Soft Starters

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Stellar® Series Soft Starters

3-Phase Basic Soft Starters up to 450 hp!
SR35 Series, 17A – 361A

The Stellar Advantage
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 are suitable 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 $49 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

Features
- 17-477A @ 200-480VAC
- 24VDC, 110VAC, or 230VAC selectable control voltage
- Internally bypassed during run
- Fully programmable, full three-phase motor control
- Built-in SCR failure protection, full motor overload protection
- Full data logging (fault records, motor current, operational status, etc.)
- Easily and separately adjustable motor start and stop times
- iERS (intelligent Energy Recovery System) saves energy on lightly loaded motors
- Can be connected ‘in-the-delta’, allowing use of a smaller Soft Starter
- Can be used for motor reversing (with external contactors)
- touchscreen with easy-to-navigate menu structure and quick automatic application set up
- Can be used with local or remote control
- Integrated Modbus RTU or optional Modbus TCP or EtherNet/IP communication
- Configure and view parameters as well as view logs using StellarLink software
- Easy operation, setup, maintenance and installation
- Operates in environments up to 131°F (55°C) without current reduction
- Built-in electronic overload relay
- Limitation of voltage drop during start
- Conformal coated circuit boards
- Two year warranty

WEG SSW07 Series, 17A – 412A

The SSW07, with DSP (Digital Signal Processor) control, is another option as a substitute for a Star/Delta starter. The SSW07 was designed to provide great performance on motor starts and stops with an excellent cost-benefit ratio. With a simplified setup, the SSW07 ensures start-up activities and daily operations go smoothly.

Features
- Universal voltage (208-575 VAC)
- Built-in run-rated (AC1) bypass contactor
- Significant reduction of mechanical stresses through the coupling and transmission devices (gearboxes, pulleys, gears, conveyors, etc.) during the start
- Easy operation, setup, maintenance and installation
- Operates in environments up to 131°F (55°C) without current reduction
- Built-in electronic overload relay
- Limitation of voltage drop during start
- Conformal coated circuit boards

For the latest prices, please check AutomationDirect.com.

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The WEG SSW05 Soft Starter is a compact, fully digital soft starter with a state-of-the-art DSP (Digital Signal Processor) controller. Simple set-up and operation are assured since all parameters and set-up selections are made via DIP switches and potentiometers. Status LEDs alert the user of the operational status of the SSW05. Simplicity, ease of set-up, and the small panel assure quick and easy installation and operation. The SSW05 can fit into the same space as many across the line motor starters and can control motors with an FLA from 10 to 85 amps.

Features

- 208-480 VAC, 50/60 Hz input power supply
- Duty cycle: 300% rated current for 10 seconds, 4 starts per hour
- Built-in bypass contactor
- Adjustable acceleration and deceleration ramps (1-20 sec)
- Adjustable pedestal voltage (30-80% of line voltage)

The WEG SSW05 Soft Starter is a compact, fully digital soft starter with a state-of-the-art DSP (Digital Signal Processor) controller. Simple set-up and operation are assured since all parameters and set-up selections are made via DIP switches and potentiometers. Status LEDs alert the user of the operational status of the SSW05. Simplicity, ease of set-up, and the small panel assure quick and easy installation and operation. The SSW05 can fit into the same space as many across the line motor starters and can control motors with an FLA from 10 to 85 amps.

Features

- 208-480 VAC, 50/60 Hz input power supply
- Duty cycle: 300% rated current for 10 seconds, 4 starts per hour
- Built-in bypass contactor
- Adjustable acceleration and deceleration ramps (1-20 sec)
- Adjustable pedestal voltage (30-80% of line voltage)

- Protective features:
  - Motor overload
  - Overcurrent and locked rotor
  - SCR overload
  - Phase loss and phase sequence
- DIN rail or direct mount
- Optional remote keypad

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
- 5–40A @ 110-240V single-phase
- 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

Compact 3-Phase Soft Starters at Direct Prices

SR22 Series, 5A – 40A

For the latest prices, please check AutomationDirect.com.

WEG SSW05 Series, 10A – 85A

For the latest prices, please check AutomationDirect.com.
Stellar® SR22 Compact Soft Starters

Overview
SR22 semi-conductor soft starters provide many advantages when used instead of electro-mechanical contactors to control 1-phase (split phase, cap run, or cap start / cap run motor) and 3-phase AC induction motors. The SR22 soft starters use thyristors for reduced voltage motor starting and stopping, then switch to internal contacts for efficient running at rated speed.

Features
- 3–22A @ 110–240V 1Ph or 208–460V 3Ph
- Class 10 starting
- 5–40A @ 110–240V 1Ph or 208–460V 3Ph (lightly loaded)
- 24 VDC control voltage
- Easily and separately adjustable motor start and stop times
- Two-phase control
- Internal bypass contacts for run
- 35mm DIN rail mounting
- Two standard-size widths: 45 & 55 mm
- Six error/trip indications: AC Supply, Control Supply, Overheated, Bypass Failure, Shear Pin, Overcurrent

Advantages
- Mechanical Advantages
  - Smooth acceleration; reduced shock and starting stress
  - Extend lifespan of mechanical drive train components
  - Fluid couplings and some clutches can be eliminated
- Electrical Advantages
  - Reduced starting current
  - 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
- RoHS
- UL listed* (E333109) *(optional fans are UL recognized: E132139, E77551, E89936)

Optional Accessories
- Cooling fan (increases # of starts/hour)

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

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### SR22 Series Compact Soft Starters *

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td>$141.00</td>
<td>$152.00</td>
<td>$164.00</td>
<td>$206.00</td>
<td>$243.00</td>
<td>$327.00</td>
<td>$406.00</td>
<td>$489.00</td>
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<tr>
<td>*Rated Motor Current</td>
<td>std Class 10 starting</td>
<td>lightly loaded Class 2 starting</td>
<td>std Class 10 starting</td>
<td>lightly loaded Class 2 starting</td>
<td>std Class 10 starting</td>
<td>lightly loaded Class 2 starting</td>
<td>std Class 10 starting</td>
<td>lightly loaded Class 2 starting</td>
<td>std Class 10 starting</td>
</tr>
<tr>
<td>3A</td>
<td>4A</td>
<td>5A</td>
<td>6.5A</td>
<td>9A</td>
<td>12A</td>
<td>16A</td>
<td>19A</td>
<td>22A</td>
<td></td>
</tr>
<tr>
<td>5A</td>
<td>7A</td>
<td>9A</td>
<td>12A</td>
<td>16A</td>
<td>22A</td>
<td>30A</td>
<td>36A</td>
<td>40A</td>
<td></td>
</tr>
</tbody>
</table>
| Rated Operational Voltage | 110-240 VAC 1Ph or 208–460 VAC 3Ph (-15% +10%) @ 50–60 Hz (±2Hz); 3 phase (2 phases controlled)
| *Motor Rating | Starters must be sized according to HP AND starting class. Refer to selection tables or to online selection tool (https://www.automationdirect.com/selectors/softstarters) |
| Impulse Withstand Voltage | 2.5 kV |
| Insulation Voltage Rating | 500V |
| Short Circuit Current Rating | 5kA Type 1 when protected by recommended semiconductor fuses |
| Control Power | approx 4VA @ 24 VDC (external power supply required) (UL applications require max 4A UL listed fuse) |
| Control Inputs | galvanically isolated opto-coupled inputs; require sourcing +24 VDC (control) |
| Auxiliary Relay Output | 250 VAC: 2.5A resistive, 0.2A inductive / 30 VDC: 3.0A resistive, 0.7A inductive |
| Start Time Setting Range | 1–30 seconds |
| Start Voltage Setting Range | 30–100% |
| Stop Time Setting Range | 0–30 seconds |
| Start Duty | 3 x full load current for 10 seconds @ Trip Class 10 |
| Starts / Hour (standard) | 5 starts / hr |
| Starts / Hour (with optional fan) | (30 starts / hr) + (30 soft stops / hr) internally bypassed |
| Ambient Operating Temperature | 0–40 °C [32–104 °F] — Above 40 °C [104 °F] derate linearly by 2% of unit FLC per °C to a max derate of 40% @ 60 °C [140 °F] |
| Transportation & Storage Temperature | -25–60 °C [-13–140 °F] |
| Humidity | max 85% non-condensing; not exceeding 50% @ 40 °C [104 °F] |
| Altitude | 1000m [3281 ft]; 1000–2000m [3281–6562 ft] derate 1% of unit FLC per 100–2000m [328–6562 ft] |
| Environmental Rating | IP20 |
| Shipping Weight | 400g [14 oz] 680g [24 oz] 725g [26 oz] |
| Dimensions [HxWxD] | 143 x 45 x 117.8 mm [5.63 x 1.77 x 4.64 in] 167.5 x 55 x 117.8 mm [6.59 x 2.17 x 4.64 in] |

### Accessories
- Cooling Fan (temperature controlled)**
  - SR22-FAN-45
  - SR22-FAN-55
| Price | $48.50 | $48.50 |
| Dimensions | does not add to soft starter overall dimensions | adds 10 mm [0.39 in] to soft starter H dimension |

* Important: Care must be taken to select the correct SR22 for the application to ensure that the SR22 is not undersized. Refer to Selection Tables or to online selection tool for deratings by application and overload trip class (https://www.automationdirect.com/selectors/softstarters).

** Cooling fans do not run continuously.

www.automationdirect.com/soft-starters
## Stellar® SR22 Compact Soft Starters

### SR22 Soft Starters – Selection

#### Step 1: Select the application from the list and follow that column down.

<table>
<thead>
<tr>
<th>Typical applications</th>
<th>Standard Duty</th>
<th>Medium Duty</th>
<th>Heavy Duty</th>
<th>Light Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>Molding Machine</td>
<td>Ball mill</td>
<td>Pump - Positive displacement</td>
<td>Centrifuge*</td>
</tr>
<tr>
<td>Agitator</td>
<td>Plastic and textile machines</td>
<td>Bow Thruster - Loaded</td>
<td>Reciprocating Pump</td>
<td>FLA x 2.3</td>
</tr>
<tr>
<td>Bow Thruster - Zero Pitch</td>
<td>Pump - Submersible</td>
<td>Centrifugal</td>
<td>Pump - Positive displacement</td>
<td>Crusher</td>
</tr>
<tr>
<td>Compressor - Rotary Vane</td>
<td>Centrifugal Pump</td>
<td>Reciprocating</td>
<td>Rotary Pump</td>
<td>Fan – High Inertia &gt; 85A</td>
</tr>
<tr>
<td>Compressor - Scroll</td>
<td>Pump - Submersible</td>
<td>Compressor - Rotary</td>
<td>Jack</td>
<td>Shredder</td>
</tr>
<tr>
<td>Conveyor - Unloaded</td>
<td>Rotodynamic Saw - Band</td>
<td>Screw</td>
<td>Roots Blower</td>
<td>Wood chipper</td>
</tr>
<tr>
<td>Fan - Low Inertia &lt; 85A</td>
<td>Transformers, voltage regulators</td>
<td>Conveyor - Loaded</td>
<td>Saw - Circular</td>
<td>Press, flywheel</td>
</tr>
<tr>
<td>Lathe machines</td>
<td>Hammer mill Mills - Flour, etc.</td>
<td>Grinders</td>
<td>Screen - Vibrating</td>
<td></td>
</tr>
<tr>
<td>Mixer - Unloaded</td>
<td>Pelletizers</td>
<td>Millers - Flour, etc.</td>
<td>Tumblers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixers - Loaded</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Step 2: Confirm the rated starting capability of the soft start against the application.

<table>
<thead>
<tr>
<th>Trip Class</th>
<th>Rated Starting Capability</th>
<th>Max Starts per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3x Motor Current - 23s</td>
<td>5 starts/hr (or 30 starts/hr with fan)</td>
</tr>
<tr>
<td>20</td>
<td>3.5x Motor Current - 17s</td>
<td>Index Rating Standard (Class5) AC53b: 3-5: 355; Overcurrent = 3 x $I_{rated}$ for 5 seconds</td>
</tr>
<tr>
<td>30</td>
<td>4x Motor Current - 19s</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4x Motor Current - 29s</td>
<td></td>
</tr>
</tbody>
</table>

*WARNING: Applying more starts per hour than the specified 5 or 30 start/hr will cause the starter to overheat and fail.

#### Step 3: Consider the operating environment and make the model selection on a higher horsepower rating.

| Height Above Sea Level | Standard operating height is 3280ft. For every 328ft, increase motor HP by 1%, up to 6600ft. |
| Operating Temperature  | Standard operating temperature is 122°F. For every 1°F above, increase motor HP by 2.2%, up to 140°F. |
| Increased Starts per Hour | Use our online tool to select the model: https://www.automationdirect.com/selectors/softstarters |

#### Step 4: Select SR22 model based on your motor Voltage and Horsepower (3Ph only; 1Ph on next page)

<table>
<thead>
<tr>
<th>Motor HP</th>
<th>208VAC</th>
<th>230VAC</th>
<th>460VAC</th>
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</thead>
<tbody>
<tr>
<td>HP</td>
<td>$I_e$ (A)</td>
<td>HP</td>
<td>$I_e$ (A)</td>
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<tr>
<td>0.5</td>
<td>2.4</td>
<td>0.5</td>
<td>2.2</td>
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<tr>
<td>0.75</td>
<td>3.5</td>
<td>0.75</td>
<td>3.2</td>
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<tr>
<td>1</td>
<td>4.6</td>
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<td>4.2</td>
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<tr>
<td>1.5</td>
<td>6.6</td>
<td>2</td>
<td>6.8</td>
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<td>7.5</td>
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<td>9.6</td>
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<td>3</td>
<td>10.6</td>
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<td>4</td>
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<td>14</td>
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<tr>
<td>6</td>
<td>16.7</td>
<td>7.5</td>
<td>22</td>
</tr>
<tr>
<td>7.5</td>
<td>24.2</td>
<td>10</td>
<td>28</td>
</tr>
</tbody>
</table>

* A separate overload protection device with a rating corresponding to the applicable trip class must be used with the SR22.

** The SR22 is not suitable for very high inertia loads such as centrifuges or loaded crushers with start times > 30s.

*** Do NOT use the Class 2 rating when there is a possibility of the motor starting under a heavy load.

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For the latest prices, please check AutomationDirect.com.
Stellar® SR22 Compact Soft Starters

**SR22 Soft Starters – Selection (Cont’d)**

<p>| Step 4: Select SR22 model based on your motor Voltage and Horsepower (1Ph only) |
|---|---|---|---|---|---|
| <strong>Motor HP</strong> | <strong>220-240V</strong> | <strong>110-120V</strong> | <strong>Trip Class</strong> |</p>
<table>
<thead>
<tr>
<th><strong>HP</strong></th>
<th><strong>I_e (A)</strong></th>
<th><strong>HP</strong></th>
<th><strong>I_e (A)</strong></th>
<th><strong>10</strong></th>
<th><strong>20</strong></th>
<th><strong>30</strong></th>
<th><strong>2</strong></th>
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<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>1.6</td>
<td>SR22-05</td>
<td>SR22-05</td>
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<tr>
<td>-</td>
<td>-</td>
<td>0.12</td>
<td>1.9</td>
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<td>SR22-05</td>
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<tr>
<td>-</td>
<td>2.4</td>
<td>0.16</td>
<td>2.3</td>
<td>SR22-05</td>
<td>SR22-07</td>
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<td>SR22-05</td>
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<td>3.3</td>
<td>0.25</td>
<td>2.9</td>
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<td>SR22-09</td>
<td>SR22-12</td>
<td>SR22-05</td>
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<td>SR22-05</td>
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<td>5.5</td>
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<td>-</td>
<td>0.75</td>
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<td>-</td>
<td>SR22-12</td>
<td>SR22-16</td>
<td>SR22-22</td>
<td>SR22-07</td>
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<tr>
<td>0.33</td>
<td>7.9</td>
<td>1</td>
<td>7.3</td>
<td>SR22-16</td>
<td>SR22-22</td>
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<tr>
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<td>11</td>
<td>1.5</td>
<td>10</td>
<td>SR22-22</td>
<td>SR22-36</td>
<td>SR22-40</td>
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<tr>
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<td>13</td>
<td>SR22-30</td>
<td>SR22-40</td>
<td>SR22-40 w/fan</td>
<td>SR22-16</td>
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<tr>
<td>1</td>
<td>15</td>
<td>3</td>
<td>-</td>
<td>SR22-40</td>
<td>SR22-40 w/fan</td>
<td>SR22-22</td>
<td>SR22-22</td>
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<tr>
<td>1.5</td>
<td>21</td>
<td>-</td>
<td>19</td>
<td>SR22-40</td>
<td>SR22-40 w/fan</td>
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<td>26</td>
<td>-</td>
<td>24</td>
<td>SR22-40 w/fan</td>
<td>SR22-40 w/fan</td>
<td>SR22-30</td>
<td>SR22-30</td>
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<tr>
<td>-</td>
<td>-</td>
<td>5</td>
<td>27</td>
<td>SR22-40 w/fan</td>
<td>SR22-40 w/fan</td>
<td>SR22-30</td>
<td>SR22-30</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>30</td>
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<tr>
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<td>37</td>
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<td>-</td>
<td>SR22-40 w/fan</td>
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</tr>
<tr>
<td>-</td>
<td>-</td>
<td>7.5</td>
<td>41</td>
<td>SR22-40 w/fan</td>
<td>SR22-40 w/fan</td>
<td>SR22-40</td>
<td>SR22-40</td>
</tr>
</tbody>
</table>

*5 starts/hour without fan; 30 starts/hour with fan
**10 starts/hour without fan; 60 starts/hour with fan

Online Product Selection Tool:
https://www.automationdirect.com/selectors/softstarters

**SR22 Max UL Overcurrent Protection**

**SR22 Internal Overcurrent Trip Curve**

The internal overcurrent trip of the soft starter does not replace the required external overcurrent device.

![SR22 Overcurrent Trip Curve](image)

**UL Maximum Overcurrent Protection Devices**

<table>
<thead>
<tr>
<th>Soft Starter Model Number</th>
<th>Maximum Non-Time-Delay Trip Rating *</th>
<th>Circuit Breaker *</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR22-05</td>
<td>15A</td>
<td>N/A</td>
</tr>
<tr>
<td>SR22-07</td>
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<td>80A</td>
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<tr>
<td>SR22-40</td>
<td>150A</td>
<td>150A</td>
</tr>
</tbody>
</table>

* Maximum trip ratings are for non-time-delay overcurrent protection devices.
Motion branch circuit protection must be based on MOTOR Full Load Current, and must comply with applicable local electrical codes. The 2008 NEC section 430.52 recommends a maximum of 175% (up to 225% absolute maximum) of motor FLC for time-delay fuses. (Class CC time-delay fuses are permitted up to the non-time-delay fuse maximum rating.)
Stellar® SR22 Compact Soft Starters

SR22 Dimensions
Dimensions = mm [in]

SR22 – PLC I/O Compatibility

Product Line | Module Type | Module Numbers
---|---|---
CLICK | PLC | C0-00AR-D, C0-00DD2-D, C0-00DR-D, C0-02DD2-D, C0-02DR-D
| DC Output | C0-08TD2, C0-16TD2
| Relay Output | C0-04TRS, C0-08TR
Productivity3000 | DC Output | P3-08ND3S, P3-16ND3, P3-32ND3, P3-64ND3
| Relay Output | P3-08TAS, P3-16TA, P3-08TRS, P3-16TR, P3-08TRS-1
DL05 | PLC | D0-05AR, D0-05DR, D0-05DR
| DC Output | D0-08TAS, D0-16TA, D0-08TRS, D0-16TR, D0-08TRS-1
DL06 | PLC | D0-05AR, D0-05DR, D0-05DR
| DC I/O | D0-07CDR
| DC Output | D0-10TAS, D0-16TAS, D0-08TAS, F0-04TRS
DL105 | PLC | F1-130-DR, F1-130-DR-D
| DC I/O | D2-08CDR
DL205 | DC Output | D2-08TAS, D2-16TAS, D2-32TAS, F2-16TAS
| Relay Output | D2-08TRS, D2-08TAS, D2-12TAS, F2-08TAS, F2-08TRS
DL305 | DC Output | D3-08TAS, D3-16TAS
| Relay Output | D3-08TAS, D3-16TAS
DL405 | DC Output | D4-16TAS, D4-32TAS
| Relay Output | D4-08TAS, D4-16TAS, D4-08TRS-1, D4-08TRS-2
Terminator I/O | DC Output | T1K-08TD2, T1K-16TAS, T1K-08TAS, T1K-16TAS
| Relay Output | T1K-08CDR, T1K-16TAS, T1K-08TAS, T1K-16TAS

For the latest prices, please check AutomationDirect.com.
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
• 15.5–350A @ 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 Soft Starter Technical Specifications

**SR33 Series Basic Soft Starters – General Specifications and Features**

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Price</td>
<td>$453.00</td>
<td>$484.00</td>
<td>$550.00</td>
<td>$615.00</td>
<td>$695.00</td>
<td>$740.00</td>
<td>$787.00</td>
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</table>

* Rated Current [class 10 starting] (A)

<table>
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<th></th>
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<tbody>
<tr>
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<td>$1,095.00</td>
<td>$1,208.00</td>
<td>$1,901.00</td>
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<td>$3,033.00</td>
<td>$3,314.00</td>
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</table>

* Motor Rating

<table>
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<tr>
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<td>$3,033.00</td>
<td>$3,314.00</td>
<td>$3,480.00</td>
</tr>
</tbody>
</table>

**SR33 Series Basic Soft Starters – Model-Specific Specifications and Features**

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
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</tbody>
</table>

<table>
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</thead>
<tbody>
<tr>
<td>Price</td>
<td>$993.00</td>
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<td>$1,208.00</td>
<td>$1,901.00</td>
<td>$2,003.00</td>
<td>$3,033.00</td>
<td>$3,314.00</td>
<td>$3,480.00</td>
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</table>

**SR33 Series Basic Soft Starters – 22A-482A * – Model-Specific Specifications and Features**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
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<td>$484.00</td>
<td>$550.00</td>
<td>$615.00</td>
<td>$695.00</td>
<td>$740.00</td>
<td>$787.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$993.00</td>
<td>$1,095.00</td>
<td>$1,208.00</td>
<td>$1,901.00</td>
<td>$2,003.00</td>
<td>$3,033.00</td>
<td>$3,314.00</td>
<td>$3,480.00</td>
</tr>
</tbody>
</table>

**Important: Care must be taken to select the correct SR33 for the application to ensure that the SR33 is not undersized. Refer to Selection Tables or to online selection tool for deratings by application and overload trip class (https://www.automationdirect.com/selectors/softstarters).**

**When protected by recommended semiconductor fuse.**

For the latest prices, please check AutomationDirect.com.
Stellar® SR33 Series Basic Soft Starters

SR33 Soft Starter Accessory

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Name</th>
<th>Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR33-HS1</td>
<td>Insulation Kit</td>
<td>$8.75</td>
<td>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.</td>
</tr>
</tbody>
</table>

SR33 Soft Starter Index Ratings

<table>
<thead>
<tr>
<th>Index Rating Example - Bypassed Operation</th>
<th>(AC-53b Utilization Category per IEC 60947-4-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• AC-53b = controller semiconductors provide squirrel-cage motor Start control only; bypassed for Run and Stop.</td>
<td></td>
</tr>
<tr>
<td>• IEC Index Ratings are comprised of Rated Operational Current (I_e), Utilization Category, Overload Current Profile (X-Tx), OFF-time.</td>
<td></td>
</tr>
</tbody>
</table>

### SR33 Index Ratings – AC-53b (Bypassed Operation) *

<table>
<thead>
<tr>
<th>Trip Class</th>
<th>X-Tx: OFF-time</th>
<th>I_e (A)</th>
<th>Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3-23; 697 (5)</td>
<td>29 to 280</td>
<td>SR33-29 to SR33-280</td>
</tr>
<tr>
<td></td>
<td>3-23; 117 (3)</td>
<td>350 to 482</td>
<td>SR33-350 to SR33-482</td>
</tr>
<tr>
<td>20</td>
<td>4-19; 701 (5)</td>
<td>29 to 350</td>
<td>SR33-29 to SR33-350</td>
</tr>
<tr>
<td></td>
<td>4-19; 1181 (3)</td>
<td>430 to 482</td>
<td>SR33-430 to SR33-482</td>
</tr>
<tr>
<td>30</td>
<td>4-29; 691 (5)</td>
<td>41 to 430</td>
<td>SR33-41 to SR33-430</td>
</tr>
<tr>
<td></td>
<td>4-29; 1171 (3)</td>
<td>482</td>
<td>SR33-482</td>
</tr>
</tbody>
</table>

* Index rating AC-53b is specified by IEC standard # 60947-4-2

For the latest prices, please check AutomationDirect.com.
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 10, which means it is capable of withstanding three times Full Load Current for ≈10-second starts. However, there are instances where a different start profile is required. To satisfy these applications, the SR33 has two other ratings; 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.
• 2-pole motors may take longer to start.

---

**SR33 Soft Starters – Selection – Steps 1 & 2 (of 4)**

<table>
<thead>
<tr>
<th>Typical Applications</th>
<th>Standard Duty</th>
<th>Medium Duty</th>
<th>Heavy Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molding Machine</td>
<td>Ball mill</td>
<td>Pump - Positive</td>
<td></td>
</tr>
<tr>
<td>Plastic and textile machines</td>
<td>Centrifugal displacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrifugal</td>
<td>Pump - Submersible displacement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saw - Band</td>
<td>Saw - Band</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformers, voltage regulators</td>
<td>Saw - Band</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Step 1:** Select the application from the list and follow that column down.

**Step 2:** Confirm the starting capability of the soft start against the application.

<table>
<thead>
<tr>
<th>Trip Class</th>
<th>Rated Starting Capability</th>
<th>Max Starts per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3x Motor Current - 23s</td>
<td>SR33-29 to -280: 5 starts/hr</td>
</tr>
<tr>
<td>20</td>
<td>4x Motor Current - 19s</td>
<td>SR33-29 to -280: 5 starts/hr</td>
</tr>
<tr>
<td>30</td>
<td>4x Motor Current - 29s</td>
<td>SR33-32 to -280: 5 starts/hr</td>
</tr>
</tbody>
</table>

**Index Rating Standard (Class 5) IEC53b: 3-5: 355; Overcurrent = 3 x Ie for 5 seconds**

**Warning:** Applying more starts per hour than the specified 5 or 3 starts/hr will cause the starter to overheat and fail.

---

**SR33 Soft Starters – Selection – Steps 3 & 4 (of 4)**

**Step 3:** Consider the operating environment and make the model selection on a higher horsepower rating.

<table>
<thead>
<tr>
<th>Height Above Sea Level</th>
<th>Standard operating height is 280ft. For every 328ft, increase motor HP by 1%, up to 660ft. Example: For a 100HP motor at 400ft, make model selection based on 105HP (5% higher).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>Standard operating temperature is 122°F. For every 1°F above, increase motor HP by 2.2%, up to 140°F. Example: For a 100HP motor at 132°F, make model selection based on 122HP (22% higher).</td>
</tr>
<tr>
<td>Increased Starts per Hour</td>
<td>Use our online tool to select the model: <a href="https://www.automationdirect.com/selectors/softstarters">https://www.automationdirect.com/selectors/softstarters</a></td>
</tr>
</tbody>
</table>

**Step 4:** Select SR33 model based on your motor Voltage and Horsepower

<table>
<thead>
<tr>
<th>Motor HP</th>
<th>230VAC</th>
<th>460VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP</td>
<td>Ie (A)</td>
<td>Ie (A)</td>
</tr>
<tr>
<td>3-23:697</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trip Class</th>
<th>5 starts/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-23:697</td>
<td>SR33-22</td>
</tr>
<tr>
<td>4-19:701</td>
<td>SR33-29</td>
</tr>
<tr>
<td>4-19:691</td>
<td>SR33-32</td>
</tr>
</tbody>
</table>

---

**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.**

---

For the latest prices, please check AutomationDirect.com.
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 150hp motor (195 Amp) at the maximum continuous running current and will allow an overload of 3 x 150 Amp (450A) for 12 seconds, 3 times per hour. The unit would also allow a 3.5 x overload (525A) for approximately 5½ seconds, 3 times per hour.

Following an overload trip, subsequent restarts need to 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.

For the latest prices, please check AutomationDirect.com.
**Stellar® SR33 Series Basic Soft Starters**

**UL Maximum Surrounding Air Temperatures**

<table>
<thead>
<tr>
<th>SR33 Model Number *</th>
<th>Maximum 40°C [104°F]</th>
<th>Maximum 50°C [122°F]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I (A)</td>
<td>HP @ 480V</td>
</tr>
<tr>
<td>SR33-22</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>SR33-29</td>
<td>29</td>
<td>20</td>
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<tr>
<td>SR33-36</td>
<td>41</td>
<td>30</td>
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<td>SR33-55</td>
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<td>SR33-66</td>
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<td>50</td>
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<td>SR33-80</td>
<td>80</td>
<td>60</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SR33 Model Number *</th>
<th>Maximum 40°C [104°F]</th>
<th>Maximum 50°C [122°F]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I (A)</td>
<td>HP @ 480V</td>
</tr>
<tr>
<td>SR33-97</td>
<td>97</td>
<td>75</td>
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<tr>
<td>SR33-132</td>
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<td>100</td>
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<tr>
<td>SR33-160</td>
<td>160</td>
<td>125</td>
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<td>SR33-195</td>
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<td>150</td>
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<td>SR33-241</td>
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<td>200</td>
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<tr>
<td>SR33-280</td>
<td>280</td>
<td>200</td>
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</table>

* 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

- 125.0 [4.92]
- Ø6.5 [0.26]
- 62.0 [2.44]
- 139.9 [5.51]
- 132.5 [5.22]

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

- 157.5 [6.20]
- 73.7 [2.90]
- 145.0 [5.71]
- Ø8.5 [0.33]
- 203.0 [7.99]

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

- 157.5 [6.20]
- 76.1 [3.00]
- 145.0 [5.71]
- Ø8.5 [0.33]
- 203.0 [7.99]
- 160.0 [6.30]

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

- 204.0 [8.03]
- 160.0 [6.30]
- M8 CLEARANCE
- M10 EARTH

For the latest prices, please check AutomationDirect.com.

www.automationdirect.com/soft-starters
Overview

SR35 full-featured solid-state Soft Starters provide many advantages when used instead of electromechanical contactors to control both 1-phase and 3-phase AC induction motors. The SR35 Soft Starters are fully digital, and use thyristors on the A and C phases for controlled reduced voltage motor starting and stopping. SR35s have an Automatic Application Setup that fully configures the starter for a specific application with one entry.

Features

- 17–361 A @ 110-240 VAC, 1PH or 200–600 VAC, 3PH
- 24VDC control voltage, 110-230 VAC with optional power supply, SR35-PSU
- Internally bypassed during run
- Two-phase motor control
- Built-in SCR failure protection
- Full motor overload protection
- Full data logging (fault records, motor current, operational status, etc.)
- Fully programmable
- Easily and separately adjustable motor start and stop times
- Can be used for motor reversing (with external contactors)
- Suitable for a wide variety of motor loads
- Easy-to-navigate menu structure and quick automatic application set up
- Can be used with local or remote control
- Integrated Modbus RTU communication
- Optional remote keypad available
- Programmable digital inputs, and relay outputs for remote control
- Fault record history of last 9 trips (using the download fault log will give faults and running data for the life of the SR35)
- IP20, panel mount with optional finger guards for frame sizes 1 and 2 soft starters
- Two-year warranty
- CE, cULus, REACH, RoHS
- Suitable for soft starting, split phase, cap run or cap start / cap run motors

Advantages

Mechanical Advantages
- Smaller physical size than equivalent SR55 models (even with the built-in bypass contactors)
- 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
- Reduced starting currents and spikes
- More motors or larger motors can be started from lower-capacity power sources
- Allows motors to be started more frequently

Economic Advantages
- Lower overall costs for new installations
- Bypass relays built in
- Reduced maintenance and replacement of mechanical drive-train components
- Reduced starting current lowers demand charges
- Automatic Application setup feature speeds installation by configuring the SR35 for a specific application with one setting

Optional Accessories

- Power terminal IP20 finger guards
- Power terminal covers (Size 3)
- Remote keypad
- 110-230 VAC Power supply
- I/O Expansion module
- Cooling fans increase starts per hour

Applications

- General purpose applications where traditional across-the-line starting or wye-delta starting would typically be appropriate
- Applications with oversized or lightly loaded motors.
- Applications requiring lower inrush currents

Stellar® SR35 Basic Soft Starters

For the latest prices, please check AutomationDirect.com.
## Stellar® SR35 Basic Soft Starters

### SR35 Soft Starter General Specifications

<table>
<thead>
<tr>
<th>General Specification</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product standard</strong></td>
<td>En 60947-4-2: 2012</td>
</tr>
<tr>
<td><strong>Rated operational voltages</strong> $U_e$</td>
<td>110 – 240 VAC 1Ph; 200 – 600 VAC 3Ph</td>
</tr>
<tr>
<td><strong>Rated operational current</strong> $I_e$</td>
<td>See Rating Table on page tSST-18</td>
</tr>
<tr>
<td><strong>Rating index</strong></td>
<td>See Rating Table on page tSST-18</td>
</tr>
<tr>
<td><strong>Rated frequencies</strong></td>
<td>50 – 60 Hz ± 5Hz</td>
</tr>
<tr>
<td><strong>Rated duty</strong></td>
<td>Uninterrupted</td>
</tr>
<tr>
<td><strong>Form designation</strong></td>
<td>Form 1, internally bypassed</td>
</tr>
<tr>
<td><strong>Method of operation</strong></td>
<td>Symmetrically controlled starter</td>
</tr>
<tr>
<td><strong>Method of connecting</strong></td>
<td>Thyristors connected between motor windings and supply</td>
</tr>
<tr>
<td><strong>Number of poles</strong></td>
<td>3 Main poles (2 main poles controlled by semiconductor switching element)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Rated insulation voltage</strong> $U_i$</th>
<th>Main circuit</th>
<th>Control supply circuit</th>
<th>See key to part numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 VAC r.m.s.</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Rated impulse withstand voltage</strong> $U_{imp}$</th>
<th>Main circuit</th>
<th>Control supply circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 kV</td>
<td>4 kV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ip code</strong></th>
<th>Main circuit</th>
<th>Supply and control circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IP00 (IP20 with finger guards 5)</td>
<td>IP20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Overvoltage category / pollution degree</strong></th>
<th>Type 1 coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>See Short Circuit Protection tables on page tSST-15 for rated conditional short-circuit current and required current rating and characteristics of the associated SCPD</td>
</tr>
</tbody>
</table>

| **Rated conditional short-circuit current and type of coordination with associated short circuit protective device (SCPD)** | See Short Circuit Protection tables on page tSST-15 for rated conditional short-circuit current and required current rating and characteristics of the associated SCPD |

<table>
<thead>
<tr>
<th><strong>As standard</strong></th>
<th>Control supply</th>
<th>Control circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kind of current, rated frequency</td>
<td>DC</td>
</tr>
<tr>
<td></td>
<td>Rated voltage $U_e$</td>
<td>24 VDC</td>
</tr>
<tr>
<td></td>
<td>Maximum power consumption</td>
<td>12 Va (SR35-017 – SR35-065) 48 Va (SR35-077 – SR35-361)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>With SR35-PSU module</strong></th>
<th>Control supply</th>
<th>Control circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply input</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kind of current, rated frequency</td>
<td>AC, 50 – 60 Hz ± 5Hz</td>
</tr>
<tr>
<td></td>
<td>Rated voltage $U_e$</td>
<td>110 – 230 VAC</td>
</tr>
<tr>
<td></td>
<td>Rated input current</td>
<td>1A</td>
</tr>
<tr>
<td></td>
<td>Programmed opto-isolated inputs</td>
<td>D1, D2</td>
</tr>
<tr>
<td></td>
<td>Common input, marking</td>
<td>COM</td>
</tr>
<tr>
<td></td>
<td>Kind of current, rated frequency</td>
<td>DC</td>
</tr>
<tr>
<td></td>
<td>Rated voltage $U_e$</td>
<td>24 VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Auxiliary Circuit</strong> 3</th>
<th>Form a – single gap make -contact (normally open)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply input</td>
</tr>
<tr>
<td></td>
<td>Kind of current, rated frequency</td>
</tr>
<tr>
<td></td>
<td>Rated voltage $U_e$</td>
</tr>
<tr>
<td></td>
<td>Rated input current</td>
</tr>
<tr>
<td></td>
<td>Programmed opto-isolated inputs</td>
</tr>
<tr>
<td></td>
<td>Common input</td>
</tr>
<tr>
<td></td>
<td>Kind of current, rated frequency</td>
</tr>
<tr>
<td></td>
<td>Rated voltage $U_e$</td>
</tr>
<tr>
<td></td>
<td>Time-current characteristics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Electronic overload relay with manual reset and thermal memory</strong></th>
<th>Trip class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 (Factory default), 20 or 30 (selectable)</td>
</tr>
</tbody>
</table>

1. With optional SR35-PSU power supply module.
2. Must be supplied by class 2, limited voltage current or protected by a 4A UL 248 listed fuse.
3. Compliant with Annex S of IEC 60947-1:2007 at 24 VDC.
4. Not applicable for UL.
5. For models SR35-017 – SR35-192 the main circuit IP20 rating only applies when the finger guards as supplied are fitted.

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

For the latest prices, please check AutomationDirect.com.
Stellar® SR35 Basic Soft Starters

SR35 Soft Starter Technical Specifications

<table>
<thead>
<tr>
<th>Model (SR35-)</th>
<th>Price</th>
<th>Frame Size</th>
<th>Heat Output (W)</th>
<th>Weight [kg [lb]]</th>
<th>Ambient Operating Temperature</th>
<th>Transportation and Storage Temperature</th>
<th>Humidity</th>
<th>Maximum Altitude</th>
<th>Environmental Rating</th>
<th>Drawing Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>017</td>
<td>$387.00</td>
<td>1</td>
<td>9</td>
<td>1.97 [4.2]</td>
<td>-20°C to 40°C, above 40°C de-rate linearly by 2% of SR35 Ie per °C to a maximum of 60°C (140°F)</td>
<td>-20°C to 70°C [-4°F to 158°F] continuous</td>
<td>Max 85% non-condensing, not exceeding 50% @ 40°C (104°F)</td>
<td>1,000m (3281ft); above 1000m derate by 1% of SR35 Ie per 100m (328ft) to a maximum altitude of 2,000m (6562ft)</td>
<td>Main circuit: IP00; Control circuit: IP20; no corrosive gases permitted</td>
<td>PDF</td>
</tr>
<tr>
<td>022</td>
<td>$412.00</td>
<td>12</td>
<td>16</td>
<td>6.0 [13.23]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
</tr>
<tr>
<td>027</td>
<td>$448.00</td>
<td>14</td>
<td>20</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
</tr>
<tr>
<td>034</td>
<td>$469.00</td>
<td>16</td>
<td>20</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>PDF</td>
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<tr>
<td>041</td>
<td>$524.00</td>
<td>20</td>
<td>25</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
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<td></td>
<td>PDF</td>
</tr>
<tr>
<td>052</td>
<td>$595.00</td>
<td>30</td>
<td>37</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>PDF</td>
</tr>
<tr>
<td>065</td>
<td>$632.00</td>
<td>49</td>
<td>61</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
</tr>
<tr>
<td>077</td>
<td>$750.00</td>
<td>111</td>
<td>139</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
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<td></td>
<td>PDF</td>
</tr>
<tr>
<td>100</td>
<td>$850.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>125</td>
<td>$1,143.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
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<td></td>
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</tr>
<tr>
<td>156</td>
<td>$1,813.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
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<td>PDF</td>
</tr>
<tr>
<td>192</td>
<td>$1,911.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>242</td>
<td>$2,200.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
</tr>
<tr>
<td>302</td>
<td>$2,546.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
</tr>
<tr>
<td>361</td>
<td>$2,719.00</td>
<td>139</td>
<td>166</td>
<td>1.97 [4.2]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PDF</td>
</tr>
</tbody>
</table>

Ventilation for Enclosures

SR35 Minimum Clearance Distances * ( in [mm] )

<table>
<thead>
<tr>
<th>SR35 Soft Starter Model</th>
<th>Top</th>
<th>Bottom</th>
<th>Left</th>
<th>Right</th>
<th>Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 1: SR35-017 to SR35-065</td>
<td>3 [75]</td>
<td>1 [25]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 2: SR35-77 to SR35-192</td>
<td>3.9 [100]</td>
<td>1.6 [40]</td>
<td>1 [25]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For heat dissipation, the SR35 must not be mounted any closer to another object than these distances.

The addition of optional finger guards to size 1 and size 2 SR35 soft starters adds approximately 14mm [0.5in] to the soft starter vertical dimension, but does not change the clearance distance.

When installing the SR35 starter in an enclosure, ventilation must be provided if the heat output of the unit is greater than what the enclosure will dissipate. Use the formula at right to determine the fan requirement.

An allowance has been incorporated into the formula so that the figure for Q is the air delivery in the fan suppliers data. Heat dissipated can be approximated with the formula:

\[ \text{Watts (SR35)} = \frac{1}{2} \times (\text{SR35 current rating}) \times 3 \]

\[ Q = \frac{4 \times \text{Wt}}{(T_{\text{max}} - T_{\text{amb}})} \]

\[ Q = \text{Volume of air (cubic meters per hour - m}^3\text{/h)} \]

\[ \text{Wt} = \text{Heat produced by the unit and all other heat sources within the enclosure (Watts)} \]

\[ T_{\text{max}} = \text{Maximum permissible temperature within the enclosure (50°C for a fully rated SR35)} \]

\[ T_{\text{amb}} = \text{Temperature of the air entering the enclosure (°C)} \]

(If you prefer to work in CFM, substitute °F for °C. Q is now in CFM)
Stellar® SR35 Basic Soft Starters

SR35 Soft Starter Overcurrent Protection

<table>
<thead>
<tr>
<th>Type designation (SR35)</th>
<th>077</th>
<th>100</th>
<th>125</th>
<th>156</th>
<th>192</th>
<th>242</th>
<th>302</th>
<th>361</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operational current $I_e$ [A]</td>
<td>17</td>
<td>22</td>
<td>29</td>
<td>35</td>
<td>41</td>
<td>55</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Rated conditional short circuit current $I_q$ [kA]</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Class J time-delay fuse #1 Maximum rating $Z_1$ [A]</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>100</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>UL Listed inverse-time delay circuit breaker #1 Maximum rating $Z_2$ [A]</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>150</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Semiconductor fuse (class aR) #2 Type</td>
<td>Mersen 6,9 URD 30</td>
<td>Mersen 6,9 URD 31</td>
<td>Bussmann 170M30</td>
<td>Bussmann 170M40</td>
<td>Bussmann 170M31</td>
<td>Bussmann 170M41</td>
<td>Bussmann 170M32</td>
<td>Bussmann 170M42</td>
</tr>
<tr>
<td>Fuse rating [A]</td>
<td>160</td>
<td>160</td>
<td>200</td>
<td>200</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

1. Suitable For Use On A Circuit Capable Of Delivering Not More Than $I_q$ r.m.s. Symmetrical Amperes, 600V Maximum, When Protected by Class J Time Delay Fuses with a Maximum Rating of $Z_1$ or by a Circuit Breaker with a Maximum Rating of $Z_2$.

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.

SR35 Soft Starter Overload Trip

The SR35 soft starter provides motor overload protection, which can be configured through the keypad. 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 $I^2T$ motor overload with memory.

Motor Overload ‘cold’ trip curves (20°C ambient)

For the latest prices, please check AutomationDirect.com.
### Typical Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>FLA 200V</th>
<th>FLA 208V</th>
<th>FLA 220-240V</th>
<th>FLA 440-480V</th>
<th>FLA 550-600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitator</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Compressor - Centrifugal</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Compressor - Rotary Vane</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Compressor - Unloaded</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Bow Thruster - Zero Pitch</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Fan - Low Inertia or &lt;85A</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Feeder - Screw</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Lathe Machines</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Mixer - Unloaded</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Molding Machine</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Plastic and Textile Machines</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Pump - Submersible, Centrifugal</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Pump - Submersible, Reciprocating</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Saw - Band</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Transformers</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Voltage Regulators</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Rolling Mill</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Roots Blower</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Saw - Circular</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Screen - Vibrating</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Tumblers</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
</tbody>
</table>

### Step 2 - Confirm the rated starting capability of the soft starter against the application

<table>
<thead>
<tr>
<th>Trip Class 10</th>
<th>Trip Class 20</th>
<th>Trip Class 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Starting Capability</td>
<td>3x Motor Current - 23s</td>
<td>4x Motor Current - 19s</td>
</tr>
<tr>
<td>Max Starts per Hour</td>
<td>5 starts/hour</td>
<td>5 starts/hour</td>
</tr>
<tr>
<td>Max Starts per Hour w/Optional Cooling Fan</td>
<td>40 starts/hour</td>
<td>40 starts/hour</td>
</tr>
</tbody>
</table>

### Step 3 - Consider the operating environment and make the model selection on a higher amp rating

- **Height Above Sea Level**: Standard operating height is 1000m, for every 100m increase motor Amps/kW by 1% up to 2000m.
  - Example: For a 20A motor at 1500m, make model selection based on 21A (5% higher).
- **Operating Temperatures**: Standard operating temperature is 40degC, for every 1°C above, increase motor Amps/kW by 2%, up to 60°C.
  - Example: For a 20A motor at 50°C make model selection based on 24A (20% higher).
- **Increased Starts per Hour**: Fit optional fan to increase maximum up to 40 starts per hour.

### Step 4 (Three Phase) - Select your motor Voltage and Horsepower/kW and select model

<table>
<thead>
<tr>
<th>FLA 200V</th>
<th>FLA 208V</th>
<th>FLA 220-240V</th>
<th>FLA 440-480V</th>
<th>FLA 550-600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>4</td>
<td>7.5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>5.5</td>
<td>11</td>
<td>20</td>
<td>25</td>
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<tr>
<td>29</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>35</td>
<td>7.5</td>
<td>18.5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>41</td>
<td>11</td>
<td>22</td>
<td>10</td>
<td>10</td>
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Select Model

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- For the latest prices, please check AutomationDirect.com.
### SR35 Soft Starter Selection (1Ph)

**Step 4 (Single Phase)** - Select your motor Voltage and Horsepower/kW and select model

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*SR35-242, 302 and 361, 3 starts/hour @ 40°C
Stellar® SR35 Basic Soft Starters

SR35 Index Ratings (per IEC 60947-4-2)

### Rating Table – Vertically Mounted (3Ph)

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<th>Iₚ</th>
<th>kW</th>
<th>FLA</th>
<th>Hp</th>
<th>Trip Class 10 Iₑ: AC-53a: 3.5-17: F-S</th>
<th>Trip Class 20 Iₑ: AC-53a: 4-19: F-S</th>
<th>Trip Class 30 Iₑ: AC-53a: 4-29: F-S</th>
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<th>Trip Class 10 Iₑ: AC-53a: 3.5-17: F-S</th>
<th>Trip Class 20 Iₑ: AC-53a: 4-19: F-S</th>
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### Index Rating Example – Standard Operation (AC-53a Utilization Category per IEC 60947-4-2)

Duty Cycle (F-S) 90-5 = 90% duty cycle - 5 cycles/hr
Overload Current Profile (X-Tx) 3.5-17 = 3.5 times rated current (Iₑ) for 17s
Utilization Category
Rated Operational Current (Iₑ) 17 to 195

1. Rated operational powers in kW as per IEC 60972-1 (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 fitted as indicated in Fan option table. For SR35-242 – SR35-361 models, fans fitted as standard. Reference page tSST-19 for duty cycle.
## Stellar® SR35 Basic Soft Starters

### Standard Overload Current Profile and Duty Cycle

The SR35 has been designed for a specific Overload Current Profile and Duty Cycle as shown above in the SR35 Index Ratings. The Overload Current Profile is expressed by two symbols, X and Tx. X denotes the overload current as a multiple of $I_e$ and represents the maximum value of operating current due to starting, operating, or maneuvering under overload conditions. For example, $X = 3.5$ means that the maximum overload start current allowed is 3.5 times FLC. Tx denotes the duration of the controlled overload currents during starting, stopping, operating, or maneuvering. For example, $Tx = 17$ means that the maximum allowed overload current is permitted for up to 17 seconds only.

The Duty Cycle is expressed by two symbols, F and S which describe the duty and also set the time that must be allowed for cooling. F is the ratio of the on-load period to the total period expressed as a percentage. For example, $F = 90$ means that the soft starter is ON for 90% of the time and then OFF for 10% of the time between each start. If there are not multiple starts per hour, then the Duty Cycle is continuous. S is the number of starts or operating cycles per hour. For example, $S = 5$ means that the soft starter is capable of 5 equally spaced starts per hour. These characteristics are summarized in the table below:

<table>
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<tr>
<th>Model</th>
<th>Rated Current (A) *</th>
<th>Class 10 O/L Multiple (X) *</th>
<th>Class 10 O/L Time (Tx) *</th>
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<th>Duty (F)</th>
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For the latest prices, please check AutomationDirect.com.
Stellar® SR35 Basic Soft Starters

SR35 Accessories

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<tr>
<th>Part Number</th>
<th>Price</th>
<th>Description</th>
<th>Image</th>
<th>For SR35 Models</th>
<th>Drawing Link</th>
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<tbody>
<tr>
<td>SR35-FG-1</td>
<td>$24.00</td>
<td>Stellar SR35 series finger guards, replacement. Package of 2. For use with size 1 Stellar SR35 series soft starters. Provides IP20 protection rating.</td>
<td><img src="sr35-fg-1.jpg" alt="Image" /></td>
<td>-017 thru -065</td>
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<tr>
<td>SR35-TC-3</td>
<td>$202.00</td>
<td>Stellar SR35 series finger guards, package of 6. For use with size 3 Stellar SR35 series soft starters.</td>
<td><img src="sr35-tc-3.jpg" alt="Image" /></td>
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<tr>
<td>SR35-FAN-1</td>
<td>$54.00</td>
<td>Stellar SR35 series main cooling fan, 36 x 222 x 90mm, 24 VDC. For use with size 1 Stellar SR35 series soft starters. Electrical connector included.</td>
<td><img src="sr35-fan-1.jpg" alt="Image" /></td>
<td>-017 thru -065</td>
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<td>SR35-FAN-2</td>
<td>$57.00</td>
<td>Stellar SR35 series main cooling fan, 68 x 297 x 102mm, 12 VDC. For use with size 2 Stellar SR35 series soft starters. Electrical connector included.</td>
<td><img src="sr35-fan-2.jpg" alt="Image" /></td>
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<td>SR35-KPD-REM</td>
<td>$172.00</td>
<td>Stellar SR35 series remote keypad, for use with Stellar SR35 series soft starters.</td>
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<td>SR35-AUX-IO</td>
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<td>Stellar SR35 series temperature combo module, thermistor, 1-channel input, 2-point input, 110-230 VAC/24 VDC, 2-point output, 250 VAC, (2) Form A (SPST) relays. For use with Stellar SR35 series soft starters. (1) 500mm ribbon cable included.</td>
<td><img src="sr35-aux-io.jpg" alt="Image" /></td>
<td>All</td>
<td>PDF</td>
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</table>

For the latest prices, please check AutomationDirect.com.
Stellar® SR35 Basic Soft Starters

## SR35 Accessories

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<th>Part Number</th>
<th>Price</th>
<th>Description</th>
<th>Image</th>
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<td>SR35-PSU</td>
<td>$90.00</td>
<td>Stellar SR35 series switching power supply, 24 VDC output, 1A, 120W, 120/240 VAC nominal input, automatic selectable, 1-phase, enclosed, plastic housing, direct mount.</td>
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<td>SR55-SPLT</td>
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<td>Stellar SR55 series communication splitter, 3 ports, (3) RS-485 (RJ45) female port(s). For use with Stellar SR55 series soft starters. (1) SR55-RJ45-RJ12 adapter and (1) 9.8ft/3m Cat5e cable included.</td>
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<td>SanDisk USB Flash drive, 32GB.</td>
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</tbody>
</table>

*For SR35 Models* | *Drawing Link* |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>All</td>
<td>PDF</td>
</tr>
</tbody>
</table>

For the latest prices, please check [AutomationDirect.com](https://www.automationdirect.com/soft-starters).

---

**SR-485 Network Examples**

- Single SR35 RS-485 network (SR55-SPLT optional)
- Multiple SR35 RS-485 network (one SR55-SPLT per starter recommended)
Stellar® SR55 Full-Featured Soft Starters

Overview
SR55 full-featured solid-state Soft Starters provide many advantages when used instead of electromechanical contactors to control 3-phase AC induction motors. The SR55 Soft Starters are fully digital, and use thyristors in all three motor phases for controlled reduced voltage motor starting and stopping. SR55s have an Automatic Application Setup that fully configures the starter for a specific application with one entry. SR55s also have a built-in internal bypass and patented iERS (intelligent Energy Recovery System) that reduces energy costs when used on lightly loaded and oversized motors.

Features
• 17–477A @ 200–480VAC
• 24VDC, 10VAC, or 230VAC selectable control voltage
• Internally bypassed during run
• Full three-phase motor control
• Built-in SCR failure protection
• Full motor overload protection
• Full data logging (fault records, motor current, operational status, etc.)
• Fully programmable
• Easily and separately adjustable motor start and stop times
• iERS (intelligent Energy Recovery System) saves energy on lightly-loaded motors
• Can be connected ‘in-the-delta’, allowing use of a smaller Soft Starter (no iERS optimizing with in-delta connections)
• Can be used for motor reversing (with external contactors)
• Suitable for a wide variety of motor loads
• Touchscreen with easy-to-navigate menu structure and quick automatic application set up
• Can be used with local or remote control
• Integrated Modbus RTU, or optional Modbus TCP or EtherNet/IP communication
• Optional remote touchscreen available
• Programmable analog I/O, digital inputs, and relay outputs for remote control
• Fault record history of last 10 trips (using the download fault log will give faults and running data for the life of the SR55)
• IP20, panel mount with optional finger guards for frame sizes 1 and 2 soft starters
• Two-year warranty
• CE, ETL (CSA C22.2 No.14 and UL 508), REACH, RoHS
• Auto Reset Feature available

Advantages
Mechanical Advantages
• Smaller physical size than equivalent SR44 models (even with the built-in bypass contactors)
• 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
• Reduced starting currents and spikes
• More motors or larger motors can be started from lower-capacity power sources
• Allows motors to be started more frequently

Economic Advantages
• Lower overall costs for new installations
• Bypass relays built in
• Reduced maintenance and replacement of mechanical drive-train components
• Reduced starting current lowers demand charges
• iERS (intelligent Energy Recovery System) reduces electrical power costs
• Automatic Application setup feature speeds installation by configuring the SR55 for a specific application with one setting

Optional Accessories
• EtherNet/IP communication module
• Modbus TCP communication module
• Modbus serial communication splitter
• RJ12 to RJ45 adapter
• Power terminal IP20 finger guards
• Remote touchscreen
• Replacement touchscreen
• Replacement cooling fans

Applications
• General purpose applications where traditional across-the-line starting or wye-delta starting would typically be appropriate
• Applications with oversized or lightly loaded motors (iERS reduces energy usage)
• Applications requiring lower inrush currents

For the latest prices, please check AutomationDirect.com.
# Stellar® SR55 Full-Featured Soft Starters

## SR55 Soft Starter Technical Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>SR55-017</th>
<th>SR55-021</th>
<th>SR55-027</th>
<th>SR55-034</th>
<th>SR55-050</th>
<th>SR55-065</th>
<th>SR55-077</th>
<th>SR55-096</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Size</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>$936.00</td>
<td>$946.00</td>
<td>$979.00</td>
<td>$1,054.00</td>
<td>$1,141.00</td>
<td>$1,217.00</td>
<td>$1,360.00</td>
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<tr>
<td>* Rated Current $I_e$ (A)</td>
<td>17</td>
<td>21</td>
<td>27</td>
<td>34</td>
<td>40</td>
<td>52</td>
<td>65</td>
<td>77</td>
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<tr>
<td>Rated Operational Voltage</td>
<td>200VAC to 480VAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Motor Rating @ 200V (hp)</td>
<td>3</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>* Motor Rating @ 208V (hp)</td>
<td>5</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>* Motor Rating @ 230V (hp)</td>
<td>5</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>* Motor Rating @ 460V (hp)</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Trip Class</td>
<td>programmable 10 to 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Index Rating [per IEC 60947-4-2]</td>
<td>$I_e$: AC-53a: 3.5–17; 90–5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Impulse Withstand Voltage</td>
<td>4kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Insulation Voltage Rating</td>
<td>480V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Short Circuit Current Rating (type 1) (kA)</td>
<td>5</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Power Consumption</td>
<td>60W inrush to latch internal bypass relays; 4W steady state</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Voltage Range</td>
<td>24VDC +10%–15% or 110–230VAC +10%–15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Fuse (external)</td>
<td>4A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Inputs</td>
<td>(3) DI @ 24VDC, 110VAC, or 230VAC; (1) PTC Thermistor; (1) AI @ 0–10VDC 10mA max or 4–20mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Outputs</td>
<td>(3) N/O relay and (1) N/C relay @ 30VDC 0.5A / 230VAC 1A resistive; (1) AO @ 0–10VDC 10mA max or 4–20mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** Start Time Setting Range (s)</td>
<td>1 to 300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** Start Voltage Setting Range (%</td>
<td>10 to 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>** Stop Time Setting Range (s)</td>
<td>0 to 300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient Operating Temperature</td>
<td>-20°C [-4°F] to 50°C [122°F]; above 50°C derate linearly by 4% of SR55 $I_e$ per °C to a maximum of 60°C (140°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation &amp; Storage Temperature</td>
<td>-20°C to 60°C [-4°F to 140°F] continuous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>max 85% non-condensing, not exceeding 50% @ 40°C (104°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Altitude</td>
<td>1,000m [3,281ft]; above 1000m derate by 1% of SR55 $I_e$ per 100m (328ft) to a maximum altitude of 2000m (6662ft)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Rating</td>
<td>Main Circuit: IP00 (IP20 with optional finger guards for sizes 1&amp;2 only); Control Circuit: IP20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (lb [kg])</td>
<td>6.6 [3.0]</td>
<td>7.7 [3.5]</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

---

**Agency Approvals**

CE, CSA C22.2 No.14 (ETL tested), ETL 4004274, REACH, RoHS, UL508 (ETL tested)

---

**Important:** Care must be taken to select the correct SR55 for the application to ensure that the SR55 is not undersized. Refer to Selection Tables or to online selection tool for deratings by application and overload trip class ([https://www.automationdirect.com/selectors/softstarters](https://www.automationdirect.com/selectors/softstarters)).

**Start Time and Stop Time** define the length of time the soft starter varies the voltage to the motor. While a Variable Frequency Drive (AC Drive) can define motor speed throughout the acceleration and deceleration ramps by varying its output frequency, a soft starter only controls average voltage to the motor and cannot accurately control motor speed. Therefore, motor speed during acceleration and deceleration can vary with load. Example: a conveyor soft starter could have a Start Time of 10s. If the conveyor is empty, the motor may actually reach top speed in 8s. If the conveyor is heavily loaded, the motor may not reach full speed until 10s. For more information, please see the SR55 User Manual - “Appendix B: Soft Starter Application Considerations.”

*** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number’s web page.
# Stellar® SR55 Full-Featured Soft Starters

## SR55 Soft Starter Technical Specifications

<table>
<thead>
<tr>
<th>SR55 Series Full-Featured Soft Starters – 124A–477A *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
</tr>
<tr>
<td><strong>Frame Size</strong></td>
</tr>
<tr>
<td><strong>Price</strong></td>
</tr>
<tr>
<td><strong>Rated Current</strong> $I_e$ (A)</td>
</tr>
<tr>
<td><strong>Rated Operational Voltage</strong></td>
</tr>
<tr>
<td><strong>Motor Rating” @ 200V (hp)</strong></td>
</tr>
<tr>
<td><strong>Motor Rating” @ 208V (hp)</strong></td>
</tr>
<tr>
<td><strong>Motor Rating” @ 230V (hp)</strong></td>
</tr>
<tr>
<td><strong>Motor Rating” @ 460V (hp)</strong></td>
</tr>
<tr>
<td><strong>Trip Class</strong></td>
</tr>
<tr>
<td><strong>Index Rating [per IEC 60947-4-2]</strong></td>
</tr>
<tr>
<td><strong>Impulse Withstand Voltage</strong></td>
</tr>
<tr>
<td><strong>Insulation Voltage Rating</strong></td>
</tr>
<tr>
<td><strong>Short Circuit Current Rating (type 1)(kA)</strong></td>
</tr>
<tr>
<td><strong>Control Power Consumption</strong></td>
</tr>
<tr>
<td><strong>Control Voltage Range</strong></td>
</tr>
<tr>
<td><strong>Control Fuse (external)</strong></td>
</tr>
<tr>
<td><strong>Control Inputs</strong></td>
</tr>
<tr>
<td><strong>Control Outputs</strong></td>
</tr>
<tr>
<td><strong>Start Time Setting Range (s)</strong></td>
</tr>
<tr>
<td><strong>Start Voltage Setting Range (%)</strong></td>
</tr>
<tr>
<td><strong>Stop Time Setting Range (s)</strong></td>
</tr>
<tr>
<td><strong>Ambient Operating Temperature</strong></td>
</tr>
<tr>
<td><strong>Transportation &amp; Storage Temperature</strong></td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
</tr>
<tr>
<td><strong>Maximum Altitude</strong></td>
</tr>
<tr>
<td><strong>Environmental Rating</strong></td>
</tr>
<tr>
<td><strong>Weight (lb [kg])</strong></td>
</tr>
<tr>
<td><strong>Agency Approvals</strong></td>
</tr>
</tbody>
</table>

---

* Refer to Selection Table for deratings by application and overload trip class.

** Important:** Care must be taken to select the correct SR55 for the application to ensure that the SR55 is not undersized. Refer to Selection Tables or to online selection tool for deratings by application and overload trip class (https://www.automationdirect.comselectors/softstarters).

** Start Time and Stop Time define the length of time the soft starter varies the voltage to the motor. While a Variable Frequency Drive (AC Drive) can define motor speed throughout the acceleration and deceleration ramps by varying its output frequency, a soft starter only controls average voltage to the motor and cannot accurately control motor speed. Therefore, motor speed during acceleration and deceleration can vary with load. Example: a conveyor soft starter could have a Start Time of 10s. If the conveyor is empty, the motor may actually reach top speed in 8s. If the conveyor is heavily loaded, the motor may not reach full speed until 10s. For more information, please see the SR55 User Manual - “Appendix B: Soft Starter Application Considerations.”

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Stellar® SR55 Full-Featured Soft Starters

SR55 Energy-Saving iERS Feature

Intelligent Energy Recovery System
iERS is an advanced SR55 feature that can reduce the energy consumed by lightly-loaded (or oversized) motors. iERS matches the power consumption to the load by monitoring and regulating voltage, current, and power factor during the motor starting and running stages. iERS automatically bypasses itself when it is not needed (as the motor approaches full load torque/current), and continues monitoring to re-engage itself as needed (as the required motor torque/current decreases).

In its most basic function, iERS reduces the voltage being fed to the motor when the motor does not need it. While the torque (and therefore current) required by the load stays the same, reducing the voltage to the motor reduces excess magnetizing current inside the motor. For a more detailed explanation of how iERS reduces magnetizing current and saves energy, please see “Chapter 4: Principles of IERS” in the SR55 User Manual.

Many, if not most, AC motor applications are oversized when the motor FLA is compared to actual running current. Oversizing can be due to non-optimal design, but can also occur intentionally: many applications need a larger motor for starting reasons, for available headroom, for future expansion, etc. Other applications may have different motor demands based on loading: think of an “up” escalator. A fully-loaded escalator requires a lot of torque (current), while an empty escalator requires significantly less torque (current) to maintain speed. When the escalator is empty, the motor will not draw as much current as its FLA. When the SR55 senses this reduced torque load, the starter will reduce the voltage to the motor. This reduced voltage results in reduced magnetizing current in the motor (and thereby saves energy). Note that the current required by the load stays the same; only magnetizing current is reduced.

How Much Will iERS Save?
The savings realized by using iERS will vary by application, how heavily the motor is loaded, and the losses internal to the motor. While these factors can be difficult to quantify, the following estimating tools and examples may help predict your potential savings:

Estimating Energy Savings
Basis for estimations:
- 3-phase squirrel cage induction motor, standard type.
- Supply: 380 to 440V, 50Hz.
- Supply voltage > minimum working voltage on motor rating plate.
- Operation 30% rated nameplate full load.

<table>
<thead>
<tr>
<th>4-Pole Motor Size kW</th>
<th>HP</th>
<th>Estimated Savings (% rated kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>7.5</td>
<td>10</td>
</tr>
<tr>
<td>22.5</td>
<td>30</td>
<td>6.5</td>
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<tr>
<td>55</td>
<td>75</td>
<td>3.5</td>
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<tr>
<td>110</td>
<td>150</td>
<td>2.5</td>
</tr>
<tr>
<td>More than 110</td>
<td>150</td>
<td>1.5</td>
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</table>

<table>
<thead>
<tr>
<th>Motor Poles</th>
<th>Number of Poles</th>
<th>Add (% kW)</th>
<th>% Slip</th>
<th>Add (% kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-0.5</td>
<td>0.5</td>
<td>-0.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.5</td>
<td>3.3</td>
<td>0.5</td>
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</tr>
<tr>
<td>8</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Examples of estimated savings:
1) 37.5 kW 4-pole motor
   From Table 1, use the estimated savings figure for the next higher rating, i.e. 55 kW = 3.5% of full rated kW.
   The savings would be approximately 3.5% x 37.5 kW = 1.3125 kW.
   Savings % = kW saved / (30% loaded motor kW)
   = 1.3125 kW / (30% x 37.5 kW) = 12%.

2) 37.5 kW 2-pole motor
   From Table 1, use the estimated savings figure for the next higher rating, i.e. 55 kW = 3.5% of full rated kW.
   From Table 2, apply the pole-number factor of -0.5%.
   The savings would be approximately (3.5% - 0.5%) x 37.5 kW = 1.125 kW.
   Savings % = kW saved / (30% loaded motor kW)
   = 1.125 kW / (30% x 37.5 kW) = 10%.

Real-world applications:
iERS has been installed in many pump-jack applications (for oil drilling, etc.). The cycle of a pump jack is extreme; for part of the cycle the pump requires near-full torque. In the other part of the cycle, the pump jack is very lightly loaded. In this extreme application, iERS reduced average power consumed by the pump jack (over 30-minute intervals) from 23.99 kW down to 19.85 kW. This is a 17% reduction in consumed power. Again, this is an extreme example and is not indicative of what a typical application may save.

iERS has been installed on metal grinding equipment. A machine that was retrofitted with an iERS starter had a 75 hp motor on a spindle that typically ran at about 20–30% of full load. iERS was able to reduce the energy consumed by this motor by 13–15%.

www.automationdirect.com/soft-starters

Soft Starters tSST-25
Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Overcurrent Protection

CUSTOMER-SUPPLIED EXTERNAL POWER-CIRCUIT ISOLATION DEVICES (CONTACTORS, DISCONNECT SWITCHES, FUSIBLE DISCONNECTS, SHUNT-TRIP CIRCUIT BREAKERS, ETC.) AND SHORT-CIRCUIT PROTECTION DEVICES (CIRCUIT BREAKERS, FUSES, ETC.) ARE REQUIRED FOR USE WITH SR55 SOFT STARTERS.

### External Short-Circuit Protection Required for SR55

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rated Operational Current $I_e$ (A)</td>
<td>17</td>
<td>21</td>
<td>27</td>
<td>34</td>
<td>52</td>
<td>65</td>
<td>77</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Semiconductor Fuse (class ar)</td>
<td>Type</td>
<td>Mersen 6.9 URD 30xx</td>
<td>Bussmann 170M30xx</td>
<td>Bussmann 170M31xx</td>
<td>Bussmann 170M32xx</td>
<td>Bussmann 170M33xx</td>
<td>SIBA 20 61xx</td>
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<td></td>
</tr>
<tr>
<td>Rating (A)</td>
<td>100</td>
<td>100</td>
<td>160</td>
<td>160</td>
<td>200</td>
<td>200</td>
<td>250</td>
<td>315</td>
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<tr>
<td>Class J High-Speed Current-Limiting Fuse</td>
<td>Rating $Z_1$ (A)</td>
<td>30</td>
<td>45</td>
<td>60</td>
<td>70</td>
<td>90</td>
<td>110</td>
<td>125</td>
<td>150</td>
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<tr>
<td>Class J Time-Delay Fuse</td>
<td>Rating $Z_2$ (A)</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>100</td>
<td>125</td>
<td>150</td>
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<tr>
<td>UL Listed Inverse Time-Delay Circuit Breaker</td>
<td>Rating $Z_3$ (A)</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>150</td>
<td>150</td>
<td>250</td>
</tr>
<tr>
<td>Rated Conditional Short-Circuit Current $I_q$ (kA)</td>
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<td>10</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

#1 Correctly selected semiconductor fuses can provide additional protection against damage to the SR55 unit (this is sometimes referred to as type 2 coordination). These semiconductor fuses are recommended to provide this increased protection.

#2 Suitable for use in a circuit capable of delivering not more than $I_q$ rms Symmetrical Amperes, 600V-rated fuses with a maximum trip rating of $Z_1$ (IEC Type 1 coordination short-circuit protection).

#3 Suitable for use in a circuit capable of delivering not more than $I_q$ rms Symmetrical Amperes, 480 Volts maximum, when protected by Class J time delay fuses with a maximum rating of $Z_2$, or by a circuit breaker with an interrupting rating not less than $Z_3$ rms Symmetrical Amperes, 480 Volts maximum as in table.

### SR55 Soft Starter Overload Trip

The SR55 soft starter provides motor overload protection, which can be configured through the touchscreen. 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 SR55 soft starters are protected using full $I^2T$ motor overload with memory.

Motor overload 'cold' trip curves (20°C ambient)

- Class 10
- Class 20
- Class 30

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Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Selection

SR55 Soft Starter Selection Steps

1. Determine the required trip class based on the motor load and required start time. See examples to the left (refer to the definitions of Class 10, 20, and 30 Trip Curves on page SST-26).

2. Below, select the row with the correct motor full load amps. Then select the correct SR55 soft starter to the right based on Trip Class (longer start times require a larger starter). Notice that there are different Motor Amps columns for starters wired In-Line (most common) and In-Delta. Select the applicable SR55 part number based on the required Trip Class, motor HP, and connection type.

DERATING IS NECESSARY IF YOUR APPLICATION REQUIRES MULTIPLE STARTS PER HOUR. REFER TO PAGE SST-29, “SR55 INCREASED STARTS PER HOUR – DERATING.”

SR55 Soft Starters – Selection Table

<table>
<thead>
<tr>
<th>Motor Size</th>
<th>Soft Starter Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-Line Connection</strong></td>
<td></td>
</tr>
<tr>
<td><strong>I (A)</strong></td>
<td><strong>HP @ 200V</strong></td>
</tr>
<tr>
<td><strong>Trip Class 10</strong></td>
<td><strong>Trip Class 20</strong></td>
</tr>
<tr>
<td><strong>17</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>21</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>27</strong></td>
<td>7.5</td>
</tr>
<tr>
<td><strong>34</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>40</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>52</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>65</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>77</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>96</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>124</strong></td>
<td>40</td>
</tr>
<tr>
<td><strong>156</strong></td>
<td>50</td>
</tr>
<tr>
<td><strong>180</strong></td>
<td>60</td>
</tr>
<tr>
<td><strong>242</strong></td>
<td>75</td>
</tr>
<tr>
<td><strong>302</strong></td>
<td>100</td>
</tr>
<tr>
<td><strong>361</strong></td>
<td>125</td>
</tr>
<tr>
<td><strong>414</strong></td>
<td>150</td>
</tr>
<tr>
<td><strong>477</strong></td>
<td>150</td>
</tr>
</tbody>
</table>

* For In-Delta connections, all six motor wires must be available for connection, and it is critical to exactly follow the In-Delta wiring diagram in the SR55 User Manual or Quick-start Guide. Nine-motor connections CANNOT be connected in the delta. The Soft Starter will only sense the Phase Current, which is about 58% of the Line Current.

* IERS energy optimizing feature is not available for In-Delta connections.
Stellar® SR55 Full-Featured Soft Starters

SR55 Index Ratings (per IEC 60947-4-2)

<table>
<thead>
<tr>
<th>SR55 Index Ratings *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model Number</strong></td>
</tr>
<tr>
<td>SR55-017 to SR55-180</td>
</tr>
<tr>
<td>SR55-242 to SR55-477</td>
</tr>
</tbody>
</table>

* Index ratings AC-53a and AC-53b are specified by IEC standard # 60947-4-2.

IEC Index Ratings are comprised of Rated Operational Current (Ie), Utilization Category, Overload Current Profile (X-Tx), and Duty Cycle (F-S) or OFF-time.

Index Rating Example – Standard Operation (AC-53a Utilization Category per IEC 60947-4-2)

- 17 to 195 - AC-53a: 3.5-17; 90-5

Duty Cycle (F-S)
90-5 = 90% duty cycle - 5 cycles/hr
[If multiple starts/hr are required, 90% D.C. requires off time ≥ 10% of previous run time]

Overload Current Profile (X-Tx)
3.5-17 = 3.5 times rated current (I_e) for 17s

Utilization Category
AC-53a = controller semiconductors provide squirrel-cage motor Start, Run, and Stop control

Rated Operational Current (I_e)
17 to 195 = controllers with Rated Operational Currents from 17A to 195A

Standard Overload Current Profile and Duty Cycle

The SR55 has been designed for a specific Overload Current Profile and Duty Cycle as shown above in the SR55 Index Ratings.

The Overload Current Profile is expressed by two symbols, X and Tx.

X denotes the overload current as a multiple of Ie and represents the maximum value of operating current due to starting, operating, or maneuvering under overload conditions.

For example, X = 3.5 means that the maximum overload start current allowed is 3.5 times FLC.

Tx denotes the duration of the controlled overload currents during starting, stopping, operating, or maneuvering.

For example, Tx = 17 means that the maximum allowed overload current is permitted for up to 17 seconds only.

The Duty Cycle is expressed by two symbols, F and S which describe the duty and also set the time that must be allowed for cooling.

F is the ratio of the on-load period to the total period expressed as a percentage.

For example, F = 90 means that the soft starter is ON for 90% of the time and then OFF for 10% of the time between each start.

If there are not multiple starts per hour, then the Duty Cycle is continuous.

S is the number of starts or operating cycles per hour.

For example, S = 5 means that the soft starter is capable of 5 equally spaced starts per hour.

These characteristics are summarized in Figure 1.

Figure 1: Standard Overload Current Profiles and Duty Cycles

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Current (A)</th>
<th>Class 10 O/L Multiple (X)</th>
<th>Class 10 O/L Time (Tx)</th>
<th>Starts / Hour (S)</th>
<th>Duty (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR55-017</td>
<td>017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-021</td>
<td>021</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-027</td>
<td>027</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-034</td>
<td>034</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-040</td>
<td>040</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-052</td>
<td>052</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-065</td>
<td>065</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-077</td>
<td>077</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-096</td>
<td>096</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-124</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-156</td>
<td>156</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-180</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-242</td>
<td>242</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-302</td>
<td>302</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-361</td>
<td>361</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-414</td>
<td>414</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR55-477</td>
<td>477</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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SR55 Increased Starts per Hour – Derating

If more than the standard number of starts/hour is required, the SR55 must be derated. To derate for more starts/hour, the motor full load current must be less than the SR55 current. The relationship between the SR55 deration and the starts/hour is given below in Figure 2 and the two examples that follow. This assumes that the SR55 is still operating at the same duty (F) as given in Figure 1.

Figure 2: SR55 Starts/Hour Deration

<table>
<thead>
<tr>
<th>Starts/Hour</th>
<th>Deration Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.83</td>
</tr>
<tr>
<td>15</td>
<td>0.73</td>
</tr>
<tr>
<td>20</td>
<td>0.66</td>
</tr>
<tr>
<td>25</td>
<td>0.61</td>
</tr>
<tr>
<td>30</td>
<td>0.56</td>
</tr>
<tr>
<td>35</td>
<td>0.53</td>
</tr>
<tr>
<td>40</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Deration Factor = \((138 - (24 \cdot \text{ln(starts/hr)})) / 100\)
(where \(\text{ln(starts/hr)}\) is the natural log of the # of starts/hour
Example: Deration Factor for 10 starts/hr = \((138 - (24 \cdot \text{ln(10)})) / 100 = 0.83\)

Example 1: SR55 Selection and Configuration

<table>
<thead>
<tr>
<th>Step</th>
<th>SR55 Selection</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Application</td>
<td>Loaded Conveyor</td>
</tr>
<tr>
<td>2</td>
<td>Trip Class</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Duty</td>
<td>90%</td>
</tr>
<tr>
<td>4</td>
<td>In-Line or In-Delta</td>
<td>In-Line</td>
</tr>
<tr>
<td>5</td>
<td>Ambient Temperature</td>
<td>40°C</td>
</tr>
<tr>
<td>6</td>
<td>Altitude</td>
<td>1000m</td>
</tr>
<tr>
<td>7</td>
<td>Full Motor Load Current</td>
<td>80A</td>
</tr>
<tr>
<td>8</td>
<td>Current Limit</td>
<td>4 x 80A = 320A</td>
</tr>
<tr>
<td>9</td>
<td>Number of Starts/Hour</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Deration Factor (from Fig 2)</td>
<td>0.83</td>
</tr>
<tr>
<td>11</td>
<td>SR55 (A) = Motor FLC / Deration Factor</td>
<td>96A</td>
</tr>
<tr>
<td>12</td>
<td>Determine SR55 from Sizing Guide</td>
<td>SR55-096</td>
</tr>
</tbody>
</table>

Step SR55 Configuration

1. Select Application (Auto Setup)
2. Leave Motor Current 100A (maximum) (Auto Setup)
3. Set Start Current Limit to 320A (110% of motor FLC) (Start Current Limit)
4. Set Overload Level to 96A (110% of motor FLC) (Overload Settings)

Step SR55 Alternative Configuration

1. Set Application (Auto Setup)
2. Set Motor Current to 80A (Auto Setup)
3. Warm Trip Time will be reduced to Trip Class 10 value (320A for 13s)

Example 2: SR55 Selection and Configuration

<table>
<thead>
<tr>
<th>Step</th>
<th>SR55 Selection</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Application</td>
<td>Agitator</td>
</tr>
<tr>
<td>2</td>
<td>Trip Class</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Duty</td>
<td>90%</td>
</tr>
<tr>
<td>4</td>
<td>In-Line or In-Delta</td>
<td>In-Line</td>
</tr>
<tr>
<td>5</td>
<td>Ambient Temperature</td>
<td>40°C</td>
</tr>
<tr>
<td>6</td>
<td>Altitude</td>
<td>1000m</td>
</tr>
<tr>
<td>7</td>
<td>Full Motor Load Current</td>
<td>66A</td>
</tr>
<tr>
<td>8</td>
<td>Current Limit</td>
<td>3.5 x 66A = 231A</td>
</tr>
<tr>
<td>9</td>
<td>Number of Starts/Hour</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>Deration Factor (from Fig 2)</td>
<td>0.66</td>
</tr>
<tr>
<td>11</td>
<td>SR55 (A) = Motor FLC / Deration Factor</td>
<td>100A</td>
</tr>
<tr>
<td>12</td>
<td>Determine SR55 from Sizing Guide</td>
<td>SR55-124</td>
</tr>
</tbody>
</table>

Step SR55 Configuration

1. Select Application (Auto Setup)
2. Leave Motor Current 100A (maximum) (Auto Setup)
3. Set Start Current Limit to 231A (350% of motor FLC) (Start Current Limit)
4. Set Overload Level to 72A (110% of motor FLC) (Overload Settings)

Step SR55 Alternative Configuration

1. Set Application (Auto Setup)
2. Set Motor Current to 66A (Auto Setup)
3. Set Trip Class to 30 (Overload Settings)
4. Warm Trip Time will be reduced to Trip Class 10 value (231A for 17s)

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Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Dimensions

**Dimensions = in [mm]**

The addition of optional finger guards to size 1 and size 2 SR55 soft starters adds approximately 14mm [0.5in] to the soft starter vertical dimension, but does not change the clearance distance.

Frame Size 1: SR55-017 to SR55-027

Mount soft starter within 30° of vertical

Frame Size 1: SR55-034 to SR55-096

Mount soft starter within 30° of vertical
Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Dimensions

Dimensions = in [mm]

See our website: www.AutomationDirect.com for complete engineering drawings.

Frame Size 2: SR55-124 to SR55-180

Mount soft starter within 30° of vertical

Frame Size 3: SR55-242 to SR55-361

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Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Dimensions

Dimensions = in [mm]

See our website: www.AutomationDirect.com for complete engineering drawings.

Frame Size 3: SR55-414 to SR55-477

Ventilation for Enclosures

<table>
<thead>
<tr>
<th>SR55 Soft Starter Model</th>
<th>Top</th>
<th>Bottom</th>
<th>Left</th>
<th>Right</th>
<th>Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 1: SR55-017 to SR55-096</td>
<td>3 [75]</td>
<td>1 [25]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 2: SR55-124 to SR55-180</td>
<td>3.9 [100]</td>
<td>1.6 [40]</td>
<td>1 [25]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For heat dissipation, the SR55 must not be mounted any closer to another object than these distances.

 WHEN FITTING SR55 INTO AN ENCLOSURE, VENTILATION MUST BE PROVIDED IF THE HEAT OUTPUT OF THE UNIT IS GREATER THAN THE ENCLOSURE WILL DISSIPATE. USE THE FORMULA AT RIGHT TO DETERMINE THE FAN REQUIREMENT. AN ALLOWANCE HAS BEEN INCORPORATED INTO THE FORMULA SO THAT THE FIGURE FOR Q IS THE AIR DELIVERY IN THE FAN SUPPLIERS DATA.

THE POWER DISSIPATION OF THE THYRISTORS ARE AT THEIR PEAK WHEN THE SR55 IS IN ENERGY SAVING MODE (ERS), THEREFORE CAUSING THE MOST HEAT GENERATED FROM THE STARTER. HEAT DISSIPATED CAN BE APPROXIMATED WITH THE FORMULA:

\[ Q = \frac{(4xWt)}{(T_{max} - T_{amb})} \]

\[ Q = \text{Volume of air (cubic meters per hour - m}^3/\text{h)} \]

\[ Wt = \text{Heat produced by the unit and all other heat sources within the enclosure (Watts)} \]

\[ T_{max} = \text{Maximum permissible temperature within the enclosure (50°C for a fully rated SR55)} \]

\[ T_{amb} = \text{Temperature of the air entering the enclosure (°C)} \]

(If you prefer to work in CFM, substitute °F for °C. Q is now in CFM)
Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Optional Accessories

EtherNet/IP Module
The EtherNet/IP communication module is intended to be installed in the SR55 option slot, and allows the SR55 to be connected to an EtherNet/IP network. The interface offers the following functionality:

- CIP Parameter Object Support
- Supports Explicit and Implicit Messaging

<table>
<thead>
<tr>
<th>Part Number</th>
<th>List Price</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR55-CM-ENETIP2</td>
<td>$432.00</td>
<td>EtherNet/IP communication module, optional, for Stellar SR55 series soft starters, dual RJ45 communication ports, complete EtherNet/IP adapter, TCP/IP socket interface, CIP parameter object support, implicit and explicit messaging, transformer isolated Ethernet interface, 10/100 Mbps full duplex.</td>
</tr>
<tr>
<td>SR55-CM-ENETIP</td>
<td>$356.00</td>
<td>EtherNet/IP communication module, optional, for Stellar SR55 series soft starters, dual RJ45 communication ports, complete EtherNet/IP adapter, TCP/IP socket interface, CIP parameter object support, implicit and explicit messaging, transformer isolated Ethernet interface, 10/100 Mbps full duplex.</td>
</tr>
<tr>
<td>SR55-CM-MODTCP</td>
<td>$356.00</td>
<td>Modbus TCP communication module, optional, for Stellar SR55 series soft starters, dual RJ45 communication ports, complete Modbus TCP server, up to 256 bytes of I/O data in each direction, transformer isolated interface, 100 Mbps full duplex, TCP/IP socket interface, supports 4 simultaneous (master) connections.</td>
</tr>
<tr>
<td>SR55-FG-1</td>
<td>$25.50</td>
<td>Finger guards, replacement, for size 1 Stellar SR55 series soft starter power terminals. Provides IP20 protection rating. Package of 2.</td>
</tr>
<tr>
<td>SR55-KPD-REM</td>
<td>$325.00</td>
<td>Touchscreen, optional remote, for Stellar SR55 series soft starters. Used to remotely monitor, configure, and control SR55 series units without opening enclosures. Rated for NEMA 4/4X enclosures, no external power wiring required. Includes 3m RJ45 cable and SR55-RJ45-RJ12 adapter.</td>
</tr>
<tr>
<td>SR55-SPLT</td>
<td>$114.00</td>
<td>Serial Modbus communication splitter, optional, for Stellar SR55 series soft starters. Used for creating a Modbus network with multiple SR55 series soft starters. Uses 3 serial RJ45 connectors for upstream/downstream connectivity and connection to the starter.</td>
</tr>
<tr>
<td>SR55-RJ45-RJ12</td>
<td>$5.50</td>
<td>RJ45 female to RJ12 male adapter, optional, for Stellar SR55 series soft starters.</td>
</tr>
<tr>
<td>USB-FLASH</td>
<td>$21.50</td>
<td>USB Flash drive, SanDisk, 4GB (SanDisk P/N SDCZ50-004G-A46).</td>
</tr>
</tbody>
</table>

For the latest prices, please check AutomationDirect.com.

Remote Touchscreen
Allows remote monitoring, configuration, and control of SR55 soft starters. Since the touchscreen is a master RS-485 device, it can control multiple SR55 soft starters. Includes a 3m Ethernet cable and an SR55-RJ45-RJ12 adapter.

Modbus TCP Module
Allows an SR55 soft starter to be connected to a Modbus TCP network using TCP/IP protocol. The communication module supports 4 simultaneous (master) connections and allows access to all user parameters.

Modbus Serial Splitter
Includes an SR55-RJ45-RJ12 adapter cable. Allows a Modbus network over RS-485 to be constructed as plug-and-play with standard Ethernet cables. Customer must provide cable between RS-485 master and the first splitter. Can only be used with one master at a time on the network, e.g. Remote Touchscreen, PLC, or HMI. Splitter includes (3) female RJ45 ports.

RJ45 to RJ12 Adapter
Allows connection of the Remote Touchscreen, Modbus Splitter, or other Modbus master to the RJ12 port on top of the SR55 soft starter.

Adapter has a male RJ12 connector and a female RJ45 connector (allows use of standard Ethernet cables).

USB Flash Drive
4GB USB Flash drive. Recommended for SR55 firmware updates and data logging.

NOTE: Other flash drives may not work with SR55. USB-FLASH has been successfully tested with SR55.
Stellar® SR55 Full-Featured Soft Starters

SR55 Soft Starter Accessory Dimensions
Dimensions = in [mm]


SR55 Soft Starter Replacement Parts

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Price</th>
<th>Description</th>
<th>For SR55 Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR55-FAN-2</td>
<td>**$14.50</td>
<td>Cooling fan, replacement, for size 1 Stellar SR55 series soft starters, 60 x 60 x 15 mm</td>
<td>-017 thru -096</td>
</tr>
<tr>
<td>SR55-FAN-3</td>
<td>**$16.50</td>
<td>Cooling fan, replacement, for size 2 Stellar SR55 series soft starters, 80 x 80 x 15 mm</td>
<td>-124</td>
</tr>
<tr>
<td>SR55-FAN-6</td>
<td>***$16.50</td>
<td>Cooling fan, replacement, for size 2 Stellar SR55 series soft starters, 80 x 80 x 20 mm</td>
<td>-156 thru -180</td>
</tr>
<tr>
<td>SR55-FAN-7</td>
<td>**$38.00</td>
<td>Cooling fan, replacement, for size 3 Stellar SR55 series soft starters, 120 x 120 x 25 mm</td>
<td>-242 thru -361</td>
</tr>
<tr>
<td>SR55-FAN-8</td>
<td>**$100.00</td>
<td>Cooling fan, replacement, for size 3 Stellar SR55 series soft starters, 171 x 151 x 151 mm</td>
<td>-414 thru -477</td>
</tr>
<tr>
<td>SR55-KPD</td>
<td>**$91.00</td>
<td>Touchscreen, replacement, for Stellar SR55 series soft starters</td>
<td>all</td>
</tr>
</tbody>
</table>

* These items are exact replacements for the comparable part that is originally installed on the applicable SR55.
** These fans include wiring connectors.
*** SR55-FAN-6 12VDC fan kits fit SR55-156 and SR55-180 soft starters. Some early models of these starters were equipped with 24VDC fans, and two SR55-FAN-6 kits are required for those particular models since both 24VDC fans require replacement. The 12VDC fan kits include wiring connectors and a resistor, which is for use only with the 24VDC soft starters. Refer to the Fan Replacement Quantity flowchart above to determine how many fan kits you need.

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