

Size for Size...Best Value in the Industry

Overview for SMC™-Flex and SMC™-3



LISTEN.
THINK.
SOLVE.™

 Allen-Bradley • Rockwell Software

Rockwell
Automation

Smart Motor Controllers...

Providing Unmatched Intelligent Motor Control

SMC-Flex and SMC-3

Manufacturers need to get their products to market faster, more efficiently, and with a higher degree of consistency. The Allen-Bradley SMC soft starters are designed to provide integrated features and functionality to help you conserve power and minimize manufacturing risks – while reaping the most productivity from your plant floor.

The flexibility and capabilities of the SMC-Flex and SMC-3 make them ideal for virtually any application. They can minimize mechanical wear resulting from full-voltage starting of AC induction motors, enabling longer system life as well as limit line disturbances from inrush currents, resulting in reduced downtime. The SMC intelligent motor control devices combine data-driven, networked motor control and industry leading protection for improved motor and system performance. With the available options, functionality, and application capabilities, they are unmatched in the industry.

SMC-Flex – Modular and Compact Soft Starter

The SMC-Flex reduces product size and is a cost-effective package for your production applications. As standard, the SMC-Flex includes I/O, electronic overload, integral bypass, advanced communication capabilities, motor starting capabilities for both star-delta and standard squirrel-cage induction motors, advanced protection, and diagnostics.

The SMC-Flex is also available for medium voltage applications with the same features and benefits for controlling motors rated up to 7.2 kV and 7500 Hp (5600 kW).



SMC-3 – A Smart and Compact Soft Starter

The SMC-3 provides increased intelligence in a compact footprint. Downtime is decreased due to basic protection of motor winding equipment and materials.

As standard, this true three-phase controlling device includes electronic overload protection with adjustable trip class, integral bypass, increased motor and system diagnostics, motor starting capabilities for both star-delta and standard squirrel-cage induction motors, configurable auxiliary contacts, and multiple START and STOP modes.



At Rockwell Automation, helping your business succeed and grow is what we do best – with power, control, and information systems and services designed to give you a competitive advantage in today's marketplace.

Why Use Smart Motor Controllers (SMCs)?



SMCs provide many features to benefit your system:

- Enable longer system life by minimizing mechanical damage resulting from full-voltage starting of AC induction motors
- Limit line disturbances from inrush currents, resulting in reduced downtime
- Multiple START/STOP modes increase functionality
- Diagnostic monitoring helps prevent problems before they occur
- Satisfy electrical distribution restrictions by reducing inrush currents



SMCs are ideal for applications where:

- Belts, gears, and chains can be damaged by across-the-line starting
- Materials can be damaged by sudden starts and stops
- A step change in torque can damage equipment
- Power company line current restrictions are imposed
- Space is a premium and enclosure size must be minimized
- Solid-state starting is needed for a star-delta motor application



With SMC Soft starters you benefit from:

- Advanced diagnostics, increasing system performance
- Compact, space-saving footprint
- Greater product functionality for increased system flexibility
- Decreased downtime due to advanced protection of motor winding, equipment, and materials
- Greater system operation accuracy due to improved technology
- Ease of purchasing, installation, setup and maintenance

“Installation and commission time were greatly reduced with the ability to put the soft starter on the network. It is a very simple setup that works very well.”

– Bradley Allen Johnson
President
BDI Engineering, Inc.



SMC-Flex

Modular Design

Current Range

Product Rating	Line Current	Delta Current
5	5	9
25	25	43
43	43	74
60	60	104
85	85	147
108	108	187
135	135	234
201	201	348
251	251	435
317	317	549
361	361	625
480	480	831
625	625	850
780	780	900
970	970	1200
1250	1250	1600

Voltage Range 200...690V AC, 50/60 Hz

Control Voltage 100...240V AC or 24V AC/DC (5...480)
110...120V AC (625...1250)
230...240V AC (625...1250)

Starting Modes

	Standard	Pump Control	Braking Control
Soft Start	X	X	X
Soft Stop	X		
Current Limit	X	X	X
Full Voltage	X	X	X
Kick Start	X	X	X
Preset Slow Speed	X		X
Linear Speed Start and Stop	X		
Dual Ramp	X		
Pump Start and Stop		X	
Smart Motor Braking™			X
Accu-Stop™			X
Slow Speed with Braking			X

Features

Overload

- Flexibility in trip class (10, 15, 20, 30, OFF)
- Reset operation (manual or automatic)

Diagnostics

- PTC
- Power loss
- Undervoltage
- Open gate
- Ground fault
- Voltage imbalance
- Overvoltage
- Overload
- Line fault
- Phase reversal
- Overtemperature
- Excessive starts per hour

Motor Control

- Standard squirrel-cage induction motor
- Star-delta motor

Communication

- DeviceNet™, ControlNet™, EtherNet™, Remote I/O, RS-485, Profibus™, Interbus™

Metering

- Three-phase currents
- Power in kW*
- Motor thermal
- Capacity usage
- Three-phase voltages
- Power usage in kWh*
- Power factor of the running motor
- Elapsed time of motor operation

I/O

- 2 Input
- 4 User configurable auxiliary contacts

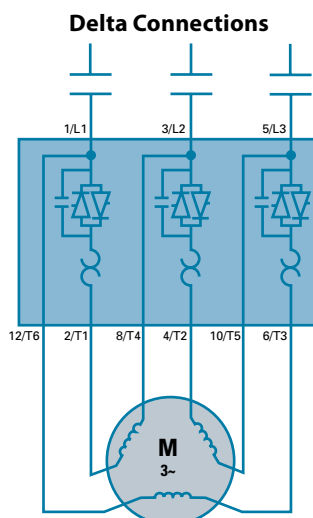
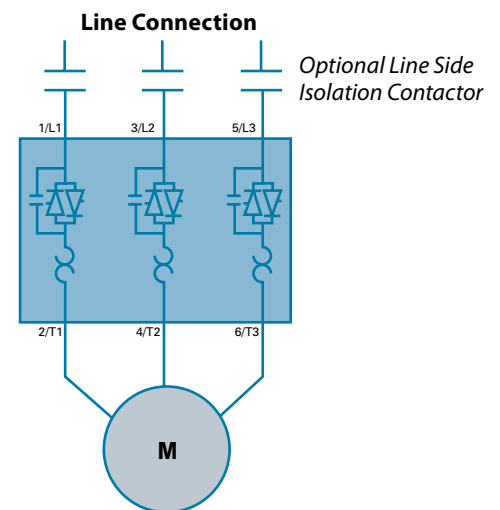
* Depends on frame size: kW or MW, kWh or MWh

The SMC-Flex provides intelligence, unmatched performance, flexibility, diagnostics, and communication in a modular compact design for controlling either a standard squirrel-cage induction motor or a star-delta motor.

Compact Size

The SMC-Flex integrates a bypass to minimize heat generation during run time. The bypass automatically closes when the motor reaches its nominal speed, resulting in a cooler-running component and reduction in enclosure size.

Motor Connection



SMC™ Flex Smart Motor Controller

Open and Non-Combination

150 – F135 F B D B – 8L
a *b* *c* *d* *e* *f* *g*

Bulletin Number	
Code	Description
150	Solid-State Controller

Controller Ratings	
Code	Description
F5	5 A, 3 Hp @ 460V AC
F25	25 A, 15 Hp @ 460V AC
F43	43 A, 30 Hp @ 460V AC
F60	60 A, 40 Hp @ 460V AC
F85	85 A, 60 Hp @ 460V AC
F108	108 A, 75 Hp @ 460V AC
F135	135 A, 100 Hp @ 460V AC
F201	201 A, 150 Hp @ 460V AC
F251	251 A, 200 Hp @ 460V AC
F317	317 A, 250 Hp @ 460V AC
F361	361 A, 300 Hp @ 460V AC
F480	480 A, 400 Hp @ 460V AC
F625	625 A, 500 Hp @ 460V AC
F780	780 A, 600 Hp @ 460V AC
F970	970 A, 800 Hp @ 460V AC
F1250	1250 A, 1000 Hp @ 460V AC

Enclosure Type		
Code	Size	Description
N	ALL	OPEN
F	5...480	NEMA Type 4/12 (IP65) (Non-Combination Only)
J	625 & 780	NEMA Type 12 (IP55) (Non-Combination Only)

Input Line Voltage	
Code	Open Type — Description
B	200...460V AC, 3-Phase, 50 and 60 Hz
C	200...575V AC, 3-Phase, 50 and 60 Hz
Z	230...690V AC, 3-Phase, 50 and 60 Hz (Open Only)
Non-Combination Enclosed Only — Description	
H	200...208V AC, 3-Phase, 50 and 60 Hz
A	230V AC, 3-Phase, 50 and 60 Hz
B	400...460V AC, 3-Phase, 50 and 60 Hz
C	500...575V AC, 3-Phase, 50 and 60 Hz

Control Voltage	
Code	Description
D	100...240V AC (5...480 A units)
R	24V AC/DC (5...480 A units) (Open Only)
E	110/120V AC (625...1250 A units)
A	230/240V AC (625...1250 A units)

Options (Select Only One)	
Code	Description
Blank	Standard
B	Pump Control
D	Braking Control

Options (Non-Combination only)	
Code	Description
8L	Line-Mounted Protective Module
8M	Load-Mounted Protective Module
8B	Line- and Load-Mounted Protective Modules
Load-side MOVs are not available with Pump and Braking options, or on delta-connected motors. MOVs can be field installed for open type units.	

Combination

152H – F108 F BD B 49 – 8B
a *b* *c* *d* *e* *f* *g*

Bulletin Number	
Code	Description
152H	Solid-State Controller with Fusible Disconnect
153H	Solid-State Controller with Circuit Breaker

Controller Ratings	
Code	Description
F5	5 A, 3 Hp @ 460V AC
F25	25 A, 15 Hp @ 460V AC
F43	43 A, 30 Hp @ 460V AC
F60	60 A, 40 Hp @ 460V AC
F85	85 A, 60 Hp @ 460V AC
F108	108 A, 75 Hp @ 460V AC
F135	135 A, 100 Hp @ 460V AC
F201	201 A, 150 Hp @ 460V AC
F251	251 A, 200 Hp @ 460V AC
F317	317 A, 250 Hp @ 460V AC
F361	361 A, 300 Hp @ 460V AC
F480	480 A, 400 Hp @ 460V AC
F625	625 A, 500 Hp @ 460V AC
F780	780 A, 600 Hp @ 460V AC

Enclosure Type		
Code	Size	Description
F	5...480	NEMA Type 4/12 (IP65)
J	480...780	NEMA Type 12 (IP55)

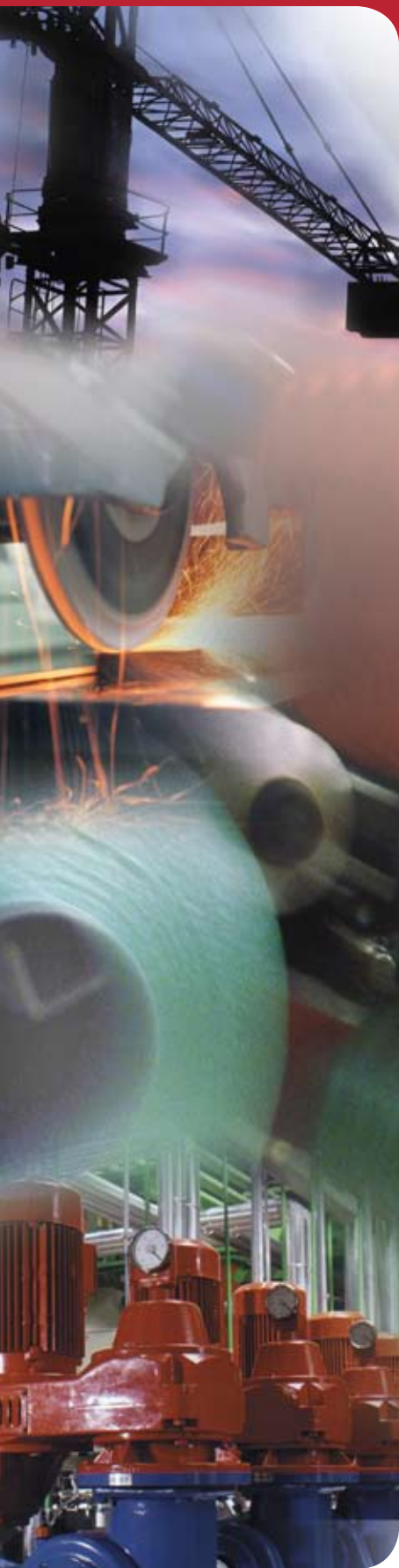
Line Voltage, 120V AC Control Voltage	
Code	Description
HD	200...208V AC, 3-phase, 50 and 60 Hz
AD	230V AC, 3-phase, 50 and 60 Hz
BD	400...460V AC, 3-phase, 50 and 60 Hz
CD	500...575V AC, 3-phase, 50 and 60 Hz

Control Options	
Code	Description
Blank	Standard
B	Pump Control
D	Braking Control

Horsepower									
Cat. No.	Hp Rating	Cat. No.	Hp Rating	Cat. No.	Hp Rating	Cat. No.	Hp Rating	Cat. No.	Hp Rating
33	0.5	39	5	46	40	52	150	60	450
34	0.75	40	7.5	47	50	54	200	61	500
35	1	41	10	48	60	56	250	62	600
36	1.5	42	15	49	75	57	300	63	700
37	2	43	20	50	100	58	350	65	800
38	3	44	25	51	125	59	400	67	1000
—	—	45	30	—	—	—	—	—	—

Options	
Code	Description
8L	Line-Mounted Protective Module
8M	Load-Mounted Protective Module
8B	Line- and Load-Mounted Protective Modules
Load-side MOVs are not available with Pump and Braking options, or when used with inside-the-delta connections.	

SMC-Flex



Unsurpassed Advantages

Features	Benefits
Built-in Overload	<ul style="list-style-type: none"> • Multiple overload trip class selection • Less products to inventory • Ease of selection • Ease of setup • Reduced footprint
Integral Bypass	<ul style="list-style-type: none"> • Reduced footprint • Minimal heat loss • Reduced enclosure size • Reduced total cost
Flexible Communication Option	<ul style="list-style-type: none"> • Reduction in inventory • Cost savings
Configurable Auxiliary Contacts	<ul style="list-style-type: none"> • Flexibility of system configuration • No external components to purchase • Less product to inventory
Full Metering and Diagnostics	<ul style="list-style-type: none"> • Built-in power monitoring • Takes mystery out of motor operation • No additional investment required • Minimize panel space
LCD Display	<ul style="list-style-type: none"> • Minimal parameters to set up • Ease of setup • Ease of operation • Minimize panel space
Product Modularity	<ul style="list-style-type: none"> • Ease of maintenance

Auxiliary Contact Number	Configurable To:
#1, #2, #3, #4	Normal/Up-to-speed/External bypass/ Fault/Alarm/Network control
	N.O./N.C.

SMC-3

The SMC-3 provides 3 Phase Control and unmatched performance in a compact design for your standard squirrel cage or star-delta induction motors. It features microprocessor-controlled electronic overload with adjustable trip class, motor and system diagnostics, configurable auxiliary contacts, and multiple START and STOP modes. All of these combined features provide a highly accurate, reliable, and efficient smart motor controller with the smallest footprint in the industry.



Actual Size 1...37 A (45 mm)

Current Range

Product Rating	Line Current	Delta Current
3	3	5
9	9	16
16	16	28
19	19	33
25	25	43
30	30	52
37	37	64
43	43	74
60	60	104
85	85	147
108	108	187
135	135	234
201	201	348
251	251	435
317	317	549
361	361	625
480	480	831

Voltage Range

200...600V AC 50/60Hz

Control Voltage

100...240V AC or 24V AC/DC

Starting Modes

Soft start, kick start, current limit start, or soft stop

Features

Overload Protection

- Flexibility in trip class (10, 15, 20 or OFF)
- Selectable overload reset (manual or automatic)

FAULT Diagnostics

- Overtemperature in power section
- Phase reversal (selectable)
- Phase loss/open load
- Phase imbalance
- Shorted SCRs

Configurable Auxiliary Contacts and Motor Control

- Full 3-phase control
- Standard squirrel cage induction motor or star-delta motors

Typical Applications

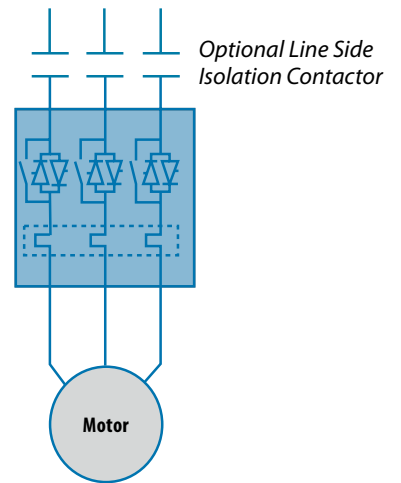
- Compressors
- Fans
- Conveyors
- Lifts
- Chillers
- Pumps

Features

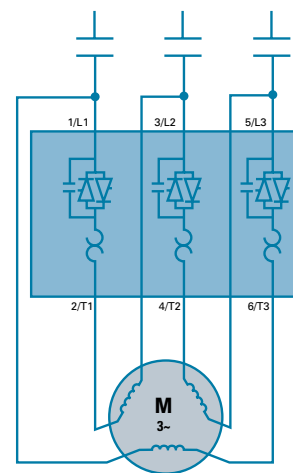
Overload

- Built-in overload
- True 3-phase control
- Advanced diagnostics
- Digital adjustments
- Add-on configurable auxiliary contacts

Line Connection



Delta Connection



Compact Size with True 3-Phase Control

The SMC-3 integrates a bypass to minimize heat generation during run time. The bypass automatically closes when the motor reaches its nominal speed, resulting in a cooler-running component and reduction in enclosure size.

Smart Motor Controllers – SMC™-3

Open and Non-Combination

150 – C 30 F B D – 8L
a b c d e f g

a

Bulletin Number	
Code	Description
150	Solid-State Controller

b

Controller Type	
Code	Description
C	SMC-3

c

Ampere Ratings	
Code	Description
3	3 A
9	9 A
16	16 A
19	19 A
25	25 A
30	30 A
37	37 A
43	43 A
60	60 A
85	85 A
108	108 A
135	135 A
201	201 A
251	251 A
317	317 A
361	361 A
480	480 A

d

Enclosure Type	
Code	Description
N	Open
F	IP65 (NEMA 4/12)

e

Input Line Voltage	
Code	Open Type — Description
B	200...460V AC, 3-Phase, 50/60 Hz
C	200...600V AC, 3-Phase, 50/60 Hz
Non-Combination Enclosed Only — Description	
H	200...208V AC, 3-Phase, 50/60 Hz
A	230V AC, 3-Phase, 50/60 Hz
B	400...460V AC, 3-Phase, 50/60 Hz
C	500...575V AC, 3-Phase, 50/60 Hz

f

Control Voltage	
Code	Description
D	100...240V AC
R	24V AC/DC (Open Type only)

g

Options	
Code	Description
8L	Line-Mounted Protective Module (Enclosed Type only)
Load-side MOVs are not available when used with inside-the-delta connections. MOVs can be field installed for open type units.	

Combination

152H – C 30 F BD 43 – 8L
a b c d e f g

a

Bulletin Number	
Code	Description
152H	Solid-State Controller with Fusible Disconnect
153H	Solid-State Controller with Circuit Breaker

b

Controller Type	
Code	Description
C	SMC-3

c

Ampere Ratings	
Code	Description
3	3 A
9	9 A
16	16 A
19	19 A
25	25 A
30	30 A
37	37 A
43	43 A
60	60 A
85	85 A
108	108 A
135	135 A
201	201 A
251	251 A
317	317 A
361	361 A
480	480 A

d

Enclosure Type		
Code	Size	Description
F	3...480	NEMA 4/12 (IP65)
J	480	NEMA 12 (IP55)

e

Input Line Voltage	
Code	Open Type — Description
HD	200...208V AC, 3-Phase, 50/60 Hz
AD	230V AC, 3-Phase, 50/60 Hz
BD	400...460V AC, 3-Phase, 50/60 Hz
CD	500...575V AC, 3-Phase, 50/60 Hz

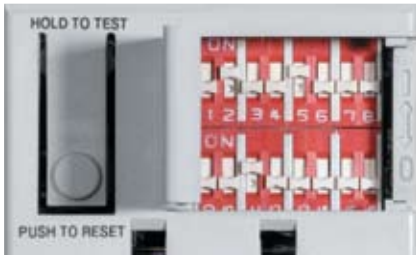
f

Horsepower									
Cat. No.	Hp Rating	Cat. No.	Hp Rating	Cat. No.	Hp Rating	Cat. No.	Hp Rating	Cat. No.	Hp Rating
33	0.5	39	5	46	40	52	150	60	450
34	0.75	40	7.5	47	50	54	200	61	500
35	1	41	10	48	60	56	250	62	600
36	1.5	42	15	49	75	57	300	63	700
37	2	43	20	50	100	58	350	65	800
38	3	44	25	51	125	59	400	67	1000
—	—	45	30	—	—	—	—	—	—

g

Options	
Code	Description
8L	Line Mounted Protective Module (Enclosed Type only)
Load-side MOVs are not available when used with inside-the-delta connections.	

Unsurpassed Advantages



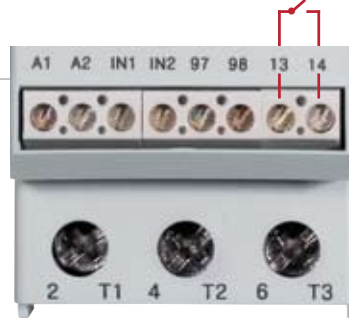
Easy and Secure Setup

- DIP switches allow for easy, precise, and secure setting of the START/STOP profile, overload, connection type, trip class, and auxiliary contact characteristics.
- The motor FLC setting is easily accomplished using the rotary pot located on the front of the device.

Configurable Auxiliary Contacts

As standard, the SMC-3 provides a configurable normally open (N.O.) auxiliary contact for motor run status indication.

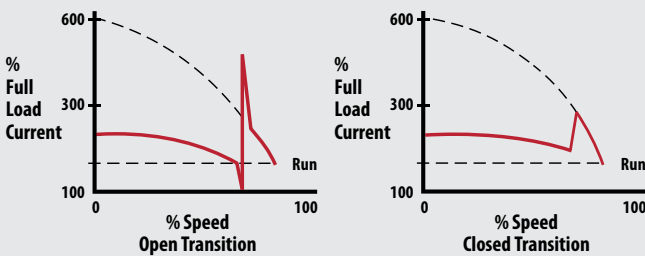
The SMC-3 has a line of side-mount configurable auxiliary contacts, allowing you more flexibility than ever before in your smart motor controller application.



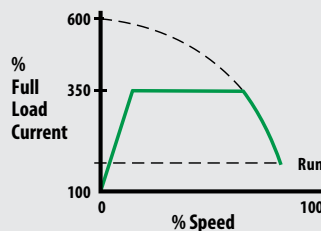
LED Display

An LED display clearly relays device status information including RUN, FAULT diagnostics, and OFF.

Electromechanical Star-Delta Starter Examples



SMC-3 Softstarter

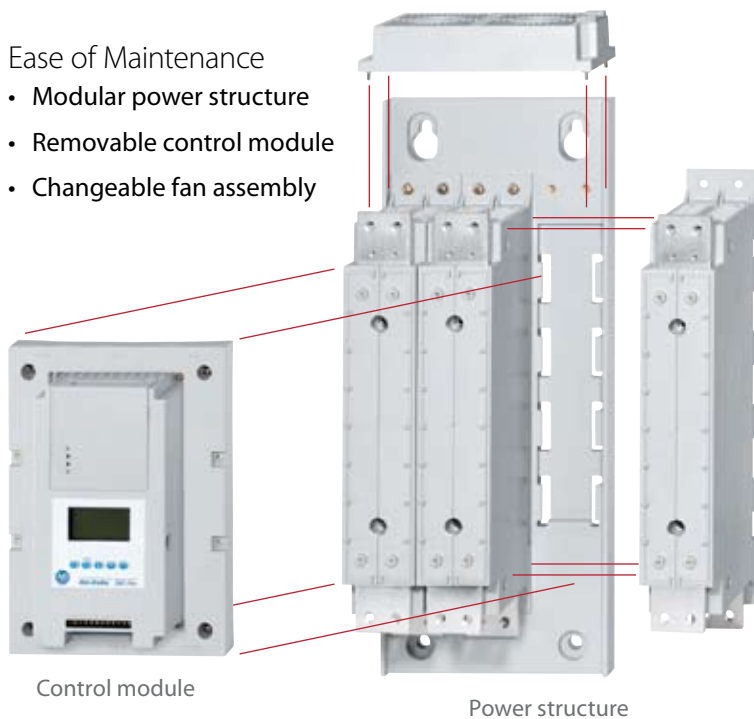
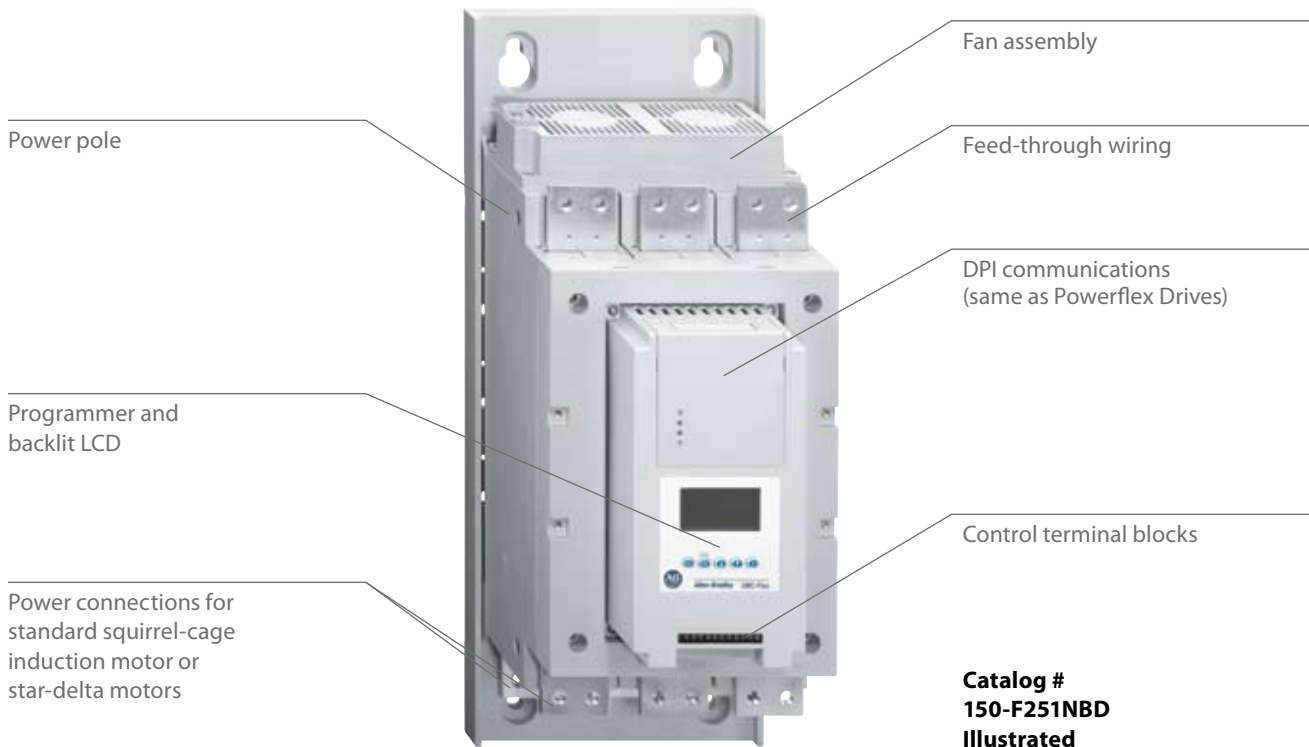


Transitionless Motor Starting – Eliminate Switching Noises and Current Surges
 The SMC-3 utilizes a current limit starting method to eliminate the current transition point found in star-delta applications. This greatly reduces the mechanical and electrical shock to your system and is especially important when power supplies are limited.



SMC-Flex

Modular by Design for Installation and Commissioning



Protection

- Power termination covers (IP2X)
- Protection is dead front (IP2X)

Advanced Diagnostics

- PTC Input
- Ground Fault Detection – additional current transformer required – Catalog Number 825-CBCT or 1411-126-252 depending on frame sizes

Communication

The Allen-Bradley family of 20-COMM DPI communication interfaces allows the SMC-Flex to be connected to multiple network types including DeviceNet, ControlNet, EtherNet, Remote I/O, RS-485, Modbus and Profibus. All connections are built into the SMC-Flex so no additional panel space is required.

SMC-3

Modularizing Accessories for the SMC-3



Flexible and Configurable Auxiliary Contacts

- Easy-to-mount side-mount auxiliary contact blocks
- Available in a variety of contact combinations

Available Configuration

	IEC	NEMA
• 1-N.O.		
• 2-N.O.		
• 1-N.C.		
• 1-N.O. & 1-N.C.		



Protected for Best Performance

Optional MOV protective modules prevent damage from transient voltages.



Reduce Temperature, Increase Duty Cycle

- Optional fan is useful if an application requires an increased duty cycle
- Snap-on fan module runs silently and is easy to install
- Fan is installed as standard for 43...480 A SMC-3

Build a Modular Control System

- With widths of 45 mm, 72 mm, or 200 mm the SMCs fit perfectly with the compact components of the MCS Plus product line
- The smart motor controllers match the MCS Plus products in performance, size, and design
- The MCS Plus system allows you to build more starters in less panel space, providing unparalleled performance in a minimal area



Remote Reset Solenoid

The Bulletin 193 remote reset solenoid allows you the ability to reset a fault from a remote location.



SMCs

Ideal for a Wide Range of Applications

Allen-Bradley SMCs provide innovative starting and stopping solutions for ample design flexibility with minimal control module options meeting the needs of most production applications. To help identify which start and stop profiles, described in the following pages, are included in each control module option, use the following code:

● SMC-Flex, Standard

▲ SMC-Flex, Pump Control

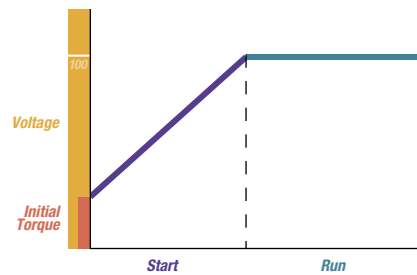
■ SMC-Flex, Braking Control

◆ SMC-3



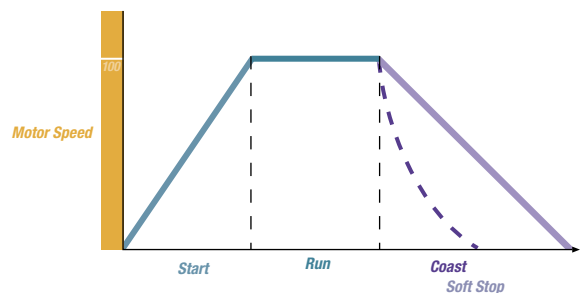
Soft Start

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



Soft Stop

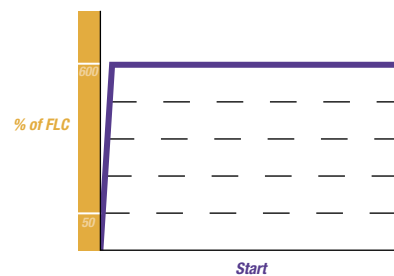
The Soft Stop option extends the stopping time to minimize load shifting or spillage.



Current Limit Start

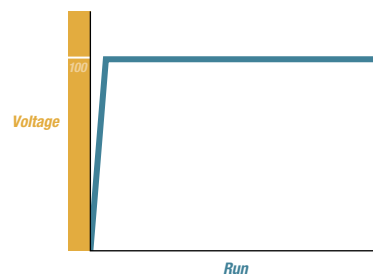
Current Limit starting is designed for applications that require the in-rush current to be limited during acceleration.

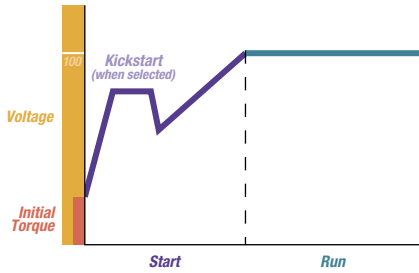
Note: Selectable Kickstart is also available with the Current Limit Start.



Full-Voltage Start

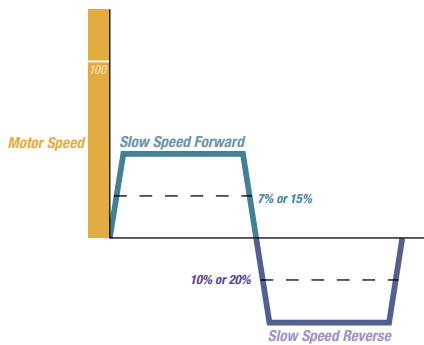
In the Full-Voltage Start mode, the SMC performs like a solid-state contactor, achieving full in-rush current and locked rotor torque.





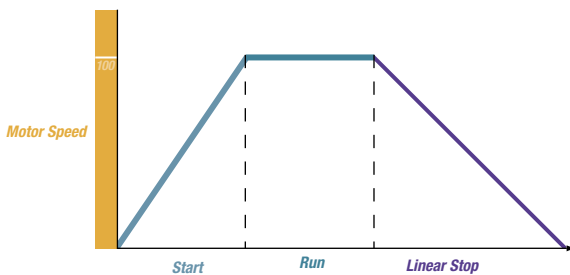
Kick Start with Soft Start

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.



Preset Slow Speed

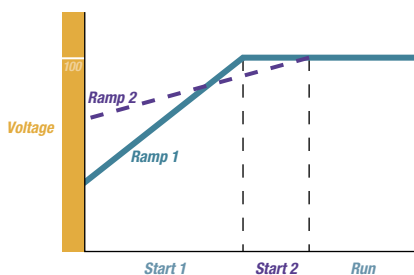
The Preset Slow Speed option furnishes two jog speeds to facilitate process setup and alignment. These speeds are available in both the forward and reverse direction without a reversing contactor.



Linear Speed Start and Stop

With this type of acceleration mode, a closed-loop feedback system maintains the motor acceleration at a constant rate. The required feedback signal is provided by a DC tachometer coupled to the motor (tachometer supplied separately).

Note: This mode is also available with Kickstart.



Dual Ramp Start

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



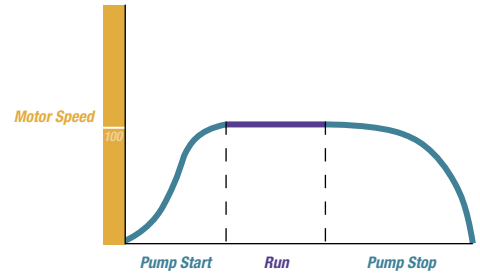
SMCs

Ideal for a Wide Range of Applications



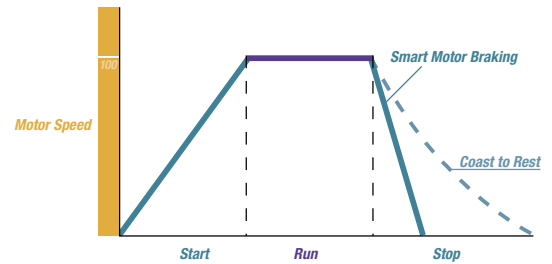
Pump Start and Stop

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.



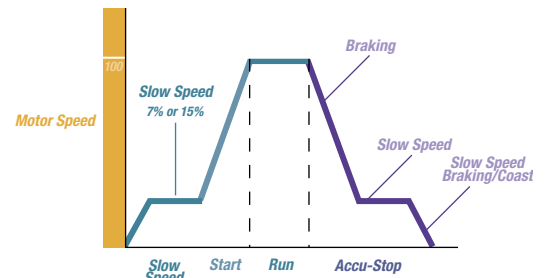
SMB™ Smart Motor Braking

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



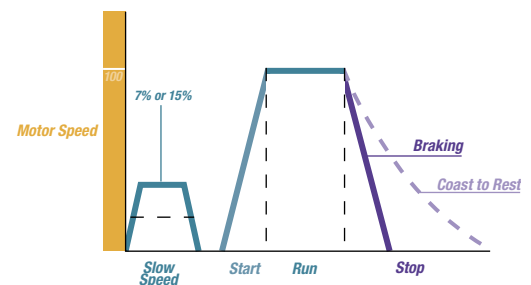
Accu-Stop™ Position Control

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

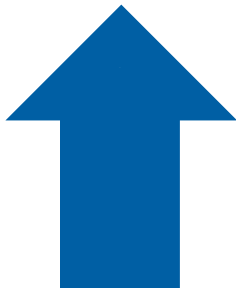
Slow Speed with Braking combines the benefits of SMB Smart Motor Braking and Preset Slow Speed for applications requiring slow setup speeds and braking to a full stop.





Modularity. Functionality. Size.

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MOTOR CONTROL**



SYSTEM-WIDE COMMUNICATIONS

**MOTOR
PERFORMANCE**

**MOTOR
PROTECTION**

Our Complete Portfolio of
Intelligent Motor Control Products,
as part of a truly integrated architecture...

- ...simplifies your start-up
- ...reduces your installed cost
- ...makes it easier for you to access
essential plant and production data

Accu-Stop, ControlNet, DeviceNet, EtherNet, Profibus, Smart Motor Breaking, SMB, SMC-3, SMC Dialog Plus, SMC-Flex and STC are trademarks of Rockwell Automation, Inc.

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