Allen-Bradley

Selection Guide
for Smart Motor Controllers

Smart Choices for Motor Management

Allen-Bradley
RELIANCE ELECTRIC
DODGE
ROCKWELL SOFTWARE
Rockwell Automation

Bringing Together Leading Brands in Industrial Automation

Allen-Bradley Smart Motor Controllers: Intelligent, Robust, Reliable

As a world leader in industrial control systems, Rockwell Automation offers a complete line of Allen-Bradley Smart Motor Controllers (SMC) designed to meet the motor management needs of many applications. Our robust family of controllers features the reliability of solid-state electronics for controlling single- and three-phase induction motors.

Solid-state starting provides smooth acceleration without the arcing, chattering, or vibration problems associated with conventional electromechanical motor starters. Maintenance costs and production losses can be reduced, as can wear on moving parts such as belts, chains, gear boxes, and bearings.

When looking for compact, cost-effective solutions, STC and SMC-2 controllers are easy to set up and maintain.


STC™ Starting Torque Controller


SMC-2™ Smart Motor Controller


SMC PLUS™ Smart Motor Controller

A Few Familiar Applications

Material Handling
Centrifugal Pumps
Compressors
Overhead Cranes
Conveyor Systems
Stirrers and Mixers
Lumber and Saw Mills
Extruders

The SMC Dialog Plus™ controller offers sophisticated performance with advanced motor protection, networking capabilities and easy programmability – making it the next generation of intelligent motor control.

Allen-Bradley SMC PLUS™ and SMC Dialog Plus controllers offer a variety of options for soft stopping, slow speed operation, braking, and pump control, providing exceptional flexibility and motor management solutions.

SMC Dialog Plus™ Controller

Rock Crushers

Transport Systems

Ventilators and Blowers

Mills and Kneaders

Motor Management: The Essence of Automation

In today's automated industrial environments, electric motors handle more than half the workload, providing the power for virtually every process involved in production and manufacturing. This places a substantial premium on **motor protection** *and up time.*

With the trend toward consolidating multiple protective functions into a single motor control device, system performance, reliability and efficiency can be significantly **enhanced.** *Solid-state devices offer even greater integration and functionality, with lower costs for components, installation and maintenance, and with smaller control panels.*

In short, **highly sophisticated** *motor management is now available in ways that were previously too costly or impractical to consider.*

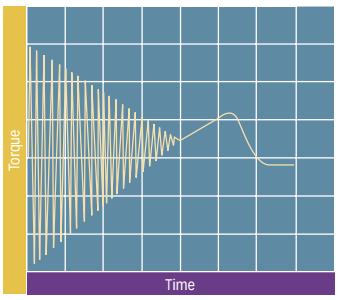
Through device level network communications, **vital** *motor operating data can be gathered, processed and displayed, all at the local level. Problems can be detected and devices prevented from tripping at a critical stage in a process, helping to prevent costly downtime and unscheduled maintenance.*

STC

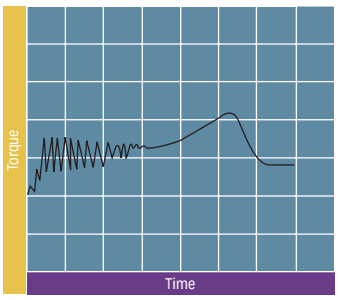
STC Starting Torque Controllers

Allen-Bradley STC controllers provide a reliable method of reducing unwanted problems encountered in typical across-the-line starting applications. With **smoother starting** of AC induction motors, equipment downtime due to problems related to mechanical shock and vibration is substantially reduced.

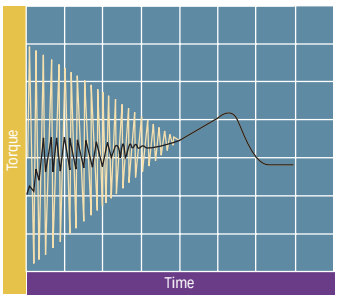
Current Range	1 22 A
Voltage Range	100 600V AC, 50/60Hz
Starting Mode	Soft Start
Features	Digital Adjustments Compact Design



Starting torque surge during DOL or across-the-line motor starting can cause damage to the motor and to the driven equipment.



The STC controller is effective in decreasing the magnitude of starting torque surges.



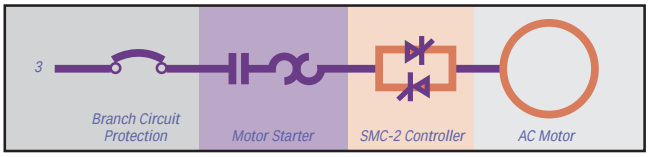
STC controller versus a typical across-the-line start.

SMC-2

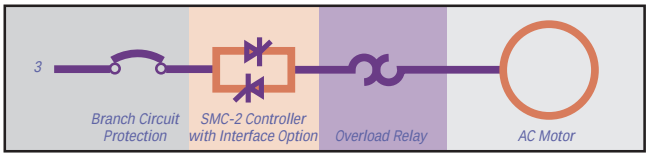
SMC-2 Smart Motor Controllers

The SMC-2 controllers offer a range of cost-effective solutions, with **easy installation** and set-up, for high-function control of AC induction motors.

Current Range	1 97 A
Voltage Range	200 600V AC, 50/60Hz
Starting Modes	Soft Start Current Limit Start Full Voltage Start
Features	Advisory and Diagnostic LED Digital Adjustments Energy Saver Compact Design
Interface Option	Soft Stop Configurable Auxiliary Contact Local On/Off Control



SMC-2 controller without Interface Option



SMC-2 controller with Interface Option

SMC PLUS

Current Range	1 1000 A
Voltage Range	200 600V AC, 50/60Hz
Starting Modes	Soft Start with Selectable Kickstart Current Limit Start Full Voltage Start
Features	Advisory and Diagnostic LEDs Digital Adjustments Energy Saver Configurable Auxiliary Contacts
Options	Soft Stop Pump Control Preset Slow Speed SMB Smart Motor Braking Accu-Stop Position Control Slow Speed with Braking

SMC PLUS Smart Motor Controllers

SMC PLUS controllers feature intelligent microprocessor control of motors rated from 1/3 through 1000 horsepower. Solid-state design provides **outstanding reliability** in a compact package with dramatically fewer parts than electromechanical devices.
All configurations provide three starting modes and self calibration.

SMC Dialog Plus Controllers

SMC Dialog Plus controllers provide the same unmatched performance, as well as all the control features and options available in the SMC PLUS controller line. In addition, they offer **highly advanced** motor protection with features, such as dynamic phase rebalance, flexible communication and straightforward programming.

Current Range	1 1000 A
Voltage Range	200 600V AC, 50/60Hz
Starting Modes	Soft Start with Selectable Kickstart Current Limit Start Dual Ramp Start Full Voltage Start
Features	Electronic Motor Overload Protection Power Monitoring Built-in SCANport Communication 2-line, 16-character Backlit LCD Display Keypad Programming Programmable Auxiliary Contacts
Options	Soft Stop Pump Control Preset Slow Speed SMB Smart Motor Braking Accu-Stop Position Control Slow Speed with Braking

Advanced Motor Management

Overload Protection

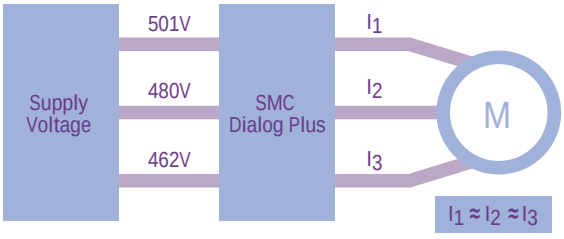
Increased accuracy is accomplished electronically with an I^2t algorithm. **Thermal memory** accurately models motor operating temperature. Ambient insensitivity is inherent in the electronic design.

Flexibility

Selectable trip classes — 10, 15, 20, and 30 — meet the requirements of a wide range of applications. A programmable trip setting eliminates the need for heater elements and simplifies start-up while reducing your inventory investment.

Protecting Your Investment

As little as 4% supply voltage unbalance can cause a 20% current unbalance. This can result in a 25% increase in motor temperature, which may lead to premature motor failure.



Rockwell Automation understands the shortcomings of traditional voltage unbalance protection, which de-energizes motor operation upon unbalance detection. The Allen-Bradley SMC Dialog Plus controllers incorporate a **Dynamic Phase Rebalance*** feature that compensates for voltage unbalance by automatically adjusting the voltage output to balance the three-phase currents drawn by the motor.

Advanced diagnostics

Fault diagnostic capabilities built into the SMC Dialog Plus controllers help you pinpoint a problem for easy troubleshooting and quick re-starting.

- **Line Fault**
- **Power Loss**
- **Voltage Unbalance**
- **Phase Reversal**
- **Undervoltage**
- **Overvoltage**
- **Overtemperature**
- **Open Gate**
- **Overload**
- **Excessive Starts Per Hour**

- **Jam -** a motor jam is generally an indication of a mechanical problem. Quick detection can prevent equipment damage and unnecessary downtime.
- **Stall -** when a motor stalls during the starting process, it can take more than 20 seconds before the overload trips. Quick detection can reduce motor heating and allow for a quick restart once the problem is corrected.
- **Underload -** the operating current of a motor can provide detailed information about equipment performance. For instance, a sudden drop in motor current can signal conditions such as pump cavitation, tool breakage or belt breakage.

**Phase Rebalance requires the use of the converter module (Bulletin 825) and the fanning strip (cat. no. 150-NFS).*

Network Communications

Integrating intelligent motor management into your automation architecture is enhanced with the SMC Dialog Plus controller. **Communication** capabilities may increase reliability by reducing the total number of components and terminations per system. The SMC Dialog Plus controller delivers enhanced control through the ability to access parameter settings and provides faults diagnostics, metering and remote start-stop control.

Using the Allen-Bradley Bulletin 1203 communication modules, the SMC Dialog Plus controller offers networking capabilities over a variety of network protocols.

- *Remote I/O*
- *DeviceNet™ Communications*
- *RS 232/422/485 (all DF1 protocol)*
- *DH-485*
- *ControlNet*

You can view various functions either locally, using the controller's built-in LCD display, or remotely, through the communication port.

The SMC Dialog Plus controller is **simple to program** with organized, descriptive, application-specific parameters. It can be configured using the Allen-Bradley Windows-based DriveTools™ programming software — compatible with several Allen-Bradley AC and DC digital drive products. The built-in LCD display provides parameter identification using clear, informative text so you can program your controller without referring to a manual.

Power monitoring

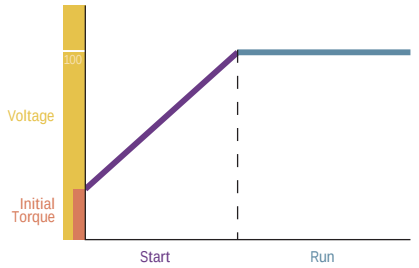
The ability to monitor power comes standard with the SMC Dialog Plus controller. **Vital information** can be reported without the need for additional devices such as transducers and meters (quicker installation and reduced panel space and wiring at no additional cost.)

- **Three-phase Currents**
- **Three-phase Voltages**
- **Power in kW**
- **Power Usage in kWH**
- **Motor Thermal Capacity Usage**
- **Power Factor of the Running Motor**
- **Elapsed Time of Motor Operation**

Standard and Optional Start/Stop Controls Meet Virtually Any Application Need

Allen-Bradley Smart Motor Controllers provide ample design flexibility to meet the needs of a host of production applications. To help identify which controllers offer the standard and optional start/stop features described on the following pages, use the following code:

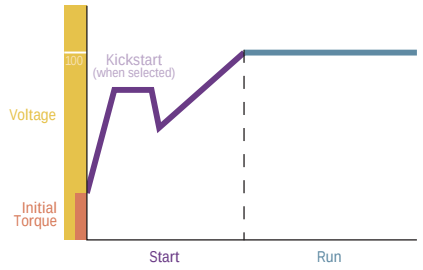
● SMC-2 ▲ SMC PLUS ■ SMC Dialog Plus



Soft Start

By reducing starting torque surges, Soft Start provides smooth, stepless motor acceleration while minimizing damage to gears, couplings and belts.

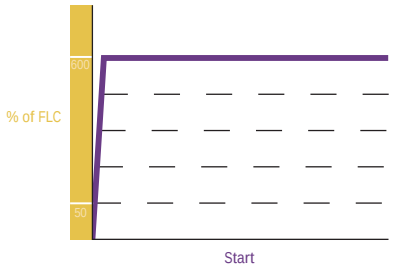
● ▲ ■



Soft Start with Selectable Kickstart

Activate the Selectable Kickstart function to provide an extra pulse of torque. This optional feature is ideal for overcoming stiction wherever high-friction loads are encountered.

▲ ■

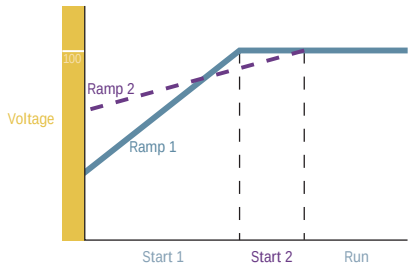


Current Limit Start

Current Limit starting is designed for applications which require the in-rush current to be limited during acceleration.

Selectable Kickstart is also available with the Current Limit Start.

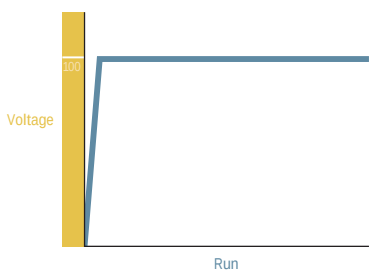
● ▲ ■



Dual Ramp Start

Available exclusively on the SMC Dialog Plus controller, Dual Ramp Start allows you to choose between two separate Soft Start profiles with independently adjustable ramp times and torque settings. It's designed for applications with varying loads, two speed requirements and reversing.

■



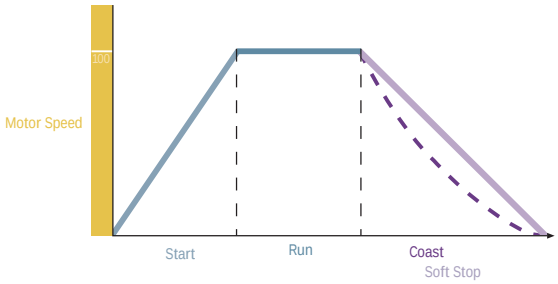
Full Voltage Start

In the Full Voltage Start mode, the SMC performs like a solid-state contactor, achieving full in-rush current and locked rotor torque.

● ▲ ■

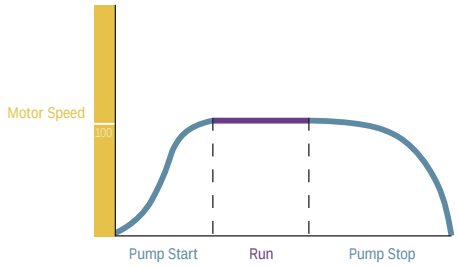
Soft Stop

The Soft Stop option extends the stopping time to minimize load shifting or spillage.



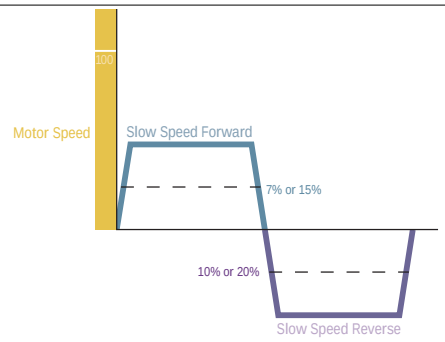
Pump Control

The SMC controller's unique, interactive Pump Control is designed to reduce fluid surges in pumping systems. It provides closed loop acceleration and deceleration control of centrifugal pump motors without need for feedback devices.



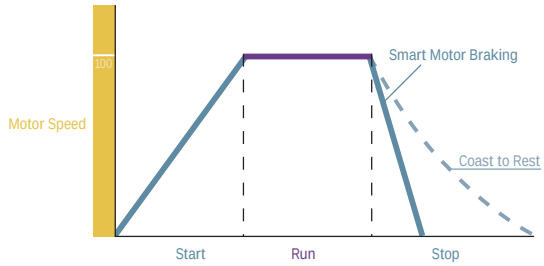
Preset Slow Speed

The Preset Slow Speed option furnishes two jog speeds to facilitate process set-up and alignment. These speeds are available in both the forward and reverse direction without a reversing contactor.



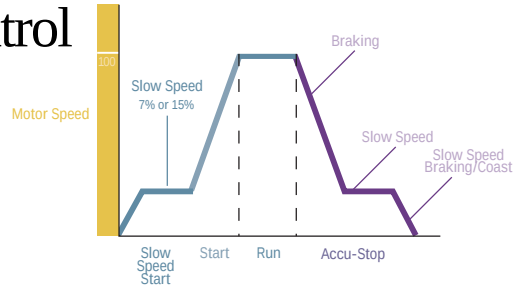
SMB™ Smart Motor Braking

SMB Smart Motor Braking stops a motor quickly for improved operation cycle times and increased productivity. Braking control with automatic zero speed shut-off is fully integrated into the controller's compact design.



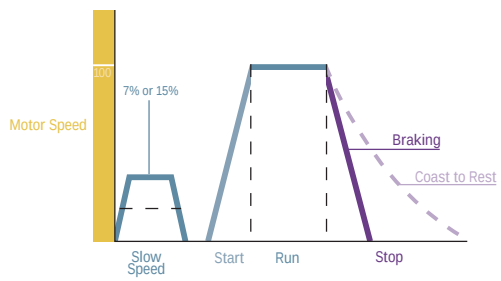
Accu-Stop™ Position Control

Accu-Stop position control provides rapid braking to a slow speed and then braking to a stop. This option facilitates cost-effective general positioning control.

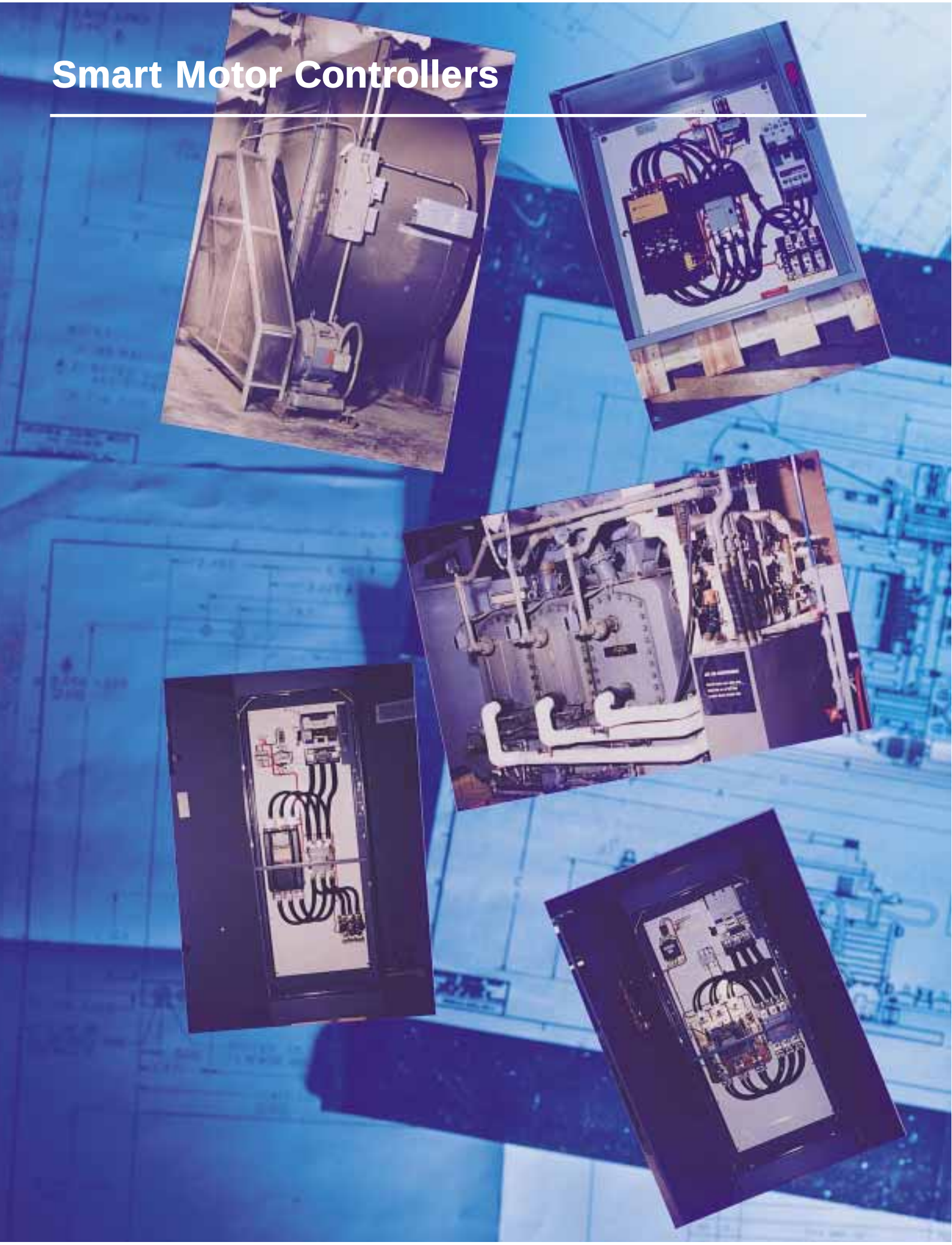


Slow Speed w/Braking

Slow Speed with Braking combines the benefits of SMB Smart Motor Braking and Preset Slow Speed for applications requiring slow set-up speeds and braking to a full stop.



Smart Motor Controllers



					
	STC Controller		**SMC-2 Controller**	**SMC Plus Controller**	**SMC Dialog Plus Controller**
Features	**100…240V, 1∅ 1…22 A**	**200…600V, 3∅ 1…22 A**	**200…600V 1…97 A**	**200…600V 1…1000 A**	**200…600V 1…1000 A**
Soft Start	S	S	S	S	S
Kickstart				S	S
Current Limit			S	S	S
Dual Ramp Start					S
Full Voltage			S	S	S
Energy Saver			S	S	S
Soft Stop			O	O	O
Pump Control				O	O
Preset Slow Speed				O	O
SMB™ Smart Motor Braking				O	O
Accu-Stop™				O	O
Slow Speed with Braking				O	O
Single-phase Operation	S				
Motor Protection					S
Communication					S
Metering					S
Keypad Programming/LCD Display					S

S = Standard Feature
O = Optional Feature

Description

The Allen-Bradley SMC Smart Motor Controller product line offers a broad range of products for starting and stopping standard three-phase squirrel-cage induction motors.

For prices, consult your local Allen-Bradley Sales Office or the Master Price List.

Approvals:

CE Marked (Open Type)
Per Low Voltage Directive
73/23/EEC, 93/68/EEC

CSA Certified (Open Type)
(File No. LR1234)

UL Listed (Open Type) (File No. E96956)

Your order must include:

- Cat. No. of the controller selected.
- Modifications.
- If required, Cat. No. of any options or accessories.

STC™ Starting Torque Controller

- 11…22 A Ratings
- Reduces Starting Torque Surge
- Feed-Through Wiring
- Single- and Three-Phase

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SMC-2™ Smart Motor Controller

- 5…97 A Ratings
- 3 Starting Modes
- Optional Soft Stop Feature

Page 20

SMC Plus™ Smart Motor Controller

- 24…1000 A Ratings
- 3 Starting Modes
- 6 Optional Features

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SMC Dialog Plus™ Smart Motor Controller

- 24…1000 A Ratings
- 4 Starting Modes
- 6 Options
- Motor Protection
- Communication
- Keypad Programming

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Bulletin 154

- **STC Starting Torque Controller**
  - **11…22 A Ratings**
  - **Reduces Starting Torque Surges**

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Description

The STC Starting Torque Controller is a compact, simple to use, solid-state controller designed for low horsepower squirrel-cage induction motors. It is intended to relieve the starting torque surge encountered in typical across-the-line starting. This will allow for smoother starts and decreased equipment downtime due to shock and vibration problems.

The STC Controller is available in three current rated sizes: 11 A, 16 A and 22 A. It is offered in four voltage ranges: 100…120V, 200…240V, 380…480V, and 500…600V, 50/60 Hz.

The STC Controller is intended to operate in conjunction with an electromechanical motor starter.

For prices, consult your local Allen-Bradley Sales Office or the Master Price List.

Approvals:

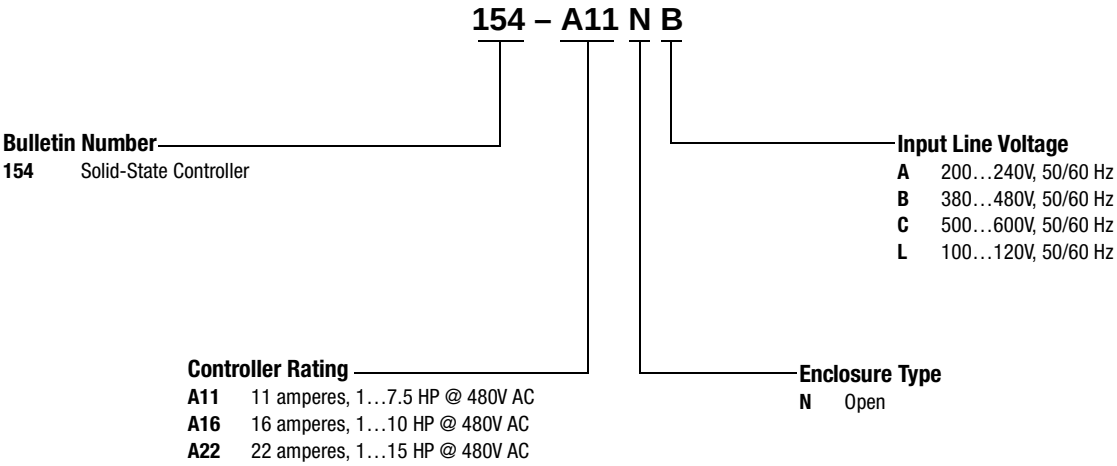
CE Marked (Open Type) Per Low Voltage Directive 73/23/EEC, 93/68/EEC

CSA Certified (Open Type) (File No. LR 1234)

UL Listed (Open Type) (File No. E96956)

Your order must include:

- Cat. No. of the controller selected.

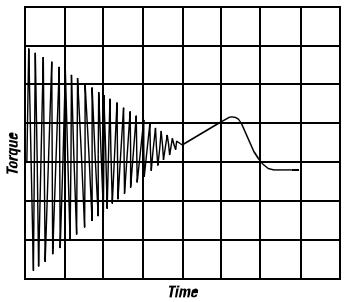

154 – A11 N B
Bulletin Number
154 Solid-State Controller
Input Line Voltage
A 200…240V, 50/60 Hz
B 380…480V, 50/60 Hz
C 500…600V, 50/60 Hz
L 100…120V, 50/60 Hz
Controller Rating
A11 11 amperes, 1…7.5 HP @ 480V AC
A16 16 amperes, 1…10 HP @ 480V AC
A22 22 amperes, 1…15 HP @ 480V AC
Enclosure Type
N Open

Single-Phase Selection — Open Type

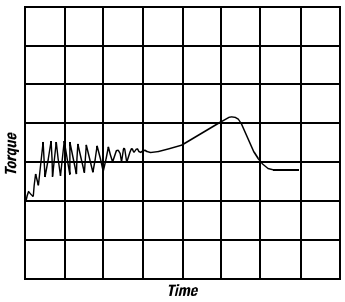
Current Rating (A)	kW	HP	Cat. No.
110…120V AC, 50/60 Hz			
11	0.75	0.5	154-A11NL
16	1.1	1	154-A16NL
22	1.5	1.5	154-A22NL
200…240V AC, 50/60 Hz			
11	1.5	1.5	154-A11NA
16	2.2	2	154-A16NA
22	3	3	154-A22NA

Three-Phase Selection — Open Type

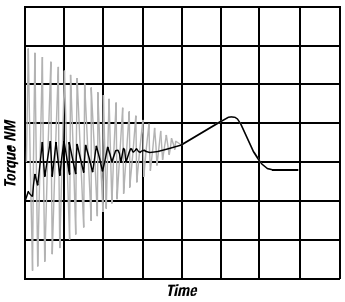
Current Rating (A)	kW	HP	Cat. No.
200V AC, 60 Hz			
11	—	3	154-A11NA
16	—	3	154-A16NA
22	—	5	154-A22NA
230V AC, 50/60 Hz			
11	2.2	3	154-A11NA
16	4	5	154-A16NA
22	5.5	7.5	154-A22NA
380…480V AC, 50/60 Hz			
11	4	7.5	154-A11NB
16	7.5	10	154-A16NB
22	11	15	154-A22NB
500…575V AC, 50/60 Hz			
11	5.5	10	154-A11NC
16	7.5	10	154-A16NC
22	11	20	154-A22NC



Typical Across-the-Line Response
The figure above shows how starting torque surge during motor starting can cause damage to the motor and to driver equipment.



STC™ Response
The figure above shows how the STC controller is effective in decreasing the magnitude of starting torque surges.



Comparison of Across-the-Line Response versus STC™ Response
The figure above shows the comparison of the STC controller versus a typical across-the-line start.

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Approximate Dimensions — Page 19

Smart Motor Controllers — STC™ Starting Torque Controller

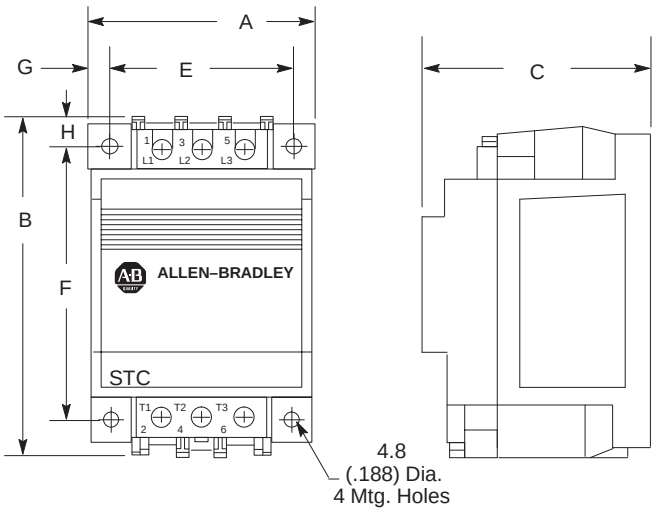
Specifications

Electrical Ratings			Cat. No. 154-A11…	154-A16…	154-A22…
Rated Operating Current		(A)	11	16	22
Maximum Heat Dissipation		(Watts)	15	18	24
Power Section			Back-to-back SCR(s)		
Rated Operational Voltage (+10%, –15%)			100…120, 200…240V AC, 50/60 Hz, 1-phase, or 200…240, 380…480, 500…600V AC, 50/60 Hz, 3-phase		
Cable Size		Power Terminals	Wire Size: 1.5…6 mm^2 (#14…#12 AWG)		
Thermal Capacity			IEC 34 (S1), NEMA MG 1		
Electrical Design Specifications/Test Requirements					
Repetitive Peak Inverse Voltage Rating			1400V up to 480V Line 1600V up to 600V Line		
Selectable Start Times Selectable Initial Torque Settings			0.1…4.5 seconds 10…80% Locked Rotor Torque		
Noise & RF Immunity			Surge Transient Peak 3400V. Showering Arc 1500V		
DV/DT Protection			RC Snubber Network		
Mechanical Design Specifications/Test Requirements					
Vibration Shock			2.5 G for 60 minutes 30 G for 11 mSecs		
Construction			Power Poles: Control: Metal Parts:	High temperature thermoplastic moldings Thermoplastic moldings Anodized aluminum, plated brass or copper	
Terminals			Power Terminals: Power Terminals Markings:	6.0 mm hole with clamping plate CENELEC EN50 012, NEMA	
Functional Design Specification					
Standard Features	Set-up	Wiring Configuring	The STC controller is wired in series with a motor starter. The STC controller is configured with rotary digital switches.		
	Starting		From an initial torque setting, the STC controller increases the voltage gradually during the acceleration period until full voltage is achieved.		
	Running	Protection	Motor overload protection is provided by the overload relay as part of the motor starter.		
Environmental					
Temperature		Operating Storage	0°C…+50°C (32°F…+122°F) –40°C…+85°C (–40°F…+185°F)		
Altitude			2000 meters (6560 feet)		
Humidity			5…95% RH (non-condensing)		

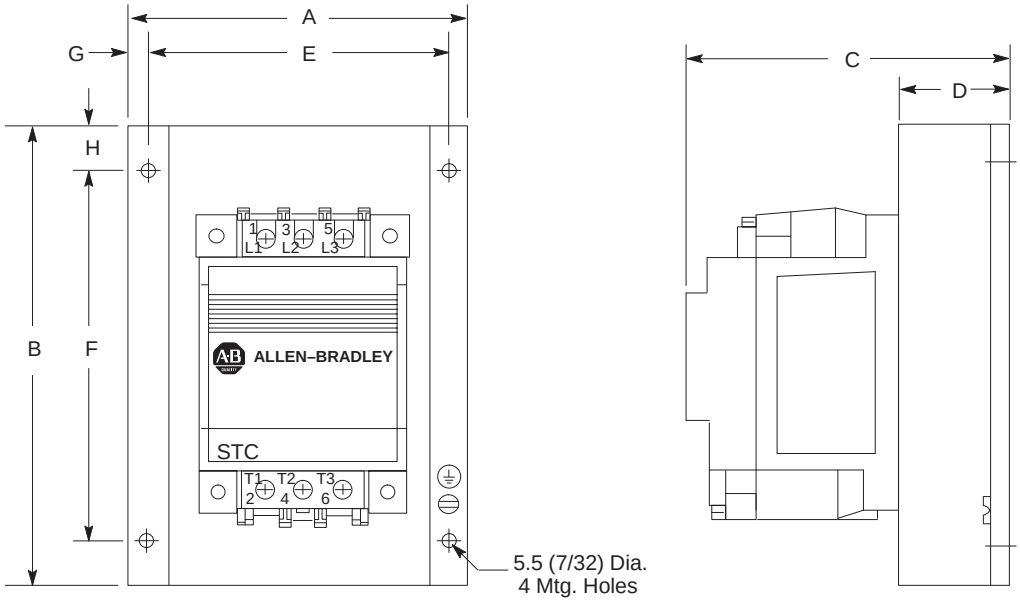
Product Selection — Page 17

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

11 A Controller



16…22 A Controller



Open Type

Controller	Unit	A Width	B Height	C Depth	D	E	F	G	H	Approx. Ship. Wt.
11 A	Millimeter (Inch)	75 (2-61/64)	111 (4-23/64)	77 (3-1/32)	—	60 (2-23/64)	90 (3-35/64)	7.5 (19/64)	10 (3-35/64)	2 kg (4.5 lbs)
16 A	Millimeter (Inch)	122 (4-13/16)	127 (5)	101 (3-31/32)	24 (15/16)	110 (4-21/64)	90 (3-35/64)	6 (1/4)	18.5 (3/4)	2.25 kg (5 lbs)
22 A	Millimeter (Inch)	154 (6-1/16)	180 (7-3/32)	127 (5)	50 (1–31/32)	140 (5-33/64)	140 (5-33/64)	7 (9/32)	20 (25/32)	3.15 kg (7 lbs)

Product Selection — Page 17

Bulletin 150

- **SMC-2 Smart Motor Controller**
  - **5…97 A Ratings**
  - **3 Start Modes**
  - **Optional Soft Stop (Requires Interface Module)**

TABLE OF CONTENTS

Description

The SMC-2 Controller is a compact, multi-functional, versatile solid-state controller used in starting standard three-phase squirrel-cage induction motors. Three standard modes of operation are available within a single controller:

- Soft Start
- Current Limit Start
- Full Voltage Start

The SMC-2 Controller is available in eight sizes: 5, 9,16, 24, 35, 54, 68 and 97 A. It is offered in three voltage ranges: 200…240V, 380…480V, and 500…600V, 50/60 Hz.

The SMC-2 Controller can be used in two configurations: as a series controller and as a motor controller with an interface option.

For prices, consult your local Allen-Bradley Sales Office or the Master Price List.

Approvals:

CE Marked (Open Type) Per Low Voltage Directive 73/23/EEC, 93/68/EEC

CSA Certified (Open Type) (File No. LR1234)

UL Listed (Open Type) (File No. E96956)

Your order must include:

- Cat. No. of the controller selected.
- If required, suffix code and description of any modifications.
- If required, Cat. No. of any options or accessories.

Series Controller

The SMC-2 Controller is designed to operate in series with an electromechanical motor starter. The series mode has the following features:

- Eliminates the need for additional control wiring, simplifying initial installation.
- Works in unison with an existing electromechanical motor starter for easy retrofits.
- Allows easy set-up with digital adjustments, eliminating the guesswork of setting analog potentiometers.

Controller with Interface Option

The SMC-2 Controller with the interface option is designed so it can be operated by an external device. The interface option enhances the capabilities of the controller. It can be field or factory installed. For devices rated 5…16 A, this is a plug-in module. For devices rated 24…97 A, there is a PC board that replaces the existing board. The SMC-2 Controller with the interface option offers the following features:

- Provides ON/OFF control directly to the controller through an external pilot device. In many applications the interface option may eliminate the need for an additional contactor if electrical isolation or soft stop is not required. This reduces panel space requirements.
- Provides a selectable auxiliary contact, which operates as either an instantaneous or up-to-speed contact, making it available for a wide variety of control schemes.
- Provides a Soft Stop feature that extends stopping time to minimize load shifting or spillage during stopping.

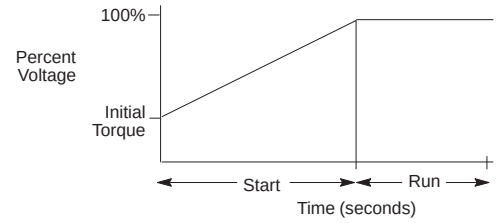
Energy Saver

This built-in feature of the SMC-2 Controller is used to save energy on applications where the motor is lightly loaded or unloaded for long periods of time.

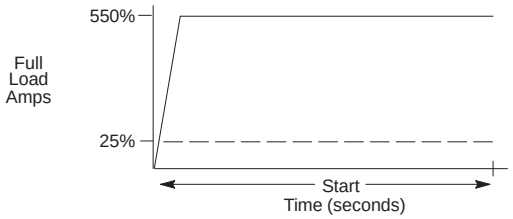
Protective Module

In applications where the SMC-2 Controller is exposed to high or abnormal line transients, an optional protective module is available and can be mounted on both the line and load side of the unit. The protective module contains MOVs (Metal Oxide Varistors) that protect the SCR from line surges and snubber networks to shunt noise energy away.

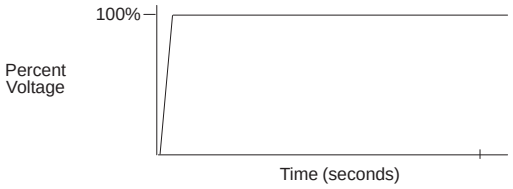
Modes of Operation



Soft Start
This method has the most general application. The motor is raised from an initial torque value to full voltage. This initial torque is adjustable between 0…70% of locked rotor torque. The motor voltage is gradually increased during the acceleration ramp time, which can be adjusted from 2…30 seconds.

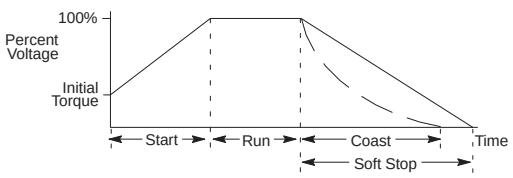


Current Limit Starting
This starting mode is used when it is necessary to limit the maximum starting current. It can be adjusted for 25…550% of full load amps. If the motor is not up to speed after the selected time elapses, the controller will transition to full voltage.



Full Voltage Starting
This mode is used for applications requiring across-the-line starting. The ramp time is set for less than 1/10 second as shown.

Options



Soft Stop
The Soft Stop feature is available with an optional interface module. This function can be used with applications that require an extended coast to rest. The voltage ramp down time can be set from 5…110 seconds. The motor will stop when the motor voltage drops to a point where the load torque is greater than the motor torque.

Open and Non-Combination

150 – A05 N B – A9 – 8L – NA – 7

Bulletin Number

150 Solid-State Controller
150R Solid-State Controller with Reversing Contactor (Non-Combination Only)

Controller Ratings

Cat. No.	Amps	Max HP				Max kW			
		200	230	460	575	220	380	415	500
A05	5	1	1	3	3	1.1	2.2	2.2	3
A09	9	2	2	5	7.5	2.2	4	4	5.5
A16	16	3	5	10	10	4	7.5	7.5	7.5
A24	24	5	7.5	15	20	5.5	11	11	15
A35	35	10	10	25	30	10	18.5	22	22
A54	54	15	20	40	50	15	22	30	37
A68	68	20	25	50	60	18.5	33	37	45
A97	97	30	30	75	75	25	45	55	63

Enclosure Type

N Open
F NEMA Type 4 (IP65)
J NEMA
H NEMA Type 3R
S NEMA Type 4X (Stainless Steel)

Input Line Voltage

A 200…240 volts (+10%, -15%), 50 and 60 Hz, 3-phase
B 380…480 volts (+10%, -15%), 50 and 60 Hz, 3-phase
C 500…600 volts (+10%, -15%), 50 and 60 Hz, 3-phase

OPTIONS/ACCESSORIES
Overload Selection ❶ ❷

Cat. No.	Current Rating	Cat. No.	Current Rating	Cat. No.	Current Rating
C1	0.32…1.0	**F1**	3.7…12	**J2**	14…45
D1	1.0…2.9	**H1**	12…32	**K3**	23…75
E1	1.6…5.0	**H2**	12…38	**L4**	66…110

Protective Modules ❸

Line Side	240V AC	**8L2**	**Both Line & Load**	240V	**8B2** ❹
	480V AC	**8L4**		480V	**8B4** ❹
	600V AC	**8L6**		600V	**8B6** ❹

Interface Option ❺

NA 200…240V (+10%, -15%), 50 and 60 Hz, single-phase
ND 100…120V (+10%, -15%), 50 and 60 Hz, single-phase

External Reset ❻

7 For NEMA Type 4 (IP65) or NEMA Type 12 (IP64)

❶ IEC overload relays are rated for Class 10 operation.
❷ Overload option for 5…16 A only (open type) and non-combination or combination unit (5…97 A units).
❸ Protective modules factory installed on 5…54 A units only. 68 A and 97 A are field modifications only.
❹ When an IEC overload relay is selected, protective modules are limited to line side only. (For 5…16 A rated controllers only.)
❺ Interface option provides selectable auxiliary contact and Soft Stop feature.
❻ External overload reset available for 5…97 A rated controllers ordered as a non-combination or combination unit with an overload relay.

Combination

152C – WO5 J BD – A90 – ND – 8L4

Bulletin Number

152C Combination Solid-State Reduced Voltage Controller with Fusible Disconnect and Isolation Contactor
152X Combination Solid-State Reduced Voltage Controller with Fusible Disconnect, 120V Interface Module and Control Circuit Transformer, without Isolation Contactor
152R Combination Solid-State Reduced Voltage Controller with Fusible Disconnect and Reversing Contactor
152XR Combination Solid-State Reduced Voltage Controller with Fusible Disconnect, 120V Interface Module and Control Circuit Transformer with Reversing Contactor
153C Combination Solid-State Reduced Voltage Controller Breaker Disconnect and Isolation Contactor
153X Combination Solid-State Reduced Voltage Controller with Circuit Breaker Disconnect, 120V Interface Module and Control Circuit Transfomer, without Isolation Contactor
153R Combination Solid-State Reduced Voltage Controller with Circuit Breaker Disconnect and Reversing Contactor
153XR Combination Solid-State Reduced Voltage Controller with Circuit Breaker Disconnect, 120V Interface Module and Control Circuit Transformer, with Reversing Contactor

Interface Option ❸

NA 200…240V (+10%, -15%), 50 and 60 Hz, single-phase
ND 100…120V (+10%, -15%), 50 and 60 Hz, single-phase

Controller Ratings

Cat. No.	Amps	Max HP				Max kW			
		200	230	460	575	220	380	415	500
W05	5	1	1	3	3	1.1	2.2	2.2	3
W09	9	2	2	5	7.5	2.2	4	4	5.5
W16	16	3	5	10	10	4	7.5	7.5	7.5
W24	24	5	7.5	15	20	5.5	11	11	15
W35	35	10	10	25	30	10	18.5	22	22
W54	54	15	20	40	50	15	22	30	37
W68	68	20	25	50	60	18.5	33	37	45
W97	97	30	30	75	75	25	45	55	63

Enclosure Type

F NEMA Type 4 (IP65)
H NEMA Type 3R
J NEMA Type 12 (IP64)
S NEMA Type 4X (Stainless Steel)

Input Line Voltage

AC Line Voltage	Hertz	Common	Control Wiring Method Separate Control	
			120V/60 Hz Secondary	110V/50 Hz Secondary
200	50	H	—	HS
208	60	H	HD	—
240	60	A	AD	—
400	50	I	—	NS
480	60	B	BD	—
500	50	M	—	MS
600	60	C	CD	—

Overload Selection ❶

OPTIONS/ACCESSORIES

Protective Modules ❷

Line Side	240V	8L2	Both Line & Load	240V	8B2
	480V	8L4		480V	8B4
	600V	8L6		600V	8B6

❶ IEC overload relays are rated for Class 10 operation for 5…97 A rated controllers only. See previous page for IEC overload selection. For 24…97 A rated controllers, NEMA overloads are furnished as standard.

❷ When an IEC overload relay is selected, protective modules are limited to line side only. (For 5…16 A rated controllers only.)

❸ Requires control power source.

Open Type

Open type is a stand-alone SMC-2 Controller. Options which can be added to open type 5…16 A controllers are an interface module, solid-state type overload relay and protective module(s).

Current Rating (A)	kW	HP	Cat. No. ❶
200V AC, 50/60 Hz			
5	—	1/3…1	150-A05NA
9	—	1/3…2	150-A09NA
16	—	1/3…3	150-A16NA
24	—	1…5	150-A24NA
35	—	1…10	150-A35NA
54	—	1…15	150-A54NA
68	—	1…20	150-A68NA
97	—	1…30	150-A97NA
230V AC, 50/60 Hz			
5	1.1	1/3…1	150-A05NA
9	2.2	1/3…2	150-A09NA
16	4	1/3…5	150-A16NA
24	5.5	1…7-1/2	150-A24NA
35	7.5	1…10	150-A35NA
54	15	1…20	150-A54NA
68	18.5	1…25	150-A68NA
97	25	1…30	150-A97NA
400…480V AC, 50/60 Hz			
5	2.2	1/3…3	150-A05NB
9	4	1/3…5	150-A09NB
16	7.5	1/3…10	150-A16NB
24	11	1…15	150-A24NB
35	22	1…25	150-A35NB
54	30	1…40	150-A54NB
68	37	1…50	150-A68NB
97	55	1…75	150-A97NB
500…575V AC, 50/60 Hz			
5	3	1/3…3	150-A05NC
9	5.5	1/3…7-1/2	150-A09NC
16	7.5	1/3…10	150-A16NC
24	15	1…20	150-A24NC
35	22	1…30	150-A35NC
54	30	1…50	150-A54NC
68	45	1…60	150-A68NC
97	63	1…75	150-A97NC

❶ For factory-installed options, add the appropriate suffix from pages 30…31.

Accessories — Page 30
Options — Page 31
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Approximate Dimensions — Page 37

Non-Combination Controllers

Non-combination is the SMC-2 Controller in an IP65 (Type 4) or IP54 (Type 12) enclosure. It is available with the same options as the Open Type and is also available with an external reset for overloads. See Accessories and Options on pages 30 and 31.

Current Rating (A)	kW	HP	IP65 — NEMA Type 4 Enclosure			IP54 — NEMA Type 12 Enclosure	
			Price Adder Code	Dimension Code ❶	Cat. No. ❷	Dimension Code ❶	Cat. No. ❷
200V AC, 50/60 Hz							
5	—	1	a	S	150-A05FA	S	150-A05JA
9	—	2	b	S	150-A09FA	S	150-A09JA
16	—	3	c	T	150-A16FA	T	150-A16JA
24	—	5	d	U	150-A24FA	U	150-A24JA
35	—	10	e	V	150-A35FA	V	150-A35JA
54	—	15	f	W	150-A54FA	W	150-A54JA
68	—	20	g	X	150-A68FA	X	150-A68JA
97	—	30	h	X	150-A97FA❸	X	150-A97JA❸
230V AC, 50/60 Hz							
5	1.1	1	a	S	150-A05FA	S	150-A05JA
9	2.2	2	b	S	150-A09FA	S	150-A09JA
16	4	5	c	T	150-A16FA	T	150-A16JA
24	5.5	7.5	d	U	150-A24FA	U	150-A24JA
35	7.5	10	e	V	150-A35FA	V	150-A35JA
54	15	20	f	W	150-A54FA	W	150-A54JA
68	18.5	25	g	X	150-A68FA	X	150-A68JA
97	25	30	h	X	150-A97FA❸	X	150-A97JA❸
400…480V AC, 50/60 Hz							
5	2.2	3	a	S	150-A05FB	S	150-A05JB
9	4	5	b	S	150-A09FB	S	150-A09JB
16	7.5	10	c	T	150-A16FB	T	150-A16JB
24	11	15	d	U	150-A24FB	U	150-A24JB
35	22	25	e	V	150-A35FB	V	150-A35JB
54	30	40	f	W	150-A54FB	W	150-A54JB
68	37	50	g	X	150-A68FB	X	150-A68JB
97	55	75	h	X	150-A97FB❸	X	150-A97JB❸
500…575V AC, 50/60 Hz							
5	3	3	a	S	150-A05FC	S	150-A05JC
9	5.5	7.5	b	S	150-A09FC	S	150-A09JC
16	7.5	10	c	T	150-A16FC	T	150-A16JC
24	15	20	d	U	150-A24FC	U	150-A24JC
35	22	30	e	V	150-A35FC	V	150-A35JC
54	30	50	f	W	150-A54FC	W	150-A54JC
68	45	60	g	X	150-A68FC	X	150-A68JC
97	63	75	h	X	150-A97FC❸	X	150-A97JC❸

❶ Optional accessories may increase panel dimensions.
❷ For factory-installed options, add the appropriate suffix from page 30…31.
❸ 97 A (Type 4 and Type 12) controllers include bypass contactors.

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Approximate Dimensions — Page 37

IP65 (Type 4) Combination Controllers ❶ ❺

Combination controllers can be ordered with or without the isolation contactor. A combination controller with the isolation contactor consists of a rod-operated fusible disconnect ❷❸, the SMC-2 Controller and a 3-pole thermal overload relay. For 5…97 A controllers, the current range of the solid-state overload relay must be selected from the chart on page 31. Otherwise, a eutectic alloy type overload relay (less elements) will be provided in place of the solid-state overload. Eutectic alloy overloads are standard on 24…97 A controllers. A combination controller without the isolation contactor consists of a rod operated fusible disconnect, the SMC-2 Controller with an interface option, a control circuit transformer and a 3-pole thermal overload relay. Again, for 5…97 A controllers, the current range must be selected for a solid-state overload or a eutectic alloy type overload will be provided.

Current Rating (A)	kW	HP	Price Adder Code	Dimension Code	With Isolation Contactor	Without Isolation Contactor
					Cat. No.	Cat. No.
220V AC, 50 Hz						
5	1.1	—	a	S	152C-W05FA❹	152X-W05FA-ND-6P
9	2.2	—	b	T	152C-W09FA❹	152X-W09FA-ND-6P
16	4	—	c	T	152C-W16FA❹	152X-W16FA-ND-6P
24	5.5	—	d	U	152C-W24FA❹	152X-W24FA-ND-6P
35	7.5	—	e	U	152C-W35FA❹	152X-W35FA-ND-6P
54	15	—	f	V	152C-W54FA❹	152X-W54FA-ND-6P
68	18.5	—	g	W	152C-W68FA❹	152X-W68FA-ND-6P
97	25	—	h	Y	152C-W97FA❹❻	152X-W97FA-ND-6P❻
400V AC, 50 Hz						
5	2.2	—	a	S	152C-W05FI❹	152X-W05FI-ND-6P
9	4	—	b	T	152C-W09FI❹	152X-W09FI-ND-6P
16	7.5	—	c	T	152C-W16FI❹	152X-W16FI-ND-6P
24	11	—	d	U	152C-W24FI❹	152X-W24FI-ND-6P
35	22	—	e	U	152C-W35FI❹	152X-W35FI-ND-6P
54	30	—	f	V	152C-W54FI❹	152X-W54FI-ND-6P
68	37	—	g	W	152C-W68FI❹	152X-W68FI-ND-6P
97	55	—	h	Y	152C-W97FI❹❻	152X-W97FI-ND-6P❻
500V AC, 50 Hz						
5	3	—	a	S	152C-W05FM❹	152X-W05FM-ND-6P
9	5.5	—	b	T	152C-W09FM❹	152X-W09FM-ND-6P
16	7.5	—	c	T	152C-W16FM❹	152X-W16FM-ND-6P
24	15	—	d	U	152C-W24FM❹	152X-W24FM-ND-6P
35	22	—	e	U	152C-W35FM❹	152X-W35FM-ND-6P
54	30	—	f	V	152C-W54FM❹	152X-W54FM-ND-6P
68	45	—	g	W	152C-W68FM❹	152X-W68FM-ND-6P
97	63	—	h	Y	152C-W97FM❹❻	152X-W97FM-ND-6P❻

❶ For combination controllers with circuit breakers, refer to Catalog Number Identification on page 23.
❷ Refer to page 36 for fuse clip sizing and type information.
❸ Fuses are not included.
❹ For 120V, 60 Hz separate control, add the letter "**D**" after the 9th character. For 110V, 50 Hz separate control, add the letter "**S**" after the 9th character. Example: **Cat. No. 152C-W05FH** becomes **Cat. No. 152C-W05FHD** for 120V, 60 Hz separate control.
❺ For 5…97 A controllers, a solid-state overload current range must be selected from the chart on page 31 and the suffix added to the Cat. No. Otherwise, an eutectic alloy overload will be provided.
❻ 97 A Type 4 SMC-2 Smart Motor Controllers include Bulletin 100 bypass contactors wired for 120V AC 50/60 Hz control.

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IP65 (Type 4) Combination Controllers ❶ ❸, Continued

Current Rating (A)	kW	HP	Price Adder Code	Dimension Code	With Isolation Contactor	Without Isolation Contactor
					Cat. No.	Cat. No.
220V AC, 60 Hz						
5	—	1/3…1	a	S	152C-W05FH❷	152X-W05FH-ND-6P
9	—	1/3…2	b	T	152C-W09FH❷	152X-W09FH-ND-6P
16	—	1/3…3	c	T	152C-W16FH❷	152X-W16FH-ND-6P
24	—	1…5	d	U	152C-W24FH❷	152X-W24FH-ND-6P
35	—	1…10	e	U	152C-W35FH❷	152X-W35FH-ND-6P
54	—	1…15	f	V	152C-W54FH❷	152X-W54FH-ND-6P
68	—	1…20	g	W	152C-W68FH❷	152X-W68FH-ND-6P
97	—	1…30	h	Y	152C-W97FH❷❹	152X-W97FH-ND-6P❹
230V AC, 60 Hz						
5	—	1/3…1	a	S	152C-W05FA❷	152X-W05FA-ND-6P
9	—	1/3…2	b	T	152C-W09FA❷	152X-W09FA-ND-6P
16	—	1/3…5	c	T	152C-W16FA❷	152X-W16FA-ND-6P
24	—	1…7-1/2	d	U	152C-W24FA❷	152X-W24FA-ND-6P
35	—	1…10	e	U	152C-W35FA❷	152X-W35FA-ND-6P
54	—	1…20	f	V	152C-W54FA❷	152X-W54FA-ND-6P
68	—	1…25	g	W	152C-W68FA❷	152X-W68FA-ND-6P
97	—	1…30	h	Y	152C-W97FA❷❹	152X-W97FA-ND-6P❹
460V AC, 60 Hz						
5	—	1/3…3	a	S	152C-W05FB❷	152X-W05FB-ND-6P
9	—	1/3…5	b	T	152C-W09FB❷	152X-W09FB-ND-6P
16	—	1/3…10	c	T	152C-W16FB❷	152X-W16FB-ND-6P
24	—	1…15	d	U	152C-W24FB❷	152X-W24FB-ND-6P
35	—	1…25	e	U	152C-W35FB❷	152X-W35FB-ND-6P
54	—	1…40	f	V	152C-W54FB❷	152X-W54FB-ND-6P
68	—	1…50	g	W	152C-W68FB❷	152X-W68FB-ND-6P
97	—	1…75	h	Y	152C-W97FB❷❹	152X-W97FB-ND-6P❹
575V AC, 60 Hz						
5	—	1/3…3	a	S	152C-W05FC❷	152X-W05FC-ND-6P
9	—	1/3…7-1/2	b	T	152C-W09FC❷	152X-W09FC-ND-6P
16	—	1/3…10	c	T	152C-W16FC❷	152X-W16FC-ND-6P
24	—	1…20	d	U	152C-W24FC❷	152X-W24FC-ND-6P
35	—	1…30	e	U	152C-W35FC❷	152X-W35FC-ND-6P
54	—	1…50	f	V	152C-W54FC❷	152X-W54FC-ND-6P
68	—	1…60	g	W	152C-W68FC❷	152X-W68FC-ND-6P
97	—	1…75	h	Y	152C-W97FC❷❹	152X-W97FC-ND-6P❹

❶ For combination controllers with circuit breakers, refer to Catalog Number Identification on page 23.

❷ For 120V, 60 Hz separate control, add the letter "**D**" after the 9th character. For 110V, 50 Hz separate control, add the letter "**S**" after the 9th character. Example: **Cat. No. 152C-W05FA** becomes **Cat. No. 152C-W05FAD** for 120V, 60 Hz separate control.

❸ For 5…97 A controllers, a solid-state overload current range must be selected from the chart on page 31 and the suffix added to the Cat. No. Otherwise, an eutectic overload will be provided.

❹ 97 A Type 4 SMC-2 Smart Motor Controllers include Bulletin 100 bypass contactors wired for 120V AC 50/60 Hz control.

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IP54 (Type 12) Combination Controllers ❶ ❺

Combination controllers can be ordered with or without the isolation contactor. A combination controller with the isolation contactor consists of a rod operated fusible disconnect ❷❸, the SMC-2 Controller and a 3-pole thermal overload relay. For 5…97 A controllers, the current range of the solid-state overload relay must be selected from the chart on page 31. Otherwise, a eutectic alloy type overload relay (less elements) will be provided in place of the solid-state overload. Eutectic alloy overloads are standard on 24…97 A controllers. A combination controller without the isolation contactor consists of a rod-operated fusible disconnect, the SMC-2 Controller with an interface option, a control circuit transformer and a 3-pole thermal overload relay. Again, for 5…97 A controllers, the current range must be selected for a solid-state overload or a eutectic alloy type overload will be provided.

Current Rating (A)	kW	HP	Price Adder Code	Dimension Code	With Isolation Contactor	Without Isolation Contactor
					Cat. No.	Cat. No.
220V AC, 50 Hz						
5	1.1	—	a	S	152C-W05JA❹	152X-W05JA-ND-6P
9	2.2	—	b	T	152C-W09JA❹	152X-W09JA-ND-6P
16	4	—	c	T	152C-W16JA❹	152X-W16JA-ND-6P
24	5.5	—	d	U	152C-W24JA❹	152X-W24JA-ND-6P
35	7.5	—	e	U	152C-W35JA❹	152X-W35JA-ND-6P
54	15	—	f	V	152C-W54JA❹	152X-W54JA-ND-6P
68	18.5	—	g	W	152C-W68JA❹	152X-W68JA-ND-6P
97	25	—	h	Y	152C-W97JA❹❻	152X-W97JA-ND-6P❻
400V AC, 50 Hz						
5	2.2	—	a	S	152C-W05JI❹	152X-W05JI-ND-6P
9	4	—	b	T	152C-W09JI❹	152X-W09JI-ND-6P
16	7.5	—	c	T	152C-W16JI❹	152X-W16JI-ND-6P
24	11	—	d	U	152C-W24JI❹	152X-W24JI-ND-6P
35	22	—	e	U	152C-W35JI❹	152X-W35JI-ND-6P
54	30	—	f	V	152C-W54JI❹	152X-W54JI-ND-6P
68	37	—	g	W	152C-W68JI❹	152X-W68JI-ND-6P
97	55	—	h	Y	152C-W97JI❹❻	152X-W97JI-ND-6P❻
500V AC, 50 Hz						
5	3	—	a	S	152C-W05JM❹	152X-W05JM-ND-6P
9	5.5	—	b	T	152C-W09JM❹	152X-W09JM-ND-6P
16	7.5	—	c	T	152C-W16JM❹	152X-W16JM-ND-6P
24	15	—	d	U	152C-W24JM❹	152X-W24JM-ND-6P
35	22	—	e	U	152C-W35JM❹	152X-W35JM-ND-6P
54	30	—	f	V	152C-W54JM❹	152X-W54JM-ND-6P
68	45	—	g	W	152C-W68JM❹	152X-W68JM-ND-6P
97	63	—	h	Y	152C-W97JM❹❻	152X-W97JM-ND-6P❻

❶ For combination controllers with circuit breakers, refer to Catalog Number Identification on page 23.
❷ Refer to page 36 for fuse clip sizing and type information.
❸ Fuses are not included.
❹ For 120V, 60 Hz separate control, add the letter "**D**" after the 9th character. For 110V, 50 Hz separate control, add the letter "**S**" after the 9th character. Example: **Cat. No. 152C-W05FH** becomes **Cat. No. 152C-W05FHD** for 120V, 60 Hz separate control.
❺ For 5…97 A controllers, a solid-state overload current range must be selected from the chart on page 31 and the suffix added to the Cat. No. Otherwise, an eutectic alloy overload will be provided.
❻ 97 A Type 12 SMC-2 Smart Motor Controllers include Bulletin 100 bypass contactors wired for 120V AC 50/60 Hz control.

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IP54 (Type 12) Combination Controllers ❶ ❸, Continued

Current Rating (A)	kW	HP	Price Adder Code	Dimension Code	With Isolation Contactor	Without Isolation Contactor
					Cat. No.	Cat. No.
200V AC, 60 Hz						
5	—	1/3…1	a	S	152C-W05JH❷	152X-W05JH-ND-6P
9	—	1/3…2	b	T	152C-W09JH❷	152X-W09JH-ND-6P
16	—	1/3…3	c	T	152C-W16JH❷	152X-W16JH-ND-6P
24	—	1…5	d	U	152C-W24JH❷	152X-W24JH-ND-6P
35	—	1…10	e	U	152C-W35JH❷	152X-W35JH-ND-6P
54	—	1…15	f	V	152C-W54JH❷	152X-W54JH-ND-6P
68	—	1…20	g	W	152C-W68JH❷	152X-W68JH-ND-6P
97	—	1…30	h	Y	152C-W97JH❷❹	152X-W97JH-ND-6P❹
230V AC, 60 Hz						
5	—	1/3…1	a	S	152C-W05JA❷	152X-W05JA-ND-6P
9	—	1/3…2	b	T	152C-W09JA❷	152X-W09JA-ND-6P
16	—	1/3…5	c	T	152C-W16JA❷	152X-W16JA-ND-6P
24	—	1…7-1/2	d	U	152C-W24JA❷	152X-W24JA-ND-6P
35	—	1…10	e	U	152C-W35JA❷	152X-W35JA-ND-6P
54	—	1…20	f	V	152C-W54JA❷	152X-W54JA-ND-6P
68	—	1…25	g	W	152C-W68JA❷	152X-W68JA-ND-6P
97	—	1…30	h	Y	152C-W97JA❷❹	152X-W97JA-ND-6P❹
460V AC, 60 Hz						
5	—	1/3…3	a	S	152C-W05JB❷	152X-W05JB-ND-6P
9	—	1/3…5	b	T	152C-W09JB❷	152X-W09JB-ND-6P
16	—	1/3…10	c	T	152C-W16JB❷	152X-W16JB-ND-6P
24	—	1…15	d	U	152C-W24JB❷	152X-W24JB-ND-6P
35	—	1…25	e	U	152C-W35JB❷	152X-W35JB-ND-6P
54	—	1…40	f	V	152C-W54JB❷	152X-W54JB-ND-6P
68	—	1…50	g	W	152C-W68JB❷	152X-W68JB-ND-6P
97	—	1…75	h	Y	152C-W97JB❷❹	152X-W97JB-ND-6P❹
575V AC, 60 Hz						
5	—	1/3…3	a	S	152C-W05JC❷	152X-W05JC-ND-6P
9	—	1/3…7-1/2	b	T	152C-W09JC❷	152X-W09JC-ND-6P
16	—	1/3…10	c	T	152C-W16JC❷	152X-W16JC-ND-6P
24	—	1…20	d	U	152C-W24JC❷	152X-W24JC-ND-6P
35	—	1…30	e	U	152C-W35JC❷	152X-W35JC-ND-6P
54	—	1…50	f	V	152C-W54JC❷	152X-W54JC-ND-6P
68	—	1…60	g	W	152C-W68JC❷	152X-W68JC-ND-6P
97	—	1…75	h	Y	152C-W97JC❷❹	152X-W97JC-ND-6P❹

❶ For combination controllers with circuit breakers, refer to catalog number identification on page 23.

❷ For 120V, 60 Hz separate control, add the letter "**D**" after the 9th character. For 110V, 50 Hz separate control, add the letter "**S**" after the 9th character. Example: **Cat. No. 152C-W05FH** becomes **Cat. No. 152C-W05FHD** for 120V, 60 Hz separate control.

❸ For 5…97 A controllers, a solid-state overload current range must be selected from the chart on page 31 and the suffix added to the Cat. No. Otherwise, an eutectic alloy overload will be provided.

❹ 97 A Type 4 SMC-2 Smart Motor Controllers include Bulletin 100 bypass contactors wired for 120V AC 50/60 Hz control.

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Protective Module for 5...16 A

Protective Module for 24...97 A

Protective Module

The Protective Module mounts on the line or load side of the SMC-2 Controller. When the solid-state overload is used on a 5…16 A device, **the Protective Module will mount only on the line side**.

SMC-2 Current Rating (A)	Field Modification Cat. No.	Factory Modification Suffix Number Line or Load Side ❶	Factory Modification Suffix Number Both Line and Load
200…240V AC, 50/60 Hz			
5…16	150-N82T	-8L2	-8B2
24…54	150-N82P	-8L2	-8B2
68	150-N82P6	-8L2	-8B2
97	150-N82P9	-8L2	-8B2
380…480V AC, 50/60 Hz			
5…16	150-N84T	-8L4	-8B4
24…54	150-N84P	-8L4	-8B4
68	150-N84P6	-8L4	-8B4
97	150-N84P9	-8L4	-8B4
500…600V AC, 50/60 Hz			
5…16	150-N86T	-8L6	-8B6
24…54	150-N86P	-8L6	-8B6
68	150-N86P6	-8L6	-8B6
97	150-N86P9	-8L6	-8B6

❶ One Protective Module is provided, which will mount on either the line side or the load side. If a solid-state overload relay is used, the Protective Module mounts on the line side only.

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Interface Option for Soft Stop ❶ and Auxiliary Contact

The interface option provides ON/OFF control through an external device, a selectable auxiliary contact and the soft stop feature. The interface option for the 24…97 A controller is a Printed Circuit Board (PCB) that replaces the existing board.

	SMC-2 Current Rating (A)	Control Voltage	Line Voltage	Field Installed Cat. No.	Factory Installed Suffix Code
 *Interface Module for 5…16 A*	5…16	120V (+10%, –15%)	200…600V	150-ND	-ND
		240V (+10%, –15%)	200…600V	150-NA	-NA
	24…97	120V (+10%, –15%)	240V 480V 600V	150-N2D❷ 150-N4D❷ 150-N6D❷	-ND
		240V (+10%, –15%)	240V 480V 600V	150-N2A❷ 150-N4A❷ 150-N6A❷	-NA

Overloads

Solid-State Overload Relay ❸

Current Rating (A)	Suffix	Current Rating (A)	Suffix
0.32…1.0	-C1	12…38	-H2
1.0…2.9	-D1	14…45	-J2
1.6…5.0	-E1	23…75	-K3
3.7…12	-F1	66…110	-L4
12…32	-H1		

Solid-State overload relays are rated for Class 10 operation only. If an overload is selected for the SMC-2 Controller, the current range must be indicated and the suffix added to the Cat. No. (for 5…16 A open type controller and 5…97 A non-combination and combination controllers).

NEMA Overload Relay

The eutectic alloy overload relay is not available on the 5…16 A non-combination or open type SMC-2 Controllers, found on pages 24 and 25. To add a eutectic alloy overload relay to a combination controller, consult Allen-Bradley Sales Office.

External Overload Relay Reset

Add the suffix "**-7**" to any enclosed SMC-2 Controller (NEMA Type 4 and 12 non-combination or combination controller) containing an overload relay.

❶ When Soft Stop is used without an isolation contactor, and the overload trips, the SMC-2 Controller will Soft Stop, not coast-to-stop.
❷ Field Kit consists of a new control board for unit.
❸ Overload relay option for 5…16 A open type and non-combination controllers 5…97 A. Overload provided as standard for combination units and at no additional cost.

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Option	Description	Price Adder Code	Cat. No. Modification
Push Buttons	Start-Stop Push Button	a...h	-1
	Start-Stop Push Button with H-O-A Selector Switch		-1F
	Soft Stop Push Button ❶		-1XA
	Emergency Stop		-1E
Selector Switch	Hand-Off-Auto Selector Switch	a...h	-3
	SMC-Off-Bypass Selector Switch		-3B
	Forward-Off-Reverse Selector Switch		-3R
Pilot Light	Transformer Pilot Light❷	a...h	-4_
	Push-to-Test Pilot Light ❷		-5_
Control Circuit Transformer	Control Circuit Transformer (fused primary and secondary)	a...h	-6P
	Additional 100 VA Control Circuit Transformer (fused primary and		-6PX
Protective Module ❸	5…16 A, 200…240V Line or Load Side Protective Module	a...c	-8L2
	24…54 A, 200…240V Line or Load Side Protective Module	d...f	
	68 A, 200…240V Line or Load Side Protective Module	g	
	97 A, 200…240V Line or Load Side Protective Module	h	
	5…16 A, 380…480V Line or Load Side Protective Module	a...c	-8L4
	24…54 A, 380…480V Line or Load Side Protective Module	d...f	
	68 A, 380…480V Line or Load Side Protective Module	g	
	97 A, 380…480V Line or Load Side Protective Module	h	
	5…16 A, 500…600V Line or Load Side Protective Module	a...c	-8L6
	24…54 A, 500…600V Line or Load Side Protective Module	d...f	
	68 A, 500…600V Line or Load Side Protective Module	g	
	97 A, 500…600V Line or Load Side Protective Module	h	
	5…16 A, 200…240V Both Line and Load Side Protective Module	a...c	-8B2
	24…54 A, 200…240V Both Line and Load Side Protective Module	d...f	
	68 A, 200…240V Both Line and Load Side Protective Module	g	
	97 A, 200…240V Both Line and Load Side Protective Module	h	
	5…16 A, 380…480V Both Line and Load Side Protective Module	a...c	-8B4
	24…54 A, 380…480V Both Line and Load Side Protective Module	d...f	
	68 A, 380…480V Both Line and Load Side Protective Module	g	
	97 A, 380…480V Both Line and Load Side Protective Module	h	
	5…16 A, 500…600V Both Line and Load Side Protective Module	a...c	-8B6
	24…54 A, 500…600V Both Line and Load Side Protective Module	d...f	
	68 A, 500…600V Both Line and Load Side Protective Module	g	
	97 A, 500…600V Both Line and Load Side Protective Module	h	
Solid State Overload Relay ❹	**Current Rating (A)**		
	0.32…1.0		-C1
	1.0…2.9		-D1
	1.6…5.0		-E1
	3.7…12		-F1
	12…32		-H1
	12…38		-H2
	14…45		-J2
	23…75		-K3
	66…110		-L4
Eutectic Alloy Overload Relay ❺❻	Three-pole thermal overload for 24 A units	d	-OL
	Three-pole thermal overload for 35 A units	e	
	Three-pole thermal overload for 54 A units	f	
	Three-pole thermal overload for 68 A units	g	
	Three-pole thermal overload for 97 A units	h	

❶ Requires the Interface option to provide the Soft Stop feature. For example: **Cat. No. 152X-W24JB-ND-6P-1-1XA**.
❷ Specify the pilot light lens color. Options: **A**mber, **B**lue, **C**lear, **G**reen, **R**ed, and **W**hite. For example: -4R for a red lens.
❸ When an IEC overload is selected, protective modules are limited to line side only. (For 5…16 A controllers only.)
❹ Solid-State Overload Relay will have a manual reset and Class 10 trip class.
❺ Three-pole thermal overload for Bulletin 150 enclosed controllers only. Overload standard on Bulletins 152 and 153. (For 24…97 A controllers only.)
❻ Three-pole thermal overload does not include heater elements.

Option	Description	Price Adder Code	Cat. No. Modification
External Overload ❶	External Overload Relay Reset	a...h	-7
Overload Auxiliary Contact	N.O. Overload Relay Auxiliary Contact	a...h	-9
	N.C. Overload Relay Auxiliary Contact		-9A
Reversing Contactor	Reversing Contactor	a…c d…h	❷
IEC Bypass Contactor ❸	IEC Bypass for 5 A unit	a	-IB
	IEC Bypass for 9 A unit	b	
	IEC Bypass for 16 A unit	c	
	IEC Bypass for 24 A unit	d	
	IEC Bypass for 35 A unit	e	
	IEC Bypass for 54 A unit	f	
	IEC Bypass for 68 A unit	g	
NEMA Bypass Contactor ❸	NEMA Bypass for 5 A unit	a	-NB
	NEMA Bypass for 9 A unit	b	
	NEMA Bypass for 16 A unit	c	
	NEMA Bypass for 24 A unit	d	
	NEMA Bypass for 35 A unit	e	
	NEMA Bypass for 54 A unit	f	
	NEMA Bypass for 68 A unit	g	
	NEMA Bypass for 97 A unit	h	
NEMA Isolation Contactor	NEMA Isolation for 5 A unit	a	-NI
	NEMA Isolation for 9 A unit	b	
	NEMA Isolation for 16 A unit	c	
	NEMA Isolation for 24 A unit	d	
	NEMA Isolation for 35 A unit	e	
	NEMA Isolation for 54 A unit	f	
	NEMA Isolation for 68 A unit	g	
	NEMA Isolation for 97 A unit	h	
Power Factor Correction Capacitors ❹	2 kVAR		-PFCC❺
	2.5 kVAR		
	3 kVAR		
	4 kVAR		
	5 kVAR		
	6 kVAR		
	7 kVAR		
	7.5 kVAR		
	8 kVAR		
	9 kVAR		
	10 kVAR		
	11 kVAR		
	12.5 kVAR		
	14 kVAR		
	15 kVAR		
	16 kVAR		
Power Factor Correction Contactor ❻	Power Factor Correction Capacitor Contactor	a…d	-PFCCC
		e…f	
		g	
		h	

❶ External Overload Relay Reset is available with Bulletins 152, 153, and enclosed Bulletin 150 devices with overload option only.

❷ To order a non-combination or combination enclosed controller with a reversing contactor, add an “R” to the bulletin prefix. Example: **Cat. No. 150R-A97JB**. See pages 22…23. Bulletin 104 contactor will be used. Enclosure dimensions are subject to change. Consult factory for dimensions.

❸ IEC Bypass Contactor is provided as standard for the 97 A unit with a non-combination or combination enclosure.

❹ Power Factor Correction Capacitor to include Power Capacitors with 3-phase Class J Time-Delay Fusing and appropriately-sized contactor.

❺ To order Power Factor Correction Capacitors indicate kVAR rating. For example: -**PFCC16kVAR**.

❻ Only the contactor will be provided.

Option	Description	Price Adder Code	Cat. No. Modification
SCR Fusing	Fast acting current limiting SCR fusing for 5 A unit	a	-SCR
	Fast acting current limiting SCR fusing for 9 A unit	b	
	Fast acting current limiting SCR fusing for 16 A unit	c	
	Fast acting current limiting SCR fusing for 24 A units	d	
	Fast acting current limiting SCR fusing for 35 A unit	e	
	Fast acting current limiting SCR fusing for 54 A unit	f	
	Fast acting current limiting SCR fusing for 68 A unit	g	
	Fast acting current limiting SCR fusing for 97 A unit	h	
Panel Board Type Ammeter	Single-phase panel board type ammeter for 5…24 A units	a…d	-85AA
	Single-phase panel board type ammeter for 35…97 A units	e...h	
	Panel board type ammeter with switch for monitoring all three phases	a...h	-86AA
Panel Board Type Voltmeter	Single-phase panel board type voltmeter	a...h	-85VA
	Panel board type voltmeter with switch for monitoring all three phases.		-86VA
Elapsed Time Meter	Elapsed time meter	a...h	-85T
Control Relays	On-Delay	a...h	-89FOD
	Off-Delay		-89FOFD
Unwired Control Relays ❶	Bulletin 700CF 4-pole relay – 2 N.O. and 2 N.C.	a...h	-89F22
	Bulletin 700CF 4-pole relay – 3 N.O. and 1 N.C.		-89F31
	Bulletin 700CF 4-pole relay – 4 N.O.		-89F40
Auxiliary Contacts	N.C. auxiliary contacts for 5…97 A units	a…h	-90
	N.O. auxiliary contacts for 5…97 A units		-91
	1 N.O.…1 N.C. auxiliary contacts for 5...97 A units		-901
Disconnect Auxiliary	N.O. disconnect auxiliary mounted on operating mechanism	a...h	-98
	N.C. disconnect auxiliary mounted on operating mechanism		-99
Circuit Breaker Disconnect Auxiliary	Internal N.O. circuit breaker auxiliary	a...h	-98X
	Internal N.C. circuit breaker auxiliary		-99X
Circuit Breaker Disconnect	Circuit Breaker Disconnect	a…c d…f g h	❷
High Interrupting Circuit Breaker	High Interrupting Circuit Breaker for 5...16 A units	a…c	-HICB
	High Interrupting Circuit Breaker for 24...54 A units	d…f	
	High Interrupting Circuit Breaker for 68A unit	g	
	High Interrupting Circuit Breaker for 97 A unit	h	
Shunt Trip	Circuit Breaker Shunt Trip for 5...16 A units	a…c	-754
	Circuit Breaker Shunt Trip for 24...54 A units	d…f	
	Circuit Breaker Shunt Trip for 68...97 A units	g…h	
Additional Load Circuit Breakers ❸	Additional load circuit breakers to be installed in panel. Customer is to stipulate size and quantity.		-ALCB
Line Voltage Monitor	Bulletin 813S Line Voltage Monitor	a…h	-813S
Smart Motor Manager	Bulletin 825 Smart Motor Manager and Bulletin 825 Converter Module	a...h	-SMM

❶ Instantaneous auxiliary contacts on Bulletin 700F Relays are non-convertible.
❷ To order a combination enclosed controller with a Circuit Breaker Disconnect, change the bulletin prefix from “152” to “153”. See page 23. Enclosure dimensions are subject to change. Consult factory for dimensions.
❸ Pricing to be determined upon request.

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Option	Description	Price Adder Code	Cat. No. Modification
IQ1000 Protective Relay	Cutler-Hammer IQ1000 Protective Relay	a…h	-IQ1000
Multilin 269 Plus	GE Multilin 269 Plus Protective Relay	a...h	-269Plus
Thermistor Protection Relay	Bulletin 817 Thermistor Protection Relay	a...h	-817
Transducer Output	4-20 mA output signal proportional to 1-100% motor FLC	a...h	-TO
Ground Fault Protection	Bulletin 1409 Arcing Ground Fault Relay and Sensor for applications up to 75 HP	a...h	-GFP
Motor Winding Heater ❶	Bulletin 1410 Motor Winding Heater for applications up to 75 HP	a...h	-MWH
Lightning Arrestor	Lightning Surge Protection	a...h	-LA
Strip Heater	Cabinet Strip Heater with Thermostat	a...h	-SH
Service Entrance Label	Service Entrance Label	a...h	-SEL
U.L. Label	U.L. Label	a...h	-UL
Unwired Terminal Blocks	Panel-mounted unwired terminal blocks 6 or 12 position	a...h	-TB6 -TB12
Panel Mount ❷	Components mounted on enclosure mounting plate only	a...h	-PM
Specified Panel Dimensions ❷	Customer is to stipulate panel dimensions	a...h	-SPD
Enclosure Color (custom paint) ❷	Customer is to stipulate paint color for enclosure	a...h	-EC
Enclosure Shock Mounts ❷	Ship Board – MIL-S-901D Shock and Vibration Mountings	a...h	-SM
Enclosure Type NEMA 3R ❸	Enclosure Type NEMA 3R Non-Combination	a…d e…g h	—
Enclosure Type NEMA 3R ❸	Enclosure Type NEMA 3R Combination	a…d e…g h	—
Enclosure Type NEMA 4X Stainless Steel ❹	Enclosure Type NEMA 4X Stainless Steel Non-Combination	a…b c d…f g…h	—
Enclosure Type NEMA 4X Stainless Steel ❹	Enclosure Type NEMA 4X Stainless Steel Combination	a…c d…f g…h	—
Air Conditioning ❷	AC Unit mounted on enclosure	a...h	-AC
Wiring Diagrams	AutoCad Drawing of panel wiring	a...h	-WD
Print Approval ❺	Customer Requested Print Approval Drawings	a...h	-PA

❶ Requires an isolation contactor on the output of the SMC.
❷ Pricing to be determined upon request.
❸ To order a non-combination or combination enclosed controller with a NEMA 3R enclosure, add an “H” to the enclosure type prefix. Example: **Cat. No. 150-A68HB**. See pages 22…23. Enclosure dimensions are subject to change. Consult factory for dimensions. Enclosure price adder is to be added to NEMA 12 non-combination or combination price.
❹ To order a non-combination or combination enclosed controller with a NEMA 4X stainless steel enclosure, add an “S” to the enclosure type prefix. Example: **Cat. No 152X-A16SB-ND**. See pages 22…23. Enclosure dimensions are subject to change. Consult factory for dimensions. Enclosure price adder is to be added to the NEMA 12 non-combination or combination price.
❺ Order to be released to manufacturing upon return of signed print approval drawings.

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Electrical Ratings		Cat. No. 150-A05…	150-A09…	150-A16…	150-A24…	150-A35…	150-A54…	150-A68…	150-A97…
Rated Operating Current (A)		5	9	16	24	35	54	68	97
Maximum Heat Dissipation (Watts)		32	45	70	80	120	170	215	285
Cable Size	Power Terminals	1.5…6 mm^2	1.5…6 mm^2	1.5…6 mm^2	10 mm^2	10 mm^2	10 mm^2	25 mm^2	50 mm^2
	Interface Option Terminals	#14…#12 AWG	#14…#12 AWG	#14…#12 AWG	#8 AWG	#8 AWG	#4 AWG	#2 AWG	#1/0 AWG
Rated Operational Voltage (+10%, –15%)		200…240, 380…480, 500…600V AC, 50/60 Hz, 3-phase							
Thermal Capacity		IEC 34 (S1), NEMA MG1							
Interface Option Voltage (+10%, –15%)		100/120V or 200/240V, 50/60 Hz, 1-phase							
	Power Requirements	15 VA Maximum							
	Heatsink Fan	—	—	—	—	—	—	—	45 VA
Auxiliary Contact Rating		NEMA C300				IEC AC-15			

Electrical Design Specifications/Test Requirements	
Repetitive Peak Inverse Voltage Rating	1200V up to 240V Line, 1400V up to 480V Line, 1600V up to 600V Line
Selectable Soft Start Times	2, 5, 10, 20, 25, & 30 seconds
Current Limit Times	15 & 30 seconds
Selectable Across-the-Line Starting	1/10 second
Soft Stop Times	5, 10, 15, 25, 35, 45, 55, 110 seconds
Noise & RF Immunity	Surge Transient Peak 3400V. Showering Arc 1500V
DV/DT Protection	RC Snubber Network
Transient Protection (Optional)	Metal Oxide Varistors: (80 joules)

Mechanical Design Specifications/Test Requirements		
Vibration		2.5 G for 60 minutes
Shock		30 G for 11 mSecs
Construction	Power Poles:	High temperature thermoplastic moldings
	Control:	Thermoplastic moldings
	Metal Parts:	Anodized aluminum, plated brass, or copper
Terminals	Power Terminals:	6.0 mm hole with clamping plate
	Control Terminals:	UNC 6-32 Screw with self-tilting clamp plate
	Power Terminal Markings:	CENELEC EN50 012, NEMA

Functional Design Specifications			
Standard Features	Set-up	Wiring	The SMC-2 Controller without options is wired in series with a motor starter.
		Adjustments	The SMC-2 Controller is configured with DIP switches and a rotary digital switch.
	Starting	3 Modes	Soft Start, Current Limit, Full Voltage in one unit.
		Protection	The controller has pre-start protection from phase loss and shorted SCRs. An LED is provided to indicate the status of the unit. The LED is ON when 3-phase power is applied. A flashing LED indicates one of 3 conditions: shorted SCR or phase loss during start, or a stalled motor during run.
	Running	Protection	Stall protection available during starting and run condition for additional motor protection.
		Energy Level	Built-in energy saver available for low load conditions.
Optional Interface Features	Set-up	Wiring	2- and 3-wire control for wider variety of applications. Interface option requires no additional space and can be factory or field installed.
	Starting	Auxiliary Contact	Selectable auxiliary contact available for either up-to-speed or instantaneous operation.
	Stopping		Module allows for soft stopping to minimize load shifting. Also adjusted from standard DIP switches.

Environmental		
Temperature	Operating	0°C…+50°C (32°F…+122°F)
	Storage	-40°C…+85°C (-40°F…+185°F)
Altitude		2000 meters (6560 feet)
Humidity		5…95% Relative Humidity (non-condensing)

Fuse Clip Sizing and Type for Fusible Combination Controllers ❶ ❷

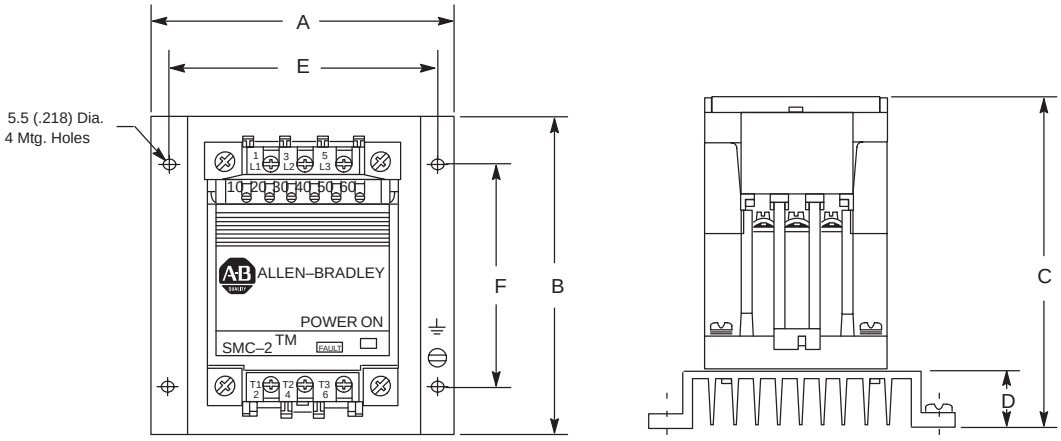
Horsepower @ 480V	Fuse Clip Size/Type	Fuse Size Range
15	30 A/Class J	0…30
20	60 A/Class J	31…60
25	60 A/Class J	31…60
30	60 A/Class J	31…60
40	100 A/Class J	61…100
50	100 A/Class J	61…100
60	200 A/Class J	101…200
75	200 A/Class J	101…200

❶ Consult NEC Handbook for proper fuse sizing guidelines.
❷ Optional fuse clip sizes and types are available upon request. Consult Allen-Bradley Sales Office.

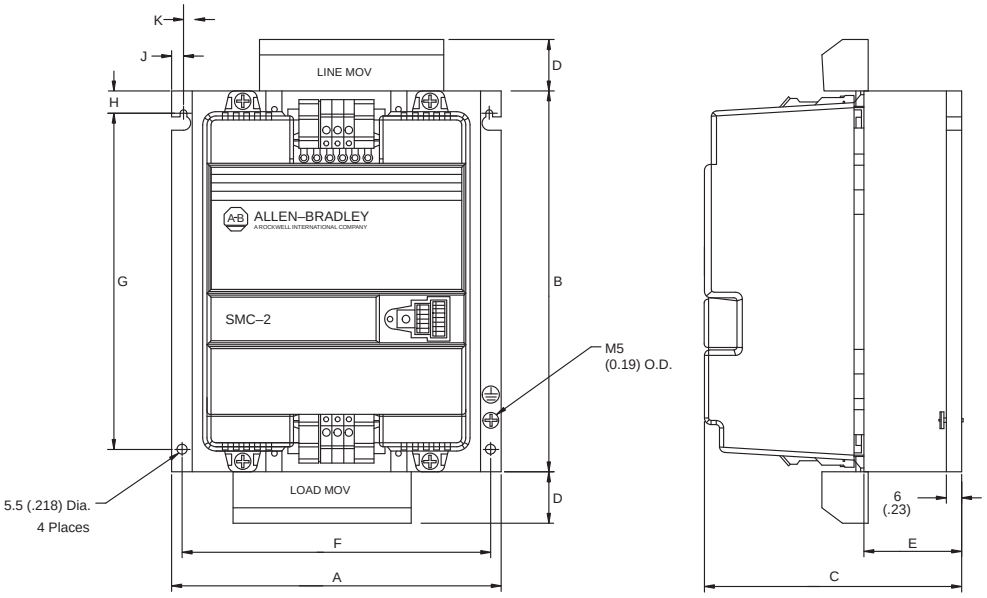
Product Selection — Page 24

Open Type

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.



Controller	Unit	A Width	B Height	C Depth	D	E	F	Approx. Ship. Wt.
5 A	Millimeter (Inch)	122 (4-13/16)	127 (5)	134 (5-9/32)	24 (61/64)	110 (4-11/32)	90 (3-35/64)	2 kg 4.5 lbs.
9 A	Millimeter (Inch)	122 (4-13/16)	180 (7-3/32)	134 (5-9/32)	24 (61/64)	110 (4-11/32)	140 (5-33/64)	2.25 kg 5 lbs.
16 A	Millimeter (Inch)	154 (6-5/64)	180 (7-3/32)	160 (6-5/16)	50 (1-31/32)	140 (5-33/64)	140 (5-33/64)	3.15 kg 7 lbs.

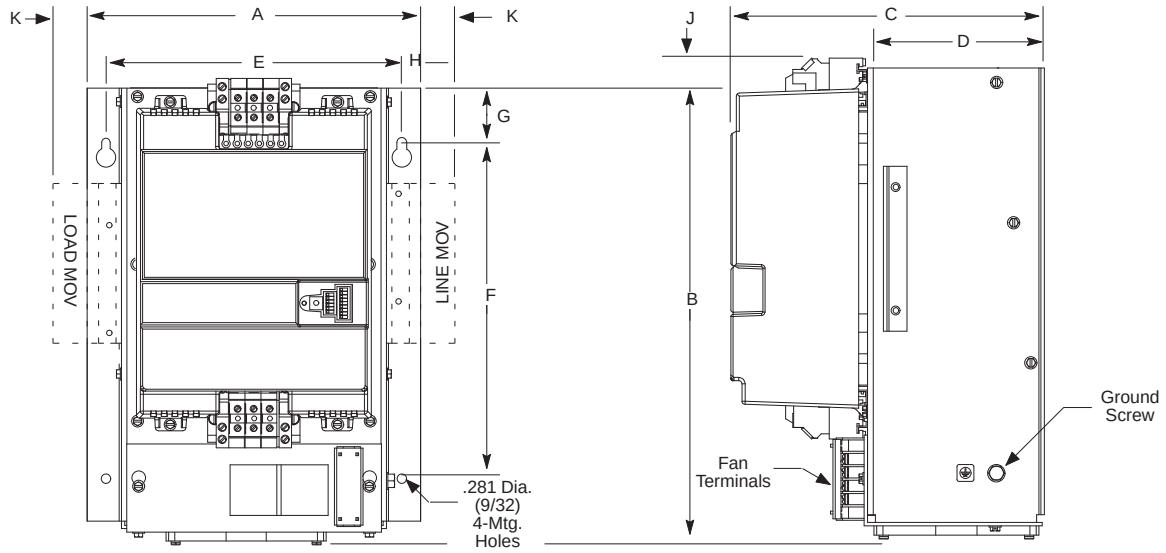


Controller	Unit	A Width	B Height	C Depth	D	E	F	G	H	J	K	Approx. Ship. Wt.
24…35 A	mm (inch)	214 (8-27/64)	250 (9-27/32)	160 (6-19/64)	34 (1-11/32)	60 (2-23/64)	200 (7-7/8)	220 (8-21/32)	15 (19/32)	7 (17/64)	8 (21/64)	4.5 kg 10 lbs
54 A…68 A	mm (inch)	244 (9-39/64)	290 (11-27/64)	190 (7-31/64)	34 (1-11/32)	90 (3-35/64)	230 (9-1/16)	250 (9-27/32)	20 (51/64)	7 (17/64)	8 (21/64)	6.8 kg 15 lbs

Product Selection — Page 24

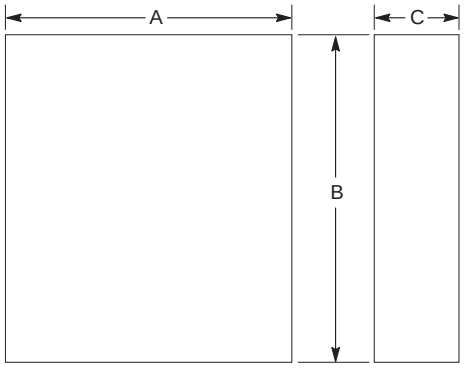
Open Type, Continued

Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.



Controller	Unit	A Width	B Height	C Depth	D	E	F	G	H	J	K	Approx. Ship. Wt.
97 A	mm (inch)	248 (9-25/32)	336 (13-15/64)	230 (9-3/64)	128 (5-3/64)	220 (8-43/64)	250 (9-55/64)	40 (1-5/8)	14 (35/64)	9.5 (3/8)	25.4 (1)	10.5 kg 23 lbs

Enclosed Type ❶



Dimension Code	Unit	Non-Combination Controllers			Combination Controllers with Fusible Disconnect		
		A Width	B Height	C Depth	A Width	B Height	C Depth
S	Millimeter (Inch)	154 (6-5/64)	290 (11-27/64)	140 (5-33/64)	400 (16)	350 (14)	210 (8)
T	Millimeter (Inch)	154 (6-5/64)	290 (11-27/64)	171 (6-47/64)	406 (16)	610 (24)	230 (9)
U	Millimeter (Inch)	244 (9-39/64)	410 (16-9/64)	218 (8-37/64)	610 (24)	762 (30)	276 (12)
V	Millimeter (Inch)	244 (9-39/64)	410 (16-9/64)	218 (8-37/64)	610 (24)	762 (30)	276 (12)
W	Millimeter (Inch)	244 (9-39/64)	410 (16-9/64)	218 (8-37/64)	762 (30)	965 (38)	302 (14)
X	Millimeter (Inch)	610 (24)	762 (30)	276 (12)	—	—	—
Y	Millimeter (Inch)	—	—	—	914 (36)	1295 (51)	356 (14)

❶ Any option(s) added to enclosed controllers may change size of enclosure.

Cat. No. 150-A360NBD *Cat. No. 150-A24NBD* *Cat. No. 150-A97NBD*

Bulletin 150

- **SMC PLUS Smart Motor Controller**
  - **24…1000 A Ratings**
  - **3 Start Modes**
  - **Options Include:**
    - **Pump Control**
    - **SMB Smart Motor Braking**
    - **Slow Speed with Braking**
    - **Accu-Stop**
    - **Preset Slow Speed**
    - **Soft Stop**

TABLE OF CONTENTS

Description

The SMC PLUS Solid-State Motor Controller provides microcomputer controlled starting for standard three-phase squirrel-cage induction motors. Three standard modes of operation are available within a single controller:

- Soft Start with Selectable Kickstart
- Current Limit Start
- Full Voltage Start

The SMC PLUS Controller is available for motors rated 1…1000 A; 200…480V, or 200…600V, 50 and 60 Hz. In addition to motors, the SMC PLUS Controller can be used to control resistive loads.

Energy Saver

This is a standard feature with the SMC PLUS Controller. It is used to save energy on applications where the motor is lightly loaded or unloaded for long periods of time. The Energy Saver is a built-in feature of the controller. **It does not require additional panel space or external wiring**. And, it does not require a complicated setup procedure.

For prices, consult your local Allen-Bradley Sales Office or the Master Price List.

Approvals:

CE Marked (Open Type) Per Low Voltage Directive 73/23/EEC, 93/68/EEC

CSA Certified (Open Type) (File No. LR1234)

UL Listed (Open Type) (File No. E96956)

Optional SMC Easy Ship Program

- Non-Combination Controllers — Cat. Nos. printed in blue will ship in two working days.
- Combination Controllers — Cat. Nos. printed in blue will ship in four working days.
- Contact your distributor for availability.
- Orders for multiple quantities may increase lead time.

Your order must include:

- Cat. No. of the controller selected.
- Modifications.
- If required, Cat. No. of any options or accessories.

The controller provides the following modes of operation: soft start with selectable kickstart, current limit start, or full voltage start across-the-line starting.

Soft Start

This method has the most general application. The motor is raised to an initial torque value. The initial torque is adjustable between 5 and 90% of locked rotor torque. The motor voltage is gradually increased during the acceleration ramp time, which can be adjusted from 2…30 seconds. These customer settings are set for the best starting performance over the required load range.

Soft Start *with* Selectable Kickstart

A kickstart or boost can be provided. Kickstart is intended to provide a current pulse of 550% of full load current and is adjustable from 0.4…2 seconds. This will allow the motor to develop additional torque at start for loads which may need a boost to get started.

Current Limit Start

This starting mode is used when it is necessary to limit the maximum starting current. This can be adjusted for 50…500% of full load amps.

Full Voltage Start

This mode is used for applications requiring across-the-line starting. The ramp time is set for less than 1/4 second.

Description of Options ❶

The following options are available in the SMC PLUS Controller. **Only one option may be added to the standard unit.**

Pump Control

The Pump Control option is used to reduce surges in a pumping system during starting and stopping of a centrifugal pump by smoothly accelerating and decelerating the motor at a selectable rate. The microcomputer analyzes the motor variables and generates control commands which control the motor in such a way to reduce the possibility of surges occurring in the system.

The starting time is adjustable from 2…30 seconds and the stopping time is adjustable from 2…120 seconds.

SMB Smart Motor Braking ❷

The Smart Motor Braking option provides motor braking for applications which require the motor to stop faster than a coast to rest. It is a microcomputer based braking system which applies braking current to a standard squirrel-cage induction motor. Braking is achieved without an additional contactor or power devices and provides automatic zero speed shut-off without a timer, sensor or tachometer. The strength of the braking current is adjustable from 150% to 400% of full load current.

Slow Speed with Braking ❷

The Slow Speed with Braking option is used on applications which require forward slow speed for positioning and alignment and also require braking control to stop. Slow speed adjustments are 7% (LOW) or 15% (HIGH) of rated speed. Slow speed acceleration current (available for 2 seconds) is adjustable from 50…400% of full load current. Running current is adjustable from 50…450% of full load current. Braking current is adjustable from 150… 400%. Kickstart is not available.

Accu-Stop ❷❸

The Accu-Stop option is used in applications requiring controlled position stopping. During stopping, braking torque is applied to the motor until it reaches preset slow speed (7 or 15% of rated 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 adjustable from 150…400% of full load current. Slow Speed Current is adjustable from 50…450% of full load current. Slow speed can be selected for either 7% (LOW) or 15% (HIGH).

Accu-Stop with Slow Speed at Start ❷❸

The Accu-Stop option can also allow the motor to operate at the preset slow speed when Slow Speed Start is selected. This minimizes the jogging required to position a load. The start command will then ramp the voltage from the preset slow speed to full speed. The operation of Accu-Stop is the same as explained previously.

Preset Slow Speed

The Preset Slow Speed option can be used on applications which require a slow speed (for example, moving material into position). The preset slow speed can be set by a DIP switch for either LOW (7% of base speed) or HIGH (15% of base speed) in the forward direction. It can also be set for LOW (10% of base speed) or HIGH (20% of base speed) in the reverse direction without a reversing contactor. The direction of rotation is DIP switch selectable.

The slow speed current limit is adjustable from 50…450% of full load current.

Soft Stop ❷

The Soft Stop option can be used on applications which require an extended coast to rest. It is designed for frictional type loads that tend to stop suddenly when voltage is removed from the motor. The voltage ramp down time can be set from 2…60 seconds. The load will stop when the motor voltage drops to a point where the load torque is greater than the motor torque.

❶ Only one option may be added to the standard unit.
❷ Not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.
❸ Accu-Stop control is not available when a bypass contactor is used.

Open and Non-Combination

150 – A180 N BD A – 8L4

Bulletin Number

150	Solid-State Controller
150B	Solid-State Controller and Isolation Contactor
150R	Solid-State Controller and Reversing Contactor

Controller Ratings

A24	24 A, 1…15 HP @ 480V AC
A35	35 A, 1…25 HP @ 480V AC
A54	54 A, 1…40 HP @ 480V AC
A97	97 A, 5…75 HP @ 480V AC
A135	135 A, 5…100 HP @ 480V AC
A180	180 A, 5…150 HP @ 480V AC
A240	240 A, 5…200 HP @ 480V AC
A360	360 A, 5…300 HP @ 480V AC
A500	500 A, 5…400 HP @ 480V AC
A650	650 A, 5…500 HP @ 480V AC
A720	720 A, 5…600 HP @ 480V AC
A850	850 A, 10…700 HP @ 480V AC
A1000	1000 A, 10…800 HP @ 480V AC

Enclosure Type

N	Open
A	NEMA Type 1
B	NEMA Type 1 Ventilated
J	NEMA Type 12
F	NEMA Type 4
H	NEMA Type 3R
S	NEMA Type 4X (stainless steel)

Input Line Voltage

BD	200…480V AC, 3-phase, 50 and 60 Hz
CD	200…600V AC, 3-phase, 50 and 60 Hz

Options (Select Only One)

A	Soft Stop
B	Pump Control
C	Preset Slow Speed
D	SMB Smart Motor Braking
E	Accu-Stop
F	Slow Speed with Braking

Options

8L4	Max. 480V AC, Line-Mounted Protective Module
8L6	Max. 600V AC, Line-Mounted Protective Module
8M4	Max. 480V AC, Load-Mounted Protective Module
8M6	Max. 600V AC, Load-Mounted Protective Module
8B4	Max. 480V AC, Line- and Load-Mounted Protective Modules
8B6	Max. 600V AC, Line- and Load-Mounted Protective Modules

Combination

152B – WA B A – 56 – 8L4

Bulletin Number

152B	Solid-State Controller with Fusible Disconnect and Isolating Contactor
152H	Solid-State Controller with Fusible Disconnect
152R	Solid-State Controller with Fusible Disconnect and Reversing Contactor
153B	Solid-State Controller with Circuit Breaker and Isolating Contactor
153H	Solid-State Controller with Circuit Breaker
153R	Solid-State Controller with Circuit Breaker and Reversing Contactor

Enclosure Type

WA	NEMA Type 1
WB	NEMA Type 1 Ventilated
WJ	NEMA Type 12
WH	NEMA Type 3R
WS	NEMA Type 4X (Stainless Steel)

Line Voltage

A	240V AC
B	480V AC
C	600V AC
H	200V AC

Options (Select only one)

A	Soft Stop
B	Pump Control
C	Preset Slow Speed
D	SMB Smart Motor Braking
E	Accu-Stop
F	Slow Speed with Braking

Horsepower

Cat. No.	HP Rating	Cat. No.	HP Rating	Cat. No.	HP Rating	Cat No.	HP Rating	Cat. No.	HP Rating
39	5	**44**	25	**49**	75	**56**	250	**61**	500
40	7.5	**45**	30	**50**	100	**57**	300	**62**	600
41	10	**46**	40	**51**	125	**58**	350	**63**	700
42	15	**47**	50	**52**	150	**59**	400	**65**	800
43	20	**48**	60	**54**	200	**60**	450	**67**	1000

Options

8L4	Max. 480V AC, Line-Mounted Protective Module
8L6	Max. 600V AC, Line-Mounted Protective Module
8M4	Max. 480V AC, Load-Mounted Protective Module
8M6	Max. 600V AC, Load-Mounted Protective Module
8B4	Max. 480V AC, Line- and Load-Mounted Protective Modules
8B6	Max. 600V AC, Line- and Load-Mounted Protective Modules

Open Type Controllers

Up to 480V AC

Current Rating (A)	kW ❶		HP ❷			Cat. No. ❸	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz		
24	5.5	11	1…5	1…7.5	1…15	150-A24NBD	a
35	10	18.5	1…10	1…10	1…25	150-A35NBD	b
54	15	22	1…15	1…20	1…40	150-A54NBD	c
97	25	45	5…30	5…30	5…75	150-A97NBD	d
135	37	75	5…40	5…50	5…100	150-A135NBD	e
180	51	90	5…60	5…60	5…150	150-A180NBD	f
240	75	132	5…75	5…75	5…200	150-A240NBD	g
360	110	200	5…125	5…150	5…300	150-A360NBD	h
500	150	257	5…150	5…200	5…400	150-A500NBD	i
650	200	355	5…200	5…250	5…500	150-A650NBD	j
720	220	400	5…250	5…300	5…600	150-A720NBD	k
850	257	475	10…300	10…350	10…700	150-A850NBD	l
1000	315	530	10…350	10…400	10…800	150-A1000NBD	m

Up to 600V AC

Current Rating (A)	kW ❶			HP ❷				Cat. No. ❸	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	500V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz		
24	5.5	11	15	1…5	1…7.5	1…15	1…20	150-A24NCD	a
35	10	18.5	22	1…10	1…10	1…25	1…30	150-A35NCD	b
54	15	22	37	1…15	1…20	1…40	1…50	150-A54NCD	c
97	25	45	63	5…30	5…30	5…75	5…75	150-A97NCD	d
135	37	75	90	5…40	5…50	5…100	5…125	150-A135NCD	e
180	51	90	132	5…60	5…60	5…150	5…150	150-A180NCD	f
240	75	132	160	5…75	5…75	5…200	5…250	150-A240NCD	g
360	110	200	250	5…125	5…150	5…300	5…350	150-A360NCD	h
500	150	257	355	5…150	5…200	5…400	5…500	150-A500NCD	i
650	200	355	475	5…200	5…250	5…500	5…600	150-A650NCD	j
720	220	400	500	5…250	5…300	5…600	5…700	150-A720NCD	k
850	257	475	600	10…300	10…350	10…700	10…800	150-A850NCD	l
1000	315	530	710	10…350	10…400	10…800	10…1000	150-A1000NCD	m

❶ The minimum rating is: 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices rated 850 A and greater.

❷ HP ratings at motor terminal voltages for 208, 480 and 600 line volts, respectively.

❸ Controllers are shipped from the factory preset for soft start mode, 10 s acceleration, energy saver inactive, motor stall inactive, and control power 100…240V AC, 50/60 Hz.

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IP30 (Type 1) Enclosed Non-Combination Controllers

SMC Easy Ship program Cat. Nos. are printed in blue. See page 39.

Bulletin 150 (Non-Combination Controller) — The SMC PLUS Controller requires a separate 100…240V, 50/60 Hz single-phase control source. A thermal overload is not included. Terminals are provided for a separate thermal overload relay connection to the control circuit. Enclosures other than those listed are available. Consult Allen-Bradley Sales Office.

Up to 480V AC

Current Rating (A)	kW ❶		HP ❷			Cat. No. ❸	Dimension Code	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz			
24	5.5	11	1…5	1…7.5	1…15	150-A24JBD	Q	a
35	10	15	1…10	1…10	1…25	150-A35JBD	Q	b
54	15	22	1…15	1…20	1…40	150-A54JBD	Q	c
97	25	45	5…30	5…30	5…75	150-A97BBD	R	d
135	37	55	5…40	5…50	5…100	150-A135BBD	T	e
180	51	90	5…60	5…60	5…150	150-A180BBD	T	f
240	75	110	5…75	5…75	5…200	150-A240BBD	T	g
360	110	200	5…125	5…150	5…300	150-A360BBD	U	h
500	150	250	5…150	5…200	5…400	150-A500BBD	W	i
650	200	355	5…200	5…250	5…500	150-A650BBD	X	j
720	220	400	5…250	5…300	5…600	150-A720BBD	X	k
850	257	450	10…300	10…350	10…700	150-A850BBD	X	l
1000	315	500	10…350	10…400	10…800	150-A1000BBD	X	m

Up to 600V AC

Current Rating (A)	kW ❶			HP ❷				Cat. No. ❸	Dimension Code	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	500V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz			
24	5.5	11	15	1…5	1…7.5	1…15	1…20	150-A24JCD	Q	a
35	10	18.5	22	1…10	1…10	1…25	1…30	150-A35JCD	Q	b
54	15	22	37	1…15	1…20	1…40	1…50	150-A54JCD	Q	c
97	25	45	63	5…30	5…30	5…75	5…75	150-A97BCD	R	d
135	37	75	90	5…40	5…50	5…100	5…125	150-A135BCD	T	e
180	51	90	132	5…60	5…60	5…150	5…150	150-A180BCD	T	f
240	75	132	160	5…75	5…75	5…200	5…250	150-A240BCD	T	g
360	110	200	250	5…125	5…150	5…300	5…350	150-A360BCD	U	h
500	150	257	355	5…150	5…200	5…400	5…500	150-A500BCD	W	i
650	200	355	475	5…200	5…250	5…500	5…600	150-A650BCD	X	j
720	220	400	500	5…250	5…300	5…600	5…700	150-A720BCD	X	k
850	257	475	600	10…300	10…350	10…700	10…800	150-A850BCD	X	l
1000	315	530	710	10…350	10…400	10…800	10…1000	150-A1000BCD	X	m

❶ The minimum rating is: 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices rated 850 A and greater.
❷ HP ratings at motor terminal voltages for 208, 480 and 600 line volts, respectively.
❸ Controllers are shipped from the factory preset for soft start mode, 10 second acceleration, energy saver inactive, motor stall active, and control power 100…240V AC, 50/60 Hz.

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IP65 (Type 4) Enclosed Non-Combination Controllers

Bulletin 150 (Non-Combination Controller) — The SMC PLUS Controller requires a separate 100…240V, 50/60 Hz single-phase control source. A thermal overload is not included. Terminals are provided for a separate thermal overload relay connection to the control circuit. Enclosures other than those listed are available. Consult Allen-Bradley Sales Office.

Up to 480V AC

Current Rating (A)	kW ❶		HP ❷			Cat. No. ❸❹	Dimension Code	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz			
24	5.5	11	1…5	1…7.5	1…15	150-A24FBD	Q	a
35	10	18.5	1…10	1…10	1…25	150-A35FBD	Q	b
54	15	22	1…15	1…20	1…40	150-A54FBD	Q	c
97	25	45	5…30	5…30	5…75	150-A97FBD	S	d
135	37	75	5…40	5…50	5…100	150-A135FBD	T	e
180	51	90	5…60	5…60	5…150	150-A180FBD	T	f
240	75	132	5…75	5…75	5…200	150-A240FBD	U	g
360	110	200	5…125	5…150	5…300	150-A360FBD	V	h
500	150	257	5…150	5…200	5…400	150-A500FBD	X	i
650	200	355	5…200	5…250	5…500	150-A650FBD	Z1	j
720	220	400	5…250	5…300	5…600	150-A720FBD	Z1	k
850	257	475	10…300	10…350	10…700	150-A850FBD	Z1	l
1000	315	530	10…350	10…400	10…800	150-A1000FBD	Z1	m

Up to 600V AC

Current Rating (A)	kW ❶			HP ❷				Cat. No. ❸❹	Dimension Code	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	500V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz			
24	5.5	11	15	1…5	1…7.5	1…15	1…20	150-A24FCD	Q	a
35	10	18.5	22	1…10	1…10	1…25	1…30	150-A35FCD	Q	b
54	15	22	37	1…15	1…20	1…40	1…50	150-A54FCD	Q	c
97	25	45	63	5…30	5…30	5…75	5…75	150-A97FCD	S	d
135	37	75	90	5…40	5…50	5…100	5…125	150-A135FCD	T	e
180	51	90	132	5…60	5…60	5…150	5…150	150-A180FCD	T	f
240	75	132	160	5…75	5…75	5…200	5…250	150-A240FCD	V	g
360	110	200	250	5…125	5…150	5…300	5…350	150-A360FCD	V	h
500	150	257	355	5…150	5…200	5…400	5…500	150-A500FCD	X	i
650	200	355	475	5…200	5…250	5…500	5…600	150-A650FCD	Z1	j
720	220	400	500	5…250	5…300	5…600	5…700	150-A720FCD	Z1	k
850	257	475	600	10…300	10…350	10…700	10…800	150-A850FCD	Z1	l
1000	315	530	710	10…350	10…400	10…800	10…1000	150-A1000FCD	Z1	m

❶ The minimum rating is: 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices rated 850 A and greater.

❷ HP ratings at motor terminal voltages for 208, 480 and 600 line volts, respectively.

❸ Controllers are shipped from the factory preset for soft start mode, 10 second acceleration, energy saver inactive, motor stall inactive, and control power 100…240V AC, 50/60 Hz.

❹ 97…1000 A Type 4 SMC PLUS Smart Motor Controllers include Bulletin 100 bypass contactors wired for 120V AC 50/60 Hz.

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IP54 (Type 12) Enclosed Non-Combination Controllers

SMC Easy Ship program Cat. Nos. are printed in blue. See page 39.

Bulletin 150 (Non-Combination Controller) — The SMC PLUS Controller requires a separate 100…240V, 50/60 Hz single-phase control source. A thermal overload is not included. Terminals are provided for a separate thermal overload relay connection to the control circuit. Enclosures other than those listed are available. Consult Allen-Bradley Sales Office.

Up to 480V AC

Current Rating (A)	kW ❶		HP ❷			Cat. No. ❸❹	Dimension Code	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz			
24	5.5	11	1…5	1…7.5	1…15	150-A24JBD	Q	a
35	10	18.5	1…10	1…10	1…25	150-A35JBD	Q	b
54	15	22	1…15	1…20	1…40	150-A54JBD	Q	c
97	25	45	5…30	5…30	5…75	150-A97JBD	S	d
135	37	75	5…40	5…50	5…100	150-A135JBD	T	e
180	51	90	5…60	5…60	5…150	150-A180JBD	T	f
240	75	132	5…75	5…75	5…200	150-A240JBD	U	g
360	150	200	5…125	5…150	5…300	150-A360JBD	V	h
500	132	257	5…150	5…200	5…400	150-A500JBD	X	i
650	200	355	5…200	5…250	5…500	150-A650JBD	Z	j
720	220	400	5…250	5…300	5…600	150-A720JBD	Z1	k
850	257	475	10…300	10…350	10…700	150-A850JBD	Z1	l
1000	315	530	10…350	10…400	10…800	150-A1000JBD	Z1	m

Up to 600V AC

Current Rating (A)	kW ❶			HP ❷				Cat. No. ❸❹	Dimension Code	Price Adder Code
	230V AC 50 Hz	400V AC 50 Hz	500V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz			
24	5.5	11	15	1…5	1…7.5	1…15	1…20	150-A24JCD	Q	a
35	10	18.5	22	1…10	1…10	1…25	1…30	150-A35JCD	Q	b
54	15	22	37	1…15	1…20	1…40	1…50	150-A54JCD	Q	c
97	25	45	63	5…30	5…30	5…75	5…75	150-A97JCD	S	d
135	37	75	90	5…40	5…50	5…100	5…125	150-A135JCD	T	e
180	51	90	110	5…60	5…60	5…150	5…150	150-A180JCD	T	f
240	75	132	160	5…75	5…75	5…200	5…250	150-A240JCD	V	g
360	110	200	250	5…125	5…150	5…300	5…350	150-A360JCD	V	h
500	150	257	355	5…150	5…200	5…400	5…500	150-A500JCD	X	i
650	200	355	475	5…200	5…250	5…500	5…600	150-A650JCD	Z	j
720	220	400	500	5…250	5…300	5…600	5…700	150-A720JCD	Z1	k
850	257	475	600	10…300	10…350	10…700	10…800	150-A850JCD	Z1	l
1000	315	530	710	10…350	10…400	10…800	10…1000	150-A1000JCD	Z1	m

❶ The minimum rating is: 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices rated 850 A and greater.
❷ HP ratings at motor terminal voltages for 208, 480 and 600 line volts, respectively.
❸ Controllers are shipped from the factory preset for soft start mode, 10 second acceleration, energy saver inactive, motor stall inactive, and control power 100…240V AC, 50/60 Hz.
❹ 97…1000 A Type 12 SMC PLUS Smart Motor Controllers include Bulletin 100 Bypass Contactors wired for 120V AC 50/60 Hz.

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Enclosed Combination Controllers ❶

Bulletin 152H/153H (Combination Controller) — Includes a 120V control transformer and a three-pole thermal overload relay less elements. Where isolating or bypass contactors are required, Bulletin 100 contactors are used (through 600 A). Enclosures other than those listed are available. Consult Allen-Bradley Sales Office.

HP	Nominal Current (A)	Price Adder Code	IP30 (Type 1) Vented Enclosure With Fusible Disconnect ❷		IP54 (Type 12) Enclosed Combination Controller With Fusible Disconnect and Bypass Contactor ❷	
			Dimension Code	Cat. No.	Dimension Code	Cat. No. ❸❹
480V AC, 60 Hz						
15	24	a	S	152H-WAB-42❺	S	152H-WJB-42❻
20	30	b	T	152H-WAB-43❺	T	152H-WJB-43❻
25	35	b	T	152H-WAB-44❺	T	152H-WJB-44❻
30	40	c	T	152H-WAB-45❺	T	152H-WJB-45❻
40	54	c	T	152H-WAB-46❺	T	152H-WJB-46❻
50	70	d	U	152H-WBB-47	U	152H-WJB-47
60	82	d	U	152H-WBB-48	U	152H-WJB-48
75	97	d	U	152H-WBB-49	U	152H-WJB-49
100	125	e	V	152H-WBB-50	V	152H-WJB-50
125	156	f	W	152H-WBB-51	W	152H-WJB-51
150	180	f	W	152H-WBB-52	W	152H-WJB-52
200	240	g	W	152H-WBB-54	W	152H-WJB-54
250	302	h	X2	152H-WBB-56	X2	152H-WJB-56
300	360	h	X2	152H-WBB-57	X2	152H-WJB-57
350	410	i	Y1	152H-WBB-58	Y2	152H-WJB-58
400	477	i	Y1	152H-WBB-59	Y2	152H-WJB-59
450	525	j	Z1	152H-WBB-60	Z2	152H-WJB-60
500	575	j	Z1	152H-WBB-61	Z2	152H-WJB-61
600	675	k	Z1	152H-WBB-62	Z2	152H-WJB-62
700	800	l	Z1	152H-WBB-63	Z3	152H-WJB-63
800	915	m	Z1	152H-WBB-65	Z3	152H-WJB-65
600V AC, 60 Hz						
20	24	a	S	152H-WAC-43❺	S	152H-WJC-43❻
25	28	b	T	152H-WAC-44❺	T	152H-WJC-44❻
30	35	b	T	152H-WAC-45❺	T	152H-WJC-45❻
40	40	c	T	152H-WAC-46❺	T	152H-WJC-46❻
50	54	c	T	152H-WAC-47❺	T	152H-WJC-47❻
60	65	d	U	152H-WBC-48	U	152H-WJC-48
75	80	d	U	152H-WBC-49	U	152H-WJC-49
100	115	e	V	152H-WBC-50	V	152H-WJC-50
125	125	e	V	152H-WBC-51	V	152H-WJC-51
150	170	f	W	152H-WBC-52	W	152H-WJC-52
200	200	g	W	152H-WBC-54	W	152H-WJC-54
250	240	g	X2	152H-WBC-56	X2	152H-WJC-56
300	310	h	X2	152H-WBC-57	X2	152H-WJC-57
350	360	h	Y1	152H-WBC-58	Y2	152H-WJC-58
400	385	i	Y1	152H-WBC-59	Y2	152H-WJC-59
450	450	i	Z1	152H-WBC-60	Z2	152H-WJC-60
500	500	i	Z1	152H-WBC-61	Z2	152H-WJC-61
600	600	j	Z1	152H-WBC-62	Z2	152H-WJC-62
700	700	k	Z1	152H-WBC-63	Z3	152H-WJC-63
800	800	l	Z1	152H-WBC-65	Z3	152H-WJC-65
1000	1000	m	Z1	152H-WBC-67	Z3	152H-WJC-67

❶ 208V and 240V Controllers are available. Consult Allen-Bradley Sales Office.
❷ See page 56 for fuse clip size and type information.
❸ Accu-Stop Control is not available when a bypass contactor is used.
❹ Bypass contactors are used to bypass the SMC PLUS Controller when the motor has reached full speed.
❺ Includes internal circulating fan rather than enclosure ventilation.
❻ Includes internal circulating fan rather than bypass contactor.

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Enclosed Combination Controllers ❶

SMC Easy Ship program Cat. Nos. are printed in blue. See page 39.

Bulletin 152H/153H (Combination Controller) — Includes a 120V control transformer and a three-pole thermal overload relay less elements. Where isolating or bypass contactors are required, Bulletin 100 contactors are used (through 600 A). Enclosures other than those listed are available. Consult Allen-Bradley Sales Office.

HP	Nominal Current	Price Adder Code	IP30 (Type 1) Vented Enclosed Combination Controllers With Circuit Breaker ❷		IP54 (Type 12) Enclosed Combination Controller With Circuit Breaker and Bypass Contactor ❷	
			Dimension Code	Cat. No.	Dimension Code	Cat. No. ❸❹
480V AC, 60 Hz						
15	24	a	S	153H-WAB-42❺	S	153H-WJB-42❻
20	30	b	T	153H-WAB-43❺	T	153H-WJB-43❻
25	35	b	T	153H-WAB-44❺	T	153H-WJB-44❻
30	40	c	T	153H-WAB-45❺	T	153H-WJB-45❻
40	54	c	T	153H-WAB-46❺	T	153H-WJB-46❻
50	70	d	U	153H-WBB-47	U	153H-WJB-47
60	82	d	U	153H-WBB-48	U	153H-WJB-48
75	97	d	U	153H-WBB-49	U	153H-WJB-49
100	125	e	V	153H-WBB-50	V	153H-WJB-50
125	156	f	W	153H-WBB-51	W	153H-WJB-51
150	180	f	W	153H-WBB-52	W	153H-WJB-52
200	240	g	W	153H-WBB-54	W	153H-WJB-54
250	302	h	X2	153H-WBB-56	X	153H-WJB-56
300	360	h	X2	153H-WBB-57	X	153H-WJB-57
350	410	i	Y1	153H-WBB-58	Y1	153H-WJB-58
400	477	i	Y1	153H-WBB-59	Y1	153H-WJB-59
450	525	j	Y2	153H-WBB-60	Z	153H-WJB-60
500	575	j	Y2	153H-WBB-61	Z	153H-WJB-61
600	675	k	Y2	153H-WBB-62	Z	153H-WJB-62
700	800	l	Z	153H-WBB-63	Z	153H-WJB-63
800	915	m	Z	153H-WBB-65	Y3	153H-WJB-65
600V AC, 60 Hz						
20	24	a	S	153H-WAC-43❺	S	153H-WJC-43❻
25	28	b	T	153H-WAC-44❺	T	153H-WJC-44❻
30	35	b	T	153H-WAC-45❺	T	153H-WJC-45❻
40	40	c	T	153H-WAC-46❺	T	153H-WJC-46❻
50	54	c	T	153H-WAC-47❺	T	153H-WJC-47❻
60	65	d	U	153H-WBC-48	U	153H-WJC-48
75	80	d	U	153H-WBC-49	U	153H-WJC-49
100	115	e	V	153H-WBC-50	V	153H-WJC-50
125	125	e	V	153H-WBC-51	V	153H-WJC-51
150	170	f	W	153H-WBC-52	W	153H-WJC-52
200	200	g	W	153H-WBC-54	W	153H-WJC-54
250	240	g	X2	153H-WBC-56	W	153H-WJC-56
300	310	h	X2	153H-WBC-57	X	153H-WJC-57
350	360	h	Y1	153H-WBC-58	Y1	153H-WJC-58
400	385	i	Y1	153H-WBC-59	Y1	153H-WJC-59
450	450	i	Y2	153H-WBC-60	Z	153H-WJC-60
500	500	i	Y2	153H-WBC-61	Z	153H-WJC-61
600	600	j	Y2	153H-WBC-62	Z	153H-WJC-62
700	700	k	Z	153H-WBC-63	Z	153H-WJC-63
800	800	l	Z	153H-WBC-65	Y3	153H-WJC-65
1000	1000	m	Z	153H-WBC-67	Y3	153H-WJC-67

❶ 208V and 240V Controllers are available. Consult Allen-Bradley Sales Office.
❷ See page 56 for circuit breaker size and rating plug size.
❸ Accu-Stop Control is not available when a bypass contactor is used.
❹ Bypass contactors are used to bypass the SMC PLUS Controller when the motor has reached full speed.
❺ Includes internal circulating fan rather than enclosure ventilation.
❻ Includes internal circulating fan rather than bypass contactor.

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Protective Modules (Field Modifications) ❶ ❷

Nominal Current Rating (A)	Price Adder Code	Description	Field Modification Cat. No.
24…54	a…c	480V Protective Module	150-N84
		600V Protective Module	150-N86
97…360	d…h	480V Protective Module	150-N84L
		600V Protective Module	150-N86L

Terminal Lug Kits (97…1000 A)

Nominal Current Rating (A)	Conductor Range	Total No. of Terminal Lugs Possible Each Side		Pkg. Qty.	Cat. No.
		Line Side	Load Side		
97…135	#6-4/0 AWG	3	3	3	199-LF1
180…360	#6-4/0 AWG	6	6	3	199-LF1
500	#4-500MCM AWG	6	6	3	199-LG1
650…720	#4-500MCM AWG	9	9	3	199-LG1
850…1000	(2) 1/0-500MCM AWG	6	6	3	199-LJ1

IEC Terminal Covers (Field Modification)

Description	Field Modification Cat. No.
IEC line or load terminal covers for 97…135 A devices (includes line and load termination covers)	150-NT1
IEC line and load terminal covers for 180…360 A devices (includes line and load termination covers)	150-NT2

❶ The same protective module mounts on the line or load side of the SMC PLUS. For applications requiring both line and load side protection, two protective modules must be ordered.
❷ Protective modules are standard on 500…1000 A units.

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SMC Easy Ship program descriptions are printed in blue. See page 39.

Option	Description	Price Adder Code	Cat. No. Modification
Soft Stop ❶❷❸	Provides a ramp down time of 2…60 seconds for applications which require an extended coast-to-rest.	a…m	A ❹
Pump Control ❶❷	Provides smooth motor acceleration and deceleration, reducing surges caused by the starting and stopping of centrifugal pumps. Starting time is adjustable from 2…30 seconds, and stopping time is adjustable from 2…120 seconds.	a…m	B ❹
Preset Slow Speed ❶❷	Provides a preset slow speed for positioning or alignment applications. Preset speeds can be selected at either 7% or 15% of rated motor speed, in the forward direction, 10% or 20% in the reverse direction. The direction of the motor is dip switch selectable. Slow speed current is adjustable from 50…450% of full load current.	a…m	C ❹
SMB Smart Motor Braking ❶❷❸	Provides a microcomputer based braking system which applies three-phase braking current to a standard squirrel-cage induction motor. The strength of the braking current is adjustable from 150…400% of full load motor current.	a b c d e f g h i j k l m	D ❹
Accu-Stop ❶❷❸❺	Provides precise stopping control for positioning or to minimize jogging to stop. A three-phase braking current is applied to the motor (adjustable from 150…400% of full load current) until it reaches a preset slow speed (either 7% or 15% of rated motor-speed). The motor is held at this speed until a stop command is given. Braking torque is then applied until the motor reaches zero speed. Slow speed current is adjustable from 50…450% of full load current.	a b c d e f g h i j k l m	E ❹
Slow Speed with Braking ❶❷❸❻	Provides forward slow speed for positioning and alignment, and braking control to stop.	a b c d e f g h i j k l m	F ❹

❶ Only one option may be added to the standard unit.
❷ Observe the thermal rating of the AC induction motor.
❸ Not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.
❹ Add the designated letter to the end of the Cat. No. For example, to add the Pump Control Option: **Cat. No 150-24NBD** becomes **Cat. No. 150-A24NBDB** or **Cat. No. 152B-WBB-56** becomes **Cat. No. 152B-WBBB-56** for combination style.
❺ Accu-stop Control is not available when a bypass contactor is used.
❻ Kickstart is not available with this option.

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SMC Easy Ship program descriptions are printed in blue. See page 39.

Option	Description	Price Adder Code	Cat. No. Modification
Push Buttons	Start-Stop Push Button	a...m	-1
	Start-Stop Push Button with H-O-A Selector Switch		-1F
	Soft Stop Push Button ❶		-1XA
	Pump Stop Push Button ❶		-1XB
	Slow Speed Push Button ❶		-1XC
	Brake Push Button ❶		-1XD
	Accu-Stop/Slow Speed Push Button ❶		-1XE
	Emergency Stop		-1E
	Fault Reset		-FR
Selector Switch	Hand-Off-Auto Selector Switch	a...m	-3
	SMC-Off-Bypass Selector Switch		-3B
	Forward-Off-Reverse Selector Switch		-3R
Pilot Lights	Transformer Pilot Light (Red Lens — Easy Ship Program) ❷	a...m	-4_
	Push-to-Test Pilot Light ❷		-5_
Control Circuit Transformer	Control Circuit Transformer (fused primary and secondary)	a...m	-6P
	Additional 100 VA Control Circuit Transformer (fused primary and		-6PX
Protective Modules ❸	24…54 A, 480V Line Side Protective Module	a...c	-8L4
	97…360 A, 480V Line Side Protective Module	d...h	
	24…54 A, 600V Line Side Protective Module	a...c	-8L6
	97…360 A, 600V Line Side Protective Module	d...h	
	24…54 A, 480V Load Side Protective Module	a...c	-8M4
	97…360 A, 480V Load Side Protective Module	d...h	
	24…54 A, 600V Load Side Protective Module	a...c	-8M6
	97…360 A, 600V Load Side Protective Module	d...h	
	24…54 A, 480V Both Line and Load Side Protective Modules	a...c	-8B4
	97…360 A, 480V Both Line and Load Side Protective Modules	d...h	
	24…54 A, 600V Both Line and Load Side Protective Modules	a...c	-8B6
	97…360 A, 600V Both Line and Load Side Protective Modules	d...h	
Overload Relay ❹❺	Three-pole thermal overload relay for 24…35 A units	a...b	-OL
	Three-pole thermal overload relay for 54 A units	c	
	Three-pole thermal overload relay for 97…135 A units	d...e	
	Three-pole thermal overload relay for 180…360 A units	f...h	
	Three-pole thermal overload relay for 500 units	i	
	Three-pole thermal overload relay for 650…850 A units	j...l	
	Three-pole thermal overload relay for 1000 A units	m	
External Overload Relay Reset ❻	24…54 A Overload Relay Reset	a...c	-7
	97…240 A Overload Relay Reset	d...g	
	360…1000 A Overload Relay Reset	h...m	
Overload Auxiliary Contact	N.O. Overload Relay Auxiliary Contact	a...m	-9
	N.C. Overload Relay Auxiliary Contact		-9A
Isolation Contactor	Isolation Contactor	a...d e...f g h i j k...l m	❼

❶ Option push buttons are only available when the corresponding option module is selected. For example, **Cat. No. 150-A24JBDA-1XA**.
❷ Specify pilot light lens color. Options: **A**mber, **B**lue, **C**lear, **G**reen, **R**ed, and **W**hite. For example, **-4R** for a red lens.
❸ Line and Load Side Protective Modules are standard on 500…1000 A units.
❹ Three-pole thermal overload for Bulletin 150 enclosed controllers only. Overload is standard on Bulletins 152 and 153.
❺ Three-pole thermal overload does not include heater elements.
❻ External Overload Relay Reset is available with Bulletins 152, 153, and enclosed Bulletin 150 devices with overload option only.
❼ To order a non-combination or combination enclosed controller with an isolator contactor, add the letter "B" to the bulletin prefix. See pages 36-37. Bulletin 100 contactors are used through 600 A. Enclosure dimensions are subject to change. Consult factory for dimensions.

Option	Description	Price Adder Code	Cat. No. Modification
Reversing Contactor	Reversing Contactor	a...d	❶
		e...f	
		g	
		h	
		i	
		j	
		k...l	
		m	
NEMA Bypass Contactor ❷	NEMA Bypass for 24…97 A unit	a…d	-NB
	NEMA Bypass for 135…180 A unit	e…f	
	NEMA Bypass for 240 A unit	g	
	NEMA Bypass for 360 A unit	h	
	NEMA Bypass for 500 A unit	i	
	NEMA Bypass for 650 A unit	j	
NEMA Isolation Contactor ❷	NEMA Bypass for 24…97 A unit	a…d	-NI
	NEMA Bypass for 135…180 A unit	e…f	
	NEMA Bypass for 240 A unit	g	
	NEMA Bypass for 360 A unit	h	
	NEMA Bypass for 500 A unit	i	
	NEMA Bypass for 650 A unit	j	
Power Factor Correction Capacitors ❸	2 kVAR		-PFCC❹
	2.5 kVAR		
	3 kVAR		
	4 kVAR		
	5 kVAR		
	6 kVAR		
	7 kVAR		
	7.5 kVAR		
	8 kVAR		
	9 kVAR		
	10 kVAR		
	11 kVAR		
	12.5 kVAR		
	14 kVAR		
	15 kVAR		
	16 kVAR		
	17.5 kVAR		
	18 kVAR		
	20 kVAR		
	22.5 kVAR		
	25 kVAR		
	27.5 kVAR		
	30 kVAR		
	32.5 kVAR		
	35 kVAR		
	37.5 kVAR		
	40 kVAR		
	42.5 kVAR		
	45 kVAR		
	47.5 kVAR		
	50 kVAR		

❶ To order a non-combination or combination enclosed controller with a reversing contactor, add an “R” to the bulletin prefix. See pages 41…42. Bulletin 104 contactors are used through 500 A @ 480V. Enclosure dimensions are subject to change. Consult factory for dimensions.
❷ 720, 850, 1000 A units currently use a NEMA Contactor.
❸ Power Factor Correction Capacitor to include Power Capacitors with 3-phase Class J Time-Delay Fusing and appropriately sized contactor.
❹ To order Power Factor Correction Capacitors indicate kVAR rating. For example: -**PFCC30kVAR**.

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Option	Description	Price Adder Code	Cat. No. Modification
Power Factor Correction Contactor ❶	Power Factor Correction Capacitor Contactor	a...d	-PFCCC
		e...f	
		g	
		h	
		i	
		j	
SCR Fusing	Fast acting current limiting SCR fusing for 24 A unit	a	-SCR
	Fast acting current limiting SCR fusing for 35 A unit	b	
	Fast acting current limiting SCR fusing for 54 A unit	c	
	Fast acting current limiting SCR fusing for 97…135 A units	d...e	
	Fast acting current limiting SCR fusing for 180 A unit	f	
	Fast acting current limiting SCR fusing for 240 A unit	g	
	Fast acting current limiting SCR fusing for 360 A unit	h	
	Fast acting current limiting SCR fusing for 500 A unit	i	
	Fast acting current limiting SCR fusing for 650…720 A units	j...k	
	Fast acting current limiting SCR fusing for 850 A unit	l	
	Fast acting current limiting SCR fusing for 1000 A unit	m	
Panel Board Type Ammeter	Single-phase panel board type ammeter for 24 A units	a	-85AA
	Single-phase panel board type ammeter for 35…97 A units	b...d	
	Single-phase panel board type ammeter for 135…240 A units	e...g	
	Single-phase panel board type ammeter for 360 A units	h	
	Single-phase panel board type ammeter for 500…650 A units	i...j	
	Single-phase panel board type ammeter for 720…1000 A units	k...m	
	Panel board type ammeter with switch for monitoring all three phases	a...m	-86AA
Panel Board Type Voltmeter	Single-phase panel board type voltmeter	a...m	-85AV
	Panel board type voltmeter with switch for monitoring all three phases.		-86AV
Elapsed Time Meter	Elapsed time meter	a...m	-85T
Unwired Control Relays ❷	Bulletin 700CF 4-pole relay – 2 N.O. and 2 N.C.	a...m	-89F22
	Bulletin 700CF 4-pole relay – 3 N.O. and 1 N.C.		-89F31
	Bulletin 700CF 4-pole relay – 4 N.O.		-89F40
Control Relays	On-Delay	a...h	-89FOD
	Off-Delay		-89FOFD
Auxiliary Contacts ❸	N.O. auxiliary contacts for 24…240 A units	a...g	-90
	N.O. auxiliary contacts for 360…1000 A units	h...m	
	N.C. auxiliary contacts for 24…240 A units	a...g	-91
	N.C. auxiliary contacts for 360…1000 A units	h...m	
	1 N.O. ... 1 N.C. auxiliary contacts for 24...240 A units	a...g	-901
	1 N.O. ... 1 N.C. auxiliary contacts for 360...1000 A units	h...m	
Disconnect Auxiliary ❹	N.O. disconnect auxiliary mounted on operating mechanism	a...m	-98
	N.C. disconnect auxiliary mounted on operating mechanism		-99
Circuit Breaker Disconnect Auxiliary ❺	Internal N.O. circuit breaker auxiliary	a...m	-98X
	Internal N.C. circuit breaker auxiliary		-99X
High Interrupting Circuit Breaker	High Interrupting Circuit Breaker for 24...54 A units	a...c	-HICB
	High Interrupting Circuit Breaker for 97...180 A units	d...f	
	High Interrupting Circuit Breaker for 240 A units	g	
	High Interrupting Circuit Breaker for 360 A units	h	
	High Interrupting Circuit Breaker for 500 A units	i	
	High Interrupting Circuit Breaker for 650...720 A units	j...k	
	High Interrupting Circuit Breaker for 850...1000 A units	l...m	

❶ Only the contactor will be provided. For motor horsepower above 500 consult factory for sizing and pricing.
❷ Instantaneous auxiliary contacts on Bulletin 700F relays are non-convertible.
❸ Available only with enclosed Bulletin 150, 152 and 153 devices with an isolation contactor or bypass contactor. Maximum of four (4) auxiliary contacts.
❹ Available only with Bulletin 152 and 153 devices. Maximum of two (2) disconnect auxiliaries.
❺ Available only with Bulletin 153 devices. Maximum of two (2) disconnect auxiliaries.

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Option	Description	Price Adder Code	Cat. No. Modification
Shunt Trip ❶	Circuit Breaker Shunt Trip for 24…54 A units	a...c	-754
	Circuit Breaker Shunt Trip for 97…135 A units	d...e	
	Circuit Breaker Shunt Trip for 180…240 A units	f...g	
	Circuit Breaker Shunt Trip for 360…500 A units	h...i	
	Circuit Breaker Shunt Trip for 650…850 A units	j...l	
	Circuit Breaker Shunt Trip for 1000 A units	m	
Additional Load Circuit Breakers ❷	Additional load circuit breakers to be installed in panel. Customer is to stipulate size and quantity.	a...m	-ALCB
Line Voltage Monitor	Bulletin 813S Line Voltage Monitor	a...m	-813S
Thermistor Protection Relay	Bulletin 817 Thermistor Protection Relay	a...m	-817
Smart Motor Manager	Bulletin 825 Smart Motor Manager and Bulletin 825 Converter Module	a...m	-SMM
IQ1000 Protective Relay	Cutler-Hammer IQ1000 Protective Relay	a...m	-IQ1000
Multilin 269 Plus	GE Multilin 269 Plus Protective Relay	a...m	-269PLUS
Transducer Output	4…20 mA output signal proportional to 1…100% motor FLC	a...m	-TO
Ground Fault Protection	Bulletin 1409 Arcing Ground Fault Relay and Sensor for applications up to 400 HP	a...i	-GFP
Motor Winding Heater ❷	Bulletin 1410 Motor Winding Heater for applications up to 600 HP	a...e f…g h…i j…k	-MWH
Lightning Arrestor	Lightning Surge Protection	a...m	-LA
Strip Heater	Cabinet Strip Heater with Thermostat	a...m	-SH
Service Entrance Label	Service Entrance Label	a...j k…l	-SEL
U.L. Label	U.L. Label	a...m	-UL
Unwired Terminal Blocks	Panel Mounted Unwired Terminal Blocks 6 or 12 position	a...m	-TB6
			-TB12
Panel Mount ❸	Components mounted on enclosure mounting plate only	a...m	-PM
Specified Panel Dimensions ❸	Customer is to stipulate panel dimensions	a...m	-SPD
Enclosure Color (Custom Paint) ❸	Customer is to stipulate paint color for enclosure	a...m	-EC
Enclosure Shock Mounts ❸	Ship Board – MIL-S-901D	a...m	-SM
Enclosure Type NEMA 3R ❹	Enclosure Type NEMA 3R Non-Combination	a…c d…e f…h i…m	❺
Enclosure Type NEMA 3R ❹	Enclosure Type NEMA 3R Combination	a…c d…e f…h i…m	❺

❶ Available only with Bulletin 153 devices.
❷ Requires an isolation contactor on the output of the SMC.
❸ Pricing to be determined upon request.
❹ To order a non-combination or combination enclosed controller with a NEMA 3R enclosure, add an “H” to the enclosure type prefix. Example: **Cat. No. 152H-B240HBD-54**. See pages 41…42. Enclosure dimensions are subject to change. Consult factory for dimensions. Enclosure price adder is to be added to NEMA 12 non-combination or combination price.
❺ Consult factory for pricing.

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Option	Description	Price Adder Code	Cat. No. Modification
Enclosure Type NEMA 4X Stainless Steel ❶	Enclosure Type NEMA 4X Stainless Steel Non-Combination	a…d e…f g…h i…m	❹
Enclosure Type NEMA 4X Stainless Steel ❶	Enclosure Type NEMA 4X Stainless Steel Combination	a…c d…e f…h i…m	❹
Air Conditioning ❷	AC Unit mounted on enclosure	a...m	-AC
Wiring Diagrams	AutoCad Drawing of panel wiring	a...m	-WD
Print Approval ❸	Customer Requested Print Approval Drawings	a...m	-PA

❶ To order a non-combination or combination enclosed controller with a NEMA 4X stainless steel enclosure, add an “S” to the enclosure type prefix. Example: **Cat. No 152H-B240SBD-54**. See pages 41…42. Enclosure dimensions are subject to change. Consult factory for dimensions. Enclosure price adder is to be added to the NEMA 12 non-combination or combination price.
❷ Pricing to be determined upon request.
❸ Order to be released to manufacturing upon return of signed approval drawing.
❹ Consult factory for pricing.

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Electrical Ratings		Cat. No. 150-A24…	150-A35…	150-A54…	150-A97…	150-A135…	150-A180…	150-A240…
Rated Operating Voltage		200…480V or 200…600V						
Rated Operating Current	(A)	24	35	54	97	135	180	240
Maximum Heat Dissipation	(Watts)	110	150	200	285	490	660	935
Cable Size ❶	Power Terminals	2.5…25 mm^2 #14…#4 AWG		16…120 mm^2 #6…#4/0 AWG		16…120 mm^2 #6…#4/0 AWG		
	Control Terminals	1.5…4.0 mm^2 (#18…#12 AWG) all sizes						
Thermal Capacity		NEMA MG1 IEC 34 (S1)						
Control Module Voltage		Single Phase 100…240V 50/60 Hz						
	Power Requirements	30 VA	30 VA	30 VA	30 VA	30 VA	30 VA	30 VA
	Heatsink Fan	—	—	—	45 VA	45 VA	45 VA	45 VA
Auxiliary Contact Rating		N.O. 240V AC Max., 24V Min., Make 4700 VA, Break 470 VA N.C. 240V AC Max., 24V Min., Make 2750 VA, Break 275 VA						
Electrical Design Specifications/Test Requirements								
Repetitive Peak Inverse Voltage Rating		(208…480V) 1400V (208…600V) 1600V						
Selectable Across-the-Line Starting		1/4 second						
Selectable Soft Start Times		2, 5, 10, 20, 25 & 30 seconds						
Stall Trip Time Corresponding to Start Times		5, 7, 10, 20, 25 & 30 seconds						
Selectable Kickstart Times		0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0						
Selectable Current Limit Starting		50…500% of Full Load Current						
Selectable Soft Stop Times		2, 5, 10, 20, 25, 30, 40, 50, 60 seconds						
Selectable Pump Starting Times		2, 5, 10, 20, 25, 30 seconds						
Selectable Pump Stopping Times		2, 4, 5, 10, 20, 25, 30, 40, 50, 60, 80, 100, 120 seconds						
Selectable Preset Slow Speed		7% & 15% forward speed; 10% or 20% reverse speed; 50…450% of Full Load Current						
Selectable SMB Smart Motor Braking		150…400% of Full Load Current						
Selectable Accu-Stop		150…400% of Full Load Current						
Selectable Slow Speed with Braking		150…400% of Full Load Current						
Noise & RF Immunity		Surge Transient Peak 3000V. Showering Arc 1500V						
DV/DT Protection		RC Snubber Network						
Transient Protection		Metal Oxide Varistors: (220 Joules @ 24 A…360 A; 220 Joules @ 480V 500 A…1000 A & 300 Joules @ 600V 500 A…1000 A)						

Fuse Clip Sizing and Type for Fusible Combination Controllers ❷ ❸

Horsepower @ 480V	Fuse Clip Size/Type	Fuse Size Range (A)
15	30 A/Class R	0…30
20	60 A/Class R	31…60
25	60 A/Class R	31…60
30	60 A/Class R	31…60
40	100 A/Class R	61…100
50	100 A/Class R	61…100
60	200 A/Class R	101…200
75	200 A/Class R	101…200
100	200 A/Class R	101…200
125	400 A/Class R	101…200
150	400 A/Class R	201…400

Horsepower @ 480V	Fuse Clip Size/Type	Fuse Size Range (A)
200	400 A/Class R	201…400
250	600 A/Class R	401…600
300	600 A/Class R	401…600
350	1200 A/Class L	601…1600
400	1200 A/Class L	601…1600
450	1200 A/Class L	601…1600
500	1200 A/Class L	601…1600
600	1200 A/Class L	601…1600
700	1200 A/Class L	601…1600
800	1200 A/Class L	601…1600

Circuit Breaker Sizes and Rating Plug Sizes

Horsepower @ 480V	Circuit Breaker Size (A)/ Rating Plug Size (A)	Interrupting Rating in Symmetrical Amps @ 480V
15	150/50	14,000
20	150/50	14,000
25	150/60	14,000
30	150/70	14,000
40	150/100	14,000
50	150/125	14,000
60	250/150	25,000
75	250/175	25,000
100	250/225	25,000
125	250/250	25,000
150	400/300	35,000

Horsepower @ 480V	Circuit Breaker Size (A)/ Rating Plug Size (A)	Interrupting Rating in Symmetrical Amps @ 480V
200	400/400	35,000
250	600/500	35,000
300	600/600	35,000
350	800/800	35,000
400	800/800	50,000
450	1200/1000	50,000
500	1200/1200	50,000
600	1200/1200	50,000
700	2000/1600	65,000
800	2000/2000	65,000

❶ 97…1000 A units require addition of appropriate lugs.
❷ Consult NEC Handbook for proper fuse sizing guidelines.
❸ Optional fuse clip sizes and types are available upon request. Consult Allen-Bradley Sales Office.

Functional Design Specifications			Cat. No. 150-A24…	150-A35…	150-A54…	150-A97…	150-A135…	150-A180…	150-A240…
Standard Features	Set-up	Wiring Adjustments	The SMC PLUS controller may be wired with or without a motor starter. The SMC PLUS controller is configured with DIP switches and rotary digital switches.						
	Starting	3 modes Protection	Soft Start with Kickstart, Current Limit, Full Voltage in one unit. The controller has pre-start and run protection from phase loss and shorted SCRs.						
		Status and Diagnostic Indicators	Dual purpose LEDs are provided to indicate the status of the unit. The LEDs indicate Control Voltage Present, Running Mode, Starting Mode, Stopping Mode, Energy Saver, Start Fault, Stalled Motor, Temperature Fault and Line Fault.						
	Running	Protection	Stall protection available during starting and run condition for additional motor protection. Built-in energy saver available for low load conditions.						
		Energy Level							
	Set-up	Wiring	2- and 3-wire control for a wide variety of applications.						
	Auxiliary Contacts		Configurable auxiliary contacts provided for either up-to-speed or instantaneous operation. 1 N.O. – 1 N.C. auxiliary contact provided as standard.						
Optional Features	Soft Stop		Extended coast to rest to minimize load shifting. Ramp down time is adjustable from 2 to 60 seconds.						
	Pump Control		Reduces surges in a pumping system during starting and stopping. Starting time is adjustable from 2…30 seconds. Stopping time is adjustable from 2…120 seconds.						
	Preset Slow Speed		Slow speed for positioning material. The Preset Slow Speed can be set for Low (7% of base speed), High (15% of base speed), Reverse Low (10% of base speed) or Reverse High (20% of base speed). Slow speed current can be adjusted to 50…450% of full load current.						
	SMB Smart Motor Braking		Provides motor braking for applications which require the motor to stop quickly. Braking current is adjustable from 150…400% of full load current.						
	Accu-Stop		Combines Smart Motor Braking and Preset Slow Speed. Braking current is adjustable from 150…400% of full load current. Slow speed can be set for either Low (7% of base speed) or High (15% of base speed).						
	Slow Speed with Braking		Combines Smart Motor Braking and Preset Slow Speed for applications that require slow set-up speeds and braking to a stop.						

Mechanical Design Specifications/Test Requirements		
Resistance to Vibration		2.5 G for 60 minutes
Resistance to Shock		30 G for 11 mSecs
Construction	Power Poles:	Thermoset Moldings 24…135 A Heatsink hockey puck thyristor 180…1000 A
	Control Modules:	Thermoset & Thermoplastic Moldings
	Metal Parts:	Anodized Aluminum, Plated Brass, Copper or Painted Steel
Terminals	Power Terminals:	Up to -A54: 6.0 mm hole with clamp screw -A97 & -A135 Line & Load; One 11.5 mm (0.453) dia. hole each -A180, -A240 & -A360 Line & Load: One 10.5 mm (0.413) dia. hole each -A500 Line & Load: Two 13.5 mm (0.531) dia. hole each -A650 & -A720 Line & Load: Three 13.1 mm (0.515) dia. hole each -A850 & -A1000 Line & Load: Six 13.1 mm (0.515) dia. hole each
	Control Terminals:	UNC 6-32 Screw with self-tilting clamp plate
	Power Terminal Marking:	NEMA, CENELEC EN50 012

Environmental		
Temperature	Operating	0°C…+50°C (32°F…122°F)
	Storage	–40°C…+85°C (–40°F…185°F)
Altitude		2000 meters (6560 feet)
Humidity		5…95% Relative Humidity (non-condensing)

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Electrical Ratings			Cat. No. 150-A360…	150-A500…	150-A650…	150-A720…	150-A850…	150-A1000…
Rated Operating Voltage			200V…480V or 200V…600V					
Rated Operating Current		(A)	360	500	650	720	850	1000
Maximum Heat Dissipation		(Watts)	1170	1400	2025	2250	2400	2760
Cable Size	Power Terminals		2x16…120 mm^2 #6…#4/0 AWG		25 mm^2…240 mm^2 #4…#500 MCM		50…240 mm^2 1/0…500 MCM	
	Control Terminals		1.5…4.0 mm^2 (#18…#12 AWG) all sizes					
Thermal Capacity			NEMA MG1 IEC 34 (S1)					
Control Module Voltage			110…120V 50/60 Hz or 220…240V 50/60 Hz					
	Power Requirements		30 VA	30 VA	30 VA	30 VA	30 VA	30 VA
	Heatsink Fan		45 VA	145 VA	320 VA	320 VA	320 VA	320 VA
Auxiliary Contact Rating			N.O. 240V AC Max., 24V Min., Make 4700 VA, Break 470 VA N.O. 240V AC Max., 24V Min., Make 2750 VA, Break 275 VA					

Electrical Design Specifications/Test Requirements	
Repetitive Peak Inverse Voltage Rating	480V…1400V 600V…1600V
Selectable Across-the-Line Starting	1/4 second
Selectable Soft Start Times	2, 5, 10, 20, 25 & 30 seconds
Stall trip time corresponding to Start Times	5, 7, 10, 20, 25 & 30 seconds
Selectable Kickstart Times	0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0
Selectable Current Limit Starting	50…500% of Full Load Current
Selectable Soft Stop Times	2, 5, 10, 20, 25, 30, 40, 50, 60 seconds
Selectable Pump Starting Times	2, 5, 10, 20, 25, 30 seconds
Selectable Pump Stopping Times	2, 4, 5, 10, 20, 25, 30, 40, 50, 60, 80, 100, 120 seconds
Selectable Preset Slow Speed	7% & 15% forward speed; 10% or 20% reverse speed; 5%…450% of Full Load Current
Selectable SMB Smart Motor Braking	150…400% of Full Load Current
Selectable Accu-Stop	150…400% of Full Load Current
Selectable Slow Speed with Braking	150…400% of Full Load Current
Noise & RF Immunity	Surge Transient Peak 3400V. Showering Arc 1500V
DV/DT Protection	RC Snubber Network
Transient Protection	Metal Oxide Varistors: (220 Joules @ 24 A…360 A; 220 Joules @ 480V 500…1000 A & 300 Joules @ 600V 500…1000 A)

Mechanical Design Specifications/Test Requirements		
Resistance to Vibration Resistance to Shock	2.5 G for 60 minutes 30 G for 11 mSecs	
Construction	Power Poles:	Thermoset Moldings 24…135 A Heatsink hockey puck thyristor 180…1000 A
	Control Modules:	Thermoset & Thermoplastic Moldings
	Metal Parts:	Anodized Aluminum, Plated Brass, Copper or Painted Steel
Terminals	Power Terminals:	Up to -A54: 6.0 mm hole with clamp screw -A97 & -A135 Line & Load; One 11.5 mm (0.453) dia. hole each -A180, -A240 & -A360 Line & Load: One 10.5 mm (0.413) dia. hole each -A500 Line & Load: Two 13.5 mm (0.531) dia. hole each -A650 & -A720 Line & Load: Three 13.1 mm (0.515) dia. hole each -A850 & -A1000 Line & Load: Six 13.1 mm (0.515) dia. hole each
	Control Terminals:	UNC 6-32 Screw with self-tilting clamp plate
	Power Terminal Marking:	NEMA, CENELEC EN50 012

Environmental		
Temperature	Operating	0°C…+50°C (32°F…122°F)
	Storage	–40°C…+85°C (–40°F…185°F)
Altitude		2000 meters (6560 feet)
Humidity		5…95% Relative Humidity (non-condensing)

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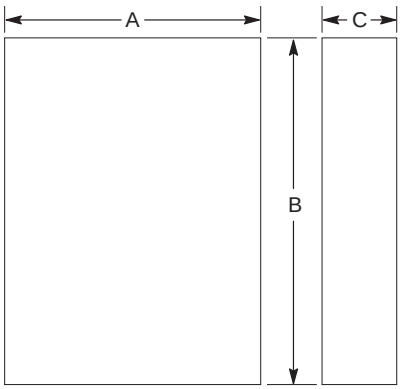
Dimensions are in millimeters (inches). Dimensions are not intended for manufacturing purposes

Enclosed Type Controllers



Open Type Controllers

Controller	Dimensions in Millimeters (Inches)			Approx. Ship Wt. kg (lbs)
	Width	Height	Depth	
24 A	155 (6-1/16)	180 (7-1/8)	160 (6-1/4)	4.5 (10)
35 A	215 (8-7/16)	240 (9-1/2)	170 (6-5/8)	6.8 (15)
54 A	245 (9-5/8)	290 (11-7/16)	200 (7-13/16)	11.3 (25)
97 A	248 (9-3/4)	336 (13-1/4)	230 (9-1/16)	10.4 (23)
135 A	248 (9-3/4)	336 (13-1/4)	230 (9-1/16)	11.8 (26)
180 A	273 (10-3/4)	560 (22-1/16)	268 (10-9/16)	25 (55)
240 A	273 (10-3/4)	560 (22-1/16)	268 (10-9/16)	30 (65)
360 A	273 (10-3/4)	560 (22-1/16)	268 (10-9/16)	30 (65)
500 A	508 (20)	609.6 (24)	304.8 (12)	40.8 (90)

❶ All dimensions are subject to change.
❷ Any options added to enclosed controllers may change size of enclosure. Consult Allen-Bradley Sales Office.

Enclosed Type Controllers ❶❷

Dimension Code	Dimensions in Millimeters (Inches)		
	A Width	B Height	C Depth
	Non-Combination Controller		
Q	244 (9-5/8)	410 (16-1/8)	220 (8-2/3)
R	610 (24)	762 (30)	254 (10)
S	610 (24)	762 (30)	305 (12)
T	762 (30)	915 (36)	305 (12)
U	915 (36)	1219 (48)	305 (12)
V	965 (38)	1524 (60)	305 (12)
W	635 (25)	2286 (90)	508 (20)
X	889 (35)	2286 (90)	508 (20)
Y	1397 (55)	2286 (90)	508 (20)
Z	1524 (60)	2286 (90)	508 (20)
Z1	1778 (70)	2286 (90)	508 (20)
	Combination Controllers with Fusible Disconnect		
S	559 (22)	609.6 (24)	203.2 (8)
T	813 (32)	914 (36)	304.8 (12)
U & V	965 (38)	1219 (48)	304.8 (12)
W	965 (38)	1524 (60)	304.8 (12)
X1	762 (30)	2286 (90)	508 (20)
X2	965 (38)	1524 (60)	356 (14)
Y1	1143 (45)	2286 (90)	508 (20)
Y2	1270 (50)	2286 (90)	508 (20)
Z1	1397 (55)	2286 (90)	508 (20)
Z2	1778 (70)	2286 (90)	508 (20)
Z3	2667 (105)	2286 (90)	508 (20)
	Combination Controllers with Circuit Breaker		
S	559 (22)	609.6 (24)	203.2 (8)
T & U	813 (32)	914 (36)	304.8 (12)
V	965 (38)	1219 (48)	304.8 (12)
W	965 (38)	1524 (60)	304.8 (12)
X	762 (30)	2286 (90)	508 (20)
Y1	889 (35)	2286 (90)	508 (20)
Y2	1397 (55)	2286 (90)	508 (20)
Y3	2667 (105)	2286 (90)	508 (20)
Z	1778 (70)	2286 (90)	508 (20)

Bulletin 150

- **SMC Dialog Plus™ Smart Motor Controller**
  - **24…1000 A Ratings**
  - **4 Standard Start Modes**
  - **Options Include:**
    - **Soft Stop**
    - **Pump Control**
    - **Preset Slow Speed**
    - **SMB Smart Motor Braking**
    - **Accu-Stop**
    - **Slow Speed with Braking**

TABLE OF CONTENTS

Description

The SMC Dialog Plus controller provides microprocessor controlled starting for standard three-phase squirrel-cage induction motors. Four standard modes of operation are available within a single controller:

- Soft Start with Selectable Kickstart
- Current Limit Start
- Dual Ramp Start
- Full Voltage Start

Features

- Motor Protection
- Metering
- SCANport Communication
- LCD Display
- Keypad Programming
- Three Programmable Auxiliary Contacts

The SMC Dialog Plus controller is available for motors rated 1…1000 A; 200…480V AC, or 200…600V AC, 50 and 60 Hz. In addition to motors, the SMC Dialog Plus controller can be used to control resistive loads.

For prices, consult your local Allen-Bradley Sales Office or the Master Price List.

Optional SMC Easy Ship Program

- Non-Combination Controllers — Cat. Nos. printed in blue will ship in two working days.
- Combination Controllers — Cat. Nos. printed in blue will ship in four working days.
- Contact your distributor for availability
- Orders for multiple quantities may increase lead time.

Your order must include:

- Cat. No. of the controller selected.
- Options (if required).
- Accessories (if required).

Starting and Stopping Options

The following options are available in the SMC Dialog Plus controller:

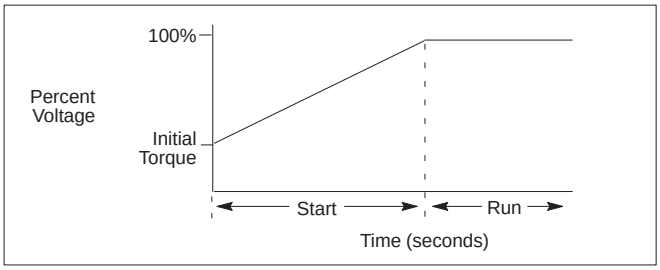
- Soft Stop
- Pump Control
- Preset Slow Speed
- SMB Smart Motor Braking
- Accu-Stop
- Slow Speed with Braking

Modes of Operation

The SMC Dialog Plus controller provides the following modes of operation: Soft Start with selectable Kickstart, Current Limit Start, Dual Ramp Start, and Full Voltage Start.

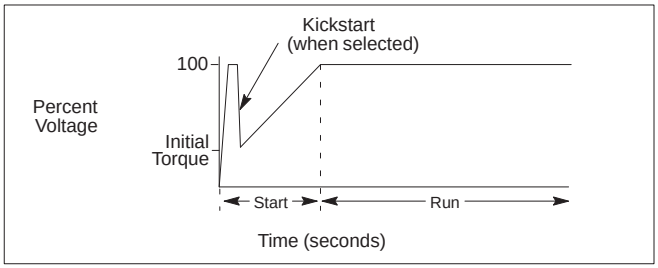
Soft Start

This method has the most general application. The motor is raised to an initial torque value which is programmable from 0…90% of locked rotor torque. The motor voltage is gradually increased during the acceleration ramp time, which can be programmed from 0…30 seconds.



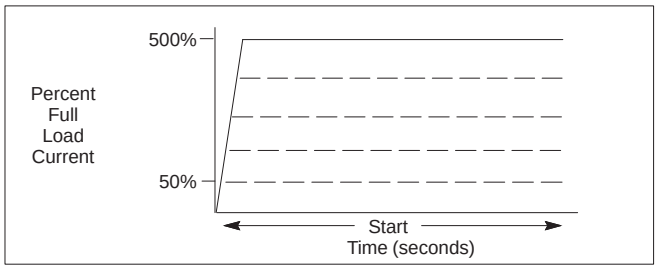
Soft Start with Selectable Kickstart

A kickstart, or boost, at the beginning of the voltage ramp is intended to provide a current pulse of 550% of full load current. The kickstart time is adjustable from 0.0…2.0 seconds. This allows the motor to develop additional torque at start for loads which may need a boost to get started.



Current Limit Start

This starting mode is used when it is necessary to limit the maximum starting current. The current limit can be programmed for 50…600% of full load current.

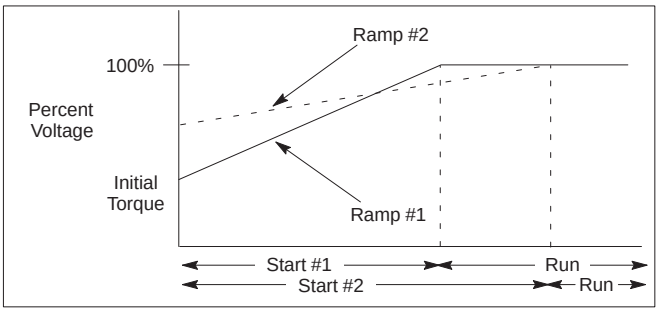


Dual Ramp Start

This starting mode is useful on applications that have varying loads and therefore varying starting torque requirements. The Dual Ramp Start offers the user the option to select between two separate Soft Start profiles with separately adjustable ramp times and initial torque settings.

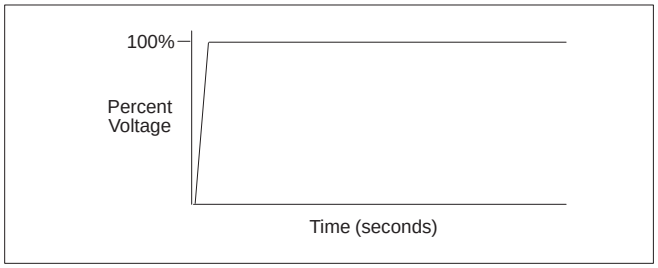
The acceleration ramp times can be programmed from 0…30 seconds. The initial torque values can be programmed from 0…90% of locked rotor torque.

Note: Dual Ramp is only available with the standard controller.



Full Voltage Start

This mode is used for applications requiring across-the-line starting. The ramp time is less than 1/4 second.



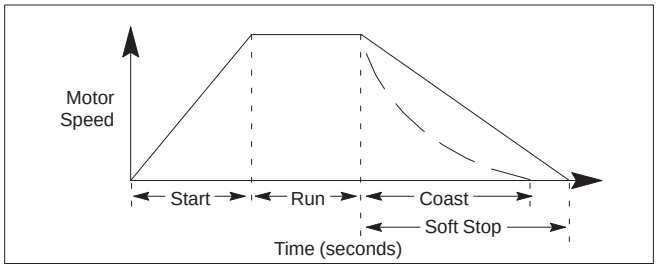
Description of Starting and Stopping Options

The following options are available in the SMC Dialog Plus controller. Only one option may be added to the standard unit.

Soft Stop ❶

This option can be used on applications that require an extended coast to rest. It is designed for frictional loads that tend to stop suddenly when voltage is removed from the motor.

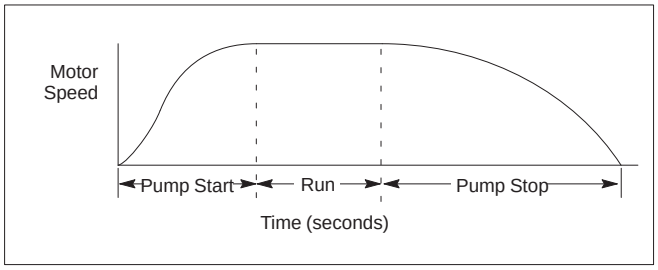
The voltage ramp down time can be programmed from 0…60 seconds. The load will stop when the motor voltage drops to a point where the load torque is greater than the motor torque.



Pump Control ❶

This option is used to reduce surges during the starting and stopping of a centrifugal pump by smoothly accelerating and decelerating the motor. The microprocessor analyzes the motor variables and generates commands which control the motor and reduce the possibility of surges occurring in the system.

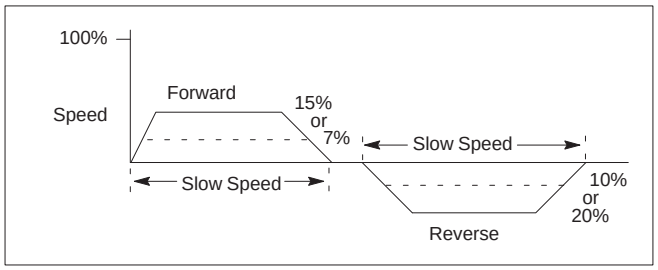
The starting time is programmable from 0…30 seconds and the stopping time is programmable from 0…120 seconds.



Preset Slow Speed

This option can be used on applications that require a slow speed (for example, moving material into position).

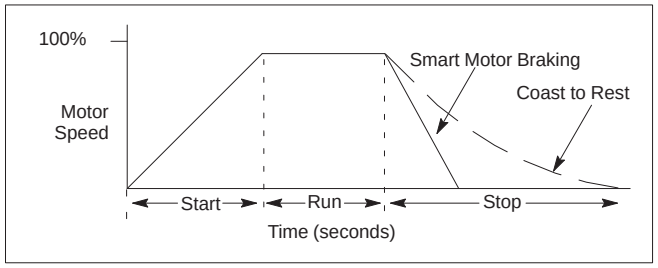
The preset slow speed can be programmed for either 7% of base speed (low) or 15% of base speed (high) in the forward direction. It can also be set for 10% of base speed (low) or 20% of base speed (high) in the reverse direction without a reversing contactor.



SMB Smart Motor Braking ❶

This option provides motor braking for applications that require the motor to stop faster than a coast to rest. Braking control, with automatic zero speed shut off, is fully integrated into the compact design of the SMC Dialog Plus controller. This design facilitates a clean, straightforward installation and eliminates the requirement for additional hardware such as braking contactors, resistors, timers, and speed sensors.

The microprocessor based braking system applies braking current to a standard squirrel cage induction motor. The strength of the braking current is programmable from 150…400% of full load current.

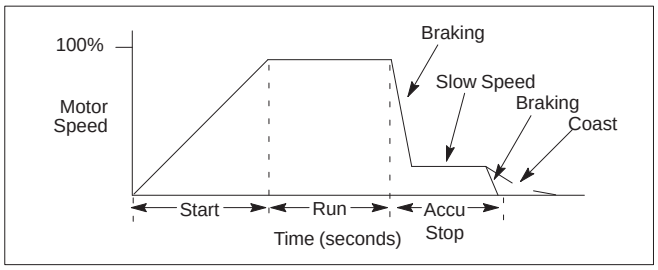


❶ Not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

Accu-Stop ❶

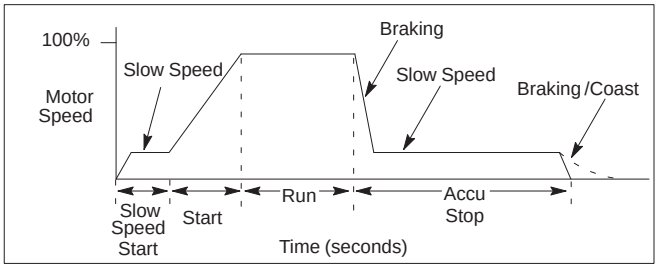
This option is used in applications requiring controlled position stopping. During stopping, braking torque is applied to the motor until it reaches preset slow speed (7 or 15% of rated speed) and holds the motor at this speed until a stop command is given. Braking torque is then applied until the motor reaches zero speed.

Braking current is programmable from 0…400% of full load current. Slow Speed Current is programmable from 0…450% of full load current. Slow speed can be programmed for either 7% (low) or 15% (high).



Accu-Stop with Slow Speed at Start ❶

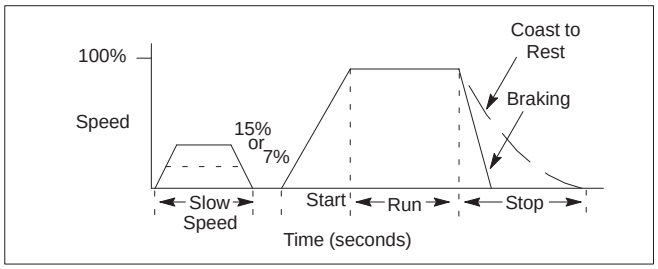
The Accu-Stop option can also allow the motor to operate at a preset slow speed when Slow Speed Start is selected. This minimizes the jogging required to position a load. The start command will ramp the voltage from the preset slow speed to full speed. The operation of Accu-Stop is the same as explained previously.



Slow Speed with Braking ❶

Slow Speed with Braking is used on applications that require slow speed (in the forward direction) for positioning or alignment and also require braking control to stop.

Slow speed adjustments are 7% (low) or 15% (high) of rated speed. Slow speed acceleration current is adjustable from 0…450%. Slow speed running current is adjustable from 0…450% of full load current. Braking current is adjustable from 0…400%.



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

Electronic Motor Overload Protection

The SMC Dialog Plus controller incorporates, as standard, electronic motor overload protection. This overload protection is accomplished electronically with an I^2t algorithm.

When coordinated with the proper short circuit protection, overload protection is intended to protect the motor, motor controller, and power wiring against overheating caused by excessive overcurrent. The SMC Dialog Plus controller meets applicable requirements as a motor overload protective device.

The controller's overload protection is programmable, providing the user with flexibility. The overload trip class can be selected for class 10, 15, 20 or 30 protection. The trip current is programmed by entering the motor full load current rating.

Thermal memory is included to accurately model motor operating temperature. Ambient insensitivity is inherent in the electronic design of the overload.

Note: The current sensing capability of the SMC Dialog Plus controller is disabled during bypass operation. The Bulletin 825 Converter Module is required for providing current feedback in these applications.

Note: To achieve calibration, 70% motor load or greater is required at the motor shaft for 2 seconds. Calibration is required when a Bulletin 825 Converter Module is not used.

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 Dialog Plus controller provides both stall protection and jam detection for enhanced motor and system protection. Stall protection allows the user to program a maximum stall protection delay time from 0…10 seconds. The stall protection delay time is in addition to the programmed start time and begins only after the start time has timed out. If the controller senses that the motor is stalled, it will shut down after the delay period has expired.

Jam detection allows the user to determine the motor jam detection level as a percentage of the motor's full load current rating. To prevent nuisance tripping, a jam detection delay time, from 0.0…10.0 seconds, can be programmed. This allows the user to select the time delay required before the SMC Dialog Plus controller will trip on a motor jam condition. The motor current must remain above the jam detection level during the delay time. Jam detection is active only after the motor has reached full speed.

Energy Saver

This is a standard feature with the SMC Dialog Plus controller. It is used to save energy on applications where the motor is lightly loaded or unloaded for long periods of time. The Energy Saver is a built-in feature of the controller. **It does not require additional panel space or external wiring.** And, it does not require a complicated setup procedure.

Phase Rebalance

The SMC Dialog Plus controller incorporates, as standard, a dynamic Phase Rebalance feature. The controller compensates for voltage unbalance by automatically adjusting the voltage output to balance the three-phase currents drawn by the motor. When phase rebalance is achieved, motor life may be extended and production can continue without interruption. Phase Rebalance is a built-in feature of the controller and does not require a complicated set-up procedure.

Note: Phase Rebalance requires the use of the Bulletin 825 Converter Module and the 150-NFS fanning strip.

Note: The performance of the Phase Rebalance feature is dependent on the motor's loading and characteristics. Severe imbalances cannot be corrected.

Underload Protection

Utilizing the underload protection of the SMC Dialog Plus controller, motor operation can be halted if a drop in current is sensed.

The SMC Dialog Plus controller 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…99 seconds.

Undervoltage Protection

The SMC Dialog Plus controller's undervoltage protection will halt 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…99%. To eliminate nuisance trips, a programmable undervoltage trip delay time of 0…99 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 Dialog Plus controller's overvoltage protection will halt motor operation.

The overvoltage trip level is adjustable as a percentage of the programmed line voltage, from 0…99%. To eliminate nuisance trips, a programmable overvoltage trip delay time of 0…99 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 controller 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.

Excessive Starts Per Hour

The SMC Dialog Plus controller allows the user to program the allowed number of starts per hour (up to 99). This helps eliminate motor stress caused by repeated starting during a short time period.

Metering
Power monitoring parameters include:

- Three-phase current
- Three-phase voltage
- Power in kW
- Power usage in kWH
- Power factor
- Motor thermal capacity usage
- Elapsed time

Note: The motor thermal capacity usage allows the user to monitor the amount of overload thermal capacity usage before the SMC Dialog Plus controller's built-in electronic overload trips.

Note: In bypass configurations, the current sensing and power factor measurement capability of the SMC Dialog Plus controller is disabled. Three-phase current measurement, kW, kWH, and motor thermal capacity usage can still be maintained with the use of the Bulletin 825 Converter Module.

Note: The usage of an SMC Controller on a generator and line power requires the use of a Bulletin 825 Converter Module.

Built-in SCANport Communication
A serial interface port is provided as standard, which allows connection to a Bulletin 1201 Human Interface Module or a variety of Bulletin 1203 Communication Modules. This includes Allen-Bradley Remote I/O, DeviceNet network and RS 232/422/485-DF1.

LCD Display
The SMC Dialog Plus controller's two-line 16-character backlit LCD display provides parameter identification using clear, informative text. Controller set up can be performed quickly and easily without the use of a reference manual. Parameters are arranged in an organized four-level menu structure for ease of programming and fast access to parameters.

Keypad Programming
Programming of parameters is accomplished through a five-button keypad on the front of the SMC Dialog Plus controller. The five buttons include up and down arrows, an Enter button, a Select button, and an Escape button. The user needs only to enter the correct sequence of keystrokes for programming the SMC Dialog Plus controller.

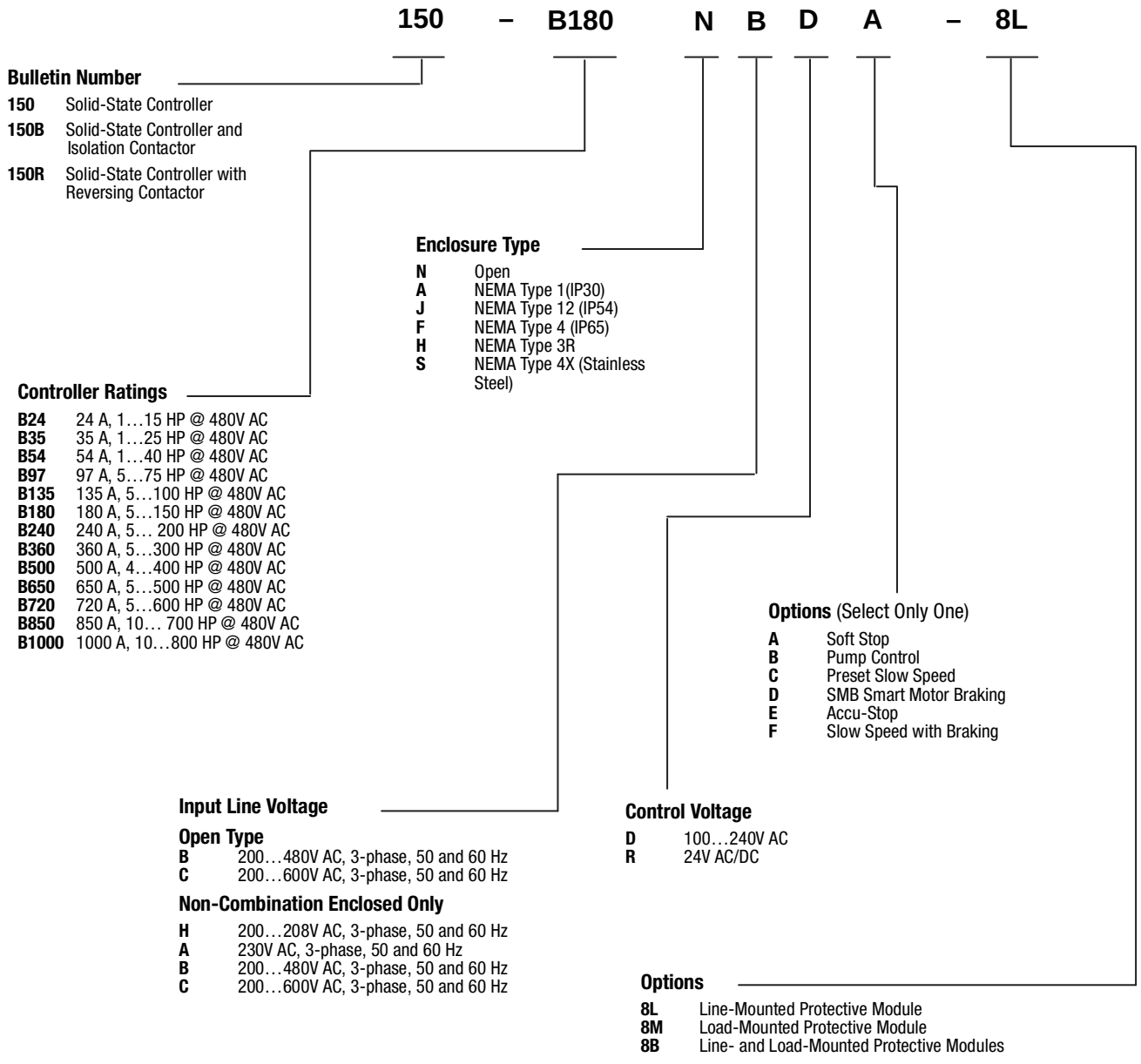
Auxiliary Contacts
Three hard contacts are furnished as standard with the SMC Dialog Plus controller. The first two contacts are programmable for Normal/Up-to-speed. The third is programmable for Normal/Fault.

Easy Ship Program
Select enclosed controllers are available with the following optional quick deliveries:

- Type 1 and Type 12 non-combination controllers rated 97…360 A, 208…480V AC, ship in 48 hours.
- Type 12 circuit breaker combination controllers rated 75…300 HP at 480V ship in 4 working days.

Cat. Nos. listed in blue type are available on the Easy Ship Program. Orders for multiple quantities may increase lead time. Consult your Allen-Bradley distributor for details.

Open and Non-Combination



Combination

152H – B240 A BD B – 52 – 8B

Controller Ratings

B24	24 A, 1…15 HP @ 480V AC
B35	35 A, 1…25 HP @ 480V AC
B54	54 A, 1…40 HP @ 480V AC
B97	97 A, 5…75 HP @ 480V AC
B135	135 A, 5…100 HP @ 480V AC
B180	180 A, 5…150 HP @ 480V AC
B240	240 A, 5…200 HP @ 480V AC
B360	360 A, 5…300 HP @ 480V AC
B500	500 A, 4…400 HP @ 480V AC
B650	650 A, 5…500 HP @ 480V AC
B720	720 A, 5…600 HP @ 480V AC
B850	850 A, 10…700 HP @ 480V AC
B1000	1000 A, 10…800 HP @ 480V AC

Control Options

A	Soft Stop
B	Pump Control
C	Preset Slow Speed
D	SMB Smart Motor Braking
E	Accu-Stop
F	Slow Speed with Braking

Line Voltage

HD	200…208V AC, 3-phase, 50 and 60 Hz
AD	230V AC, 3-phase, 50 and 60 Hz
BD	400…480V AC, 3-phase, 50 and 60 Hz
CD	500…600V AC, 3-phase, 50 and 60 Hz

Enclosure Type

A	NEMA Type 1 (IP30)
J	NEMA Type 12 (IP54)
F	NEMA Type 4 (IP65)
H	NEMA 3R
S	NEMA 4X (Stainless Steel)

Bulletin Number

152B	Solid-State Controller with Fusible Disconnect and Isolating Contactor
152H	Solid-State Controller with Fusible Disconnect
152R	Solid-State Controller with Fusible Disconnect and Reversing Contact
153B	Solid-State Controller with Circuit Breaker and Isolating Contactor
153H	Solid-State Controller with Circuit Breaker
153R	Solid-State Controller with Circuit Breaker and Reversing Contactor

Horsepower

Cat. No.	HP Rating	Cat. No.	HP Rating	Cat. No.	HP Rating	Cat. No.	HP Rating	Cat. No.	HP Rating
39	5	**44**	25	**49**	75	**56**	250	**61**	500
40	7.5	**45**	30	**50**	100	**57**	300	**62**	600
41	10	**46**	40	**51**	125	**58**	350	**63**	700
42	15	**47**	50	**52**	150	**59**	400	**65**	800
43	20	**48**	60	**54**	200	**60**	450	**67**	1000

Options

8L	Line-Mounted Protective Module
8M	Load-Mounted Protective Module
8B	Line- and Load-Mounted Protective Modules

Open Type Controllers

Up to 480V AC

Current ❶ Rating (A)	kW ❷		HP ❸			Price Adder Code	100 – 240V AC 50/60 Hz Control Cat. No.	24V AC/DC Control Cat. No.
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz			
24	5.5	11	1…5	1…7.5	1…15	a	150-B24NBD	150-B24NBR
35	10	18.5	1…10	1…10	1…25	b	150-B35NBD	150-B35NBR
54	15	22	1…15	1…20	1…40	c	150-B54NBD	150-B54NBR
97	25	45	5…30	5…30	5…75	d	150-B97NBD	150-B97NBR
135	37	75	5…40	5…50	5…100	e	150-B135NBD	150-B135NBR
180	51	90	5…60	5…60	5…150	f	150-B180NBD	150-B180NBR
240	75	132	5…75	5…75	5…200	g	150-B240NBD	150-B240NBR
360	110	200	5…125	5…150	5…300	h	150-B360NBD	150-B360NBR
500	150	257	5…150	5…200	5…400	i	150-B500NBD	150-B500NBR
650	200	355	5…200	5…250	5…500	j	150-B650NBD	150-B650NBR
720	220	400	5…250	5…300	5…600	k	150-B720NBD	150-B720NBR
850	257	475	10…300	10…350	10…700	l	150-B850NBD	150-B850NBR
1000	315	530	10…350	10…400	10…800	m	150-B1000NBD	150-B1000NBR

Up to 600V AC

Current ❶ Rating (A)	kW ❷			HP ❸				Price Adder Code	100 – 240V AC 50/60 Hz Control Cat. No.	24V AC/DC Control Cat. No.
	230V AC 50 Hz	400V AC 50 Hz	500V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz			
24	5.5	11	15	1…5	1…7.5	1…15	1…20	a	150-B24NCD	150-B24NCR
35	10	18.5	22	1…10	1…10	1…25	1…30	b	150-B35NCD	150-B35NCR
54	15	22	37	1…15	1…20	1…40	1…50	c	150-B54NCD	150-B54NCR
97	25	45	63	5…30	5…30	5…75	5…75	d	150-B97NCD	150-B97NCR
135	37	75	90	5…40	5…50	5…100	5…125	e	150-B135NCD	150-B135NCR
180	51	90	132	5…60	5…60	5…150	5…150	f	150-B180NCD	150-B180NCR
240	75	132	160	5…75	5…75	5…200	5…250	g	150-B240NCD	150-B240NCR
360	110	200	250	5…125	5…150	5…300	5…350	h	150-B360NCD	150-B360NCR
500	150	257	355	5…150	5…200	5…400	5…500	i	150-B500NCD	150-B500NCR
650	200	355	475	5…200	5…250	5…500	5…600	j	150-B650NCD	150-B650NCR
720	220	400	500	5…250	5…300	5…600	5…700	k	150-B720NCD	150-B720NCR
850	257	475	600	10…300	10…350	10…700	10…800	l	150-B850NCD	150-B850NCR
1000	315s	530	710	10…350	10…400	10…800	10…1000	m	150-B1000NCD	150-B1000NCR

❶ Controllers rated 97 A and greater are not equipped with line and load terminal lugs. See page 82 for terminal lug kits.
❷ The minimum rating is: 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices rated 850 A and greater.
❸ HP ratings at motor terminal voltages for 208, 480 and 600 line volts, respectively.

Options — Page 77
Accessories — Page 82
Specifications — Page 85
Approximate Dimensions — Page 89

IP30 (Type 1) Vented Enclosed Non-Combination Controllers

SMC Easy Ship program Cat. Nos. are printed in blue. See page 61.

Requires a separate 100 to 240V, 50/60 Hz single-phase control source. Line and load terminations are provided as standard. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

Current Rating (A)	HP 200V AC 60 Hz	Price Adder Code	Cat. No.
208V AC			
24	1…5	a	150-B24AHD❶
35	1…10	b	150-B35AHD❶
54	1…15	c	150-B54AHD❶
97	5…30	d	150-B97AHD
135	5…40	e	150-B135AHD
180	5…60	f	150-B180AHD
240	5…75	g	150-B240AHD
360	5…125	h	150-B360AHD
500	5…150	i	150-B500AHD
650	5…200	j	150-B650AHD
720	5…250	k	150-B720AHD
850	10…300	l	150-B850AHD
1000	10…350	m	150-B1000AHD

Current Rating (A)	kW ❷ 230V AC 50 Hz	HP 230V AC 60 Hz	Price Adder Code	Cat. No.
240V AC				
24	5.5	1…7.5	a	150-B24AAD❶
35	10	1…10	b	150-B35AAD❶
54	15	1…20	c	150-B54AAD❶
97	25	5…30	d	150-B97AAD
135	37	5…50	e	150-B135AAD
180	51	5…60	f	150-B180AAD
240	75	5…75	g	150-B240AAD
360	110	5…150	h	150-B360AAD
500	150	5…200	i	150-B500AAD
650	200	5…250	j	150-B650AAD
720	220	5…300	k	150-B720AAD
850	257	10…350	l	150-B850AAD
1000	315	10…400	m	150-B1000AAD

Current Rating (A)	kW ❷ 400V AC 50 Hz	HP 460V AC 60 Hz	Price Adder Code	Cat. No.
480V AC				
24	11	1…15	a	150-B24ABD❶
35	18.5	1…25	b	150-B35ABD❶
54	22	1…40	c	150-B54ABD❶
97	45	5…75	d	150-B97ABD
135	75	5…100	e	150-B135ABD
180	90	5…150	f	150-B180ABD
240	132	5…200	g	150-B240ABD
360	200	5…300	h	150-B360ABD
500	257	5…400	i	150-B500ABD
650	355	5…500	j	150-B650ABD
720	400	5…600	k	150-B720ABD
850	475	10…700	l	150-B850ABD
1000	530	10…800	m	150-B1000ABD

Current Rating (A)	kW ❷ 500V AC 50 Hz	HP 575V AC 60 Hz	Price Adder Code	Cat. No.
600V AC				
24	15	1…20	a	150-B24ACD❶
35	22	1…30	b	150-B35ACD❶
54	37	1…50	c	150-B54ACD❶
97	63	5…75	d	150-B97ACD
135	90	5…125	e	150-B135ACD
180	132	5…150	f	150-B180ACD
240	160	5…250	g	150-B240ACD
360	250	5…350	h	150-B360ACD
500	355	5…500	i	150-B500ACD
650	475	5…600	j	150-B650ACD
720	500	5…700	k	150-B720ACD
850	600	10…800	l	150-B850ACD
1000	710	10…1000	m	150-B1000ACD

❶ Includes internal circulating fan rather than enclosure ventilation.
❷ The minimum rating is 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices 850 A and greater.

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IP65 (Type 4) Enclosed Non-Combination Controllers

Require a separate 100 to 240V, 50/60 Hz single-phase control source. Line and load terminations are provided as standard. The 97 to 1000 A controllers include a bypass contactor and a Bulletin 825 converter module. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

Current Rating (A)	HP 200V AC 60 Hz	Price Adder Code	Cat. No.
208V AC			
24	1…5	a	150-B24FHD❶
35	1…10	b	150-B35FHD❶
54	1…15	c	150-B54FHD❶
97	5…30	d	150-B97FHD
135	5…40	e	150-B135FHD
180	5…60	f	150-B180FHD
240	5…75	g	150-B240FHD
360	5…125	h	150-B360FHD
500	5…150	i	150-B500FHD
650	5…200	j	150-B650FHD
720	5…250	k	150-B720FHD
850	10…300	l	150-B850FHD
1000	10…350	m	150-B1000FHD

Current Rating (A)	kW ❷ 230V AC 50 Hz	HP 230V AC 60 Hz	Price Adder Code	Cat. No.
240V AC				
24	5.5	1…7.5	a	150-B24FAD❶
35	10	1…10	b	150-B35FAD❶
54	15	1…20	c	150-B54FAD❶
97	25	5…30	d	150-B97FAD
135	37	5…50	e	150-B135FAD
180	51	5…60	f	150-B180FAD
240	75	5…75	g	150-B240FAD
360	110	5…150	h	150-B360FAD
500	150	5…200	i	150-B500FAD
650	200	5…250	j	150-B650FAD
720	220	5…300	k	150-B720FAD
850	257	10…350	l	150-B850FAD
1000	315	10…400	m	150-B1000FAD

Current Rating (A)	kW ❷ 400V AC 50 Hz	HP 460V AC 60 Hz	Price Adder Code	Cat. No.
480V AC				
24	11	1…15	a	150-B24FBD❶
35	18.5	1…25	b	150-B35FBD❶
54	22	1…40	c	150-B54FBD❶
97	45	5…75	d	150-B97FBD
135	75	5…100	e	150-B135FBD
180	90	5…150	f	150-B180FBD
240	132	5…200	g	150-B240FBD
360	200	5…300	h	150-B360FBD
500	257	5…400	i	150-B500FBD
650	355	5…500	j	150-B650FBD
720	400	5…600	k	150-B720FBD
850	475	10…700	l	150-B850FBD
1000	530	10…800	m	150-B1000FBD

Current Rating (A)	kW ❷ 500V AC 50 Hz	HP 575V AC 60 Hz	Price Adder Code	Cat. No.
600V AC				
24	15	1…20	a	150-B24FCD❶
35	22	1…30	b	150-B35FCD❶
54	37	1…50	c	150-B54FCD❶
97	63	5…75	d	150-B97FCD
135	90	5…125	e	150-B135FCD
180	132	5…150	f	150-B180FCD
240	160	5…250	g	150-B240FCD
360	250	5…350	h	150-B360FCD
500	355	5…500	i	150-B500FCD
650	475	5…600	j	150-B650FCD
720	500	5…700	k	150-B720FCD
850	600	10…800	l	150-B850FCD
1000	710	10…1000	m	150-B1000FCD

❶ Includes an internal circulating fan instead of a bypass contactor.
❷ The minimum rating is 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices 850 A and greater.

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IP54 (Type 12) Enclosed Non-Combination Controllers

SMC Easy Ship program Cat. Nos. are printed in blue. See page 61.

Require a separate 100…240V, 50/60 Hz single-phase control source. Line and load terminations are provided as standard. The 97…1000 A controllers include a bypass contactor and a Bulletin 825 converter module. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

Current Rating (A)	HP 200V AC 60 Hz	Price Adder Code	Cat. No.
208V AC			
24	1...5	a	150-B24JHD❶
35	1...10	b	150-B35JHD❶
54	1...15	c	150-B54JHD❶
97	5...30	d	150-B97JHD
135	5...40	e	150-B135JHD
180	5...60	f	150-B180JHD
240	5...75	g	150-B240JHD
360	5...125	h	150-B360JHD
500	5...150	i	150-B500JHD
650	5...200	j	150-B650JHD
720	5...250	k	150-B720JHD
850	10...300	l	150-B850JHD
1000	10...350	m	150-B1000JHD

Current Rating (A)	kW ❷ 230V AC 50 Hz	HP 230V AC 60 Hz	Price Adder Code	Cat. No.
240V AC				
24	5.5	1...7.5	a	150-B24JAD❶
35	10	1...10	b	150-B35JAD❶
54	15	1...20	c	150-B54JAD❶
97	25	5...30	d	150-B97JAD
135	37	5...50	e	150-B135JAD
180	51	5...60	f	150-B180JAD
240	75	5...75	g	150-B240JAD
360	110	5...150	h	150-B360JAD
500	150	5...200	i	150-B500JAD
650	200	5...250	j	150-B650JAD
720	220	5...300	k	150-B720JAD
850	257	10...350	l	150-B850JAD
1000	315	10...400	m	150-B1000JAD

Current Rating (A)	kW ❷ 400V AC 50 Hz	HP 460V AC 60 Hz	Price Adder Code	Cat. No.
480V AC				
24	11	1...15	a	150-B24JBD❶
35	18.5	1...25	b	150-B35JBD❶
54	22	1...40	c	150-B54JBD❶
97	45	5...75	d	150-B97JBD
135	75	5...100	e	150-B135JBD
180	90	5...150	f	150-B180JBD
240	132	5...200	g	150-B240JBD
360	200	5...300	h	150-B360JBD
500	257	5...400	i	150-B500JBD
650	355	5...500	j	150-B650JBD
720	400	5...600	k	150-B720JBD
850	475	10...700	l	150-B850JBD
1000	530	10...800	m	150-B1000JBD

Current Rating (A)	kW ❷ 500V AC 50 Hz	HP 575V AC 60 Hz	Price Adder Code	Cat. No.
600V AC				
24	15	1...20	a	150-B24JCD❶
35	22	1...30	b	150-B35JCD❶
54	37	1...50	c	150-B54JCD❶
97	63	5...75	d	150-B97JCD
135	90	5...125	e	150-B135JCD
180	132	5...150	f	150-B180JCD
240	160	5...250	g	150-B240JCD
360	250	5...350	h	150-B360JCD
500	355	5...500	i	150-B500JCD
650	475	5...600	j	150-B650JCD
720	500	5...700	k	150-B720JCD
850	600	10...800	l	150-B850JCD
1000	710	10...1000	m	150-B1000JCD

❶ Includes an internal circulating fan instead of a bypass contactor.
❷ The minimum rating is 0.7 kW for devices with current ratings of 54 A or less; 4 kW for devices rated 97…720 A; 7.5 kW for devices 850 A and greater.

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IP30 (Type 1) Vented Enclosed Combination Controllers with Fusible Disconnect

Includes a 120V control transformer and line and load terminations. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
208V AC, 60 Hz			
1…5	24	a	152H-B24AHD-39❷
7-1/2	35	b	152H-B35AHD-40❷
10	35	b	152H-B35AHD-41❷
15	54	c	152H-B54AHD-42❷
20	54	c	152H-B54AHD-43❷
25	97	d	152H-B97AHD-44
30	97	d	152H-B97AHD-45
40	135	e	152H-B135AHD-46
50	180	f	152H-B180AHD-47
60	180	f	152H-B180AHD-48
75	240	g	152H-B240AHD-49
100	360	h	152H-B360AHD-50
125	360	h	152H-B360AHD-51
150	500	i	152H-B500AHD-52
200	650	j	152H-B650AHD-54
250	720	k	152H-B720AHD-56
300	850	l	152H-B850AHD-57
350	1000	m	152H-B1000AHD-58

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
240V AC, 60 Hz			
1…7-1/2	24	a	152H-B24AAD-40❷
10	35	b	152H-B35AAD-41❷
15	54	c	152H-B54AAD-42❷
20	54	c	152H-B54AAD-43❷
25	97	d	152H-B97AAD-44
30	97	d	152H-B97AAD-45
40	135	e	152H-B135AAD-46
50	135	e	152H-B135AAD-47
60	180	f	152H-B180AAD-48
75	240	g	152H-B240AAD-49
100	360	h	152H-B360AAD-50
125	360	h	152H-B360AAD-51
150	360	h	152H-B360AAD-52
200	500	i	152H-B500AAD-54
250	650	j	152H-B650AAD-56
300	720	k	152H-B720AAD-57
350	850	l	152H-B850AAD-58
400	1000	m	152H-B1000AAD-59

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
480V AC, 60 Hz			
1…15	24	a	152H-B24ABD-42❷
20	35	b	152H-B35ABD-43❷
25	35	b	152H-B35ABD-44❷
30	54	c	152H-B54ABD-45❷
40	54	c	152H-B54ABD-46❷
50	97	d	152H-B97ABD-47
60	97	d	152H-B97ABD-48
75	97	d	152H-B97ABD-49
100	135	e	152H-B135ABD-50
125	180	f	152H-B180ABD-51
150	180	f	152H-B180ABD-52
200	240	g	152H-B240ABD-54
250	360	h	152H-B360ABD-56
300	360	h	152H-B360ABD-57
350	500	i	152H-B500ABD-58
400	500	i	152H-B500ABD-59
450	650	j	152H-B650ABD-60
500	650	j	152H-B650ABD-61
600	720	k	152H-B720ABD-62
700	850	l	152H-B850ABD-63
800	1000	m	152H-B1000ABD-65

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
600V AC, 60 Hz			
1…20	24	a	152H-B24ACD-43❷
25	35	b	152H-B35ACD-44❷
30	35	b	152H-B35ACD-45❷
40	54	c	152H-B54ACD-46❷
50	54	c	152H-B54ACD-47❷
60	97	d	152H-B97ACD-48
75	97	d	152H-B97ACD-49
100	135	e	152H-B135ACD-50
125	135	e	152H-B135ACD-51
150	180	f	152H-B180ACD-52
200	240	g	152H-B240ACD-54
250	240	g	152H-B240ACD-56
300	360	h	152H-B360ACD-57
350	500	i	152H-B500ACD-58
400	500	i	152H-B500ACD-59
450	500	i	152H-B500ACD-60
500	500	i	152H-B500ACD-61
600	650	j	152H-B650ACD-62
700	7200	k	152H-B720ACD-63
800	850	l	152H-B850ACD-65
1000	1000	m	152H-B1000ACD-67

❶ The nominal current rating for the combination package may differ from the controller, based on the horsepower. Consult Allen-Bradley Sales Office.
❷ Includes internal circulating fan rather than enclosure ventilation.

IP54 (Type 12) Enclosed Combination Controllers with Fusible Disconnect

Include a 120V control transformer and line and load terminations. The 97 to 1000 A controllers include a bypass contactor and a Bulletin 825 converter module. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
208V AC, 60 Hz			
1...5	24	a	152H-B24JHD-39❷
7-1/2	35	b	152H-B35JHD-40❷
10	35	b	152H-B35JHD-41❷
15	54	c	152H-B54JHD-42❷
20	54	c	152H-B54JHD-43❷
25	97	d	152H-B97JHD-44
30	97	d	152H-B97JHD-45
40	135	e	152H-B135JHD-46
50	180	f	152H-B180JHD-47
60	180	f	152H-B180JHD-48
75	240	g	152H-B240JHD-49
100	360	h	152H-B360JHD-50
125	360	h	152H-B360JHD-51
150	500	i	152H-B500JHD-52
200	650	j	152H-B650JHD-54
250	720	k	152H-B720JHD-56
300	850	l	152H-B850JHD-57
350	1000	m	152H-B1000JHD-58

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
240V AC, 60 Hz			
1...7-1/2	24	a	152H-B24JAD-40❷
10	35	b	152H-B35JAD-41❷
15	54	c	152H-B54JAD-42❷
20	54	c	152H-B54JAD-43❷
25	97	d	152H-B97JAD-44
30	97	d	152H-B97JAD-45
40	135	e	152H-B135JAD-46
50	135	e	152H-B135JAD-47
60	180	f	152H-B180JAD-48
75	240	g	152H-B240JAD-49
100	360	h	152H-B360JAD-50
125	360	h	152H-B360JAD-51
150	360	h	152H-B360JAD-52
200	500	i	152H-B500JAD-54
250	650	j	152H-B650JAD-56
300	720	k	152H-B720JAD-57
350	850	l	152H-B850JAD-58
400	1000	m	152H-B1000JAD-59

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
480V AC, 60 Hz			
1...15	24	a	152H-B24JBD-42❷
20	35	b	152H-B35JBD-43❷
25	35	b	152H-B35JBD-44❷
30	54	c	152H-B54JBD-45❷
40	54	c	152H-B54JBD-46❷
50	97	d	152H-B97JBD-47
60	97	d	152H-B97JBD-48
75	97	d	152H-B97JBD-49
100	135	e	152H-B135JBD-50
125	180	f	152H-B180JBD-51
150	180	f	152H-B180JBD-52
200	240	g	152H-B240JBD-54
250	360	h	152H-B360JBD-56
300	360	h	152H-B360JBD-57
350	500	i	152H-B500JBD-58
400	500	i	152H-B500JBD-59
450	650	j	152H-B650JBD-60
500	650	j	152H-B650JBD-61
600	720	k	152H-B720JBD-62
700	850	l	152H-B850JBD-63
800	1000	m	152H-B1000JBD-65

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
600V AC, 60 Hz			
1...20	24	a	152H-B24JCD-43❷
25	35	b	152H-B35JCD-44❷
30	35	b	152H-B35JCD-45❷
40	54	c	152H-B54JCD-46❷
50	54	c	152H-B54JCD-47❷
60	97	d	152H-B97JCD-48
75	97	d	152H-B97JCD-49
100	135	e	152H-B135JCD-50
125	135	e	152H-B135JCD-51
150	180	f	152H-B180JCD-52
200	240	g	152H-B240JCD-54
250	240	g	152H-B240JCD-56
300	360	h	152H-B360JCD-57
350	500	i	152H-B500JCD-58
400	500	i	152H-B500JCD-59
450	500	i	152H-B500JCD-60
500	500	i	152H-B500JCD-61
600	650	j	152H-B650JCD-62
700	720	k	152H-B720JCD-63
800	850	l	152H-B850JCD-65
1000	1000	m	152H-B1000JCD-67

❶ The nominal current rating for the combination package may differ from the controller, based on the horsepower. Consult Allen-Bradley Sales Office.
❷ Supplied without bypass contactor or converter module.

IP30 (Type 1) Vented Enclosed Combination Controllers with Circuit Breaker

Includes a 120V control transformer and line and load terminations. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
208V AC, 60 Hz			
1...5	24	a	153H-B24AHD-39❷
7-1/2	35	b	153H-B35AHD-40❷
10	35	b	153H-B35AHD-41❷
15	54	c	153H-B54AHD-42❷
20	54	c	153H-B54AHD-43❷
25	97	d	153H-B97AHD-44
30	97	d	153H-B97AHD-45
40	135	e	153H-B135AHD-46
50	180	f	153H-B180AHD-47
60	180	f	153H-B180AHD-48
75	240	g	153H-B240AHD-49
100	360	h	153H-B360AHD-50
125	360	h	153H-B360AHD-51
150	500	i	153H-B500AHD-52
200	650	j	153H-B650AHD-54
250	720	k	153H-B720AHD-56
300	850	l	153H-B850AHD-57
350	1000	m	153H-B1000AHD-58

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
240V AC, 60 Hz			
1...7-1/2	24	a	153H-B24AAD-40❷
10	35	b	153H-B35AAD-41❷
15	54	c	153H-B54AAD-42❷
20	54	c	153H-B54AAD-43❷
25	97	d	153H-B97AAD-44
30	97	d	153H-B97AAD-45
40	135	e	153H-B135AAD-46
50	135	e	153H-B135AAD-47
60	180	f	153H-B180AAD-48
75	240	g	153H-B240AAD-49
100	360	h	153H-B360AAD-50
125	360	h	153H-B360AAD-51
150	360	h	153H-B360AAD-52
200	500	i	153H-B500AAD-54
250	650	j	153H-B650AAD-56
300	720	k	153H-B720AAD-57
350	850	l	153H-B850AAD-58
400	1000	m	153H-B1000AAD-59

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
480V AC, 60 Hz			
1...15	24	a	153H-B24ABD-42❷
20	35	b	153H-B35ABD-43❷
25	35	b	153H-B35ABD-44❷
30	54	c	153H-B54ABD-45❷
40	54	c	153H-B54ABD-46❷
50	97	d	153H-B97ABD-47
60	97	d	153H-B97ABD-48
75	97	d	153H-B97ABD-49
100	135	e	153H-B135ABD-50
125	180	f	153H-B180ABD-51
150	180	f	153H-B180ABD-52
200	240	g	153H-B240ABD-54
250	360	h	153H-B360ABD-56
300	360	h	153H-B360ABD-57
350	500	i	153H-B500ABD-58
400	500	i	153H-B500ABD-59
450	650	j	153H-B650ABD-60
500	650	j	153H-B650ABD-61
600	720	k	153H-B720ABD-62
700	850	l	153H-B850ABD-63
800	1000	m	153H-B1000ABD-65

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
600V AC, 60 Hz			
1...20	24	a	153H-B24ACD-43❷
25	35	b	153H-B35ACD-44❷
30	35	b	153H-B35ACD-45❷
40	54	c	153H-B54ACD-46❷
50	54	c	153H-B54ACD-47
60	97	d	153H-B97ACD-48
75	97	d	153H-B97ACD-49
100	135	e	153H-B135ACD-50
125	135	e	153H-B135ACD-51
150	180	f	153H-B180ACD-52
200	240	g	153H-B240ACD-54
250	240	g	153H-B240ACD-56
300	360	h	153H-B360ACD-57
350	500	i	153H-B500ACD-58
400	500	i	153H-B500ACD-59
450	500	i	153H-B500ACD-60
500	500	i	153H-B500ACD-61
600	650	j	153H-B650ACD-62
700	720	k	153H-B720ACD-63
800	850	l	153H-B850ACD-65
1000	1000	m	153H-B1000ACD-67

❶ The nominal current rating for the combination package may differ from the controller, based on the horsepower. Consult Allen-Bradley Sales Office.
❷ Includes internal circulating fan rather than enclosure ventilation.

IP54 (Type 12) Enclosed Combination Controllers with Circuit Breaker

Includes a 120V control transformer and line and load terminations. The 97…1000 A controllers include a bypass contactor and a Bulletin 825 converter module. Enclosures other than those listed are available; consult Allen-Bradley Sales Office.

SMC Easy Ship program Cat. Nos. are printed in blue. See page 61.

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
208V AC, 60 Hz			
1…5	24	a	153H-B24JHD-39❷
7-1/2	35	b	153H-B35JHD-40❷
10	35	b	153H-B35JHD-41❷
15	54	c	153H-B54JHD-42❷
20	54	c	153H-B54JHD-43❷
25	97	d	153H-B97JHD-44
30	97	d	153H-B97JHD-45
40	135	e	153H-B135JHD-46
50	180	f	153H-B180JHD-47
60	180	f	153H-B180JHD-48
75	240	g	153H-B240JHD-49
100	360	h	153H-B360JHD-50
125	360	h	153H-B360JHD-51
150	500	i	153H-B500JHD-52
200	650	j	153H-B650JHD-54
250	720	k	153H-B720JHD-56
300	850	l	153H-B850JHD-57
350	1000	m	153H-B1000JHD-58

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
240V AC, 60 Hz			
1…7-1/2	24	a	153H-B24JAD-40❷
10	35	b	153H-B35JAD-41❷
15	54	c	153H-B54JAD-42❷
20	54	c	153H-B54JAD-43❷
25	97	d	153H-B97JAD-44
30	97	d	153H-B97JAD-45
40	135	e	153H-B135JAD-46
50	135	e	153H-B135JAD-47
60	180	f	153H-B180JAD-48
75	240	g	153H-B240JAD-49
100	360	h	153H-B360JAD-50
125	360	h	153H-B360JAD-51
150	360	h	153H-B360JAD-52
200	500	i	153H-B500JAD-54
250	650	j	153H-B650JAD-56
300	720	k	153H-B720JAD-57
350	850	l	153H-B850JAD-58
400	1000	m	153H-B1000JAD-59

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
480V AC, 60 Hz			
1…15	24	a	153H-B24JBD-42❷
20	35	b	153H-B35JBD-43❷
25	35	b	153H-B35JBD-44❷
30	54	c	153H-B54JBD-45❷
40	54	c	153H-B54JBD-46❷
50	97	d	153H-B97JBD-47
60	97	d	153H-B97JBD-48
75	97	d	153H-B97JBD-49
100	135	e	153H-B135JBD-50
125	180	f	153H-B180JBD-51
150	180	f	153H-B180JBD-52
200	240	g	153H-B240JBD-54
250	360	h	153H-B360JBD-56
300	360	h	153H-B360JBD-57
350	500	i	153H-B500JBD-58
400	500	i	153H-B500JBD-59
450	650	j	153H-B650JBD-60
500	650	j	153H-B650JBD-61
600	720	k	153H-B720JBD-62
700	850	l	153H-B850JBD-63
800	1000	m	153H-B1000JBD-65

HP Range	Controller Current Rating (A) ❶	Price Adder Code	Cat. No.
600V AC, 60 Hz			
1…20	24	a	153H-B24JCD-43❷
25	35	b	153H-B35JCD-44❷
30	35	b	153H-B35JCD-45❷
40	54	c	153H-B54JCD-46❷
50	54	c	153H-B54JCD-47❷
60	97	d	153H-B97JCD-48
75	97	d	153H-B97JCD-49
100	135	e	153H-B135JCD-50
125	135	e	153H-B135JCD-51
150	180	f	153H-B180JCD-52
200	240	g	153H-B240JCD-54
250	240	g	153H-B240JCD-56
300	360	h	153H-B360JCD-57
350	500	i	153H-B500JCD-58
400	500	i	153H-B500JCD-59
450	500	i	153H-B500JCD-60
500	500	i	153H-B500JCD-61
600	650	j	153H-B650JCD-62
700	720	k	153H-B720JCD-63
800	850	l	153H-B850JCD-65
1000	1000	m	153H-B1000JCD-67

❶ The nominal current rating for the combination package may differ from the controller, based on the horsepower. Consult Allen-Bradley Sales Office.
❷ Supplied without bypass contactor or converter module.

SMC Easy Ship program Cat. Nos. are printed in blue. See page 61.

Option	Description	Price Adder Code	Cat. No. Modification
Soft Stop	Provides a ramp down time of 0…60 seconds for applications which require an extended coast-to-rest.	a…m	A ❶
Pump Control	Provides smooth motor acceleration and deceleration, reducing surges caused by the starting and stopping of centrifugal pumps. Starting time is adjustable from 0…30 seconds, and stopping time is adjustable from 0…120 seconds.	a…m	B ❶
Preset Slow Speed	Provides preset slow speeds for positioning or alignment applications. Preset speeds can be selected at either 7% or 15% of rated motor speed, with adjustable slow speed current from 0…450% of full load motor current.	a…m	C ❶
SMB™ Smart Motor Braking	Provides a microprocessor-based braking system that applies three-phase braking current to a standard squirrel cage induction motor. The strength of the braking current is adjustable from 0…400% of the motor's full load current rating.	a b c d e f g h i j k l m	D ❶
Accu-Stop™	Provides stopping control for general positioning or to minimize jogging to stop. A three-phase braking current is applied to the motor (adjustable from 0…400% of full load current) until it reaches a preset slow speed (either 7% or 15% of rated motor speed). The motor is held at this speed until a stop command is given. Braking torque is then applied until the motor reaches zero speed. Slow speed current is adjustable from 0…450% of full load current.	a b c d e f g h i j k l m	E ❶
Slow Speed with Braking	Provides a preset slow speed for positioning or alignment applications. Preset speeds can be selected at either 7% or 15% of rated motor speed, with adjustable slow speed current from 0…450% of full load current. Provides a microprocessor based braking system that applies three-phase braking current to a standard squirrel cage induction motor. The strength of the braking current is adjustable from 0…400% of full load motor current.	a b c d e f g h i j k l m	F ❶
Protective Modules	24…54 A, 480V Line Side Protective Module	a…c	-8L
	97…360 A, 480V Line Side Protective Module	d…h	
	24…54 A, 600V Line Side Protective Module	a…c	
	97…360 A, 600V Line Side Protective Module	d…h	
	24…54 A, 480V Load Side Protective Module	a…c	-8M
	97…360 A, 480V Load Side Protective Module	d…h	
	24…54 A, 600V Load Side Protective Module	a…c	
	97…360 A, 600V Load Side Protective Module	d…h	
	24…54 A, 480V Both Line and Load Side Protective Modules	a…c	-8B
	97…360 A, 480V Both Line and Load Side Protective Modules	d…h	
	24…54 A, 600V Both Line and Load Side Protective Modules	a…c	
	97…360 A, 600V Both Line and Load Side Protective Modules	d…h	

❶ Add the designated letter to the end of the Cat. No. For example, to add the Pump Control option: **Cat. No. 150-B24NBDB** or **Cat. No. 152H-B180JBDB-51**.

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SMC Easy Ship program Cat. Nos. are printed in blue. See page 61.

Option	Description	Price Adder Code	Cat. No. Modification
Push Buttons	Start-Stop Push Button	a...m	-1
	Start-Stop Push Button with H-O-A Selector Switch		-1F
	Soft Stop Push Button ❶		-1XA
	Pump Stop Push Button ❶		-1XB
	Slow Speed Push Button ❶		-1XC
	Brake Push Button ❶		-1XD
	Accu-Stop/Slow Speed Push Button ❶		-1XE
	Emergency Stop		-1E
	Fault Reset		-FR
Selector Switch	Hand-Off-Auto Selector Switch	a...m	-3
	SMC-Off-Bypass Selector Switch		-3B
	Forward-Off-Reverse Selector Switch		-3R
Pilot Lights	Transformer Pilot Lights (Red Lens — Easy Ship Program)	a...m	-4_ ❷
	Push-to-Test Pilot Lights		-5_ ❷
Control Circuit Transformer	Control Circuit Transformer (fused primary and secondary)	a...m	-6P
	Additional 100 VA Control Circuit Transformer (fused primary and secondary)		-6PX
SCR Fusing	Fast acting current limiting SCR fusing for 24 A unit	a	-SCR
	Fast acting current limiting SCR fusing for 35 A unit	b	
	Fast acting current limiting SCR fusing for 54 A unit	c	
	Fast acting current limiting SCR fusing for 97…135 A units	d...e	
	Fast acting current limiting SCR fusing for 180 A unit	f	
	Fast acting current limiting SCR fusing for 240 A unit	g	
	Fast acting current limiting SCR fusing for 360 A unit	h	
	Fast acting current limiting SCR fusing for 500 A unit	i	
	Fast acting current limiting SCR fusing for 650…720 A units	j...k	
	Fast acting current limiting SCR fusing for 850 A unit	l	
	Fast acting current limiting SCR fusing for 1000 A unit	m	
Door-Mounted Human Interface Module	Programmer Only (Type 1)	a...m	-HAP
	Programmer Only (Type 4/12)		-HJP
	Digital Control Panel (Type 1)		-HA2
	Digital Control Panel (Type 4/12)		-HJ2
Communication Module	Remote I/O	a...m	-GD1
	RS- 232/422/485		-GD2
	DH485		-GD2
	DeviceNet™ Network		-GK5
	Enhanced Devicenet™		-GU5
	Control Net		-CN1
Isolation Contactor	Isolation Contactor	a...d e...f g h i j k...l m	❸

❶ Option pushbuttons are available only when the corresponding option module is selected. For example: **Cat. No. 150-B24JBDA-1XA**.

❷ Specify pilot light lens color. Options: **A**mber, **B**lue, **C**lear, **G**reen, **R**ed, and **W**hite. For example, **-4R** for a red lens.

❸ To order a non-combination or combination enclosed controller with an isolation contactor, add the letter "**B**" to the bulletin prefix. For example, **Cat. No. 150B-B180JBD**. See pages 67…68. Bulletin 100 contactor is used through 500 HP @ 480V. Enclosure dimensions are subject to change. Consult Allen-Bradley Sales Office.

Option	Description	Price Adder Code	Cat. No. Modification
Reversing Contactor	Reversing Contactor	a...d	❶
		e...f	
		g	
		h	
		i	
		j	
		k...l	
		m	
NEMA Bypass Contactor ❷	NEMA Bypass for 24…97 A unit	a…d	-NB
	NEMA Bypass for 135…180 A unit	e…f	
	NEMA Bypass for 240 A unit	g	
	NEMA Bypass for 360 A unit	h	
	NEMA Bypass for 500 A unit	i	
	NEMA Bypass for 650 A unit	j	
NEMA Isolation Contactor ❷	NEMA Bypass for 24…97 A unit	a…d	-NI
	NEMA Bypass for 135…180 A unit	e…f	
	NEMA Bypass for 240 A unit	g	
	NEMA Bypass for 360 A unit	h	
	NEMA Bypass for 500 A unit	i	
	NEMA Bypass for 650 A unit	j	
Power Factor Correction Capacitors ❸	2 kVAR		-PFCC ❹
	2.5 kVAR		
	3 kVAR		
	4 kVAR		
	5 kVAR		
	6 kVAR		
	7 kVAR		
	7.5 kVAR		
	8 kVAR		
	9 kVAR		
	10 kVAR		
	11 kVAR		
	12.5 kVAR		
	14 kVAR		
	15 kVAR		
	16 kVAR		
	17.5 kVAR		
	18 kVAR		
	20 kVAR		
	22.5 kVAR		
	25 kVAR		
	27.5 kVAR		
	30 kVAR		
	32.5 kVAR		
	35 kVAR		
	37.5 kVAR		
	40 kVAR		
	42.5 kVAR		
	45 kVAR		
	47.5 kVAR		
	50 kVAR		

❶ To order a non-combination or combination enclosed controller with a reversing contactor, add a “R” to the bulletin prefix. For example: **Cat. No. 152R-B240JBD-54**. See pages 67…68. Bulletin 104 contactor is used through 500 HP @ 480V. Enclosure dimensions are subject to change. Consult factory for dimensions

❷ 720, 850, 1000 A units currently use a NEMA contactor

❸ Power Factor Correction Capacitor to include Power Capacitors with 3-phase Class J Time-Delay Fusing and appropriately-sized contactor.

❹ To order Power Factor Correction Capacitors indicate kVAR Rating. For example: -**PFCC30kVAR**.

Option	Description	Price Adder Code	Cat. No. Modification
Power Factor Correction Contactor ❶	Power Factor Correction Capacitor Contactor	a...d	-PFCCC
		e...f	
		g	
		h	
		i	
		j	
Converter	Bulletin 825 Converter Module and Bulletin 150-NFS	a...m	-825
Overload Relay	Three-pole thermal overload for 24...35 A units	a...b	-OL ❷
	Three-pole thermal overload for 54 A units	c	
	Three-pole thermal overload for 97...135 A units	d...e	
	Three-pole thermal overload for 180...240 A units	f...g	
	Three-pole thermal overload for 360...500 A units	h...i	
	Three-pole thermal overload for 650...850 A units	j...l	
	Three-pole thermal overload for 1000 A units	m	
Control Relays	On-Delay	a...h	-89FOD
	Off-Delay		-89FOFD
Unwired Control Relays	Bulletin 700CF 4-pole relay — 2 N.O. and 2 N.C.	a...m	-89F22
	Bulletin 700CF 4-pole relay — 3 N.O. and 1 N.C.	a...m	-89F31
	Bulletin 700CF 4-pole relay — 4 N.O.	a...m	-89F40
Auxiliary Contacts	N.O. auxiliary contacts for 24...240 A units	a...g	-90
	N.O. auxiliary contacts for 360...1000 A units	h...m	
	N.C. auxiliary contacts for 24...240 A units	a...g	-91
	N.C. auxiliary contacts for 360...1000 A units	h...m	
	1 N.O. … 1 N.C. auxiliary contacts for 24…240 A units	a...g	-901
	1 N.O. … 1 N.C. auxiliary contacts for 360…1000 A units	h...m	
Disconnect Auxiliary	N.O. disconnect auxiliary mounted on operating mechanism	a...m	-98
	N.C. disconnect auxiliary mounted on operating mechanism		-99
Circuit Breaker Disconnect Auxiliary	Internal N.O. circuit breaker auxiliary	a...m	-98X
	Internal N.C. circuit breaker auxiliary		-99X
Shunt Trip	Circuit Breaker Shunt Trip for 24...54 A units	a...c	-754
	Circuit Breaker Shunt Trip for 97...135 A units	d...e	
	Circuit Breaker Shunt Trip for 180...240 A units	f...g	
	Circuit Breaker Shunt Trip for 360...500 A units	h...i	
	Circuit Breaker Shunt Trip for 650...850 A units	j...l	
	Circuit Breaker Shunt Trip for 1000 A unit	m	
Additional Load Circuit Breakers	Additional load circuit breakers to be installed in panel. Customer is to stipulate size and quantity.	a...m	-ALCB
High Interrupting Circuit Breaker	High Interrupting Circuit Breaker for 24...54 A units	a...c	-HICB
	High Interrupting Circuit Breaker for 97...180 A units	d...f	
	High Interrupting Circuit Breaker for 240 A unit	g	
	High Interrupting Circuit Breaker for 360 A unit	h	
	High Interrupting Circuit Breaker for 500 A unit	i	
	High Interrupting Circuit Breaker for 650...720 A units	j...k	
	High Interrupting Circuit Breaker for 850...1000 A units	l...m	

❶ Only the contactor will be provided. for motor horsepower above 500 consult factory for sizing and pricing

❷ To be used with SMC-Off-Bypass circuit to provide overload protection during bypass operation. Selector Switch Option of -3B will be required. For example: **Cat. No. 153H-B240JBD-54-3B-OL**.

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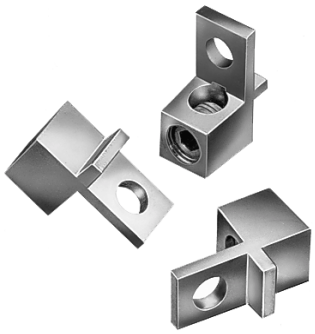
Option	Description	Price Adder Code	Cat. No. Modification
Line Voltage Monitor	Bulletin 813S Line Voltage Monitor	a...m	-813S
Thermistor Protection Relay	Bulletin 817 Thermistor Protection Relay	a...m	-817
Smart Motor Manager	Bulletin 825 Smart Motor Manager and Bulletin 825 Converter Module	a...m	-SMM
IQ1000 Protective Relay	Cutler-Hammer IQ1000 Protective Relay	a...m	-IQ1000
Multilin 269 Plus	GE Multilin 269 Plus Protective Relay	a...m	-269PLUS
Transducer Output	4…20 mA output signal proportional to 0…100% motor FLC	a...m	-TO
Ground Fault Protection	Bulletin 1409 Arcing Ground Fault Relay and Sensor for applications up to 400 HP	a...i	-GFP
Motor Winding Heater ❶	Bulletin 1410 Motor Winding Heater for applications up to 600 HP	a...e f…g h…i j…k	-MWH
Lightning Arrestor	Lightning Surge Protection	a...m	-LA
Strip Heater	Cabinet Strip Heater with Thermostat	a...m	-SH
Service Entrance Label	Service Entrance Label	a...j k...l	-SEL
U.L. Label	U.L. Label	a...m	-UL
Unwired Terminal Blocks	Panel Mounted unwired terminal blocks 6 or 12 position	a...m	-TB6 -TB12
Panel Mount ❷	Components mounted on enclosure mounting plate only	a...m	-PM
Specified Panel Dimensions ❷	Customer is to stipulate panel dimensions	a...m	-SPD
Enclosure Color (Custom Paint) ❷	Customer is to stipulate paint color for enclosure	a...m	-EC
Enclosure Shock Mounts ❷	Ship Board – MIL-S-901D	a...m	-SM
Enclosure Type NEMA 3R ❸	Enclosure Type NEMA 3R Non-Combination	a…c d…e f…h i…m	❻
Enclosure Type NEMA 3R ❸	Enclosure Type NEMA 3R Combination	a…c d…e f…h i…m	❻
Enclosure Type NEMA 4X Stainless Steel ❹	Enclosure Type NEMA 4X Stainless Steel Non-Combination	a…d e…f g…h i	❻
Enclosure Type NEMA 4X Stainless Steel ❹	Enclosure Type NEMA 4X Stainless Steel Combination	a…c d…e f…h i…m	❻
Air Conditioning ❷	AC Unit mounted on enclosure	a...m	-AC
Wiring Diagrams	AutoCad Drawing of panel wiring	a...m	-WD
Print Approval ❺	Customer Requested Print Approval Drawings	a...m	-PA
Window Kit	Standard (3″ H x 5″ W) (76.2 mm H x 127 mm W) Hinged (10″ H x 10″ W) (254 mm H x 254 mm W)	a...m	-WK1 -WK2

❶ Requires an isolation contactor on the output of the SMC.
❷ Pricing to be determined upon request.
❸ To order a non-combination or combination enclosed controller with a NEMA 3R enclosure, add an “H” to the enclosure type prefix. Example: **Cat. No. 152H-B240HBD-54**. See pages 67…68. Enclosure dimensions are subject to change. Consult factory for dimensions. Enclosure price adder is to be added to NEMA 12 non-combination or combination price.
❹ To order a non-combination or combination enclosed controller with a NEMA 4X stainless steel enclosure, add an “S” to the enclosure type prefix. Example: **Cat. No 152H-B240SBD-54**. See pages 67…68. Enclosure dimensions are subject to change. Consult factory for dimensions. Enclosure price adder is to be added to the NEMA 12 non-combination or combination price.
❺ Order to be released to manufacturing upon return of signed print approval drawings.
❻ Consult factory for pricing.

Protective Modules ❶❷

Current Rating (A)	Description	Price Adder Code	Field Modification Cat. No.
24...54	480V Protective Module	a...c	150-N84
	600V Protective Module		150-N86
97...360	480V Protective Module	d...h	150-N84L
	600V Protective Module		150-N86L

Terminal Lug Kits (97…1000 A)



Current Rating (A)	Conductor Range	Total No. of Terminal Lugs Possible Each Side		Pkg. Qty.	Cat. No.
		Line Side	Load Side		
97...135	#6-4/0 AWG	3	3	3	199-LF1
180...360		6	6		
500	#4-500MCM AWG	6	6		199-LG1
650...720		9	9		
850...1000	(2) 1/0-500MCM AWG	6	6		199-LJ1

IEC Terminal Covers

Description	Field Modification Cat. No.
IEC line or load terminal covers for 97...135 A devices (includes line and load termination covers)	150-NT1
IEC line and load terminal covers for 180...360 A devices (includes line and load termination covers)	150-NT2

❶ The same protective module mounts on the line or load side of the SMC Dialog Plus Controller. For applications requiring both line and load side protection, two protective modules must be ordered.
❷ Surge protection is provided as standard on 500…1000 A units

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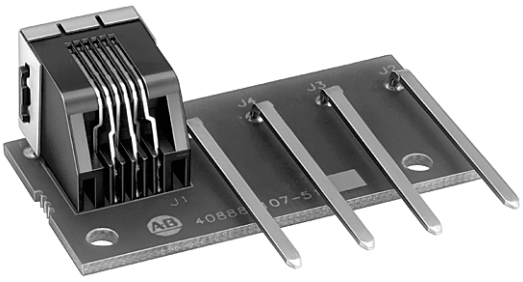
Description				Cat. No.
 *Cat. No. 1201-HAP*  *Cat. No. 1201-HA1*  *Cat. No. 1201-HA2*	Human Interface Modules ❸	Door Mount Bezel Kit	IP30 (Type 1)	1201-DMA
		Programmer Only	IP30 (Type 1) ❷	1201-HAP
			IP65 (Type 4/12) with Bezel	1201-HJP
		Analog Control Panel ❶	IP30 (Type 1) ❷	1201-HA1
		Digital Control Panel ❶	IP30 (Type 1) ❷	1201-HA2
			IP65 (Type 4/12) with Bezel	1201-HJ2

Description				Use With	IP30 (Type 1) Cat. No.
 *Communication Cable* ***Cat. No. 1202-C10***  *Communication Module* ***Cat. No. 1203-GD1***	Communication Cables	Male-Male	1/3 Meter	Human Interface Module and Communications Modules	1202-C03
			1 Meter		1202-C10
			3 Meters		1202-C30
			9 Meters		1202-C90
	Communication Modules ❸	Single Point Remote I/O		Bulletin 150 SMC Dialog Plus	1203-GD1
		RS232/RS422/RS485/DF1			1203-GD2
		DH485			1203-GD2
		ControlNet			1203-CN1
		DeviceNet Network			1203-GK5
		Enhanced DeviceNet			1203-GU5
DriveTools™	Programming Software ❸❹			Personal Computer	1300-DTLS
  ***Cat. No. 1203-FM1*** ***Cat No. 1203-SM1*** *Communication Option Kits*	Flex I/O SCANport Module ❸❺ Flex I/O Terminal Base Flex I/O Module			Bulletin 150 SMC Dialog Plus	1203-FB1 1203-FM1❻
	SLC Communication Module ❸				1203-SM1

❶ Start, Stop and Jog buttons are the only active controls when used with the SMC Dialog Plus Controller.
❷ Requires Type 1 Door Mount Bezel Kit.
❸ Separately powered 120/240V AC.
❹ Requires the use of a 1203-GD2 communication module.
❺ Each Flex I/O SCANport Module requires (1) 1203-FB1 and (1) 1203-FM1.
❻ Requires a Communication Option Cable (1202-C03/C10/C30/C90) to be functional. These units are not acceptable for NEMA Type 4 door mounting or UL Type 4X **outdoor** only.

Converter Modules ❶

Description	Motor Full Load Current Range (A)	Cat. No.
 *Cat. No. 825-MCM180*	1…12.5	825-MCM20
	9…100	825-MCM180
 *Cat. No. 825-MCM630*	64…360	825-MCM630

Description	Cat. No.
Fanning Strip for Bulletin 825 Converter Modules  *Cat. No. 150-NFS*	150-NFS
Optional Bus Bars for Cat. No. 825-MCM180 Features Terminals: M8 1/8 x 5/8 x 4-1/64 in. (4 x 16 x 102 mm) Weight: 230 g 	825-MVM

❶ Must be used with fanning strip **Cat. No. 150-NFS**.

Functional Design Specifications			
Standard Features	Installation	Power Wiring	The SMC Dialog Plus Controller can be wired with or without an isolation contactor. Bypass contactors can be employed after the controller has brought the motor to full speed.
		Control Wiring	2- and 3-wire control for a wide variety of applications.
	Set-up	Keypad	The SMC Dialog Plus Controller is configured with the front keypad and backlit LCD display.
		Software	Parameter values can be downloaded to the SMC Dialog Plus Controller with DriveTools programming software and the 1203-GD2 communication module.
	Communications		One serial port provided for connection to optional human interface and communication modules.
	Starting Modes		Soft start with selectable kickstart, current limit, dual ramp and full voltage in one unit.
	Protection and Diagnostics		Power loss, line fault, voltage unbalance, excessive starts/hour, phase reversal, undervoltage, overvoltage, controller temp, stall, jam, open gate, overload, underload, communication fault.
	Metering		Amps, volts, kW, kWH, elapsed time, power factor, motor thermal capacity usage.
	Status Indication		Stopped, ramping, stopping, at speed and fault.
	Auxiliary Contacts		(1) Single-pole double-throw contact programmable as normal or up-to-speed; one programmable as normal or fault.
Optional Features	Soft Stop		Extended coast-to-rest to minimize load shifting. Ramp down time is adjustable from 0…60 seconds.
	Pump Control		Helps reduce fluid surges in centrifugal pumping systems during starting and stopping period. Starting time is adjustable from 0…30 seconds. Stopping time is adjustable from 0…120 seconds.
	Preset Slow Speed		Enables the operator to position material. The preset slow speed can be set for low (7% of base speed), high (15% of base speed), reverse low (10% of base speed) or reverse high (20% of base speed).
	SMB Smart Motor Braking		Provides motor braking without additional equipment for applications that require the motor to stop quickly. Braking current is adjustable from 0…400% of the motor's full load current rating.
	Accu-Stop/Slow Speed with Braking		Combines Smart Motor Braking and Preset Slow Speed. Braking current is adjustable from 0…400% of full load current. Slow speed can be set for either Low (7% of base speed) or High (15% of base speed).

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Electrical Ratings		UL/CSA/NEMA	IEC
Power Circuit:	Rated Operation Voltage	200...480V AC 200...600V AC (–15%, +10%)	200...415V 200...500V
	Rated Insulation Voltage	N/A	500V
	Rated Impulse Voltage	N/A	6000V
	Dielectric Withstand	2200V AC	2500V
	Repetitive Peak Inverse Voltage Rating	200...480V AC: 1400V 200...600V AC: 1600V	200...415V: 1400V 200...500V: 1600V
	Operating Frequency	50/60 Hz	50/60 Hz
	Utilization Category	MG 1	AC-53a
	Protection Against Electrical Shock	N/A	IP00 (open device)
	DV/DT Protection	RC Snubber Network	
	Transient Protection	Metal Oxide Varistors: 220 Joules @ 24...360 A 220 Joules @ 480V, 500...1000 A 300 Joules @ 600V, 500...1000 A	
Short Circuit Protection:	SCPD Performance	Type 1	
	SCPD List	Maximum Fuse or Circuit Breaker (A):	
	Device Operational Current Rating (A):		
	24	80	
	35	125	
	54	200	
	97	350	
	135	500	
	180	600	
	240	700	
	360	1000	
	500	1200	
	650	1600	
	720	2000	
	850	2500	
	1000	3000	
Control Circuit:	Rated Operational Voltage	100...240V AC 24V AC 24V DC	100...240V 24V 24V DC
	Rated Insulation Voltage	N/A	240V
	Rated Impulse Voltage	N/A	3000V
	Dielectric Withstand	1600V AC	2000V
	Operating Frequency	50/60 Hz	50/60 Hz
	Protection Against Electric Shock	N/A	IP20
Power Requirements:	Control Module	40 VA	
	Heatsink Fan(s) (A) ❶		
	24	—	
	35	—	
	54	—	
	97	45 VA	
	135	45 VA	
	180	45 VA	
	240	45 VA	
	360	45 VA	
	500	145 VA	
	650	320 VA	
	720	320 VA	
	850	320 VA	
	1000	320 VA	

❶ For devices rated 24…500 A, heatsink fans can be powered by either 110/120V AC or 220/240V AC. For devices rated 650…1000 A, heatsink fans can only be powered by 110/120V AC.

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Electrical Ratings, Continued		UL/CSA/NEMA	IEC
Maximum Heat Dissipation (Watts):	Controller Rating (A):		
	24	110	
	35	150	
	54	200	
	97	285	
	135	490	
	180	660	
	240	935	
	360	1170	
	500	1400	
	650	2025	
	720	2250	
	850	2400	
	1000	2760	
Auxiliary Contacts:	Rated Operation Voltage	240V AC	240V
	Rated Insulation Voltage	N/A	240V
	Dielectric Withstand	1600V AC	2000V
	Operating Frequency	50/60 Hz	50/60 Hz
	Utilization Category	B300 (terminals 18…19) C300 (terminals 18…20) C300 (terminals 29…30)	AC-15
	SCPD Performance	Type 2	
	SCPD List	Class CC 8A @ 1000 A Available Fault Current	
Environmental			
Operating Temperature Range		0°C…50°C (32°F…122°F) (open) 0°C…40°C (32°F…104°F) (enclosed)	
Storage and Transportation Temperature Range		–20°C…+75°C	
Altitude		2000 meters	
Humidity		5%…95% (non-condensing)	
Pollution Degree		2	
Mechanical			
Resistance to Vibration			
	Operational	1.0 G Peak, 0.006 Inch Displacement	
	Non-Operational	2.5 G, 0.015 Inch Displacement	
Resistance to Shock			
	Operational	15 G	
	Non-Operational	30 G	
Construction		Power Poles: Thermoset Moldings: 24…135 A Heatsink hockey puck thyristor: 180…1000 A Control Modules: Thermoset and Thermoplastic Moldings Metal Parts: Anodized Aluminum, Plated Brass, Copper or Painted Steel	
Terminals		Power Terminals: 24…54 A: 6.0 mm hole with clamp screw 97 & 135 A: One 11.5 mm (0.453) diameter hole each 180…360 A: One 10.5 mm (0.413) diameter hole each 500 A: Two 13.5 mm (0.531) diameter holes each 650 & 720 A: Three 13.1 mm (0.515) diameter holes each 850 & 1000 A: Six 13.1 mm (0.515) diameter holes each Power Terminal Markings: NEMA, CENELEC EN50 012 Control Terminals: M 3.5 x 0.6 Pozidriv screw with self-lifting clamp plate	

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Other	
EMC Emission Levels	
Conducted Radio Frequency Emissions	Class A
Radiated Emissions	Class A
EMC Immunity Levels	
Electrostatic Discharge	8 kV Air Discharge
Radio Frequency Electromagnetic Field	Per IEC 947-4-2
Fast Transient	Per IEC 947-4-2
Surge Transient	Per IEC 947-4-2
Overload Characteristics	
Current Range	1.0…999.9 A
Trip Classes	10, 15, 20 & 30
Trip Current Rating	120% of Motor FLC
Number of Poles	3
Approvals	
Open Type Controllers	CE Marked Per Low Voltage Directive 73/23/EEC, 93/68/EEC CSA Certified (File No. LR1234) UL Listed (File No. E96956)

Fuse Clip Sizing and Type for Fusible Combination Controllers ❶ ❷

Horsepower @ 480V	Fuse Clip Size/Type	Fuse Size Range (A)
15	30 A/Class J	0…30
20	60 A/Class J	31…60
25	60 A/Class J	31…60
30	60 A/Class J	31…60
40	100 A/Class J	61…100
50	100 A/Class J	61…100
60	200 A/Class J	101…200
75	200 A/Class J	101…200
100	200 A/Class J	101…200
125	400 A/Class J	201…400
150	400 A/Class J	201…400

Horsepower @ 480V	Fuse Clip Size/Type	Fuse Size Range (A)
200	400 A/Class J	201…400
250	600 A/Class J	401…600
300	600 A/Class J	401…600
350	600 A/Class J	401…600
400	1200 A/Class L	601…1600
450	1200 A/Class L	601…1600
500	1200 A/Class L	601…1600
600	1200 A/Class L	601…1600
700	1200 A/Class L	601…1600
800	1200 A/Class L	601…1600

Circuit Breaker Sizes and Rating Plug Sizes

Horsepower @ 480V	Circuit Breaker Size (A)/ Rating Plug Size (A)	Interrupting Rating in Symmetrical Amps @ 480V ❸
15	150/50	14,000
20	150/50	14,000
25	150/60	14,000
30	150/70	14,000
40	150/100	14,000
50	150/125	14,000
60	250/150	25,000
75	250/175	25,000
100	250/225	25,000
125	250/250	25,000
150	400/300	35,000

Horsepower @ 480V	Circuit Breaker Size (A)/ Rating Plug Size (A)	Interrupting Rating in Symmetrical Amps @ 480V ❸
200	400/400	35,000
250	600/500	35,000
300	600/600	35,000
350	800/800	35,000
400	800/800	50,000
450	1200/1000	50,000
500	1200/1200	50,000
600	1200/1200	50,000
700	2000/1600	65,000
800	2000/2000	65,000

❶ Consult NEC Handbook for proper fuse sizing guidelines.
❷ Optional fuse clip sizes and types are available upon request. Consult Allen-Bradley Sales Office.
❸ For higher interrupting ratings, consult Allen-Bradley Sales Office.

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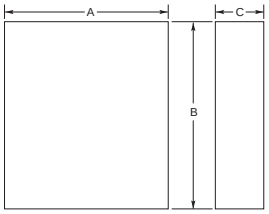
Open Type Controllers

Dimensions are not intended for manufacturing purposes.

Controller Rating (A)	Dimensions in Millimeters (Inches)			Weight
	Height	Width	Depth	
24	180 (7.09)	154 (6.06)	185 (7.29)	4.5 kg (10 lbs.)
35	240 (9.45)	214 (8.43)	195 (7.68)	6.8 kg (15 lbs.)
54	290 (11.42)	244 (9.61)	225 (8.86)	11.3 kg (25 lbs.)
97	336 (13.23)	248 (9.77)	256 (10.09)	10.4 kg (23 lbs.)
135	336 (13.23)	248 (9.77)	256 (10.09)	11.8 kg (26 lbs)
180	560 (22.06)	273 (10.75)	294 (11.58)	25 kg (55 lbs.)
240	560 (22.06)	273 (10.75)	294 (11.58)	30 kg (65 lbs.)
360	560 (22.06)	273 (10.75)	294 (11.58)	30 kg (65 lbs.)
500	588 (23.17)	508 (20.00)	311 (12.23)	40.8 kg (90 lbs.)
650…1000	1524 (60.0)	813 (32.00)	402 (15.83)	167.8 kg (370 lbs.)

Enclosed Type Controllers



Dimensions are in millimeters (inches). Dimensions are not intended for manufacturing purposes. All dimensions are subject to change.

Factory installed options may affect enclosure size requirements.

Exact dimensions can be obtained after order entry. Please consult Allen-Bradley Sales Office.

Controller Rating (A)	IP30 (Type 1)			IP54 (Type 12)			IP65 (Type 4)		
	B Height	A Width	C Depth	B Height	A Width	C Depth	B Height	A Width	C Depth
Non-Combination Controller									
24	610 (24)	406 (16)	229 (9)	610 (24)	406 (16)	229 (9)	610 (24)	406 (16)	229 (9)
35	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
54	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
97	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
135	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
180	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
240	965 (38)	762 (30)	356 (14)	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)
360	1295 (51)	914 (36)	356 (14)	1524 (60)	914 (36)	356 (14)	1524 (60)	914 (36)	356 (14)
500	1524 (60)	914 (36)	356 (14)	2286 (90)	889 (35)	508 (20)	2134 (84)	1016 (40)	457 (18)
650	2286 (90)	889 (35)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
720	2286 (90)	889 (35)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
850	2286 (90)	889 (35)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
1000	2286 (90)	889 (35)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)

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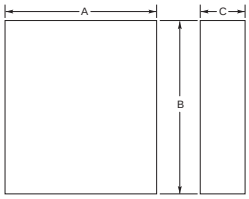
Enclosed Type Controllers, Continued



Dimensions are in millimeters (inches). Dimensions are not intended for manufacturing purposes. All dimensions are subject to change.

Factory installed options may affect enclosure size requirements.

Exact dimensions can be obtained after order entry. Please consult Allen-Bradley Sales Office.

Controller Rating (A)	IP30 (Type 1)			IP54 (Type 12)			IP65 (Type 4)		
	B Height	A Width	C Depth	B Height	A Width	C Depth	B Height	A Width	C Depth
Combination Controllers with Fusible Disconnect									
24	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
35	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
54 (60 A Disconnect)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
54 (100 A Disconnect)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
97	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
135	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
180	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)
240	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)
360	1524 (60)	965 (38)	356 (14)	1524 (60)	965 (38)	356 (14)	1524 (60)	965 (38)	356 (14)
500 (600 A Disconnect)	2134 (84)	1016 (40)	457 (18)	2134 (84)	1016 (40)	457 (18)	2134 (84)	1016 (40)	457 (18)
500 (1200 A Disconnect)	2286 (90)	1143 (45)	508 (20)	2286 (90)	1270 (50)	508 (20)	2286 (90)	1778 (70)	508 (20)
650	2286 (90)	1397 (55)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
720	2286 (90)	1397 (55)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
850	2286 (90)	1397 (55)	508 (20)	2286 (90)	2667 (105)	508 (20)	2286 (90)	2667 (105)	508 (20)
1000	2286 (90)	1397 (55)	508 (20)	2286 (90)	2667 (105)	508 (20)	2286 (90)	2667 (105)	508 (20)
Combination Controllers with Circuit Breaker									
24	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
35	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
54	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)	762 (30)	610 (24)	305 (12)
97	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
135	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)	965 (38)	762 (30)	356 (14)
180	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)
240	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)	1295 (51)	914 (36)	356 (14)
360	1524 (60)	965 (38)	356 (14)	1524 (60)	965 (38)	356 (14)	1524 (60)	965 (38)	356 (14)
500	2134 (84)	1016 (40)	457 (18)	2134 (84)	1016 (40)	457 (18)	2134 (84)	1016 (40)	457 (18)
650	2286 (90)	1397 (55)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
720	2286 (90)	1397 (55)	508 (20)	2286 (90)	1778 (70)	508 (20)	2286 (90)	1778 (70)	508 (20)
850	2286 (90)	1778 (70)	508 (20)	2286 (90)	2667 (105)	508 (20)	2286 (90)	2667 (105)	508 (20)
1000	2286 (90)	1778 (70)	508 (20)	2286 (90)	2667 (105)	508 (20)	2286 (90)	2667 (105)	508 (20)

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