



# SureStart

Single Phase Soft Starters

Submission Data  
 English Language/IP Units  
 04/14



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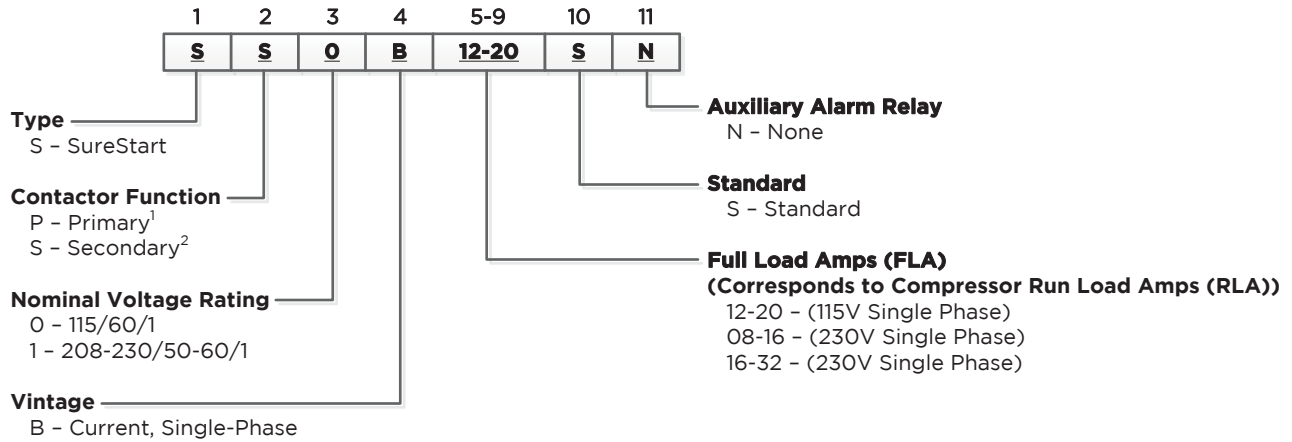
Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

Engineer: \_\_\_\_\_

Project Name: \_\_\_\_\_ Unit Tag: \_\_\_\_\_



## Model Nomenclature



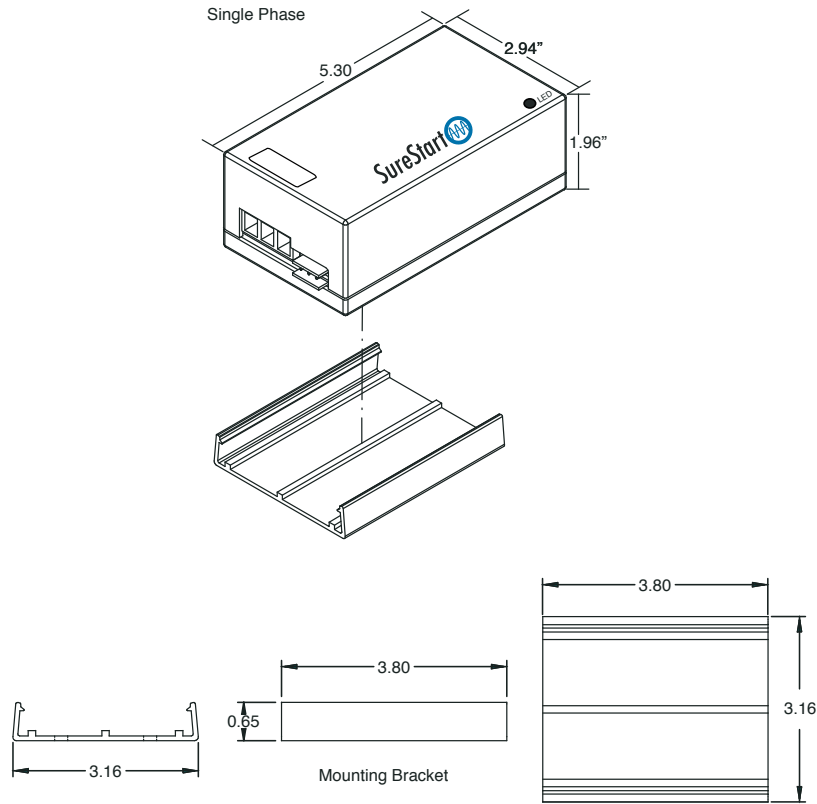
**Rev.:** 27 February 2014D

**Notes:**

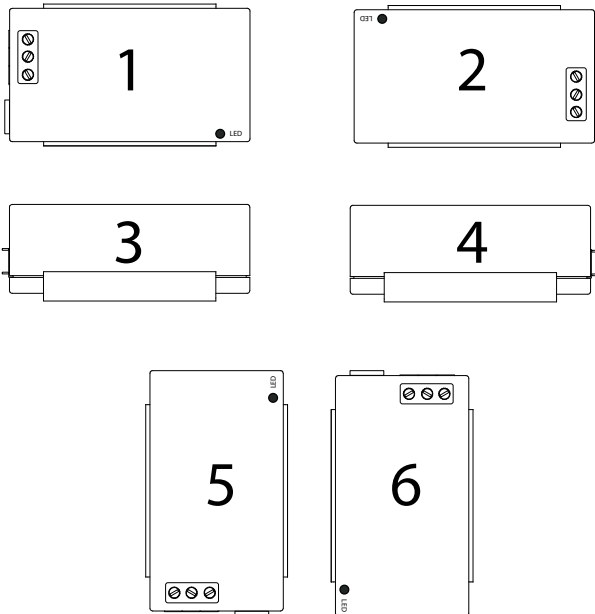
- 1 - Not available in the United States.
- 2 - Primary includes a contactor. Secondary operates in series with contactor.

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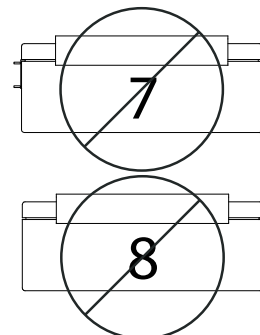
## Dimensional Data



## Approved Mounting Positions



## Not Approved



The manufacturer works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice. Purchaser's approval of this data set signifies that the equipment is acceptable under the provisions of the job specification. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely the manufacturer's opinion or commendation of its products.

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## Physical Characteristics

SureStart Model	Single Phase		
	SS0B12-20	SS1B08-16	SS1B16-32
Storage Temperature, °F [°C]	-40 [-40] to 185 [85]		
Case Material	ABS Flameproof UL-94 V0		
IP Rating	IP207		
Line Conductor, AWG	14 - 6	14 - 6	14 - 6
Line Conductor Strip Length, in. [mm]	0.47 [12]	0.47 [12]	0.47 [12]
Minimum Line Conductor Length, in. [mm]	15.7 [400]	15.7 [400]	15.7 [400]
Line Terminal Tightening Torque, in-lbs [N-m]	11.5 [1.3]	11.5 [1.3]	11.5 [1.3]
Start Winding & Compressor Common, AWG	16-12	16-12	16-12

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## Operating Characteristics

SureStart Model	Single Phase		
	SS0B12-20	SS1B08-16	SS1B16-32
Rated Voltage, VAC	115	208-230	208-230
Rated Phase	1	1	1
Rated Frequency, Hz	60	50/60	50/60
Maximum Load Current, Amps	20	16	32
Maximum Starting Current, Amps	35	35	65
Control input, VAC	Auto-Start at Power Up		
Number of Starts/Hour (Evenly Distributed)	15	15	15
Short Circuit Current Rating (SCCR), kA	5	5	5
Shutdown on Low Voltage	98	175	175
Minimum Startup Voltage	103	180	180
Maximum High Voltage	126	253	253
Operating Ambient, °F [°C]	-4 [-20] to 140 [60]		
Life Expectancy (At Maximum Rated Load)	Minimum 100,000 Operations		

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## Software Characteristics

SureStart Model	Single Phase		
	SS0B12-20	SS1B08-16	SS1B16-32
Software Fault Delay, seconds	300	300	300
Initial Power on Delay, seconds, 60 Hz [50Hz]	1 [2]	1 [2]	1 [2]
Power Loss Reset, milliseconds	100	100	100
Contactors Chatter Protection	Yes	Yes	Yes
Motor Reversal Protection	Yes	Yes	Yes
Software Optimization	Auto tune		

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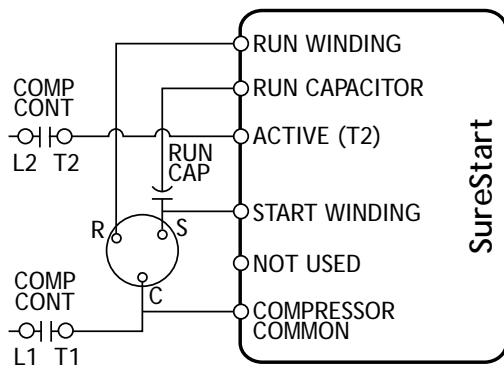
## SureStart Compatibility Guide

Nominal Supply Voltage*	Single Phase		
	SS0B12-20	SS1B08-16	SS1B16-32
115/60/1	•		
208-230/50-60/1		•	•
Full Load Amperage, FLA (Typical)	12-20	08-16	16-32

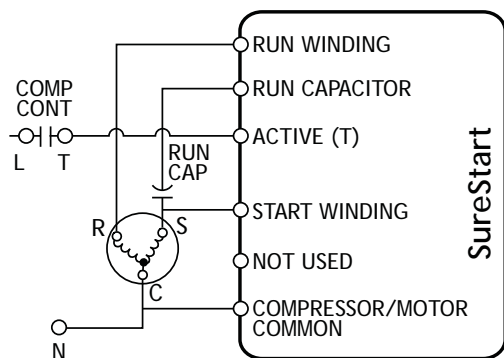
\* - Voltage/Hz/Phase

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## Wiring Schematics



230V with Two Pole Contactor



115V/230V with Single Pole Contactor



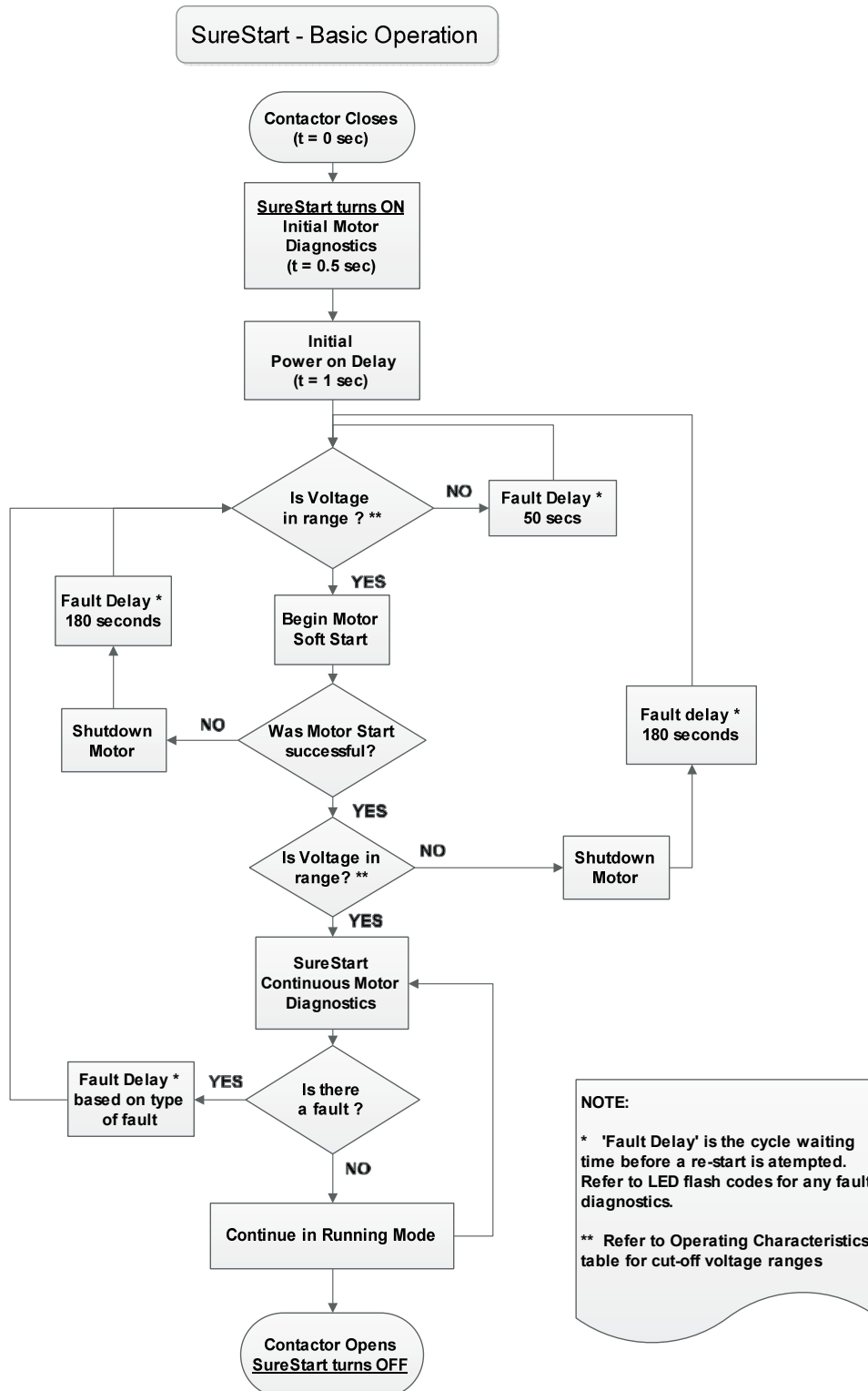
**CAUTION:** SureStart must be installed in a location that ensures that the external heat from a hot gas line, compressor discharge piping, or similar heat source will not cause damage. Minimum 3" [76mm] clearance is recommended.

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## SureStart Mode of Operation



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## SureStart Single Phase LED Flash Codes

### Led Flash Codes

A Red LED indicator will flash under the following conditions.

[NOTE: LED fault indicator is turned off in normal running mode.]

- a) Rapid Flash (10 / sec) : Low Voltage
- b) Triple Flash Every Three Seconds (3 / 3 secs): Lockout on Three Failed Starts
- c) Slow Flash (1 / 3 secs): Lockout on Over Current
- d) Slow Steady Flash (1 / sec): Cycle Delay / Fault Mode

### Flash Code (Rapid Flash (10 / sec) : Low Voltage)

- Displayed for “Low supply voltage” before or after a softstart.
- If Low voltage is detected before a start, a re-start is attempted after 50 seconds.
- If Low voltage is detected after a start, a re-start is attempted after 3 minutes.

### Flash Code (Triple Flash every three seconds (3 / 3 secs): Lockout on Three Failed Starts)

- Displayed after failure to start on “Three consecutive start attempts”.
- Re-start is attempted after 50 minutes.
- Standard lockout period is revised to 3 minutes after a successful start.

In circumstances where the compressor may have seized or is unable to startup due to failure of other components in the HVAC system, the software will check for three consecutive failed starts. On the third sequential failed start, the program goes into Lockout for 50 mins. On failing to get a good start even after 50 mins, it will re-attempt start again after duration of 50 mins. Once a good start is eventually achieved, it will reset the hardstart counter and will require 3 failed starts again to force it back into Lockout mode. Lockout can be cleared anytime through a power reset of the SureStart device.

### Flash Code (Slow Flash (1 / 3 secs): Lockout on Over current)

- Displayed for “Overcurrent” in running mode of the compressor motor.
- Overcurrent limit is “25A for 08-16A version” and “50A for 16-32A rated version”.
- Also displayed, if internal Klixon of the compressor trips out on overheat.
- Re-start is attempted after 10 minutes.

To limit the current in compressors from extending abnormally beyond its stated capacities, SureStart is also equipped with Overcurrent limit protection. For models rated from 16-32A, SureStart is designed to trip out in overload conditions exceeding 50A. In smaller models, it is designed to cutoff power to the compressor if the current drawn exceeds 25A. On overcurrent lockout, SureStart attempts a re-start automatically after 10 minutes.

Both failed start lockout and overcurrent limit protection have been designed to prevent the compressor from drawing abnormal currents in conditions not feasible for the compressor operation.

### Flash Code (Slow Steady Flash (1 / sec): Cycle Delay / Fault Mode)

- Displayed for “Cycle delay” between two consecutive softstarts or other faults mentioned below.
- Re-start is attempted after a default period of 3 minutes.
- Other possible reasons for this Fault mode indicator can be due to
  - incorrect wiring during installation,
  - a failed Softstart attempt,
  - intermittent power loss (duration longer than 100ms),
  - frequency out of range, or
  - failed run capacitor.

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## Declaration of Conformity

SureStart technology has been tested and certified under the following standards that apply.

For United States, Canada, & Mexico

UL 508/ CSA 22.2 # 14 (ETL control # 4004190)

For European Union, Australia, and other countries accepting CE Marking

Low Voltage Directive (LVD)

IEC/ EN 60947-4-2: Low Voltage switchgear and control gear: contactors and motor-starters

IEC/ EN 60335-1 & IEC/ EN 60335-2-40: Safety requirements for electrical heat pumps, air conditioners, dehumidifiers.

Electromagnetic Compliance (EMC)

IEC/ EN 55014-1	Conducted & radiated emissions
IEC/ EN 61000-3-11	Flicker
IEC/ EN 61000-3-12	Harmonics emissions
IEC/ EN 61000-3-2	Harmonic current emissions
IEC/ EN 55014-2	Conducted & radiated immunity
IEC/ EN 61000-6-1	Immunity for residential, light commercial, and light industrial
IEC EN 61000-3-3	Voltage fluctuations
IEC/ EN 61000-4-2	Electrostatic discharge (ESD) immunity test
IEC/ EN 61000-4-3	Radiated, radio-frequency, electromagnetic field immunity test
IEC/ EN 61000-4-4	Electrical fast transient/burst immunity test
IEC/ EN 61000-4-5	Surge Immunity Test
IEC/ EN 61000-4-6	Conducted radio-frequency immunity
IEC/ EN 61000-4-11	Voltage dips, short interruptions, and voltage variations immunity tests

EMC compliance tested in accordance with:

ANSI C63.4

EN55022 + A1:2000 + A2:2003

CISPR16 and CISPR22

VCCI V-3/2007.04



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## Definitions

Case Material - SureStart enclosure material

Line conductor - Wiring that connects to the “run winding” and “active” terminations on single phase SureStart.

Line Conductor Strip Length - This is the length of insulation stripped away in order to properly insert into the SureStart.

Line Terminal Tightening Torque - The necessary torque needed to secure line conductors to the SureStart.

Rated Voltage - This is the nominal supply voltage to the SureStart.

Rated Frequency - This is the nominal frequency, Hz, of the power supply to the SureStart.

Maximum Starting Current - The maximum current at motor startup for the largest motor that can be applied to the SureStart.

Control Input - Any AC/DC voltage that needs to be applied in addition to active supply to SureStart.

Short Circuit Current Rating - This is the maximum fault current that can be applied without damaging the SureStart.

Shutdown on Low Voltage - SureStart will shutdown motor if the supply voltage falls below this threshold.

Maximum High Voltage - The maximum voltage that can be applied to SureStart.

Maximum Operating Ambient - The maximum temperature the SureStart can properly operate.

Maximum Load Current - This is the maximum current the SureStart is capable of handling.

Minimum Startup Voltage - SureStart will not attempt a motor start if the supply voltage is below this limit.

Software Fault Delay - This is the time delay that will initiate if the SureStart encounters a problem during motor operation.

Initial Power Delay - The time delay from when the SureStart receives power and motor start occurs.

Power Loss Reset - SureStart is designed to turn motor off in the event power is lost for more than this time period.

Contactor Chatter Protection - SureStart can detect faulty contactor conditions and shut the motor off.

Motor Reversal Protection - SureStart will prevent a single phase motor from reverse rotation due to intermittent power outages.

Software Optimization - The maximum number of starts required to achieve optimized motor starting.

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## Notes

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## Revision Guide

Pages:	Description:	Date:	By:
3	Updated Nomenclature for New Revision	22 Apr 2014	DS
4	Updated Single Phase Dimensional Drawing	22 Apr 2014	DS
5	Updated Physical and Operational Characteristics	22 Apr 2014	DS
7	Updated Operation Flow Chart	22 Apr 2014	DS
8	Added LED Flash Code Description	22 Apr 2014	DS
9	Updated Declaration of Conformity	22 Apr 2014	DS
10	Updated Definitions	22 Apr 2014	DS
5	Updated Physical and Operational Characteristics	21 Nov 2013	DS
6	Updated SureStart Compatibility Guide	21 Nov 2013	DS
All	Updated Model Nomenclature	10 Oct 2013	DS
All	First Published	26 Jun 2013	DS



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