

Motor Controllers

Industrial, 2-Phase IO Reversing

Types RR2 I HAP, RR2 I LAP, RR2 I HDP



- Motor reversing Solid State Relays for 3-phase induction motors up to 3 kW
- Rated operational voltage: Up to 480 VACrms
- Built-in interlock function
- AC or DC control voltage
- Built-in voltage transient protection
- LED indication for direction
- Insulation: Reed relay or optocoupler (input-output) 4000 VACrms
- Direct copper bonding technology

Product Description

This family of motor reversing Solid State Relays is designed to switch 3-phase motors rated up to 3 kW. The built-in interlocking circuitry for both AC and DC control voltage prevents the relay from switching both directions at the same time. A dual colour LED indicates direction "forward" when green and direction "reverse" when red. The output alternistor chips are protected from excessive voltage fluctu-

ations (transients) by the built-in varistors. Furthermore, optimum reliability is achieved by soldering the output alternistor chips directly on to the ceramic substrate (Direct Copper Bonding).

The housing is designed to incorporate a temperature limit switch. It is recommended to install an appropriate semiconductor fuse in series with the relay.

Ordering Key

RR 2 I 40 05 HD P

Solid State Relay _____
 Reversing type _____
 Switched phases _____
 Interlock _____
 Rated operational voltage _____
 Motor power rating _____
 Input control voltage _____
 Protection _____

Type Selection

Switching mode	Interlocking	Rated operational voltage	Load power	Control voltage	Protection
RR2: Reversing relay (2-phase)	I: Interlock	40: 400 VACrms 48: 480 VACrms	05: 0.5 kW 15: 1.5 kW 30: 3.0 kW	HD: 10 - 40 VDC LA: 90 - 140 VAC HA: 180 - 265 VAC	P: Protected (varistor)

Selection Guide

Rated operational voltage	Control voltage	Load power		
		0.5 kW	1.5 kW	3.0 kW
400 VACrms	10 to 40 VDC	RR2 I 4005 HDP	RR2 I 4015 HDP	RR2 I 4030 HDP
	90 to 140 VAC	RR2 I 4005 LAP	RR2 I 4015 LAP	RR2 I 4030 LAP
	180 to 265 VAC	RR2 I 4005 HAP	RR2 I 4015 HAP	RR2 I 4030 HAP
480 VACrms	10 to 40 VDC	RR2 I 4805 HDP	RR2 I 4815 HDP	RR2 I 4830 HDP
	90 to 140 VAC	RR2 I 4805 LAP	RR2 I 4815 LAP	RR2 I 4830 LAP
	180 to 265 VAC	RR2 I 4805 HAP	RR2 I 4815 HAP	RR2 I 4830 HAP

General Specifications

	RR2 I 40.. ..P	RR2 I 48.. ..P
Operational voltage range	120 to 440 VACrms	120 to 530 VACrms
Non-rep. peak voltage	$\geq 1200 V_p$	$\geq 1400 V_p$
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Power factor	$\geq 0.5 @ 400 \text{ VACrms}$	$\geq 0.5 @ 480 \text{ VACrms}$
Approvals	CSA, UL, cUL	CSA, UL, cUL
CE-marking	Yes	Yes

Input Specifications

	RR2 I HDP	RR2 I LAP	RR2 I HAP
Control voltage range	10 to 40 VDC	90 to 140 VAC	180 to 265 VAC
Pick-up voltage	$\leq 10 \text{ VDC}$	$\leq 90 \text{ VAC}$	$\leq 180 \text{ VAC}$
Drop-out voltage	$\geq 3 \text{ VDC}$	$\geq 30 \text{ VAC}$	$\geq 60 \text{ VAC}$
Power consumption	$\leq 1.4 \text{ W}$	$\leq 4 \text{ VA}$	$\leq 4 \text{ VA}$
Time delay F $\rightarrow$ R, R $\rightarrow$ F	$\leq 50 \text{ ms}$	$\leq 100 \text{ ms}$	$\leq 100 \text{ ms}$

Output Specifications

	RR2 I 4005 ..P RR2 I 4805 ..P	RR2 I 4015 ..P RR2 I 4815 ..P	RR2 I 4030 ..P RR2 I 4830 ..P
Rated operational current AC51 AC53a	2 x 10 AACrms 2 x 1.5 AACrms	2 x 25 AACrms 2 x 3.5 AACrms	2 x 40 AACrms 2 x 6 AACrms
Min. operational current	200 mArms	200 mArms	200 mArms
Off-state leakage current	$\leq 10 \text{ mA}$	$\leq 10 \text{ mA}$	$\leq 10 \text{ mA}$
I ² t for fusing t=1-10 ms	$\leq 72 \text{ A}^2\text{s}$	$\leq 450 \text{ A}^2\text{s}$	$\leq 760 \text{ A}^2\text{s}$
Critical di/dt	$\geq 50 \text{ A}/\mu\text{s}$	$\geq 50 \text{ A}/\mu\text{s}$	$\geq 50 \text{ A}/\mu\text{s}$
On-state voltage drop	$\leq 1.6 \text{ V rms}$	$\leq 1.6 \text{ V rms}$	$\leq 1.6 \text{ V rms}$
Critical dV/dt commutating	$\geq 200 \text{ V}/\mu\text{s}$	$\geq 200 \text{ V}/\mu\text{s}$	$\geq 200 \text{ V}/\mu\text{s}$
Critical dV/dt off-state	$\geq 500 \text{ V}/\mu\text{s}$	$\geq 500 \text{ V}/\mu\text{s}$	$\geq 500 \text{ V}/\mu\text{s}$

Thermal Specifications

	RR2 I 4005 ..P RR2 I 4805 ..P	RR2 I 4015 ..P RR2 I 4815 ..P	RR2 I 4030 ..P RR2 I 4830 ..P
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	$\leq 125^\circ\text{C}$ (257°F)	$\leq 125^\circ\text{C}$ (257°F)	$\leq 125^\circ\text{C}$ (257°F)
R _{th} junction to case	$\leq 2.3 \text{ K/W}$	$\leq 1.5 \text{ K/W}$	$\leq 0.8 \text{ K/W}$

Insulation

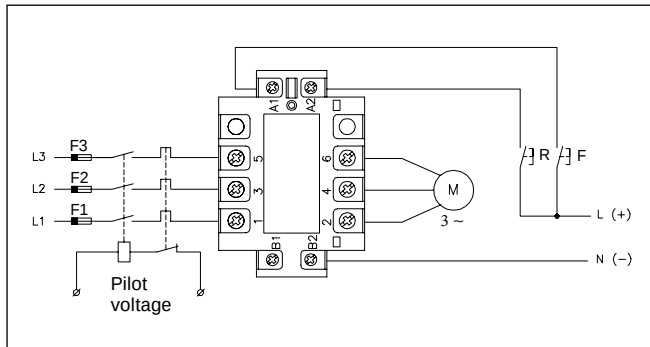
Rated insulation voltage	
Input to output	$\geq 4000 \text{ VACrms}$
Input to case	$\geq 4000 \text{ VACrms}$
Rated insulation voltage	
Output to case	$\geq 4000 \text{ VACrms}$

Accessories

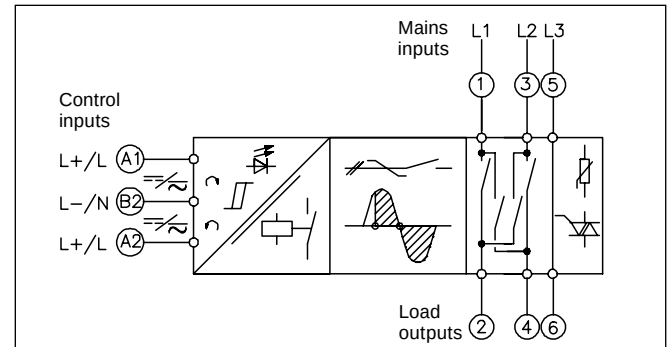
Heatsinks
Fuses
Temperature limit switch

For further information refer to "General Accessories".

Wiring Diagram



Functional Diagram



Heatsink Dimensions

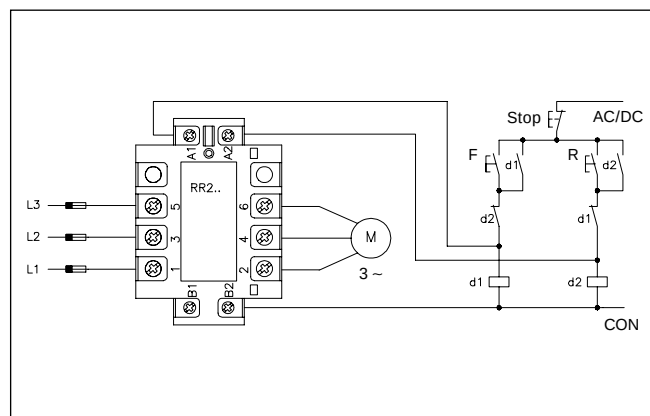
Motor load	Relay	Type of heatsink (at max. 50 °C ambient temp.)
0.5 kW	RR2 I 4.05 ..P	No heatsink required (mounted on backplate)
1.5 kW	RR2 I 4.15 ..P	2.5 K/W
3.0 kW	RR2 I 4.30 ..P	1.0 K/W

Fuse Selection Guide

Relay	Fuse FERRAZ PROTISTOR
RR2 I 4005 ..P	660 g RB 10-10
RR2 I 4015 ..P	660 g RB 10-25
RR2 I 4030 ..P	6.621 CP URGB 14 x 51/40
RR2 I 4805 ..P	660 g RB 10-10
RR2 I 4815 ..P	660 g RB 10-25
RR2 I 4830 ..P	6.621 CP URG 22 x 58

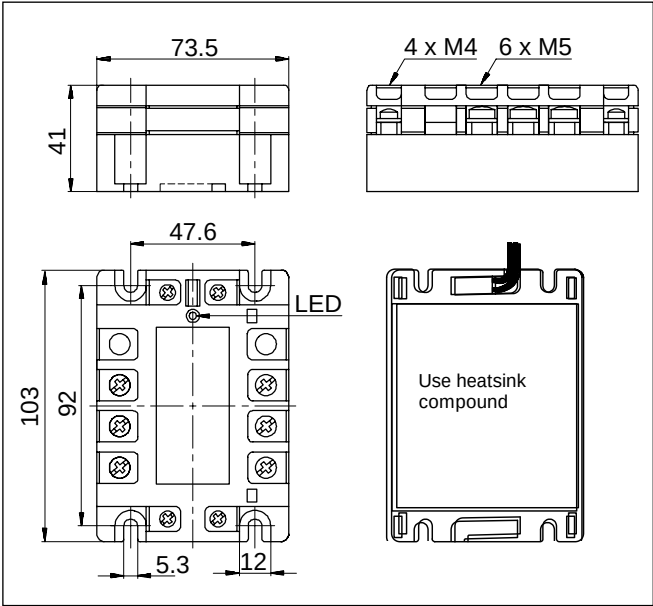
Applications

AC/DC input forward/reverse/stop





Dimensions



All dimensions in mm

Housing Specifications

Weight	Approx. 350 g	
Housing material	Noryl, glass-reinforced	
Colour	Black	
Base plate	Aluminium, nickel-plated	
Potting compound	Polyurethane, black	
Relay		
Mounting screws	M5	
Mounting torque	≤ 1.5 Nm	
Control terminal		
Mounting screws	M4	
Mounting torque	≤ 0.5 Nm	
Wire size	Max.	2 x 2.5 mm ² (AWG 14)
	Min.	2 x 1.0 mm ²
Power terminal		
Mounting screws	M5	
Mounting torque	≤ 2.5 Nm	
Wire size	Max.	2 x 6 mm ² (AWG 8)
	Min.	2 x 1 mm ²