ELECTRICAL INSTALLATION



TABLE OF CONTENTS

WARNINGS

Isolation



CAUTION: THE SR35 SOFT STARTER USES SEMICONDUCTOR DEVICES IN THE MAIN CIRCUIT AND IS NOT DESIGNED TO PROVIDE ISOLATION. FOR THIS REASON ISOLATION MEANS MUST BE INSTALLED IN THE SUPPLY CIRCUIT IN ACCORDANCE WITH THE APPROPRIATE WIRING AND SAFETY REGULATIONS.

Electrical Control Supply Requirements



WARNING: ALL ELECTRICAL CONNECTIONS ARE MADE TO POWER INPUT AND OUTPUT TERMINALS, CONTROL TERMINALS AND AN EARTH STUD.

Fuse Protection



WARNING: THE MAINS SUPPLY AND THE CONTROL SUPPLY EACH REQUIRE PROTECTION. ALTHOUGH ALL UNITS HAVE ELECTRONIC OVERLOAD PROTECTION FOR THE SOFT STARTER, THE INSTALLER SHOULD ALWAYS FIT FUSES, FOR MOTOR PROTECTION, BETWEEN THE UNIT AND THE MAINS SUPPLY, NOT BETWEEN THE UNIT AND THE MOTOR. SEMICONDUCTOR FUSES CAN BE SUPPLIED AS AN OPTION FOR SHORT-CIRCUIT PROTECTION OF THE SEMICONDUCTORS. THESE FUSES MUST BE INSTALLED EXTERNALLY TO THE SR35 SOFT STARTER CHASSIS TO COMPLY WITH CERTAIN STANDARDS. IT IS THE RESPONSIBILITY OF THE INSTALLER AND SYSTEM DESIGNER/SPECIFIER TO ENSURE THAT THE REQUIRED STANDARDS OR REGULATIONS ARE NOT AFFECTED BY SO DOING.

Safety



WARNING: SR35 SOFT STARTERS CONTAIN HAZARDOUS VOLTAGES WHEN CONNECTED TO THE ELECTRICAL POWER SUPPLY. ONLY QUALIFIED PERSONNEL WHO ARE TRAINED AND AUTHORIZED SHOULD CARRY OUT INSTALLATION, OPERATION AND MAINTENANCE OF THIS EQUIPMENT. REFER TO AND CAREFULLY FOLLOW ALL OF THE 'WARNINGS' SECTION AT THE BEGINNING OF THIS USER MANUAL, AS WELL AS OTHER WARNINGS AND NOTES THROUGHOUT THE MANUAL.

Electrical Supplies

The unit requires a 3-phase balanced Mains Supply to provide the power for the controlled motor, and a 24VDC for the internal control circuitry. The unit will not operate unless the control supply voltage is within the specified limits.

GENERAL SPECIFICATIONS

		General Specific	ation					
Product standard		En 60947-4-2: 2012						
Rated operational voltages	Ue	110 – 240 VAC, 1PH; 200 – 60	0 VAC, 3PH					
Rated operational current	Ie	See Rating Tables on page 2-	5 and page 2–6					
Rating index		See Rating Tables on page 2-	See Rating Tables on page 2–5 and page 2–6					
Rated frequencies		50 – 60 Hz ± 5hz						
Rated duty		Uninterrupted						
Form designation		Form 1, internally bypassed						
Method of operation		Symmetrically controlled start	er					
Method of control		Semi-automatic						
Method of connecting		Thyristors connected between motor windings and supply						
Number of poles		3 Main poles, 2 main poles controlled by semiconductor switching element						
· ·		Main circuit	See key to part numbers					
Rated insulation voltage	Ui	Control supply circuit	230VAC r.m.s with optional SR35-PSU power supply module					
Rated impulse withstand		Main circuit	6 kV					
voltage	U _{imp}	Control supply circuit	4 kV with optional SR35-PSU power supply module					
		Main circuit	IP00 (IP20 with finger guards ⁴)					
IP code		Supply and control circuit	IP20					
Overvoltage category / poll degree	ution	III/3						
Rated conditional short-circ		Type 1 coordination						
current and type of coordination with associated short circuit protective device (SCPD)		See Short Circuit Protection tables on page 2–7 for rated conditional short-circuit current and required current rating and characteristics of the associated SCPD						
 Must be supplied by cl. Compliant with Annex Not applicable for UL 		d voltage current or protected L 947-1:2007 at 24VDC	by a 4A UL 248 listed fuse.					

4. For models SR35-017 – SR35-192 the main circuit IP20 rating only applies when the finger guards as supplied are installed

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508 and CSA14-13, general use applications

		General Specificat	ion			
		Supply input	0, 24V			
	Control	Kind of current, rated frequency	DC			
	supply 1	Rated voltage U _s	24VDC			
As standard		Maximum power consumption	12Va (sr35-017 – sr35-065) 48va (sr35-077 – sr35-361)			
AS Standard		Programmable opto-isolated inputs	D1, d2			
	Control	Common input, marking	СОМ			
	circuit ¹	Kind of current, rated frequency	DC			
		Rated voltage U _c	24VDC			
		Supply input	L, n			
	Control	Kind of current, rated frequency	Ac, 50 – 60 Hz ± 5hz	Protect with 4a UL		
	supply	Rated voltage us	110 – 230 VAC	listed fuse		
		Rated input current	1A			
With SR35-PSU module		Programmable opto-isolated inputs	D1, d2			
	Control	Common input	СОМ			
	circuit	Kind of current, rated frequency	Ac, 50 - 60 Hz ± 5hz			
		Rated voltage U _C	110V – 230 VAC			
	Form a – s (normally o	ingle gap make -contact open)	13, 14			
Auxiliary Circuit ²	Form b – s closed)	ingle gap break-contact (normally	21, 22			
Circuit	Utilization	category, voltage rating, current	Resistive load, 250vac, 2a.			
	rating	gy,g,	Cosø =0.5, 250VAC, 2a ³			
	Trip class		10 (Factory default), 20 or 30 (s	electable)		
Electronic overload relay	Current se	tting	See electronic overload relay c	urrent settings		
with manual reset and	Rated freq	uency	50 – 60 Hz ± 5hz			
thermal memory	Time-curre	ent characteristics	See Motor Overload Protection on page 2–9 For trip curves (trip time $T_p \pm 20\%$)			

Must be supplied by class 2, limited voltage current or protected by a 4A UL 248 listed fuse.
 Compliant with Annex S of IEC 60947-1:2007 at 24VDC
 Not applicable for UL

4. For models SR35-017 – SR35-192 the main circuit IP20 rating only applies when the finger guards as supplied are installed

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508 and CSA14-13, general use applications

RATING TABLES

	Rating Table – Vertically Mounted												
le		kW 1		FLA			Нр ²			Trip Class 10	Trip Class 20	Trip Class 30	
A 3)	230V	400V	500V ⁴	A 3	200V	208V	220- 240V	440- 480V	550- 600V 4	I _e : AC-53a: 3.5-17: F-S ⁵	l _e : AC-53a: 4-19: F-S ⁵	I _e : AC-53a: 4-29: F-S ⁵	
17	4	7.5	7.5	17	3	5	5	10	15	SR35-017	SR35-022	SR35-027	
22	5.5	11	11	22	5	5	7.5	15	20	SR35-022	SR35-027	SR35-034	
29	7.5	15	15	27	7.5	7.5	7.5	20	25	SR35-027	SR35-034	SR35-041	
35	7.5	18.5	22	34	10	10	10	25	30	SR35-034	SR35-041	SR35-052	
41	11	22	22	41	10	10	10	30	40	SR35-041	SR35-052	SR35-065	
55	15	30	37	52	15	15	15	40	50	SR35-052	SR35-065	SR35-077	
66	18.5	37	45	65	20	20	20	50	60	SR35-065	SR35-077	SR35-100	
80	22	45	55	77	20	25	25	60	75	SR35-077	SR35-100	SR35-125	
106	30	55	75	100	30	30	30	75	100	SR35-100	SR35-125	SR35-156	
132	37	75	90	125	40	40	40	100	125	SR35-125	SR35-156	SR35-192	
160	45	90	110	156	50	50	60	125	150	SR35-156	SR35-192	SR35-242	
195	55	110	132	192	60	60	60	150	200	SR35-192	SR35-242	SR35-302	
242	75	132	160	242	75	75	75	200	250	SR35-242	SR35-302	SR35-361	
302	90	160	200	302	100	100	100	250	300	SR35-302	SR35-361	-	
361	110	200	250	361	125	125	150	300	350	SR35-361	-	-	

1. Rated operational powers in kW as per IEC 60072-1 (primary series) corresponding to IEC current rating.

2. Rated operational powers in hp as per UL508 corresponding to FLA current rating.

3. The Ie and FLA rating applies for a maximum surrounding air temperature of 40°C. Above 40°C de-rate linearly by 2% of Ie or FLA per °C to a maximum of 60°C.

4. kW and Hp ratings applicable for SR35-017 – SR35-361 models only.

5. For SR35-017 – SR35-192 models, a higher duty cycle F-S is possible with optional fan installed as indicated in Fan option table. For SR35-242 – SR35-361 models, fans are standard.

	Rating Table – Horizontally Mounted												
le		kW 1		FLA			Нр ²			Trip Class 10	Trip Class 20	Trip Class 30	
A 3	230V	400V	500V ⁴	A 3	200V	208V	220- 240V	440- 480V	550- 600V ⁴	I _e : AC-53a: 3.5-17: F-S ⁵	l _e : AC-53a: 4-19: F-S ⁵	I _e : AC-53a: 4-29: F-S ⁵	
17	4	7.5	7.5	17	3	5	5	10	15	SR35-022	SR35-027	SR35-034	
22	5.5	11	11	22	5	5	7.5	15	20	SR35-027	SR35-034	SR35-041	
29	7.5	15	15	27	7.5	7.5	7.5	20	25	SR35-034	SR35-041	SR35-052	
35	7.5	18.5	22	34	10	10	10	25	30	SR35-041	SR35-052	SR35-065	
41	11	22	22	41	10	10	10	30	40	SR35-052	SR35-065	SR35-077	
55	15	30	37	52	15	15	15	40	50	SR35-065	SR35-077	SR35-100	
66	18.5	37	45	65	20	20	20	50	60	SR35-077	SR35-100	SR35-125	
80	22	45	55	77	20	25	25	60	75	SR35-100	SR35-125	SR35-156	
106	30	55	75	100	30	30	30	75	100	SR35-125	SR35-156	SR35-192	
132	37	75	90	125	40	40	40	100	125	SR35-156	SR35-192	SR35-242	
160	45	90	110	156	50	50	60	125	150	SR35-192	SR35-242	SR35-302	
195	55	110	132	192	60	60	60	150	200	SR35-242	SR35-302	SR35-361	
242	75	132	160	242	75	75	75	200	250	SR35-302	SR35-361	-	
302	90	160	200	302	100	100	100	250	300	SR35-361	-	-	

1. Rated operational powers in kW as per IEC 60072-1 (primary series) corresponding to IEC current rating.

2. Rated operational powers in hp as per UL508 corresponding to FLA current rating.

3. The Ie and FLA rating applies for a maximum surrounding air temperature of 40°C. Above 40°C de-rate linearly by 2% of Ie or FLA per °C to a maximum of 60°C.

4. kW and Hp ratings applicable for SR35-017 – SR35-361 models only.

5. For SR35-017 – SR35-192 models, a higher duty cycle F-S is possible with optional fan installed as indicated in Fan option table. For SR35-242 – SR35-361 models, fans are standard.

SHORT CIRCUIT	PROTECTION	SHORT CIRCUIT PROTECTION										
	Shoi	rt Ciı	cuit Prot	ection – S	R35 Fram	e Size 1						
Type designation (S	R35-)		017	022	027	034	041	052	065			
Rated operational current	le	A	17	22	29	35	41	55	66			
Rated conditional short circuit current	Iq	kA	5	5	5	5	5	5	5			
Class J time-delay fuse #1	Maximum rating Z1	A	30	40	50	60	70	100	125			
UL Listed inverse- time delay circuit breaker #1	Maximum rating Z2	A	60	60	60	60	60	150	150			
			Mersen 6,9	9 URD 30 _	Mersen 6,9 URD 31 _							
				Bussmann	170M30	Bussmann 170M40						
Semiconductor fuse	Туре			Bussmann	170M31		Bussmann 170M41					
(class aR) #2			Bussmann	170M32		Bussmann 170M42						
			SIBA 2	0 61		SIBA 20 61						
	Fuse rating	A	160A	160A	200A	200A	250A	250A	250A			
1 Cuitable Faulles	On A Cinquit Canabl	- 01		Lat Mawa Th	1-		atuinal Auron	COOL	M			

SHORT CIRCUIT PROTECTION

1. Suitable For Use On A Circuit Capable Of Delivering Not More Than ___Iq___ r.m.s. Symmetrical Amperes, 600V Maximum, When Protected by Class J Time Delay Fuses with a Maximum Rating of __Z1___ or by a Circuit Breaker with a Maximum Rating of __Z2___.

2. Correctly selected semiconductor fuses can provide additional protection against damage to the SR35 unit (this is sometimes referred to as type 2 coordination). These semiconductor fuses are recommended to provide this increased protection.

	Short	Circı	uit Prote	ction – S	SR35 Fra	me Size	2 & 3		•	
Type designation (S	R35-)		077	100	125	156	192	242	302	361
Rated operational current	le	A	80	106	132	160	195	242	302	361
Rated conditional short circuit current	Iq	kA	10	10	10	10	10	18	18	18
Class J time-delay fuse #1	Maximum rating Z1	A	150	200	250	300	400	450	600	600
UL Listed inverse- time delay circuit breaker #1	Maximum rating Z2	A	250	300	350	450	500	700	800	800
Semiconductor fuse (class aR) #2	Туре			Bussi Bussi Bussi	en 6,9 URD mann 170N mann 170N mann 170N IBA 20 61_	 140 141 142		Mersen 6,9 URD 33_ Bussmann 170M60_ Bussmann 170M61_ Bussmann 170M62_ SIBA 20 63_		
	Fuse rating	A	400A	400A	550A	550A	550A	800A	900A	1000 A

 Suitable For Use On A Circuit Capable Of Delivering Not More Than ___Iq___ r.m.s. Symmetrical Amperes, 600Volts Maximum, When Protected by Class J Time Delay Fuses with a Maximum Rating of __Z1___ or by a Circuit Breaker with a Maximum Rating of __Z2___.

2. Correctly selected semiconductor fuses can provide additional protection against damage to the SR35 Soft Starter (this is sometimes referred to as type 2 coordination). These semiconductor fuses are recommended to provide this increased protection.

ELECTROMAGNETIC COMPATIBILITY

	Electromagnet	ic Compatibility
EMC Emission levels	EN 55011	Class A*
	IEC 61000-4-2	8kV/air discharge or 4kV/contact discharge
	IEC 61000-4-3	10 V/m
		2kV/5kHz (main and power ports)
EMC Immunity levels	IEC 61000-4-4	1kV/5kHz (signal ports)
	IEC 61000-4-5	2kV line-to-ground 1kV line-to-line
	IEC 61000-4-6	10V
		nt A. Use of this product in environment B may cause the user may be required to take adequate mitigation

FAN OPTION

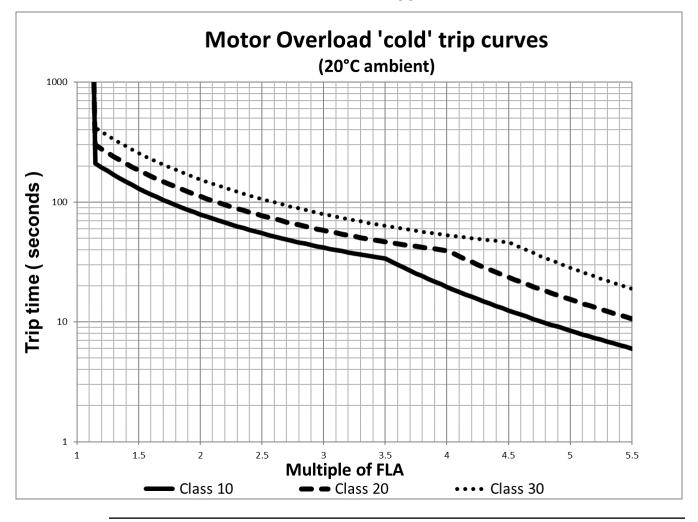
Fan Option									
SR35 Model	Maximum duty cycle F-S with optional fan installed								
SR35-017 – SR35-100	90-40 (40 cycles per hour)								
SR35-125	90-30 (30 cycles per hour)								
SR35-156	90-20 (20 cycles per hour)								
SR35-192	90-10 (10 cycles per hour)								
NOTE: SR35-242 – SR35-361 have built-in fans and a	are limited to 3 starts per hour								

WIRE SIZES AND TORQUES

		Wire Sizes and Tore	ques				
Termina		Models	Wire/Bus	bar Size	Torque		
Termina	l.	Models	Metric (mm²)	Imperial	Nm	lb in	
Main Terminals	Terminal	SR35-017 – SR35-065	2.5 – 70	12 – 2/0 AWG	9	80	
	Ierminal	SR35-077 – SR35-192	4 - 185	12 – 350 MCM	14	124	
Cu STR 75°C only	M10 bolt	SR35-242 – SR35-361	2 – 95	2 – 4/0 AWG	28	248	
Control term	inals	All models	0.2 – 1.5	24-16 AWG	0.5	4.5	
		SR35-017	≥ 4	≥ 12 AWG			
Protective Earth*	M6 screw	SR35-022 – SR35-052	≥ 6	≥ 10 AWG	8	71	
Cu only		SR35-065 – SR35-100	≥ 10	≥ 8 AWG			
\square	M8 screw	SR35-125 – SR35-192	≥ 16	≥ 6 AWG			
	MQ Ctural	SR35-242	≥ 25	≥ 4 AWG	12	106	
	M8 Stud	SR35-302 and SR35-361	≥ 35	≥ 3 AWG			
*Protective Earth w	ire size base	d on bonding conductor requirements	of UL508 Table 6.	4 and UL508A Ta	ble 15.1.		

MOTOR OVERLOAD PROTECTION

SR35 Soft Starter provides full motor overload protection, configurable through the user interface. Overload trip settings are determined by the Motor Current setting and the Trip Class setting. Trip class choices are Class 10, Class 20, and Class 30. The SR35 soft starters are protected using full I²T motor overload with memory. See Appendix 1 for sizing guide.

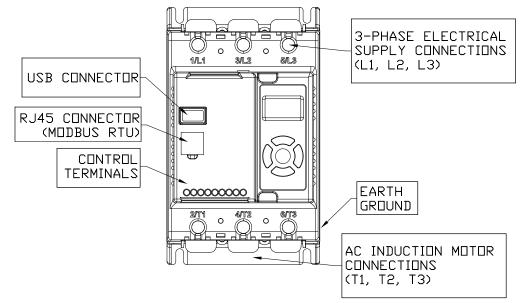


NOTE: When the overload has tripped, there is a mandatory cooling time to allow the overload to recover before the next start.

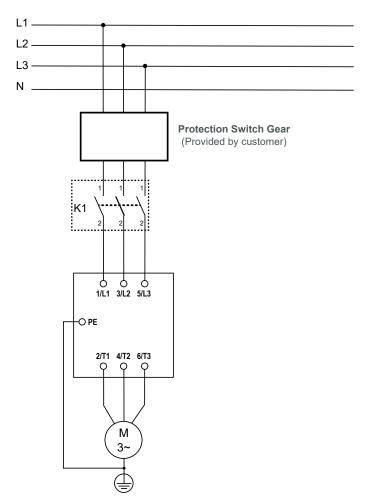


NOTE: The 'warm' trip times are 50% of the 'cold' trip time.

ELECTRICAL CONNECTIONS



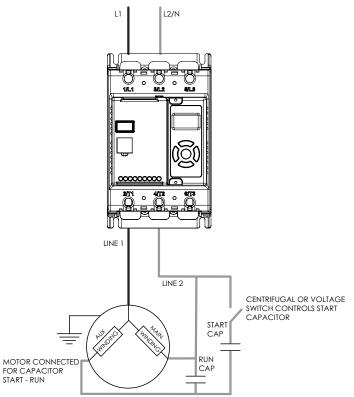
MAIN CIRCUIT WIRING DIAGRAM



SINGLE PHASE OPERATION

SR35 Soft Starters may be operated with a single-phase supply and motor. The base rating of the unit is unchanged.

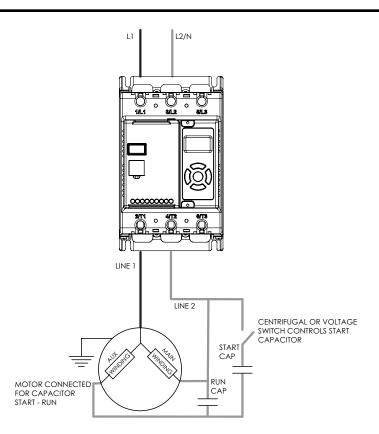
Electrical Connection

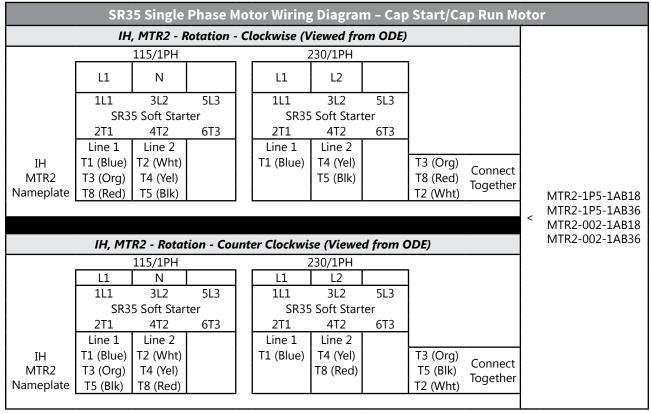


SR35 Single	Phase Motor Wiring	Diagram	– Cap S	Start/Ca	p Run Mo	tor
IH, MTF2 -	Rotation - Clockwise (V	iewed fro	m ODE)			
	20	8-230/1PF	4			
	L1	L2				
	1L1 SR35	3L2 Soft Star	5L3 ter			
	2T1	4T2	6T3			
IH	P1	8		1		
MTF2 Nameplate		4		1 5	Connect Together	
						All < MTF2-XXX-1B18
						Motors
IH, MTF2 - Rot	ation - Counter Clockwis	e (Viewed	l from O	DE)		11101013
	20	8-230/1PH	4	_		
	L1	L2]		
	1L1	3L2	5L3			
	SR35	Soft Star	ter			
	2T1	4T2	6T3	ļ		
IH	P1	5				
MTF2		4		1	Connect	
Nameplate				8	Together	

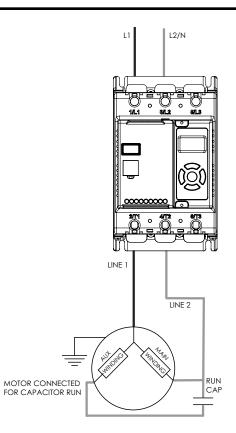
Page 2–11 Stellar® SR35 Series Soft Starter User Manual – 1st Ed, Rev D – 12/15/2023

Chapter 2: Electrical Installation VAUTOMATIONDIRECT

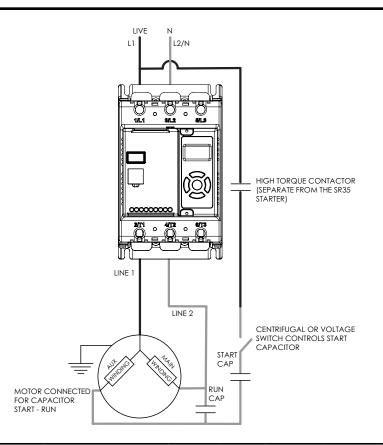








SR35 Single Phase Motor Wiring Diagram – Cap Run Motor												
	IH,	MTR2 - Ro	tation -	Clo	ockwise (Vi	ewed from	n ODE)					
		115/1PH				230/1PH						
	L1	Ν			L1	L2						
	1L1	3L2	5L3		1L1	3L2	5L3]				
	SR35 Soft Starter				SR35	Soft Star	ter					
	2T1	4T2	6T3		2T1	4T2	6T3					
	Line 1	Line 2			Line 1	Line 2						
IH	T1 (Blue)	T2 (Wht)			T1 (Blue)	T4 (Yel)		T3 (Org)	Connect		MTR2-P33-1AB18	5
MTR2	T3 (Org)	T4 (Yel)				T5 (Blk)		T8 (Red)	Together		MTR2-P33-1AB36	
Nameplate	T8 (Red)	T5 (Blk)						T2 (Wht)			MTR2-P50-1AB50	- 1
											MTR2-P50-1AB36 MTR2-P75-1AB18	
		2	6				(MTR2-P75-1AB16	
			on - Cour	π	r Clockwis	-	from O	DE)			MTR2-001-1AB18	
		115/1PH			230/1PH			1			MTR2-001-1AB36	,
	L1	<u>N</u>	51.3		L1	L2	51.3					
	1L1	3L2 5 Soft Star	0 =0		1L1	3L2 5 Soft Start	0 -0					
	2T1	4T2	6T3		2T1	4T2	6T3					
	Line 1	Line 2	015		Line 1	Line 2	015	-				
ІН	T1 (Blue)	T2 (Wht)			T1 (Blue)	T4 (Yel)		T3 (Org)				
MTR2	T3 (Org)	T4 (Yel)				T8 (Red)		T5 (Blk)	Connect			
Nameplate	T5 (Blk)	T8 (Red)				- (u)		T2 (Wht)	Together			



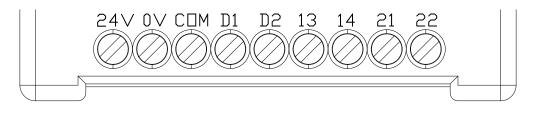
SR35 Single Phase Motor Wiring Diagram – Cap Start/Cap Run Motor – High Start Torque											
IH, MTR2 - Rotation - Clockwise (Viewed from ODE) - High Start Torque - Cap Start / Cap Run Only!											
115/1PH 230/1PH											
T8 (Red) >	L1	N			L1	L2		< T8 (Red) to L1			
IH MTR2 Nameplate IH, MTR2	2T1 Line 1 T1 (Blue) T3 (Org)	3L2 5 Soft Star 4T2 Line 2 T2 (Wht) T4 (Yel) T5 (Blk) - Counter	6T3		2T1 Line 1 T1 (Blue)		6T3	T3 (Org) Connect T2 (Wht) Together	<	MTR2-1P5-1AB18 MTR2-1P5-1AB36 MTR2-002-1AB18 MTR2-002-1AB36	
	115/1PH 230/1PH										
T5 (Blk) >	L1	N			L1	L2	-	< T5 (Blk) to L1			
	1L1	3L2	5L3		1L1	3L2	5L3				
	SR35 Soft Starter				SR35 Soft Starter						
	2T1	4T2	6T3		2T1	4T2	6T3				
	Line 1	Line 2			Line 1	Line 2					
IH	T1 (Blue)	T2 (Wht)			T1 (Blue)	T4 (Yel)		T3 (Org) Connect			
MTR2 Nameplate	T3 (Org)	T4 (Yel) T8 (Red)				T8 (Red)		T2 (Wht)			

Page 2–14 Stellar® SR35 Series Soft Starter User Manual – 1st Ed, Rev D – 12/15/2023

For single phase operation the mode of the soft starter must be set correctly in the Advanced Menu:



CONTROL TERMINAL CONNECTION



CONTROL TERMINAL FUNCTIONS

Terminal	Description	Function Selectable	Note				
24VDC	Control Supply +Us	No	1				
0V	Control Supply -Us	No					
СОМ	Digital Inputs Common	No					
D1	Digital Input 1	No	2				
D2	Digital Input 2	Yes	2				
13/14	Main Contactor Control (Run Relay)	Yes	3				
21/22	Fault Relay	Yes	3				
 24VDC Specification: See General Specification table (Page 15) for VA rating. Residual ripple < 100mV, spikes/switching peaks < 240mV. Turn On/Off response no overshoot of Volt, Overvoltage voltage protection output voltage must be clamped <30VDC The voltage applied to the digital inputs D1 and D2 must not exceed 24VDC 230VAC, 1A, AC15. 30VDC, 0.5 A resistive 							

DIGITAL INPUT 2 (D2) SELECTABLE FUNCTIONS

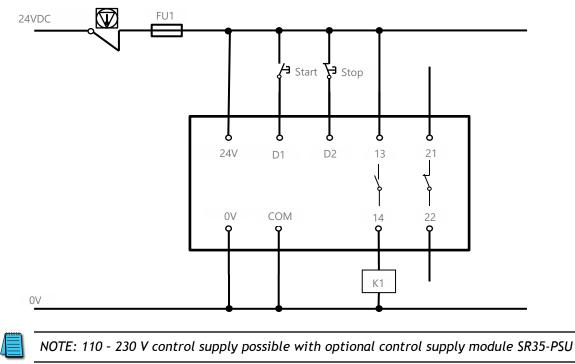
Different functions may be assigned to Digital Input 2 in the I/O menu. Available assignments are:

- Reset
- Hold Start Ramp
- Enable
- Fire Mode (In Fire Mode all trips are disabled)

DIGITAL OUTPUTS SELECTABLE FUNCTIONS (13/14 AND 21/22)

The output may be mapped to Fault, Top-of-Ramp indication or Auto-Reset Pending or exceeded.





2-WIRE CONTROL WIRING DIAGRAM

