Solid State Relays
System Monitoring Relay (*SOLITRON*)
Type RN1S (Sense Relay)

CARLO GAVAZZI

- System (line and load) monitoring relay
- Rated operational current: 30 A and 50 AACrms
- Zero switching for heating and motor applications
- Rated operational voltage: 230, 400 and 480 VACrms
- Transient overvoltage protection built-in
- Alarm output signal
- LED-indication for alarm and supply/relay ON
- DIN-rail mountable

Product Description

The system monitoring Solid State Relay (Sense Relay) provides an alarm output in the event of a circuit failure. Internal circuits monitor:
- line voltage
- load current
- correct functioning of the SSR
- SSR input status

The relay is designed for applications where immediate fault detection is required.

A red LED indicates an alarm, a green LED indicates DC control supply OK (half LED light intensity) resp. relay switched ON (full LED light intensity).

Ordering Key

RN 1S 23 H 30 NO

Solid State Relay
Number of poles
Rated operational voltage
Control input
Rated operational current
Alarm output type

Type Selection

Rated operational voltage	Control input	Rated operational current	Alarm output type
23: 230 VACrms 40: 400 VACrms 48: 480 VACrms	H: Active high L: Active low	30: 30 AACrms 50: 50 AACrms	NO: NPN, NO NC: NPN, NC PO: PNP, NO PC: PNP, NC

Selection Guide

Rated operational voltage	Alarm output type	Rated operational current 30 AACrms Active high	30 AACrms Active low	50 AACrms Active high	50 AACrms Active low
230 VACrms	NPN, NO	RN 1S23H30NO	RN 1S23L30NO	RN 1S23H50NO	RN 1S23L50NO
	NPN, NC	RN 1S23H30NC	RN 1S23L30NC	RN 1S23H50NC	RN 1S23L50NC
	PNP, NO	RN 1S23H30PO	RN 1S23L30PO	RN 1S23H50PO	RN 1S23L50PO
	PNP, NC	RN 1S23H30PC	RN 1S23L30PC	RN 1S23H50PC	RN 1S23L50PC
400 VACrms	NPN, NO	RN 1S40H30NO	RN 1S40L30NO	RN 1S40H50NO	RN 1S40L50NO
	NPN, NC	RN 1S40H30NC	RN 1S40L30NC	RN 1S40H50NC	RN 1S40L50NC
	PNP, NO	RN 1S40H30PO	RN 1S40L30PO	RN 1S40H50PO	RN 1S40L50PO
	PNP, NC	RN 1S40H30PC	RN 1S40L30PC	RN 1S40H50PC	RN 1S40L50PC
480 VACrms	NPN, NO	RN 1S48H30NO	RN 1S48L30NO	RN 1S48H50NO	RN 1S48L50NO
	NPN, NC	RN 1S48H30NC	RN 1S48L30NC	RN 1S48H50NC	RN 1S48L50NC
	PNP, NO	RN 1S48H30PO	RN 1S48L30PO	RN 1S48H50PO	RN 1S48L50PO
	PNP, NC	RN 1S48H30PC	RN 1S48L30PC	RN 1S48H50PC	RN 1S48L50PC

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General Specifications

	RN1S23.....	RN1S40.....	RN1S48.....
Operational voltage range	120 to 265 VAC	150 to 440 VAC	180 to 530 VAC
Blocking voltage	800 V_p	1000 V_p	1200 V_p
Varistor voltage	275 VAC	420 VAC	510 VAC
Zero voltage turn-on	≤ 15 V	≤ 15 V	≤ 25 V
Operational frequency range	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.5 @ 230 VAC	≥ 0.5 @ 400 VAC	≥ 0.5 @ 480 VAC
Approvals	UL, cUL, CSA	UL, cUL, CSA	UL, cUL, CSA
CE-marking	Yes	Yes	Yes

Norms fulfilled   EN 60947-1   Low-voltage switchgear and control gear. Part 1- General Rules.
                     EN 61000-6-2   Generic Immunity Standard. Industrial Environment

Control Specifications

Supply voltage range	20 to 32 V	PNP alarm output	
Supply current	≤ 40 mA	Alarm output voltage open	≤ 0 VDC
Response time pick-up @ 50 Hz	≤ 10 ms	Alarm output voltage @ 100 mA	Vcc - 2 VDC
Response time drop-out @ 50 Hz	≤ 10 ms	Alarm output current	≤ 100 mA
Active high control input		NPN alarm output	
Pick-up voltage	Typ. 7 VDC	Alarm output voltage open	≤ 32 VDC
Drop-out voltage	Typ. 6.8 VDC	Alarm output voltage @ 100 mA	2 VDC
Input current (Vc = 32 V)	≤ 4 mA	Alarm output current	≤ 100 mA
Active low control input			
Pick-up voltage	Typ. Vcc - 10 VDC		
Drop-out voltage	Typ. Vcc - 10 VDC		
Input current (Vcc = 32 V)	≤ 4 mA		

Output Specifications

		RN1S...30..	RN1S...50..
Rated operational load current			
AC 51	@T_a = 30°C	30 Arms	50 Arms
	@T_a = 40°C	30 Arms	50 Arms
	@T_a = 50°C	23 Arms	38 Arms
	@T_a = 60°C	20 Arms	30 Arms
AC 53a	@T_a = 40°C	6 Arms	12 Arms
Zero crossing detection		Yes	Yes
Min. operational current		200 mA	250 mA
Non-rep. surge current t = 10 ms (Tj init. = 25°C)		≤ 325 A_p	≤ 600 A_p
Off-state leakage current @ rated voltage and frequency (Tj. = 125°C, max.)		< 6 mA	< 6 mA
I^2t for fusing t = 10 ms		525 A^2s	1800 A^2s
Critical dV/dt off-state		500 V/µs	500 V/µs

Sense Specifications

	RN1S23.....	RN1S40.....	RN1S48.....
Current			
Sensed load current	≥ 50 mA	≥ 50 mA	≥ 50 mA
Non-sensed leakage current	≤ 20 mA	≤ 20 mA	≤ 20 mA
Voltage			
Sensed line voltage	≥ 120 Vrms	≥ 150 Vrms	≥ 180 Vrms
Non-sensed line voltage	≤ 50 Vrms	≤ 80 Vrms	≤ 100 Vrms
Timing			
Response time from fault to alarm output	≤ 100 ms	≤ 100 ms	≤ 100 ms
Short-circuit of semiconductor	Will be sensed	Will be sensed	Will be sensed

                 Specifications are subject to change without notice (28.02.2007)

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Thermal Specifications

Operating temperature	- 20° to +70°C (-4° to +158°F)
Storage temperature	- 40° to +100°C (-40° to +212°F)

Housing Specifications

Mounting	DIN-rail 35 mm
Weight with RHN1	470 g
Weight with RHN2	780 g
Housing material	Noryl SEI, GFN1, Black
LED window material	PC Lexan 141R
Base plate	Aluminium, nickel plated
Potting compound	Polyurethane, Casco Nobel
Terminals	Screw with captive wire clamp
Control terminals nominal	4 mm² or 2 x 2.5 mm² AWG 12 or 2 x AWG 14
Min. cable dimenssion	0.5 mm², AWG 20
Mounting torque max.	0.6 Nm
Power terminals nominal	10 mm² or 2 x 6 mm² AWG 6 or 2 x AWG 10
Min. cable dimension	1 mm², AWG 16
Mounting torque max.	2.0 Nm
Heatsink compound used	Electrolube HTS

Insulation

Rated impulse withstand voltage Input to output	4000 V$_{imp}$
Rated impulse withstand voltage Output to case	4000 V$_{imp}$

Environment Specifications

Humidity max.	95%, no condensation

Dimensions

Dimensions	(H x W x D)
RN..30	120 x 45 x 110 mm
RN..50	120 x 90 x 110 mm

Operation Diagram

	Normal Relay OFF	Operation Relay ON	Line Voltage Loss	Load Open Circuit	DC Supply Loss	Relay Remains OFF	Shorted Relay
Line Voltage							
Line Current							
Control							
Green LED							
DC Supply							
Red LED							
Alarm output (normally open type)							

☐☐☐ = Half LED light intensity

Terminal Layout

RN..30
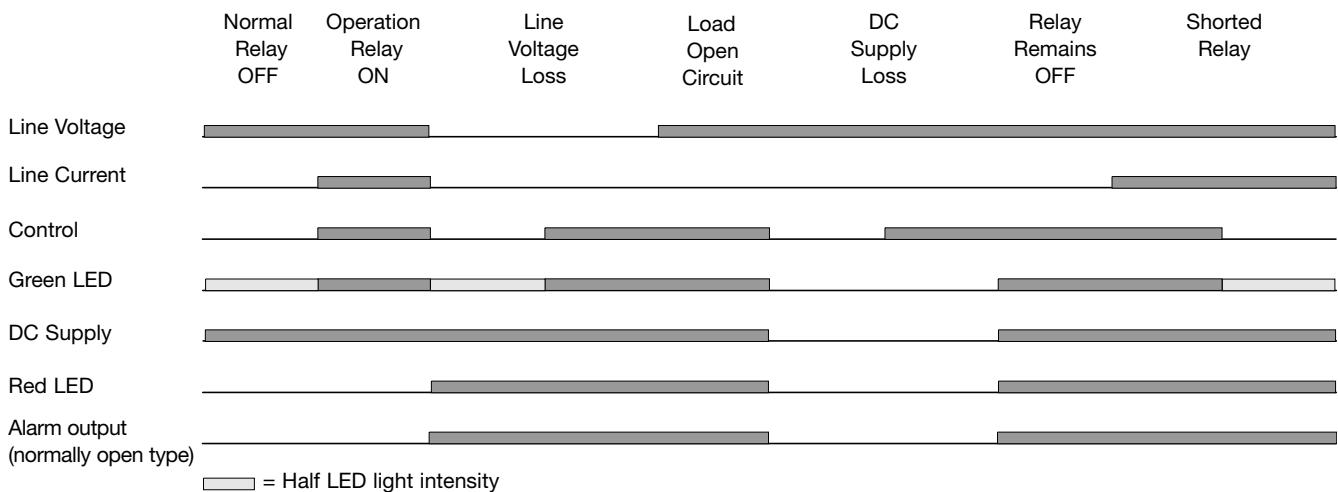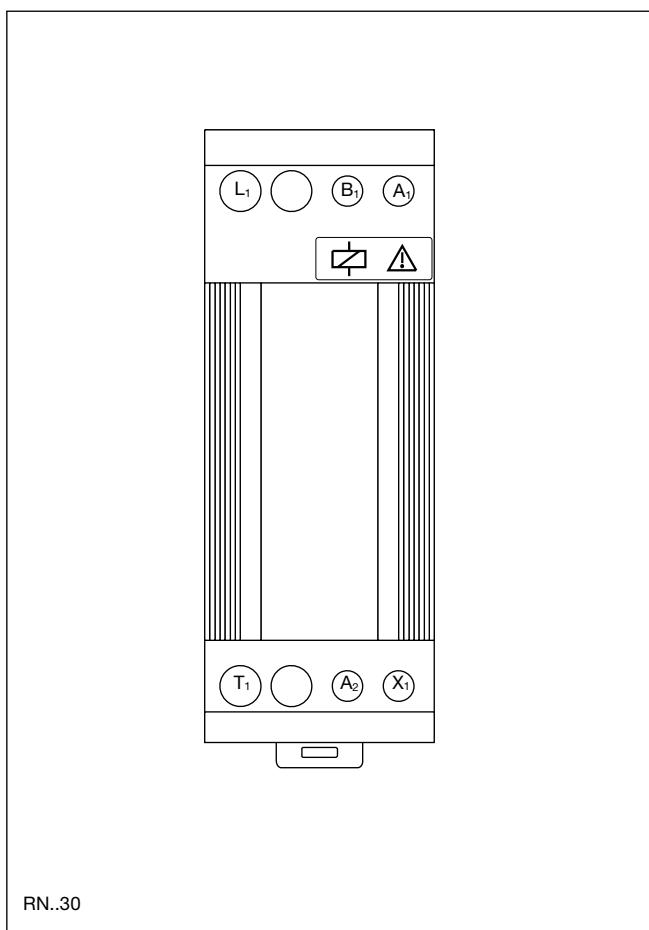
Functional Diagrams

RN1S .....N.

VCC
A_1
Alarm output X_1
Com A_2
Control input B_1
L_1
T_1

RN1S .....P.

VCC
A_1
Alarm output X_1
Com A_2
Control input B_1
L_1
T_1

Dimensions

RN..30
Note: all dimensions in mm

RN..50
Note: all dimensions in mm

Specifications are subject to change without notice (28.02.2007)
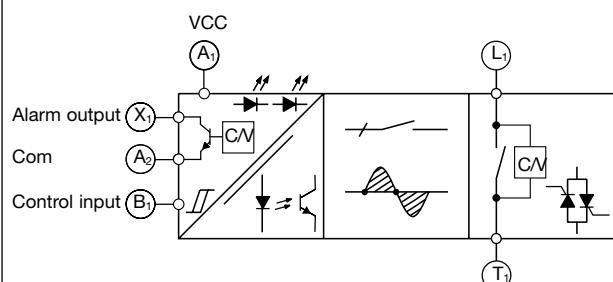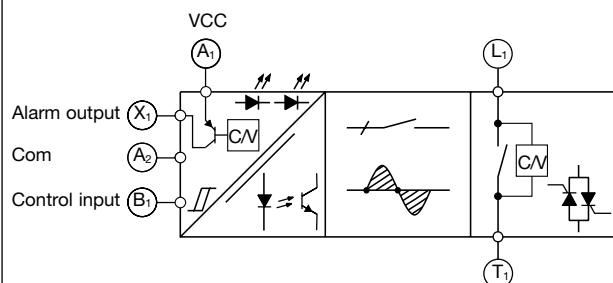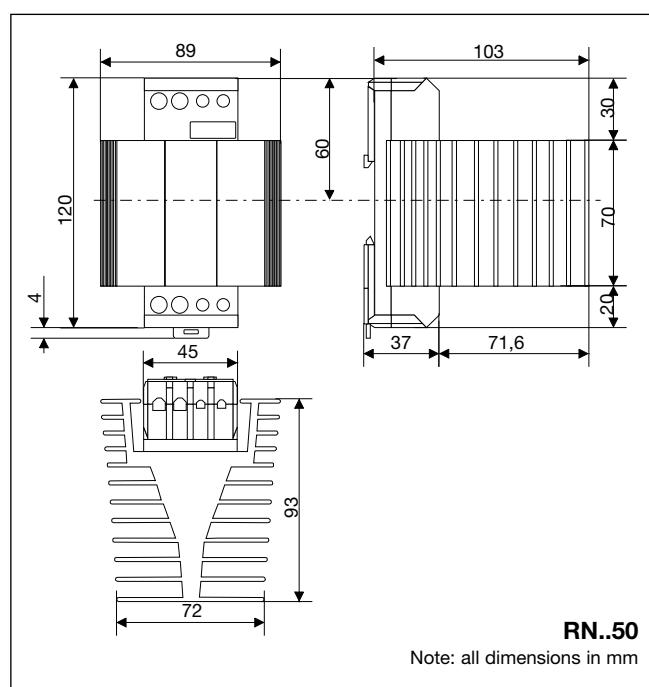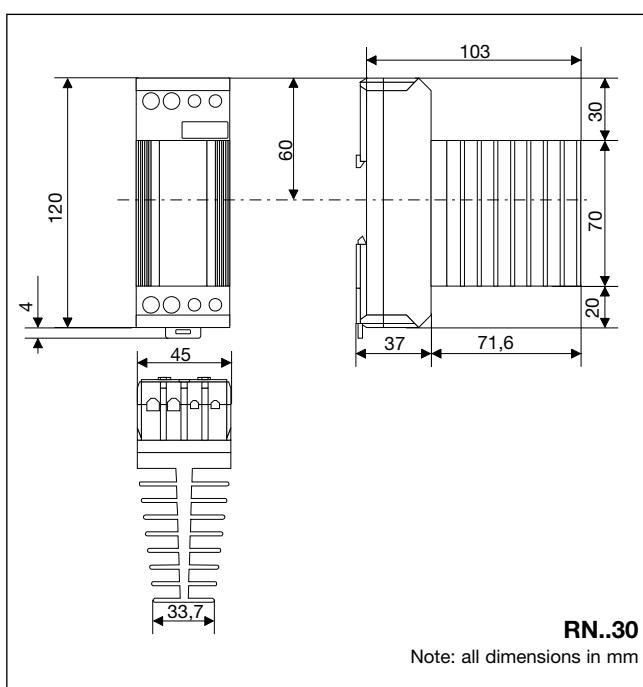
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