

# RSDR

## Технические характеристики

### По вопросам продаж и поддержки обращайтесь:

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# 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
- UL approved up to RSDR40280B

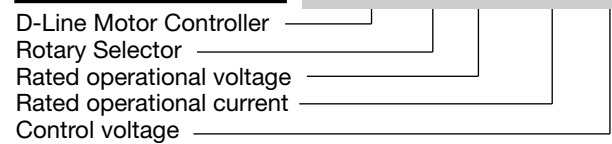
### Product Description

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 <sup>1</sup>	
		132: 132 AACrms	430: 430AACrms <sup>1</sup>	
		160: 160 AACrms	500: 500AACrms <sup>1</sup>	

\* 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	<b>55A AC-53b</b>	<b>66A AC-53b</b>	<b>80A AC-53b</b>
		RSDR40055B	RSDR40066B	RSDR40080B
		<b>97A AC-53b</b>	<b>132A AC-53b</b>	<b>160A AC-53b</b>
		RSDR40097B	RSDR40132B	RSDR40160B
		<b>195A AC-53b</b>	<b>230A AC-53b</b>	<b>280A AC-53b</b>
RSDR40195B	RSDR40230B	RSDR40280B		
<b>350A AC-53b</b>	<b>430A AC53-b</b>	<b>500A AC-53b</b>		
RSDR40350B <sup>1</sup>	RSDR40430B <sup>1</sup>	RSDR40500B <sup>1</sup>		

<sup>1</sup> Not UL approved

## 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 (For use in Pollution degree 2 environment)

## 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
Rated impulse withstand voltage (Uimp)	4kV

## 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. per starter) RSDR40055B up to RSDR40195B 24VDC (12VA approx per starter)* RSDR40230B up to RSDR40500B
Residual ripple	100 mV
Spikes/ switching peaks	240 mV
Turn On/ Off response	No overshoot of V out
Oversvoltage protection	Output voltage must be clamped to < 30V

\* 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

<b>RSDR40055B</b> 30kW 40HP	<b>RSDR40066B</b> 37kW 50HP	<b>RSDR40080B</b> 45kW 60HP
<b>RSDR40097B</b> 55kW 75HP	<b>RSDR40132B</b> 75kW 100HP	<b>RSDR40160B</b> 90kW 125HP
<b>RSDR40195B</b> 110kW 150HP	<b>RSDR40230B</b> 132kW 150HP	<b>RSDR40280B</b> 160kW 200HP
<b>RSDR40350B<sup>1</sup></b> 200kW 250HP	<b>RSDR40430B<sup>1</sup></b> 250kW 350HP	<b>RSDR40500B<sup>1</sup></b> 280kW 400HP

## Conductor Data

	<b>RSDR40055B</b>	<b>RSDR40066B</b> <b>RSDR40080B</b> <b>RSDR40097B</b>	<b>RSDR40132B</b> <b>RSDR40160B</b> <b>RSDR40195B</b>	<b>RSDR40230B</b> <b>RSDR40280B</b>	<b>RSDR40350B<sup>1</sup></b> <b>RSDR40430B<sup>1</sup></b> <b>RSDR40500B<sup>1</sup></b>
<b>Line conductors:</b> 1L1, 3L2, 5L3, PE /2T1, 4T2, 6T3 according to IEC60947	6...16mm <sup>2</sup>	16...35mm <sup>2</sup>	50...95mm <sup>2*</sup>	2x 95mm <sup>2**</sup>	2x150mm <sup>2</sup>
UL rated data	AWG 8...4	AWG 6...1	AWG 1/0...250 Kcmil	AWG 2x 2/0	AWG 2x 350 Kcmil
Terminal screws	0.8 x 4 mm	1.2 x 6.5 mm	7xM8	7xM10	7xM10
Tightening torque	2Nm (18 lb.in)	2.5Nm (27 lb.in)	12Nm	14Nm (123.9 lb.in)	14Nm (123.9 lb.in)
Stripping length	13mm	17mm	-	-	-

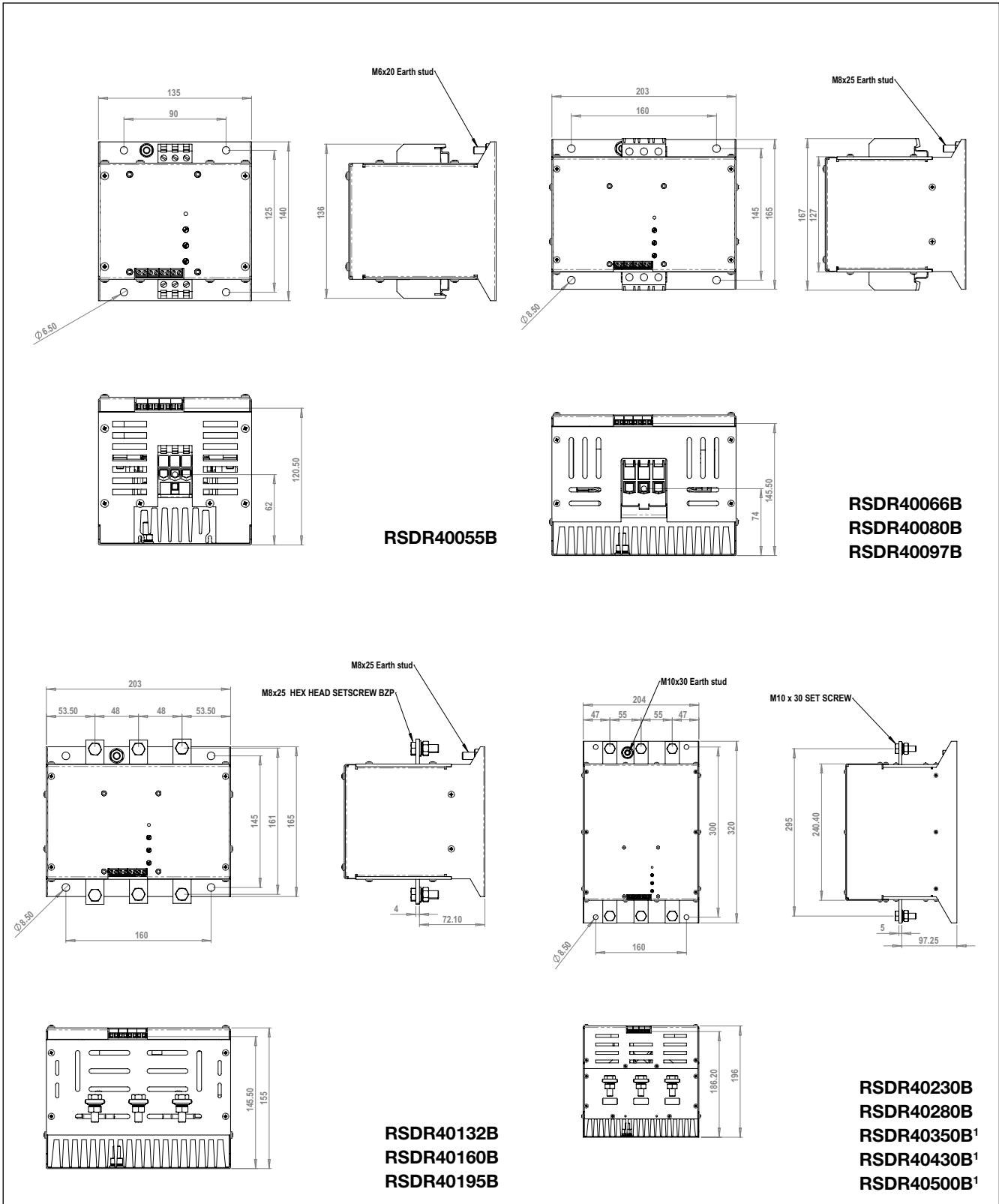
\* Kit installation with insulation KIT part number MIS854\_CG is required for UL compliance.

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

<sup>1</sup> Not UL approved

# Dimensions



<sup>1</sup> Not UL approved

All dimensions in mm

## Short circuit protection

Model Name 400/ 460V Range	Class 5 (Standard Rating) 3 X FLC for 5 seconds 10 starts per Hr		Class 10B 3.5 x FLC for 12 seconds 10 starts per Hr		Siba semiconductor fuse for type 1 coordination Short Circuit Protection
	Ie (Arms)	Motor kW @ 400V	Ie (Arms)	Motor kW @ 400V	
RSDR40055B	55A	30kW	41A	22kW	2018920.125A
RSDR40066B	66A	37kW	55A	30kW	
RSDR40080B	80A	45kW	66A	37kW	2061032.200A
RSDR40097B	97A	55kW	66A	37kW	
RSDR40132B	132A	75kW	97A	55kW	2061032.250A
RSDR40160B	160A	90kW	116A	60kW	2061032.400A
RSDR40195B	195A	110kW	160A	90kW	
Model Name 400/ 460V Range	Class 10A @40°C 3 X FLC for 12 seconds 3 starts per Hr		Siba semiconductor Fuse for Type 1 Coordination Short Circuit Protection		Rated Short Circuit current (Iq)
	Ie (Arms)	Motor kW @ 400V			
RSDR40230B	230A	132kW	2062032.630		18kA
RSDR40280B	280A	160kW			18kA
RSDR40350B	350A	200kW	2063032.1000		18kA
RSDR40430B	430A	250kW			18kA
RSDR40500B	500A	280kW			18kA

## UL ratings and protection requirements

### Maximum surrounding air temperatures

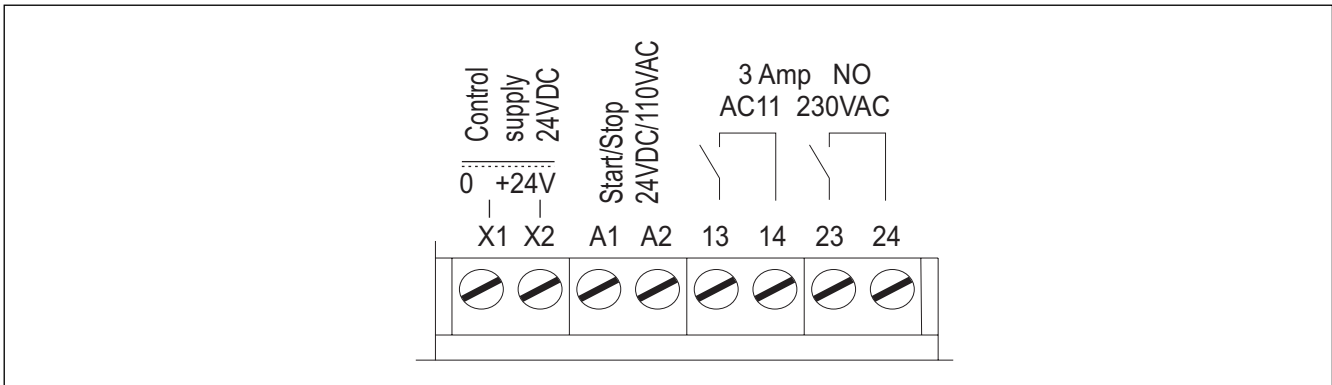
Model 480v rated	Maximum 40°C		Maximum 50°C	
	Input Current	Power	Input Current	Power
RSDR40055B	55 A	40hp	45 A	30hp
RSDR40066B	66 A	50hp	60 A	40hp
RSDR40080B	80 A	60hp	72 A	50hp
RSDR40097B	97 A	75hp	78 A	60hp
RSDR40132B	132 A	100hp	119 A	75hp
RSDR40160B	160 A	125hp	144 A	100hp
RSDR40195B	195 A	150hp	176 A	125hp
RSDR40230B	241 A	200hp	193 A	150hp
RSDR40280B	280 A	200hp	224 A	150hp

### Short Circuit Protection

Suitable for use on a circuit capable of delivering not more than the rms symmetrical amperes indicated below, 480 volts maximum, when protected by fuses or inverse-time circuit breakers, rated maximum amperes as indicated below:

Model	Short circuit rating	RK5 time delay fuse rated 600VAC	Circuit breaker rated 600VAC
RSDR40055B	5 kA	80 A	-
RSDR40066B	10 kA	125 A	-
RSDR40080B	10 kA	175 A	-
RSDR40097B	10 kA	200 A	-
RSDR40132B	10 kA	250 A	350 A
RSDR40160B	10 kA	350 A	450 A
RSDR40195B	10 kA	400 A	500 A
RSDR40230B	18 kA	450 A	-
RSDR40280B	18 kA	450 A	-

## Connection Diagram



## 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 I <sub>e</sub> )
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

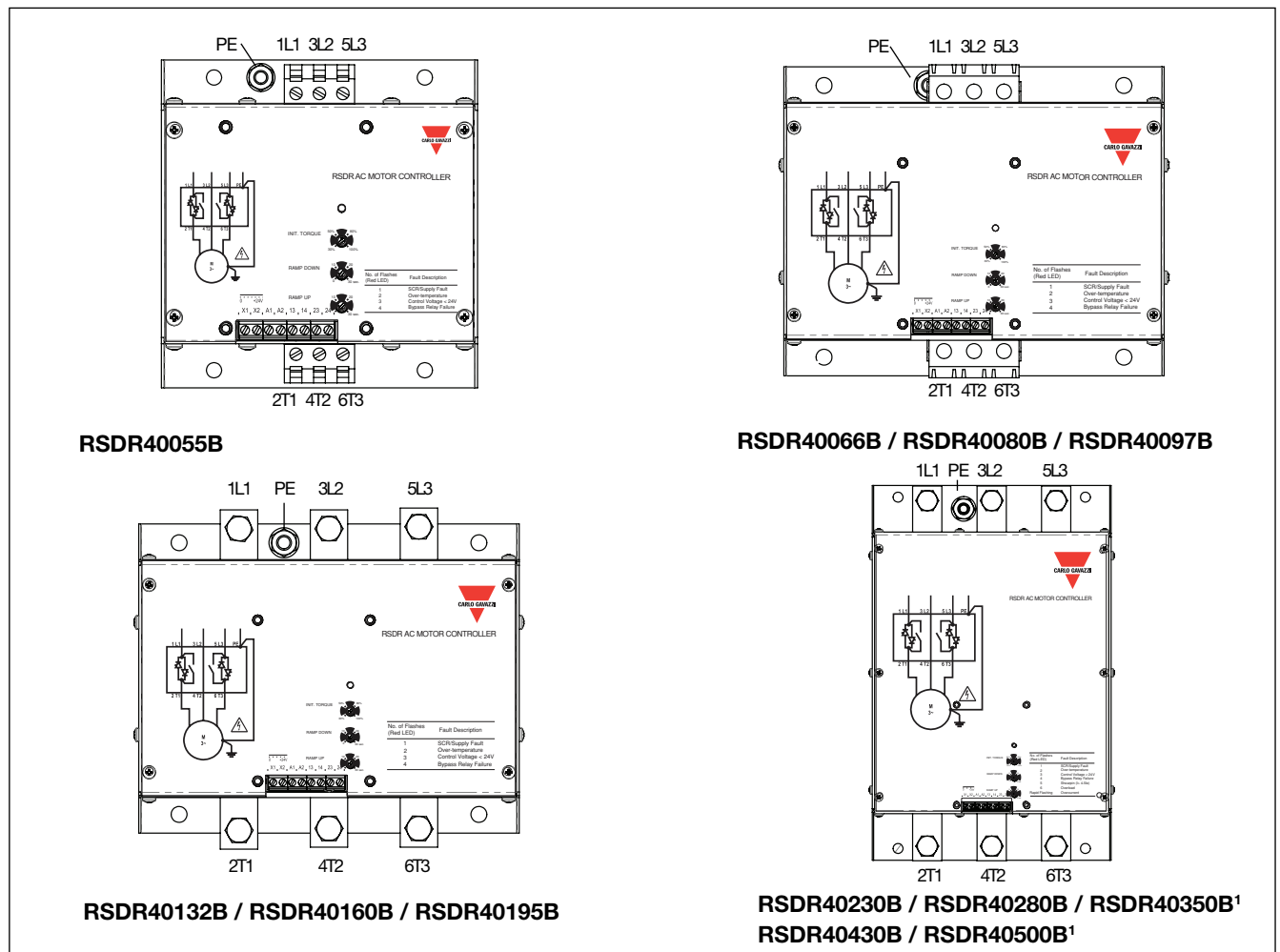
\* Only available on RSDR models RSDR40230B to RSDR40500B

## Standards

<b>Approvals</b>	UL*, UL508 Industrial Control Equipment	<b>Radiated Radio Frequency Immunity</b>	IEC/EN 61000-4-3 10V/m, 80 - 1000 Mhz
<b>CE Marking</b> EMC/LVD	IEC/EN 60947-4-2	<b>Conducted Radio Frequency Immunity</b>	IEC/EN 61000-4-6 140dbµV, 0.15 - 80 MHz
<b>Electrostatic Discharge (ESD) Immunity</b>	IEC/EN 61000-4-2 8kV, Air discharge 4kV, Contact	<b>Radio Interference field emission (radiated)</b>	IEC/EN 55011, Class A
<b>Electrical Fast Transient Burst Immunity</b>	IEC/EN 61000-4-4 Output, 2kV Input, 1kV	<b>Radio Interference voltage emission (conducted)</b>	IEC/EN 55011, Class A
<b>Electrical Surge Immunity</b> Input, line to line Input, line to earth	1kV 2kV		

\* Applicable to RSDR40055B up to RSDR40280B units

## Terminal Diagram

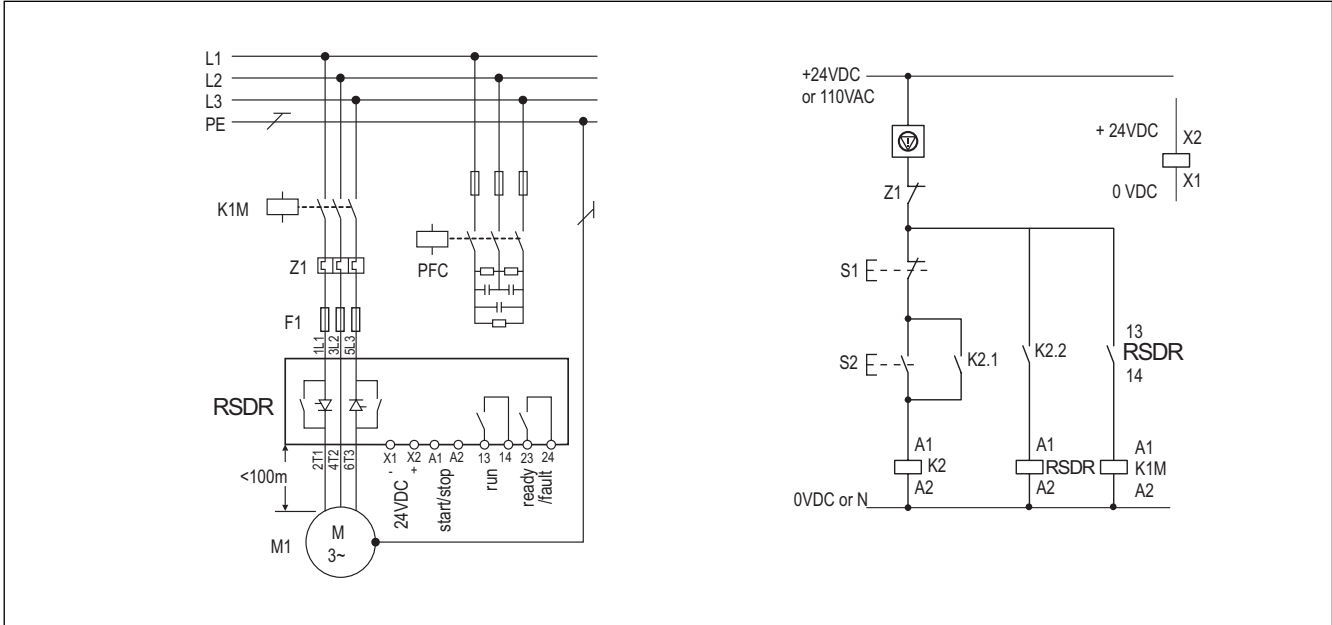


1. Not UL approved



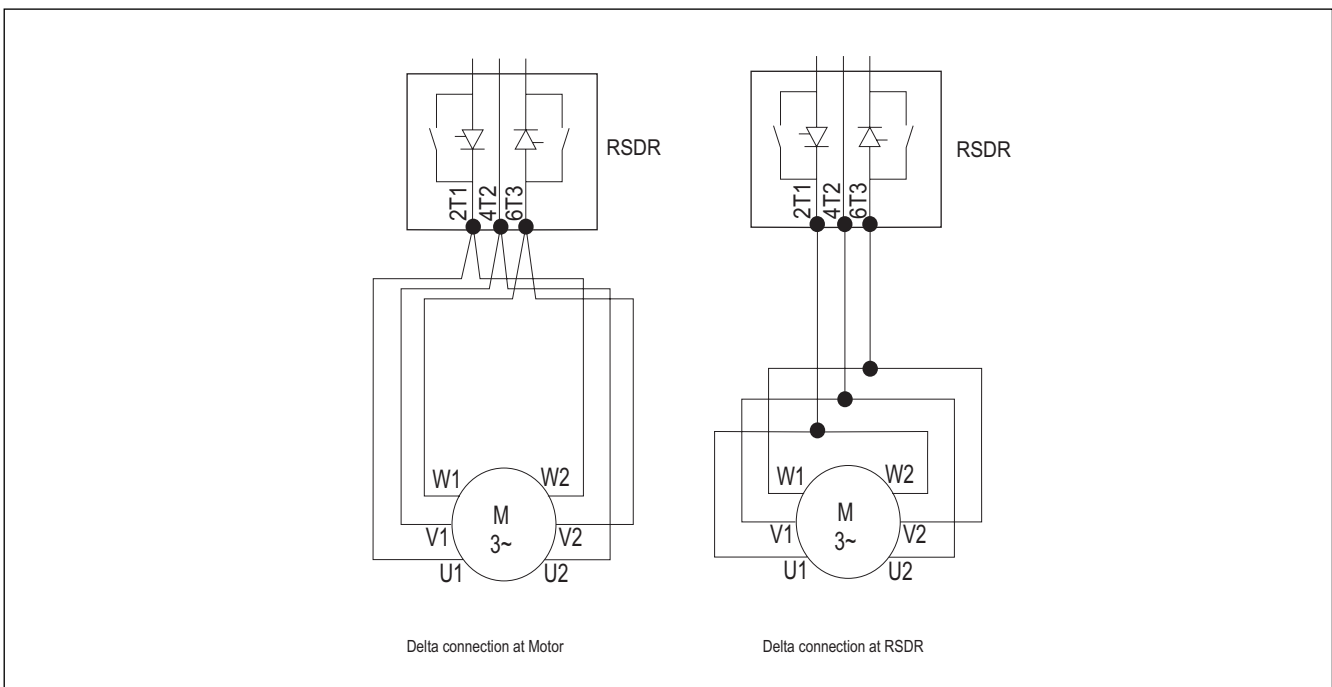
## Wiring Diagrams

### 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 conveyor	5	5	Starting of unloaded conveyor
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)

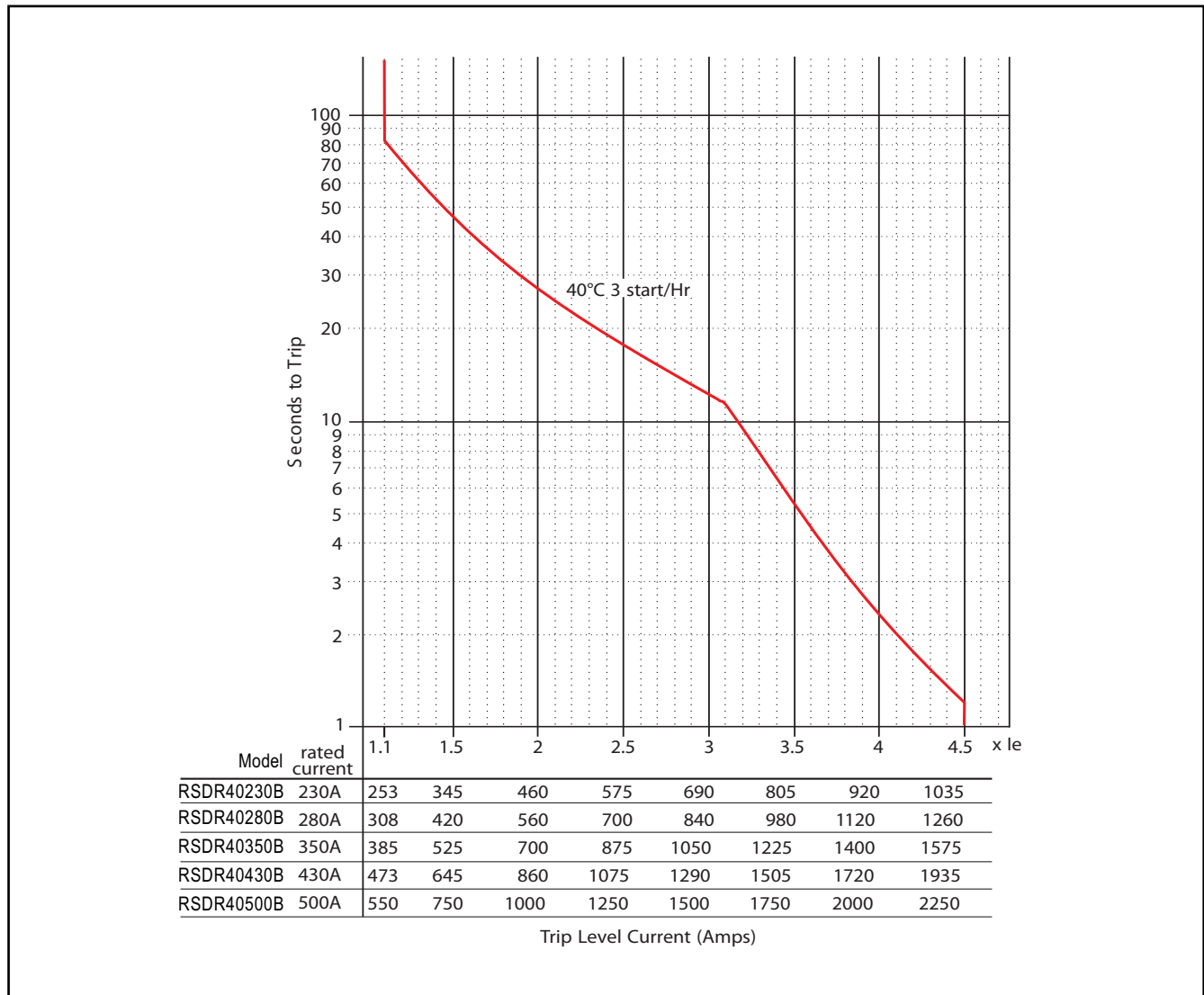
le (Amp) @ 400V	In Line kW @ 400V	Trip Class 5 3-5: 355 10 starts/hr	Trip Class 10B 3.5-12: 708 5 starts/hr	Trip Class 10 3-23: 697 5 starts/hr	Trip Class 20 4-19: 701 5 starts/hr	Trip Class 30 4-29: 691 5 starts/hr
55A	30kW	RSDR40055B	RSDR40066B	RSDR40066B	RSDR40097B	RSDR40132B
66A	37kW	RSDR40066B	RSDR40080B	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 * <sup>1</sup>
230A	132kW	RSDR40230B	RSDR40280B *	RSDR40350B * <sup>1</sup>	RSDR40430B * <sup>1</sup>	RSDR40500B * <sup>1</sup>
280A	160kW	RSDR40280B	RSDR40350B * <sup>1</sup>	RSDR40430B * <sup>1</sup>	RSDR40500B * <sup>1</sup>	Note
350A	200kW	RSDR40350B <sup>1</sup>	RSDR40500B * <sup>1</sup>	RSDR40500B * <sup>1</sup>	Note	Note
430A	250kW	RSDR40430B <sup>1</sup>	Note	Note	Note	Note
500A	280kW	RSDR40500B <sup>1</sup>	Note	Note	Note	Note

Note: Contact Carlo Gavazzi representative

\*. Trip class rating of 3 starts/hr

1. Not UL approved

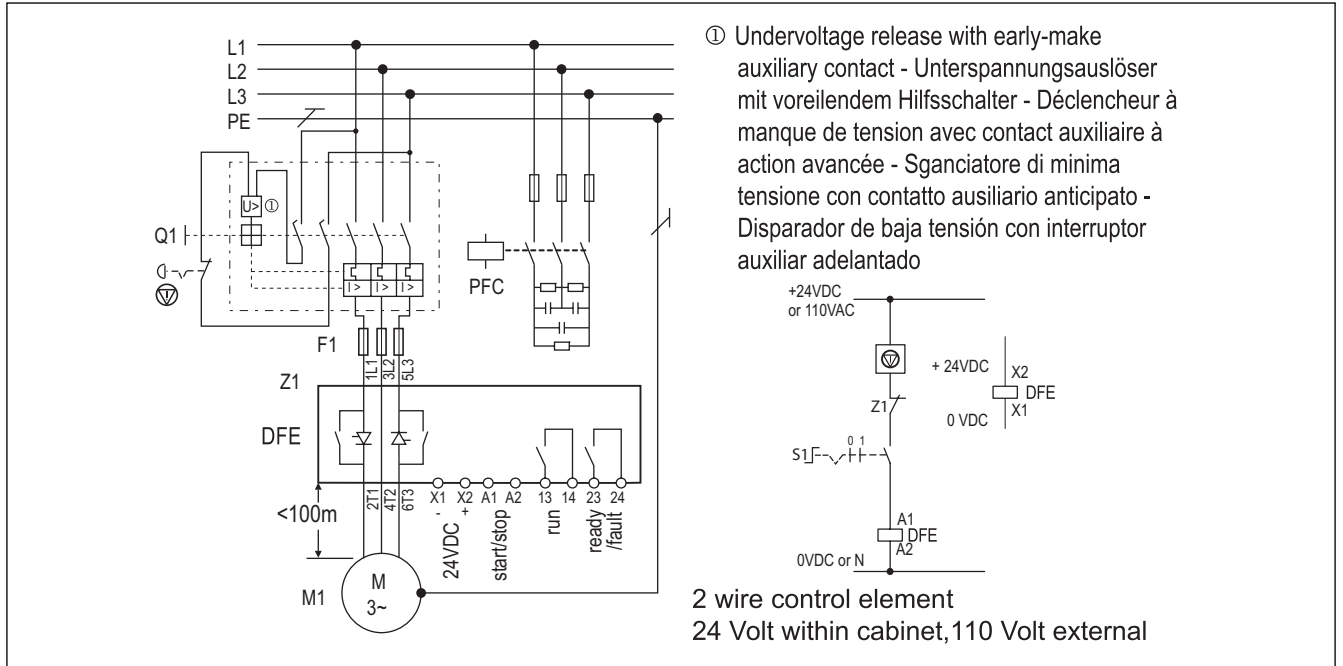
## Application Guide (cont.)



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.

## Wiring Diagrams (cont.)

### Soft starter connection using semiconductor contactor



Q1 - Cable protection

Z1 - Overload relay

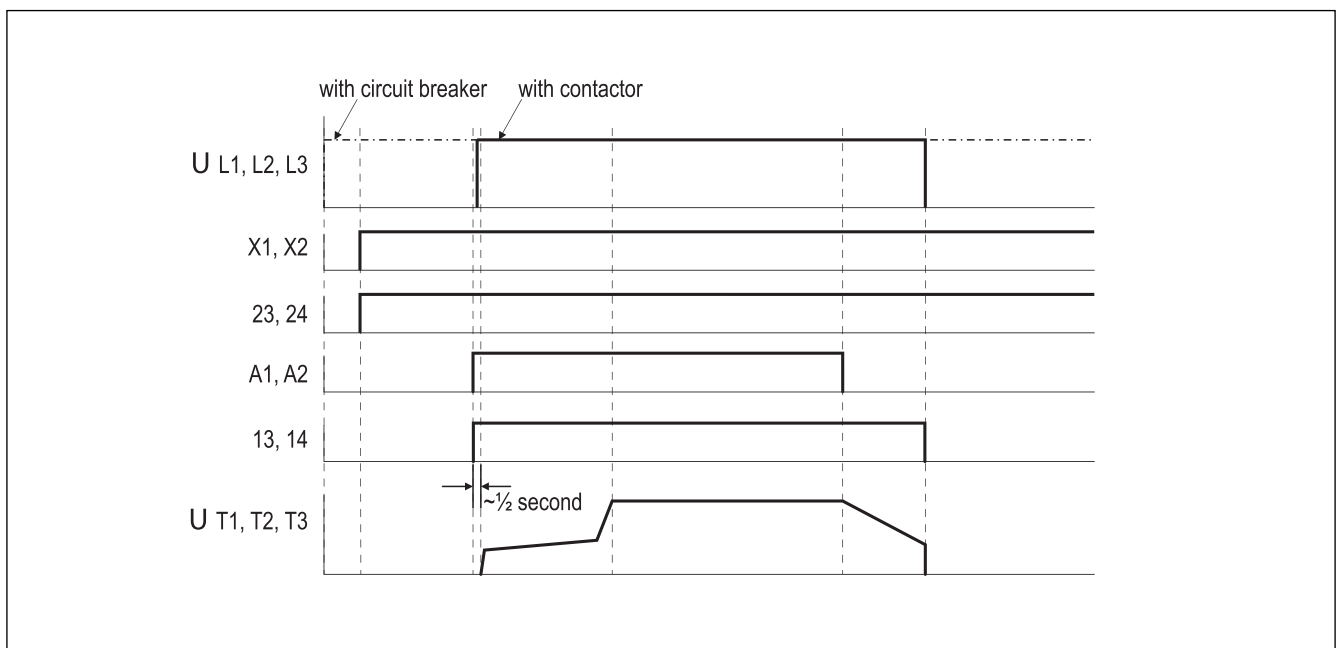
F1 - Semiconductor fuse for type 2 coordination, in addition to Q1

RSDR - Soft starter

Emergency Stop

Undervoltage release with early-make auxiliary contact

## Timing Diagram



## 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

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