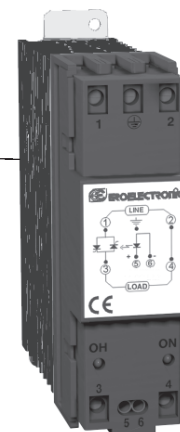




170.IU0.ISL.0B0 12-99



☐ USER MANUAL

ISL

INDEX



ASSEMBLING	1
WARNINGS	1
PRELIMINARY HARDWARE SETTING	2
NOTES ABOUT OPERATIVE MODES	3
GENERAL ASSEMBLING INFORMATION	5
Wall mounting	7
Omega din rail mounting	7
CONNECTION DIAGRAMS	8
General notes for wiring	8
WARNINGS	8
Power $\Rightarrow$ nominal current conversion	10
CONNECTION	12
GENERAL SPECIFICATIONS	13
CHARACTERISTICS OF ISL MODELS	14
MAINTENANCE	15
TROUBLESHOOTING	16
How to replace the fuse	17
WARNINGS	17
APPENDIX A	
Dimensions and panel cut out	A.1



ASSEMBLING

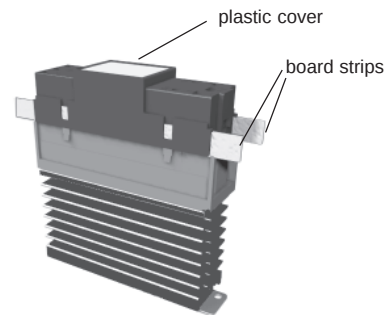
WARNINGS:

- 1) The correct functionality of these devices 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 devices is equal to IP 20 (according to CEI EN 60529) 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) Do not execute any dielectric strength or insulation resistance test on the power terminals.
These type of tests could damage the power semiconductors.
- 4) Circuit-breaker:
 - 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.

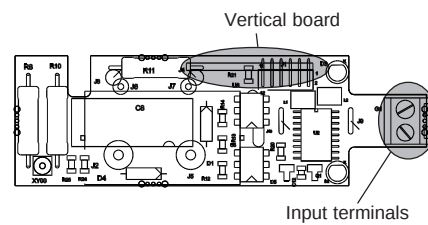
NOTE: a single switch or circuit-breaker can drive more than one device.
- 5) Before executing any operation on the load or its connections, disconnect the device from the power line by the circuit breaker.
- 6) During continuous operation, the heat sink could reach a temperature higher than 80 °C (176 °F). Before executing any operation to the device, you have to be sure that its temperature is decreased to an acceptable value.
- 7) To place the device, choose a cleaned position, easy to reach, and possibly without vibration.
- 8) The ambient temperature must be within 0 °C and 50 °C (32 to 122 °F).

PRELIMINARY HARDWARE SETTING

The device is shipped with the plastic cover not completely inserted and two board strips placed between the plastic cover and the device.

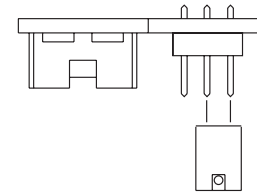


- 1) Remove the plastic cover.
It will be possible to see the vertical electronic board.

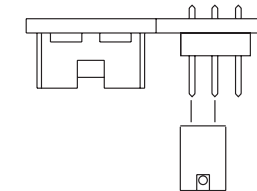


- 2) Select the operative mode by setting the internal jumper as shown below:

Fast cycle
(standard)



Single cycle



- 3) Remove the board strips from the plastic cover.
- 4) Reinsert the plastic cover on the device and push it until a "click" is heard.

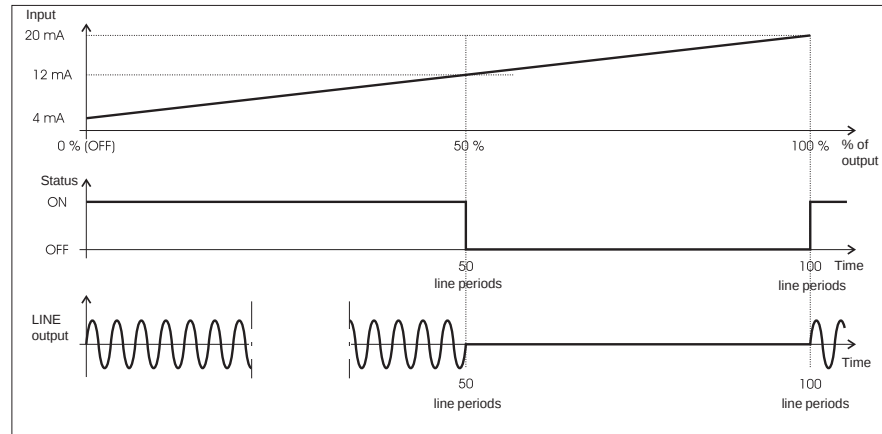
NOTES ABOUT OPERATIVE MODES

This device can be operative in 2 different modes: fast cycle and single cycle.

Fast cycle

This operative mode is based on the concept to maintain a fixed cycle time and to modulate the ON **and** OFF periods (cycle time = ON + OFF periods).

When the fast cycle is selected, the device automatically detects the line frequency and sets the cycle time to 100 line periods (1 line period is equal to 20 ms for 50 Hz lines or 16.6 ms for 60 Hz lines). In this way it selects the minimum cycle time able to assure an output accuracy equal to 1%.

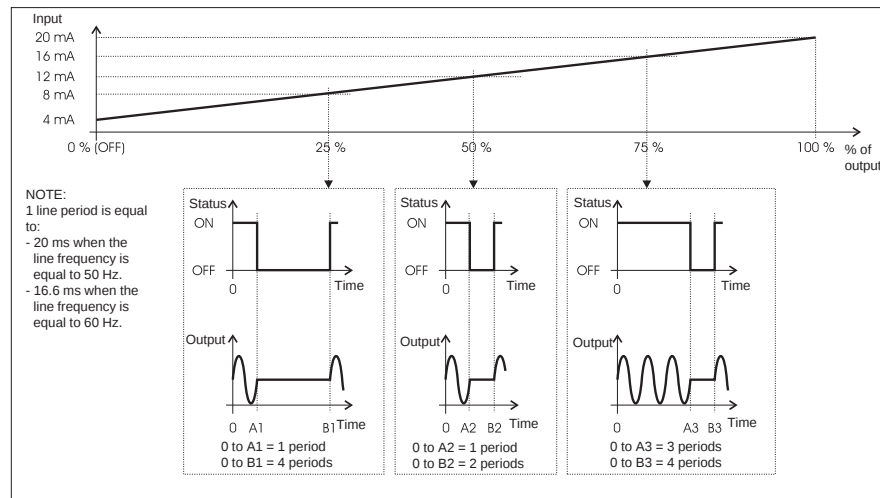


Single cycle

This operative mode drastically reduces the cycle time.

The line period is taken as base time and the algorithm modulates the cycle time modifying the ON or the OFF period.

At 50 % the device obtains the minimum cycle time that is equal to 2 line periods (one ON and one OFF).



GENERAL ASSEMBLING INFORMATION

- 1) These devices must be assembled vertically or with a maximum inclination of 20°.

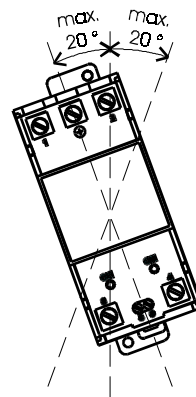


Fig. 1

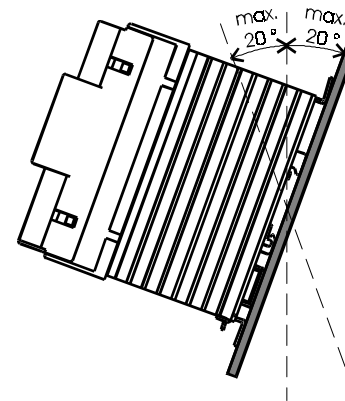


Fig. 2

- 2) In order to allow a sufficient heat dissipation, these devices must be placed 100 mm from the bottom and 150 mm from the top of the cabinet or any other element (I.E. raceway) which can compromise the air flow.

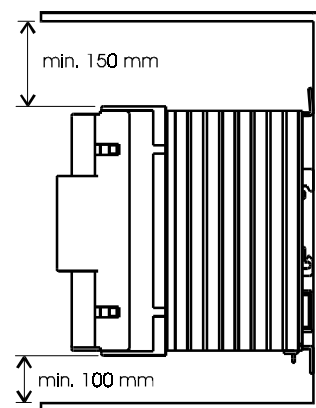


Fig. 3

- 3) The manufacturer strongly recommends do not to assemble two or more devices one upon another but, if necessary, the distance between the two devices must be more than 400 mm.

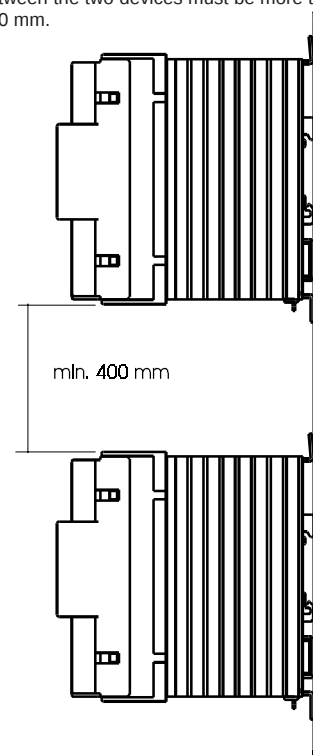
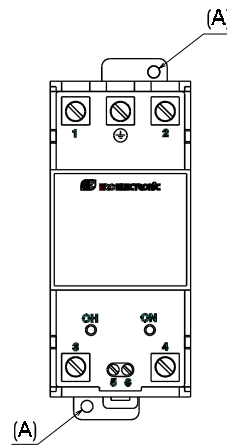


Fig. 4

The device can be mounted either on wall or on a Omega DIN rail.

WALL MOUNTING

For wall mounting can be used the (A) holes.



In this case use two M4 screws (torque of 1Nm max).

For the mounting template and the mechanical dimensions of all models, please refer to the appropriate drawing, located in the "Mechanical dimensions" paragraph.

OMEGA DIN RAIL MOUNTING

For rail mounting use an Omega DIN rail in accordance with EN 50 022 (35 x 7.5 mm or 35 x 15 mm) regulations.

MOUNTING

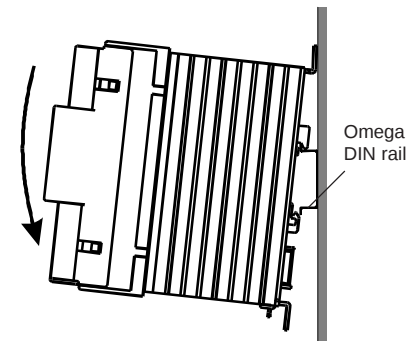


Fig. 5

REMOVING

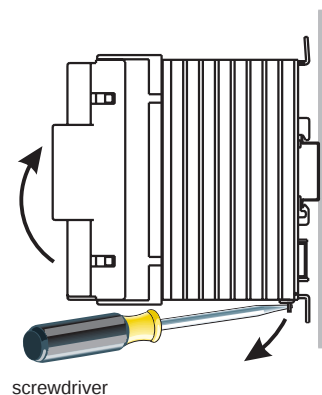


Fig. 6

For the mechanical dimensions of all models, please refer to the proper drawing (see Appendix A).

CONNECTION DIAGRAMS

GENERAL NOTES FOR WIRING

WARNINGS:

- 1) The wiring must be executed only after the device has been correctly mounted.
- 2) Before connecting the device, be sure that power line voltage value is less or equal the nominal value reported on the device's identification label.
- 3) Before connecting the device, be sure that the load current (see **Power** $\Rightarrow$ **nominal current conversion** paragraph) is less or equal the device nominal current as a function of the ambient temperature and the Duty cycle (see **Trend of the nominal current in relation with the ambient temperature and duty cycle** paragraph).
- 4) Before executing any operations, be absolutely sure that the device is disconnected from the power line through the circuit breaker.
- 5) Use copper wires only.
- 6) Pay attention to the input command polarity; terminal 5 is the positive one while terminal 6 is the negative one.
- 7) The neutral (if used) must be connected to the 2 and 4 terminals.
- 8) The power input **IS NOT** fuse protected; place an external fuse selected among the types shown in Table 1.

NOTE:

The Manufacturer decline any responsibility for injury and/or property damage if NO fuse or fuse not included in Table 1 is used. The warranty validity also depends on it.

Table 1

ISL Model	Fuse	
	Manuf.	model
25 - 400	Ferraz	6600CPURGA22X58/32
	Busmann	FWP.32A.22F
	Gould	52443
35 - 400	Ferraz	6600CPURGA22X58/50
	Busmann	FWP.50A.22F
	Gould	53251
45 - 400	Ferraz	6600CPURGA22X58/50
	Busmann	FWP.50A.22F
	Gould	53251
60 - 400	Ferraz	6600CPURGA22X58/80
	Busmann	FWP.80A.22F
	Gould	53259
80 - 400	Ferraz	6600CPURGA22X58/100
	Busmann	FWP.100A.22F
	Gould	53263
25 - 600	Ferraz	6600CPURD22X58/32
35 - 600	Ferraz	6600CPURD22X58/50
45 - 600	Ferraz	6600CPURD22X58/50
60 - 600	Ferraz	6600CPURD22X58/80
80 - 600	Ferraz	6600CPURD22X58/100

9) To connect the devices to the power line, use appropriate sized wires with 75 °C (167 °F) minimum temperature rating. The following table shows the recommended sizes:

Nominal current	φ wires (mm ²)	AWG
25 A	4	12
35 A	6	10
45 A	10	8
60 A	16	6
80 A	25 (*)	4

(*) without wire terminal

10) The tightening torque for terminals 1, 2, 3, 4 and earth is:

- for ISL 25 and 35 A
 - max = 0.8 Nm
 - suggested = 0.7 Nm
- for ISL 45, 60 and 80 A
 - max = 2 Nm
 - suggested = 1.5 Nm

11) The tightening torque for terminals 5 and 6 is:

- max = 0.5 Nm
- suggested = 0.33 Nm

12) The control input is fuse protected by an SMD fuse type F, 63 V 63 mA.



Fig. 7 TERMINAL BLOCK

Power $\Rightarrow$ nominal current conversion

In order to have a quick check of the device working conditions, the formulas to calculate the nominal current for each device in relation to the total power and the connection type are provided.

Preliminary notes:

- 1) Only a resistive load must be applied to the device, so in the following formulas the $\cos \phi$ will be considered equal to 1.
- 2) the formulas related with the 3-phase applications are referred to a balanced 3-phase system only.

Single-phase connection

$$I_{RMS} = \frac{P}{V_{RMS}}$$

where:

P = power (in Watts).

V_{RMS} = **phase to neutral** or **phase to phase** voltage (in Volts)

I_{RMS} = nominal current (in Amperes)

3-phase without neutral connection (star or delta application)

$$I_{RMS} = \frac{P}{\sqrt{3} \cdot V_{RMS}}$$

where:

P = Total load power (in Watts).

V_{RMS} = **phase to phase** voltage (in Volts)

I_{RMS} = nominal current (in Amperes)

3-phase with neutral connection (star application)

$$I_{RMS} = \frac{P}{3 \cdot V_{RMS}}$$

where:

P = Total load power (in Watts).

V_{RMS} = **phase to neutral** voltage (in Volts)

I_{RMS} = nominal current (in Amperes)

CONNECTION

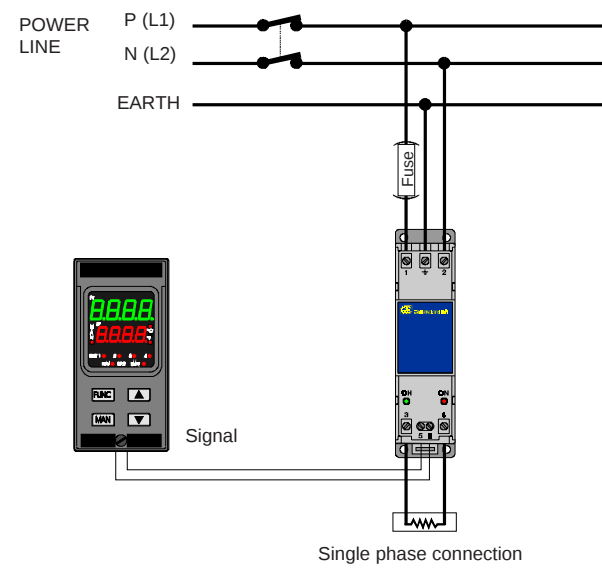


Fig. 8

GENERAL SPECIFICATIONS

Mounting: rear-of-board on wall or omega DIN rail.

Terminals: screw terminals with front access.

Load type: resistive.

Min. holding current: 50 mA RMS.

Leakage current: 10 mA RMS.

Min. latching voltage: 40 V

Voltage drop on power semiconductor: 1.2 V.

Control input type: 4 to 20 mA linear.

Insulation:

- between power circuit and earth: 3000 V RMS for 1 second.
- between command and power circuits: 7500 V_{pk}

Insulation resistance:

for ISL 400 V models is > 1 MΩ at 500 V DC

for ISL 600 V models is > 2 MΩ at 500 V DC

Operational temperature: from 0 to 50 °C (from 32 to 122 °F).

Humidity: from 20 % to 85 % RH non condensing.

Storage temperature: from - 20 to + 70 °C (-4 to 158 °F)

Protection: IP 20.

Thermal protection

When the heat sink temperature exceeds the threshold of the thermal protection, a circuit-breaker inhibits the command signal and enables the OH LED indication.

When the heat sink temperature goes under the threshold of the thermal protection minus hysteresis, the command signal is enabled again and the OH LED is turned OFF.

CE MARKING

These devices are conforming to the 89/336/EEC and 93/68/EEC council directives for Electromagnetic compatibility (reference harmonized standard EN-50081-2 for Emissions and EN-50082-2 for Immunity) and to the 73/23/EEC and 93/68/EEC for Low Voltage (Standard reference UL508 part VIII and CEI EN 50178).

Installation category: II

Pollution Degree: 2

CHARACTERISTICS OF ISL MODELS

MODEL	Amp. - V	Amp. - V	Amp. - V	Amp. - V	Amp. - V
CHARACTERISTICS	25-400	35-400	45-400	60-400	80-400
Nominal voltage	400 V	400 V	400 V	400 V	400 V
Nominal current(@ 50 °C)	25 A	35 A	45 A	60 A	80 A
Non-rep. surge current	280 A	400 A	400 A	1200 A	1200 A
I ² t for fusing (10 ms)	550	860	860	10180	10180
Non-rep. peak voltage	1300 V	1300 V	1300 V	1300 V	1300 V
ΔV/Δt	500 V/μs	500 V/μs	500 V/μs	500 V/μs	500 V/μs
PRV	1200 V	1200 V	1200 V	1200 V	1200 V
Total power dissipation (I = I _{nom})	30 W	45 W	55 W	75 W	100 W
Weight	630 g	630 g	900 g	1100 g	2000 g

MODEL	Amp. - V	Amp. - V	Amp. - V	Amp. - V	Amp. - V
CHARACTERISTICS	25-600	35-600	45-600	60-600	80-600
Nominal voltage	600 V	600 V	600 V	600 V	600 V
Nominal current(@ 50 °C)	25 A	35 A	45 A	60 A	80 A
Non-rep. surge current	280 A	400 A	400 A	1200 A	1200 A
I ² t for fusing (10 ms)	550	860	860	10180	10180
Non-rep. peak voltage	1700 V	1700 V	1700 V	1700 V	1700 V
ΔV/Δt	1000 V/μs	1000 V/μs	1000 V/μs	1000 V/μs	1000 V/μs
PRV	1600 V	1600 V	1600 V	1600 V	1600 V
Total power dissipation (I = I _{nom})	30 W	45 W	55 W	75 W	100 W
Weight	630 g	630 g	900 g	1100 g	2000 g

MAINTENANCE

WARNING:

- 1) Before executing any maintenance operation on the device, on the load or on their connections, disconnect it from the power line by a mechanical circuit breaker.
- 2) The protection degree of these devices is equal to IP 20 (according to CEI EN 60529) 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) Do not execute any dielectric strength or insulation resistance test on the power terminals.
These types of test could damage the power semiconductors.
- 4) During continuous operation, the heat sink could reach a temperature higher than 80 °C (176 °F) Before execute any operation on the device, be sure that its temperature has decreased to an acceptable value.

MAINTENANCE

- 1) REMOVE POWER FROM THE DEVICE BY USING A MECHANICAL CIRCUIT BREAKER
- 2) Using a vacuum cleaner or a compressed air jet (max. 5 kg/cm²) remove all deposit of dust and dirt which may be present on the heat sink and on the terminals.
- 3) To clean external plastic or rubber parts use only a cloth moistened with:
 - Ethyl Alcohol (pure or denatured) [C₂H₅OH] or
 - Isopropil Alcohol (pure or denatured) [(CH₃)₂CHOH] or
 - Water (H₂O)
- 4) Verify that there are no loose terminals (see paragraph **GENERAL NOTES FOR WIRING**).
- 5) Before switching the power ON, be sure that the device is perfectly dry.
- 6) Turn the power ON.

Troubleshooting

Fault condition	Test	Possible cause
The device is always OFF and no LED is lit or the red LED is flashing.	By a standard multimeter measure the voltage across terminals 1 and 3	If no voltage is present across terminals 1 and 3: - no power is present on the power line or - the external power fuse is broken or - the load is disconnected.
	If the voltage across terminal 1 and 3 is equal to the nominal line voltage, measure the voltage across terminals 5 and 6	- If the voltage across terminals 5 and 6 is equal or lower than 5.1 V, the command signal is equal or lower than 4 mA. - If the voltage across terminals 5 and 6 is lower than 1,7 V, the polarity of the command signal could be reverted. - If the voltage across terminals 5 and 6 is higher than 6V, the internal fuse is broken (for fuse replacement see "how to replace the fuse" at page 21).
The thermal protection is frequently ON.		The device drives an excessive current in relation to the ambient temperature. The ambient temperature exceeds the operative temperature. The device has been mounted in wrong position. The ventilation is insufficient.

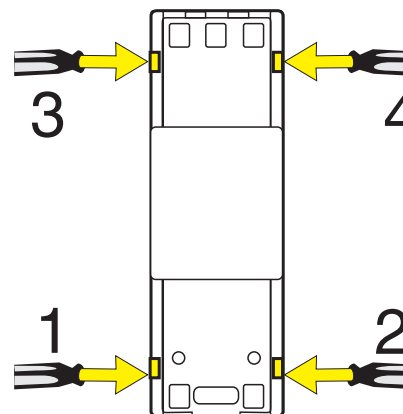
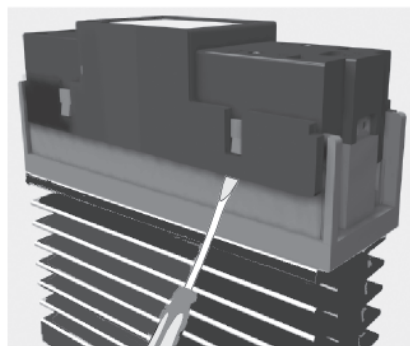
HOW TO REPLACE THE FUSE

WARNING:

- I) Before executing any maintenance operation, disconnect the device from the power line by a mechanical circuit breaker.
- II) During continuous operation, the heat sink could reach a temperature higher than 80 °C (176 °F). Before executing any operation on the device, be sure that its temperature is decreased to an acceptable value.

How to remove the plastic cover.

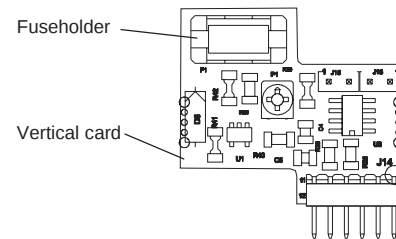
- a) Lift a corner of the plastic cover inserting a screwdriver between the plastic cover and the device case, close to the lock 1 as shown in the following pictures



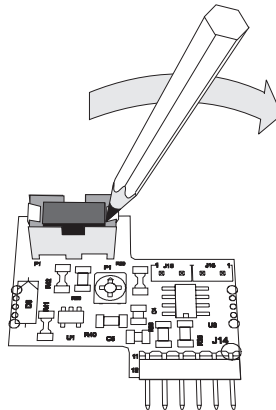
- b) Maintaining the corner lifted, insert the screwdriver close to the lock 2 and lift this side of the plastic cover.
- c) Repeat the point a) and b) for lock 3 and 4.
- d) Remove the plastic cover.

How to replace the fuse.

The fuseholder is located on the vertical card (see page 2) close to the jumper as shown below.



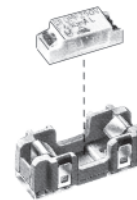
Using a pencil, remove the fuse from its fuseholder as shown below.



NOTES:

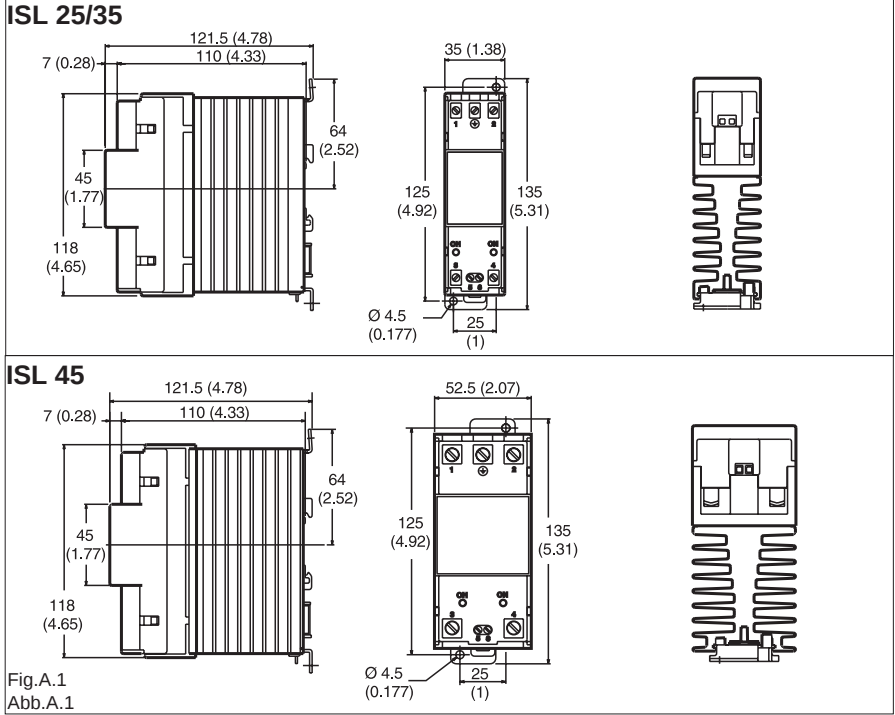
- 1) The fuse is an SMD fuse type F, 63 V 63 mA.
- 2) The replacing fuse is supplied in a package of 5 pieces and it can be ordered to your supplier with the order code: AISL.KIT.FUS.E00

Insert the new fuse as shown below.



Reinsert the plastic cover of the device.

APPENDIX A
DIMENSIONS
DIMENSIONS
ABMESSUNGEN
DIMENSIONI



A. 1

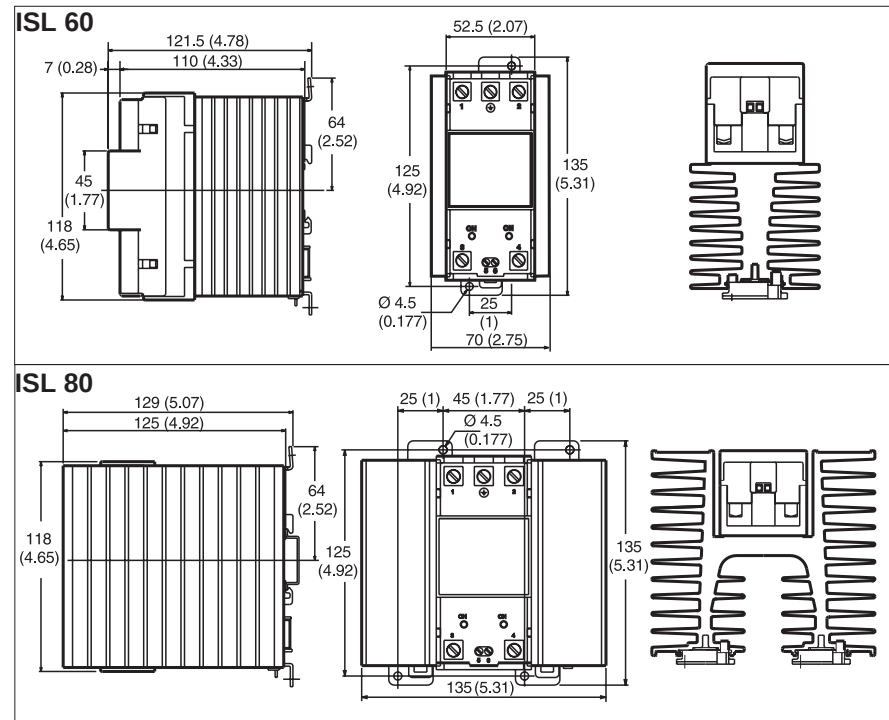


Fig. A.2
Abb. A.2



A. 3



ISL-A-B0.p65

3

15/12/99, 15.52







Ero Electronic S.r.l.
Via E. Mattei, 21
28100 Novara
Italy
Tel. +39 0321481111
Fax +39 0321481112
E-mail eroelectronic@ero.eurotherm.co.uk
[Http://www.eroelectronic.com](http://www.eroelectronic.com)

AUSTRIA
ERO ELECTRONIC ÖSTERREICH
Geiereckstrasse 18/1
1110 Wien
Tel. 01-7987601
Fax 01-7987605
christian.kunst@eurotherm.at

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@nutechnet.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
Ganteelant 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