



170.ADD.LFS.RB0 0,8.011-98/B



ADDENDUM FOR REAR-OF-BOARD VERSION

LFS - R

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ASSEMBLING

WARNING:

- 1) The correct functionality of these instruments is guaranteed only if transport, storage, installation, wiring, working condition and maintenance are executed in compliance with this manual.
- 2) The protection degree of these instruments is equal to IP 20 (according to IEC529) and they are connected to dangerous power lines, for these reasons:
 - installation, wiring and maintenance must be executed by qualified personnel;
 - all warnings contained in this manual must be complied.
- 3) The safety requirements for Permanently Connected Equipment say:
 - a switch or circuit-breaker shall be included in the building installation;
 - It shall be in close proximity to the equipment and easy to reach for the operator;
 - it shall be marked as the disconnecting device for the equipment.

NOTE: a single switch or circuit-breaker can drive more than one instrument.
- 4) Before to execute any operation on the connections, disconnect the instrument from the power line by the circuit breaker.

GENERAL ASSEMBLING INFORMATION

Select a cleaned location, easy to reach, where minimum vibrations are present and the ambient temperature is within 0 and 50 °C (32 and 122 °F). These instruments can be mounted either on wall or on OMEGA DIN rail.

For mechanical dimensions refer to Fig. 4.

WALL MOUNTING

For wall mounting, use the (A) holes.

In this case it is advisable to use four M4 screws with a torque of 1Nm.

For mounting template and mechanical dimensions, please refer to Fig. 4 drawing.

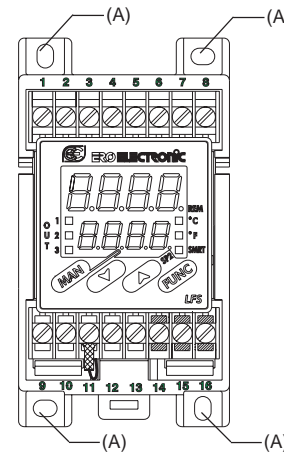


Fig. 1

OMEGA DIN RAIL MOUNTING

For rail mounting use an OMEGA DIN rail in accordance with EN 50 022 (35 x7.5 mm or 35 x 15 mm) regulations.

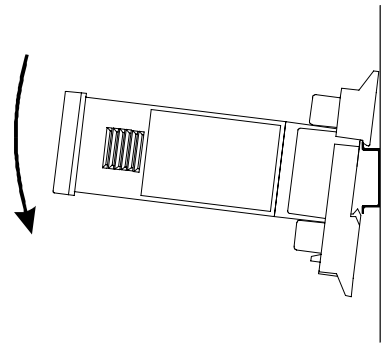


Fig. 2 MOUNTING

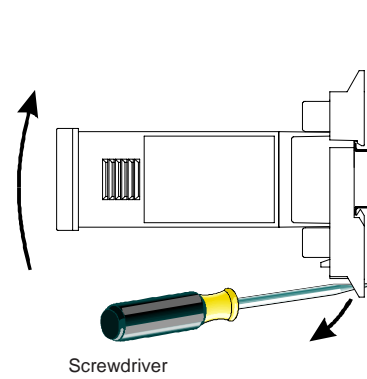


Fig. 3 REMOVING

MECHANICAL DIMENSIONS

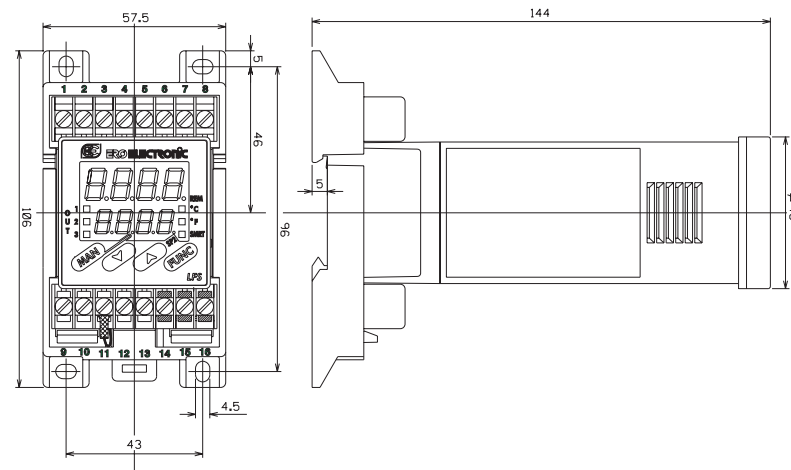


Fig. 4 MECHANICAL DIMENSIONS

CONNECTION DIAGRAMS

Connections have to be executed when the instrument is placed in its proper location.

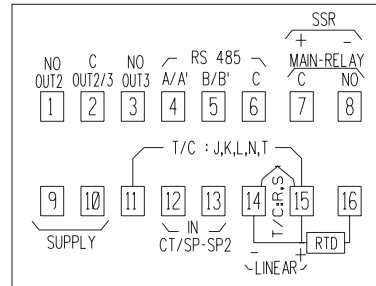


Fig. 5.A LFS-RELAY TERMINAL BLOCK

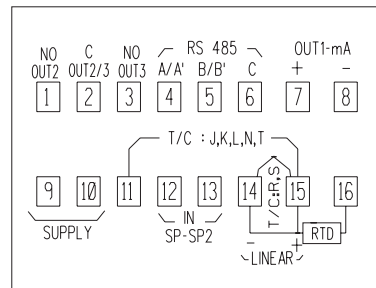


Fig. 5.B LFS-mA TERMINAL BLOCK

MEASURING INPUTS

NOTES:

- Any external components (like zener barriers etc.) connected between sensor and input terminals may cause measurement errors due to excessive and/or not balanced line resistance or possible leakage currents.
- The input accuracy is equal to $\pm 0.2\%$ f.s.v. (**) ± 1 dgt. @ 25 °C of ambient temperature. (***) For TC input, the f.s.v. should be referred to the higher f.s.v. of the TC selected.

TC INPUT

TC type R and S

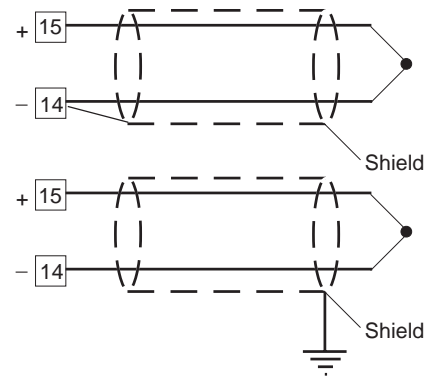


Fig. 6.A INPUT WIRING FOR TC TYPE R AND S

TC type J, K, L, N and T

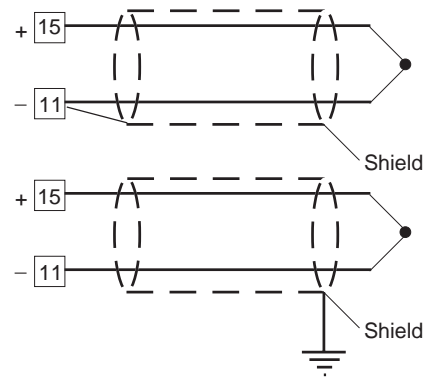


Fig. 6.B INPUT WIRING FOR TC TYPE J, K, L, N AND T

NOTE:

- 1) Do not run input wires with power cables.
- 2) For TC wiring use proper compensating cable preferable shielded.
- 3) when a shielded cable is used, it should be connected to one side only.

RTD INPUT

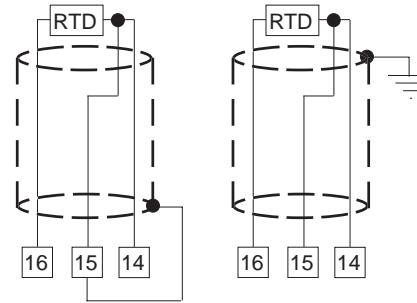


Fig. 7 RTD INPUT WIRING

NOTE:

- 1) Don't run input wires together with power cables.
- 2) Pay attention to the line resistance; an high line resistance may cause measurement errors.
- 3) When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.
- 4) The resistance of the 3 wires must be the same.

LINEAR INPUT

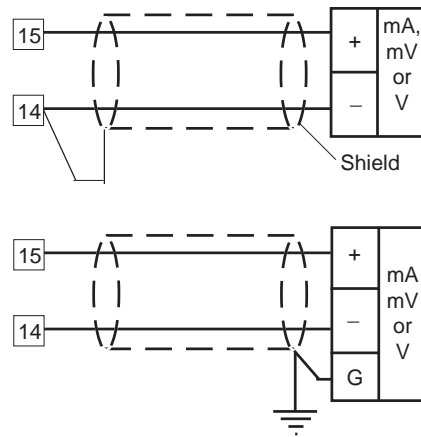


Fig. 8 mA, mV AND V INPUTS WIRING

NOTE:

- 1) Do not run input wires together with power cables.
- 2) Pay attention to the line resistance; a high line resistance may cause measurement errors.
- 3) When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.
- 4) The input impedance is equal to:
 - < 5 Ω for 20 mA input
 - > 1 M Ω for 60 mV input
 - > 200 k Ω for 5 V input
 - > 400 k Ω for 10 V input

LOGIC INPUT

NOTES:

- 1) Do not run logic input wiring together with power cables.
- 2) Use an external dry contact capable of switching 0.5 mA, 5 V DC.
- 3) The instrument needs 100 ms to recognize a contact status variation.
- 4) The logic input is **NOT** isolated by the measuring input.
- 5) This feature excludes the current transformer input function.

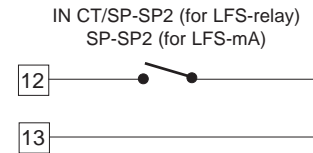


Fig. 9- LOGIC INPUT WIRING

This input (connections 12 and 13) is used either a current transformer input (for LFS-relay only) or a logic input.

When the logic input is selected, it is used to switch, by an external contact, from main set point to second set point and viceversa.

logic input	op. set point
open	SP
close	SP2

CURRENT TRANSFORMER INPUT
(For LFS-relay only)

Safety note:

- 1) Do not run current transformer input wiring together with AC power cables.
- 2) This feature excludes the logic input function.
- 3) The input impedance is equal to 10 Ω .

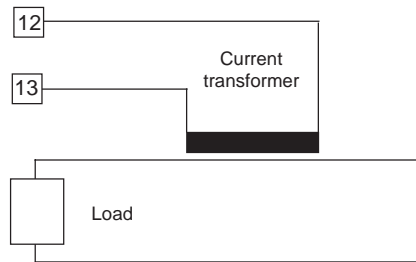


Fig. 10 - CURRENT TRANSFORMER INPUT WIRING

This input allows to measure and display the current running in the load driven by the OUTPUT1 during the ON and OFF period of the OUT 1 cycle time. By this feature it is also available the "OUT 1 failure detection" function.

OUTPUTS

LINEAR OUTPUT (For LFS-mA only)

This instrument is equipped with one linear output (OUT 1) programmable as:

- main output (heating or cooling)
- secondary output (cooling)
- analog retransmission of the measured value
- analog retransmission of the operative set point.

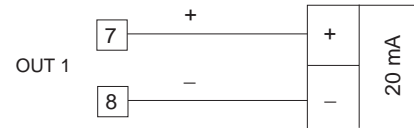


Fig. 11 mA OUTPUT 1 WIRING

NOTE:

It is an isolated analog output.
Maximum load: 500 Ω .

RELAY OUTPUTS

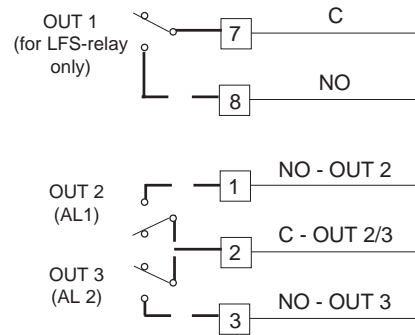


Fig. 12 RELAY OUTPUTS WIRING

The contact rating of OUT 1 is 3A/250V AC on resistive load.

The contact rating of OUT 2 and 3 is 2A/250V AC on resistive load.

The number of operations is 1×10^5 at specified rating.

- NOTES**
- 1) To avoid electric shock, connect power line at the end of the wiring procedure.
 - 2) For power connections use No 16 AWG or larger wires rated for at least 75 °C.
 - 3) Use copper conductors only.
 - 4) Do not run input wires with power cables.

All relay contacts are protected by varistor against inductive load with inductive component up to 0.5 A.

The following are recommendations avoid serious problems which may occur, when using relay output for driving inductive loads.

INDUCTIVE LOADS

High voltage transients may occur switching inductive loads.

Through the internal contacts these transients may introduce disturbances which can affect the instrument performances.

For all outputs, the internal protection (varistor) assures a correct protection up to 0.5 A of inductive component.

The same problems may occur when a switch is used in series with the internal contacts as shown in Fig. 13.

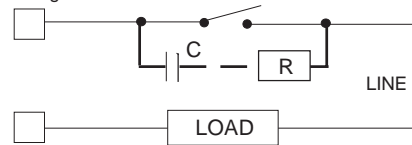


Fig. 13 EXTERNAL SWITCH IN SERIES WITH THE INTERNAL CONTACT

In this case it is recommended to install an additional RC network across the external contact as shown in Fig. 13.

The value of capacitor (C) and resistor (R) are shown in the following table.

LOAD (mA)	C (μF)	R (Ω)	P. (W)	OPERATING VOLTAGE
<40 mA	0.047	100	1/2	260 V AC
<150 mA	0.1	22	2	260 V AC
<0.5 A	0.33	47	2	260 V AC

Anyway the cable involved in relay output wiring must be as far away as possible from input or communication cables.

**VOLTAGE OUTPUTS FOR SSR DRIVE
(For LFS-relay only)**

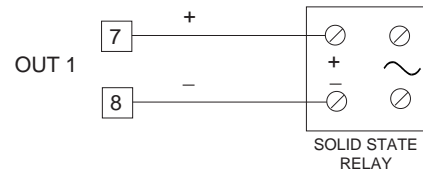


Fig. 14 SSR DRIVE OUTPUT WIRING

It is a time proportioning output.

Logic level 0: $V_{out} < 0.5 \text{ V DC}$.

Logic level 1:

- $14 \text{ V} \pm 20 \% @ 20 \text{ mA}$

- $24 \text{ V} \pm 20 \% @ 1 \text{ mA}$.

Maximum current = 20 mA.

NOTE: This output is not isolated.

A double or reinforced isolation between instrument output and power supply must be assured by the external solid state relay.

SERIAL INTERFACE

RS-485 interface allows to connect up to 30 devices with one remote master unit.

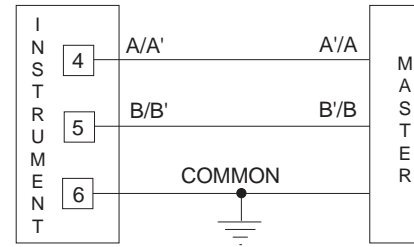


Fig. 15 - RS-485 WIRING

The cable length must not exceed 1.5 km at 9600 BAUD.

NOTES:

- 1) This is an isolated RS 485 serial interface.
- 2) The following report describes the signal sense of the voltage appearing across the interconnection cable as defined by EIA for RS-485.
 - a) The "A" terminal of the generator shall be negative with respect to the "B" terminal for a binary 1 (MARK or OFF) state.
 - b) The "A" terminal of the generator shall be positive with respect to the "B" terminal for a binary 0 (SPACE or ON).

POWER LINE WIRING

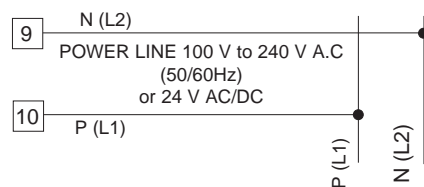


Fig. 16 POWER LINE WIRING

NOTES:

- 1) Before connecting the instrument to the power line, make sure that line voltage corresponds to the description on the identification label.
- 2) To avoid electric shock, connect power line at the end of the wiring procedure.
- 3) For supply connections use No 16 AWG or larger wires rated for at least 75 °C.
- 4) Use copper conductors only.
- 5) Do not run input wires with power cables.
- 6) For 24 V DC the polarity is not a care condition.
- 7) The power supply input is **NOT** fuse protected. Please, provide it externally.

Power supply	Type	Current	Voltage
24 V AC/DC	T	500 mA	250 V
100/240 V AC	T	125 mA	250 V

When fuse is damaged, it is advisable to verify the power supply circuit, so that it is necessary to send the instrument back to your supplier.

- 8) The safety requirements for Permanently Connected Equipment say:
 - a switch or circuit-breaker shall be included in the building installation;
 - It shall be in close proximity to the

equipment and within easy reach of the operator;
 - it shall be marked as the disconnecting device for the equipment.

NOTE: a single switch or circuit-breaker can drive more than one instrument.

- 9) When neutral line is present, connect it to terminal 9

**Ero Electronic S.r.l.**

Via E. Mattei, 21
28100 Novara
Italy
Tel. +39 0321481111
Fax +39 0321481112
eroelectronic@ero.eurotherm.co.uk

BENELUX

ERO Electronic Benelux SA/NV
Rue Val Notre Dame 384
MOHA 4520 (WANZE)
Tel. 085-274080
Fax 085-274081
ero.electronic@skynet.be

BRASIL

ERO ELECTRONIC DO BRASIL Industria
e Comercio Ltda.
Rua Garibaldi, 659 - Conj. 202
90035-050 PORTO ALEGRE
Tel. 051-2214888
Fax 051-2214734
erobr@nutecnet.com.br

CHINA

TIANJIN VEGA COMPANY Ltd
(TAIF)
Hebei District
300232 TIANJIN
Tel. 022-26273296
Fax 022-26273297

FRANCE

ERO Electronic SARL
Zac du Chêne
34, Rue du 35ème Régiment d'Aviation
69673 BRON CEDEX
Tel. 0478267979
Fax 0478267800

GERMANY

ERO Electronic GmbH
Ottostrasse 1
65549 LIMBURG A.D. LAHN
Tel. 06431-95680
Fax 06431-57493

NETHERLAND

ERO Electronic Nederland
Ganieelan 4
2404 CH Alphen a/d Rijn
Tel. 0172-420400
Fax. 0172-420395
sales@eroelectronic.nl

SOUTH AFRICA

ERO Electronic S.A. Pty Ltd
Airgro House
1343, Spokeshave Avenue
Stormill Ext 2 ROODEPOORT
Tel. 011-4742278/9
Fax 011-4749404
P.O. Box 43112
Industria 2042
ero-sa@kingsley.co.za

SPAIN

ERO ELECTRONIC IBERICA
Calle La granja, 74
Pol. Ind. Alcobendas
MADRID
Tel. 091-6618194
Fax. 091-6619093

U.K.

ERO U.K.
Unit 1, Cygnet Trading Estate
Faraday Close
Durrington, Worthing
WEST SUSSEX BN13 3RQ
Tel. 01903-693322
Fax. 01903-693377

U.S.A.

AMERICAN ERO Electronic Corp
BARRINGTON, ILL. 60010
Tel. 0847-382-0881
Fax 0847-382-0240

U.S.A.

BARBER COLMAN
Industrial Instruments Div.
P.O. BOX 2940
Loves Park, IL - 31132 - 2940
Tel. 0815-637-3000
Fax 0815-637-5341
jgsearle@ad.com