

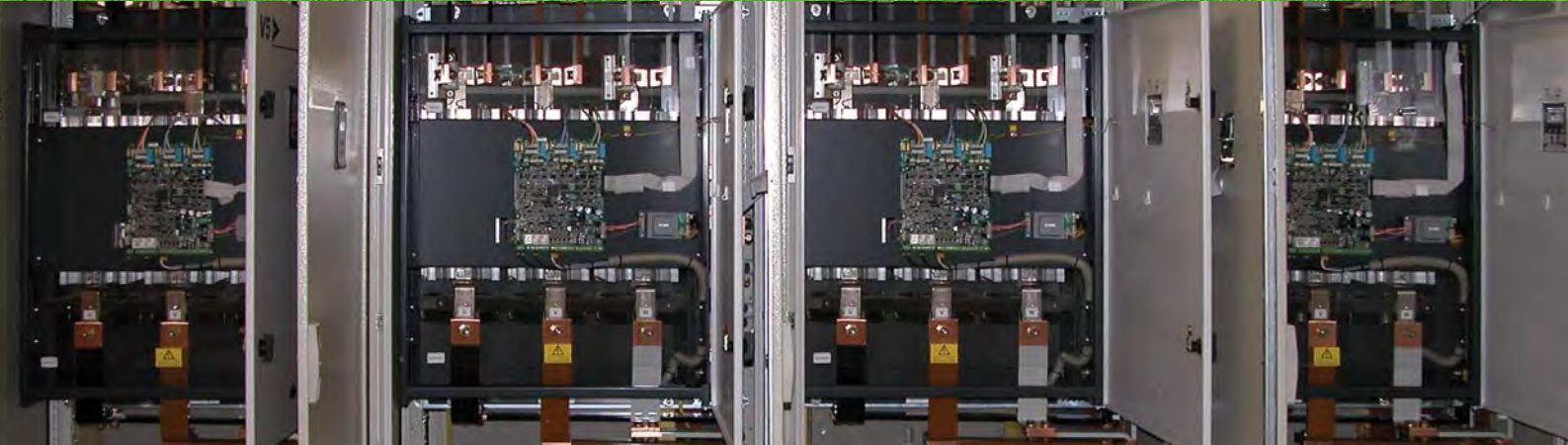
High Performance, High Function System Drive
SOFTSTARTER SS7

2.2kW ~ 1.5MW / 230 ~ 690V



Drive Solution

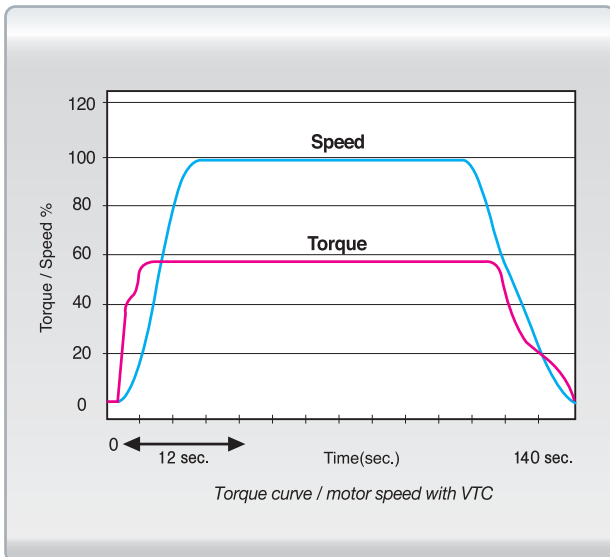




Optimized Solution for high performance drive 2.2kW - 1.5MW / 230 - 690V



Optimized motor control solution



Serial Communications

SS7 is available with in-built RS232/485 serial ports, developed for integration into the most commonly used industrial communication protocols. While MODBUS protocol is standard, other protocols are supported including PROFIBUS-DP, DeviceNet.

Slow Speed

SS7 Series allows torque adjustment at slow speed, thus it will adapt to any type of load requirement. This setting is ideal for machine positioning, as ceramic mills, etc.

Dynamic Torque Control

SS7 Series are featured with Dynamic Torque Control, exclusive starting method, it means progressive soft starting in those high inertia applications. With this control algorithm, progressive acceleration and optimization of starting current peak is achieved.

D.C. Brake

In some applications the deceleration ramp is not enough. DC Injection setting is provided in SS7 Series for those, specially in high load inertia machines.

Pump Control

An special designed control algorithm for decelerating pumps is provided in SS7 Series. This special adjustment does not operate in function of lineal stop curve for quadratic torque loads, as it is normally operated, but automatically it will adapt to hydraulic system curve.



External or Built in Bypass

SS7 softstarter offers both possibilities. The user can choose the standard model offering the possibility of installing an external contactor for bridging the power stage once acceleration ramp is finished, until the start of deceleration ramp. Otherwise the user can choose the new SS7 model with built in bypass which will offer the same functionality without requiring any external device installation. In any case, SS7 control stage remains monitoring all control operations and motor protections.

Permanent Information

SS7 Series displays constantly, motor status and complete information of the installation where it is integrated. The user will access locally (keypad unit) or remote (serial communications) to the following information :

- Voltage in each phase
- Total and partial
- Motor phi cosine (Power Factor)
- Motor shaft torque
- Power (kW) and current (I) in each phase
- Fault history (5 most recent faults)
- Number of starts
- Analogue input / output status
- Digital input /output status
- Timer, total and partial

Integration and Control

SS7 Series make easy its integration into any automation process. Via 2 analogue inputs 0-10V and 4-20mA, 5 configurable digital inputs, 1 PTC input, 1 analogue output 4-20mA and 3 changeover configurable relays.

Full Protections

All protections included in SS7 Series are translated to a better control and motor security.

- Input phase loss
- Rotor locked
- Phase imbalance > 40%
- High input voltage
- Low input voltage
- Motor overload
- Motor underload
- Motor overtemperature PTC
- Shearpin current
- Input phase sequence

Multivoltage

Only one softstarter for 230V/400V/440V and 500V, simply adjusting SS7 current to motor's.

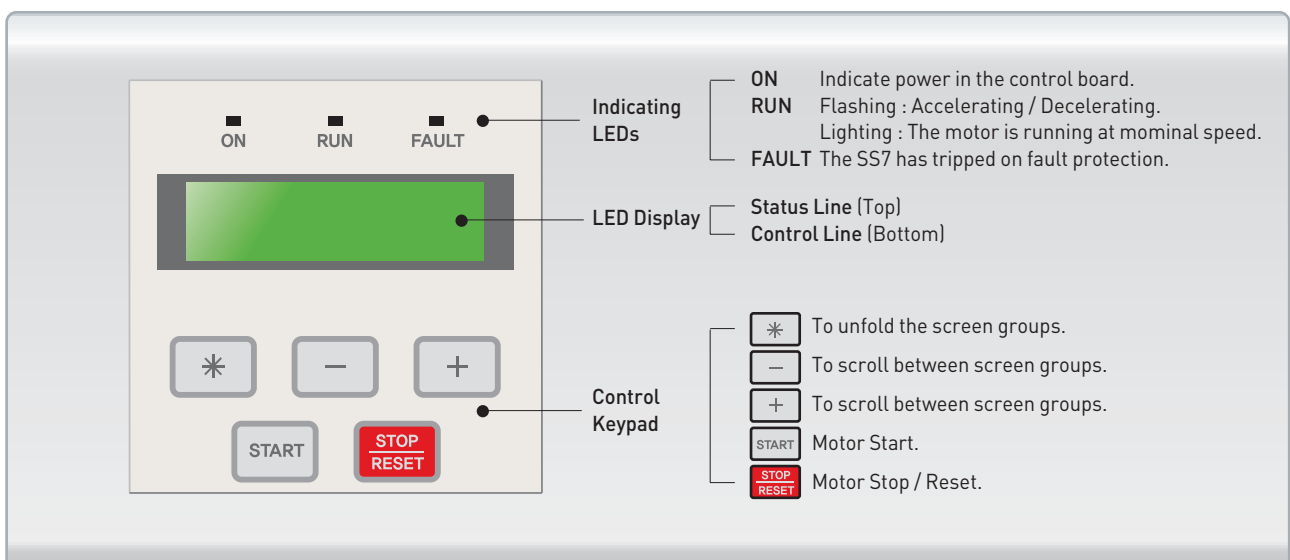
For 690V, please consult tables available at standard ratings section.

International Standards

SS7 complies with international standards as CE, cTick, UL and cUL

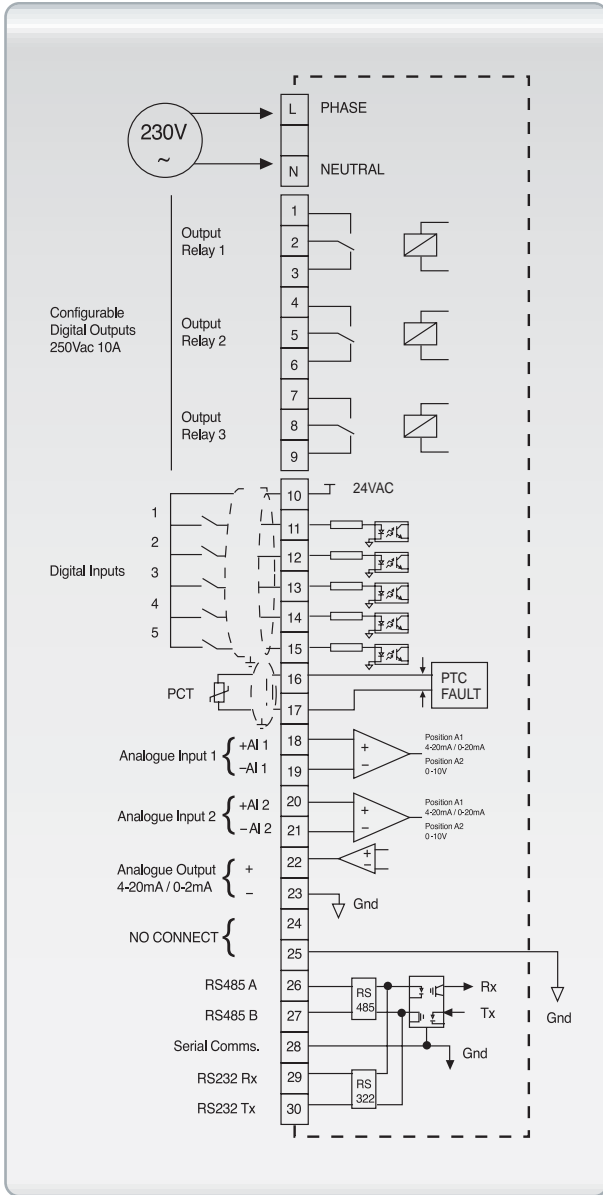


Display Unit + Keypad Control



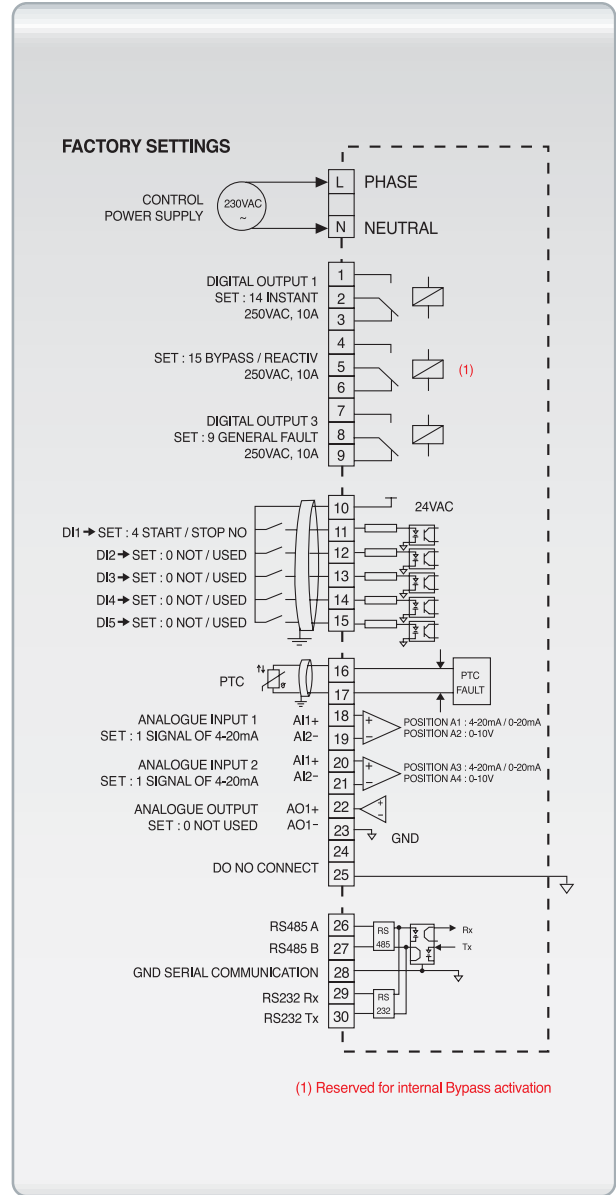
>>> Standard

Configuration of Control Wiring

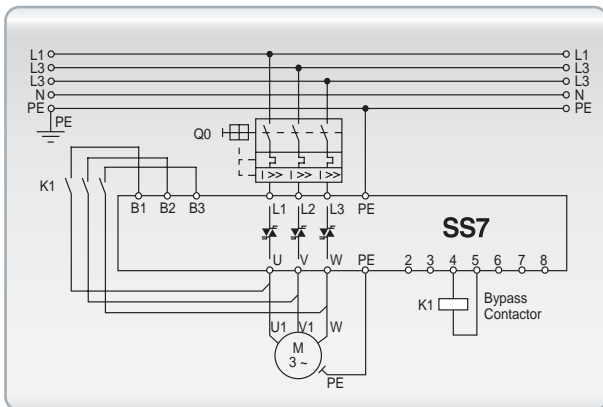


>>> Bypass built in

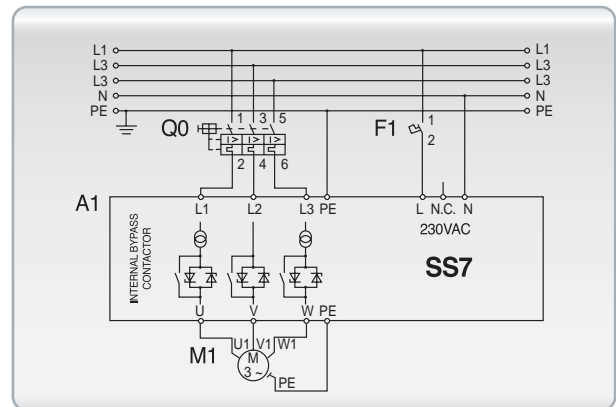
Configuration of Control Wiring



Configuration of Power Wiring



Configuration of Power Wiring



Technical Specifications

| | | |
|--------------------------|---|-------------------------------------|
| Input | Input voltage | 3 Phase, 230-500V, 690V (-20%~+15%) |
| | Supply frequency | 47-62Hz |
| | Control voltage | 220-230V (± 10%) |
| Output | Output voltage | 0-100% Supply voltage |
| | Output frequency | 47-62Hz |
| | Efficiency (at full load) | > 99% |
| Environmental Conditions | Ambient temperature | -10°C ~ +45 °C |
| | Altitude losses | Below 3,000m ^{*note 1} |
| | Ambient humidity | Less 95% (non-condensing) |
| | Enclosure | IP20 |
| Serial Communications | Standard | RS232/485, Modbus |
| | Option | Profibus, DeviceNet |
| Motor Protections | Input phase missing, High current, Low input voltage, Starting current limit, Rotor locked, Motor overload (thermal model), Underload, Phase unbalance, Motor overtemperature (PTC, normal status 150R-2k7), Shearpin current | |
| Protections | Thyristor fault, SS7 over temperature | |
| Sources Control | Local via keypad, Remote via digital inputs, Remote via Serial Communications (Modbus, RS232/485) | |

*note 1) More 1,000m, 1% derating each 100m

| | |
|---------------------------------|--|
| Adjustments ^{*note 2)} | Torque surge, Initial torque, Initial torque time, Acceleration time, Current limit : 1-In, Overload : 0.8-1.2 In, Overload slope : 0-10, Deceleration time / Freewheel stop, DC braking, Slow Speed (1/7 fundamental frequency), Dual setting Number of starts allowed, Torque control, Water hammer surge control stop |
| Input Signals | 2 analogue inputs, 0-20mA or 4-20mA, 0-10V 5 configurable digital inputs 1 PTC input |
| Output Signals | 1 analogue output 0-20mA or 4-20mA 3 changeover output relays (250VAC, 10A non inductive) |
| Display Information | Phase current, Supply voltage, Relays status, Digital inputs / PTC status, Analogue inputs value, Analogue output value, Overload status, Motor supply frequency, Motor power factor, Developed power, Motor shaft torque, Fault history (5 most recent faults) |
| LED's Indications | LED1 (green) : Voltage present on control board |
| | LED2 (orange) : Blinking , Motor accelerating / decelerating On , motor running |
| | LED3 (red): Fault present |

*note 2) For additional information consult the technical manual

Softstarter applications

According to this information, there are two utilisation categories for the Electronics Softstarter, described as follow :

- 1) Starting Time
- 2) Starting Current
- 3) Ambient Temperature
- 4) Time at OFF status
- 5) Number of Startings per Hour

EXAMPLE

1 90 : 2 AC53b 3 4.5 - 4 30 : 5 330

- 1 Rated Current of the Softstarter under the described conditions : In, (90 Amps)
- 2 The thyristors will be bypassed
- 3 Starting Current, as multiple of the nominal current (In), that means : 4.5 × In

- 4 Starting Time, in seconds, (30s)
- 5 Seconds between the end of starting and the beginning of next starting (10 startings per hour)

Common Applications

Example : The application is: Fan(fresh Air), 400V, 55kW motor

Look at 400VAC table right column [AC53b 4.5-30:330] 55kW means the softstarter coded SS7011B with nominal current of 110A

| COMMON APPLICATIONS | CHARACTERISTIC STARTING CURRENT |
|--|---------------------------------|
| WATER AND WASTEWATER | |
| Centrifugal Pumps | 3.0 × In |
| Mono and High Pressure Pumps | 4.0 × In |
| Multistage Pumps | 4.0 × In |
| Vertical Pumps | 3.0 × In |
| Split Chamber Pumps | 3.5 × In |
| Submersible Pumps | 3.5 × In |
| VENTILATION | |
| Fans (extraction) | 3.5 × In |
| Fans (fresh air) | 4.5 × In |
| Condensor Fans | 3.5 × In |
| Climatization Turbine | 4.5 × In |
| PULP AND PAPER INDUSTRY | |
| Refine Pumps | 4.0 × In |
| Pulp Pumps | 4.0 × In |
| Vacuum Pumps | 4.0 × In |
| Pulp Machines | 4.5 × In |
| Trommels | 4.0 × In |
| Pulp Mixers | 4.0 × In |
| Filters | 4.0 × In |
| METALS, AGGREGATES AND MINERALS | |
| Dust Filters Fans | 3.5 × In |
| Conveyor Belts | 4.5 × In |
| Crushers | 3.0 × In |
| Hammer Mills | 4.5 × In |

| COMMON APPLICATIONS | CHARACTERISTIC STARTING CURRENT |
|--------------------------------------|---------------------------------|
| Jaw Crushers | 4.0 × In |
| Rotor Bar Mills | 4.5 × In |
| Ball Mills | 4.5 × In |
| Secondary Mills and Sand Pulverizers | 3.5 × In |
| Eccentric Feeder | 4.5 × In |
| Trommels | 4.0 × In |
| Vibrators | 4.0 × In |
| Separators | 4.0 × In |
| Feeders | 3.5 × In |
| FOOD INDUSTRY | |
| Air Compressors | 4.0 × In |
| Sorters | 3.5 × In |
| Bottle Wash Machines | 3.0 × In |
| Driers | 4.5 × In |
| Centrifuges | 4.0 × In |
| Crushers, Punchers | 4.5 × In |
| Palletizers | 4.5 × In |
| Separators | 4.5 × In |
| Cutters | 3.0 × In |
| Material Handling | 3.5 × In |
| TOOLING MACHINES | |
| Arm Saws | 4.5 × In |
| Buzz Saws | 3.5 × In |
| Stamping presses | 4.5 × In |
| Crumbing Machines | 3.5 × In |

| COMMON APPLICATIONS | CHARACTERISTIC STARTING CURRENT |
|--|---------------------------------|
| Chamfering Tools | 3.5 × In |
| Flatters | 3.5 × In |
| Sanding Machines | 4.0 × In |
| Lathes | 4.5 × In |
| Crusher Machines | 3.5 × In |
| Palletizers | 4.5 × In |
| Presses | 4.0 × In |
| Turn Tables | 4.0 × In |
| Transporters | 4.0 × In |
| PETRO-CHEMICAL | |
| Centrifugal Machines | 4.0 × In |
| Screw Pumps | 4.0 × In |
| Gas Pumps (Propane, butane) | 3.0 × In |
| Crude Oil Extraction Pumps | 4.5 × In |
| Crude Oil Transfer Pumps | 4.5 × In |
| Hydrocarbon Transfer Pumps (liquid Stage) | 3.5 × In |
| Transport and Packaging | 3.5 × In |
| Conveyors | 3.5 × In |
| GENERAL | |
| Hydraulic Equipment | 3.5 × In |
| Agitators | 4.0 × In |
| Compressors (Screw compressor, without load) | 3.0 × In |
| Compressors (Reciprocating compressor, without load) | 4.0 × In |
| Conveyors | 4.0 × In |
| Mixers | 4.5 × In |

>>> Standard

⇒ 230 ~ 500V (-20% ~ +10%)

| Frame | Code | Rated I (A) | Power motor until (kW) | | | |
|-------|---------|-------------|------------------------|-------|------|------|
| | | | 230V | 4000V | 440V | 500V |
| 1 | SS70009 | 9 | 2 | 4 | 5 | 5.5 |
| | SS70017 | 17 | 5 | 7 | 9 | 11 |
| | SS70030 | 30 | 9 | 15 | 18.5 | 18 |
| | SS70045 | 45 | 14 | 22 | 25 | 30 |
| | SS70060 | 60 | 18 | 30 | 35 | 40 |
| | SS70075 | 75 | 22 | 37 | 45 | 50 |
| | SS70090 | 90 | 25 | 45 | 55 | 65 |
| 2 | SS70110 | 110 | 35 | 55 | 65 | 80 |
| | SS70145 | 145 | 45 | 75 | 90 | 100 |
| | SS70170 | 170 | 50 | 90 | 110 | 115 |
| | SS70210 | 210 | 65 | 110 | 120 | 150 |
| | SS70250 | 250 | 75 | 132 | 160 | 180 |
| 3 | SS70275 | 275 | 85 | 150 | 170 | 200 |
| | SS70330 | 330 | 100 | 185 | 200 | 220 |
| | SS70370 | 370 | 115 | 200 | 220 | 257 |
| | SS70460 | 460 | 145 | 250 | 270 | 315 |
| 4 | SS70580 | 580 | 185 | 315 | 375 | 415 |
| | SS70650 | 650 | 200 | 355 | 425 | 460 |
| | SS70800 | 800 | 250 | 450 | 500 | 560 |
| | SS70900 | 900 | 280 | 500 | 560 | 630 |
| 5 | SS71000 | 1000 | 322 | 560 | 616 | 700 |
| | SS71200 | 1250 | 400 | 710 | 800 | 900 |
| | SS71500 | 1500 | 500 | 800 | 900 | 1100 |

⇒ 690V (-20% ~ +10%)

| Frame | Code | Rated I (A) | Power motor until (kW) |
|-------|-----------|-------------|------------------------|
| | | | 690V |
| 1 | SS70009.6 | 9 | 7.5 |
| | SS70017.6 | 17 | 15 |
| | SS70030.6 | 30 | 30 |
| | SS70045.6 | 45 | 45 |
| | SS70060.6 | 60 | 60 |
| | SS70075.6 | 75 | 75 |
| | SS70090.6 | 90 | 90 |
| 2 | SS70110.6 | 110 | 11 |
| | SS70145.6 | 145 | 140 |
| | SS70170.6 | 170 | 160 |
| | SS70210.6 | 210 | 200 |
| | SS70250.6 | 250 | 230 |
| 3 | SS70275.6 | 275 | 250 |
| | SS70330.6 | 330 | 315 |
| | SS70370.6 | 370 | 355 |
| | SS70460.6 | 460 | 450 |
| 4 | SS70580.6 | 580 | 560 |
| | SS70650.6 | 650 | 630 |
| | SS70800.6 | 800 | 800 |
| | SS70900.6 | 900 | 900 |
| 5 | SS71000.6 | 1000 | 960 |
| | SS71200.6 | 1250 | 1250 |
| | SS71500.6 | 1500 | 1500 |

>>> Option

| Code | Description |
|------------|--|
| I001 | Profibus interface SS7 |
| A002 | Devicenet Interface SS7 |
| A003 | Metasys [JOHNSON CONTROLS] interface SS7 |
| L051 | BY-PASS Terminal Kit for SS70009-SS70017 |
| L052 | BY-PASS Terminal Kit for SS70030-SS70045 |
| P0015 (X3) | BY-PASS Terminal Kit for SS70060-SS70090 |
| P0016 (X3) | BY-PASS Terminal Kit for SS70110-SS70250 |
| V01 | Remote Display Kit 2m with plastic case |
| V02 | Remote Display Kit 1m with plastic case |
| V09 | Remote Display Kit 3m with plastic case |
| V16 | Remote Display Kit 5m with plastic case |
| MFV50275 | D.C. Brake 275A |

>>> Bypass built in

⇒ 400Vac (-20% ~ +10%)

| Frame | Code | AC53b 3.0 ~ 30:330 | | AC53b 4.0 ~ 30:330 | | AC53b 4.5 ~ 30:330 | |
|-------|------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
| | | Max. Rated I(A) | Motor Power (kW) | Max. Rated I(A) | Motor Power (kW) | Max. Rated I(A) | Motor Power (kW) |
| 1 | SS70009.6B | 14 | 7.5 | 10 | 5.5 | 9 | 4 |
| | SS70017.6B | 26 | 15 | 19 | 11 | 17 | 7.5 |
| | SS70030.6B | 45 | 22 | 34 | 18.5 | 30 | 15 |
| | SS70045.6B | 68 | 37 | 51 | 30 | 45 | 22 |
| | SS70060.6B | 90 | 45 | 68 | 37 | 60 | 30 |
| | SS70075.6B | 113 | 55 | 85 | 45 | 75 | 37 |
| | SS70090.6B | 135 | 75 | 101 | 55 | 90 | 45 |
| 2 | SS70110.6B | 165 | 90 | 140 | 75 | 110 | 55 |
| | SS70145.6B | 218 | 110 | 164 | 90 | 145 | 75 |
| | SS70170.6B | 255 | 150 | 192 | 110 | 170 | 90 |
| | SS70210.6B | 315 | 185 | 237 | 132 | 210 | 110 |
| | SS70250.6B | 375 | 200 | 281 | 150 | 250 | 132 |
| 3 | SS70275.6B | 412 | 220 | 310 | 185 | 275 | 150 |
| | SS70330.6B | 495 | 280 | 370 | 200 | 330 | 185 |
| | SS70370.6B | 555 | 315 | 416 | 220 | 370 | 200 |
| | SS70460.6B | 690 | 400 | 518 | 280 | 460 | 250 |
| 4 | SS70580.6B | 870 | 450 | 650 | 355 | 580 | 315 |
| | SS70650.6B | 975 | 500 | 731 | 400 | 650 | 355 |
| | SS70800.6B | 1200 | 630 | 900 | 500 | 800 | 450 |

⇒ 500Vac (-20% ~ +10%)

| Frame | Code | AC53b 3.0 ~ 30:330 | | AC53b 4.0 ~ 30:330 | | AC53b 4.5 ~ 30:330 | |
|-------|----------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
| | | Max. Rated I(A) | Motor Power (kW) | Max. Rated I(A) | Motor Power (kW) | Max. Rated I(A) | Motor Power (kW) |
| 1 | SS70009B | 14 | 11 | 10 | 7.5 | 9 | 5.5 |
| | SS70017B | 26 | 18.5 | 19 | 15 | 17 | 11 |
| | SS70030B | 45 | 30 | 34 | 22 | 30 | 18.5 |
| | SS70045B | 68 | 45 | 51 | 37 | 45 | 30 |
| | SS70060B | 90 | 55 | 68 | 45 | 60 | 37 |
| | SS70075B | 113 | 75 | 85 | 55 | 75 | 45 |
| 2 | SS70090B | 135 | 90 | 101 | 75 | 90 | 55 |
| | SS70110B | 165 | 110 | 140 | 90 | 110 | 75 |
| | SS70145B | 218 | 150 | 164 | 110 | 145 | 90 |
| | SS70170B | 255 | 185 | 192 | 132 | 170 | 110 |
| | SS70210B | 315 | 220 | 237 | 185 | 210 | 150 |
| 3 | SS70250B | 375 | 250 | 281 | 200 | 250 | 185 |
| | SS70275B | 412 | 280 | 310 | 220 | 275 | 200 |
| | SS70330B | 495 | 355 | 370 | 250 | 330 | 220 |
| | SS70370B | 555 | 400 | 416 | 280 | 370 | 250 |
| 4 | SS70460B | 690 | 500 | 518 | 355 | 460 | 315 |
| | SS70580B | 870 | 560 | 650 | 450 | 580 | 400 |
| | SS70650B | 975 | 630 | 731 | 500 | 650 | 450 |
| | SS70800B | 1200 | 710 | 900 | 630 | 800 | 560 |

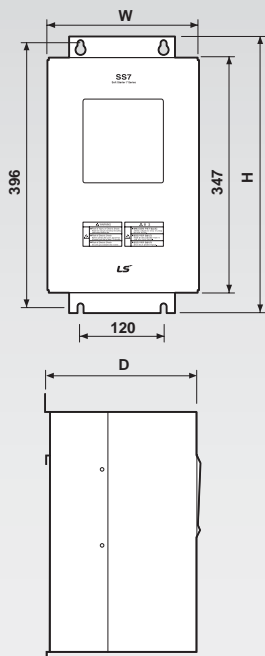
⇒ 690Vac (-20% ~ +10%)

| Frame | Code | AC53b 3.0 ~ 30:330 | | AC53b 4.0 ~ 30:330 | | AC53b 4.5 ~ 30:330 | |
|-------|------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
| | | Max. Rated I(A) | Motor Power (kW) | Max. Rated I(A) | Motor Power (kW) | Max. Rated I(A) | Motor Power (kW) |
| 1 | SS70009.6B | 14 | 15 | 10 | 11 | 9 | 7.5 |
| | SS70017.6B | 26 | 22 | 19 | 18.5 | 17 | 15 |
| | SS70030.6 | 45 | 45 | 34 | 37 | 30 | 30 |
| | SS70045.6B | 68 | 75 | 51 | 55 | 45 | 45 |
| | SS70060.6B | 90 | 90 | 68 | 75 | 60 | 55 |
| | SS70075.6B | 113 | 110 | 85 | 90 | 75 | 75 |
| | SS70090.6B | 135 | 132 | 101 | 110 | 90 | 90 |
| 2 | SS70110.6B | 165 | 150 | 140 | 132 | 110 | 110 |
| | SS70145.6B | 218 | 200 | 164 | 150 | 145 | 132 |
| | SS70170.6B | 255 | 250 | 192 | 200 | 170 | 150 |
| | SS70210.6B | 315 | 315 | 237 | 220 | 210 | 200 |
| | SS70250.6B | 375 | 355 | 281 | 250 | 250 | 220 |
| 3 | SS70275.6B | 412 | 400 | 310 | 315 | 275 | 250 |
| | SS70330.6B | 495 | 450 | 370 | 355 | 330 | 315 |
| | SS70370.6B | 555 | 500 | 416 | 400 | 370 | 355 |
| | SS70460.6B | 690 | 630 | 518 | 500 | 460 | 450 |
| 4 | SS70580.6B | 870 | 800 | 650 | 630 | 580 | 560 |
| | SS70650.6B | 975 | 900 | 731 | 710 | 650 | 630 |
| | SS70800.6B | 1200 | 1000 | 900 | 900 | 800 | 800 |

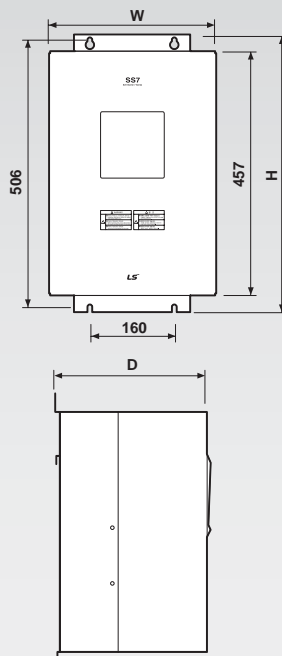


Dimensions

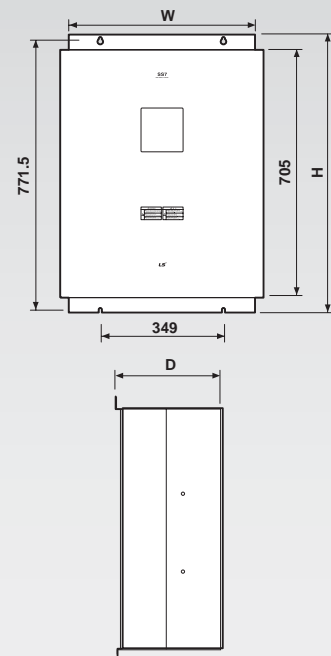
Frame 1



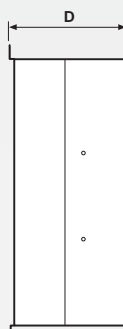
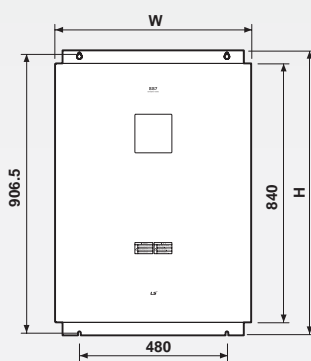
Frame 2



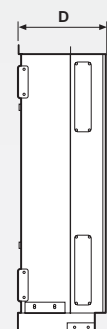
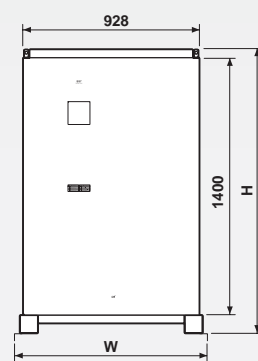
Frame 3



Frame 4



Frame 5



| Frame | Code | Dimensions (mm) | | | Weight (kg) |
|-------|-------------------------|-----------------|------|-----|-------------|
| | | H | D | W | |
| 1 | SS70009 - SS70090 | 414 | 226 | 230 | 11,6 |
| | SS70009.6 - SS70090.6 | | | | 12,1 |
| | SS70009B - SS70090B | | | | |
| | SS70009.6B - SS70090.6B | | | | |
| 2 | SS70110 - SS70250 | 523 | 314 | 260 | 19 |
| | SS70110.6 - SS70250.6 | | | | 21 |
| | SS70110B - SS70250B | | | | |
| | SS70110.6B - SS70250.6B | | | | |
| 3 | SS70275 - SS70460 | 791 | 580 | 309 | 53,6 |
| | SS70275.6 - SS70460.6 | | | | 60,6 |
| | SS70275B - SS70460B | | | | |
| | SS70275.6B - SS70460.6B | | | | |
| 4 | SS70580 - SS71000 | 926 | 640 | 324 | 77,6 |
| | SS70580.6 - SS71000.6 | | | | 86,6 |
| | SS70580B - SS71000B | | | | |
| | SS70580.6B - SS71000.6B | | | | |
| 5 | SS71200 - SS71500 | 1552 | 1084 | 475 | 300 |
| | SS71200.6 - SS71500.6 | | | | |



Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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LS Industrial Systems Co., Ltd.

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■ **HEAD OFFICE**

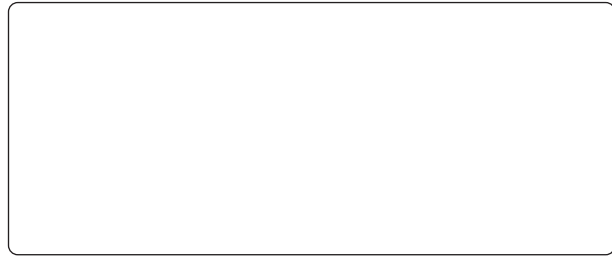
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