

Solid State Relays

Industrial, 1-Phase Analog Switching

Types RE 24.. AA 06, RE 48.. AA 12, RE 6050 AA 16

CARLO GAVAZZI



- AC Solid State Relay
- Analog switching for resistive load applications
- 4 to 20 mA control current
- Rated operational current: 10, 25 and 50 AACrms
- Rated operational voltage: Up to 600 VACrms
- LED-indication of loop current

Product Description

The analog switching relay works in accordance with the phase control principle, i.e. the output switching point in the AC sine wave depends on the control current. 4 to 20 mA corresponds to no switch-

ing and to full sine wave (near linear). The relay switches off every time the current crosses zero, and switches ON in accordance with the applied control current.

Ordering Key

RE 48 50 AA 12

Solid State Relay
Switching mode
Rated operational voltage
Rated operational current
4 to 20 mA control current
Non-rep. off-state peak voltage

Type Selection

Switching mode	Rated operational voltage	Rated operational current	Control current	Non-rep. voltage
E: Analog switching	24: 115 VACrms 230 VACrms 48: 400 VACrms 480 VACrms 60: 600 VACrms	10: 10 AACrms 25: 25 AACrms 50: 50 AACrms	AA: 4 to 20 mA	06: 650 V _p 12: 1200 V _p 16: 1600 V _p

Selection Guide

Rated operational voltage	Non-rep. voltage	Control current	Rated operational current 10 AACrms	25 AACrms	50 AACrms
115 VACrms	650 V _p	4 to 20 mA	RE 2410 AA 06	RE 2425 AA 06	RE 2450 AA 06
230 VACrms	650 V _p	4 to 20 mA	RE 2410 AA 06	RE 2425 AA 06	RE 2450 AA 06
400 VACrms	1200 V _p	4 to 20 mA	RE 4810 AA 12	RE 4825 AA 12	RE 4850 AA 12
480 VACrms	1200 V _p	4 to 20 mA	RE 4810 AA 12	RE 4825 AA 12	RE 4850 AA 12
600 VACrms	1600 V _p	4 to 20 mA	-	-	RE 6050 AA 16

General Specifications

	RE 24.. AA 06	RE 48.. AA 12	RE 6050 AA 16
Operational voltage range	90 to 280 VACrms	265 to 530 VACrms	330 to 660 VACrms
Non-rep. peak voltage	≥ 600 V _p	≥ 1200 V _p	≥ 1600 V _p
Operational frequency range	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz
Power factor	0.5	0.5	0.5
Approvals	UL, CSA	UL, CSA	UL, CSA
CE-marking	Yes	Yes	Yes

Input Specifications

Control current range	4 to 20 mA
Voltage drop	≤ 8 VDC @ 20 mA
Dynamic impedance	≥ 100 Ω
Allowable input current	≤ 50 mA
Reverse polarity protected	Yes

Caution:

Current to input must be limited to max. 50 mA.

Insulation

Rated insulation voltage Input to output	≥ 4000 VACrms
Rated insulation voltage Output to case	≥ 4000 VACrms
Insulation resistance Input to output	≥ 10 ¹⁰ Ω
Insulation resistance Output to case	≥ 10 ¹⁰ Ω
Insulation capacitance Input to output	≤ 8 pF
Insulation capacitance Output to case	≤ 50 pF

Output Specifications

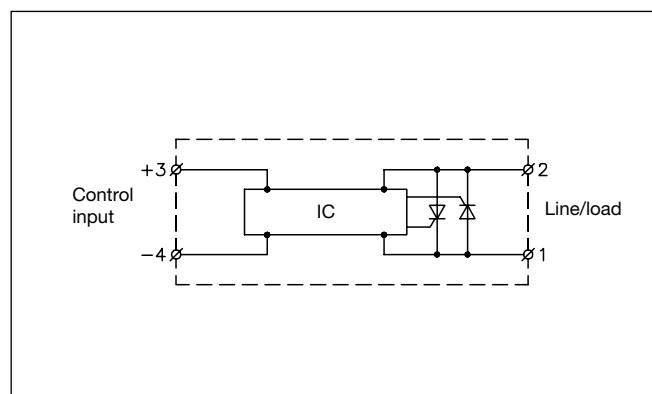
	RE ..10 AA ..	RE ..25 AA ..	RE ..50 AA ..	RE 6050 AA 16
Rated operational current AC 50/60 Hz	10 Arms	25 Arms	50 Arms	50 Arms
Minimum operational current	500 mArms	500 mArms	500 mArms	500 mArms
Rep. overload current t=1 s	< 35 AACrms	55 AACrms	125 AACrms	125 AACrms
Off-state leakage current @ rated voltage and frequency*)	< 6 mA	< 6 mA	< 6 mA	< 6 mA
I ² t for fusing t = 1-10 ms	≤ 130 A ² s	≤ 310 A ² s	≤ 1800 A ² s	≤ 1800 A ² s
Critical di/dt	≥ 100 A/μs	≥ 100 A/μs	≥ 100 A/μs	≥ 100 A/μs
Critical dV/dt commutating	≥ 500 V/μs	≥ 500 V/μs	≥ 500 V/μs	≥ 500 V/μs
Critical dV/dt off-state	≥ 500 V/μs	≥ 500 V/μs	≥ 500 V/μs	≥ 500 V/μs

*) Min. power let-through ≥ 0.5%. Please refer to Applications.

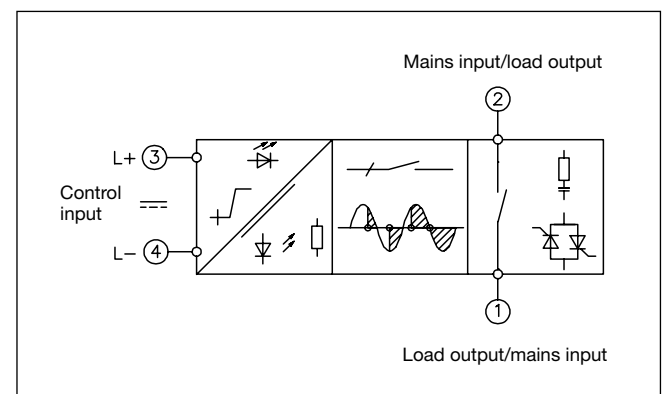
Thermal Specifications

	RE ..10 AA ..	RE ..25 AA ..	RE ..50 AA ..
Operating temperature	-20° to +70°C (-4° to +158°F)	-20° to +70°C (-4° to +158°F)	-20° to +70°C (-4° to +158°F)
Storage temperature	-40° to +100°C (-40° to +212°F)	-40° to +100°C (-40° to +212°F)	-40° to +100°C (-40° to +212°F)
Junction temperature	≤ 125°C (257°F)	≤ 125°C (257°F)	≤ 125°C (257°F)
R _{th} junction to case	≤ 2 K/W	≤ 1.25 K/W	≤ 0.65 K/W
R _{th} junction to ambient	≤ 12.5 K/W	≤ 12 K/W	≤ 12 K/W

Wiring Diagram



Functional Diagram





Heatsink Dimensions (load current versus ambient temperature)

With the output fully on (360° conduction angle)

RE ..10 AA ..

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
16	2.7	2.2	1.8	1.3	0.87	0.41	22
15	3.1	2.6	2.1	1.7	1.2	0.65	20
14	3.7	3.1	2.6	2	1.5	0.92	18
13	4.3	3.7	3.1	2.5	1.9	1.2	16
12	5	4.3	3.7	3	2.3	1.6	15
11	5.9	5.1	4.4	3.6	2.8	2.1	13
10	6.9	6	5.2	4.3	3.5	2.6	12
9	7.9	6.9	5.9	4.9	4	3	10
7	10.8	9.5	8.1	6.8	5.4	4.1	7
5	-	14.2	12.2	10.2	8.1	6.1	5
3	-	-	-	-	14.6	10.9	3
1	-	-	-	-	-	-	1
20 30 40 50 60 70 T _A							
Ambient temp. [°C]							

RE ..25 AA ..

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
25	2	1.7	1.4	1	0.71	0.40	32
22.5	2.5	2.1	1.8	1.4	1	0.66	27
20	3.1	2.7	2.3	1.9	1.4	1	23
17.5	4	3.5	3	2.5	2	1.4	20
15	4.9	4.3	3.7	3.1	2.5	1.9	16
12.5	6.2	5.4	4.6	3.9	3.1	2.3	13
10	8.1	7.1	6.1	5.1	4	3	10
7.5	11.3	9.9	8.5	7.1	5.6	4.2	7
5	-	15.6	13.3	11.1	8.9	6.7	5
2.5	-	-	-	-	18.7	14	2
20 30 40 50 60 70 T _A							
Ambient temp. [°C]							

RE ..50 AA ..

Load current [A]	Thermal resistance [K/W]						Power dissipation [W]
50	0.92	0.76	0.60	0.45	0.29	-	63
45	1.2	0.99	0.80	0.62	0.44	0.26	55
40	1.5	1.3	1.1	0.85	0.63	0.42	47
35	1.9	1.6	1.4	1.1	0.89	0.63	40
30	2.4	2.1	1.8	1.5	1.2	0.91	33
25	3	2.7	2.3	1.9	1.5	1.1	26
20	3.9	3.5	3	2.5	2	1.5	20
15	5.5	4.8	4.1	3.4	2.7	2.1	15
10	8.6	7.5	6.4	5.4	4.3	3.2	9
5	17.9	15.6	13.4	11.2	8.9	6.7	4
20 30 40 50 60 70 T _A							
Ambient temp. [°C]							

Heatsink Selection

Carlo Gavazzi Heatsink (see Accessories)	Thermal resistance
No heatsink required	$R_{th\ s-a} > 12.5$ K/W
RHS 100 Assy	3.0 K/W
RHS 301 Assy	0.8 K/W
RHS 301 F Assy	0.25 K/W
Consult your distributor	< 0.25 K/W

Compare the value found in the current versus temperature chart with the standard heatsink values and select the heatsink with the next lower value.



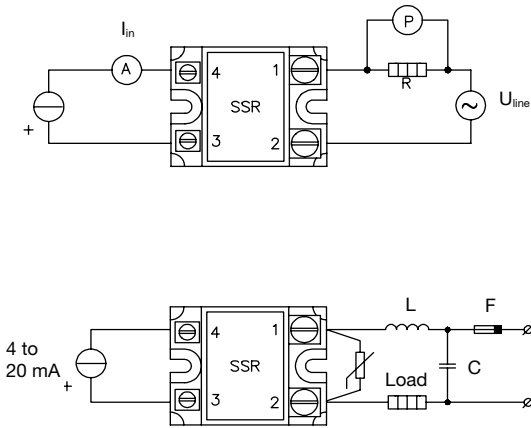
Applications

This relay is suitable for temperature control or control of lighting.

The relay can also be used for soft turn-on of high-power incandescent lamps.

Transfer characteristics

Output power as a function of control input (4 to 20 mA)



I_{in} [mA]	P_{out} [%] typically 50/60 Hz
4	0.5
6	8
8	22
10	40
12	54
14	66
16	75
18	81
20	86
25	92

Max. unit variation: $\pm 5\%$ @ $T_j = 25^\circ\text{C}$
Temperature variation: $\pm 5\%$ @ $T_j = -20^\circ$ to $+ 125^\circ\text{C}$

L: Optional radio interference low-pass filter component

RE 24.. AA 06 $U_L = 230\text{ V}$
RE 48.. AA 12 $U_L = 480\text{ V}$
RE 6050 AA 16 $U_L = 600\text{ V}$

C: Optional radio interference low-pass filter component

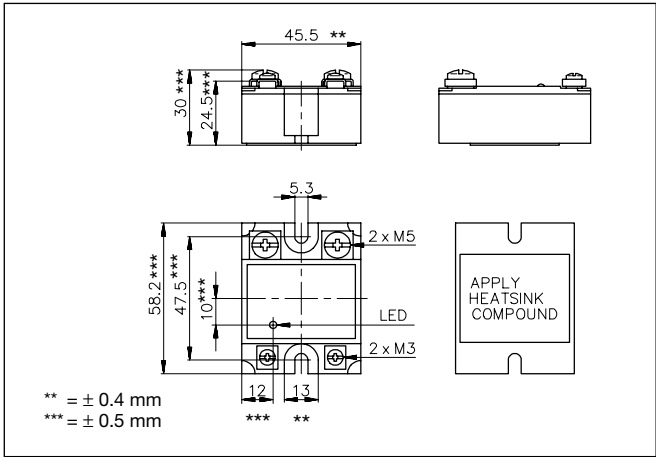
Application hints:
L and C must be connected as close as possible to the SSR.

Accessories

Protection cover
Heatsinks
DIN rail adapter
Varistors
Fuses

For further information refer to "General Accessories".

Dimensions



Housing Specifications

Weight	Approx. 110 g
Housing material	Noryl GFN 1, black
Base plate	Aluminium
Potting compound	Polyurethane
Relay	
Mounting screws	M5
Mounting torque	$\leq 1.5\text{ Nm}$
Control terminal	
Mounting screws	M3 x 6
Mounting torque	$\leq 0.5\text{ Nm}$
Power terminal	
Mounting screws	M5 x 6
Mounting torque	$\leq 2.4\text{ Nm}$