common)*

5.- Connect a multimeter to the output terminals *(4 and 5 for mA or 4 and 6 for Vdc)*

(Following values in brackets are examples for readjusting the input/output relation of the instrument to 4/20mA = 0/10 Vdc)

6.- Generate the low input signal *(4mA)*
Operate the OFFSET potentiometer, until the low output value is reached *(0Vdc)*

7.- Generate the high input signal *(20mA)*
Operate the SPAN potentiometer, until the high output value is reached *(10Vdc)*

8.- Repeat 6 and 7 to improve the accuracy until it reaches its specified value

9.- Close the front cover

IMPORTANT - Opening the front cover may grant access to areas with dangerous voltages. Operations must be performed by qualified technical staff.

7-CALCULATING POSSIBLE ADJUSTMENTS

Use the formulas below to find if an input/output relation is possible on the instrument. Formulas are based on the input and output signals desired, and the input and output ranges selectable on the instrument.These parameters are defined as *[IL]* (Input Low), *[IH]* (Input High), *[OL]* (Output Low), *[OH]* (Output High), *[IR]* (Input Range) and *[OR]* (Output Range).

Signal Input	from	*[IL]*	to	*[IH]*	in mA or Vdc
Signal Output	from	*[OL]*	to	*[OH]*	in mA or Vdc

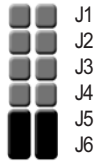
Input Range — select the input range *[IR]* from the following options
20mA, 50mA, 5mA , 10Vdc, 1Vdc

Output Range — select the output range *[OR]* from the following options
10Vdc, 20mA, 1Vdc

SPAN Value

$$SPAN = \frac{[IR]}{[IH] - [IL]} \times \frac{[OH] - [OL]}{[OR]}$$

SPAN>2	Adjust NOT possible
0.5<SPAN<2	Adjust possibe
0.05<SPAN<0.5	Adjust possible, but select the Output Selection Jumpers J5 and J6 as indicated while J1, J2, J3 and J4 remain as indicated in section 5



OFFSET Value

$$OFFSET = \frac{[OL]}{[OR]} - \frac{[IL]}{[IR]} \times SPAN$$

OFFSET >0.5	Adjust NOT possible
-0.5<OFFSET<0.5	Adjust possibe
OFFSET <-0.5	Adjust NOT possible

8-TECHNICAL DATA - I

INPUT SIGNAL in Vdc

RANGES	0/10Vdc
	0/1Vdc

INPUT SIGNAL in mA

RANGES	0/20mA (4/20mA)
	0/50mA (10/50mA)
	0/5mA

OUTPUT SIGNAL in Vdc

RANGES	0/10Vdc
	0/1Vdc
Maximum Output	11Vdc aprox.
Minimum Output	-1Vdc aprox.
Minimum Load	≥1KOhm

OUTPUT SIGNAL in mA

RANGES	0/20mA (4/20mA)
Maximum Output	22mA aprox.
Minimum Output	-1.5mA aprox.
Maximum Load	≤400 Ohms

IMPEDANCES and OVERVOLTAGES

Range	**Zin**	**Max. Vdc**
4/20 mA	50 Ohm	3.5 Vdc
0/20 mA	50 Ohm	3.5 Vdc
0/50 mA	20 Ohm	2.5 Vdc
0/5 mA	20 Ohm	2.5 Vdc
0/10 Vdc	5 MOhm	150 Vdc
0/1 Vdc	0/1 MOhm	15 Vdc

POWER SUPPLY

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

MECHANICAL DIMENSIONS

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

Standard DIN rail mounting (DIN46277, DIN EN 50022)
37,5 x 7,5 mm (1,38 x 0,3 ´´)

GALVANIC ISOLATION

DC Powered Units	
Input - Output	3K5 *(60 seconds)*
Power - Input	3K5 *(60 seconds)*
Power - Output	1KV *(60 seconds)*
AC Powered 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 Vac TrueRMS signal, and current leaks <1mA

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

MATERIALS

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

9-TECHNICAL DATA - II

Accuracy	<0.2% F.S. Optimized for 12 bit systems
Linearity	<0.1% F.S.
Thermal Drift	150 ppm/ºC Typical (Max. <200ppm/ºC)
Response Time	<70mS (90% of signal)
Bandwith	20Hz (-3dB)
Warm-Up Time	15 minutes
Electrical Connections	Plug-in Screw Terminals
Maximum Wire Section	2.5 mm^2
Protection	IP-30
Operating Temperature	0 to 60ºC
Storage Temperature	-20 to +70ºC
Excitation Voltage for Transducers	+15Vdc ±10% (22mA max.)

10-CE DECLARATION OF CONFORMITY

Manufactured by : FEMA ELECTRÓNICA, S.A.
Address: Pol. Ind. Santiga - Altimira 14 (T14 - N2)
E 08210-Barberà del Vallès - BARCELONA
ESPAÑA - 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