Selection Guide

Allen-Bradley

SMC™-50 Solid-State Smart Motor Controller

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Allen-Bradley • Rockwell Software

Rockwell Automation

Features	SMC™-50 § 200…690V 90…520 A
Soft Start	S
Linear Acceleration/Deceleration	S
Torque Control	S
Kickstart	S
Pump Control	S
Current Limit	S
Dual Ramp Start	S
Full Voltage	S
Energy Saver	S
Soft Stop	S
Preset Slow Speed	S
SMB™ Smart Motor Braking	S
Accu-Stop™ Δ	S
Slow Speed with Braking	S
Integrated Bypass Contactor	NA ♣
Integrated Motor Overload Protection	S
Single-phase Operation	—
DPI Communication	S
Metering	S
Real Time Clock	S
Energy Saver Mode	S
Motor Winding Heater Function	S
Diagnostic Faults & Alarms	S
Individual Bit Enable of Faults & Alarms	S
Automatic Tuning of Motor Parameters	S
Parameter Configuration/Programming Tools	—
Human Interface Module (HIM)	O
Parameter Configuration Module	O
Software: DriveExplorer™ & DriveExecutive™	O
Digital I/O Expansion Module‡	O
Analog I/O Expansion Module‡	O
Ground Fault/CT/PTC Module ‡	O
Network Communications	O
Inside-the-Delta Functionality	S
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S = Standard Feature
O = Optional Feature
★ The starter does not include a configuration device as standard.
‡ With removable terminal block.
§ The starter ships with two 24V DC control inputs and two relay outputs as standard.
♣ The SMC-50 Starter is fully solid-state (no integrated bypass). An external bypass contactor can be added as an option.
Δ Accu-Stop is not included as a parameter/function like that of the SMC-Flex. However, the Accu-Stop function can be accomplished with the Stop Option and Slow Speed with Braking functions.

Bulletin 150 — SMC™-50 Smart Motor Controller

The SMC-50 Smart Motor Controller provides microprocessor-controlled, solid-state (SCR, no bypass) starting for standard three-phase squirrel-cage induction or Wye-Delta (6-lead) motors.

Features

- 90…520 A range
- Nine standard start modes
- Rated voltage: 200…690V AC
- Three expansion ports to install option modules
- Fully solid-state, continuous SCR control
- Built-in electronic motor overload protection
- Current and voltage sensing on each phase
- Metering
- DPI Communication Protocol
- Parameter configuration options
- Energy saver mode
- Logging of the last 100 events with time stamp
- Network communication (option)
- External bypass as an option
- Conformally-coated PCBs

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Standards Compliance

UL 508
EN 60947-4-2

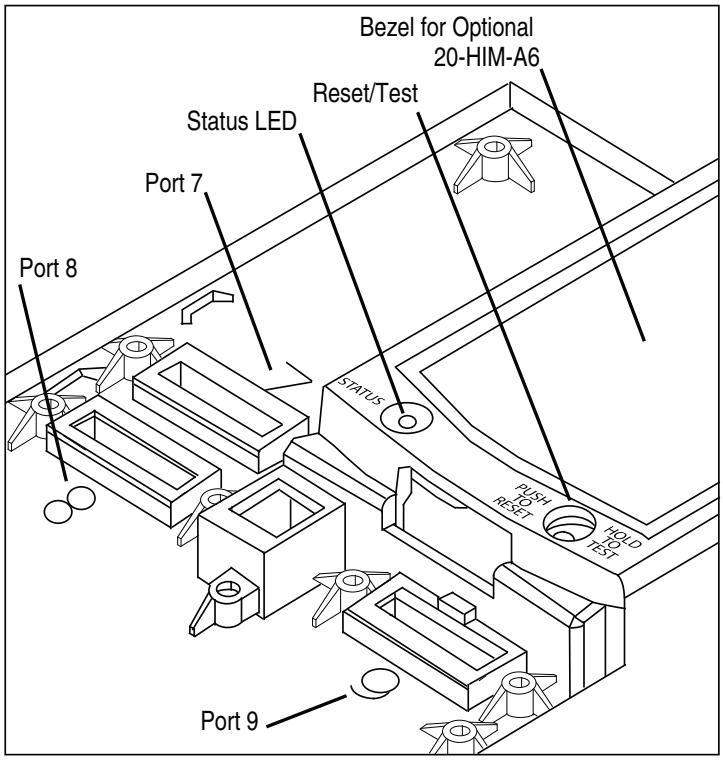
Certifications

cULus Listed (Open Type) (File No. E96956)
CE Marked per EMC Directive and Low Voltage Directive
CCC

Selection Guide

This selection guide/catalog provides minimum information needed to select the proper SMC-50 Smart Motor Controller according to the motor ratings used in the application. For normal duty applications (e.g., pumps, compressors, and short conveyors), refer to the Normal Duty Product Selection tables on page 16 and page 22. For high inertia, heavy duty applications (e.g., rock crushers, wood chippers, centrifugal fans, and long conveyors), refer to the Heavy Duty Product Selection tables on page 19 and page 24. For best selection results in all cases, especially where there is frequent starting and stopping or when it is unclear if the application is Normal Duty or Heavy Duty, it is highly recommended that the free selection tools be used (available at http://www.ab.com). For additional assistance, please visit www.ab.com or contact Industrial Controls Technical Support by email at raictechsupport@ra.rockwell.com or by phone at 440-646-5800 (select option 1> option 1> and direct dial code 804).

Product Overview



The SMC-50 Smart Motor Controller is a micro-processor based soft starter designed to maximize the efficiency of motor starts and stops. Featuring a fully solid-state design, the SMC-50 uses six SCRs (two per phase), which are always engaged (no internal bypass) to vary the conduction period and control the voltage (torque) to the motor during starting, running, and stopping. The starter has many advanced power monitoring and motor/starter protection features to help increase overall reliability. Product scalability is enabled by its three connection ports (Port 7, 8, & 9) to house additional I/O, network communication, or parameter configuration modules (a maximum of three modules). Scalability continues into the configuration of the controller via three different options: (1) a parameter configuration module with limited configuration capability using DIP and selector switches, (2) a multilingual 20-HIM-A6 controller or a panel-mount keypad with LCD display featuring more advanced configuration features, and (3) software that is PC based and network capable (e.g., DriveExplorer) with optimal configuration features. The SMC-50's front panel features a single, multi-colored LED status indicator which provides both diagnostics and controller status information as well as a Push-to-Reset/Hold-to-Test push button which allows manual reset of an actual fault condition, and initiates a tuning cycle or test for fault.

Starting Modes

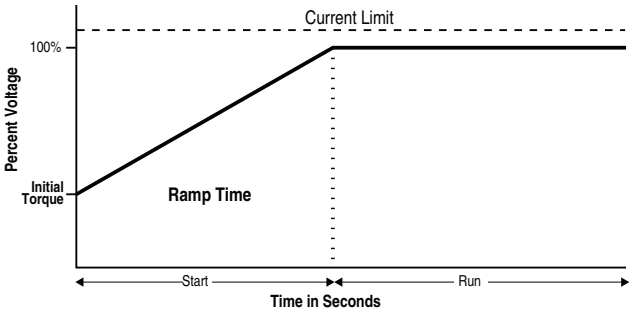
The SMC-50 Smart Motor Controller provides the following starting modes of operation as standard:

Starting Modes	
Soft Start	Pump Control Mode
Linear Speed Acceleration	Dual Ramp Start
Torque Control Start	Full Voltage Start
Current Limit Start	Preset Slow Speed
Selectable Kickstart	Integral Motor Winding Heater (starting feature)

Soft Start

This method covers the most general applications. The motor is given an initial torque setting, which is user adjustable. From the initial torque level, the output voltage to the motor is steplessly increased (ramped) during the acceleration ramp time, which is user-adjustable. A user-adjustable current limit value is also available. This limits the current throughout the soft start.

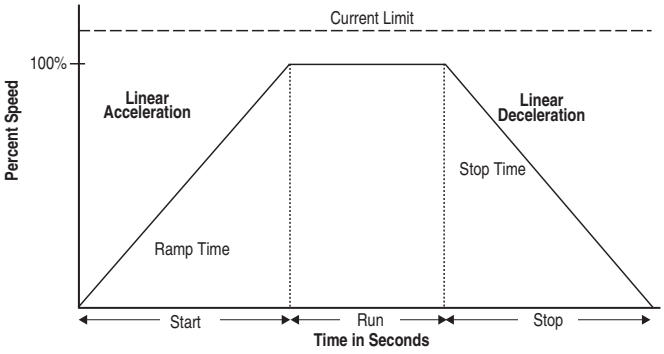
NOTE: A motor's torque curve is not a linear function and depends on both applied voltage and current. As such, if the soft starter ramped voltage applied to the motor is sufficient for it to develop torque high enough to overcome the inertia of the load, the motor could quickly accelerate to full speed in less than the configured ramp time when using the Soft Start mode.



Linear Speed Acceleration

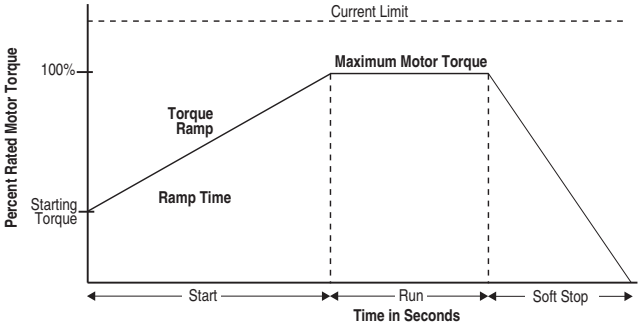
With this type of starting mode, the motor acceleration is at a constant rate. The controller accelerates the motor in a linear fashion from the off (0 speed) condition to full speed condition in the time configured in the user-defined ramp time. This is done using a proprietary motor speed feedback algorithm to sense motor speed*. This starting mode presents the least amount of stress on mechanical components. An initial torque value is configured to define a motor starting value. A current limit value is also available to limit the starting current throughout the linear acceleration start maneuver.

***NOTE:** An external speed sensor is **NOT** required.



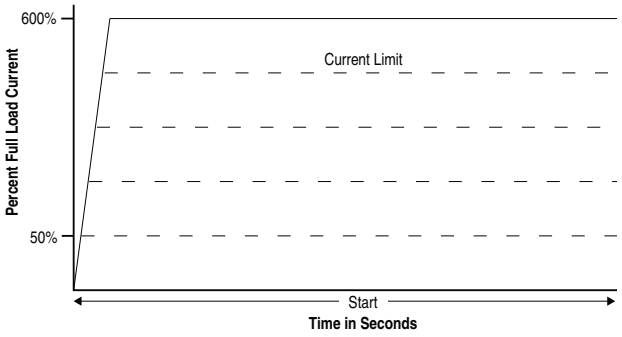
Torque Control Start

This method provides a torque ramp from a user-adjustable, initial motor starting torque to a user-adjustable, maximum torque over the defined starting ramp time. The torque control mode provides a more linear starting ramp than a soft start, potentially resulting in less stress on mechanical components and a more time controlled ramp. A current limit value is also available to limit the starting current throughout the torque start.



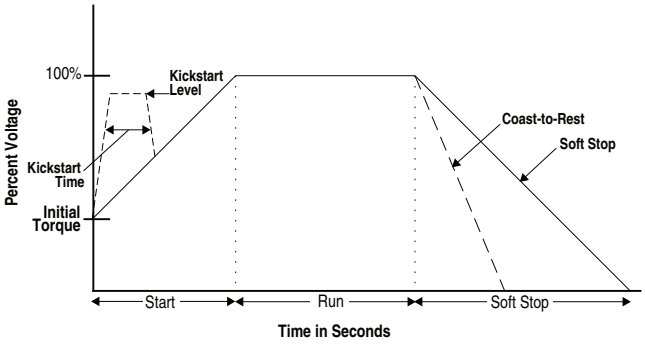
Current Limit Start

This method provides a current limit controlled start by maintaining a constant current to the motor and is used when it is necessary to limit the maximum starting current. The starting current and current limit starting ramp time is user-adjustable. Current Limit Start can be used in conjunction with Soft Start, Torque Control, and Linear Speed Acceleration Starts.



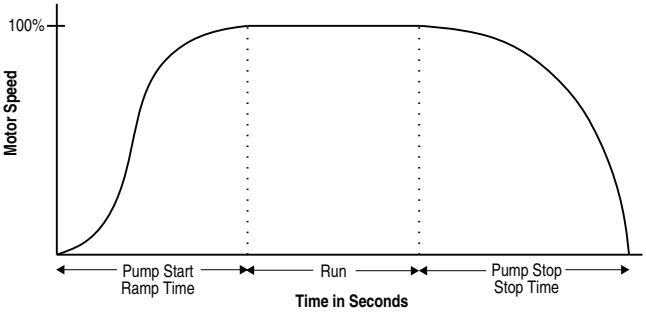
Selectable Kickstart

The kickstart feature provides a boost at startup to break away loads that may require a pulse of current/torque to get started. It is intended to provide a current/voltage pulse for a short period of time. Kickstart is available in Soft Start, Current Limit, Pump, and Torque Control modes.



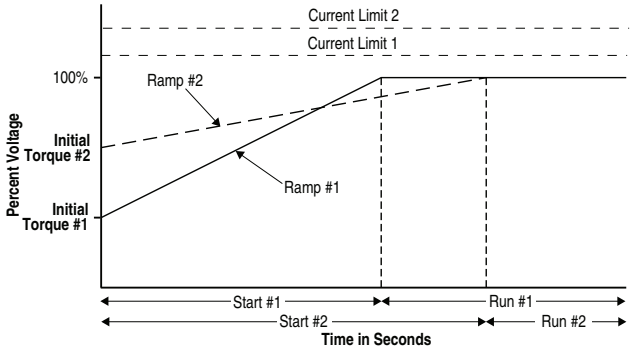
Pump Control Mode

This mode is used to reduce surges in a fluid piping system and the resulting water hammer or check valve slam caused by starting a centrifugal pump at full voltage and full speed. In addition, this mode also reduces pump cavitations, increasing pump life. To provide these benefits, the SMC-50's microprocessor generates a motor starting curve which follows the starting characteristics of a centrifugal pump and monitors operation during start to ensure reliable pump starts.



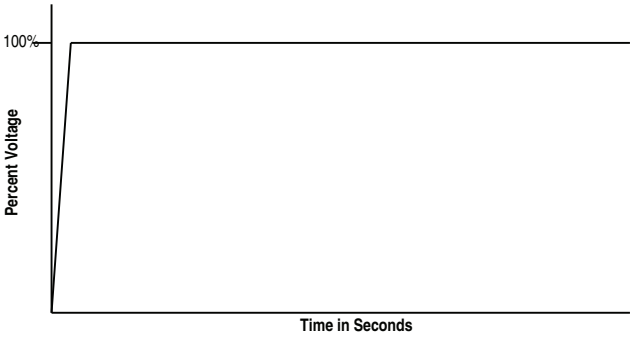
Dual Ramp Start

This method is useful on applications with varying loads, starting torque, and start time requirements. Dual Ramp Start gives the user the ability to select between two separate start profiles via any programmable auxiliary input. Each start profile can use any of the available starting modes.



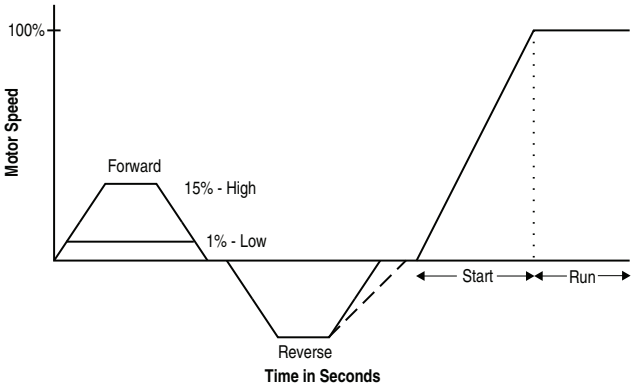
Full Voltage Start

This method is used in applications requiring across-the-line starting. The SMC-50 performs like a solid-state across-the-line contactor. Full inrush current and locked-rotor torque are realized. The SMC-50 may be programmed to provide full voltage start in which the output voltage to the motor reaches full voltage in five cycles.



Preset Slow Speed

This feature/function can be used on applications that require slow speed moves for positioning material. The Preset Slow Speed can be set from Low, ± 1%, up to High, ± 15% in 1% increments of base speed. Forward or reverse movement is enabled through programming the sign (±) of the percent speed. No reversing contacts are required. To ensure accurate stops, braking is also a part of this function.



Integral Motor Winding Heater (starting feature)

This function eliminates the need for additional hardware to heat the motor from a cold start and enables using a small amount of motor current switched to each motor phase in sequence to heat the windings. Heating can be time based or activated by configurable input. The winding heat level is also configurable.

Stopping Modes

The SMC-50 Smart Motor Controller provides the following Stopping Modes of operation as standard:

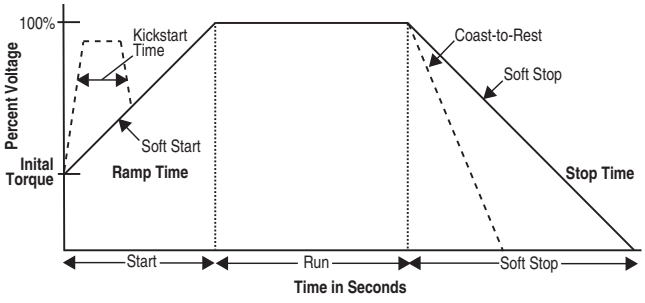
Stopping Modes	
Coast	**Linear Speed Deceleration**
Soft Stop	**Pump Stop**

Coast

Configuring the stop mode to coast sets the controller to perform a motor coast-to-stop maneuver.

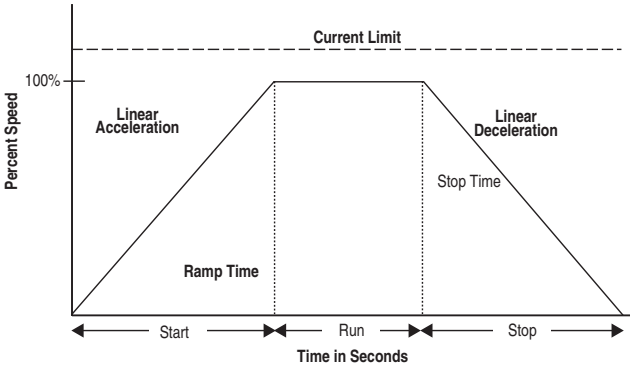
Soft Stop

The Soft Stop mode can be used in applications requiring an extended stop time. The voltage ramp down time is user-adjustable from 0...999 seconds. This load will stop when the programmed stop time has elapsed or the voltage ramp drops to a point where the load torque is greater than the motor torque.



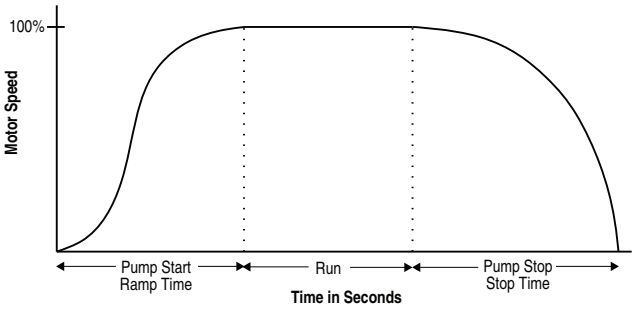
Linear Speed Deceleration

Configuring the motor stop mode to Linear Speed Deceleration mode commands the motor to stop from full speed to zero speed following a linear ramp based on the user-configured stop time. A current limit value is also available to limit the stopping current throughout the Linear Speed Deceleration maneuver.



Pump Stop

Just as starting a centrifugal pump at full voltage causes water hammer and check valve slam, stopping a centrifugal pump that is running at full speed can also produce the same results. The SMC-50's Pump Stop mode generates a motor stop curve, which follows the stop characteristics of a centrifugal pump, which results in the gradual decrease in motor speed.



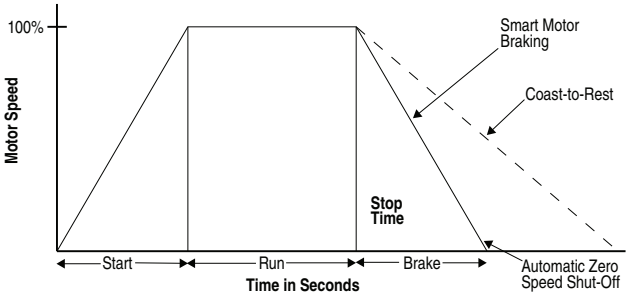
Braking Control Modes★

The SMC-50 Smart Motor Controller provides the following braking control modes of operation as standard:

Braking Control Modes	
SMB — Smart Motor Braking	Accu-Stop™
Slow Speed with Braking	External Braking Control

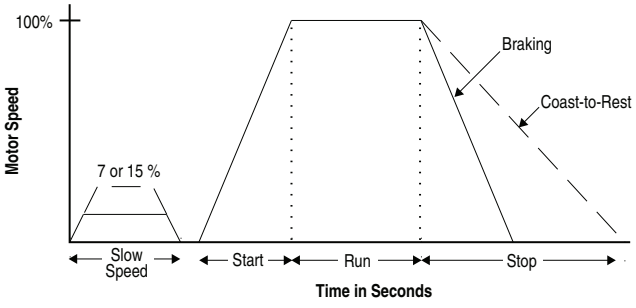
SMB — Smart Motor Braking★

This mode provides motor braking for applications that require the motor to stop faster than a coast-to-rest. Braking control with automatic zero speed shutoff is fully integrated into the design of the SMC-50. This design facilitates a clean, straight-forward installation and eliminates the requirement for additional hardware (e.g., braking contactors, resistors, timers, and speed sensors). The micro-processor based braking system applies braking current to a standard squirrel-cage induction motor. The strength of the braking current is programmable from 0…400% of full-load current.



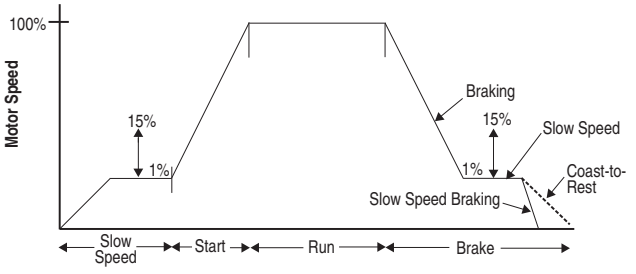
Slow Speed with Braking★

Slow Speed with Braking is used on applications that require slow speed (in the forward or reverse direction) for positioning or alignment and also require braking control to stop. Slow Speed adjustments are ±1% (low)…±15% (high) of rated speed. Braking current is adjustable from 0…350%.



Accu-Stop★ ‡

This control is used in applications requiring controlled position stopping. During stopping, braking torque is applied to the motor until it reaches the configured preset slow speed value (±1…±15%) and holds the motor at this speed until a stop command is given. Braking torque is then applied until the motor reaches zero speed. Braking current is programmable from 0…350% of full-load current.



External Braking Control★

An external braking device can be used to externally brake a motor controlled by the SMC-50. The external braking device is activated using one of the SMC-50's auxilliary relays configured for “Ext Brake” with the stop mode parameter set to "Ext Brake". The relay is energized when the “Stop” command is given and stays on until the time configured in the “Stop Time” parameter counts down to zero.

★ Not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

‡ Accu-Stop is not included as a parameter/function like that of the SMC-Flex. However, the Accu-Stop function can be accomplished with the Stop Option and Slow Speed with Braking functions.

Running Modes

The SMC-50 Smart Motor Controller provides the following running modes of operation as standard:

Running Modes	
SCR Control — Normal Run Operation	External Bypass — Optional Run Operation
SCR Control — Energy Saver Run Operation	Emergency Run

SCR Control - Normal Run Operation

The SMC-50 uses its power section SCRs to start, run, and stop (except for Coast-to-Stop) a squirrel-cage induction motor. The basic operation of the SCRs is to switch on (conduct) for a certain percentage of the 50/60 Hz AC sine wave, as directed by the SMC-50, to control the amount of voltage applied to the motor. By using special control algorithms and motor feedback to manage voltage supplied, the SMC-50 provides the previously outlined motor starting, stopping, and braking control modes. During the normal run operation, the SMC-50 power section SCRs are conducting for 100% of the 50/60 Hz AC sine wave to provide the motor specified full load current (FLA/FLC) voltage and the resulting torque.

SCR Control – Energy Saver Run Operation

The Energy Saver Run Operation function is typically used in applications where the running motor is lightly loaded or unloaded for an extended period of time. With the Energy Saver Run Operation function enabled, the SMC-50 continuously monitors motor load using internal feedback to control its SCRs which reduces the voltage applied to the motor. This will potentially reduce power consumption. A parameter is provided to display the possible energy saved as a percent.

External Bypass – Optional Run Operation

An external bypass contactor can be used to carry the motor running current. In this running mode, the SCRs are only used for starting and potentially stopping depending on the stop mode selected. The SMC-50 controls the external bypass using one of its auxiliary relay outputs. When the SMC-50 is used in the external bypass mode with the contacts of the external bypass contactor closed, the user has the option of using the SMC-50's internal or external current sensing capabilities. If using external current sensing so that metering, alarm/fault, etc. conditions are reported to the controller during run operation, an external Bulletin 825-MCMxxx Converter Module is required to interface with the 150-SM2 Option Module. This configuration enables the SMC-50's current-related motor protection features to be used (e.g., external overload not required).

NOTE: If this configuration is not used, a means of external motor protection is required.

Emergency Run

When one of the SMC-50's inputs is configured for Emergency Run and that input is activated, all system faults are disabled. This prevents the system from being shut down by a fault.

Motor & Starter Protection Features

The SMC-50 provides both motor and starter alarms and faults. An alarm condition is intended to provide an alert that a potential system issue, or fault is pending to allow time to take corrective action. A fault is intended to protect equipment from damage by shutting that equipment down and/or removing power. The SMC-50 provides the ability to individually enable or disable motor and starter alarms and faults by bit (On/Off) selection. Alarm and fault trip points are typically user-configurable to allow for application dependence. In addition, many alarms and faults provide a separate user-configurable alarm and fault time delay parameter to limit nuisance trips and shutdowns.
The SMC-50 has a separate Fault Buffer and Alarm Buffer to maintain a Fault/Alarm history. In addition to the fault/alarm code and description, a time and date stamp is provided by the SMC-50's Real Time Clock (RTC). The Fault Buffer holds the last five faults which provide the time and date; the Alarm Buffer holds the last 100 alarm events which detail the time, date, parameter change, Start, Stop, Coast, Slow Speed Operation, Alarm. Fault, and Fault Reset.
As standard, the SMC-50 enables manual reset of a fault from the PUSH-TO-RESET/HOLD-TO-TEST button, located adjacent to the LED status indicator. Fault indication and reset can also be performed from an optional controller bezel and/or panel-mount HIM or from PC software (e.g., DriveExplorer).

Motor Protection Features

Electronic Motor Overload Protection
As standard, the SMC-50 incorporates electronic motor overload protection. This is accomplished electronically with an I^2t algorithm.
Overload Protection is intended to protect the motor, motor controller, and power wiring against overheating caused by excessive overcurrent. The SMC-50 meets applicable requirements as a motor overload protective device. It is not intended, however, to protect against a short circuit condition.
The SMC-50's overload protection is programmable, providing the user maximum flexibility. The Overload Trip class is either OFF or is configurable from 5 to 30. The overload is programmed by entering the motor full-load current rating, service factor, and selecting the trip class.
Thermal memory is included to accurately model motor operating temperature. Ambient temperature insensitivity is inherent in the electronic design of the overload. A user-configurable timer can also be set to disable the overload function during motor starts; another timer provides the ability to monitor the amount of time remaining before the overload trip occurs. Manual or automatic reset of an overload is configurable.

Stall Protection and Jam Detection
Motors can experience locked-rotor currents and develop high torque levels in the event of a stall or a jam. These conditions can result in winding insulation breakdown or mechanical damage to the connected load. The SMC-50 provides both stall protection and jam detection for enhanced motor and system protection. A jam level (as a percent of motor FLC) is configurable for both an alarm and motor shutdown (fault). In addition, both stall and jam conditions provide the ability to set a delay time before initiating an alarm (jam only) or motor shutdown (fault).

Underload Protection
Utilizing the Underload Protection of the SMC-50, an alarm can be sounded or motor operation can be halted (fault) if a drop in current is sensed.
The SMC-50 provides an adjustable underload trip setting from 0…99% of the programmed motor full-load current rating with an adjustable trip delay time of 0.1…99.0 seconds.

Excessive Starts Per Hour
The SMC-50 permits the user to program the allowed number of starts within a one-hour sliding window (up to 99). This helps eliminate motor stress caused by repetitive starting during a short time period. An alarm or fault can be enabled using the single configured value.

User-Configurable Alarms & Faults
In addition to the previous motor alarms and faults, the following can also be configured:

- Apparent Power
- OverPower
  - Real
  - Reactive Consumed
  - Reactive Produced
- Current Imbalance
- UnderPower
  - Real
  - Reactive Consumed
  - Reactive Produced
- Power Quality★
- Power Factor Over
  - Leading
  - Lagging
- Open Load★
- Power Factor Under
  - Leading
  - Lagging
- Power Quality THD Current

★ Contains no parameters to configure.

The SMC-50 also has user-configurable motor alarms and faults which can be used to indicate required or planned maintenance.

- Planned Maintenance Hours
- Planned Maintenance Starts

Starter Protection Features

Undervoltage Protection
The SMC-50's Undervoltage Protection can sound an alarm or halt (fault) motor operation if a drop in the incoming line voltage is detected. The undervoltage trip level is adjustable as a percentage of the programmed line voltage from 0…100%. To eliminate nuisance trips, a programmable undervoltage trip delay time of 0.1…99.0 seconds can also be programmed. The line voltage must remain below the undervoltage trip level during the programmed delay time.

Overvoltage Protection
If a rise in the incoming line voltage is detected, the SMC-50's Overvoltage Protection can sound an alarm or halt (fault) motor operation. The overvoltage trip level is adjustable as a percentage of the programmed line voltage, from 100…199%. To eliminate nuisance trips, a programmable overvoltage trip delay time of 0.1…99.0 seconds can also be programmed. The line voltage must remain above the overvoltage trip level during the programmed delay time.

Voltage Unbalance Protection
Voltage unbalance is detected by monitoring the three-phase supply voltage magnitudes in conjunction with the rotational relationship of the three phases. The SMC-50 will halt motor operation when the calculated voltage unbalance reaches the user-programmed trip level. The voltage unbalance trip level is programmable from 0…25% unbalance.
In addition to the aforementioned faults and alarms, the following are also available:

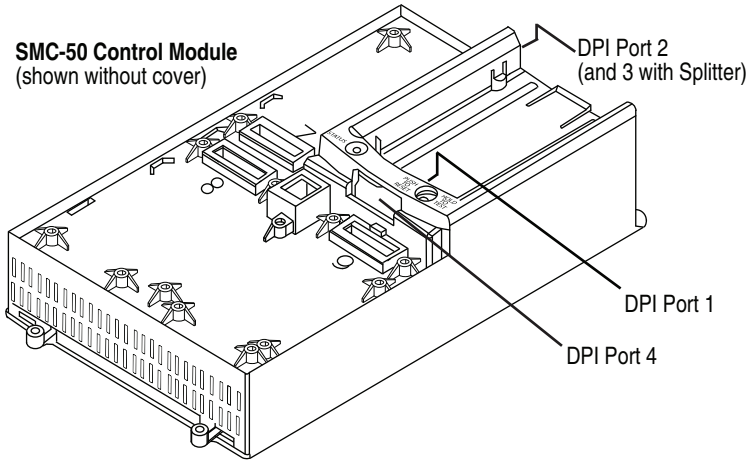
- Phase Reversal (CBA Connection)
- Open SCR Gate
- Parameter Configuration Change
- Line Loss with Phase Identification
- Frequency High and Low
- Poor Voltage Power Quality — THD V

Metering System

Power and operational monitoring parameters include:

- **Current** The RMS current value is provided for each phase, plus the average current of all three.
- **Voltage** The RMS line-to-line and line-to-neutral voltage values are provided while the motor is running and when stopped. The average of all three is also provided.
- **Line Frequency** The SMC-50 measures and provides user access to the line frequency (Hz).
- **Power** Real, reactive, and apparent power values are calculated for each phase plus the total for all 3 phases. In addition, the current power demand and the maximum power demand is provided.
- **Power Factor** The value of the power factor is provided for each phase and as a total of all three.
- **Peak Starting Current** The SMC-50 stores the peak average RMS motor current consumed for the last 5 start cycles.
- **Total Harmonic Distortion (THD)** The SMC-50 calculates and provides user access to the THD for the 3 line voltages and 3 motor currents, along with the average value of each.
- **Voltage Unbalance** The calculation of the voltage unbalance signal is provided.
- **Current Imbalance** The calculation of the current imbalance signal is provided.
- **Energy Savings** The SMC-50 provides the percentage of energy saved when it is running the motor in the Energy Savings mode.
- **Motor Torque** Electromechanical motor torque is calculated based on current and voltage feedback from the motor.
- **Motor Speed** The SMC-50 provides a calculated estimate of motor speed in percent of full speed when operating in the linear speed acceleration starting or deceleration stopping mode.
- **Elapsed Time & Elapsed Time 2** An elapsed time meter is provided to account for the total accumulated hours the motor has been running. The meter can be reset by the user. Elapsed Time 2 cannot be user reset and will hold after 50,000 hours have elapsed.
- **Running Time** The running time meter accumulates time (in hours) from the point the motor start command is given up to the point the motor stop command is issued. When a new start command is given, the meter resets to zero and begins accumulating time again.
- **Actual Start Time** The unit stores the actual time it takes to complete a start cycle (motor start command issued until motor is up-to-speed). The last five start times are stored as parameters for user access and in the Alarm Buffer as events.
- **Total Starts** The total starts counter increments on every successful start (no prestart fault occurred) and cannot be reset. The maximum value is 65,635.

Communications

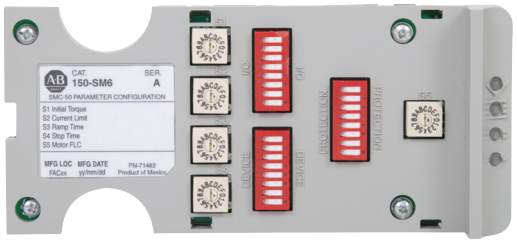


Device Peripheral Interface (DPI) Protocol
The SMC-50 Soft Motor Starter communicates in the same manner as the Allen-Bradley SMC Flex and drive products using the DPI protocol. This enables almost any DPI-supported Human Interface Module (HIM), PC software (e.g., DriveExplorer), or network communications module (20-COMM-X) to be used with the SMC-50. The SMC-50 supports four DPI ports for communication devices. Port #1 is located in the controller bezel for the front-mounted HIM. Port #2, located on the top of the controller, supports a second and third device via Port #3 when a DPI splitter is used. Port #4, located directly below the controller bezel, is dedicated to a 20-COMM-X network communications module when inserted into the space alloted for controller option Port #9. All four communication ports can be used simultaneously.

Controller Parameter Configuration

The SMC-50's starting, stopping, and running operations are configured/programmed by changing the settings of a functionally predefined set of parameters. Several different configuration tools are available to perform this.
NOTE: A configuration tool is **not** shipped with the starter/controller. The desired configuration tool must be ordered separately.

Parameter Configuration Option Module (Cat. No.150-SM6)
The Parameter Configuration Option Module inserts into any one of the SMC-50's three option ports (Port 7, 8 or 9). The 150-SM6 features three sets of 8-position ON/OFF DIP switches and five sets of 16-position rotary switches. These switches allow for configuration of several key motor parameters (e.g., start and stop modes, ramp time, motor FLA, etc.) for limited setup of simple applications. In addition, the 150-SM6 features three diagnostic LED status indicators to display key alarms and faults. Only one 150-SM6 is allowed per SMC-50.
NOTE: After parameter configuration is complete, the 150-SM6 can be removed from the SMC-50. This enables one module to configure multiple SMC-50s.



150-SM6 Parameter Configuration Module

Configuration by Keypad & LCD Display (Human Interface Module Cat. No. 20-HIM-A6)
The upper right portion of the SMC-50 has a dedicated bezel and DPI port for the Cat. No. 20-HIM-A6. The 20-HIM-A6 features an LCD display to show parameter data values, detailed diagnostic alarm/fault information, numeric keypad with function keys to enter parameter data values and navigate to the different SMC-50 parameter menus, null parameter configuration and diagnostic display, and the ability to set up SMC-50 Controller Option Modules. Optional extension cables and control cabinet door mounting kits are available to mount the HIM off the SMC-50.


SMC-50 Smart Motor Controller with 20-HIM-A6

Configuration by PC Programmable Software
DriveExplorer™ and DriveTools™ PC software provides network connectivity between the PC and the SMC-50 as well as configurability of the full set of parameters of the SMC-50. To achieve connectivity, the PC can be directly connected to the SMC-50 DPI Port #2 (or #3 using a splitter) with (1) a 1203-SSS AnaCANda™ RS232 to DPI device or (2) a 1203-USB DPI to USB device.

Control Inputs & Outputs

Standard Inputs★

The SMC-50 comes standard with two 24V DC inputs. The control functionality of each input is user-configurable as follows: Start, Coast, Stop Option (e.g., Soft Stop, Pump Stop), Start/Coast, Start/Stop, Slow Speed, Overload Select, Fault Input (N.O.), Fault Input (N.C.), Clear Fault, Emergency Run, Dual Ramp Profile Select, and Start Motor Heater function. The status of any input is readable via communications.

Optional Inputs★

A Cat. No. 150-SM4 Digital I/O option module contains four 120/240V AC inputs and can be inserted into any of the three control module option ports (three modules maximum per control module). The control functionality of each input is user configurable and identical to the standard inputs. The status of any input is readable via communications.

A Cat. No. 150-SM3 Analog I/O option module provides two analog inputs (voltage or current) and can be inserted into any of the three control module option ports (three modules maximum per control module). The control functionality of each input is user configurable. The status of any input is readable via communications.

SMC-50 Smart Motor Controller with 150-SM4

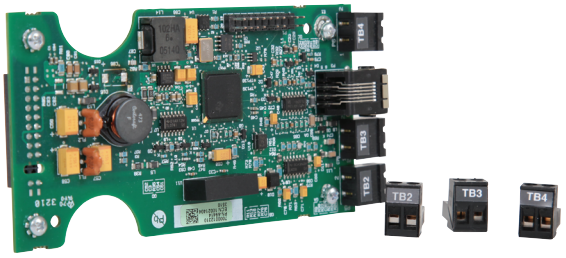
Standard and Optional Outputs★

The SMC-50 comes standard with two relay outputs. By adding a Cat. No. 150-SM4 Digital I/O Option Module, three additional relay outputs are provided (three option modules maximum per control module). The control functionality of each relay output is user-configurable as follows: Normal (Start Enabled), Up-To-Speed, Fault, Alarm, External Bypass, External brake, Auxillary Control, and Network 1-4. Each output also includes a user-configurable on and off delay timer (10.0 seconds maximum) and the ability to invert the state of the contact. Network control of each output is also provided.

By adding a Cat. No. 150-SM3 Analog I/O module, two analog outputs (voltage of current) are provided.

Optional PTC, Ground Fault‡, & Current Transformer Interface Capability★

The Cat. No. 150-SM2 Option Module features PTC, ground fault, and external current transformer interface capability. The PTC feature enables connection to external PTC temperature sensors to monitor motor winding temperature and feedback data to the SMC-50. A SMC-50 Alarm and/or Fault can be configured to trip if the PTC setpoint is exceeded. The ground fault feature enables controller detection and enunciation of a possible system ground fault which could indicate a pending motor winding failure (e.g., insulation breakdown). A Bulletin 825-CBCT External Ground Fault (Core Balance) Sensor is also required to interface with the 150-SM2 to fully enable this feature.
When the SMC-50 is used in the external bypass mode with the contacts of the external bypass contactor closed, the user has the option of using the SMC-50's internal or external current sensing capabilities. If using external current sensing so that metering, alarm/fault, etc. conditions are reported to the controller during run operation, an external Bulletin 825-MCMxxx Converter Module is required to interface with the 150-SM2 Option Module.



150-SM2 Option Module

★ All standard and optional I/O Terminal Blocks are removable

‡ The ground fault sensing feature of the SMC-50 is intended for monitoring purposes only. It is **not** to be used as a ground fault circuit interrupter for personnel protection as defined by Article 100 of the NEC. The sensing feature has not been evaluated to UL 1053.

Catalog Number Explanation
Open Controllers

150-S	B1	N	U	D
a	*b*	*c*	*d*	*e*

a

Bulletin Number — Product Type	
Code	Description
150-S	SMC-50 Solid-State Motor Controller

b

Controller Ratings	
Code	Description Max. Normal/Standard Duty Current Rating
B1	90 A
B2	110 A
B3	140 A
B4	180 A
C1	210 A
C2	260 A
C3	320 A
D1	361 A
D2	420 A
D3	520 A

c

Enclosure Type	
Code	Description
N	Open

d

Line Voltage	
Code	Description
B	200…460V AC, 3-phase, 50 and 60 Hz
U	200…690V AC, 3-phase, 50 and 60 Hz

e

Control Voltage	
Code	Description
D	100…240V AC (two 24V DC inputs and two relay outputs standard)
R	24V DC (two 24V DC inputs and two relay outputs standard)§

§Consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Normal Duty Rated Open Type Controllers — For Use with Line-Connected Motors

Normal/Standard Duty Ratings (for pumps, compressors, elevators, and short conveyors)
Utilization Category: AC-53a:3.5-10:99-2. Start Not to Exceed: 350% of the controller maximum current rating, 10 second start time, 99% ON load factor, two starts per hour with 40 °C surrounding air ambient temperature.
NOTE: Refer to and use Selection Wizards to ensure the SMC selection meets the application requirements. For additional assistance, please visit www.ab.com or contact Industrial Controls Technical Support by email at raictechsupport@ra.rockwell.com or by phone at 440-646-5800 (select option 1> option 1> and direct dial code 804).

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
200/208	30…90	—	10…25	100…240V AC; 50/60 Hz	150-SB1NBD
				24V DC	150-SB1NBR
	37…110		15…30	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	47…140		20…40	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	60…180		25…60	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	70…210		25…60	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	87…260		30…75	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	107…320		40…100	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	120…361		50…125	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	140…420		50…150	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	174…520		75…150	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
230	30…90	11…22	15…30	100…240V AC; 50/60 Hz	150-SB1NBD
				24V DC	150-SB1NBR
	37…110	11…30	15…40	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	47…140	15…37	20…50	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	60…180	18.5…55	25…60	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	70…210	22…55	30…75	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	87…260	30…75	40…100	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	107…320	37…90	50…125	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	120…361	45…110	50…150	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	140…420	45…132	60…150	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	174…520	75…160	75…200	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Normal Duty Rated Open Type Controllers — For Use with Line-Connected Motors

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
400/415 (kW) 460 (Hp)	30…90	18.5…45	25…60	100…240V AC; 50/60 Hz	150-SB1NBD
				24V DC	150-SB1NBR
	37…110	22…55	30…75	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	47…140	30…75	40…100	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	60…180	37…90	50…150	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	70…210	45…110	60…150	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	87…260	55…132	75…200	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	107…320	75…160	100…250	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	120…361	75…200	100…300	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	140…420	90…200	125…350	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	174…520	110…250	150…450	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
500 (kW) 575 (Hp)	30…90	22…55	30…75	100…240V AC; 50/60 Hz	150-SB1NUD
				24V DC	150-SB1NUR
	37…110	30…75	40…100	100…240V AC; 50/60 Hz	150-SB2NUD
				24V DC	150-SB2NUR
	47…140	37…90	50…125	100…240V AC; 50/60 Hz	150-SB3NUD
				24V DC	150-SB3NUR
	60…180	45…110	60…150	100…240V AC; 50/60 Hz	150-SB4NUD
				24V DC	150-SB4NUR
	70…210	55…132	75…200	100…240V AC; 50/60 Hz	150-SC1NUD
				24V DC	150-SC1NUR
	87…260	75…160	100…250	100…240V AC; 50/60 Hz	150-SC2NUD
				24V DC	150-SC2NUR
	107…320	75…200	125…300	100…240V AC; 50/60 Hz	150-SC3NUD
				24V DC	150-SC3NUR
	120…361	90…250	125…350	100…240V AC; 50/60 Hz	150-SD1NUD
				24V DC	150-SD1NUR
	140…420	110…250	150…450	100…240V AC; 50/60 Hz	150-SD2NUD
				24V DC	150-SD2NUR
	174…520	132…355	200…500	100…240V AC; 50/60 Hz	150-SD3NUD
				24V DC	150-SD3NUR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Normal Duty Rated Open Type Controllers — For Use with Line-Connected Motors

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
690/Y (kW) 600 (Hp)	30…90	30…75	30…75	100…240V AC; 50/60 Hz	150-SB1NUD
				24V DC	150-SB1NUR
	37…110	37…90	40…100	100…240V AC; 50/60 Hz	150-SB2NUD
				24V DC	150-SB2NUR
	47…140	45…132	50…125	100…240V AC; 50/60 Hz	150-SB3NUD
				24V DC	150-SB3NUR
	60…180	75…160	60…150	100…240V AC; 50/60 Hz	150-SB4NUD
				24V DC	150-SB4NUR
	70…210	75…200	75…200	100…240V AC; 50/60 Hz	150-SC1NUD
				24V DC	150-SC1NUR
	87…260	90…250	100…250	100…240V AC; 50/60 Hz	150-SC2NUD
				24V DC	150-SC2NUR
	107…320	110…315	125…300	100…240V AC; 50/60 Hz	150-SC3NUD
				24V DC	150-SC3NUR
	120…361	132…355	125…350	100…240V AC; 50/60 Hz	150-SD1NUD
				24V DC	150-SD1NUR
	140…420	160…400	150…450	100…240V AC; 50/60 Hz	150-SD2NUD
				24V DC	150-SD2NUR
	174…520	200…500	200…500	100…240V AC; 50/60 Hz	150-SD3NUD
				24V DC	150-SD3NUR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Heavy Duty Rated Open Type Controllers — For Use with Line-Connected Motors

Heavy Duty Ratings (for centrifugal fans, crushers, mixers, long conveyors, etc.)
Utilization Category: AC-53a:3.5-30:99-1. Start Not to Exceed: 350% of the controller maximum current rating, 30 second start time, 99% ON load factor, one start per hour with 50 °C surrounding air ambient temperature.
NOTE: Refer to and use Selection Wizards to ensure the SMC selection meets the application requirements. For additional assistance, please visit www.ab.com or contact Industrial Controls Technical Support by email at raictechsupport@ra.rockwell.com or by phone at 440-646-5800 (select option 1> option 1> and direct dial code 804).

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
200/208	30…90	—	10…25	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	37…110		15…30	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	47…140		20…40	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	60…180		25…60	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	70…210		25…60	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	87…260		30…75	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	107…320		40…100	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	120…361		50…125	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	140…420		50…150	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
230	30…90	11…22	15…30	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	37…110	11…30	15…40	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	47…140	15…37	20…50	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	60…180	18.5…55	25…60	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	70…210	22…55	30…75	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	87…260	30…75	40…100	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	107…320	37…90	50…125	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	120…361	45…110	50…150	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	140…420	45…132	60…150	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Heavy Duty Rated Open Type Controllers — For Use with Line-Connected Motors

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
400/415 (kW) 460 (Hp)	30…90	18.5…45	25…60	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	37…110	22…55	30…75	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	47…140	30…75	40…100	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	60…180	37…90	50…150	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	70…210	45…110	60…150	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	87…260	55…132	75…200	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	107…320	75…160	100…250	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	120…361	75…200	100…300	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	140…420	90…200	125…350	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
500 (kW) 575 (Hp)	30…90	22…55	30…75	100…240V AC; 50/60 Hz	150-SB2NUD
				24V DC	150-SB2NUR
	37…110	30…75	40…100	100…240V AC; 50/60 Hz	150-SB3NUD
				24V DC	150-SB3NUR
	47…140	37…90	50…125	100…240V AC; 50/60 Hz	150-SB4NUD
				24V DC	150-SB4NUR
	60…180	45…110	60…150	100…240V AC; 50/60 Hz	150-SC1NUD
				24V DC	150-SC1NUR
	70…210	55…132	75…200	100…240V AC; 50/60 Hz	150-SC2NUD
				24V DC	150-SC2NUR
	87…260	75…160	100…250	100…240V AC; 50/60 Hz	150-SC3NUD
				24V DC	150-SC3NUR
	107…320	75…200	125…300	100…240V AC; 50/60 Hz	150-SD1NUD
				24V DC	150-SD1NUR
	120…361	90…250	125…350	100…240V AC; 50/60 Hz	150-SD2NUD
				24V DC	150-SD2NUR
	140…420	110…250	150…450	100…240V AC; 50/60 Hz	150-SD3NUD
				24V DC	150-SD3NUR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Heavy Duty Rated Open Type Controllers — For Use with Line-Connected Motors

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
690/Y (kW) 600 (Hp)	30…90	30…75	30…75	100…240V AC; 50/60 Hz	150-SB2NUD
				24V DC	150-SB2NUR
	37…110	37…90	40…100	100…240V AC; 50/60 Hz	150-SB3NUD
				24V DC	150-SB3NUR
	47…140	45…132	50…125	100…240V AC; 50/60 Hz	150-SB4NUD
				24V DC	150-SB4NUR
	60…180	75…160	60…150	100…240V AC; 50/60 Hz	150-SC1NUD
				24V DC	150-SC1NUR
	70…210	75…200	75…200	100…240V AC; 50/60 Hz	150-SC2NUD
				24V DC	150-SC2NUR
	87…260	90…250	100…250	100…240V AC; 50/60 Hz	150-SC3NUD
				24V DC	150-SC3NUR
	107…320	110…315	125…300	100…240V AC; 50/60 Hz	150-SD1NUD
				24V DC	150-SD1NUR
	120…361	132…355	125…350	100…240V AC; 50/60 Hz	150-SD2NUD
				24V DC	150-SD2NUR
	140…420	160…400	150…450	100…240V AC; 50/60 Hz	150-SD3NUD
				24V DC	150-SD3NUR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Normal Duty Rated Open Type Controllers — For Use with Delta-Connected Motors

Normal/Standard Duty Ratings (for pumps, compressors, elevators, and short conveyors)
Utilization Category: AC-53a:3.5-10:99-2. Start Not to Exceed: 350% of the controller maximum current rating, 10 second start time, 99% ON load factor, two starts per hour with 40 °C surrounding air ambient temperature.
NOTE: Refer to and use Selection Wizards to ensure the SMC selection meets the application requirements. For additional assistance, please visit www.ab.com or contact Industrial Controls Technical Support by email at raictechsupport@ra.rockwell.com or by phone at 440-646-5800 (select option 1> option 1> and direct dial code 804).

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
200/208	52…155	—	20…50	100…240V AC; 50/60 Hz	150-SB1NBD
				24V DC	150-SB1NBR
	65…190		25…60	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	82…242		30…75	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	104…311		40…100	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	122…363		50…125	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	151…450		60…150	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	186…554		75…200	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	210…625		75…200	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	243…727		100…250	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	302…900		125…300	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
230	52…155	18.5…45	20…60	100…240V AC; 50/60 Hz	150-SB1NBD
				24V DC	150-SB1NBR
	65…190	22…55	25…60	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	82…242	30…75	40…75	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	104…311	37…90	40…100	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	122…363	45…110	50…125	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	151…450	55…132	60…150	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	186…554	75…160	75…200	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	210…625	75…200	100…250	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	243…727	90…200	100…300	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	302…900	110…250	125…350	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Normal Duty Rated Open Type Controllers — For Use with Delta-Connected Motors

Rated Utililization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
400/415 (kW) 460 (Hp)	52…155	30…75	40…100	100…240V AC; 50/60 Hz	150-SB1NBD
				24V DC	150-SB1NBR
	65…190	37…90	50…150	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	82…242	55…132	75…200	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	104…311	75…160	100…250	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	122…363	75…200	100…300	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	151…450	90…250	125…350	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	186…554	110…315	200…450	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	210…625	132…355	200…500	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	243…727	160…400	250…600	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	302…900	200…500	250…700	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
500 (kW) 575 (Hp)	52…155	37…90	50…150	100…240V AC; 50/60 Hz	150-SB1NUD
				24V DC	150-SB1NUR
	65…190	55…132	75…150	100…240V AC; 50/60 Hz	150-SB2NUD
				24V DC	150-SB2NUR
	82…242	75…160	100…250	100…240V AC; 50/60 Hz	150-SB3NUD
				24V DC	150-SB3NUR
	104…311	90…200	125…300	100…240V AC; 50/60 Hz	150-SB4NUD
				24V DC	150-SB4NUR
	122…363	90…250	125…350	100…240V AC; 50/60 Hz	150-SC1NUD
				24V DC	150-SC1NUR
	151…450	110…315	200…450	100…240V AC; 50/60 Hz	150-SC2NUD
				24V DC	150-SC2NUR
	186…554	132…400	200…500	100…240V AC; 50/60 Hz	150-SC3NUD
				24V DC	150-SC3NUR
	210…625	160…450	250…600	100…240V AC; 50/60 Hz	150-SD1NUD
				24V DC	150-SD1NUR
	243…727	200…500	300…700	100…240V AC; 50/60 Hz	150-SD2NUD
				24V DC	150-SD2NUR
	302…900	250…630	350…900	100…240V AC; 50/60 Hz	150-SD3NUD
				24V DC	150-SD3NUR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Heavy Duty Rated Open Type Controllers — For Use with Delta-Connected Motors

Heavy Duty Ratings (for centrifugal fans, crushers, mixers, long conveyors, etc.)
Utilization Category: AC-53a:3.5-30:99-1. Start Not to Exceed: 350% of the controller maximum current rating, 30 second start time, 99% ON load factor, one start per hour with 50 °C surrounding air ambient temperature.
NOTE: Refer to and use Selection Wizards to ensure the SMC selection meets the application requirements. For additional assistance, please visit www.ab.com or contact Industrial Controls Technical Support by email at raictechsupport@ra.rockwell.com or by phone at 440-646-5800 (select option 1> option 1> and direct dial code 804).

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
200/208	52…155	—	20…50	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	65…190		25…60	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	82…242		30…75	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	104…311		40…100	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	122…363		50…125	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	151…450		60…150	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	186…554		75…200	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	210…625		75…200	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	243…727		100…250	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
230	52…155	18.5…45	20…60	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	65…190	22…55	25…60	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	82…242	30…75	40…75	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	104…311	37…90	40…100	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	122…363	45…110	50…125	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	151…450	55…132	60…150	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	186…554	75…160	75…200	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	210…625	75…200	100…250	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	243…727	90…200	100…300	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Heavy Duty Rated Open Type Controllers — For Use with Delta-Connected Motors

Rated Utililization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
400/415 (kW) 460 (Hp)	52…155	30…75	40…100	100…240V AC; 50/60 Hz	150-SB2NBD
				24V DC	150-SB2NBR
	65…190	37…90	50…150	100…240V AC; 50/60 Hz	150-SB3NBD
				24V DC	150-SB3NBR
	82…242	55…132	75…200	100…240V AC; 50/60 Hz	150-SB4NBD
				24V DC	150-SB4NBR
	104…311	75…160	100…250	100…240V AC; 50/60 Hz	150-SC1NBD
				24V DC	150-SC1NBR
	122…363	75…200	100…300	100…240V AC; 50/60 Hz	150-SC2NBD
				24V DC	150-SC2NBR
	151…450	90…250	125…350	100…240V AC; 50/60 Hz	150-SC3NBD
				24V DC	150-SC3NBR
	186…554	110…315	200…450	100…240V AC; 50/60 Hz	150-SD1NBD
				24V DC	150-SD1NBR
	210…625	132…355	200…500	100…240V AC; 50/60 Hz	150-SD2NBD
				24V DC	150-SD2NBR
	243…727	160…400	250…600	100…240V AC; 50/60 Hz	150-SD3NBD
				24V DC	150-SD3NBR

‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Rated Utilization Voltage [V AC]	Motor Current [A]	Motor kW, 50 Hz	Motor Hp, 60 Hz	Control Power‡	Cat. No.
500 (kW) 575 (Hp)	52…155	37…90	50…150	100…240V AC; 50/60 Hz	150-SB2NUD
				24V DC	150-SB2NUR
	65…190	55…132	75…150	100…240V AC; 50/60 Hz	150-SB3NUD
				24V DC	150-SB3NUR
	82…242	75…160	100…250	100…240V AC; 50/60 Hz	150-SB4NUD
				24V DC	150-SB4NUR
	104…311	90…200	125…300	100…240V AC; 50/60 Hz	150-SC1NUD
				24V DC	150-SC1NUR
	122…363	90…250	125…350	100…240V AC; 50/60 Hz	150-SC2NUD
				24V DC	150-SC2NUR
	151…450	110…315	200…450	100…240V AC; 50/60 Hz	150-SC3NUD
				24V DC	150-SC3NUR
	186…554	132…400	200…500	100…240V AC; 50/60 Hz	150-SD1NUD
				24V DC	150-SD1NUR
	210…625	160…450	250…600	100…240V AC; 50/60 Hz	150-SD2NUD
				24V DC	150-SD2NUR
	243…727	200…500	300…700	100…240V AC; 50/60 Hz	150-SD3NUD
				24V DC	150-SD3NUR

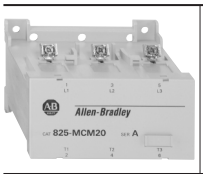
‡ For controllers with 24V DC control power, consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Option Modules

Option modules can be used to add or expand the functionality of the SMC-50 Control Module. Option modules are installed into the control module's three expansion ports, 7 through 9.
NOTE: If network communication is required, a Cat. No. 20-COMM-X communication adapter must be inserted in expansion port 9.

Description		Compatible Control Module Ports	Maximum # of Option Modules of this Type Per Controller	Cat. No.
	PTC, Ground Fault, & Current Feedback Option Module	7 & 8	1	150-SM2
	Analog I/O Option Module: 2 analog inputs (voltage or current) and 2 analog outputs (voltage or current)	7, 8, 9	3	150-SM3
	Digital I/O Option Module: 4 100…240V AC inputs and 3 relay outputs	7, 8, 9	3	150-SM4
	Parameter Configuration Module — DIP and rotary dial	7, 8, 9	1	150-SM6

Converter Modules

Description		Rated Current		Cat. No.
	Three-Phase Current Monitoring Module	30…180 A	★	**825-MCM180**
		181…520 A	★ ‡	**825-MCM20**
Connection Cable (Replacement) Cat. No. 150-SM2 to Bul. 825-MCM Connection				**825-MCA**

★ Used with a Cat. No. 150-SM2 to provide current feedback to the SMC-50 when in external bypass configuration.
‡ Requires user-supplied current transformers with 5 A secondary.

Description		Turns Ratio		Cat. No.
	**Core Balance Ground Fault Sensor**	100:1	§	**825-CBCT**

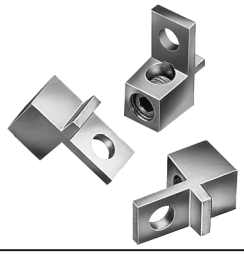
§ Used with a Cat. No. 150-SM2 to provide ground current feedback.
NOTE: The ground fault sensing feature of the SMC-50 is intended for monitoring purposes only. It is **not** to be used as a ground fault circuit interrupter for personnel protection as defined by Article 100 of the NEC. The sensing feature has **not** been evaluated to UL 1053.

Protective Modules★‡

	Current Rating	Description	Cat. No.
	90...520	480V Protective Module	**150-F84L**
	90…520	600V Protective Module	150-F86L

★ The same protective module mounts on the line or load side of the SMC-50. Use of protective modules is highly recommended. For applications requiring both line and load side protection, two protective modules must be ordered.
‡ Protective modules must not be placed on the load (motor) side of an SMC-50 when using an inside-the-delta connection or with pump, braking, or linear speed acceleration/deceleration control.

SMC-50 Terminal Lug Kits



For Use With	Current Range [A]	Wire Size Range	Total No. of Terminal Lugs Possible Each Side		Pkg. Qty.	Cat. No.
			Line Side	Load Side		
150-SB…	90…180	#6…250 MCM AWG 16 mm^2…120 mm^2	3	3	3	199-LF1
150-SC…	210…320	#6…250 MCM AWG 16 mm^2…120 mm^2	6	6	3	199-LF1
150-SD…	361…520	#4…500 MCM AWG 25 mm^2…240 mm^2	6	6	3	199-LG1

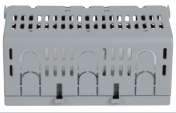
Inside-the-Delta Distribution Blocks

For Use With	Current Range [A]	Wire Size Range		Total No. of Distribution Blocks Needed per Side		Pkg. Qty.	Cat. No.
		Line Side	Load Side	Line Side	Load Side		
150-SB…	155…311	(2) #4 AWG…500 MCM 25…240 mm^2	(2) #4 AWG…500 MCM 25…240 mm^2	3	—	1	**1492-BG**
150-SC…	363…554	(2) 1/0 AWG…750 MCM 54…400 mm^2	(6) 6 AWG…250 MCM 16…120 mm^2	1	—	1	Marathon Special Products Cat. No. 1353703
150-SD…	625…900	(4) 1/0 AWG…750 MCM 54…400 mm^2	(4) 1/0 AWG…750 MCM 54…400 mm^2	3	—	1	Marathon Special Products Cat. No. 1352702

Bypass Terminal Lug Kits

For Use With	Current Range [A]	Wire Size Range	Total No. of Terminal Lugs Possible Each Side		Pkg. Qty.	Lug Cat. No.	Bypass Kit Cat. No.
			Line Side	Load Side			
150-SB…	90…180	(2)#6…250 MCM AWG 16 mm^2…120 mm^2	3	3	3	**1494R-N14**	—
150-SC…	210…320	#6…250 MCM AWG 16 mm^2…120 mm^2	6 (6 additional needed for bypass kit)	6	3	199-LF1	150-SCBK
150-SD…	361…520	#4…500 MCM AWG 25 mm^2…240 mm^2	6 (6 additional needed for bypass kit)	6	3	199-LG1	150-SDBK

IEC Terminal Covers



Description	For Use With	Pkg. Quantity	Cat. No.
IEC line or load terminal cover for 90…180 A devices. Dead front protection IP2X finger safe when used with 250 MCM cable	150-SB…	1	150-STCB

Human Interface Modules (HIM) & Communication Modules

	Description			Cat. No.
	SMC-50 Controller — Bezel-Mounted	Enhanced, LCD, Full Numeric Keypad		**20-HIM-A6**
	Door-Mounted HIM	Remote (panel mount) LCD Display, Full Numeric Keypad (version of Cat. No. 20-HIM-A6)	‡	**20-HIM-C6S**
	HIM Interface Cables	HIM Interface Cable, 1 m (39 in)	★	**20-HIM-H10**
		Cable Kit (Male-Female) 0.33 m (1.1 ft)		1202-H03
		Cable Kit (Male-Female) 1 m (3.3 ft)		**1202-H10**
		Cable Kit (Male-Female) 3 m (9.8 ft)		**1202-H30**
		Cable Kit (Male-Female) 9 m (29.5 ft)		**1202-H90**
		DPI/SCANport™ One to Two Port Splitter Cable		**1203-S03**
	Description (IP30/Type 1)		**For Use With**	
	Communication Modules (installed into the physical space assigned to control module expansion port 9; connected to DPI port 4 via cable)	RS485 DF1 Communication Adapter	Bulletin 150-Sxx	**20-COMM-S**
		PROFIBUS™ DP Communication Adapter		**20-COMM-P**
		ControlNet™ Communication Adapter (Coax)		**20-COMM-C**
		Interbus™ Communication Adapter		20-COMM-I
		Modbus/TCP Communication Adapter		**20-COMM-M**
		DeviceNet™ Communication Adapter		**20-COMM-D**
		EtherNet/IP™ Communication Adapter		**20-COMM-E**
		Dual-port EtherNet/IP™ Communication Adapter	Δ	20-COMM-ER
		HVAC Communication Adapter		**20-COMM-H**
		ControlNet™ Communication Adapter (Fiber)		**20-COMM-Q**
DriveExecutive™		Programming Software	Windows 7/2000/XP/Vista	9303-4DTE01ENE
DriveTools™ SP ♣				9303-4DTS01ENE
DriveExplorer™ for PC				9306-4EXP02ENE
AnaCANda™ RS-232 to DPI		PC Interface	Serial	♦ **1203-SSS**
DPI to USB			USB	♠ **1203-USB**

★ A cable is required if 20-HIM-A6 is connected to the SMC-50 DPI Port #2 and used as a handheld device.
‡ A 3 m (9.8 ft.) 1202-C30 cable is provided.
♣ Includes DriveExecutive™ and DriveObserver™ .
Δ Consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.
♦ Includes Cat. No. 1203-SFC and 1202-C10 cables.
♠ Includes Cat. No. 20-HIM-H10 and 22-HIM-H10 cables.

Spare or Replacement Parts

Spare or Replacement Power Poles and Assemblies

Description		Cat. No.
Frame B Power Structure Assembly (Contains all three power poles in a single package and includes the pole-to-control module transition cover and cooling fan.)	90 A, 200…480V AC line	150-SPPB1B
	110 A, 200…480V AC line	150-SPPB2B
	140 A, 200…480V AC line	150-SPPB3B
	180 A, 200…480V AC line	150-SPPB4B
	90 A, 200…690V AC line	150-SPPB1U
	110 A, 200…690V AC line	150-SPPB2U
	140 A, 200…690V AC line	150-SPPB3U
	180 A, 200…690V AC line	150-SPPB4U
Frame C Power Pole (Contains one power pole — SCR and heatsink assembly and cable.)	210 A, 200…480V AC line	150-SPPC1B
	260 A, 200…480V AC line	150-SPPC2B
	320 A, 200…480V AC line	150-SPPC3B
	210 A, 200…690V AC line	150-SPPC1U
	260 A, 200…690V AC line	150-SPPC2U
	320 A, 200…690V AC line	150-SPPC3U
Frame D Power Pole (Contains one power pole — SCR and heatsink assembly and cable.)	361 A, 200…480V AC line	150-SPPD1B
	420 A, 200…480V AC line	150-SPPD2B
	520 A, 200…480V AC line	150-SPPD3B
	361 A, 200…690V AC line	150-SPPD1U
	420 A, 200…690V AC line	150-SPPD2U
	520 A, 200…690V AC line	150-SPPD3U

Spare or Replacement Control Module

Description			Cat. No.
SMC-50 Control Module	100…240V AC control power; two 24V DC inputs, two relay outputs		150-SCMD
	24V DC control power; two 24V DC inputs, two relay outputs	Δ	150-SCMR

Δ Consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Replacement Parts

Description		Rated Control Voltage	For Use With	Cat. No.
Replacement Fan	Replacement fan for SMC-50 Frame B	100…240V AC	90…180 A units	150-SF1
		24V DC		Δ 150-SF1R
	Replacement fan for SMC-50 Frame C	100…240V AC	210…320 A units	150-SF2D
		24V DC		Δ 150-SF2R
	Replacement fan for SMC-50 Frame D	100…240V AC	361…520 A units	150-SF3D
		24V DC		Δ 150-SF3R
Replacement Fan Cover	Replacement fan cover for SMC-50 Frame B		90…180 A units	150-SBFC
	Replacement fan cover for SMC-50 Frame C		210…320 A units	150-SCFC
	Replacement fan cover for SMC-50 Frame D		361…520 A units	150-SDFC
Replacement Cover	Replacement control module front cover		90…520 A units	150-SCMRC
	Replacement controller cover		210…320 A units	150-SCRC
			361…520 A units	150-SDRC
Replacement Removable Terminal Block	Control module control I/O replacement removable terminal block		Control module	150-SCMRTB
	PTC module replacement removable terminal block (set of 3)		150-SM2	150-SM2RTB
	Analog I/O option replacement removable terminal block		150-SM3	150-SM3RTB
	Digital I/O module replacement removable terminal block		150-SM4	150-SM4RTB

Δ Consult your local Rockwell Automation sales office or Allen-Bradley distributor for availability.

Functional Design

Standard Features		Description
Installation	Power Wiring	standard squirrel-cage induction motor or a Wye-Delta, six-lead motor
	Control Wiring	2- and 3-wire control for a wide variety of applications
Configuration/Setup★	Keypad	Cat. No. 20-HIM-A6 full numeric keypad with LCD display Cat. No. 20-HIM-C6S remote panel mount full numeric keypad with LCD display
	Software	parameter values are downloaded to the SMC-50 with the DriveTools and DriveExplorer programming software
	Parameter Configuration Option Module (PCM)	Cat. No. 150-SM6 provides simple and limited configuration by DIP and rotary dial switches
Communications		four DPI ports for local serial communications. Network communication supported by optional 20-COMM-X modules
Starting & Stopping Modes		modes include: Soft Start, Coast-to-Stop, Soft Stop, Current Limit Start, Dual Ramp, Full Voltage, Linear Speed Acceleration (start), Linear Speed Deceleration (stop), Torque Start, and Preset Slow Speed
Pump Control	Start & Stop	helps reduce fluid surges in centrifugal pumping systems during the starting and stopping period
Braking Control∆	SMB Smart Motor Braking	provides motor braking without additional equipment for applications that require the motor to stop quickly
	Accu-Stop♣	provides controlled position stopping; during stopping, brake torque is applied to the motor until the motor reaches the preset slow speed and holds the motor at this speed until a stop command is given - braking torque is then applied until the motor reaches zero speed - braking current is programmable
	Slow Speed with Braking	used on applications that require slow speed (in the forward or reverse direction) for positioning or alignment and requires braking control to stop
	External Braking	activates the external braking device by using aux. relay output
Protection & Diagnostics‡		displays: Power Loss, Line Fault, Voltage Unbalance, Excessive Starts/Hour, Phase Reversal, Undervoltage, Overvoltage, Controller Temperature, Stall, Jam, Open Gate, Overload, Underload, and Communication Fault
Metering Indication§		provides: Phase Current, Current Average, Phase-to-Phase Voltage, Voltage P-P Average, Phase-to-Neutral Voltage, Calculated Torque, Real Phase Power, Real Power, Real Energy, Real Demand, Max Real Demand, Reactive Power, Reactive Energy + & -, Reactive Energy, Reactive Demand, Max Reactive Demand, Apparent Power, Apparent Energy, Apparent Demand, Number of Periods, Power Factor, Energy Savings, Elapsed Time 1 & 2, Running Time, Motor Speed, Start Time 1-5, Peak Current 1-5, Total Starts, THD V, THD I, THD V Average, THD I Average, Line Frequency, Current Imbalance, and Voltage Unbalance
LED Status Indication by Multi-color (standard)		displays fault and alarm codes: Running - with alarm, Running - no alarm, Ready - with alarm, Ready - no alarm, Ready - tuning enabled on next start, and Firmware Download Active - with alarm
Auxillary Contacts (two standard)		two fully programmable contacts as: normal, UTS, fault, alarm, external brake, auxilliary control, network, or external bypass

★ The configuration method must be ordered separately from the controller which doers not include a setup tool.

‡ Diagnostic indication depends on the type of configuration tool used, The standard LED status indication displays: Inhibit (stop enabled), Fault (non-resettable), Fault (resettable). For full local access, a HIM or PC software is required, For network access, full access to data can also be obtained.

§ Metering Indication depends on the type of configuration tool being used. Metering Indication requires the use of a HIM or a PC software configuration tool for full local access. Full access to data can also be obtained via network.

♣ Accu-Stop is not included as a parameter/function like that of the SMC-Flex. However, the Accu-Stop function can be accomplished with the SMB mode and Slow Speed with Braking functions.

∆ Not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

Electrical Ratings

Description	Device Rating	UL/CSA/NEMA	IEC
Power Circuit			
Rated Operation Voltage	480V	200…480V AC (–15%, +10%)	200…415V (-15%, +10%)
	690V	200…600V AC (–15%, +10%)	200…690V/Y (–15%, +10%)
Rated Insulation Voltage	480V	N/A	500V
	690V	N/A	690V
Rated Impulse Voltage	480V	N/A	6000V
	690V	N/A	6000V
Dielectric Withstand	480V	2200V AC	2500V
	690V	2200V AC	2500V
Repetitive Peak Inverse Voltage Rating	480V	1400V	1400V
	690V	1800V	1800V
Operating Frequency	All	47...63 Hz	47...63 Hz
Utilization Category		**UL/CSA/NEMA**	**IEC**
Normal Duty	90…520 A	MG 1	AC-53a:3.5-10:99-2
Heavy Duty			AC-53a:3.5-30:99-1
Protection Against Electrical Shock	90…520 A	N/A	IP00 (IP20 - Control Terminals only)
	90…180 A		IP2X (with Cat. No. 150-STCB Terminal Cover)
DV/DT Protection	480V	RC Snubber Network	
	690V		
Transient Protection	480...600V	Metal Oxide Varistors: 220 Joules	
	690V	None	
Control Power Specifications		**UL/CSA/NEMA**	**IEC**
Rated Operational Voltage		100…240V AC (-15%…+10%) or 24V DC	
Rated Insulation Voltage		NA	240V
Rated Impulse Voltage		NA	3000V
Dielectric Withstand		1500V AC	1500V
Operating Frequency		47…63 Hz	
Control Power Ride Through		22 ms	
Max. Output of 24V DC Supply (Terminals 8 & 12)		300 mA	
Control Module Battery Type		CR 2032	
Control Module Standard Inputs: Terminals 10 & 11		**UL/CSA/NEMA**	**IEC**
Nominal Operating Voltage		24V DC	
Operating Voltage Range		15…30V DC	
On State	Min. Current	2.8 mA	
	Min. Voltage	10V DC	
Off State	Max. Current	3 mA	
	Max. Voltage	10.9V DC	
Inrush Current Maximum		7 mA	
Input Delay Time		On-to-Off: 30 ms, Off-to-On: 20 ms	
Reverse Polarity Protection		Yes	
Rated Insulation Voltage		NA	60V
Rated Impulse Voltage		NA	500V
Dielectric Withstand		500V AC	1000V AC
Control Module Standard Outputs: Terminals 4/5 & 6/7		**UL/CSA/NEMA**	**IEC**
Outputs		Aux 1, Aux 2	
Type of Control Circuit		Electromagnetic Relay	
Number of Contacts per Relay		1	
Type of Contacts		Programmable N.O./N.C. (electrically held closed)	
Type of Current		AC	
Rated Operational Current		3 A @ 120V AC, 1.5 A @ 240V AC	
Conventional Thermal Current I_{th} AC/DC		5A	
Make/Break VA		3600/360	
Utilization Category		B300	AC-15
Off-State Leakage Current		0.024 mA @ 24V	
Off-State Leakage Current		0.12 mA @120V	
Off-State Leakage Current		0.24 mA @ 240V	

Wiring Terminals (applies to Control Module Standard I/O & Expansion Module Terminals 150-SM2, 150-SM3, 150-SM4)	
Terminal Style	M3 Screw Clamp
Terminal Type	Removable
Screw Terminal Torque	0.8 N m (7.0 lb-in)
Terminal Wire Size	0.2..2.5 mm^2 (24...14 AWG)
Wire Strip Length	7.0 mm (0.27 in.)

SMC™-50 Smart Motor Controllers

Specifications

Description			
Cat. No. 150-SM4 Optional Digital Control Inputs: Terminals A1 & A2		**UL/CSA/NEMA**	**IEC**
Nominal Operating Voltage		100…240V AC	
Operating Voltage Range		85V…264V AC @ 47 Hz…63 Hz	
On State	Min. Current	9.7 mA @ 47 Hz, 9.7 mA @ 62.4 Hz	
	Min. Voltage	74.5V AC @ 47 Hz, 55.9V AC @ 62.4 Hz	
Off State	Max. Current	9.0 mA @ 47 Hz, 9.3 mA @ 62.4 Hz	
	Max. Voltage	68.8V AC @ 47 Hz, 53.6V AC @ 62.4 Hz	
Inrush Current Maximum		3.64 A	
Input Delay Time		On-to-Off: 30 ms, Off-to-On: 25 ms	
Rated Insulation Voltage		NA	240V
Rated Impulse Voltage		NA	3000V
Dielectric Withstand		1600V AC	2000V AC
Cat. No. 150-SM4 Optional Digital Control Inputs: Terminals A3 & A4★		**UL/CSA/NEMA**	**IEC**
Nominal Operating Voltage		100…240V AC	
Operating Voltage Range		85V…264V AC @ 47 Hz…63 Hz	
On State	Min. Current	5.1 mA @ 47 Hz, 5.0 mA @ 62.4 Hz	
	Min. Voltage	74.5V AC @ 47 Hz, 55.8V AC @ 62.4 Hz	
Off State	Max. Current	4.7 mA @ 47 Hz, 4.8 mA @ 62.4 Hz	
	Max. Voltage	68.6V AC @ 47 Hz, 53.5V AC @ 62.4 Hz	
Inrush Current Maximum		3.64 A	
Input Delay Time		On-to-Off: 30 ms, Off-to-On: 25 ms	
Rated Insulation Voltage		NA	240V
Rated Impulse Voltage		NA	3000V
Dielectric Withstand		1600V AC	2000V AC
Cat. No. 150-SM4 Optional Outputs: Terminals A6/A7, A8/A9, A10/A11		**UL/CSA/NEMA**	**IEC**
Outputs		Aux 1, Aux 2, Aux 3	
Type of Control Circuit		Electromagnetic Relay	
Number of Contacts per Relay		1	
Type of Contacts		Programmable N.O./N.C. (electrically held closed)	
Type of Current		AC	
Rated Operational Current		3 A @ 120V AC, 1.5 A @ 240V AC	
Conventional Thermal Current I_{th} AC/DC		5A	
Make/Break VA		3600/360	
Utilization Category		B300	AC-15
Off-State Leakage Current		0.024 mA @ 24V	
		0.12 mA @120V	
		0.24 mA @ 240V	

★ Meets IEC Type 2 specifications for inputs per IEC 60947-1 for 240V AC only.

Cat. No. 150-SM3 Optional Analog Control Inputs: Terminals B1…B4	
Number of Inputs	2 differential inputs
Normal Operating Input Ranges	±10V, 0…10V, 0…5V, 1…5V, 0…20 mA, 4…20 mA
Full Scale Operating Input Ranges	±10.5V, 0…10.5V, -0.5…5.25V, 0.5…5.25V, 0…21 mA, 3.5…21 mA
Input Resolution	16 bit (sample rate = 60 Hz)/13 bit (sample rate = 250 Hz)
Data Refresh Rate	Filter dependent: 100 ms (sample rate = 60Hz);24 ms (sample rate = 250Hz)
Rated Working Voltage	24V DC / 17V AC
Common Mode Voltage Range	±10V DC / channel
Input Impedance	220 kΩ: voltage mode
	249 Ω: current mode
Input Channel Diagnostics	Over and Under Range and Open Circuit
Open Circuit Detection Time	Positive Full Scale Reading: within 3 seconds (max)
Maximum Overload at Input Terminals	Voltage: ±24V DC continuous at 0.1 mA
	Current: ±30 mA continuous at 7V DC
External Calibration	Not required: auto-calibration performed by the module if required to meet specs.
Module Isolation to Control Board	Yes (1000V AC)
Removable Terminal Block	Yes (Cat. No.150-SM3RTB as a spare replacement part)
Cable Type	Belden 8760 (or equiv.) 0.750 mm^2 (18 AWG twisted pair 100% shield with drain)
Cat. No. 150-SM3 Optional Analog Control Outputs: Terminals B5…B10	
Number of Outputs	2 Single-ended
Normal Operating Ranges	±10V, 0…10V, 0…5V, 0…20 mA, 4…20 mA
Full Scale Operating Ranges	±10.5V, 0…10.5V, -0.5…5.25V, 0…21 mA, 3.5…21 mA
Output Resolution ±10.5V, 0 …10.5V, -0.5…5.25V, 0…21 mA, 3.5 …21 mA	16 bit (15 plus sign bipolar)
Resistive Load on Current Output	0…750 Ω
Load Range on Voltage Output	1 kΩ at 10V DC
Max. Inductive Load (Current Outputs)	15 mH
Max. Capacitive Load (Voltage Outputs)	100 µF
Overall Accuracy	Voltage Terminal: ±0.5% full scale at 25° C
	Current Terminal: ±0.35% full scale at 25° C
Accuracy Drift with Temperature	±5 PPM / ° C
Output Impedance	15 Ω (typical)
Open and Short-Circuit Protection	Yes
Maximum Short-Circuit Current	45 mA
Output Overvoltage Protection	Yes

PTC Input Ratings

PTC Input Ratings (Cat. No. 150-SM2 required)	
Response Resistance	3400 Ω ± 150 Ω
Reset Resistance	1600 Ω ± 100 Ω
Short-Circuit Trip Resistance	25 Ω ± 10 Ω
Max. Voltage at PTC Terminals (R_{PTC} = 4 kΩ)	< 7.5 V
Max. Voltage at PTC Terminals (R_{PTC} = open)	30V
Max. No. of Sensors (wired in series)	6
Max. Cold Resistance of PTC Sensor Chain	1500 Ω
Response Time	800 ms

Electrical Specifications

Control Power Requirements (Maximum Control Circuit Consumption)			
	Current Range [A]	Control Voltage	
		100…240V AC	24V DC
Base Power Draw: Control Module with Heat Sink Fan [A]	90…180	150 VA	TBD
	210…260	150 VA	TBD
	361…520	300 VA	TBD
Option VA Adder (for each option installed, add to base power to obtain total VA requirement)	Human Interface Module (HIM)	10 VA	TBD
	150-SM2★	30 VA	TBD
	150-SM3	30 VA	TBD
	150-SM4	50 VA	TBD
	150-SM6★	5 VA	TBD
	20-COMM-X★	25 VA	TBD
Continuous Duty Power Structure Heat Dissipation at Rated Current (Watts)			
Controller Rating [A]	90	270	
	110	330	
	140	420	
	180	540	
	210	630	
	260	780	
	320	960	
	361	1083	
	420	1260	
	520	1560	

★ Max. one of each option type per control module.

Power Calculation:

$$\text{Max. Total Power Dissipation} = \frac{}{\text{Base Power}} + \frac{}{\text{Options}} + \frac{}{\text{Power Structure}} \text{ Watts}$$

Example: 361 A device with a 20-COMM-X, HIM, and Cat. No. 150-SM4

$$\text{Max. Total Power Dissipation} = \frac{300}{\text{Base Power}} + \frac{(25 + 10 + 50)}{\text{Options}} + \frac{1083}{\text{Power Structure}} \text{ Watts}$$

Max. Total Power Dissipation = 1468 Watts

SCPD Performance, Type 1

SCPD Performance★		Type 1♣					
SCCR List (Standard Capacity Fault)		Non-Time Delay Fuse‡		Time Delay Fuse§		Inverse Time (Thermal Magnetic) Circuit Breaker	
		Max. Standard Available Fault [kA]	Max. Amps	Max. Standard Available Fault [kA]	Max. Amps	Max. Standard Available Fault [kA]	Max. Amps
Line Device△ Operational Current Rating [A]	90	10	250	10	150	10	225
	110		300		175		250
	140		400		225		350
	180		500		300		450
	210	18	600	18	350	18	500
	260		700		450		600
	320		800		500		800
	361	30/18♠	1000	30/18♠	600	30/18♠	800
	420		1200		700		1000
	520		1200		800		1200
Delta Device♦ Operational Current Rating [A]	155	18	450	18	250	18	350
	190		500		300		450
	242		700		400		600
	311		900		500		700
	363	30	1000	30	600	30	800
	450		1200		700		1000
	554		1600		800		1200
	625	42	1600	42	1000	42	1200
	727		2000		1200		1600
	900		2500		1200		2000

★ Consult local codes for proper sizing of short-circuit protection.

‡ **Non-Time Delay Fuses:** Class K5 up to 600 A, Class L above 600 A.

§ **Time Delay Fuse:** Devices rated 90…180 A (155…311 A): Class RK5. Devices rated 210…520 A (363…900 A): Class RK5 or Class J up to 600 A, Class L above 600 A

♣ **Basic Requirements for Type 1 Coordination:** Under the short-circuit condition, the starter shall cause no danger to persons or to the installation. The starter may not be suitable for further service without repair or replacement of parts. For further details, refer to UL 508/CSA C22.2 No. 14 and EN 60947-4-2.

△ **UL/CSA (Type 1) & EN 60947-4-2 (Type 1) for Line-Connected Motors:** Suitable for use on a circuit capable of delivering not more than the listed max. RMS symetrical amperes (UL: 600V maximum, IEC: 690V maximum).

♦ **UL/CSA (Type 1) & EN 60947-4-2 (Type 1) for Inside-the-Delta Connected Motors:** Suitable for use on a circuit capable of delivering not more than the listed max. RMS symetrical amperes (UL & IEC: 600V maximum).

♠ **UL/CSA applications** = 30 kA, 600V maximum. **IEC applications** = 18 kA, 690V maximum.

SCPD Performance★		Type 1§			
SCCR List (High Capacity Fault)		Class J Fuse‡		Inverse Time (Thermal Magnetic) Circuit Breaker	
		Max. High Capacity Available Fault (600V) [kA]	Max. Amps	Max. High Capacity Available Fault (480V) [kA]	Max. Amps
Line Device Operational Current Rating (A)	90	100	150	65	225
	110		175		250
	140		225		350
	180		300		400
	210	TBD	—	TBD	—
	260		—		—
	320		—		—
	361	TBD	—	TBD	—
	420		—		—
	520		—		—
Delta Device Operational Current Rating (A)	155	65	250	65	350
	190		300		450
	242		400		600
	311		500		700
	363	TBD	—	TBD	—
	450		—		—
	554		—		—
	625	TBD	—	TBD	—
	727		—		—
	900		—		—

★ Consult local codes for proper sizing of short-circuit protection.

‡ High capacity fault ratings when used with time delay Class J fuse.

§ **Basic Requirements for Type 1 Coordination:** Under the short circuit condition, the starter shall cause no danger to persons or to the installation. The starter may not be suitable for further service without repair or replacemement of parts. For further details, refer to UL 508/CSA C22.2 No. 14 and EN 60947-4-2.

Environmental, Mechanical, & Other Specifications

Environmental	
Operating Ambient Temperature Range (surrounding air ambient)	-20…+40 °C (-4…+104 °F) (no derating) — For operation 40...65 °C (104...149 °F), refer to Thermal Wizard.
Storage & Transportation Temperature Range	–25…+75 °C (-13…+167 °F)
Altitude	2000 m (6560 ft) without derating; for operation above 2000...7000 m (6560...22965 ft) maximum, refer to Thermal Wizard
Humidity	5…95% (non-condensing)
Pollution Degree	2
Mounting Orientation	Vertical

Mechanical			
Resistance to Vibration	Operational	90…520 A	1.0 G Peak, 0.15 mm (0.006 in.) Displacement
	Non-Operational		2.5 G Peak, 0.38 mm (0.015 in.) Displacement
Resistance to Shock	Operational	90...520 A	15 G
	Non-Operational		30 G
Construction	Power Poles		Heatsink Hockey Puck Thyristor Modular Design
	Control Modules		Thermoset and Thermoplastic Moldings
	Metal Parts		Plated Brass, Copper, or Steel
Terminals	Power Terminal Lugs	90…180 A	One 10.5 mm (0.41 in.) diameter hole per power pole
		210…320 A	Two 10.5 mm (0.41 in.) diameter holes per power pole
		361…520 A	Two 13.5 mm (0.53 in.) diameter holes per power pole
	Power Terminal Markings		NEMA, CENELEC EN50 012
	Control Terminals	M3 Screw Clamp	Clamping Yoke Connection

Other		EN
EMC Emission Levels	Conducted Radio Frequency Emissions Radiated Emissions	Class A (per EN 60947-4-2) Class A (per EN 60947-4-2)
EMC Immunity Levels	Electrostatic Discharge Radio Frequency Electromagnetic Field Fast Transient Surge Transient	8 kV Air Discharge Per EN 60947-4-2 Per EN 60947-4-2 Per EN 60947-4-2

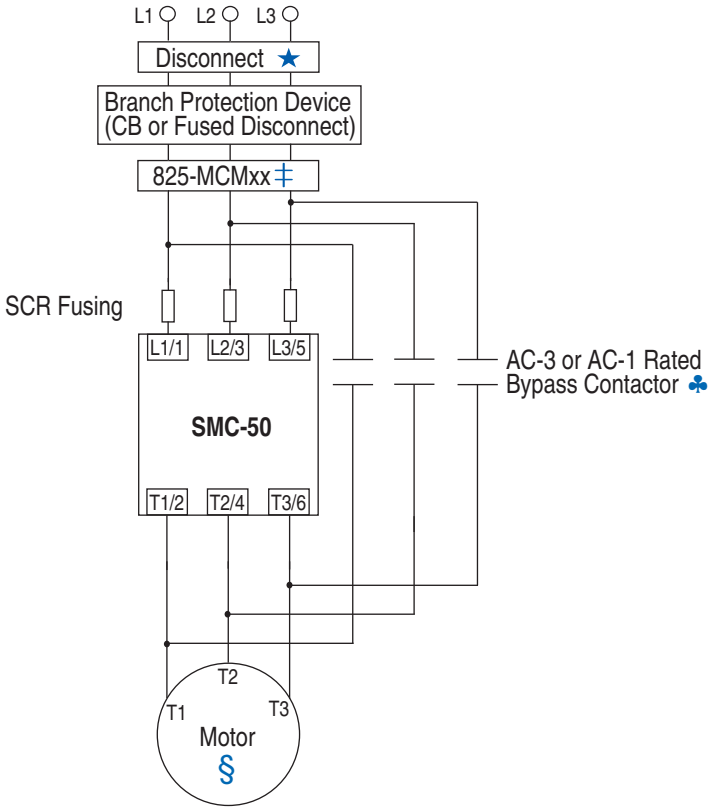
Overload Characteristics		Line	Delta
Current Range	90	30...90	52…155
	110	37…110	65…190
	140	47…140	82…242
	180	60…180	104…311
	210	70…210	122…363
	260	87…260	151…450
	320	107…320	186…554
	361	120…361	210…625
	420	140…420	243…727
	520	174…520	302…900
Overload Type		Electronic - using I^2t algorithm	
Trip Classes		5 to 30	
Trip Current Rating		118% of Motor FLC	
Number of Poles		3	
Certifications	Open-Type Controllers	CE Marked Per Low Voltage Directive 73/23/EEC, 93/68/EEC UL Listed (File No. E96956)	

Protection Device & Bypass Component Selection Overview — Line Connected Motor

Description	SMC-50 Cat. No.‡									
	150-SB1N*	150-SB2N*	150-SB3N*	150-SB4N*	150-SC1N*	150-SC2N*	150-SC3N*	150-SD1N*	150-SD2N*	150-SD3N*
Rated Current [A]	90	110	140	180	210	260	320	361	420	520
Voltage	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC
Short-Circuit Current Ratings (SCCR)★										
Standard Fault SCCR at 600V										
Std. Available Fault [kA]	10				18			30		
Max. Non-Time Delay Fuse	250 A	300 A	400 A	500 A	600 A	700 A	800 A	1000 A	1200 A	1200 A
Max. Time Delay Fuse	150 A	175 A	225 A	300 A	350 A	450 A	500 A	600 A	700 A	800 A
Max. Inverse Time Circuit Breaker (CB)	225 A	250 A	350 A	450 A	500 A	600 A	800 A	800 A	1000 A	1200 A
Maximum High Fault SCCR										
High Available Fault with Fuses at 600V [kA]	100				TBD			TBD		
Max. Class J or L Time Delay Fuse	150 A	175 A	225 A	300 A	—	—	—	—	—	—
High Available Fault with Circuit Breaker at 480V [kA]	65				TBD			TBD		
Max. Inverse Time CB	225 A	250 A	350 A	400 A	—	—	—	—	—	—
Branch Protection Reference★										
Inverse Time Circuit Breaker Selections‡										
35 kA at 600V Maximum	140U-K6D3-D*	140U-K6D3-D*	140U-K6D3-D*	140U-K6D3-D*	140U-L6D3-D*	140U-L6D3-D*	140U-M6D3-D*	140U-M6D3-D*	140U-N6L3-E12§	140U-N6L3-E12§
65 kA at 480V Maximum	140U-K6D3-D*	140U-K6D3-D*	140U-K6D3-D*	140U-K6D3-D*	—	—	—	—	—	—
Fused Disconnect Selections										
Time Delay Fuses (100 kA at 600V)	200 A	200 A	400 A	400 A	—	—	—	—	—	—
	194R-J200-1753	194R-J200-1753	194R-J400-1753	194R-J400-1753	—	—	—	—	—	—
Semi-Conductor Fusing Recommendations (SCR Fusing)♣										
North American Style (480V, 65 kA avail. fault)Δ♦	A70QS150	A70QS175	A70QS200	A70QS250	A70QS350	A70QS400	A70QS450	A70QS500	A70QS600	A70QS700
European Style (500V, 65 kA available fault)Δ♦‡	6,9URD30* 0200	6,9URD30* 0200	6,9URD30* 0250	6,9URD31* 0315	6,9URD30* 0315	6,9URD31* 0400	6,9URD31* 0450	6,9URD31* 0500	6,9URD31* 0630	6,9URD31* 0700
Type 2 Performance per EN 60947-4-2	—	—	—	—	—	—	—	—	—	—
I^2t Reference (10^3 A^2s)	92	95	100	106	200	238	320	1000	1100	1200
Bypass Contactor Reference‡★										
AC-3 Rated per UL/CSA♠										
Short Circuit Ratings @ 600V with:	**100-D115*00**	**100-D115*00**	**100-D140*00**	**100-D180*00**	**100-D250*00**	**100-D250*00**	**100-D300*00**	**100-D630*00**	**100-D630*00**	**100-D630*00**
Std. Available Fault [kA]	10				18			30		
Max. Non-Time Delay Fuse	250 A	250 A	350 A	450 A	700 A	700 A	700 A	2000 A	2000 A	2000 A
High Available Fault with Fuses at 600V [kA]	100				TBD			TBD		
Max. Class J or L Time Delay Fuse	200 A	200 A	250 A	300 A	—	—	—	—	—	—
High Available Fault with CB at 480V [kA]	65				TBD			TBD		
Max. Inverse Time CB	125 A	125 A	200 A	200 A	—	—	—	—	—	—

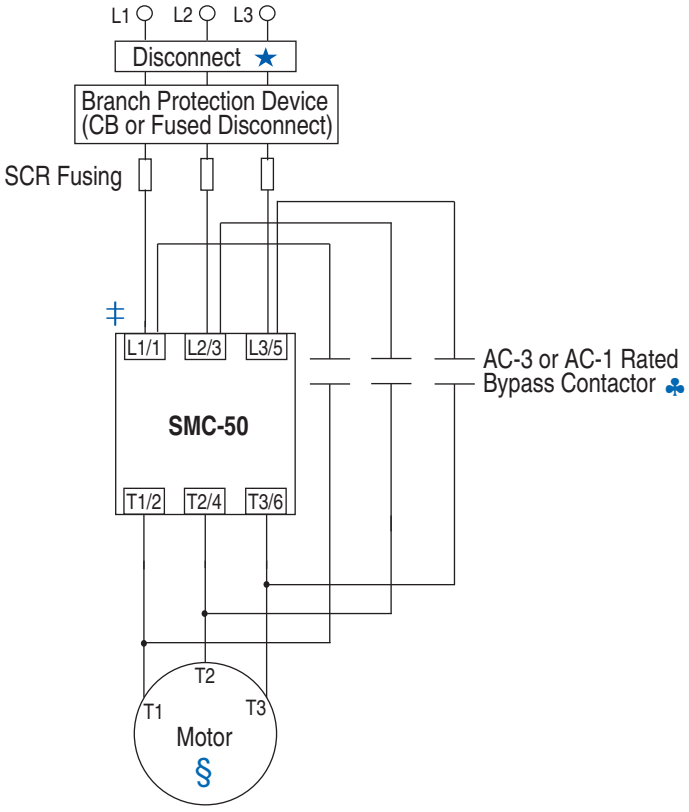
‡ For complete catalog numbers, refer to the online catalog: www.ab.com/catalogs or the appropriate manufacturer's web site.
★ Always refer to local codes for proper selection of branch circuit components.
§ Requires rating plug selection based on application; refer to the online catalog: www.ab.com/catalogs
♣ For Line-connected motors, connect fuses to the SMC-50 in line with three-phase power terminals L1, L2, and L3.
Δ Ferraz Shawmut - Mersen part numbers.
♦ Calculated only, NOT tested. Calculations based on a start profile of 350% of the controller maximum current rating for 10 seconds. For applications with a longer start time or higher starting current, contact your local Rockwell Automation sales office or Allen-Bradley distributor.
♠ In IEC regulated regions when sizing the bypass contactor per AC-1 or AC-3 ratings, the short circuit rating of the bypass contactor must be similar to the SMC-50.

Line-Connected Motor Wiring Diagram using Bul. 825 Converter Module and Cat. No. 150-SM2 Devices with Bypass Contactor



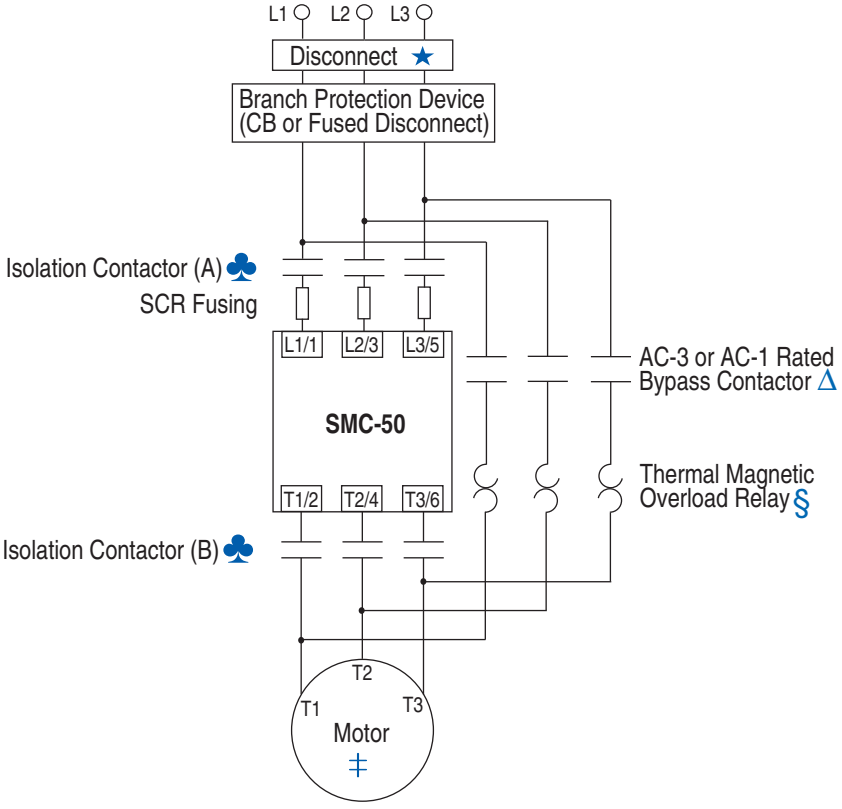
★ Not required if disconnect is fused to provide branch protection.
‡ The 825-MCMxx provides current feedback to the SMC-50 when RUN in Bypass Operation. A Cat. No.150-SM2 is also required.
§Due to current leakage through an SCR in the OFF state (controller stopped), some form of upstream line power isolation is recommended if maintenance is required on the motor. See the isolation contactor application information for details.
♣Bypass must be controlled by an auxiliary contact of the SMC-50 configured to exernal bypass.

Line Connected Motor Wiring Diagram for Cat. No. 150-SC… or 150-SD… Devices with Bypass Contactor and Bypass Bus Kit



★ Not required if disconnect is fused to provide branch protection.
‡ SMC-50 Bypass Bus Kit Cat. No. 150-SCBK or -SDBK is required.
§Due to current leakage through an SCR in the OFF state (controller stopped), some form of upstream line power isolation is recommended if maintenance is required on the motor. See the isolation contactor application information for details.
♣Bypass must be controlled by an auxiliary contact of the SMC-50 configured to exernal bypass.
NOTE: Controller FRN 3.001or higher is required.

Line Connected Motor Wiring Diagram with Bypass and External Overload



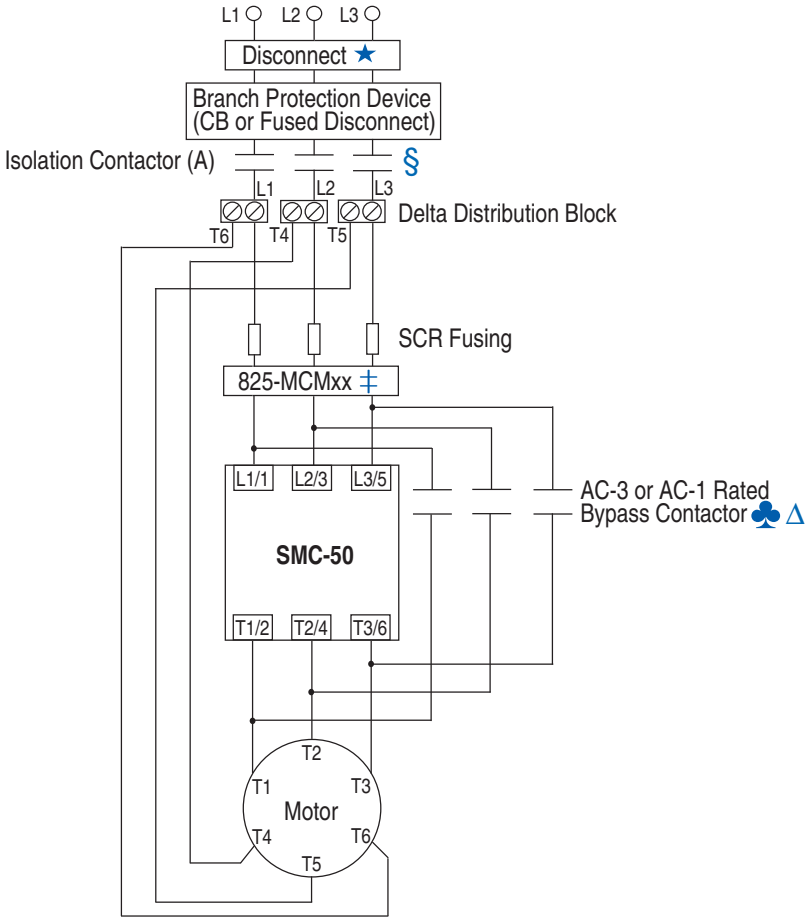
★ Not required if disconnect is fused to provide branch protection.
§ Overload is required.
NOTE: Bypass **must** be fully rated to motor Hp/kW and FLA.
♣ Isolation Contactors A and B are required if bypass is used for emergency START, STOP, and RUN operation.
‡Due to current leakage through an SCR in the OFF state (controller stopped), some form of upstream line power isolation is recommended if maintenance is required on the motor. See the isolation contactor application information for details.
ΔBypass must be controlled by an auxiliary contact of the SMC-50 configured to exernal bypass.

Protection Device & Bypass Component Selection Overview — Delta Connected Motor

Description	SMC-50 Cat. No.‡									
	150-SB1N*	150-SB2N*	150-SB3N*	150-SB4N*	150-SC1N*	150-SC2N*	150-SC3N*	150-SD1N*	150-SD2N*	150-SD3N*
Rated Current [A]	155	190	242	311	363	450	554	625	727	900
Voltage	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC	230…600V AC
Short-Circuit Current Ratings (SCCR)★										
Standard Fault SCCR at 600V										
Std. Available Fault [kA]	18				30			42		
Max. Non-Time Delay Fuse	450 A	500 A	700 A	900 A	1000 A	1200 A	1600 A	1600 A	2000 A	2500 A
Max. Time Delay Fuse	250 A	300 A	400 A	500 A	600 A	700 A	800 A	1000 A	1200 A	1200 A
Max. Inverse Time Circuit Breaker (CB)	350 A	450 A	600 A	700 A	800 A	1000 A	1200 A	1200 A	1600 A	2000 A
Maximum High Fault SCCR										
High Available Fault with Fuses at 600V [kA]	65				TBD			TBD		
Max. Class J or L Time Delay Fuse	250 A	300 A	400 A	500 A	—	—	—	—	—	—
High Available Fault with Circuit Breaker at 480V [kA]	65				TBD			TBD		
Max. Inverse Time CB	350 A	450 A	600 A	700 A	—	—	—	—	—	—
Branch Protection Reference★										
Inverse Time Circuit Breaker Selections‡										
35 kA at 600V Maximum	140U-K6D3-D*	140U-K6D3-D*	140U-L6D3-D*	140U-M6D3-D*	140U-M6D3-D*	140U-N6L3-E12§	140U-N6L3-E12§	—	—	—
50 kA at 600V Maximum	—	—	—	—	—	—	—	140U-R6L3-E20§	140U-R6L3-E20§	140U-R6L3-E20§
65 kA at 480V Maximum	140U-K6D3-D*	140U-K6D3-D*	140U-L6D3-D*	140U-M6D3-D*	—	—	—	—	—	—
Fused Disconnect Selections										
Time Delay Fuses (100 kA at 600V)	400 A	400 A	400 A	600 A	—	—	—	—	—	—
	194R-J400-1753	194R-J400-1753	194R-J400-1753	194R-J600-1753	—	—	—	—	—	—
Semi-Conductor Fusing Recommendations (SCR Fusing)♣										
North American Style (480V, 65 kA avail. fault)Δ♦	A70QS150	A70QS175	A70QS200	A70QS250	A70QS350	A70QS400	A70QS450	A70QS500	A70QS600	A70QS700
European Style (500V, 65 kA available fault)Δ♦‡	6,9URD30* 0200	6,9URD30* 0200	6,9URD30* 0250	6,9URD31* 0315	6,9URD30* 0315	6,9URD31* 0400	6,9URD31* 0450	6,9URD31* 0500	6,9URD31* 0630	6,9URD31* 0700
Type 2 Performance per EN 60947-4-2	—	—	—	—	—	—	—	—	—	—
I^2t Reference (10^3 A^2s)	92	95	100	106	200	238	320	1000	1100	1200
Bypass Contactor Reference‡★										
AC-3 Rated per UL/CSA♠										
Short Circuit Ratings @ 600V with:	**100-D250*00**	**100-D250*00**	**100-D250*00**	**100-D300*00**	**100-D630*00**	**100-D630*00**	**100-D630*00**	**100-D860*00**	**100-D860*00**	—
Std. Available Fault [kA]	18				30			42		
Max. Non-Time Delay Fuse	700 A	700 A	700 A	700 A	2000 A	2000 A	2000 A	2500 A	2500 A	—
High Available Fault with Fuses at 600V [kA]	100				TBD			TBD		
Max. Class J or L Time Delay Fuse	400 A	400 A	400 A	500 A	—	—	—	—	—	—
High Available Fault with CB at 480V [kA]	65				TBD			TBD		
Max. Inverse Time CB	400 A	400 A	400 A	400 A	—	—	—	—	—	—

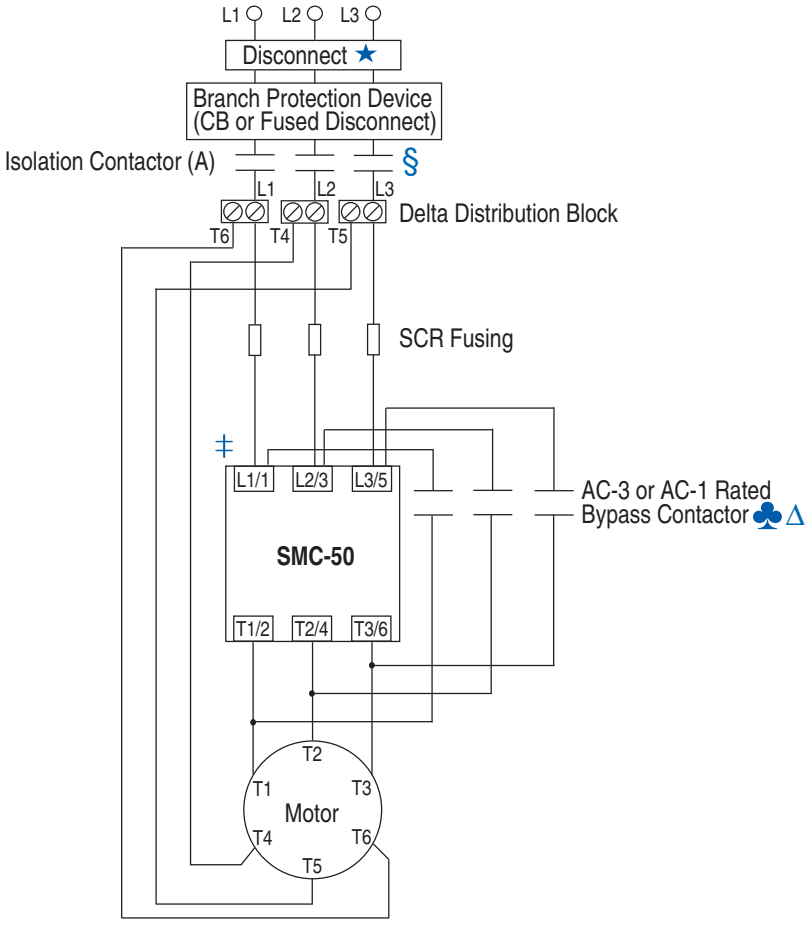
‡ For complete catalog numbers, refer to the online catalog: www.ab.com/catalogs or the appropriate manufacturer's web site.
★ Always refer to local codes for proper selection of branch circuit components.
§ Requires rating plug selection based on application; refer to the online catalog: www.ab.com/catalogs
♣ For Delta-connected motors, connect fuses to the SMC-50 inside the delta after terminals L1-T6, L2-T4, and L3-T5.
Δ Ferraz Shawmut - Mersen part numbers.
♦ Calculated only, NOT tested. Calculations based on a start profile of 350% of the controller maximum current rating for 10 seconds. For applications with a longer start time or higher starting current, contact your local Rockwell Automation sales office or Allen-Bradley distributor.
♠ In IEC regulated regions when sizing the bypass contactor per AC-1 or AC-3 ratings, the short circuit rating of the bypass contactor must be similar to the SMC-50.

Delta-Connected Motor Wiring Diagram using Bul. 825 Converter module and Cat. No. 150-SM2 Devices with Bypass Contactor



★ Not required if disconnect is fused to provide branch protection.
‡ The 825-MCMxx provides current feedback to the SMC-50 when RUN in Bypass Operation. A Cat. No. 150-SM2 is also required.
♣ Configuration not acceptable for emergency RUN off bypass.
§Isolation contactor required.
ΔBypass must be controlled by an auxiliary contact of the SMC-50 configured to exernal bypass.

Delta-Connected Motor Wiring Diagram for Cat. No. 150-SC… and 150-SD… Devices with Bypass Contactor and Bypass Kit



★ Not required if disconnect is fused to provide branch protection.
‡ SMC-50 Bypass Bus Kit Cat. No. 150-SCBK or -SDBK is required.
♣ Configuration not acceptable for emergency RUN off bypass.
NOTE: Controller FRN 3.001or higher is required.
§Isolation contactor required.
ΔBypass must be controlled by an auxiliary contact of the SMC-50 configured to exernal bypass.

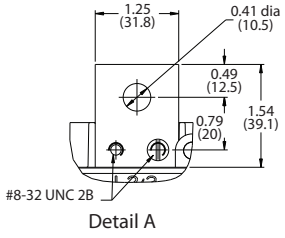
Minimum Enclosure Requirements★				
Cat. No.	Type	Height	Width	Depth
150-SB…	Wye	609.6 (24.0)	762.0 (30.0)	304.8 (12.0)
	Inside-the-Delta	762.0 (30.0)	965.2 (38.0)	355.6 (14.0)
150-SC…	All	762.0 (30.0)	965.2 (38.0)	355.6 (14.0)
150-SD…	All	914.4 (36.0)	1295.4 (51.0)	355.6 (14.0)

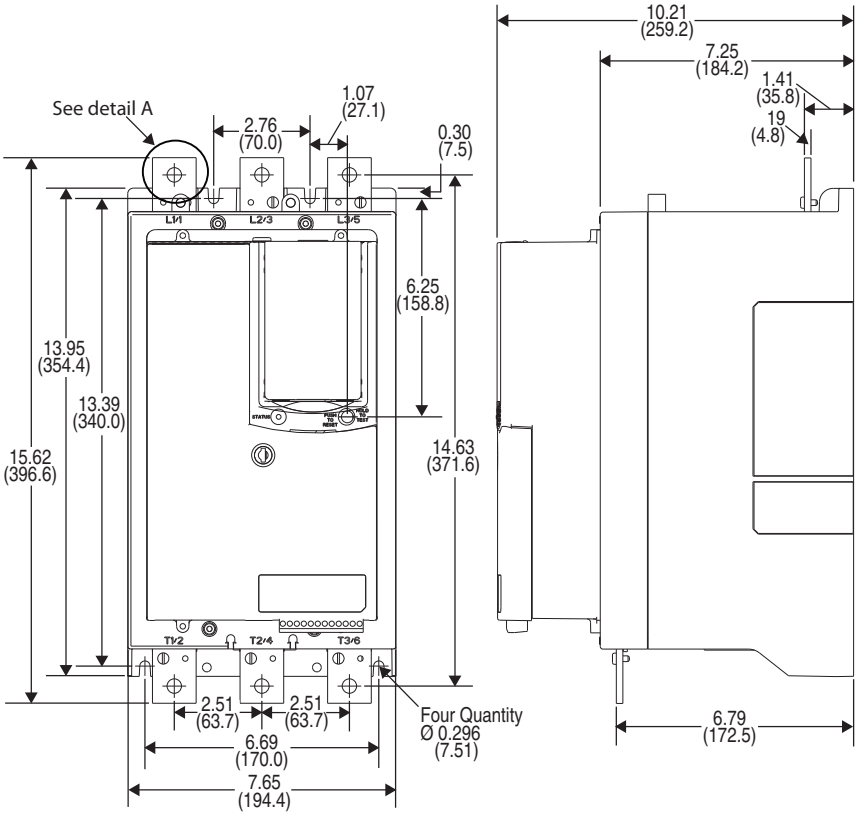
★ Enclosure **must** be sized such that the enclosure's internal temperature remains within specified controller ratings.

Cat. Nos. 150-SB1...SB4 Controllers without Terminal Covers

Dimensions are in inches (millimeters) unless otherwise noted. Dimensions are not intended for manufacturing purposes.

NOTE: When mounted in an enclosure, maintain a minimum of 6.0 inches (152.4 millimeters) clearance above or below the SMC-50. Side-to-side clearance is not required.



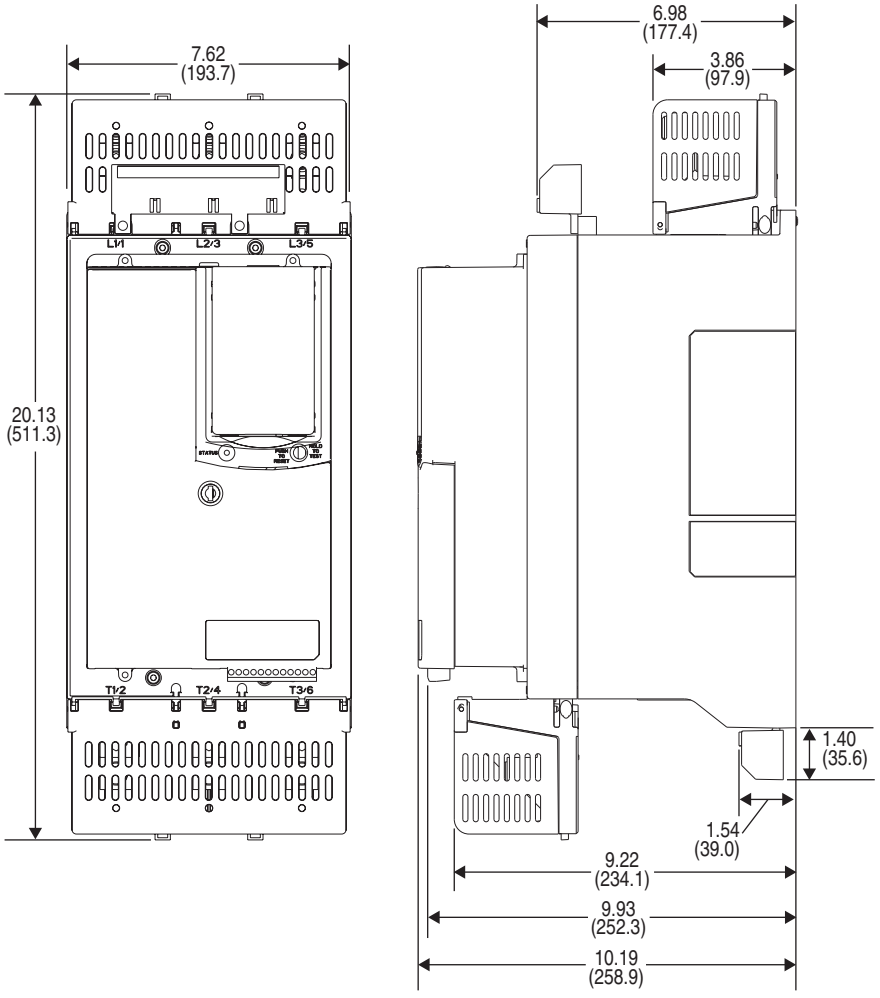


Cat. No.	Weight
150-SB1	15.7 kg (34.6 lbs)
150-SB2	
150-SB3	
150-SB4	

Cat. Nos. 150-SB1...SB4 Controllers with Terminal Covers

Dimensions are in inches (millimeters) unless otherwise noted. Dimensions are not intended for manufacturing purposes.

NOTE: When mounted in an enclosure, maintain a minimum of 6.0 inches (152.4 millimeters) clearance above or below the SMC-50. Side-to-side clearance is not required.

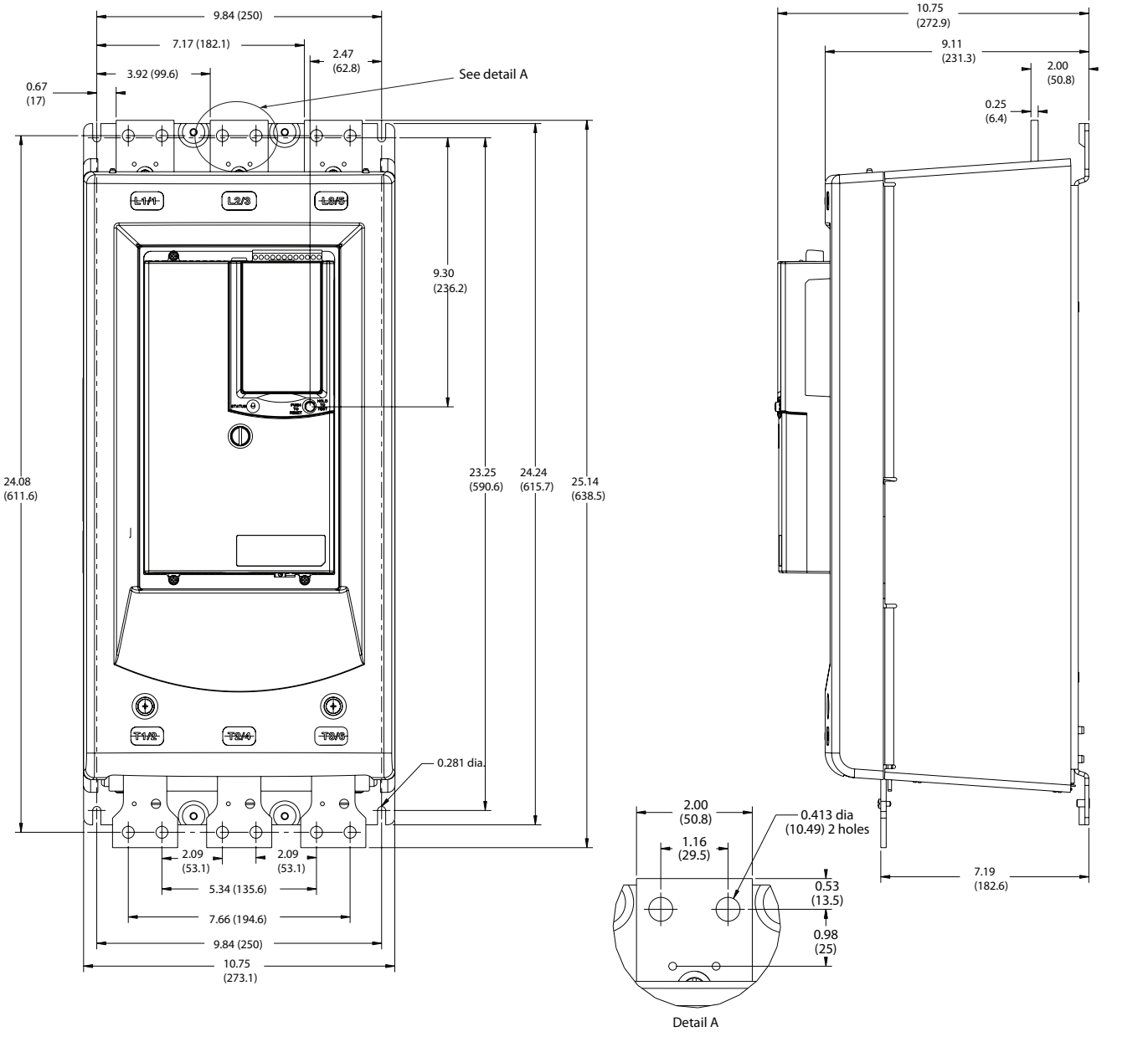


Cat. No.	Weight
150-SB1	15.9 kg (35.1 lbs)
150-SB2	
150-SB3	
150-SB4	

Cat. Nos. 150-SC1...SC3 Controllers

Dimensions are in inches (millimeters) unless otherwise noted. Dimensions are not intended for manufacturing purposes.

NOTE: When mounted in an enclosure, maintain a minimum of 6.0 inches (152.4 millimeters) clearance above or below the SMC-50. Side-to-side clearance is not required.

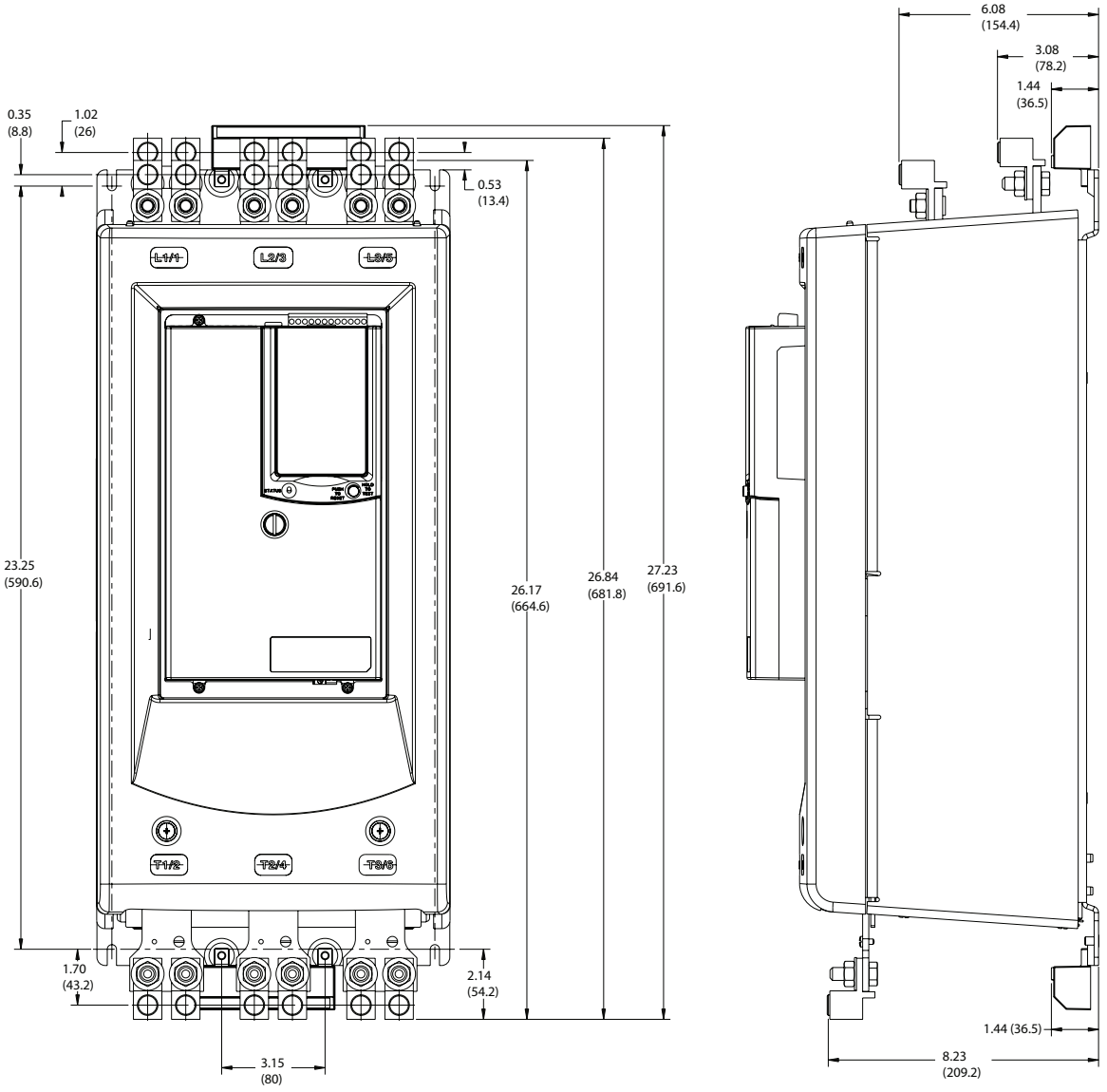


Cat. No.	Weight
150-SC1	47.6 kg (105 lb)
150-SC2	
150-SC3	

Cat. Nos. 150-SC1...SC3 Controllers with Lugs, Bypass Kit, and MOV Options

Dimensions are in inches (millimeters) unless otherwise noted. Dimensions are not intended for manufacturing purposes.

NOTE: When mounted in an enclosure, maintain a minimum of 6.0 inches (152.4 millimeters) clearance above or below the SMC-50. Side-to-side clearance is not required.

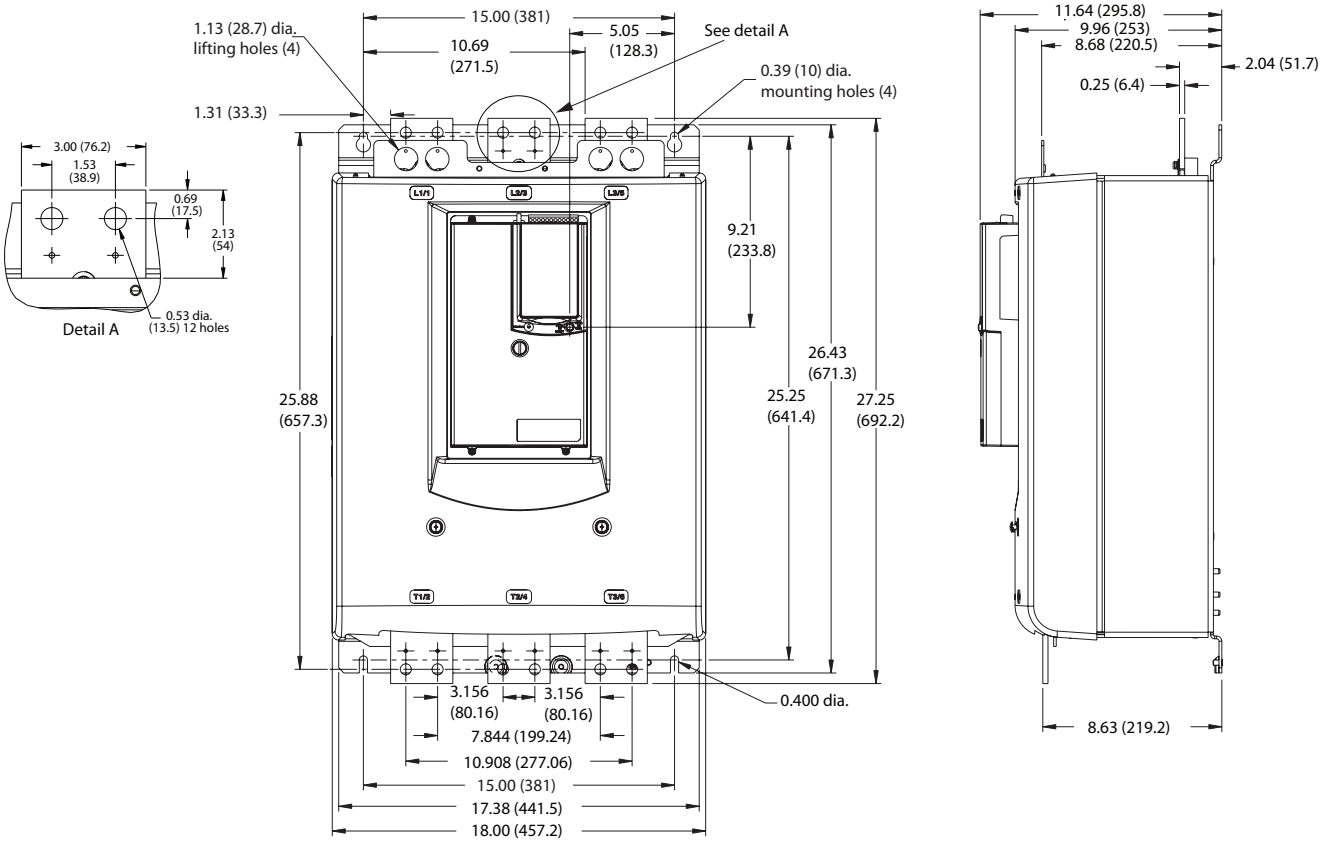


Cat. No.	Weight
150-SC1	47.6 kg (105 lb)
150-SC2	
150-SC3	

Cat. Nos. 150-SD1...SD3 Controllers

Dimensions are in inches (millimeters) unless otherwise noted. Dimensions are not intended for manufacturing purposes.

NOTE: When mounted in an enclosure, maintain a minimum of 6.0 inches (152.4 millimeters) clearance above or below the SMC-50. Side-to-side clearance is not required.

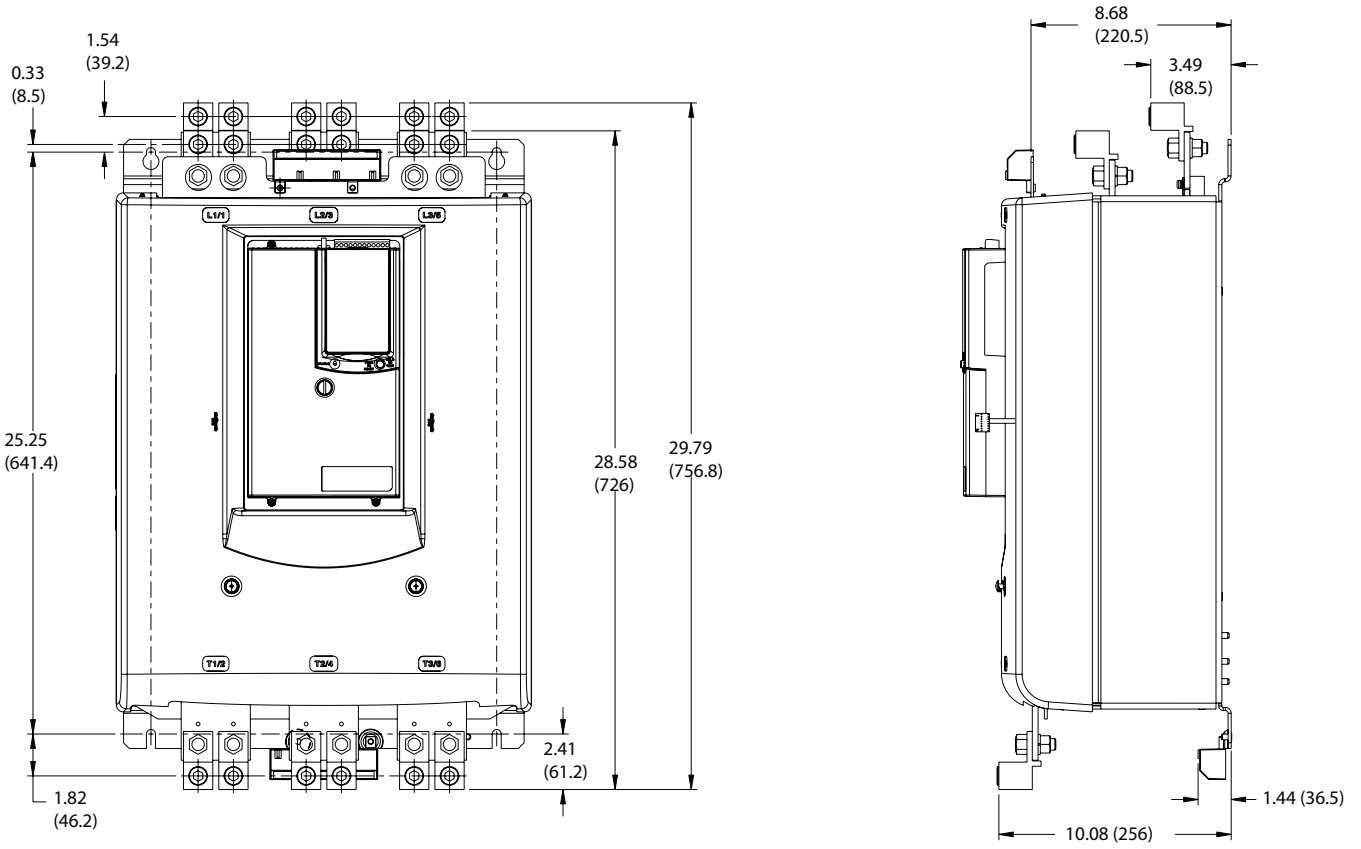


Cat. No.	Weight
150-SD1	77.1 kg (170 lb)
150-SD2	
150-SD3	

Cat. Nos. 150-SD1…SD3 Controllers with Lugs, Bypass Kit, and MOV Options

Dimensions are in inches (millimeters) unless otherwise noted. Dimensions are not intended for manufacturing purposes.

NOTE: When mounted in an enclosure, maintain a minimum of 6.0 inches (152.4 millimeters) clearance above or below the SMC-50. Side-to-side clearance is not required.



Cat. No.	Weight
150-SD1	77.1 kg (170 lb)
150-SD2	
150-SD3	

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