

# Type SSM Softstarters



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



6

## 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.



### 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

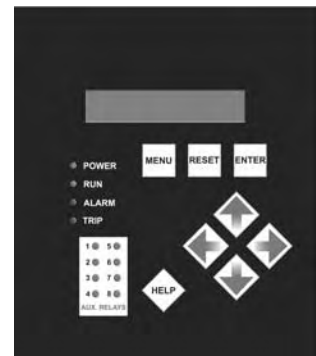
- Load break/fault make disconnect switch with door safety interlocking mechanism
- Isolated, noise-immune low voltage control compartment
- NEMA 12 enclosure with bypass vacuum contactor included as standard<sup>①②</sup>
- Extra wiring space for MV cables for easy installation

### 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 programming 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



### 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 contactor<sup>②</sup> 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
- Programmable keypad with LCD and status LEDs for easy setup and operation
- Bypass vacuum contactor<sup>②</sup> 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

<sup>①</sup> 13.8 kV softstarters are rated NEMA 1.

<sup>②</sup> 13.8 kV, 600A softstarters use circuit breakers for isolation and bypass functions.

# Type SSM



Volts	Ratings ①		Soft start with line start section		Optional soft start only ②	
	Max. amps	Nominal max. HP	Catalog number	List price	Catalog number	List price
2300	200	800	SSM-23200-E-S	③	SSM-23200-E	③
	400	1500	SSM-23400-E-S		SSM-23400-E	
	600	2500	SSM-23600-E-S		SSM-23600-E	
3300	200	1000	SSM-33200-E-S	③	SSM-33200-E	③
	400	1800	SSM-33400-E-S		SSM-33400-E	
	600	3000	SSM-33600-E-S		SSM-33600-E	
4160	200	1250	SSM-41200-E-S	③	SSM-41200-E	③
	400	2500	SSM-41400-E-S		SSM-41400-E	
	600	5000	SSM-41600-E-S		SSM-41600-E	
6600/6900	200	2500	SSM-66200-E-S	③	SSM-66200-E	③
	400	5000	SSM-66400-E-S		SSM-66400-E	
	600	7500	SSM-66600-E-S		SSM-66600-E	
13,800	300	7500	SSM-138300-E-S	④	SSM-138300-E	⑤
	600	15,000	SSM-138600-E-S		SSM-138600-E	

6

## 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 ④ ⑤**

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.

## 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 sequence 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 contactor<sup>③</sup>

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

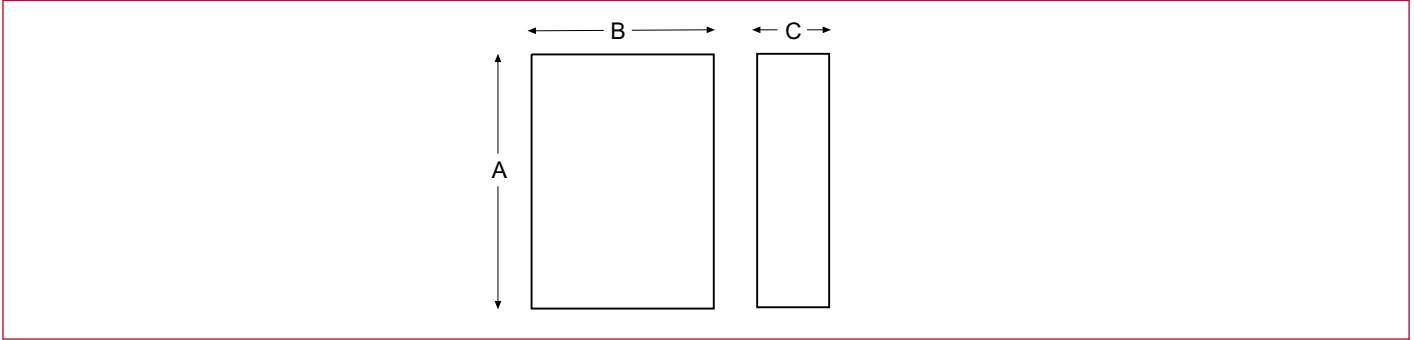
ASA #61 gray paint with lifting eyes

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			