Softstarters
Type SSM
Medium voltage
2300 – 13,800V [1]

Description

- Fused disconnect switch with blown fuse indicators and door safety interlocks rated for load break/fault make with automatic grounding arm
- Inline isolation vacuum contactor sized for across-the-line motor starting (optional on "soft start only" models)
- Bi-metallic thermal overload provides backup motor protection when operating in emergency bypass mode (optional on "soft start only" models)
- 120V fused control power transformer standard in line start section (optional on "soft start only" models)
- Digital controller provides solid state overload and numerous protective features for both the motor and the soft starter
- Fiber optic firing circuit for superior electrical noise isolation
- Programmable keypad with LCD and status LEDs for easy setup and operation
- Bypass vacuum contactor sized for across-the-line (emergency) motor starting is standard on all models to guarantee cool operation in all environments and extend unit life
- Heavy duty SCR stack assemblies with ring transformer isolated circuit for reliable, hard-firing gate pulse
- Isolated low voltage compartment provides maximum protection for operating personnel
- Mechanically interlocked medium voltage compartment
- UL File # E175732 [2]

1 Consult factory for higher voltages.
2 For softstarters rated 4160V, 400A and below.

General information

Key construction features

- Fused disconnect switch with blown fuse indicators and door safety interlocks rated for load break/fault make with automatic grounding arm
- Inline isolation vacuum contactor② sized for across-the-line motor starting (optional on "soft start only" models)
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- Mechanically interlocked medium voltage compartment

Heavy duty SCR power assemblies

- Rated for 500 percent overload for 60 seconds
- Field-proven design in use since 1975
- Fiber optics gate-firing circuit using “ring transformer” isolation design for superior noise immunity

Industrial “real world” packaging

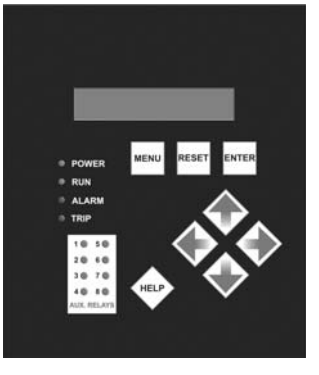
- Load break/fault make disconnect switch with door safety interlocking mechanism
- Isolated, noise-immune low voltage control compartment
- NEMA 12 enclosure with bypass vacuum contactor included as standard①②
- Extra wiring space for MV cables for easy installation

Custom engineered systems

- Available in special enclosures and lineups
- Numerous control component options including:
  - Reversing contactors
  - Motor protection relays
  - Customer specified devices
- Horizontal and custom bus interconnects
- Various motor configurations including synchronous, wound rotor and two speed

Digital microprocessor control

- Full featured for flexibility, including dual ramp and programmable custom start curves
- LCD status/alarm display and built-in programing keypad
- Serial communications port standard: RS485 with Modbus RTU protocol or RS232 with Windows interface
- In-depth motor and system protection monitors
- Monitors 18 separate parameters and maintains a nonvolatile fault memory



① 13.8 kV softstarters are rated NEMA 1.
② 13.8 kV, 600A softstarters use circuit breakers for isolation and bypass functions.

Type SSM

Custom line-up

SSM-41200-E-S

Ratings ①			Soft start with line start section		Optional soft start only ②	
Volts	Max. amps	Nominal max. HP	Catalog number	List price	Catalog number	List price
2300	200 400 600	800 1500 2500	SSM-23200-E-S SSM-23400-E-S SSM-23600-E-S	③	SSM-23200-E SSM-23400-E SSM-23600-E	③
3300	200 400 600	1000 1800 3000	SSM-33200-E-S SSM-33400-E-S SSM-33600-E-S	③	SSM-33200-E SSM-33400-E SSM-33600-E	③
4160	200 400 600	1250 2500 5000	SSM-41200-E-S SSM-41400-E-S SSM-41600-E-S	③	SSM-41200-E SSM-41400-E SSM-41600-E	③
6600/ 6900	200 400 600	2500 5000 7500	SSM-66200-E-S SSM-66400-E-S SSM-66600-E-S	③	SSM-66200-E SSM-66400-E SSM-66600-E	③
13,800	300 600	7500 15,000	SSM-138300-E-S SSM-138600-E-S	③	SSM-138300-E SSM-138600-E	③

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Catalog number explanation

SSM - 23 200 - E - S

Softstarter
SSM — medium voltage

Voltage
23 = 2300V
33 = 3300V
41 = 4160V
66 = 6600/6900V
138 =13,800V

Amperage
200 = 200A
400 = 400A
600 = 600A

S = Switchgear line start panel

E = NEMA 12 enclosure ④⑤

① Contact factory for higher horsepower and voltage requirements.
② Must be used with customer supplied line start panel.
③ Consult factory.
④ Consult factory for other enclosure types.
⑤ 13.8 kV softstarters are rated NEMA 1.

Technical data

Type of load
Three phase medium voltage AC induction motors

AC supply voltage
2300, 3300, 4160, 6600/6900, 13,800 VAC
+10% to -10%
50/60 Hz line voltages

HP ratings ①
Up to 15,000 HP @ 13,800V (600 Amps max)

Overload rating
500% – 60 Seconds

Power circuit
Series strings of SCR power modules (2,4 or 6 matched pairs of SCRs per phase depending on voltage rating)

SCR peak inverse voltage

Amps	Line voltage	PIV rating
200 to 400	2300 V	6500
	3300 V	13,000
	4160 V	13,000
	6600/6900 V	19,500
	11-14 kV	39,000
600	2300 V	7000
	3300 V	14,000
	4160 V	14,000
	6600/6900 V	21,000
	11-14 kV	39,000

Transient voltage protection
dv/dt circuits (1 per SCR power module)

Vacuum bypass contactor ③
Standard on all models, line start rated

Ambient operating temperature
0 to 50°C (32°F to 122°F)
(Optional -20° to 50°C with heaters)

Control
Digital microprocessor controller with read-out in English text
Alphanumeric LCD display
Non-volatile memory for programming and faults
Opto-isolated inputs

Communications
RS485 with modbus RTU protocol
RS232 with Windows interface

Auxiliary contacts
FORM C, 8 Amps @ 250V

Adjustments
Motor FLA
Dual adjustments — Two independent settings for:

Initial voltage	0 – 100% of nominal voltage
Current limit	0 – 600% of motor FLA
Acceleration time	1 – 120 seconds
Deceleration time	1 – 60 seconds
Kick start	0.1 – 2.0 seconds, 10 - 100% of line voltage
Under voltage trip	70 – 95% (adjustable trip delay)
Over voltage trip	105 – 130% (adjustable trip delay)
Under current trip	20 – 90% of motor FLA (adjustable trip delay)
Over current trip	100 - 300% of motor FLA (adjustable trip delay)
Allowable re-starts	0 – 10 (adjustable time inhibit)

Motor and starter protection

Electronic overload	Inverse time, 75 – 150% of motor FLA
Electronic shear pin	Trips within 1 cycle of setpoint
Phase loss	One or more phases missing
Phase sequence	Phase sequency incorrect
Over voltage	Trips at high line setpoint
Under voltage	Trips at low line setpoint
Stall protection	Starting process is not complete
Shorted SCR	Internal fault detected
Error connection	Internal fault/motor connection
Starter over-temp	Heatsink over temperature

Metering

Current	Phase A, B, C & average current
Thermal data	Thermal capacity of motor
Power	KVA, KW, KVAR, power factor, KWH

Line start section
Load break/fault make disconnect switch with automatic grounding arm and viewing window
Fuses with blown fuse indicator
In-line vacuum contactor③
Control power transformer with fused primary/secondary
Packaged in common enclosure with soft start
Optional "Soft Start" (requires customer supplied line start panel)

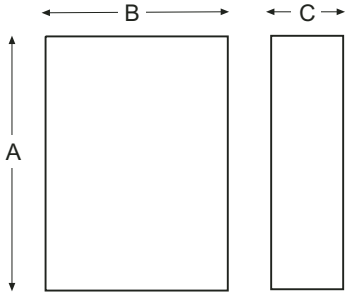
Statistical data
Total amount of run time since soft start was reset
Amount of time it took motor to start during last period
Maximum current during last start period
Total number of starts since soft start was reset
Event history for last 60 events

Elevation
1000 m / 3300 ft. without derating (contact factory for higher elevations)

Enclosure ②
NEMA 12, top and bottom entrance plates
11 gauge steel
ASA #61 gray paint with lifting eyes

① Consult factory for higher horsepower and voltage requirements.
② 13.8 kV softstarters are rated NEMA 1.
③ 13.8 kV, 600A softstarters use circuit breakers for isolation and bypass functions.

Approximate dimensions



Soft start with line start section (inches)				Optional softstart only (inches)			
Model number	A	B	C	Model number	A	B	C
SSM-23200-E-S	92	36	30	SSM-23200-E	92	36	30
SSM-23400-E-S	92	36	30	SSM-23400-E	92	36	30
SSM-23600-E-S	92	72	30	SSM-23600-E	92	36	30
SSM-33200-E-S	92	36	30	SSM-33200-E	92	36	30
SSM-33400-E-S	92	36	30	SSM-33400-E	92	36	30
SSM-33600-E-S	92	72	30	SSM-33600-E	92	36	30
SSM-41200-E-S	92	36	30	SSM-41200-E	92	36	30
SSM-41400-E-S	92	36	30	SSM-41400-E	92	36	30
SSM-41600-E-S	92	72	30	SSM-41600-E	92	36	30
SSM-66200-E-S	92	72	30	SSM-66200-E	92	36	30
SSM-66400-E-S	92	72	30	SSM-66400-E	92	36	30
SSM-66600-E-S	92	72	30	SSM-66600-E	92	72	30
SSM-138300-E-S	92	120	44	SSM-138300-E	Consult factory		
SSM-138600-E-S	92	84	96	SSM-138600-E			

Notes