

Motor Controllers

AC Semiconductor Motor Controller

Type RSDR



- Soft starting, soft stopping of 3-phase induction motors
- 2 Phase controlled with internal bypass relays
- Rated operational voltage: 230-460VAC 3-phase
- Rated operational current: up to 500A (280kW) AC-53b
- Auxiliary relay outputs (2x NO)
- Overcurrent "shearpin" protection
- Ramp-up and Ramp-down time settings up to 30sec
- IP20 Up to 55kW
- In Line or In Delta connection

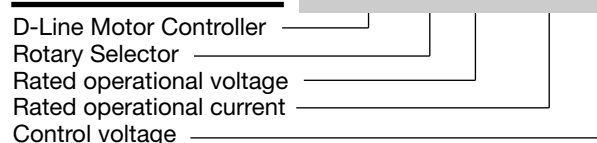
Product Description

RSDR is a 2-phase controlled, internally bypassed soft starter for 3-phase induction motors. Initial torque, ramp-up and ramp-down parameters

can be selected via rotary knobs. Two Normally Open (NO) auxiliary relay contacts are also available for Run and Ready/Fault indication.

Ordering Key

RSD R 40 280 B



Type Selection

Type	Rated operational voltage U_e	Rated operational Current I_e		Control voltage U_c
RSDR	40: (230-460VACrms)	55: 55 AACrms	195: 195AACrms	B: 24VDC/ 110VAC*
		66: 66 AACrms	230: 230AACrms	
		80: 80 AACrms	280: 280AACrms	
		97: 97 AACrms	350: 350AACrms	
		132: 132 AACrms	430: 430AACrms	
		160: 160 AACrms	500: 500AACrms	

* externally supplied

Selection Guide

Rated operational voltage U_e	Control voltage U_c	Rated operational current I_e		
230 - 460 VACrms (-15%, + 10%) 50/60Hz (+/- 2Hz)	24VDC/ 110VAC	55A AC-53b	66A AC-53b	80A AC-53b
		RSDR40055B	RSDR40066B	RSDR40080B
		97A AC-53b	132A AC-53b	160A AC-53b
		RSDR40097B	RSDR40132B	RSDR40160B
		195A AC-53b	230A AC-53b	280A AC-53b
		RSDR40195B	RSDR40230B	RSDR40280B
		350A AC-53b	430A AC-53b	500A AC-53b
		RSDR40350B	RSDR40430B	RSDR40500B



Environmental Specifications

Ambient temperature	0°C to 40°C (32°F to 104°F) Above 40°C de-rate linearly by 2% of unit FLC per °C to a derate of 40% at 60°C.	Degree of Protection	IP20 up to 55kW IP00 - 75kW to 280kW
Storage temperature	-25°C to +60°C -13°F to 140°F	Installation altitude	1000m. Above 1000m de-rate linearly by 1% of unit altitude of 2000m
Relative Humidity	<85% non-condensing, not exceeding 50% @ 40°C	Pollution Degree	2

General Specifications

Ramp up time	1...30s
Ramp down time	0...30s
Initial torque	30% ... 100%
Operational voltage (Ue)	230 - 460 VACrms (-15% +10%)
Rated frequency	50 - 60Hz (+/- 2Hz)
Rated insulation voltage(Ui)	500V
Form designation	Form 1
Status indication LEDs	
Power supply ON	LED, Green (continuous)
Alarm	LED, Red (flashing)
Tripped and Reset	LED, Orange (flashing)
Control voltage (Uc) A1-A2:	24VDC/110VAC

Output Specifications

IEC rated operational current Ie (AC53b)	55/66/80/97/132/160 195/230/280/350/430/500A
Overload cycle according to EN/IEC 60947-4-2	AC53b: 3-5:355 (10starts/hour)
Auxiliary relay outputs	
Run relay (13, 14)	230VAC 3AAC Normally Open (NO)
Ready (23, 24)	230VAC 3AAC Normally Open (NO)

External Supply Specifications

External supply voltage (X1, X2)	24VDC (4VA approx.) RSDR40055B up to RSDR40195B
	24VDC (12VA approx)* RSDR40230B up to RSDR40500B

* Power supply must be capable of 4Amps for 250ms
Refer to Accessories Section in the datasheet for recommended power supplies.

Motor Ratings - In Line

Assigned motor kW rating @ 400V
UL rating HP @ 460V

RSDR40055B 30kW 42HP	RSDR40066B 37kW 54HP	RSDR40080B 45kW 60HP
RSDR40097B 55kW 75HP	RSDR40132B 75kW 110HP	RSDR40160B 90kW 130HP
RSDR40195B 110kW 160HP	RSDR40230B 132kW 190HP	RSDR40280B 160kW 230HP
RSDR40350B 200kW 290HP	RSDR40430B 250kW 350HP	RSDR40500B 280kW 400HP

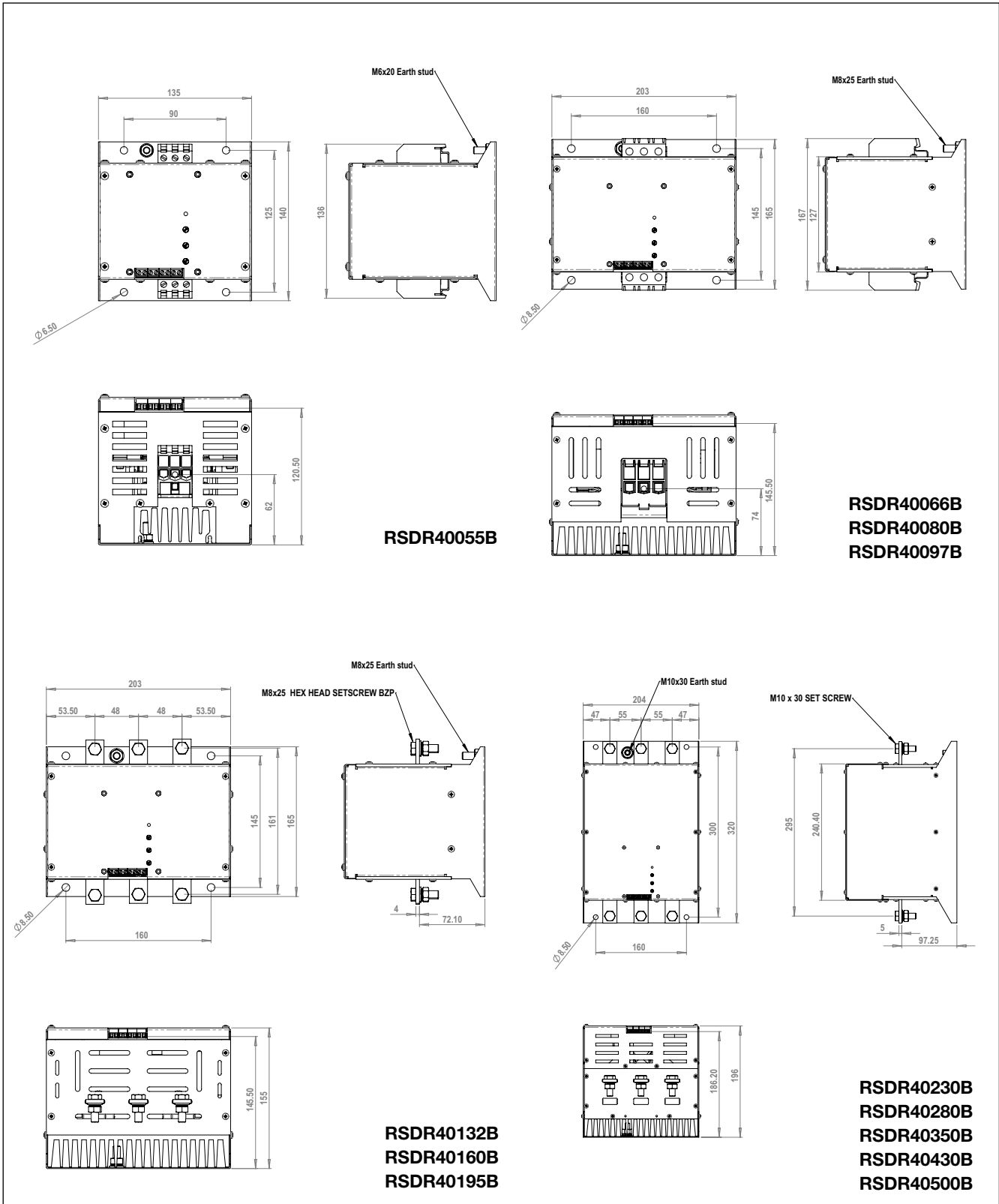
Conductor Data

	RSDR40055B	RSDR40066B RSDR40080B RSDR40097B	RSDR40132B RSDR40160B RSDR40195B	RSDR40230B RSDR40280B	RSDR40350B RSDR40430B RSDR40500B
Line conductors: 1L1, 3L2, 5L3, PE /2T1, 4T2, 6T3 according to IEC60947	6...16mm ²	16...35mm ²	50...95mm ² *	2x 95mm ² *	2x150mm ² *
UL/CSA rated data	AWG 10...4	AWG 6...1	AWG 2/0...4/0	AWG 2x 2/0	AWG 2x4/0
Terminal screws	0.8 x 4 mm	1.2 x 6.5 mm	7xM8	7xM10	7xM10
Tightening torque	1.2Nm	2.5Nm	12Nm	14Nm	14Nm
Stripping length	13mm	17mm	-	-	-

* with end sleeve

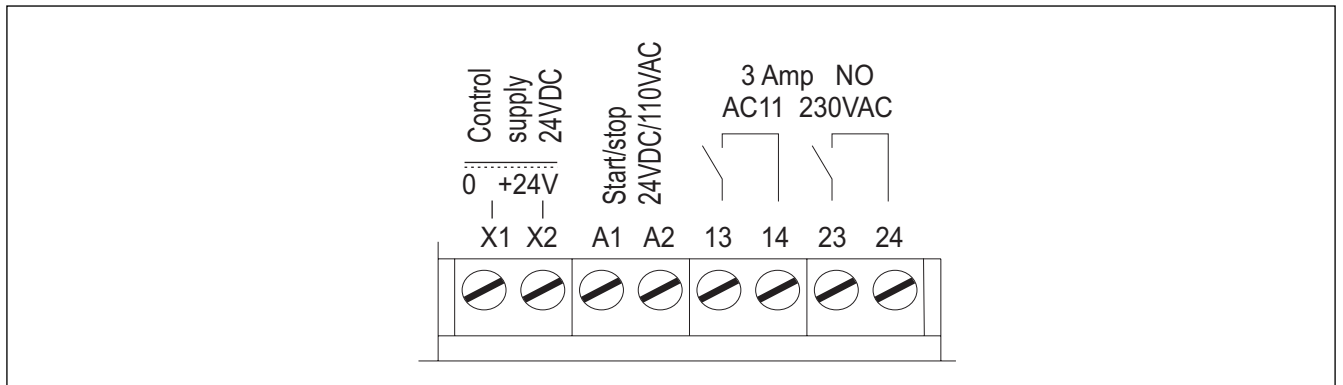
	RSDR40....
Secondary conductors: X1, X2, 13, 14 A1, A2, 23, 24 according to IEC60947	1 x 0.75 ... 2.5mm ² 2 x 0.75 ... 1.0mm ²
UL/CSA rated data	AWG 18...12
Terminal screws	0.5 x 3.5 mm
Tightening torque	0.8Nm
Stripping length	1x 6mm 2x 11mm

Dimensions



All dimensions in mm

Connection Diagram



Short circuit Protection

Type of coordination: 1
 Rated short circuit current
 Semiconductor fuse

RSDR40055B RSDR40066B	RSDR40080B RSDR40097B	RSDR40132B
10kA when protected by semiconductor fuses Ferraz Shawmut 6,9 URD 00 D08L 125	10kA when protected by semiconductor fuses Ferraz Shawmut 6,9 URD 31 D08L 200	10kA when protected by semiconductor fuses Ferraz Shawmut 6,9 URD 31 D08L 250

Type of coordination: 1
 Rated short circuit current
 Semiconductor fuse

RSDR40160B RSDR40195B	RSDR40230B RSDR40280B	RSDR40350B* RSDR40430B RSDR40500B
10kA when protected by semiconductor fuses Ferraz Shawmut 6,9 URD 31 D08L 400	10kA when protected by semiconductor fuses Ferraz Shawmut 6,9 URD 32 D08A 0630	10kA when protected by semiconductor fuses Ferraz Shawmut 6,9 URD 33 D08A 1100

* Rated S/C Current: 18kA

Alarms

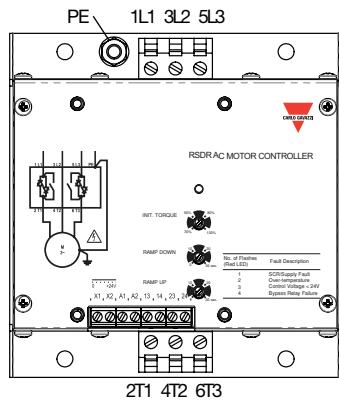
No. of Flashes Red LED	Green LED	Fault Description
1	ON	SCR/Supply Fault
2	ON	Over-temperature
3	ON	Control voltage <24V
4	ON	Bypass Relay Failure
5*	ON	Shearpin (Load current > 4.5x Ie)
6*	ON	Overload - refer to chart above
Rapid flashes*	ON	Overcurrent
Red LED not Flashing	OFF	Fault
Orange LED Flashing	Flashing	Tripped and Reset, Ready for next start

* Only available on RSDR models RSDR40230B to RSDR40500B

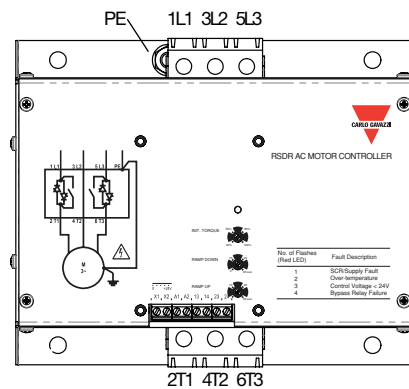
Standards

Approvals	UL (pending)	Radiated Radio Frequency Immunity	IEC/EN 61000-4-3 10V/m, 80 - 1000 Mhz
CE Marking	LVD EMC Immunity EMC Emission	IEC/EN 60947-4-2 IEC/EN 61000-6-4 IEC/EN 61000-6-2	Conducted Radio Frequency Immunity
Electrostatic Discharge (ESD) Immunity	IEC/EN 61000-4-2 8kV, Air discharge 4kV, Contact	Radio Interference field emission (radiated)	IEC/EN 61000-4-6 140dbµV, 0.15 - 80 MHz
Electrical Fast Transient Burst Immunity	IEC/EN 61000-4-4 Output, 2kV Input, 1kV	Radio Interference voltage emission (conducted)	IEC/EN 55011, Class A
Electrical Surge Immunity	Output, line to line Output, line to earth Input, line to line Input, line to earth		

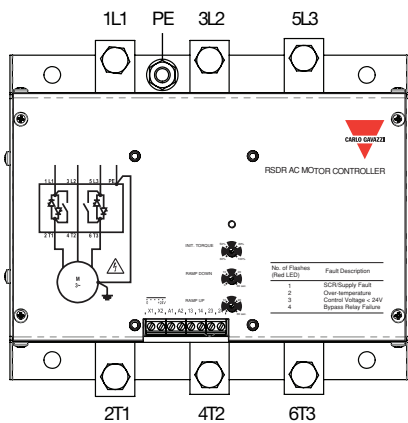
Terminal Diagram



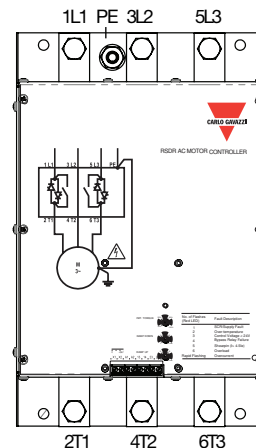
RSDR40055B



RSDR40066B / RSDR40080B / RSDR40097B



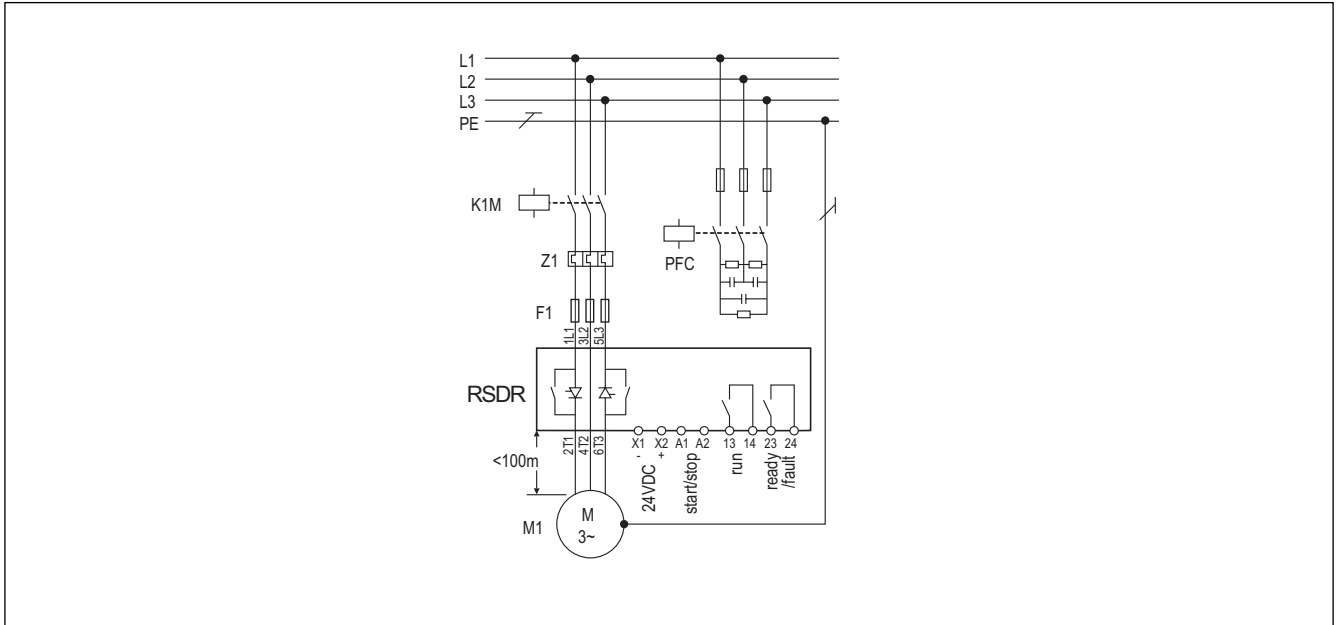
RSDR40132B / RSDR40160B / RSDR40195B



**RSDR40230B / RSDR40280B / RSDR40350B
RSDR40430B / RSDR40500B**

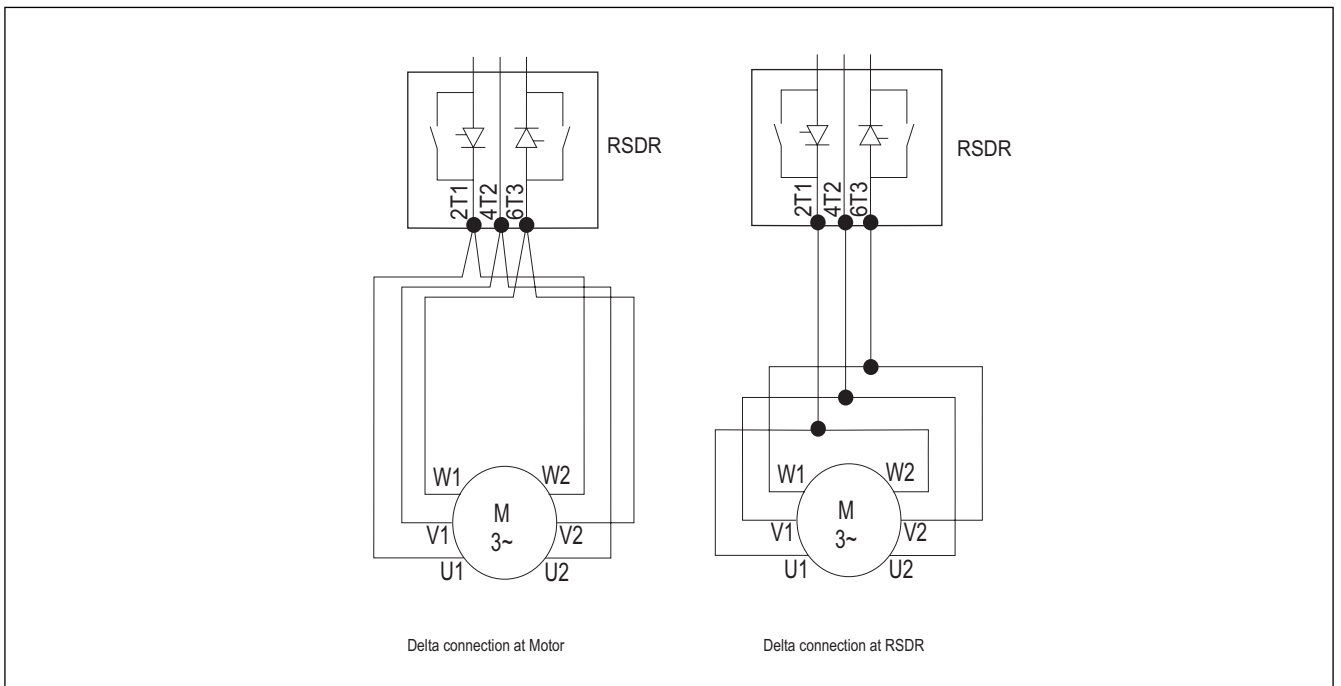
Wiring Diagrams

Soft starter connection using mains contactor



- K1M - Mains contactor
- Z1 - Overload relay
- F1 - Semiconductor fuse for type 1 coordination
- M1 - Load (3-phase motor)

Delta Connection of RSDR



RSDR series offers the possibility of connecting the softstarter in the delta as shown above. Delta connection can be made either at the motor side or at the soft starter (RSDR) side. Where several conductors are to be connected, the difference between the wires/cables used must not exceed one DIN Standard size level.



Application Guide (for Determination of appropriate Trip Class)

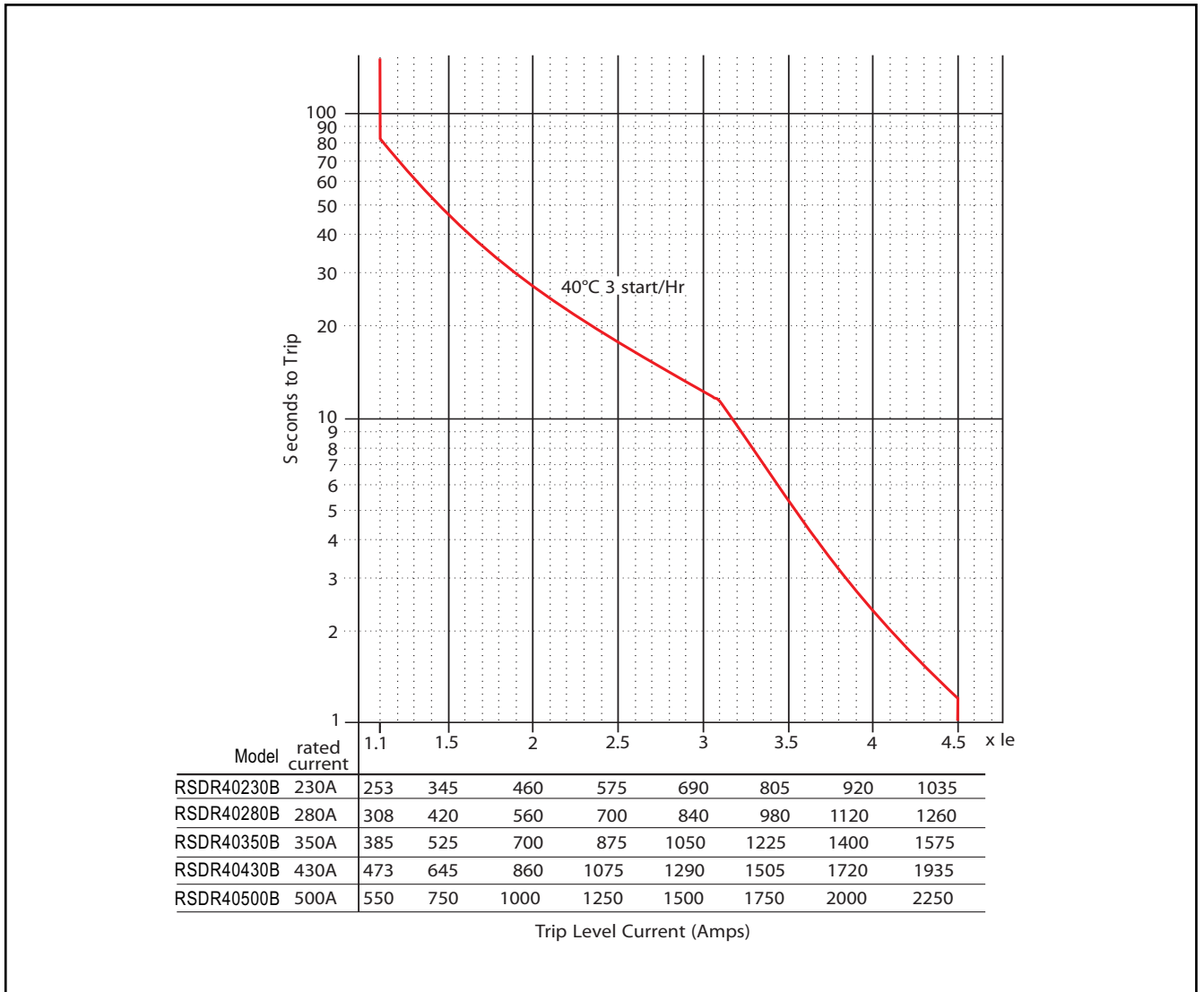
Application	Trip class	Start time (sec.)	Notes
Standard start	5	5	Star/Delta applications with < 5sec Star time. Motor starting off load.
Unloaded conveyer	5	5	Starting of unloaded conveyer
Unloaded compressor	5	5	Dedicated circuits ensure motor starts unloaded
Unloaded mixer	5	5	Mixer starting with no material in basin
Centrifugal pump	10	10	Generally easy to start when pumping water
Positive displacement pump	10	12	Can be difficult to start
Loaded compressor	10	12	Certain compressor systems can be hard to start
High inertia fan	10	23	Starting of fans > 45kW
Heavy start	10B	12	Suitable for star/Delta applications with, 12sec Star time
High torque	20	12	Application requires more starting torque than Star/ Delta
Heavy mixer	20	12	Starting of load mixer

Application Guide (based on Application Trip Class)

Ie (Amp) @ 400V	In Line kW @ 400V	Trip Class 5 3-5: 355 10 starts/hr	Trip Class 10B 3.5-12: 708 5 starts/hr	Trip Class 10 3-23: 697 5 starts/hr	Trip Class 20 4-19: 701 5 starts/hr	Trip Class 30 4-29: 691 5 starts/hr
55A	30kW	RSDR40055B	RSDR40066B	RSDR40066B	RSDR40097B	RSDR40132B
66A	37kW	RSDR40066B	RSDR40080B	RSDR40080B	RSDR40132B	RSDR40132B
80A	45kW	RSDR40080B	RSDR40132B	RSDR40132B	RSDR40132B	RSDR40160B
97A	55kW	RSDR40097B	RSDR40132B	RSDR40132B	RSDR40160B	RSDR40195B
132A	75kW	RSDR40132B	RSDR40195B	RSDR40195B	RSDR40230B	RSDR40280B
160A	90kW	RSDR40160B	RSDR40230B	RSDR40230B	RSDR40230B	RSDR40280B
195A	110kW	RSDR40195B	RSDR40230B	RSDR40230B	RSDR40280B	RSDR40430B
230A	132kW	RSDR40230B	RSDR40280B	RSDR40350B	RSDR40430B	RSDR40500B
280A	160kW	RSDR40280B	RSDR40350B	RSDR40430B	RSDR40500B	Note(1)
350A	200kW	RSDR40350B	RSDR40500B	RSDR40500B	Note(1)	Note(1)
430A	250kW	RSDR40430B	Note(1)	Note(1)	Note(1)	Note(1)
500A	280kW	RSDR40500B	Note(1)	Note(1)	Note(1)	Note(1)

(1) Contact Carlo Gavazzi representative

Application Guide (cont.)



The above trip curves can be used as a guidance to identify the required unit for the application duty. Subsequent restarts, following an overload trip, can be restricted due to a cooling time. The severity of the overload determines the cooling time which has a maximum value of 10 minutes.

Accessories - External Power Supply 24VDC

For RSDR40055B to RSDR40195B, an external control supply with 24VDC, 5W output needs to be provided to terminals X1-X2. The following power supplies can be used:-

SPD24101



Input Voltage	90-265VAC 120-370VDC
Output Power	10W
Terminal Type	Screw terminal

SPD24101B



Input Voltage	90-265VAC 120-370VDC
Output Power	10W
Terminal Type	Spring terminal

For RSDR40230B to RSDR40500B, a power supply capable of supplying 4Amps for 250ms is required across terminals X1-X2. The following power supply can be used:-

SPD241001



Input Voltage	90-264VAC 120-375VDC
Output Power	100W
Terminal Type	Screw terminal