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 fluctuations (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	≥ 1200 V_p	≥ 1400 V_p
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Power factor	≥ 0.5 @ 400 VACrms	≥ 0.5 @ 480 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	≤ 10 VDC	≤ 90 VAC	≤ 180 VAC
Drop-out voltage	≥ 3 VDC	≥ 30 VAC	≥ 60 VAC
Power consumption	≤ 1.4 W	≤ 4 VA	≤ 4 VA
Time delay F → R, R → F	≤ 50 ms	≤ 100 ms	≤ 100 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	2 x 10 AACrms	2 x 25 AACrms	2 x 40 AACrms
AC53a	2 x 1.5 AACrms	2 x 3.5 AACrms	2 x 6 AACrms
Min. operational current	200 mArms	200 mArms	200 mArms
Off-state leakage current	≤ 10 mA	≤ 10 mA	≤ 10 mA
I^2t for fusing t=1-10 ms	≤ 72 A^2s	≤ 450 A^2s	≤ 760 A^2s
Critical dI/dt	≥ 50 A/µs	≥ 50 A/µs	≥ 50 A/µs
On-state voltage drop	≤ 1.6 V rms	≤ 1.6 V rms	≤ 1.6 V rms
Critical dV/dt commutating	≥ 200 V/µs	≥ 200 V/µs	≥ 200 V/µs
Critical dV/dt off-state	≥ 500 V/µs	≥ 500 V/µs	≥ 500 V/µs

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	≤ 125°C (257°F)	≤ 125°C (257°F)	≤ 125°C (257°F)
R_{th} junction to case	≤ 2.3 K/W	≤ 1.5 K/W	≤ 0.8 K/W

Insulation

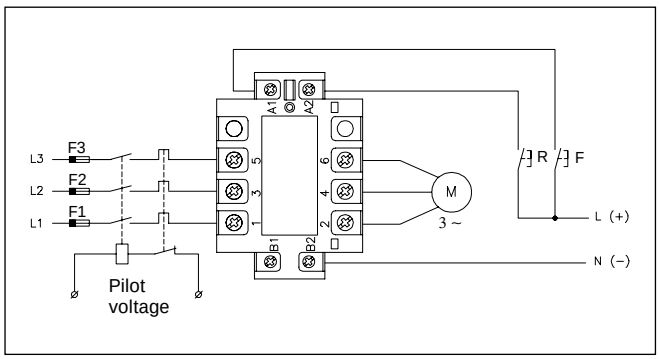
Rated insulation voltage	
Input to output	≥ 4000 VACrms
Input to case	≥ 4000 VACrms
Rated insulation voltage	
Output to case	≥ 4000 VACrms

Accessories

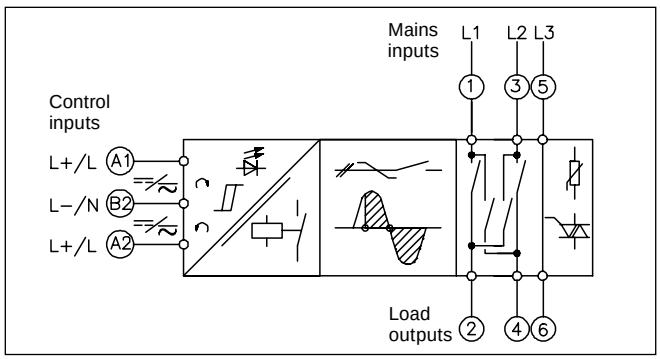
Heatsinks
Fuses
Temperature limit switch

For further information refer to “General Accessories”.

Wiring Diagram



Functional Diagram



Heatsink Dimensions

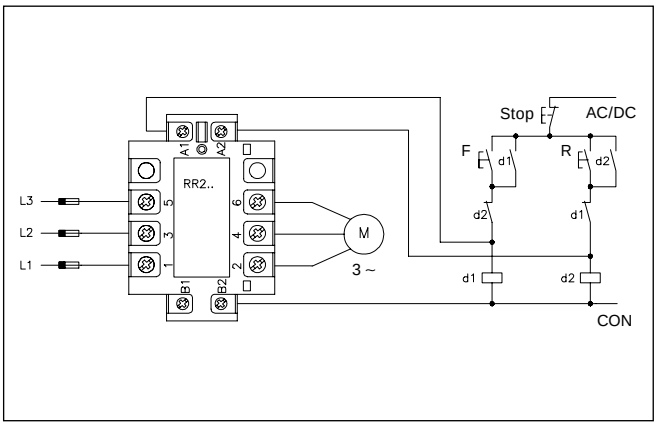
Motor load	Relay	Type of heatsink (at max. 50 °C ambient temp.)
0.5 kW	RR2 I 4.05 ..P	No heatsink required (mounted on backplate)
1.5 kW	RR2 I 4.15 ..P	2.5 K/W
3.0 kW	RR2 I 4.30 ..P	1.0 K/W

Fuse Selection Guide

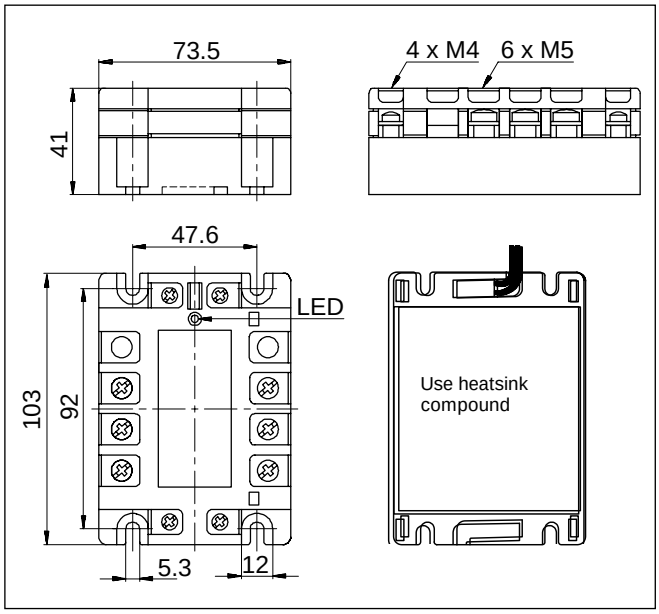
Relay	Fuse FERRAZ PROTISTOR
RR2 I 4005 ..P	660 g RB 10-10
RR2 I 4015 ..P	660 g RB 10-25
RR2 I 4030 ..P	6.621 CP URGB 14 x 51/40
RR2 I 4805 ..P	660 g RB 10-10
RR2 I 4815 ..P	660 g RB 10-25
RR2 I 4830 ..P	6.621 CP URGA 22 x 58

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 mm² (AWG 14)
	Min.	2 x 1.0 mm²
Power terminal		
Mounting screws		M5
Mounting torque		≤ 2.5 Nm
Wire size	Max.	2 x 6 mm² (AWG 8)
	Min.	2 x 1 mm²