The Stellar Advantage

Why use a soft starter instead of electromechanical contactors to control 3-phase AC induction motors?

Reduce mechanical wear and tear

- Smooth acceleration; reduced shock and starting stress
- Extend lifespan of mechanical drive train components
- Fluid couplings and some clutches can be eliminated

Increased electrical efficiency

- Reduced starting current
- More motors or larger motors can be started from lower-capacity power sources
- Allows motors to be started more frequently
- SR22 and SR33 only - Internal mechanical bypass contacts open and close under reduced current, increasing lifespan and reliability

Cost savings

- Lower overall costs for new installations
- Reduced maintenance and replacement of mechanical drive train components
- Reduced starting current reduces electrical power costs
- SR44 only - Energy Optimizing mode reduces electrical power costs
- SR44 only - Automatic Application setup feature speeds installation by configuring the SR44 for a specific application with one setting.

Stellar® Series Soft Starters

STELLAR® soft starter

Our Stellar Series of soft starters are designed to help you reduce mechanical wear and tear on startup, reduce energy costs and help you minimize loss of production hours from equipment breakdown.

When to use a soft starter?

General purpose soft start applications where traditional across-the-line starting or wye-delta starting would typically be appropriate. Stellar soft starters should not be used if the starting time will exceed 30 seconds.

Why purchase your soft starter from AutomationDirect?

- **Our soft starters are IN-STOCK and ready to ship**
- **FREE 2-day delivery when you order $300 or more**
- **FREE 30-day money-back guarantee**
- **FREE #1 voted tech support**
- **VALUE PRICING on everything we sell - you'll always get our best price whether you order 1 or 100 items**

3-Phase Basic Soft Starters up to 400 hp!

SR33 Series, 22A - 482A

The SR33 series is an ideal substitute for a Star/Delta starter because it fits into a similar footprint, thus simplifying installation. The SR33 soft starters use thyristors for controlled reduced voltage motor starting and stopping, then switch to internal bypass contacts for efficient running at rated speed.

This series is designed to fit in place of existing wye-delta starters. 3-potentiometer setup (Start Voltage, Start Time, and Stop Time) make installation and commissioning easy.

Features

- 22–482A @ 208-230/460 VAC
- 24 VDC or 115 VAC I/O
- 24 VDC control power required
- Two-phase control
- Internal bypass contacts for Run
- Easily and separately adjustable motor start voltage and start and stop times
- Suitable for a wide variety of motor loads
- Designed to replace wye-delta starters
- Fault indication of 4 or 7 fault types, depending upon model.
- IP20 (SR33-22 to SR33-97) IP00 (SR33-132 to SR33-482) panel mount
- Two-year warranty

Energy Optimizing and Efficient, Full-Featured 3-Phase Soft Starters

SR44 Series, 9A - 370A

SR44 full-featured solid-state Soft Starters provide many advantages when used instead of electromechanical contactors to control 3-phase AC induction motors. The SR44 Soft Starters are fully digital, and use thyristors in all three motor phases for controlled reduced voltage motor starting and stopping. SR44s have an Automatic Application Setup that fully configures the starter for a specific application with one entry. SR44s also have a built-in "Optimizing" mode that reduces energy costs when used on lightly loaded or oversized motors, and external bypass capability for efficient running at rated speed.

Features

- **Advanced energy-saving Optimizing Mode improves motor efficiency and power factor; prolongs motor life**
- **Can be connected 'in-the-delta', allowing use of a smaller Soft Starter**
- **9–370A @ 230–460VAC**
- **Full three-phase motor control**
- **Can be controlled via Local Keypad, Digital Inputs, optional Remote Keypad, or optional Modbus Communications.**
- **115/230VAC or 12/24VDC control inputs**
- **Fault record history of last 5 trips**
- **Two-year warranty**

Compact 3-Phase Soft Starters at Direct Prices

SR22 Series, 5A - 40A

The SR22 series is a low-cost family perfect for use in applications where space is a concern. The SR22 soft starters use thyristors for controlled reduced voltage motor starting and stopping, then switch to internal bypass contacts for efficient running at rated speed. 3-potentiometer setup (Start Voltage, Start Time, and Stop Time) make installation and commissioning easy.

Features

- 5–40A @ 208–460V
- 24 VDC control voltage
- Easily and separately adjustable motor start and stop times
- Two-phase control
- Internal bypass contacts for run
- DIN rail mounting
- Two standard-size widths: 45 & 55 mm
- Six error/trip indications: AC Supply, Control Supply, Overheated, Bypass Failure, Shear Pin, Overcurrent
- Two-year warranty

Stellar® SR33 Series Basic Soft Starters

Overview

SR33 semi-conductor soft starters provide many advantages when used instead of electro-mechanical contactors to control 3-phase AC induction motors. The SR33 soft starters use thyristors for controlled reduced voltage motor starting and stopping, then switch to internal contacts for efficient running at rated speed.

Designed to fit in place of existing wye-delta starters.

Features

- 22–482A @ 208-230/460 VAC
- 24 VDC or 115 VAC I/O
- 24 VDC control power required
- Two-phase control
- Internal bypass contacts for Run
- Easily and separately adjustable motor start voltage and start and stop times
- Suitable for a wide variety of motor loads
- Can replace wye/delta starters
- Fault indication of 4 or 7 fault types, depending upon model: SCR or Power Supply, Overheat, Control Power Supply, Bypass Relay Failure, Shearpin, Overload, Overcurrent
- IP20 (SR33-22 to SR33-97)
  IP00 (SR33-132 to SR33-482)
  panel mount
- Two-year warranty

Advantages

Mechanical Advantages

- Smooth acceleration; reduced mechanical shock and starting stress
- Extend lifespan of mechanical drive train components
- Fluid couplings and some clutches can be eliminated

Electrical Advantages

- Reduces starting currents and spikes
- Reduces high transient currents
- More motors or larger motors can be started from lower-capacity power sources
- Allows motors to be started more frequently
- Internal mechanical contacts open and close under reduced current, increasing lifespan and reliability

Economic Advantages

- Lower overall costs for new installations
- Reduced maintenance and replacement of mechanical drive train components
- Reduced starting current reduces electrical power costs

Standards & Approvals

- CE
- REACH
- RoHS
- UL listed* (E333109)
  * (soft starters SR33-350 to SR33-482 are not UL listed or recognized)

Accessories

- Heat-shrink insulation kit SR33-HS1 (required for soft starters SR33-132 to SR33-280 used in UL applications)

Applications

- General purpose applications where traditional across-the-line starting or wye-delta starting would typically be appropriate.

SR33-66 to SR33-97

SR33-22 to SR33-55

SR33-132 to SR33-195

SR33-241 to SR33-482

Stellar® SR33 Series Basic Soft Starters

SR33 Soft Starter Technical Specifications

SR33 Series Basic Soft Starters – 22A-482A * – Model-Specific Specifications and Features							
Model	***SR33-22***	***SR33-29***	***SR33-41***	***SR33-55***	***SR33-66***	***SR33-80***	***SR33-97***
Price	<--->	<--->	<--->	<--->	<--->	<--->	<--->
**** Rated Current [trip class 5] (A)***	22	29	41	55	66	80	97
**** Motor Rating***	Refer to selection table. Starters must be sized according to HP and **starting class**.						
***** Short Circuit Current Rating (Type 1)***	5kA for SR33-22 to SR33-55; 10kA for SR33-66 to SR33-195; 18kA for SR33-241 to SR33-482						
Steady State Power Loss (W)	6	10	12	15	17	20	24
Control Power Supply Required Output Capacity	approx 4VA						
Overload Trip	n/a						
Terminals: Power / Ground	wire clamp terminals / M6				wire clamp terminals / M8		
Design Standards	UL508 Industrial Control Equipment; EN/IEC 60947-4-2 "AC Semiconductor Motor Controllers and Starters"						
Environmental Rating	IP20						
Product Weight (kg [lb])	2.3 [5.1]				3.5 [7.75]		

Model	***SR33-132***	***SR33-160***	***SR33-195***	***SR33-241***	***SR33-280***	***SR33-350***	***SR33-430***	***SR33-482***
Price	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->
**** Rated Current [class 10(B) trip] (A)***	132	160	195	241	280	350	430	482
**** Motor Rating***	Refer to selection table. Starters must be sized according to HP and **starting class**.							
***** Short Circuit Current Rating (type 1)***	5kA for SR33-22 to SR33-55; 10kA for SR33-66 to SR33-195; 18kA for SR33-241 to SR33-482							
Steady State Power Loss (W)	35	42	52	60	69	83	104	121
Control Power Supply Required Output Capacity	approx 12VA, capable of 4A for 250ms							
Overload Trip	n/a			Single-phase sensing; Non-adjustable; (refer to O/L trip curve)				
Terminals: Power / Ground	external busbars / M8			external busbars / M10				
Design Standards	UL508 Industrial Control Equipment					n/a		
	EN/IEC 60947-4-2 "AC Semiconductor Motor Controllers and Starters"							
Environmental Rating	IP00							
Product Weight (kg [lb])	4.3 [9.5]			9.7 [21.4]		13.5 [29.8]		

**** Refer to Selection Table for deratings by application and overload trip class.*** ***** When protected by recommended semiconductor fuse.***

SR33 Series Basic Soft Starters – General Specifications and Features	
Models	***All Models (SR33 -22, -29, -41, -55, -66, -80, -97, -132, -160, -195, -241, -280, -350, -430, -482)***
Rated Operational Voltage / Frequency	230–460VAC rms 3-phase (-15% +10%) / 50–60Hz +/- 2Hz; Form Designation = Form 1
Impulse Withstand Voltage	4kV
Insulation Voltage Rating	500V (IEC standard insulation rating. Actual testing proves insulation withstand capacity beyond 460V+10%)
Control Power Supply General Requirements	24VDC supplied externally to terminals X1-X2; Residual Ripple: 100mV; Spikes/Switching Peaks: 240mV; Turn On/Off Response: No overshoot of V_{out}; Output voltage must be clamped to < 30V
Control Input (Start/Stop)	24V DC/110V AC galvanically isolated terminals A1-A2 (1mA @ 24V DC; 3mA @ 110V AC; not suitable for use with PLC triac output)
Control Relay Outputs	230VAC, 3A, resistive; 230VAC, 1A, AC15; Run – 13/14; Ready – 23/24
Start Time Setting Range	0 to 30 seconds
Start Voltage Setting Range	30 to 100 percent
Stop Time Setting Range	0 to 30 seconds
Start Duty	S1 per IEC 34-1 & VDE0530 Part 1. 3 x FLC for 5 seconds @ standard rating (Class5, 40°C [104°F]).
Starts / Hour	10 starts per hour, or 5 starts + 5 soft stops per hour
Index Rating	Class 5; AC53b: 3-5: 355; internally bypassed (10 starts/hr)
Indication	Multi function LED on front panel
Ambient Operating Temperature	0 to 40 °C [32 to 104 °F] – Above 40°C [104 °F] derate linearly by 2% of unit FLC per °C to a max derate of 40% at 60°C [140 °F]. (Derating not UL. Refer to separate UL Ratings and Protection Requirements)
Transportation & Storage Temperature	-25 to 60 °C [-13 to 140 °F]
Humidity	max 85% non-condensing, not exceeding 50% at 40°C [104°F]
Altitude	1000m [3281 ft]. Above 1000m de-rate linearly by 1% of unit FLC per 100m to a max altitude of 2000m [6562 ft].
Pollution Degree	For use in a Pollution Degree 2 environment; No corrosive gases

Stellar® SR33 Series Basic Soft Starters

SR33 Soft Starter Accessory

SR33 Series Basic Soft Starters – Accessory			
Part Number	***Name***	***Price***	***Description***
SR33-HS1	Insulation Kit	<--->	Heat-shrink insulation required for soft starters SR33-132 to SR33-280 used in UL applications. Can also be used with SR33-350 to SR33-482.

SR33 Soft Starter Index Ratings

SR33 Index Ratings – AC-53b (Bypassed Operation) *			
Trip Class	***X-Tx; OFF-time***	***I_e (A)***	***Model #***
5	3-5; 355 (10)	22 to 482	***SR33-22 to SR33-482***
10B	3.5-12; 708 (5)	29 to 241	***SR33-29 to SR33-241***
	3.5-12; 1188 (3)	280 to 482	***SR33-280 to SR33-482***
10	3-23; 697 (5)	29 to 280	***SR33-29 to SR33-280***
	3-23; 1177 (3)	350 to 482	***SR33-350 to SR33-482***
20	4-19; 701 (5)	29 to 350	***SR33-29 to SR33-350***
	4-19; 1181 (3)	430 to 482	***SR33-430 to SR33-482***
30	4-29; 691 (5)	41 to 430	***SR33-41 to SR33-430***
	4-29; 1171 (3)	482	***SR33-482***
**** Index rating AC-53b is specified by IEC standard # 60947-4-2***			

Index Rating Example - Bypassed Operation (AC-53b Utilization Category per IEC 60947-4-2)

AC-53b = controller semiconductors provide squirrel-cage motor Start control only; bypassed for Run and Stop.

IEC Index Ratings are comprised of Rated Operational Current (I_e), Utilization Category, Overload Current Profile (X-Tx), OFF-time.

22 to 482 3-5; 355 (10)

- Cycles / hr
  Start/Stop cycles per hour
- OFF-time
  355 = 355s minimum OFF-time before restart
- Overload Current Profile (X-Tx)
  3-5 = 3 times rated current (I_e) for 5s
- Rated Operational Current (I_e)
  22 to 482 = controllers with Rated Operational Currents from 22A to 482A

Stellar® SR33 Series Basic Soft Starters

SR33 Soft Starter Selection

SR33 Sizing Guide

The SR33 is designed for general purpose applications and where a traditional Wye/Delta is currently used (or considered appropriate). Generally the motor will start off-load, and the time to accelerate to full speed will be in the range of a few seconds.

The standard SR33 range is suitable for the majority of applications, and conforms to Trip Class 5, which means it is capable of withstanding three times Full Load Current for 5-second starts. However, there are instances where a different start profile is required. To satisfy these applications, the SR33 has four other ratings; Class 10B, Class 10, Class 20, and Class 30. These ratings correspond to IEC thermal/electronic overload trip classes, and the SR33 must be used with an overload protection device that has a rating corresponding to the Trip Class selected.

When using the selection tables to select the most appropriate SR33 model, please note the following:

- The SR33 is not suitable for very high inertia loads, such as centrifuges or loaded crushers, with starts > 30 seconds.
- Do not use the Class 5 rating when there is a possibility of the motor starting with a significant load.
- 2-pole motors may take longer to start, so use a minimum of Trip Class 10B.

SR33 Soft Starters – O/L Trip Class ①

Application	Trip Class	Start Time (s)	Notes
Standard	5	5	Suitable for Wye/Delta applications with < 5s start time, motor starts off-load
Heavy	20	12–19	Suitable for Wye/Delta with applications > 12s start time
High Torque	20	12	Requires more starting torque than a Wye/Delta
Centrifugal Pump	10B	10–15	Generally easy to start when pumping water
Positive Displacement Pump (unloaded)	10	5–10	Can be difficult to start
Off-Load Conveyor	5	5	Unloaded at start
Heavy conveyor	20	5–10	Loaded at start
Low-Inertia Fan	10	10–20	Generally fans less than or equal to 45kW (60hp)
High-Inertia Fan	30	30	Generally fans greater than or equal to 45kW (60hp)
Off-Load Compressor	5	5–10	Special circuits ensure motor starts off-load
Loaded Compressor	20	10–15	Some compressor systems can be difficult to start
Off-Load Mixer	5	5	No material in basin; off-load
Heavy Mixer	20	10–15	Material in basin

SR33 Selection Steps

① Determine the required trip class based on the motor load and required start time.

② Select the applicable SR33 part number based on the required Trip Class and motor HP.

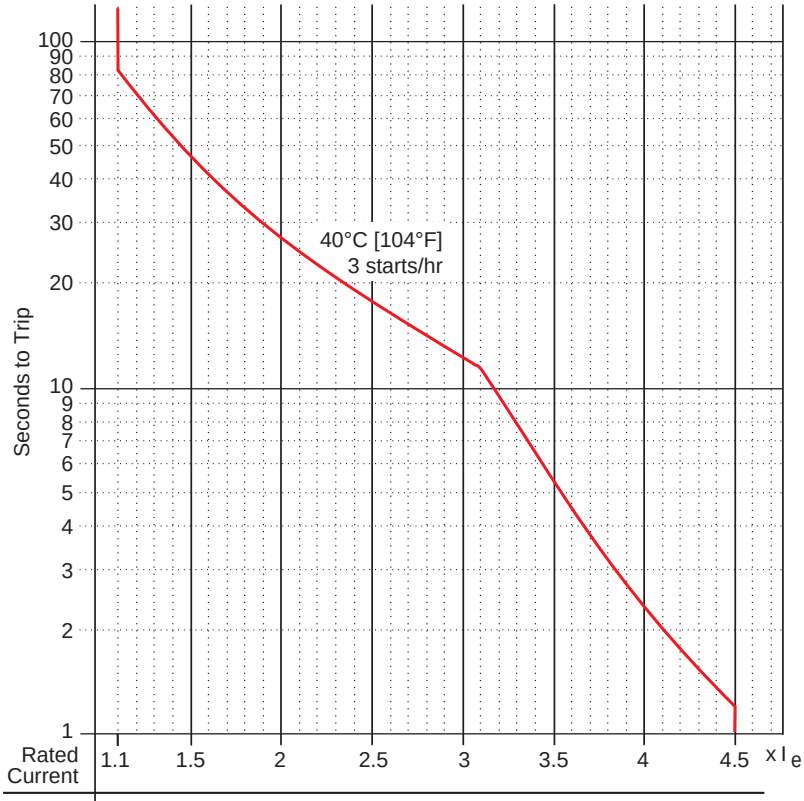
SR33 SELECTION – Selection Table ②

I (A)	Motor		Soft Starter Application Trip Class				
	HP @ 230V	HP @ 460V	Class 5	Class 10B	Class 10	Class 20	Class 30
			10 starts/hr	5 starts/hr			
22	**7.5**	**15**	SR33-22	SR33-29	SR33-29	SR33-29	SR33-41
29	**10**	**20**	SR33-29	SR33-41	SR33-41	SR33-41	SR33-55
41	**10**	**30**	SR33-41	SR33-55	SR33-55	SR33-66	SR33-97
55	**20**	**40**	SR33-55	SR33-66	SR33-66	SR33-97	SR33-132
66	**20**	**50**	SR33-66	SR33-80	SR33-80	SR33-132	SR33-132
80	**30**	**60**	SR33-80	SR33-132	SR33-132	SR33-132	SR33-160
97	**30**	**75**	SR33-97	SR33-132	SR33-132	SR33-160	SR33-195
132	**50**	**100**	SR33-132	SR33-195	SR33-195	SR33-241	SR33-280
160	**60**	**125**	SR33-160	SR33-241	SR33-241	SR33-280	SR33-350
195	**75**	**150**	SR33-195	SR33-241	SR33-280	SR33-350	SR33-430
–	**–**	**–**	–	3 starts/hr			
241	**75**	**200**	SR33-241	SR33-280	SR33-350	SR33-430	SR33-482
280	**100**	**200**	SR33-280	SR33-350	SR33-430	SR33-482	–
350	**125**	**250**	SR33-350	SR33-482	SR33-482	–	–
430	**150**	**350**	SR33-430	–	–	–	–
482	**200**	**400**	SR33-482	–	–	–	–

FOR MOTOR OVERLOAD PROTECTION, THE SR33 MUST BE USED WITH A SEPARATE CUSTOMER-SUPPLIED OVERLOAD PROTECTION DEVICE THAT HAS A RATING CORRESPONDING TO THE APPLICABLE TRIP CLASS.

Stellar® SR33 Series Basic Soft Starters

SR33 Soft Starter Circuit Protection



Rated Current	1.1	1.5	2	2.5	3	3.5	4	4.5
241A	265	361	482	602	723	843	964	1084
280A	308	420	560	700	840	980	1120	1260
350A	385	525	700	875	1050	1225	1400	1575
430A	473	645	860	1075	1290	1505	1720	1935
482A	530	723	964	1205	1446	1687	1928	2169

Trip Level Current (Amps)

The SR33 can be used at ratings other than those stated. Use the above trip curves to determine the required unit for the duty.

As an example, the SR33-280 will run a 200hp motor (280 Amp) at the maximum continuous running current and will allow an overload of 3 x 280 Amp (840A) for 12 seconds, 3 times per hour. The unit would also allow a 3.5 x overload (980A) for approximately 5½ seconds, 3 times per hour.

Following an overload trip, subsequent restarts can be restricted due to a cooling time. The severity of overload determines the cooling time, which has a maximum value of 10 minutes.

THE SOFT STARTER OVERLOAD TRIP CURVE SHOWN ON THIS PAGE APPLIES ONLY TO MODEL NUMBERS SR33-241 THROUGH SR33-482, AND IT PROVIDES PROTECTION ONLY FOR THE SOFT STARTER. FOR MOTOR OVERLOAD PROTECTION, A SEPARATE CUSTOMER-SUPPLIED OVERLOAD PROTECTION DEVICE MUST BE PROVIDED.

UL Short Circuit Protection **

SR33 Model Number *	Short Circuit Rating	Class J High-Speed or RK5 Time-Delay Current-Limiting Fuse *** Rated 600VAC	Circuit Breaker Rated 600VAC
SR33-22	5kA	35A	–
SR33-29	5kA	45A	–
SR33-41	5kA	60A	–
SR33-55	5kA	80A	–
SR33-66	10kA	125A	–
SR33-80	10kA	175A	–
SR33-97	10kA	200A	–
SR33-132	10kA	250A	350A
SR33-160	10kA	350A	450A
SR33-195	10kA	400A	500A
SR33-241	18kA	450A	–
SR33-280	18kA	450A	–

** Soft starters SR33-350 to SR33-482 are NOT UL listed or recognized.*

*** Suitable for use on a circuit capable of delivering not more than the RMS symmetrical Amperes as indicated at 480VAC maximum, when protected by fuses or inverse-time circuit breakers with rated maximum Amperes as indicated.*

**** Fuse comparable to Edison type JHL (class J) or ECSR (class RK5).*

RECOMMENDED FUSING for IEC Type 1 Coordination Short Circuit Protection

SR33 Model Number	Rated Short Circuit Current	SIBA Semiconductor Fuse	Class J High-Speed or RK5 Time-Delay Current-Limiting Fuse* Rated 600VAC	
			Amp	Edison JHL Part #
SR33-22	5kA	2018920.50A	35A	JHL35
SR33-29		2018920.100A	45A	JHL45
SR33-41			60A	JHL60
SR33-55		2018920.125A	80A	JHL80
SR33-66	10kA		125A	JHL125
SR33-80		2061032.200A	175A	JHL175
SR33-97			200A	JHL200
SR33-132		2061032.250A	250A	JHL250
SR33-160		2061032.400A	350A	JHL350
SR33-195			400A	JHL400
SR33-241	18kA	2062032.630	450A	JHL450
SR33-280				
SR33-350		2063032.1000	–	
SR33-430				
SR33-482				

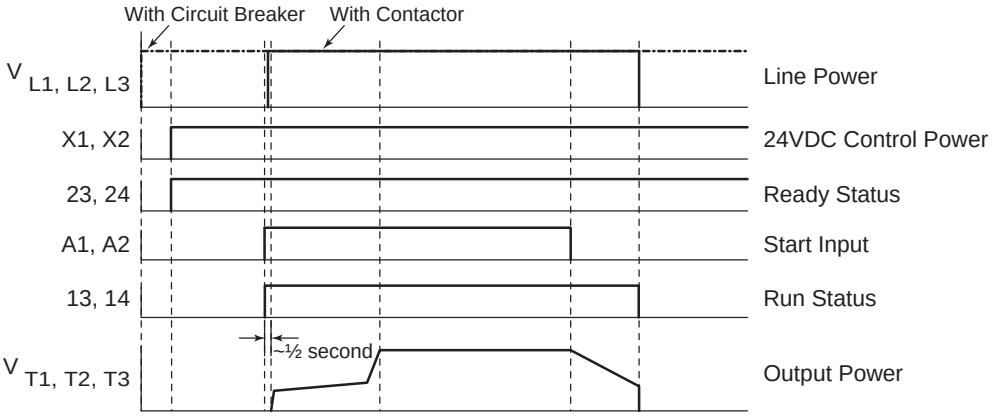
** Fuse comparable to Edison type JHL (class J) or ECSR (class RK5).*

Stellar® SR33 Series Basic Soft Starters

UL Maximum Surrounding Air Temperatures									
SR33 Model Number *	Maximum 40°C [104°F]		Maximum 50°C [122°F]		SR33 Model Number *	Maximum 40°C [104°F]		Maximum 50°C [122°F]	
	I (A)	HP @ 480V	I (A)	HP @ 480V		I (A)	HP @ 480V	I (A)	HP @ 480V
SR33-22	22	15	20	10	SR33-97	97	75	78	60
SR33-29	29	20	27	20	SR33-132	132	100	119	75
SR33-41	41	30	37	25	SR33-160	160	125	144	100
SR33-55	55	40	45	30	SR33-195	195	150	176	125
SR33-66	66	50	60	40	SR33-241	241	200	193	150
SR33-80	80	60	72	50	SR33-280	280	200	224	150

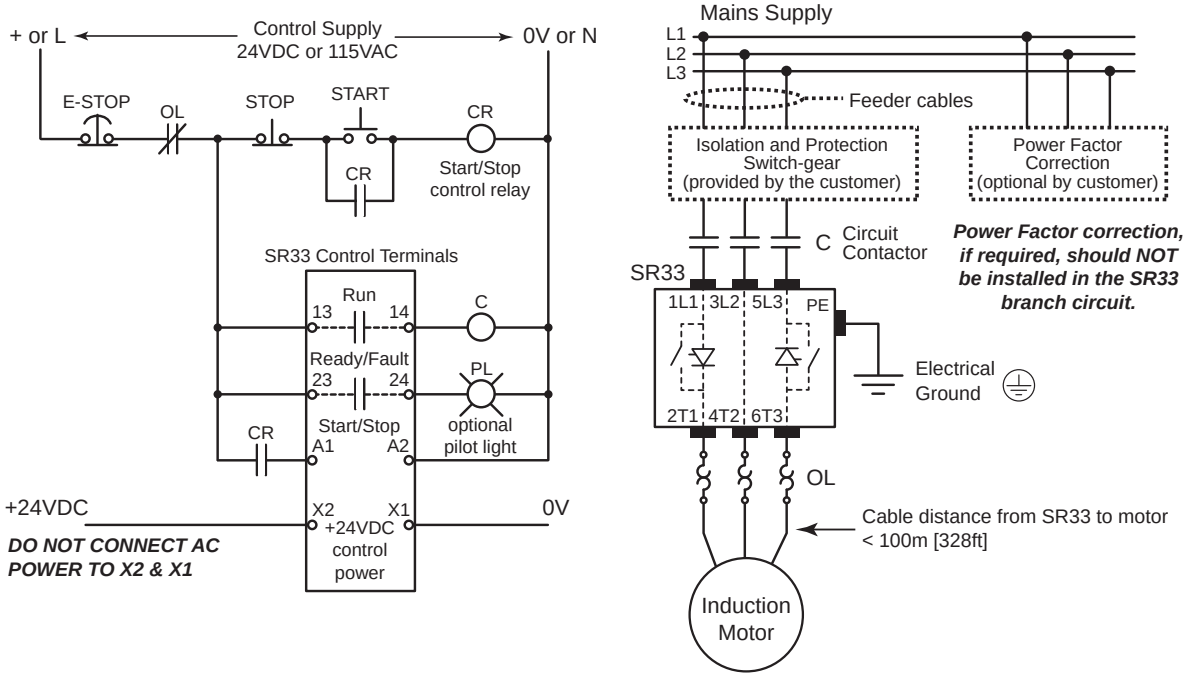
** Soft starters SR33-350 to SR33-482 are NOT UL listed or recognized.*

SR33 Soft Starter Timing Diagram



SR33 Soft Starter Standard Wiring Diagram

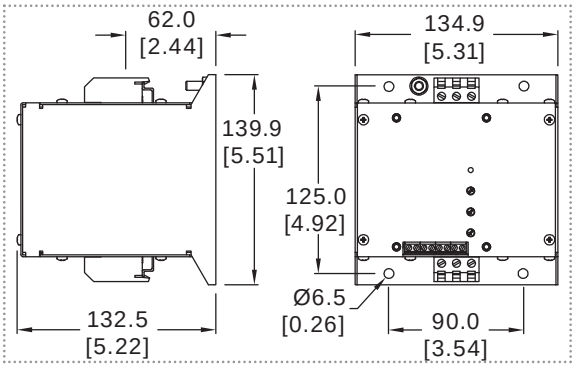
For complete wiring instructions, refer to the "SR33 Digital Soft Starters Quick-start Guide: Installation and Operation" included with the SR33 soft starter and available online at www.AutomationDirect.com.



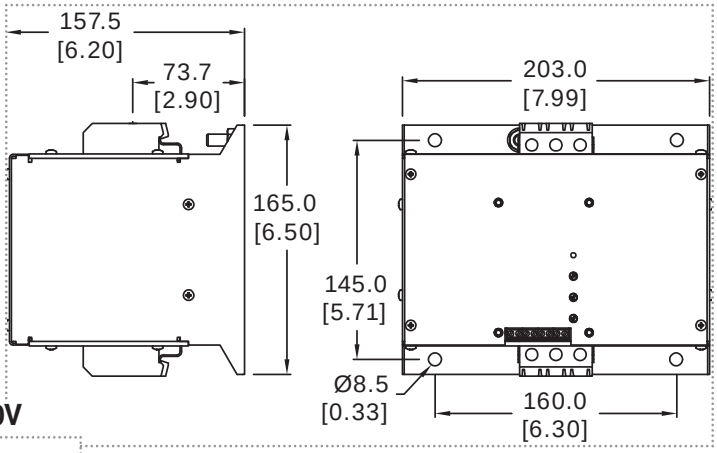
Stellar® SR33 Series Basic Soft Starters

SR33 Soft Starter Dimensions (mm [in])

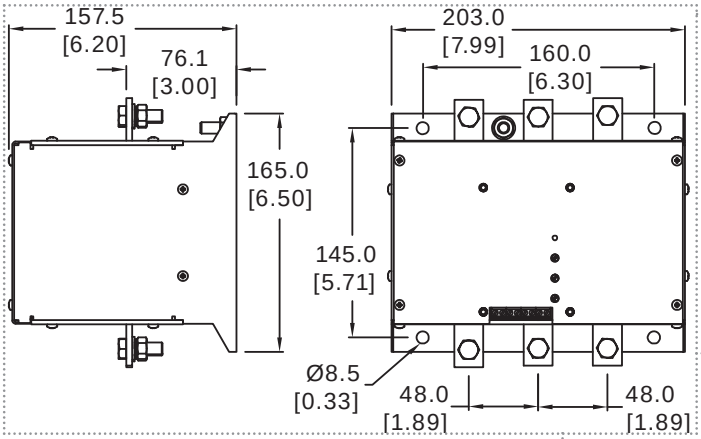
SR33-22 to SR33-55 – 15hp to 40hp @ 460V



SR33-66 to SR33-97 – 50hp to 75hp @ 460V



SR33-132 to SR33-195 – 100hp to 150hp @ 460V



SR33-241 to SR33-482 – 200hp to 400hp @ 460V