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Solid-State Relay – SSR

SSR 4840AC / 4880AC – INSTRUCTIONS MANUAL – V1.0x D

FEATURES

Solid-State Relays (SSR) are electronic devices used to switch resistive or inductive AC loads with many advantages over conventional relays. A command signal (INPUT) determines the activation of the load connected to the output terminals (OUTPUT) without electrical noise, sparking or mechanical wear.

They have a LED, which acts as an on or off status indicator, internal output snubber, and Zero Crossing function. It turns on at zero Volt and off at zero Ampere. Optical isolation between INPUT and OUTPUT.

OPERATION

Upon receiving a command signal at its input terminals, the SSR conducts (turns on) and powers the load. When the mains voltage crosses zero, conduction takes place. The same process happens during shutdown. The command signal is removed, but the SSR only blocks (turns off) at the next zero crossing.
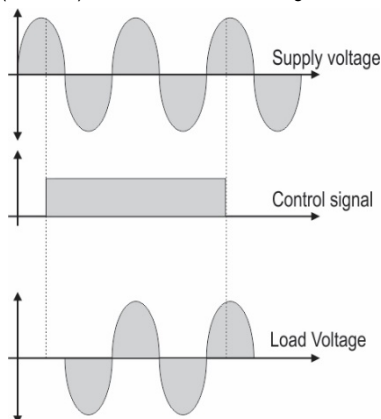

Figure 1 –   Electrical voltage on a resistive load

This implies delays of no more than 8.3 milliseconds between the instant the ON/OFF command is triggered and the act of energizing or not energizing the load.

Switching the load power on and off at a zero crossing has important advantages for the installation. No electrical interference is generated in the installation and the SSR is not subjected to severe switching conditions.

It is impossible to switch direct current (DC), only alternating current (AC).

ELECTRICAL CONNECTIONS

2 connections are required: Command signal and connection with the load. When making the connection to the load, you must use an ultra-fast fuse to protect the installation.

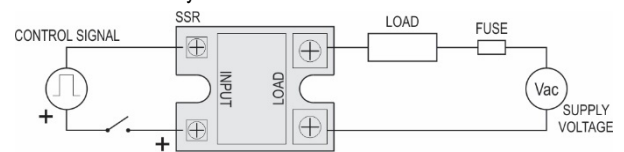Well-fixed terminals and adequate wiring help improve the installation efficiency.

Figure 2 –   Electrical connections – Command and Load Signal

HEAT DISSIPATION

SSR generates heat during its conduction. This heat must be dissipated to avoid SSR fail due to over-heat.

The load current (IL) ratings set for each SSR model consider the use of a suitable heat sink. Without a heat sink, the maximum allowed load current is substantially reduced. You can calculate the appropriate heat sink for your process or use the model indicated by **NOVUS**.

$$R_{thha} = \frac{75°C - T_{amb}}{I_L \times V_{ssr}}$$

Where:
R thha = Thermal resistance heat sink to ambient
T amb = Maximum ambient temperature
I L = Load current
V ssr = Voltage drop when the SSR is ON.
75°C is the maximum temperature allowed for the

t these current levels, in addition to the heat sink, forced ventilation is also critical for maximum performance.

Thermal paste, which is essential for perfect heat transfer, must be used between the SSR and the heat sink. The set SSR + heat sink should be fixed in a vertical position to facilitate heat exchange.

Notes:

1. The use of the Thermal Pad that comes with the SSR is optional. In installations where a heat sink is provided for the cooling function, you do not need to use the Thermal Pad. In installations where the surface to receive the SSR is not perfectly flat, its use may improve the cooling of the SSR.

2. Make sure that the screws on the SSR terminals are properly tightened. Contact problems at these points influence the proper operation of the entire installation power system.

3. Before continuous use, always perform installation validation tests.

The graphs below show the current carrying capacity of the SSR as a function of ambient temperature when mounted on the indicated heatsink and whether or not the fan is used.
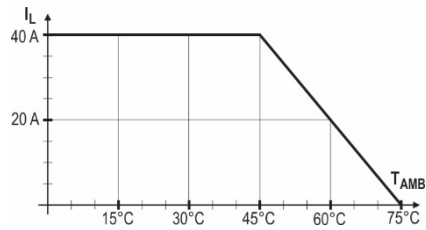

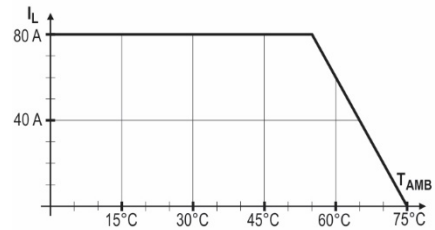
Figure 3 – SR2540/4840 + sink ND40-100 mm

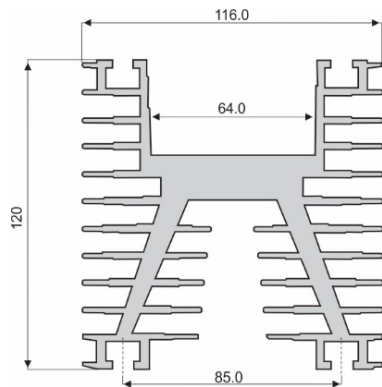Figure 4 – SSR4880 + sink NDP3-120 mm + fun 3 m/s

Figure 5 – Sink ND40 (to 100 mm: R thha = 0.65 °C / W)

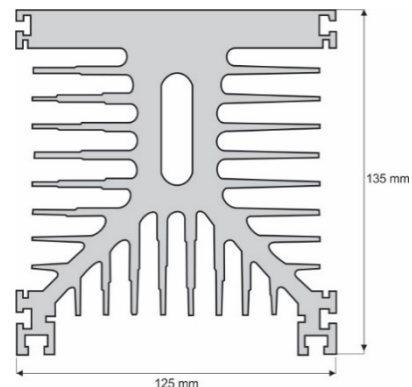Figure 6 – Sink NDP3 (to 120 mm: R thha = 0.52 °C / W)

SPECIFICATIONS

Parameter	Unit	Model	
		SSR 4840AC	SSR 4880AC
Load current (I_L)	A rms	40	80
Load voltage	V rms	40 to 530	40 to 530
Voltage drop (V_{SSR})	V rms	1.1 to 1.5	1.1 to 1.5
Leakage current	mA rms	< 8	< 8
Frequency	Hz	47 to 63	47 to 63
Dv/dt	V/µs	500	500
I²t (50/60 Hz)	A²s	1770 / 1629	3230 / 2971
Control voltage	V rms	90 to 280	90 to 280
Control current	mA	5 to 10	7 to 12
Switching time	ms	< 10	< 10
Control method		Zero cross trigger (resistive load) Instantaneous (inductive load)	Zero cross trigger (resistive load) Instantaneous (inductive load)
Isolation	V rms	4000	4000
Housing temperature	°C	-40 to 80	-40 to 80
Plastic body material	UL E211125 / 94 V-0		
Metal base material	Aluminium with phosphor bronze coating		
Certification	CE		

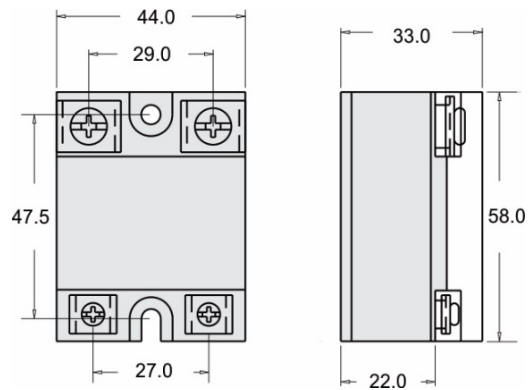Table 1 - Specifications

DIMENSIONS

Figure 7 – SSR dimensions

WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.