

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

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- 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<sub>rms</sub>
- Rated operational voltage up to 480 VAC
- LED-indication for normal operation and alarm status
- IP 20 protection
- DIN-rail mountable

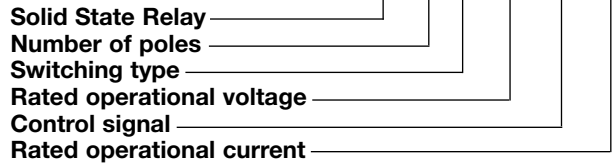
## Product Description

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**



## Type Selection, 1-Pole

Rated operational voltage	Control input	Control supply	Rated operational current	
			30 A	50 A
120 VAC	4-20 mA	7-10 VDC	<b>RN 1F12I30</b>	<b>RN 1F12I50</b>
	0-10 VDC	12-32 VDC, 24 VAC	<b>RN 1F12V30</b>	<b>RN 1F12V50</b>
230 VAC	4-20 mA	7-10 VDC	<b>RN 1F23I30</b>	<b>RN 1F23I50</b>
	0-10 VDC	12-32 VDC, 24 VAC	<b>RN 1F23V30</b>	<b>RN 1F23V50</b>
480 VAC	4-20 mA	7-10 VDC	<b>RN 1F48I30</b>	<b>RN 1F48I50</b>
	0-10 VDC	12-32 VDC, 24 VAC	<b>RN 1F48V30</b>	<b>RN 1F48V50</b>

## Type Selection, 2-Pole

Rated operational voltage	Control input	Control supply	Rated operational current	
			30 A	50 A
120 VAC	4-20 mA	7-10 VDC	<b>RN 2F12I30</b>	<b>RN 2F12I50</b>
	0-10 VDC	12-32 VDC, 24 VAC	<b>RN 2F12V30</b>	<b>RN 2F12V50</b>
230 VAC	4-20 mA	7-10 VDC	<b>RN 2F23I30</b>	<b>RN 2F23I50</b>
	0-10 VDC	12-32 VDC, 24 VAC	<b>RN 2F23V30</b>	<b>RN 2F23V50</b>
480 VAC	4-20 mA	7-10 VDC	<b>RN 2F48I30</b>	<b>RN 2F48I50</b>
	0-10 VDC	12-32 VDC, 24 VAC	<b>RN 2F48V30</b>	<b>RN 2F48V50</b>

## 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 <sub>p</sub>	800 V <sub>p</sub>	1000 V <sub>p</sub>
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%
Approvals	UL, cUL, CSA	UL, cUL, CSA	UL, cUL, CSA
CE-marking	Yes	Yes	Yes

Norms fulfilled    HD 419.2S1    Low-voltage controlgear semiconductor contactors  
                           EN 50082-1    Generic Immunity Standard. Residential, Commercial & Light Industry Environment  
                           EN 50082-2    Generic Immunity Standard. Industrial Environment

## Input Specifications

	RN.F..I..		RN.F..V..
<b>Current controlled input</b>		<b>Voltage controlled input</b>	
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
<b>Rated operational current</b>		
AC1 @Ta=30°C	30 A	50 A
“ @Ta=40°C	30 A	50 A
“ @Ta=50°C	23 A	38 A
“ @Ta=60°C	20 A	30 A
<b>Zero crossing detection</b>	Yes	Yes
<b>Min. operational current (per pole)</b>	500 mA	500 mA
<b>Rep. overload current t=1 s</b> (T <sub>j</sub> init.=25°C)	55 A (rms)	125 A (rms)
<b>Non-rep. surge current t=10 ms</b> (T <sub>j</sub> init.=25°C)	< 250 A <sub>p</sub>	< 600 A <sub>p</sub>
<b>Off-state leakage current, @ rated voltage and frequency</b> (T <sub>j</sub> .=125°C, max.)	< 6 mA	< 6 mA
<b>I<sup>2</sup>t for fusing t=1 to 10 ms</b>	310 A <sup>2</sup> s	1800 A <sup>2</sup> s
<b>Critical dV/dt off-state</b>	500 V/μs	500 V/μs

## Thermal Specifications

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

## Housing Specifications

<b>Mounting</b>	DIN-rail 35 mm
<b>Weight with RHN1</b>	470 g
<b>Weight with RHN2</b>	780 g
<b>Housing material</b>	Glass reinforced noryl SE1GFN1
<b>LED window material</b>	PC Lexan 141R
<b>Base plate</b>	Aluminium, nickel plated
<b>Potting compound</b>	Polyurethane, Casco Nobel
<b>Terminals</b>	Screw with captive wire clamp
<b>Control terminals nominal</b>	4 mm <sup>2</sup> or 2 x 2.5 mm <sup>2</sup> AWG 12 or 2 x AWG 14 0.5 mm <sup>2</sup> , AWG 20
Min.	
<b>Mounting torque max.</b>	0.6 Nm
<b>Power terminals nominal</b>	10 mm <sup>2</sup> or 2 x 6 mm <sup>2</sup> AWG 6 or 2 x AWG 10 1 mm <sup>2</sup> , AWG 16
Min.	
<b>Mounting torque max.</b>	2.0 Nm
<b>Heatsink compound used</b>	Dow Corning 340

## Insulation

<b>Rated impulse withstand voltage</b>	4000 V <sub>imp</sub>
Input to output	
<b>Rated impulse withstand voltage</b>	4000 V <sub>imp</sub>
Output to heatsink	

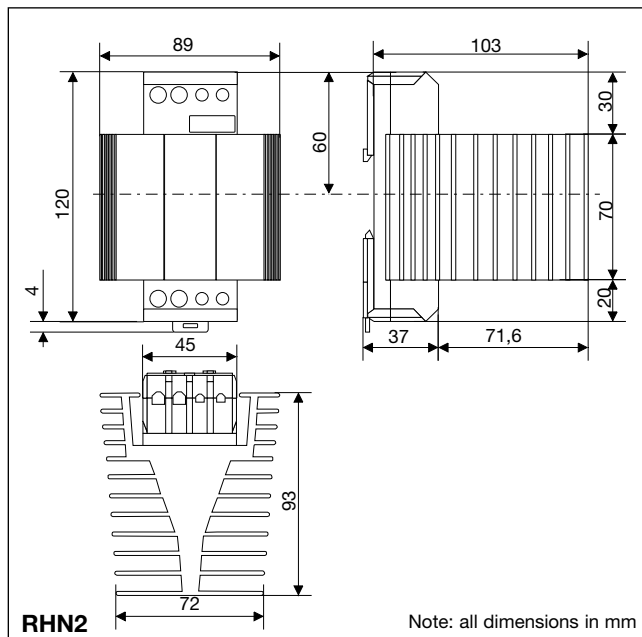
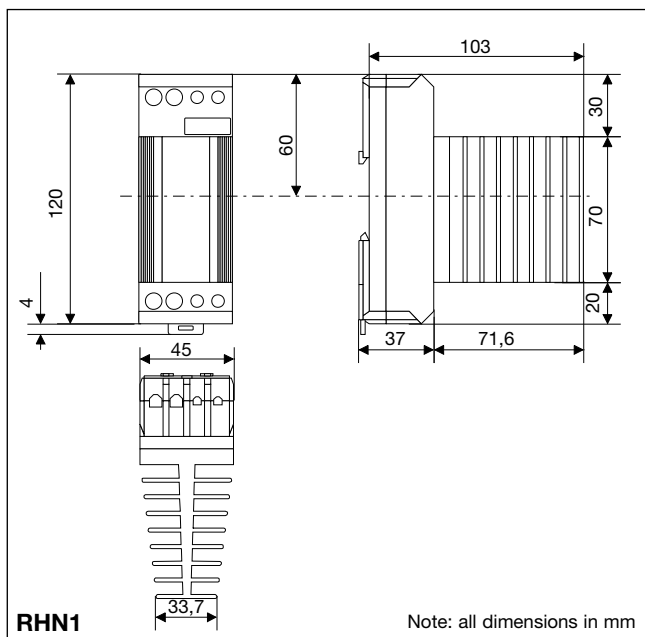
## Environment Specifications

<b>Humidity max.</b>	95%, no condensation
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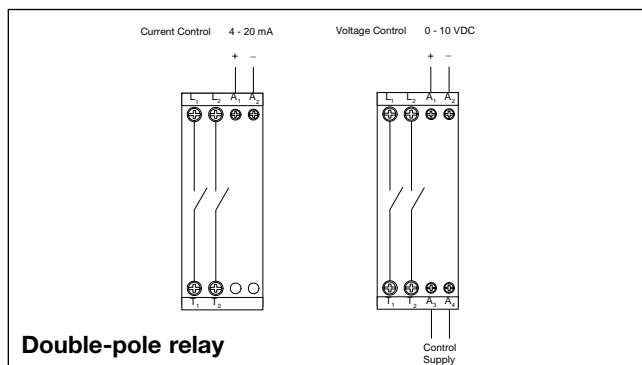
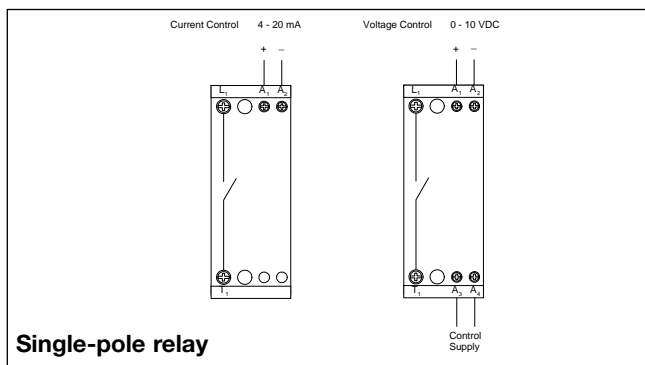
## Dimensions

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

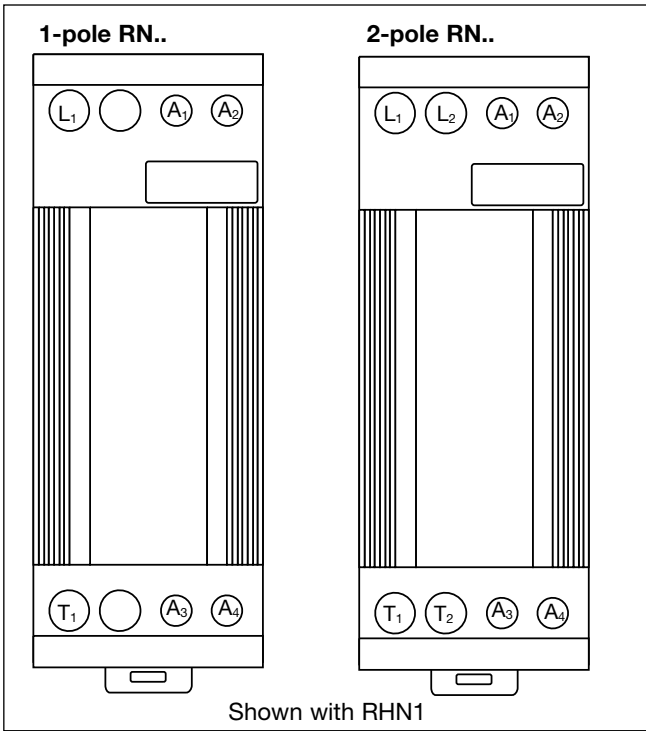
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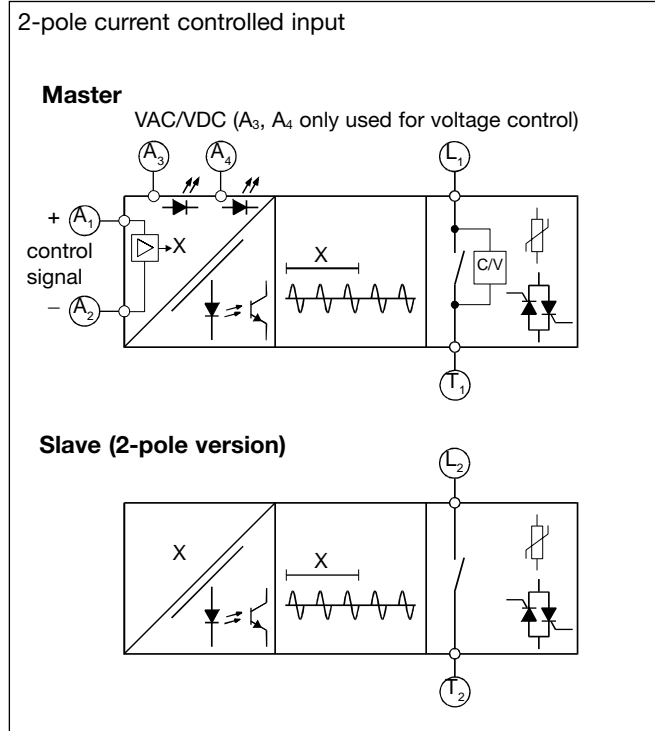
## Wiring Diagrams



## Terminal Layout



## Functional Diagrams



## Applications

