Solid State Relays
Analog Full Cycle Switching
Type RN.F...

- AC solid state relay, 1- and 2 poles
- Analog switching for resistive loads (heating)
- 4-20 mA or 0-10 V controls
- Rated operational current 30 and 50 AAC_{rms}
- Rated operational voltage up to 480 VAC
- LED-indication for normal operation and alarm status
- IP 20 protection
- DIN-rail mountable

Product Description

The analog switching relay provides a number of full cycles, evenly distributed over a fixed period, depending of the control input. The input of 4-20 mA or 0-10 VDC respectively, corresponds to zero and full output within a period of 1.28 s @ 50 Hz (1.07 s @ 60 Hz). This principle makes the transfer characteristics fully linear. The principle operates with zero switching, thus ensuring a reduced level of radiated and wire conducted noise. The 2-pole type has alarm LED indication by loss of master phase. The analogue Full Cycle Switching is not recommended for light control due to light-flickering.

Ordering Key

RN 1 F 40 V 30

- **Solid State Relay**
- **Number of poles**
- **Switching type**
- **Rated operational voltage**
- **Control signal**
- **Rated operational current**

Type Selection, 1-Pole

Rated operational voltage	Control input	Control supply	Rated operational current 30 A	50 A
120 VAC	4-20 mA	-	**RN 1F12I30**	**RN 1F12I50**
	0-10 VDC	12-32 VDC, 24 VAC	**RN 1F12V30**	**RN 1F12V50**
230 VAC	4-20 mA	-	**RN 1F23I30**	**RN 1F23I50**
	0-10 VDC	12-32 VDC, 24 VAC	**RN 1F23V30**	**RN 1F23V50**
480 VAC	4-20 mA	-	**RN 1F48I30**	**RN 1F48I50**
	0-10 VDC	12-32 VDC, 24 VAC	**RN 1F48V30**	**RN 1F48V50**

Type Selection, 2-Pole

Rated operational voltage	Control input	Control supply	Rated operational current 30 A	50 A
120 VAC	4-20 mA	-	**RN 2F12I30**	**RN 2F12I50**
	0-10 VDC	12-32 VDC, 24 VAC	**RN 2F12V30**	**RN 2F12V50**
230 VAC	4-20 mA	-	**RN 2F23I30**	**RN 2F23I50**
	0-10 VDC	12-32 VDC, 24 VAC	**RN 2F23V30**	**RN 2F23V50**
480 VAC	4-20 mA	-	**RN 2F48I30**	**RN 2F48I50**
	0-10 VDC	12-32 VDC, 24 VAC	**RN 2F48V30**	**RN 2F48V50**

General Specifications

	RN.F12...	RN.F23...	RN.F48...
Operational voltage range	85 to 140 VAC	85 to 265 VAC	190 to 530 VAC
Non-rep. peak voltage	800 V_p	800 V_p	1000 V_p
Varistor voltage	275 VAC	275 VAC	510 VAC
Zero voltage turn-on	< 10 V	< 10 V	< 20 V
Operational frequency range	45 to 65 Hz	45 to 65 Hz	45 to 65 Hz
Power factor at rated voltage	≥ 0.9	≥ 0.9	≥ 0.9
Average output power	0 to 100%	0 to 100%	0 to 100%
Output power resolution	1/64 of 100%	1/64 of 100%	1/64 of 100%
CE-marking	Yes	Yes	Yes
Approvals	CSA	CSA	CSA

Input Specifications

	RN.F..I..		RN.F..V..
Current controlled input		**Voltage controlled input**	
Control current range	4 - 20 mA	Supply voltage range	21 - 27 VAC, 12 - 32 VDC
Allowable input current	50 mA	Supply current	30 mA @ 24 VAC/32 VDC
Reverse polarity protected	Yes	Control voltage range	0 - 10 V
Voltage drop	10 VDC @ 20 mA	Control input current	0.1 mA @ 10 VDC

Output Specifications

		RN.F..30	RN.F..50
Rated operational current			
AC1	@Ta=30°C	30 A	50 A
“	@Ta=40°C	25 A	50 A
“	@Ta=50°C	23 A	38 A
“	@Ta=60°C	20 A	30 A
Zero crossing detection		Yes	Yes
Min. operational current (per pole)		500 mA	500 mA
Rep. overload current t=1 s (Tj init.=25°C)		55 A (rms)	125 A (rms)
Non-rep. surge current t=10 ms (Tj init.=25°C)		< 250 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=1 to 10 ms		310 A^2s	1800 A^2s
Critical dV/dt off-state		500 V/µs	500 V/µs

Thermal Specifications

	RN.F..30	RN.F..50
Operational temperature	-20° to +70°C (-4° to +158°F)	-20° to +70°C (-4° to +158°F)
Storage temperature	-20° to +100°C (-4° to +212°F)	-20° to +100°C (-4° to +212°F)
Junction temperature	< 125°C (257°F)	< 125°C (257°F)
R_{th} junction to ambient (AC load)	2.8 K/W	1.7 K/W

Housing Specifications

Mounting	DIN-rail 35 mm
Weight with RHN1	470 g
Weight with RHN2	780 g
Housing material	Glass reinforced noryl SE1GFN1
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 mm^2 or 2 x 2.5 mm^2 AWG 12 or 2 x AWG 14
Min.	0.5 mm^2, AWG 20
Mounting torque max.	0.6 Nm
Power terminals nominal	10 mm^2 or 2 x 6 mm^2 AWG 6 or 2 x AWG 10
Min.	1 mm^2, AWG 16
Mounting torque max.	2.0 Nm
Heatsink compound used	Dow Corning 340

Insulation

Rated imp. withstand voltage Input to output	4000 V_{imp}
Rated imp. withstand voltage Output to heatsink	4000 V_{imp}

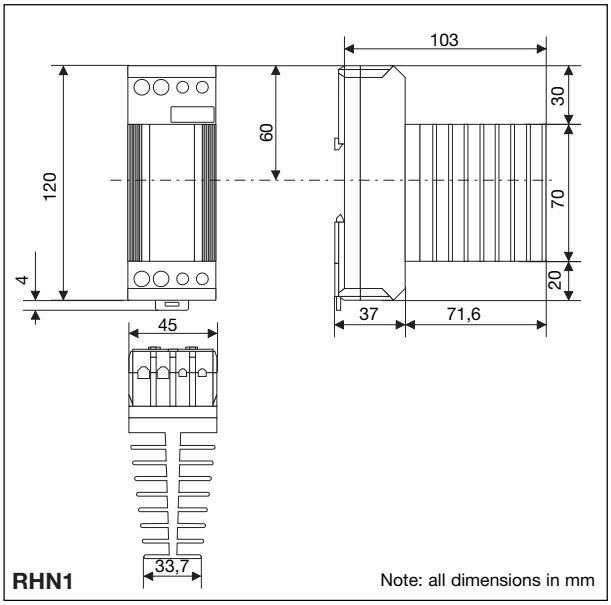
Environment Specifications

Humidity max.	95%, no condensation

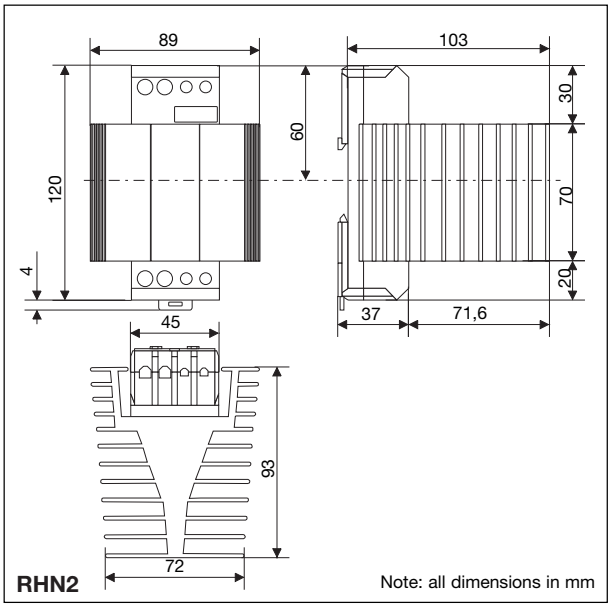
Dimensions

Dimensions with RHN 1 (30 A) (H x W x D)	120 x 45 x 110 mm
Dimensions with RHN 2 (50 A) (H x W x D)	120 x 90 x 110 mm

Dimensions

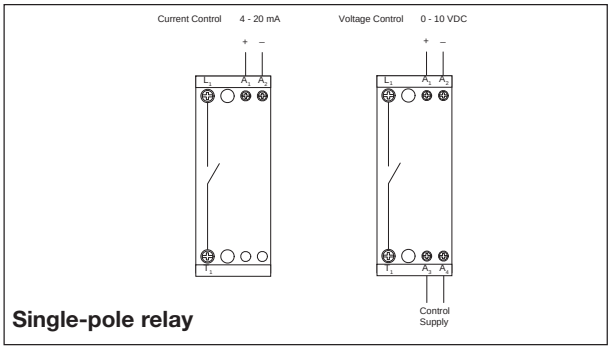


RHN1 Note: all dimensions in mm

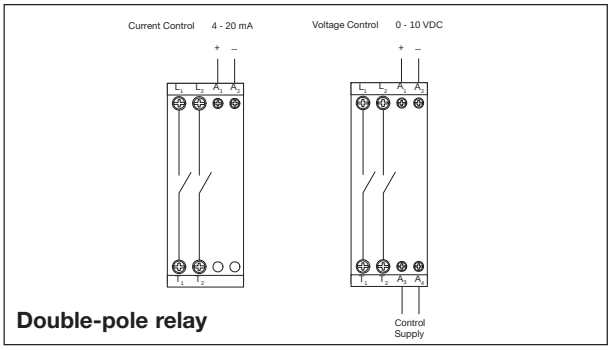


RHN2 Note: all dimensions in mm

Wiring Diagrams

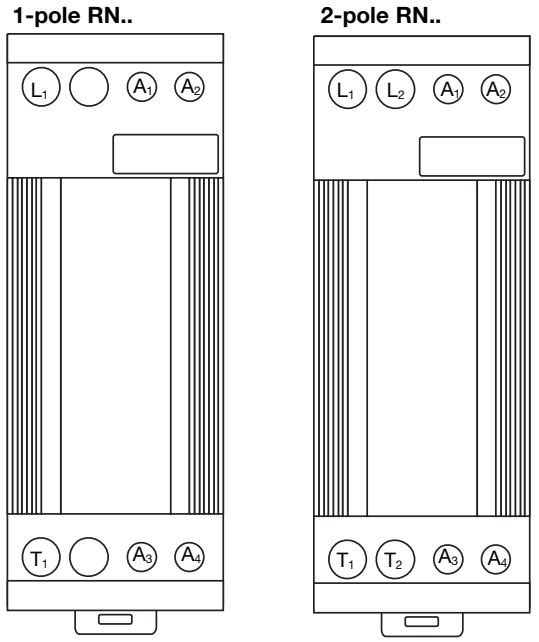


Single-pole relay



Double-pole relay

Terminal Layout



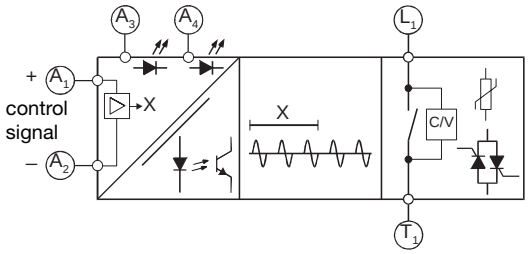
Shown with RHN1

Functional Diagrams

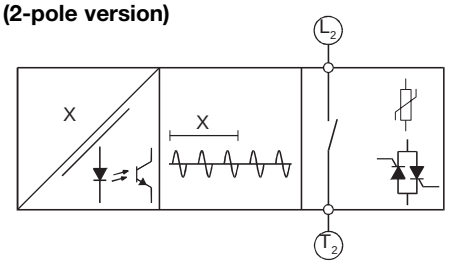
2-pole current controlled input

Master

VAC/VDC (A_3, A_4 only used for voltage control)

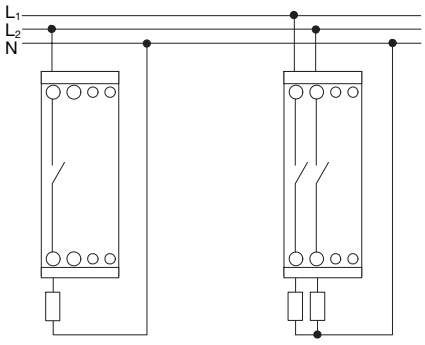


Slave (2-pole version)



Applications

Single and double pole relay application
Line-Neutral



Double pole relay in 3-phase application
Star and delta application (Economy Switching only)