

# SureStart

Three-Phase Soft Starters

Submittal Data  
 English Language/IP Units  
 04/14



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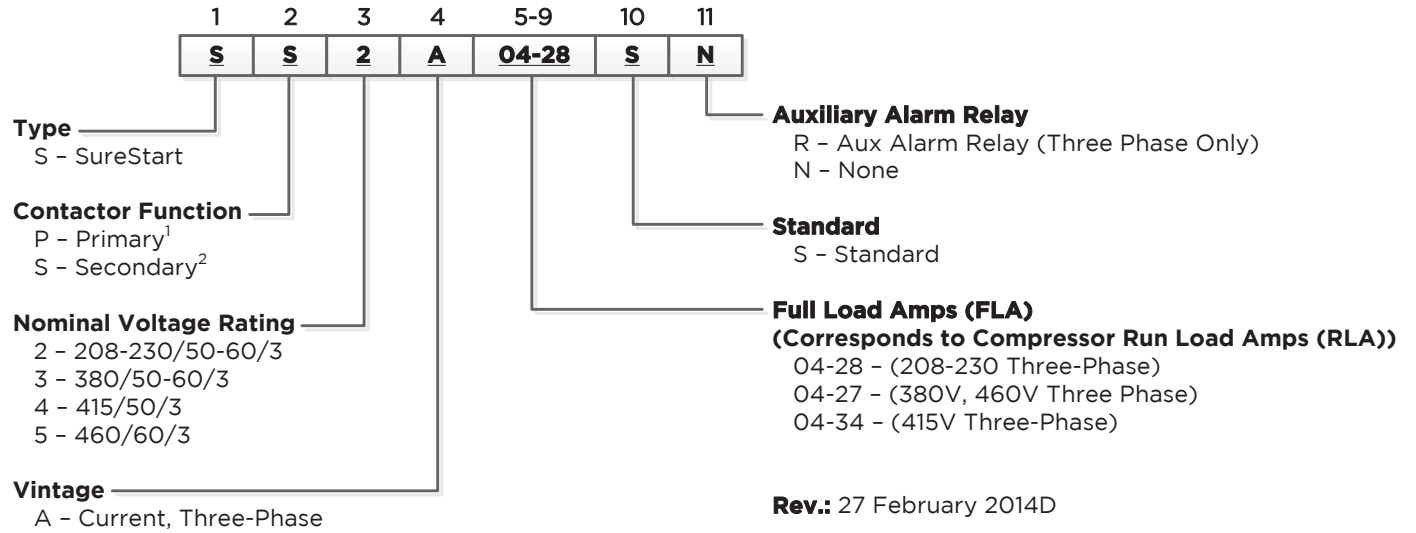
Contractor: \_\_\_\_\_ P.O.: \_\_\_\_\_

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

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



## Model Nomenclature



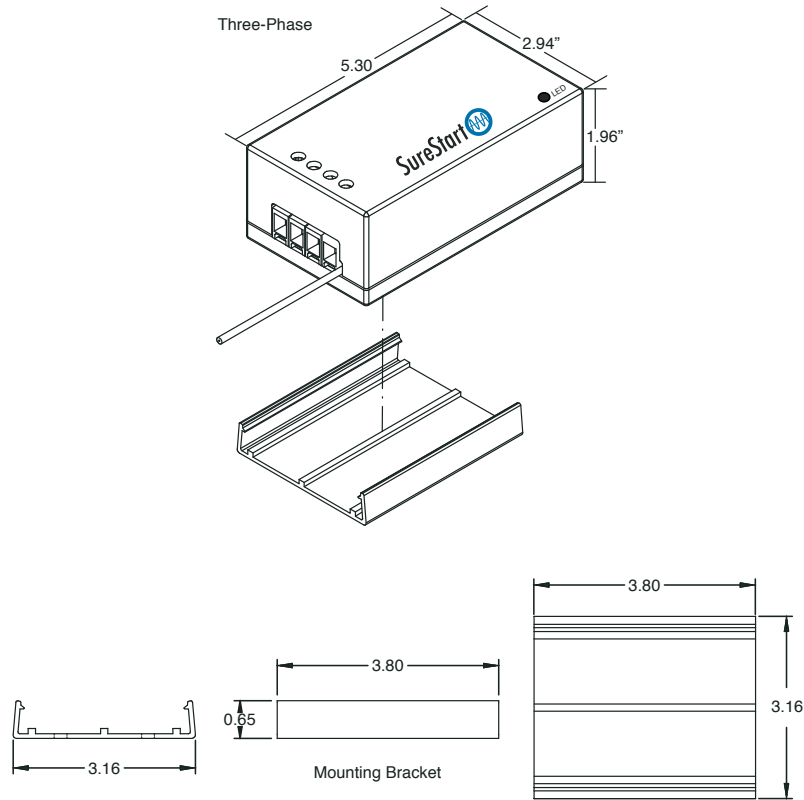
**Notes:**

1 - Not available in the United States.

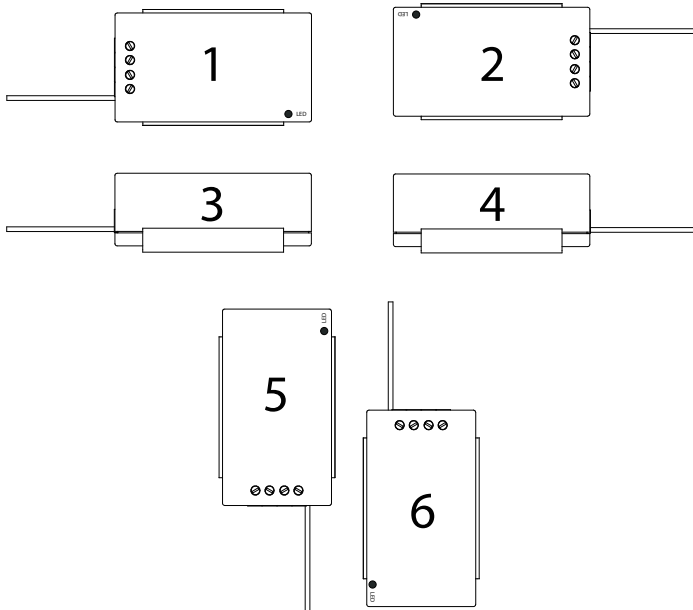
2 - Primary includes a contactor. Secondary operates in series with contactor.

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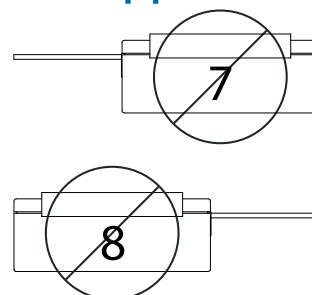
## Dimensional Data



## 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	Three Phase		
	SS2A04-28	SS3A04-27	SS4A04-34 SS5A04-27
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]	10.5 [1.2]	10.5 [1.2]	10.5 [1.2]
T3 Wire Gauge, AWG	18	18	18
T3 Wire Lead Length, in. [mm]	24.4 [620]	24.4 [620]	24.4 [620]
T3 Wire Termination, in. [mm]	0.25 [6.35] insulated quick connect		

03/06/14

## Operating Characteristics

SureStart Model	Three Phase			
	SS2A04-28	SS3A04-27	SS4A04-34	SS5A04-27
Rated Voltage, VAC	208-230	380	415	460
Rated Phase	3	3	3	3
Rated Frequency, Hz	50/60	50/60	50	60
Maximum Load Current, Amps	38	38	38	38
Maximum Starting Current, Amps	150	150	150	150
Number of Starts/Hour (Evenly Distributed)	20	20	20	20
Short Circuit Current Rating (SCCR), kA	5	5	5	5
Shutdown on Low Voltage	176	323	353	391
Minimum Startup Voltage	187	342	373	414
Maximum High Voltage	253	422	460	510
Operating Ambient, °F [°C]	-4 [-20] to 140 [60]			
Life Expectancy (At Maximum Rated Load)	Minimum 100,000 Operations			

03/06/14

## Software Characteristics

SureStart Model	Three Phase		
	SS2A04-28	SS3A04-27	SS4A04-34 SS5A04-27
Software Fault Delay, seconds	180	180	180
Initial Power on Delay, seconds, 60 Hz [50Hz]	1 [1]	1 [1]	1 [1]
Power Loss Reset, milliseconds	100	100	100
Contactors Chatter Protection	Yes	Yes	Yes
Reverse Phase Protection	Yes	Yes	Yes
Software Optimization	Auto tune		

10/01/13

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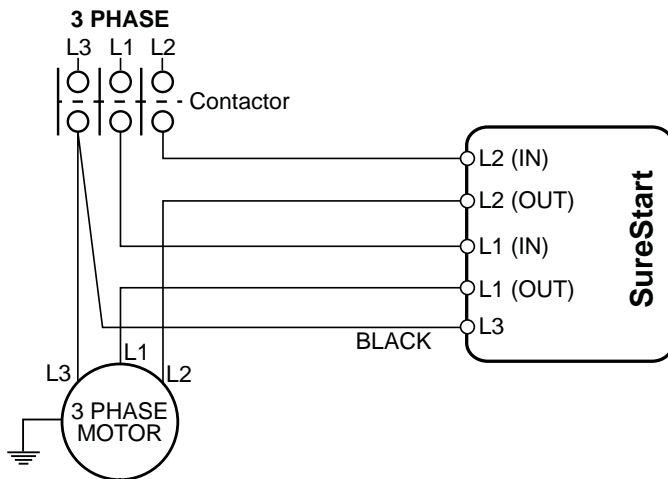
## SureStart Compatibility Guide

Nominal Supply Voltage*	Three Phase			
	SS2A04-28	SS3A04-27	SS4A04-34	SS5A04-27
208-230/50-60/3	•			
380/50-60/3		•		
415/50/3			•	
460/60/3				•
Full Load Amperage, FLA (Typical)	04-28	04-27	04-34	04-27

\* - Voltage/Hz/Phase

11/21/13

## Wiring Schematics

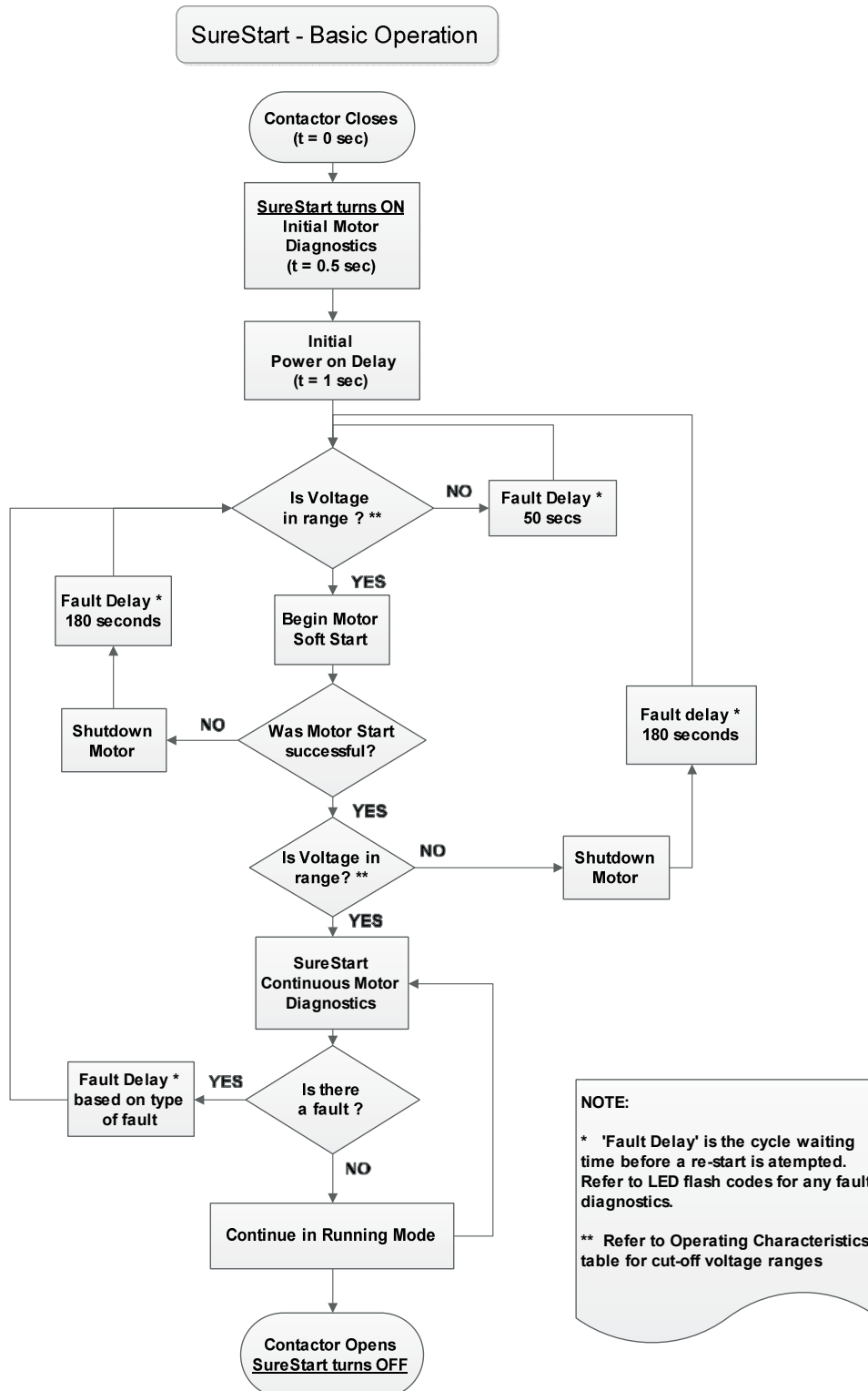


**CAUTION:** SureStart must be installed in a location that ensures that the external heat from a hot gas line, compressor discharge piping, or similar heat source will not cause damage. Minimum 3" [76mm] clearance is recommended.

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## SureStart Mode of Operation



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## SureStart Three-Phase 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) Reverse Phase: (1 / 2 secs)
- b) Fault Mode/Cycle Delay: (1 / 4 secs)
- c) Low Voltage/ Over Voltage: (2 / 2 secs)

### Flash Code (Reverse Phase: (1 / 2 secs))

- Displayed if the supply "Phase Sequence" gets reversed before or after a start.
- Re-start is attempted after 3 minutes.

### Flash Code (Fault Mode / Cycle Delay: (1 / 4 secs))

- 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
  - a failed Softstart attempt,
  - intermittent power loss (duration longer than 100ms), or
  - frequency out of range

### Flash Code (Low Voltage / Over Voltage: 2 / 2 secs)

- Displayed for "Low supply voltage" or "High supply voltage" before or after a softstart.
- If voltage is out of range before a start, a re-start is attempted after 50 seconds.
- If voltage is out of range after a start, a re-start is attempted after 3 minutes.

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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. The wiring for “IN” and “OUT” for T1/T2 connections on three 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.

Reverse Phase Protection - SureStart will prevent a three-phase motor from reverse rotation.

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
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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