

# REVO Sx

## SOLID-STATE RELAY

### 4x3,5A – 3x4,5A – 2x7A



**CD Automation S.r.l.**

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## Important warning for safety



Thyristor units are used in power industrial equipment.  
The voltages used in the Thyristor unit can cause severe electrical shock, and could be lethal.  
Don't remove the plastic cover.  
Don't use this unit in aerospace and nuclear application.

### **Electric Shock Hazard (Risque the choque électrique)**

When thyristor unit has been connected to main supply voltage and is switched off, before to touch it be secure that the unit is isolated and wait at least one minute to allow discharging internal capacitors. Thus be secure that:

- Access to thyristor unit is only permitted to specialized personnel;
- The authorized personnel must read this manual before to have access to the unit;
- The access to the unit must be denied to unauthorized personnel.

### **Important warnings(attention)**

Local regulations regarding electrical installation should be rigidly observed.

- Safety regulations must be rigidly observed.
- Don't bend components to maintain insulation distances.
- Protect the unit from high temperature humidity and vibrations.
- Don't touch components to prevent electrostatic discharges on them.
- Verify that all rating is in line with real needs.
- If authorized personnel must measure voltage current etc. on units, take away rings and other jewels from fingers and hands.
- Authorized personnel working on thyristor unit under power supply voltage must work on insulated board. Be secure that board is not connected to earth.

This listing does not represent a complete enumeration of all necessary safety cautions.

### **Protection(protection)**

The thyristor unit has a polymeric plastic cover to compliance to International specification IP20.  
To understand if IP20 protection is sufficient should be evaluated the installation place.  
Open Type Equipment.

### **Electromagnetic compatibility (compatibilité électromagnétique)**

Our thyristor units have an excellent immunity to electromagnetic interferences if all suggestions contained in this manual are respected. In respect to a good Engineering practice, all inductive loads like solenoids contactor coils should have a filter in parallel.

### **Emissions (Emission, Emissioni)**

All solid-state power controllers emit a certain amount of radio-frequency energy because of the fast switching of the power devices.

The CD Automation's Thyristor unit are in accord with the EMC norms, CE mark.

In most installations, near by electronic systems will experience no difficulty with interference. If very sensitive electronic measuring equipment or low-frequency radio receivers are to be used near the unit, some special precautions may be required. These may include the installation of a line supply filter and the use of screened (shielded) output cable to the load.



**Order Code**

NUMBER OF ZONES X CURRENT RATING	4	5	6	
description		code		note
4 zones 3,5A each	4	0	3	
3 zones 4,5A each	3	0	4	
2 zones 7A each	2	0	7	

MAX VOLTAGE	7	
description	code	note
230 V	2	
480 V	4	2

VOLTAGE SUPPLY AUX.	8	
description	code	note
No auxiliary voltage with 230V	0	
12-24V ac-dc with 480V	4	

INPUT	9	
description	code	note
SSR	S	

FIRING	10	
description	code	note
Zero Crossing	Z	
Random (used with Revo-PC)	R	

CONTROL MODE	11	
description	code	note
Open Loop	0	

FUSES & OPTION	12	
description	code	Note
Fuse + Fuse Holder	F	
Total Load Faillure with Latching	L	1

FAN VOLTAGE	13	
description	code	Note
No Fan Voltage	0	

APPROVALS	14	
description	code	Note
CE EMC For European Market	0	

MANUAL	15	
description	code	Note
None	0	
Italian	1	
English	2	
German	3	
French	4	

VERSION	16	
description	code	Note
Version 1	1	

**Technical Specifications**

<b>General features:</b>	
Cover and Socket material:	PolymericV2
Mounting:	DIN bar (thickness type 1mm Max)
Utilization Category	AC-51 AC-55b
IP Code	20
Method of Connecting	Single Phase load
Auxiliary voltage (only with HB option):	12÷24V dc/ac (max 70mA)
Delay switch ON/OFF time:	1/2 Period Max
Relay output for HeaterBreakAlarm (only with HB option):	0.5A a 125VAC

<b>Input features:</b>	
Logic input SSR:	4 ÷ 30Vdc 5mA Max (ON ≥ 4Vdc OFF < 1Vdc)

<b>Output features(power device):</b>	
Nominal current in continuous service:	4x3,5A - 3x4,5 - 2 x 7A
Max peak current (10ms)	350A
Nominal Voltage range <b>Ue</b> :	24÷230V
Repetitive peak reverse voltage <b>Uimp</b> :	1200V
Latching current:	250mA
Leakage current:	15mA eff
I <sup>2</sup> T value tp=10msec:	610 A <sup>2</sup> s
Frequency range:	47÷70Hz
Power loss (I=Inom):	4x4,2W - 3x5,4W - 2x8,4W
Isolation Voltage <b>Ui</b> :	2500Vac

**Basic Connections**

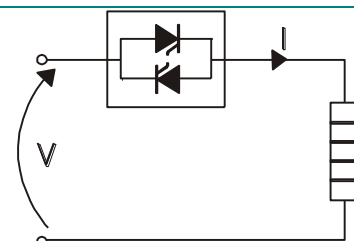
Wiring with resistive load

$$I = \frac{P}{V}$$

V = Nominal load voltage

I = Nominal load current

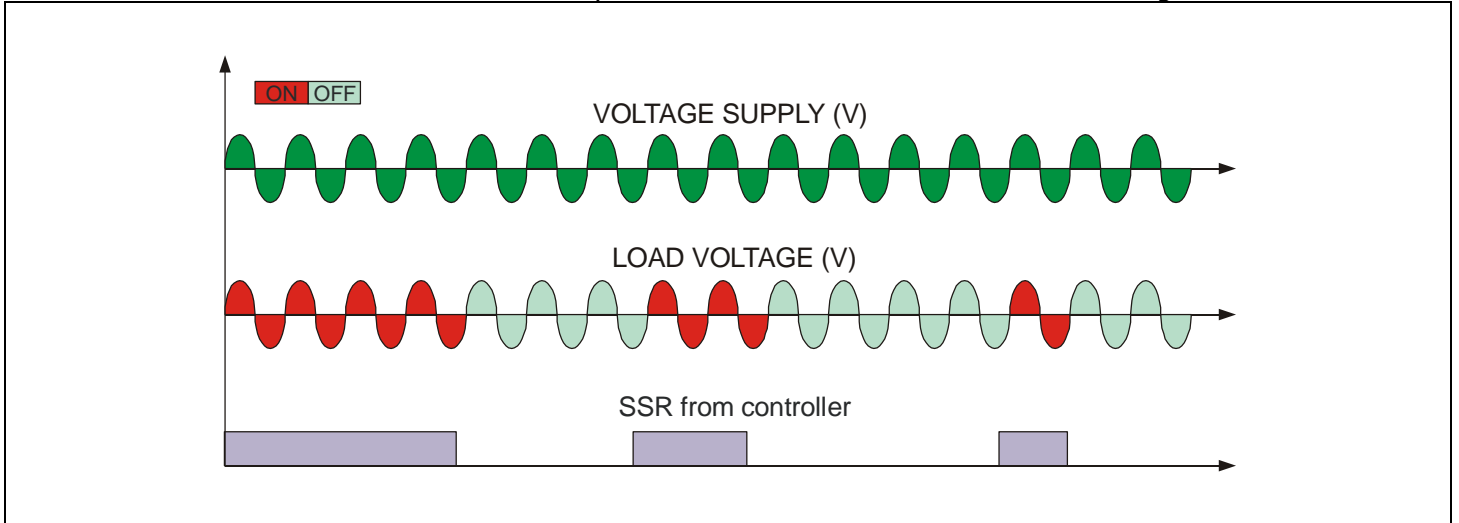
P = Nominal load power



## Firing Type

ZC firing mode is used with Logic Output from temperature controllers and the Thyristor operates like a contactor. The Cycle time is performed by temperature controller.

ZC minimizes interferences because the Thyristor unit switches ON-OFF at zero voltage.

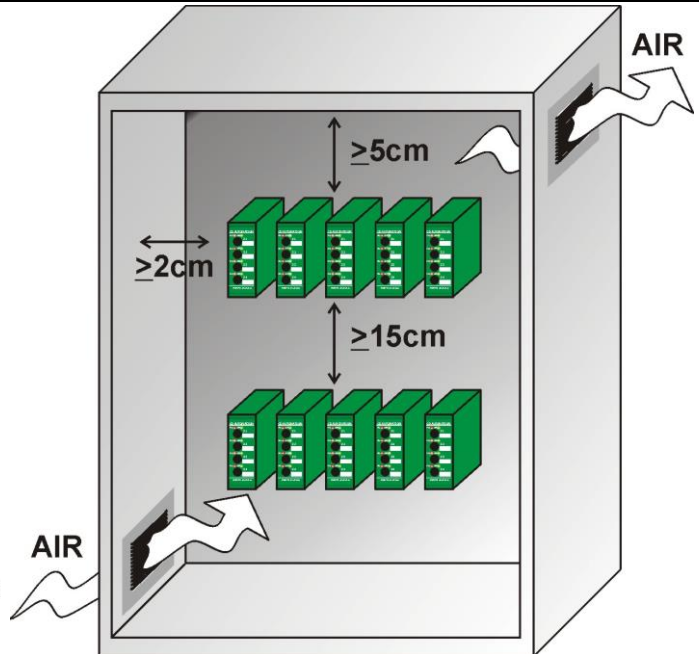
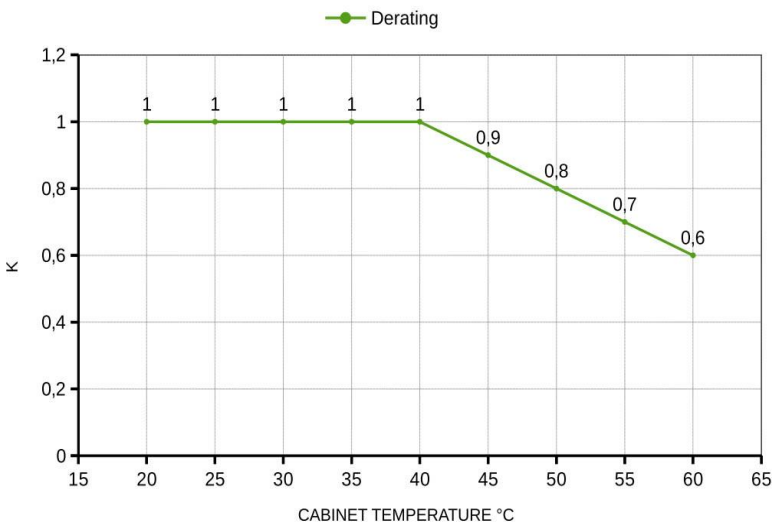


## Environmental installation conditions

Ambient temperature	0-40°C at nominal current. Over 40°C use the Derating Curve.
Stocking temperature	-25°C to 70°C
Installation place	Don't install at direct sun light, where there are conductive dust, corrosive gas, vibration or water and also in salty environmental.
Altitude	Up to 1000 meter over sea level. For higher altitude reduce the nominal current of 2% for each 100m over 1000m
Humidity	From 5 to 95% without condense and ice

## Derating Curve

$$I_{max} = I_{nominal} \times K$$



## Installation

Before to install the thyristor unit examine for damages or deficiencies. If any is found, notify the carrier immediately. Check that the product features shown on unit cover corresponds to that ordered.

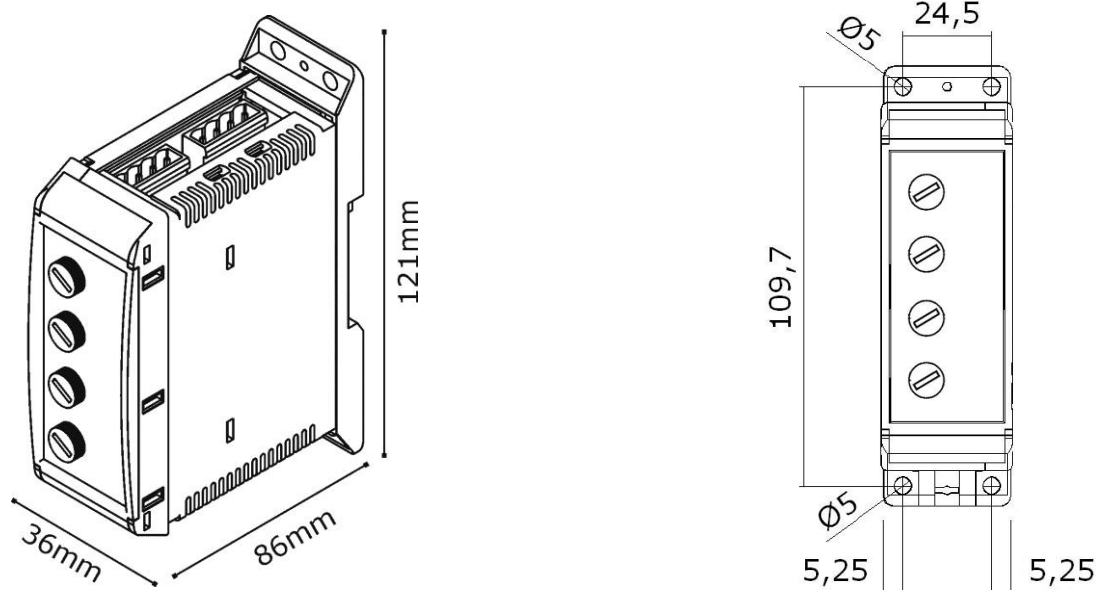
The thyristor unit should be always mounted in vertical position to improve air cooling on heat-sink. Maintain minimum distances in vertical and in horizontal as represented.

Don't install in proximity of hot elements and near units generating electromagnetic interferences.

When more units are mounted in the same cabinet provide air circulation as represented.

Sometimes it is necessary to provide a fan to have better air circulation.

## Dimensions and Fixing holes



Weight: 0,3Kg

## Wiring instructions

The Thyristor unit could be susceptible to interferences lost by near equipments or by the power supply, for this reason in accord to the fundamental practices rules is opportune take some precautions:

- The coil contactor, the relays and other inductive loads must be equipped with opportune RC filter.
- Use shielded bipolar cables for all the input and output signals.
- The signal cables must not be near and parallel to the power cables.
- Local regulations regarding electrical installation should be rigidly observed.

Use copper cables and wires rated for use at 75°C only.

### Command cable dimensions (suggested)

0.5mm<sup>2</sup> (AWG 18)

### Power cable dimensions (suggested)

Each terminal can reach 12A using a wire with 1.5mm<sup>2</sup> of diameter, if you use all the 4 zones in the ON condition at the same time, connecting more terminals (13-14-15-16) at the line power

### Power cable torque (suggested)

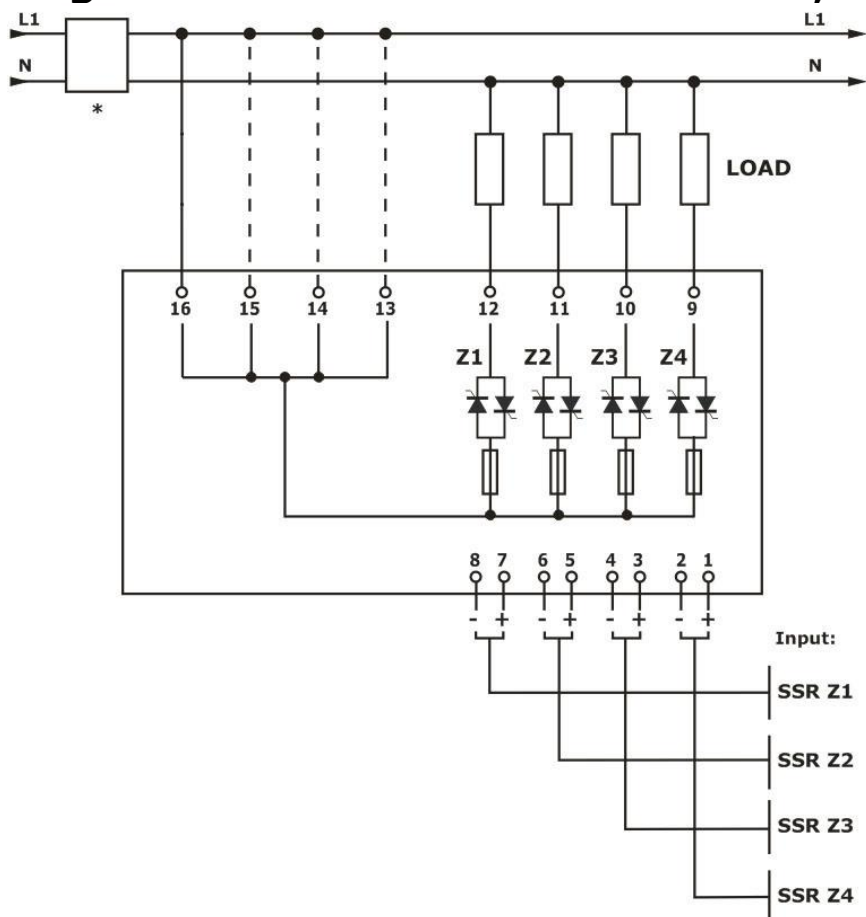
MAX Current Each terminal	Connector Type	Torque Lb-in (Nm)	Wire Range mm <sup>2</sup> (AWG )	Wire Terminal
12A	Estraibile Connectors	4.42 (0.5)	0.5-1.5 (18-14)	Rigid / Flexible Wire Pin

## Terminals **230V 4x3,5A**

Terminal	Description
1	Z4 (+) Control Input (SSR)
2	Z4 (-) Control Input (SSR)
3	Z3 (+) Control Input (SSR)
4	Z3 (-) Control Input (SSR)
5	Z2 (+) Control Input (SSR)
6	Z2 (-) Control Input (SSR)
7	Z1 (+) Control Input (SSR)
8	Z1 (-) Control Input (SSR)
9	Load Output Z4
10	Load Output Z3
11	Load Output Z2
12	Load Output Z1
13	Line Input *
14	Line Input *
15	Line Input *
16	Line Input *

\* All inputs have inner connection in parallel.

## Diagram of control connection 4x3,5A



### Note:

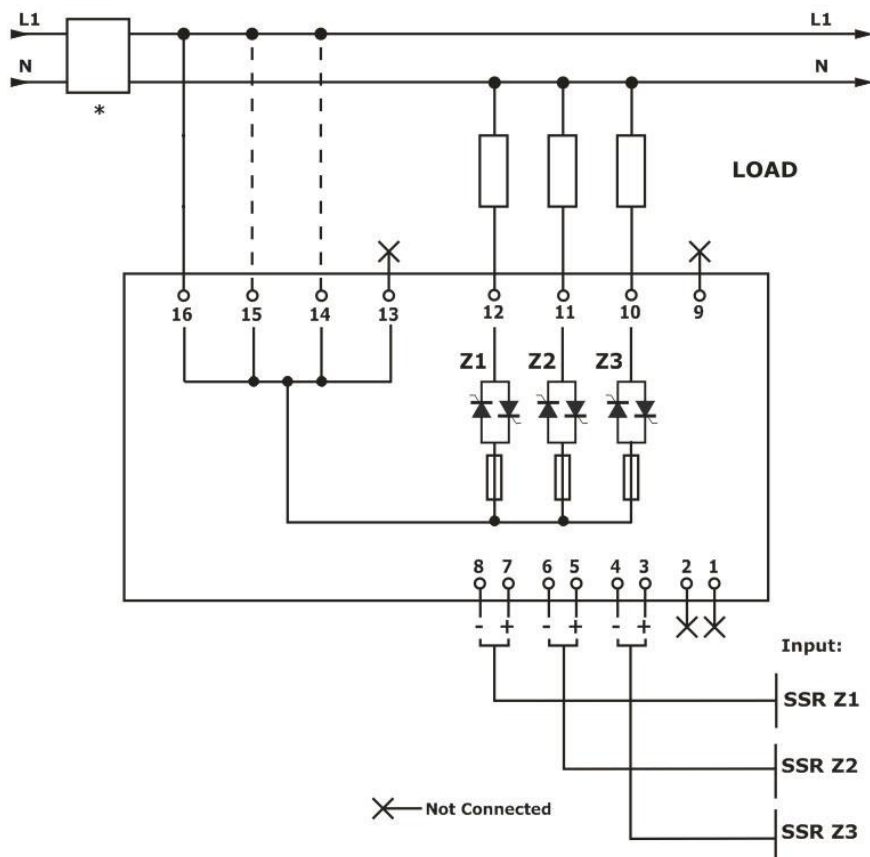
- A suitable device must ensure that the unit can be electrically isolated from the supply, this allows the qualified people to work in safety (\*).
- Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources

## Terminals **230V 3x4,5A**

Terminal	Description
1	Not connected
2	Not connected
3	Z3 (+) Control Input (SSR)
4	Z3 (-) Control Input (SSR)
5	Z2 (+) Control Input (SSR)
6	Z2 (-) Control Input (SSR)
7	Z1 (+) Control Input (SSR)
8	Z1 (-) Control Input (SSR)
9	Not connected
10	Load Output Z3
11	Load Output Z2
12	Load Output Z1
13	Line Input *
14	Line Input *
15	Line Input *
16	Line Input *

\* All inputs have inner connection in parallel.

## Diagram of control connection 3x4,5A



### Note:

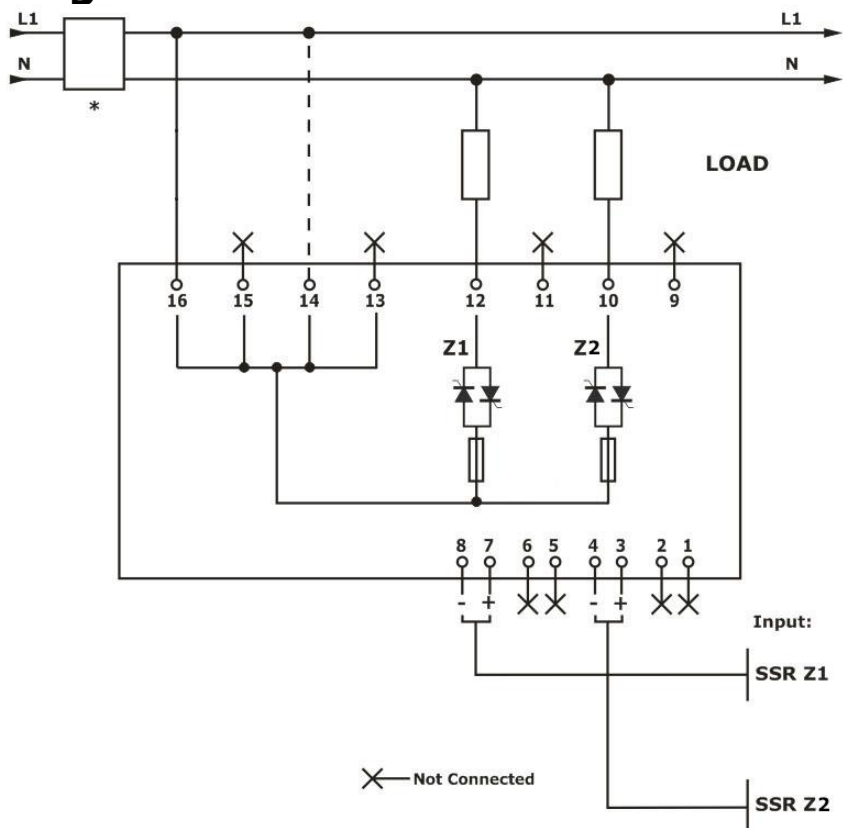
- A suitable device must ensure that the unit can be electrically isolated from the supply, this allows the qualified people to work in safety (\*).
- Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources

## Terminals **230V 2x7A**

Terminal	Description
1	Not connected
2	Not connected
3	Z2 (+) Control Input (SSR)
4	Z2 (-) Control Input (SSR)
5	Not connected
6	Not connected
7	Z1 (+) Control Input (SSR)
8	Z1 (-) Control Input (SSR)
9	Not connected
10	Load Output Z2
11	Not connected
12	Load Output Z1
13	Line Input *
14	Line Input *
15	Line Input *
16	Line Input *

\* All inputs have inner connection in parallel.

## Diagram of control connection 2x7A

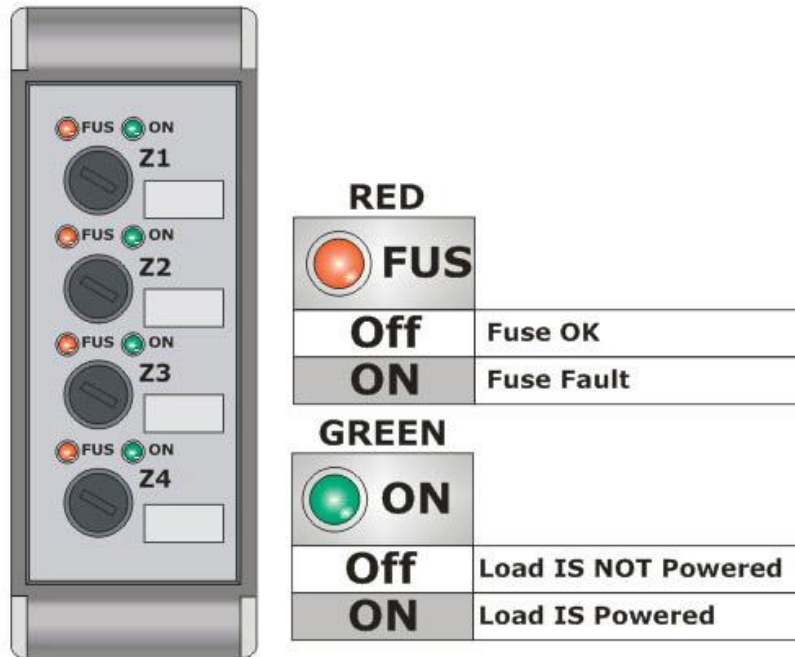


### Note:

- A suitable device must ensure that the unit can be electrically isolated from the supply, this allows the qualified people to work in safety (\*).
- Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources



## Led status and Alarms



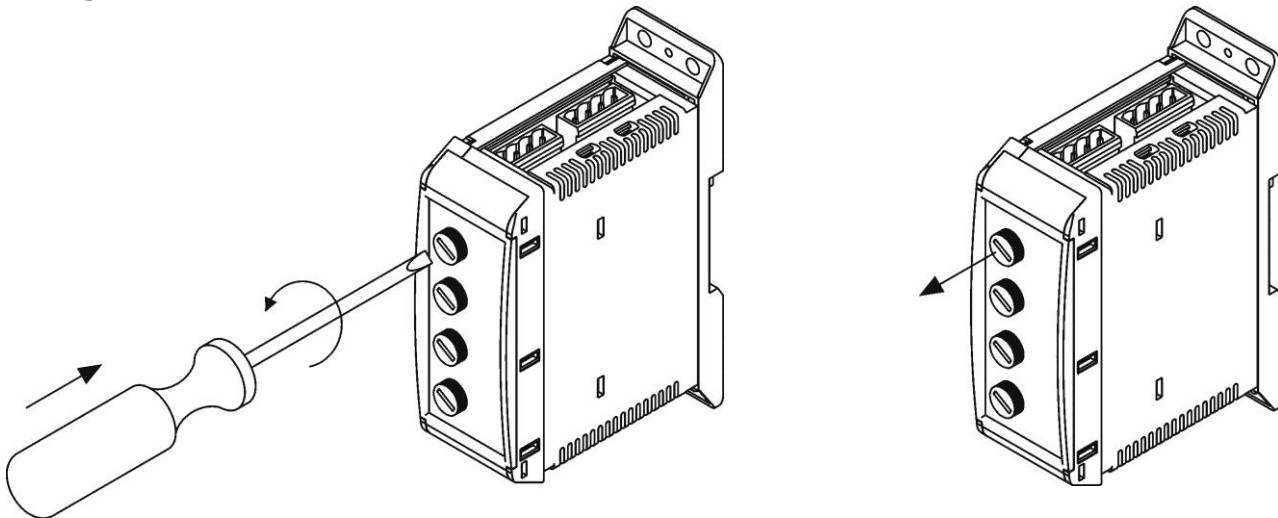
## Internal Fuse

The thyristor unit must be protected against short circuit by High speed fuses.

The Fuses must have  $I^2t$  20% less than thyristor's  $I^2t$ .

The warranty of thyristor is null if no proper fuses are used.

### Change the Fuses:



Press, turn in counter-clockwise and release

Extract the fuse



**Caution:** High speed fuses are used only for the thyristor protection and can not be used to protect the installation



**Caution:** The warranty of thyristor is null if no proper fuses are used.

### Spare Fuse Order Code:

REVO 4x3,5A	FU5X20-4	Only one pcs.	Type 5x20 4A 250V fast	0324004
REVO 3x4,5A	FU5X20-5	Only one pcs.	Type 5x20 6A 250V fast	0324005
REVO 2x7A	FU5X20-8	Only one pcs.	Type 5x20 10A 250V fast	0325008

## Maintenance

In order to have correct cooling, the user must clean the heat-sink and the protective grill. The frequency of this servicing depends on environmental pollution.

Also check periodically if the screw for the power and the control cables are tightened correctly (See Diagram of control connection)

## Trouble Shooting

Small problems sometimes can be solved locally with the help of the below tab of trouble shooting. If you don't succeed, contact us or your nearest distributor.

Symptom	Indication on front unit	Possible reasons of the symptom	Actions
Load current doesn't flow also with input signal	Green LED (ON) light OFF	<ul style="list-style-type: none"> <li>No input signal</li> <li>Reversed polarities of input signal</li> </ul>	<ul style="list-style-type: none"> <li>Provide to give input signal</li> <li>Reverse the input signal polarity</li> </ul>
	Green LED (ON) light ON	<ul style="list-style-type: none"> <li>Fuse failure: The red led (FUS) is light on</li> <li>Load connection interruption: The yellow led (HB) is light on (with HB option)</li> <li>Load failure: The yellow led (HB) is light on (with HB option)</li> </ul>	<ul style="list-style-type: none"> <li>Change the fuse</li> <li>Check the wiring</li> <li>Check the load</li> </ul>
Load current flow also without input signal	Yellow LED (HB) light on	<ul style="list-style-type: none"> <li>Short Circuit on Thyristor: The yellow led (HB) is light on (with HB option)</li> </ul>	<ul style="list-style-type: none"> <li>Change the thyristor module</li> </ul>
Thyristor unit doesn't work properly		<ul style="list-style-type: none"> <li>Auxiliary voltage supply out of limits</li> <li>Wrong input signal selection.</li> <li>Wrong input signal calibration (out of range)</li> </ul>	<ul style="list-style-type: none"> <li>Verify the auxiliary voltage supply</li> <li>Control input signal setting.</li> <li>Check input setting</li> </ul>

## Warranty condition

CD Automation gives a 12 months warranty to its products. The warranty is limited to repairing and parts substitution in our factory and does exclude products not properly used and fuses.

Warranty does not include products with serial numbers deleted.

The faulty product should be shipped to CD Automation at customer's cost and our Service will evaluate if product is under warranty terms.

Substituted parts remain of CD Automation property.

