

Smart Motor Controllers – SMC™-3, SMC™ Flex and SMC™-50 Soft Starters Family



Size for Size, the Best Value in the Industry



LISTEN.
THINK.
SOLVE.™

Rockwell Automation Starting Solutions



Scan this QR code with your smartphone to go to the SMC family page

<http://www.rockwellautomation.com/go/lvstarter>



Across-the-Line Starters

- *Simplest starting solution*
- *Full torque applied to motor*
- *Mechanical wear/finite mechanical life*

Electro-Mechanical

Solid-State

Soft Starters

Reap the benefits of high productivity on your plant floor with the SMC family of soft starters. Our soft starters are designed for flexibility and scalability with integrated features and functionality to help reduce your energy costs and maximize your investments.

- *Simple starting and stopping*
- *Limited control at various speeds*
- *Reduced torque and current starting*
- *Simple to adjust and set up*



SMC-3 Compact

Compact design provides true three-phase control, increased intelligence and unmatched performance. Motor and system diagnostics and an electronic overload with adjustable trip class reduce downtime and protect valuable assets.

- Compact footprint
- Easy and secure setup
- Integrated bypass
- Five Start/Stop modes



SMC Flex Modular

Modular design features advanced intelligence, performance and diagnostics; communications flexibility; removable control module, power modules and fan assembly in a cost-effective package for your demanding production applications.

- Modular for installation and maintenance
- Built-in LCD and keypad
- Integrated bypass
- Nine Start/Stop modes and up to three slow-speed modes
- Full metering and diagnostics



SMC-50 Scalable

Designed for customer flexibility – advanced monitoring and protection, superior communications capabilities and Energy Saver mode help increase efficiency and reduce downtime.

- Application scalability
 - Normal and Heavy-duty ratings
 - Expandable I/O and sensor capability
 - Network integration capabilities
- Switch, LCD or PC software setup
- External bypass optional
- 17 Start/Stop modes and three slow-speed modes

Electro-Mechanical

Solid-State



Variable Frequency Drives

- *Continuous control at any speed*
- *Full torque at any speed*
- *More complex*

Allen-Bradley® Smart Motor Controllers

Ideal for a wide range of applications

- Compact • Modular • Scalable

SMC-3

Compact, true three-phase control in a cost-effective package with overload protection, integral bypass, and motor and system diagnostics.

Accessories



Flexible and Configurable Auxiliary Contacts



Remote Reset Solenoid



Optional MOV Protective Modules



Snap-on Fan Module

Integral Bypass

The bypass automatically closes when the motor reaches its nominal speed, minimizing heat generation.

- Reduced enclosure size
- Reduced total cost

Hold to Test/ Push to Reset Button

Used to quickly test for fault conditions or reset the unit.

- Reduces downtime
- Assists during setup

LED Display

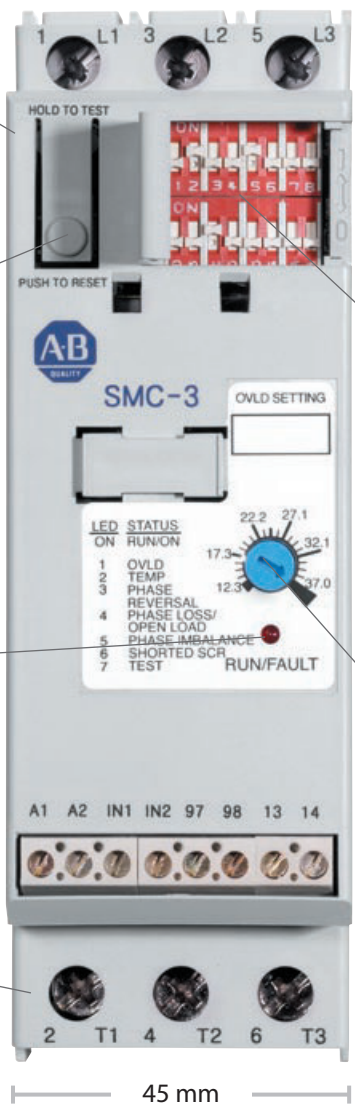
Status information provided including RUN, Fault type and OFF.

- Instant status display
- Assists during troubleshooting

Ultra-Compact Size

1 to 37 A units are only 45 mm wide.

- Reduced panel space
- Higher-density installations



Actual Size (1 to 37 A units)



Build a Modular Control System (MCS)

- With widths of 45, 72, or 200 mm, the SMCs fit perfectly within the MCS product line
- The MCS system allows you to build more starters in less panel space, providing enhanced performance in a minimal area

Easy and Secure Setup

DIP switches allow setting of the START/STOP profile, built-in overload, connection type, trip class and auxiliary contact characteristics.

- Process optimization
- Setup efficiency

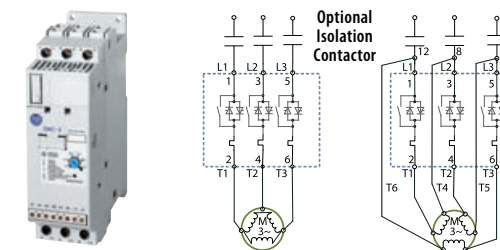
Simplified Motor FLA Setup

Rotary switch allows quick and easy setup of motor FLA.

- Setup efficiency
- Protects motor assets

Current Ranges

Standard squirrel cage or star-delta induction motors

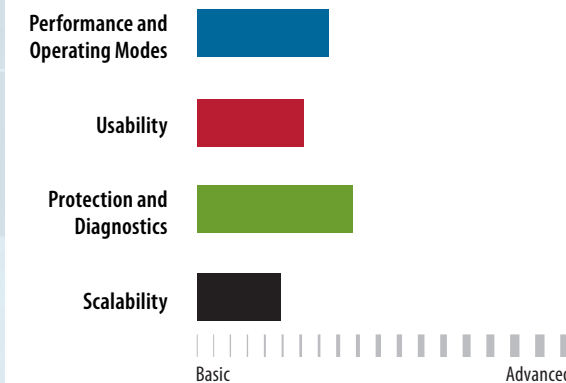


Size	Line-connected Motor Current (Amps)	Delta-connected Motor Current (Amps)
Frame 1	3...37	5...64
Frame 2	43...85	74...147
Frame 3	108...135	187...234
Frame 4	201...251	348...435
Frame 5	317...480	549...831

Voltage Ranges and Operating Modes

Voltage Range	Operating Modes
200...600V AC, 50/60 Hz	5 Start/Stop Modes
Control Voltage	Control Options
100...240V AC or 24V AC/DC	Standard

Product Selection Attributes



Application Spotlight

Ideal Applications:

- Conveyors
- Fans
- Pumps
- Chillers
- Mixers
- Lifts



Problem:

A remote pump station needs to replace existing full-voltage motor starters to reduce mechanical stress on check valves and pump impellers and to reduce total operating costs.

Solution:

The SMC-3 and its compact design is an ideal alternative.

- Decreased startup torque translates to less shock/stress on mechanical components
- Simple user interface reduces installation time
- Line and motor diagnostics detect single-phase conditions, protecting against motor damage
- Lower peak currents during starting reduces system maintenance, driving operating costs down

SMC Flex

Modular by design for installation and commissioning. Features built-in LCD display and flexible communications providing advanced performance, diagnostics and protection.

Accessories



Protective Modules



Human Interface Modules (HIMs)



Terminal Covers



Communication Modules

Integral Bypass

The bypass automatically closes when the motor reaches its nominal speed, minimizing heat generation.

- Reduced enclosure size
- Reduced total cost

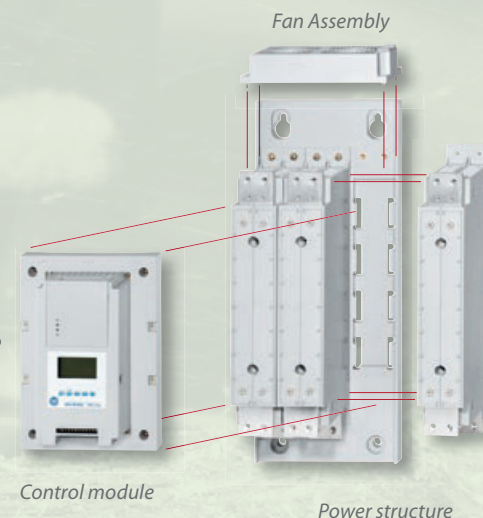
Feed-through Wiring

Power Pole

Communications

Optional communication modules allow the SMC Flex to be connected to multiple networks.

- Common DPI modules reduce inventory
- EtherNet/IP™, DeviceNet™, ControlNet™ and other networks available



Ease of Maintenance

Product Modularity

- Modular power structure
- Removable control module
- Changeable fan assembly

Advanced Monitoring and Diagnostics

Built-in current and voltage protection provide enhanced power monitoring and diagnostic capabilities.

- No additional monitoring equipment required
- PTC input
- Ground fault detection

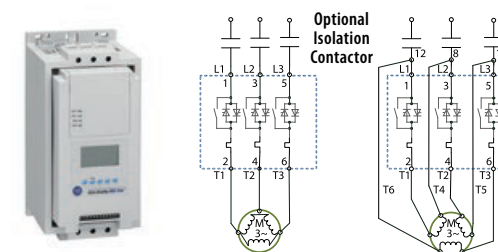
Simplified Application Setup

Built-in multilingual, backlit LCD display for programming and monitoring.

- Setup efficiency
- Process optimization

Current Ranges

Standard squirrel cage or star-delta induction motors

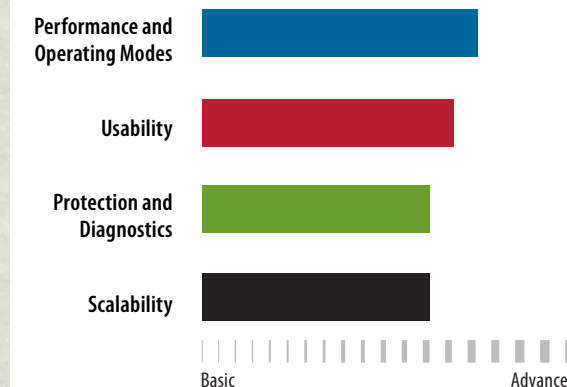


Size	Line-connected Motor Current (Amps)	Delta-connected Motor Current (Amps)
Frame 2	5...85	9...147
Frame 3	108...135	187...234
Frame 4	201...251	348...435
Frame 5	317...480	549...831
Frame 6	625...780	850...900
Frame 7	970...1250	1200...1600

Voltage Ranges and Operating Modes

Voltage Range 200...690V AC, 50/60 Hz	Operating Modes 9 Start/Stop Modes Up to 3 Slow-speed Modes
Control Voltage 100...240V AC (5...480 A) or 24V AC/DC (5...480 A) 110...120V AC (625...1250 A) 230...240V AC (625...1250 A)	Control Options Standard Pump Control Braking Control

Product Selection Attributes



Application Spotlight

Ideal Applications:

- Compressors
- Pumps
- Fans
- Conveyors
- Bandsaws
- Chillers
- Centrifuges



Problem:

A lumber mill is updating starting methods for their saws. In addition to space constraints, the main focus is on improving operating efficiencies while staying within the limitations of the current transformer and distribution system.

Solution:

- The SMC Flex and its modular design is an ideal fit for the existing system.
- Minimizes starting peak current and torque shock to the system
 - Smart Motor Braking option stops the motor in 2 minutes versus the coast-down time of 15 minutes
 - Slow Speed operation enables inspection of saw blade tracking before the motor is brought to full speed
 - Current, Voltage, and Power diagnostics displayed via a door-mounted HIM interface
 - Built-in programmable overload protection accommodates characteristics of a high-inertia load
 - Diagnostics detect jam, stall, or single phasing and shut off the motor, helping to prevent damage

SMC-50

Scalable design for customer flexibility satisfying a wide variety of control needs.

Accessories



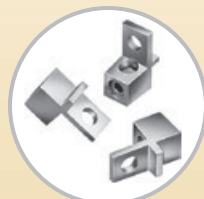
I/O Modules



Protective Modules



Programming and Communication Modules



Bypass and Lug Kits

Solid-State Power Structure

State-of-the-art solid-state SCR power structure.

- Ideal for harsh environments
- Higher operations per hour
- Scalable thermal ratings
- Higher SCCR ratings

LED Display

Multi-colored LED provides both diagnostics and controller status information.

- Instant status display
- Assists during troubleshooting

Hardware Expansion Ports

Three hardware expansion ports accept optional digital and analog I/O expansion modules as well as a protection module (PTC, Ground Fault, Current Feedback).

- Process scalability & optimization
- Application flexibility (simple to complex)



Shown with optional terminal covers

Simplified, Scalable Application Setup

Optional Parameter Configuration Module, Human Interface Module or PC-based software for programming and monitoring simplifies setup.

- Setup efficiency
- Process optimization

Hold to Test/ Push to Reset Button

Used to quickly test for fault conditions or reset the unit.

- Reduces downtime
- Assist during setup

Communications

Optional communication modules allow the SMC-50 to be connected to multiple networks.

- Common DPI modules reduce inventory
- EtherNet/IP, DeviceNet, ControlNet and other networks available

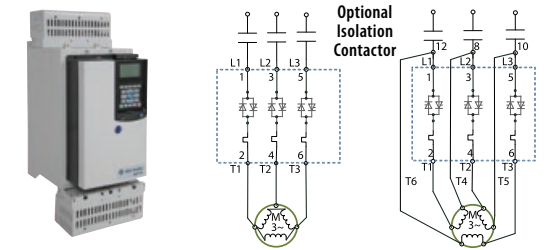
Common Control Module

All features/functions are included in standard control module including linear acceleration/deceleration, torque control, Pump control, Smart Motor Braking (SMB) and Energy Saver mode.

- Reduced inventory
- Increased efficiency

Current Ranges

Standard squirrel cage or star-delta induction motors



Size	Line-connected Motor Current (Amps)	Delta-connected Motor Current (Amps)
Frame B	90...180	155...311
Frame C	210...320	363...554
Frame D	361...520	625...900

Voltage Ranges and Operating Modes

Voltage Range

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

Operating Modes

17 Start/Stop Modes (including linear acceleration, linear deceleration and torque control)
4 Special Operating Modes Including Energy Saver mode

Control Voltage

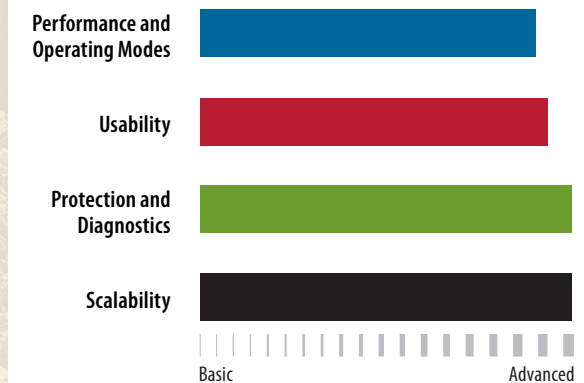
100...240V AC or 24V DC*

Control Options

Standard (all features/functions in one module)

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

Product Selection Attributes



Application Spotlight

Ideal Applications:

- Pumps
- Compressors
- Fans
- Conveyors
- Bandsaws
- Mills
- Crushers
- Grinders
- Shredders
- Centrifuges



Problem:

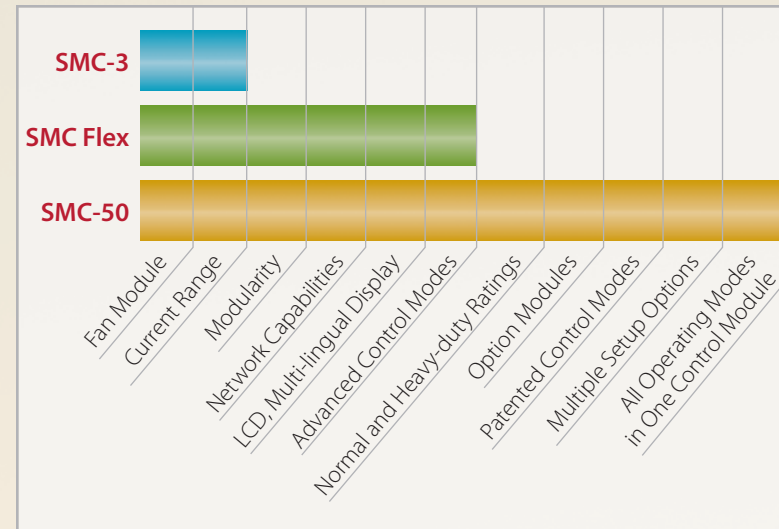
A rock quarry is looking for a soft starter solution to replace the existing starters on their large motors due to power system limitations and to increase operating efficiencies while maximizing uptime.

Solution:

- The SMC-50 provides a scalable solution addressing power company requirements and distribution limitations.
- Advanced linear starting technology yields consistent starting performance and limits peak current and torque shock
 - Advanced control and monitoring maximizes uptime with reduced need for system maintenance
 - Solid State power structure with optional external bypass provides operating redundancy
 - Optional communications allow monitoring and control over the existing EtherNet/IP backbone
 - Advanced diagnostics and condition monitoring support customizable protection
 - The Energy Saver mode helps reduce total power consumption during periods of light production

Product Selection Attributes

Scalability



Usability



- SMC-3**
- Easy Setup
 - LED Display
 - Built-in Test/Reset Button



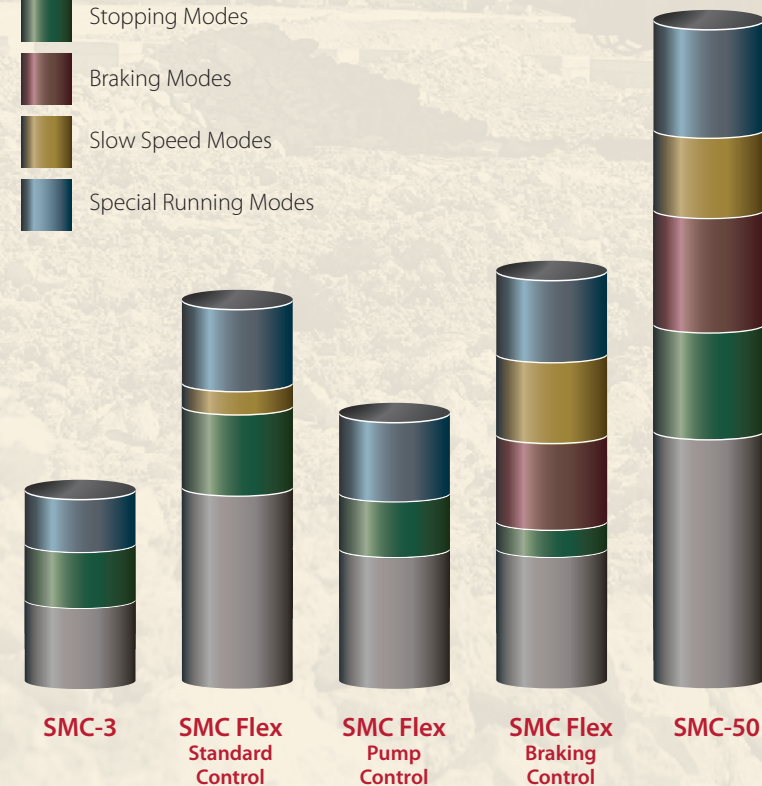
- SMC Flex**
- Built-in LCD, Multi-lingual Display
 - Advanced Performance and Diagnostics
 - Network Capabilities
 - Modularity



- SMC-50**
- Setup Wizards
 - Auto Connection and Fan Control
 - Motor Auto Tuning
 - Removable Terminal Blocks
 - Multiple Programming Methods
 - Network Capabilities

Performance and Operating Modes

- Starting Modes
- Stopping Modes
- Braking Modes
- Slow Speed Modes
- Special Running Modes



Protection and Diagnostics

	SMC-3	SMC Flex	SMC-50
Motor Overload	✓	✓	✓
Temperature Protection	✓	✓	✓
Current Protection	✓	✓	✓
Voltage Protection		✓	✓
Power Protection			✓
Frequency Protection			✓
Preventive Maintenance			✓
Real-time Clock			✓
Snapshot Data Capture			✓
Start Performance Tracking			✓

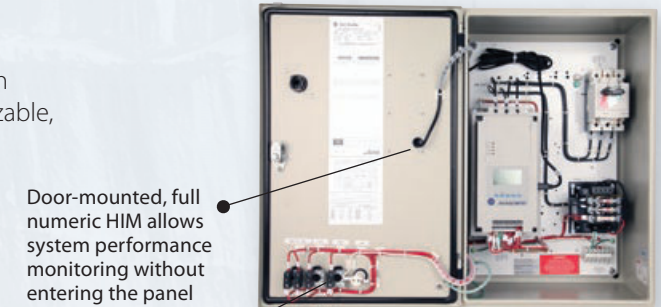
Enclosed Soft Starting Solutions

With the available options, functionality, and application capabilities, Allen-Bradley Enclosed SMCs are virtually unmatched in the industry.

Enclosed SMC Family

Enclosed SMCs encompass all the starting, stopping, protection and diagnostics benefits of our open soft starters, in a customizable, pre-engineered solution.

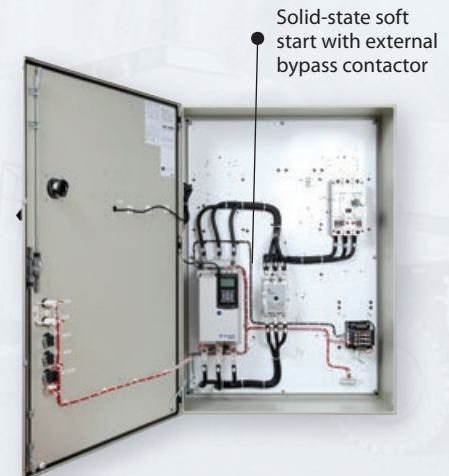
- Available as non-combination or with fusible or circuit breaker disconnect
- Broad size offering:
 - SMC-3 up to 480 A
 - SMC Flex up to 1250 A
 - SMC-50 up to 520 A
- Standard options include pilot devices, isolation and bypass contactors, protective modules, HIM and communication modules
- Solutions with specialized options or third-party devices are available through our Modified Standards program
- Quick factory lead times!



Door-mounted, full numeric HIM allows system performance monitoring without entering the panel

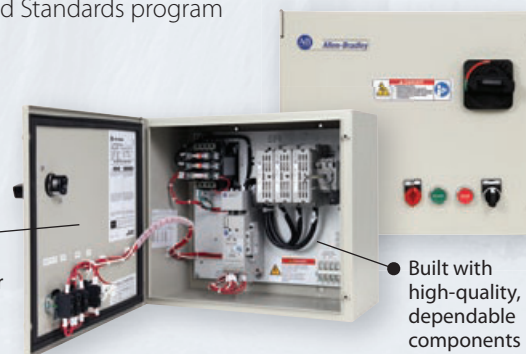
Wide range of factory-installed options

Enclosed SMC Flex Solution



Solid-state soft start with external bypass contactor

Enclosed SMC-50 Solution



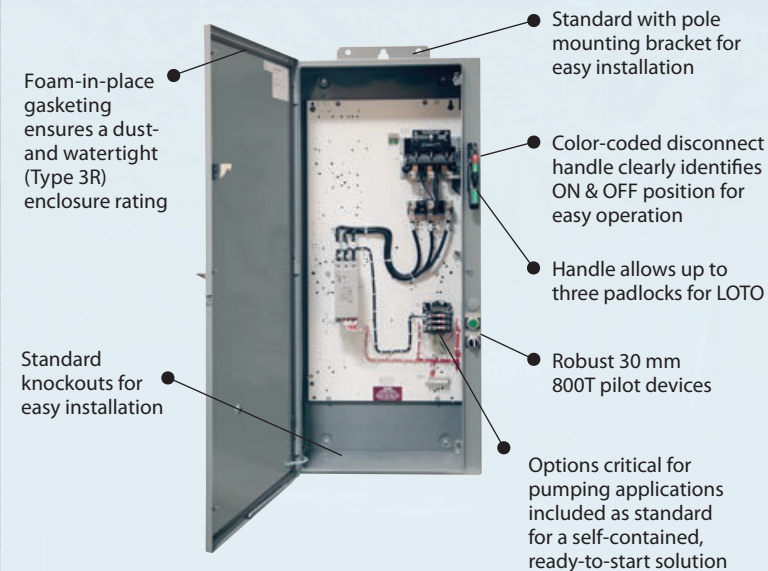
Type 1/12/4 enclosure for indoor or outdoor applications

Built with high-quality, dependable components

Enclosed SMC-3 Solution

Pump Panels

SMC-3 pump panels are a robust solution for pumping applications. Perfect for crop irrigation, oil & gas pumping, golf courses, marina slip power hook-ups and wastewater treatment.



CENTERLINE 2100 MCC

CENTERLINE 2500 MCC

Motor Control Centers

Combination soft starter units are available globally in our CENTERLINE® motor control centers. These units contain a microprocessor-controlled motor controller, control circuit transformer and either a fusible or circuit breaker disconnect.

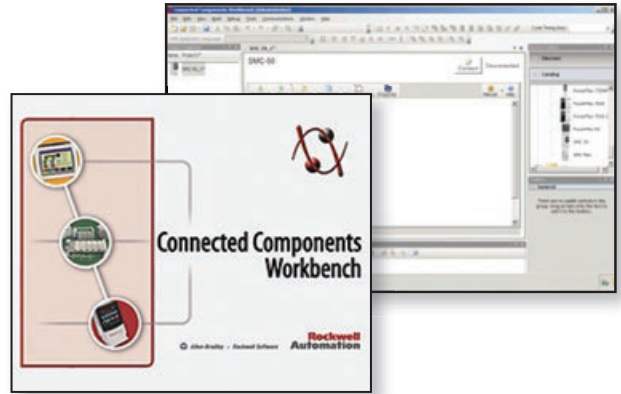


Wizards

The SMC Wizards assist in product selections for short circuit protection devices, thermal analysis and system analysis for the SMC family.

The Connected Component Workbench™ Software

Connected Components Workbench software offers device configuration and helps minimize your initial machine development with free software download.



Rockwell Automation offers a breadth of quality Allen-Bradley® components to fit your specific needs. In order to assist you with your component selection, we offer a variety of configuration and selection tools.



Local Distributor

Call 1.800.223.3354 to contact your local Distributor today.
<http://www.rockwellautomation.com/distributor/>



On-Line Product Directory

Our extensive product portfolio is designed to improve your processes through every stage of your manufacturing cycle.
<http://www.rockwellautomation.com/products/>



Product Selection Toolbox

Our powerful range of product selection and system configuration tools assist you in choosing and applying our products.
<http://www.rockwellautomation.com/en/e-tools/>



Catalogs

Within our catalogs you'll find an extensive selection of essential Allen-Bradley component products.
<http://www.ab.com/catalogs/>

Rockwell Automation, Inc. (NYSE:ROK), the world's largest company dedicated to industrial automation, makes its customers more productive and the world more sustainable. Throughout the world, our flagship Allen-Bradley® and Rockwell Software® product brands are recognized for innovation and excellence.

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Bulletins 150, 152 and 153 Enclosed Smart Motor Controllers



SMC™ -3, SMC™ Flex and SMC™ -50 soft starters

Advantages

- Reduced mechanical system stress, wear and maintenance
- Lower voltage/current spikes and line disturbances
- Decreased water hammer in pumping applications
- Snap-together wiring technology for faster, easier installation
- Lower peak electrical use and demand charges
- Floor standing indoor/outdoor rated enclosure has compact footprint requiring less space

Functionality

Enhanced Control Options

- User programmability
- Scalable to critical nature of application
- Local, manual and automatic modes

Inherent Diagnostics

- Current, voltage, power and energy monitoring
- Faults and alarms

Lowest Installed Cost with Network Integration

- Ease of communication linkage (e.g. multi protocol, AOPs)
- Localized I/O and control
- Wire reductions

Enclosed soft starters offer a balance of performance, versatility and price.



Overview

The capabilities and flexibility of the enclosed SMC-3, SMC Flex and SMC-50 soft starters make them ideal for almost any application. They minimize mechanical wear that results from full-voltage starting, enabling longer starting. This prolongs system life and lowers line disturbances, reducing downtime and increasing efficiency. Factory-built, enclosed soft starters are customized solutions tailored to your specific application, but pre-engineered for standardization and quick delivery available through regional configuration centers.

Offering

Enclosed SMC-3, SMC Flex and SMC-50 soft starters are available as non-combination, combination fusible disconnect or combination circuit breaker. Solutions can be fully customized with any selection of a wide variety of factory-installed options, and are pre-engineered for quick factory lead times.

With industry-leading customization, available options, and functionality, these soft starters are a clear-cut choice for diverse and specialized applications.

LISTEN.
THINK.
SOLVE.™

Enclosed Soft Starting Solutions

Enclosed soft starting solutions encompass all the starting, stopping, protection and diagnostics benefits of Allen-Bradley® soft starters, in a customizable, pre-engineered solution. Factory-built enclosed soft starters are shipped ready to install, with quick lead times.

Enclosed SMC-3 soft starter

Compact, cost-effective solution for on-machine or pumping applications

- Available 3...480 A
- Snap-together wiring technology¹

Bulletins 150C, 152C, 153C

APPLICATIONS: *Conveyors • Fans • Pumps • Chillers • Mixers • Lifts*



Enclosed SMC Flex soft starter

Modular design with advanced performance and communications flexibility

- Available 5...1250 A
- Snap-together wiring technology¹
- Optional full-numeric keypad, door-mounted HIM

Bulletins 150F, 152F, 153F

APPLICATIONS: *Compressors • Pumps • Fans • Conveyors
Bandsaws • Chillers • Centrifuges*

Enclosed SMC-50 soft starter

Scalable solution, satisfying a wide variety of control needs

- Available 90...520 A
- Snap-together wiring technology¹
- Normal and heavy-duty ratings
- Optional start- or run-duty external bypass
- Optional door-mounted HIM with easy-selection arrows and soft keys for navigation
- Optional digital and analog I/O expansion modules and protection

Bulletins 150S, 152S, 153S

APPLICATIONS: *Pumps • Compressors • Fans • Conveyors • Bandsaws • Mills •
Crushers • Grinders • Shredders • Centrifuges*



¹Snap-together wiring available from 90... 520 A

Soft Starter Feature Comparison

	SMC-3 soft starter	SMC Flex soft starter	SMC-50 soft starter
True 3-Phase control	Yes	Yes	Yes
Bypass	Integral	Integral	External
Protection and Diagnostics	Basic	Advanced	Industry leading
Start/stop modes	5	9	17
Enclosure type	1/12/4 or 3R	1/12/4 or 3R	1/12/4 or 3R
Factory-installed communication modules (optional)	None	RS-485, DeviceNet™, Ethernet/IP, ControlNet™, ProfiBUS	RS-485, DeviceNet™, Ethernet/IP, ControlNet™, ProfiBUS
Voltage range	200....575V AC	200....575V AC	200....575V AC
Control voltage	100....240V AC	100....240V AC	100....240V AC
Option offering and customization	Moderate	Extensive	Extensive
Customization through modified standards	Yes	Yes	Yes

Soft Starter Enclosures

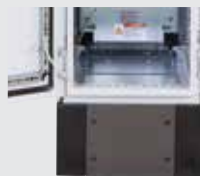
Standard enclosure sizes are available in three widths:

- 400 mm (15.7 in.)
- 600 mm (23.6 in.)
- 1000 mm (39.4 in.)



Enclosure accessories are available for each width

- Mounting rail for door installation
- Enclosure mounting foot, high strength plastic
- Enclosure mounting foot, sheet steel



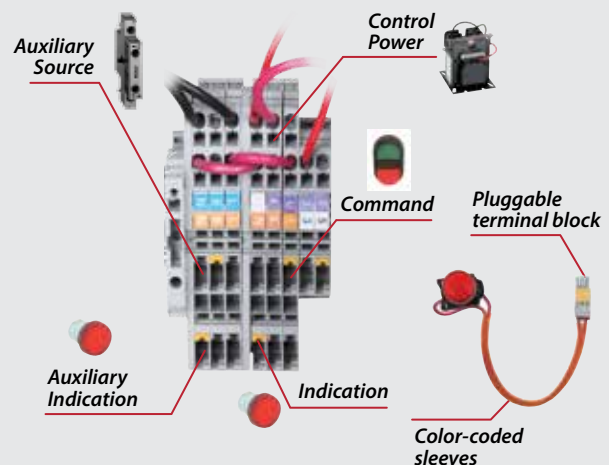
Ratings and Environmental Specifications

- Standards compliance: UL 508A
- Enclosure and ambient operating temperature: -5...40 °C (23...104 °F)
- Altitude: 2000 m (6560 ft)
- Humidity: 5...95% (non condensing)

Snap-together Wiring Technology

Wiring Made Easy

Many of our enclosed soft starters¹ now feature component wiring that is color-coded by function. The wiring sleeve cover corresponds to a colored label on the terminal block, reducing wiring errors and allowing quicker installation times.



¹Snap-together wiring available from 90...520 A

Modified Industrial Controls

The Modified Industrial Controls business at Rockwell Automation® can take your panel design needs from conception to completion. We provide a unique engineer-to-engineer relationship that helps to ensure that every aspect of your panel is designed, developed and delivered according to your specifications, schedule and budget.

Customizable panels include:

- Programmable controllers
- Starters
- Distributed I/O
- Servo drives
- Push buttons and pilot lights
- Partner products and other third-party devices



Find out more about
Modified Industrial Controls:

www.rockwellautomation.com/go/lit/icp-modified



Regional Configuration Centers

The Rockwell Automation regional configuration centers are located in your area to help you get the right product, right when you need it.

Availability

- Products ship within 5 days

Flexibility

- Factory-installed modifications
- Comply with regional needs and standards

Enclosed soft starters are assembled in the Central and Western regional configuration centers.



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Bulletin 154 Starting Torque Controllers

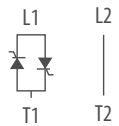


Cost-effective Soft Starting for Single- and Three-Phase Low Horsepower Motors

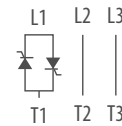
Features and Benefits

- Reliable proven technology with solid state power poles
- Simple commissioning with only two adjustments:
 - Initial Torque Setting (10%....80%)
 - Duration of Ramp (0.5...5sec)
- Energy savings
- Less wear and tear on mechanical systems
- RoHS compliant, China RoHs
- cULus approved

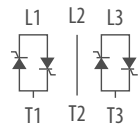
Starting Torque Controllers help reduce mechanical and electrical stress on motor circuits and systems by limiting the torque surge at start-up.



SINGLE PHASE



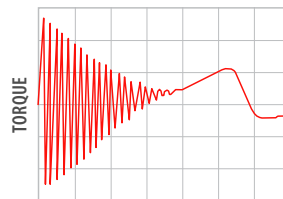
THREE PHASE
(1 control phase)



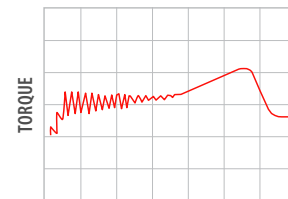
THREE PHASE
(2 control phases)

Reduce Mechanical and Electrical Stress

The Starting Torque Controller (STC) provides a cost-effective basic soft-starting solution for low horsepower single and three phase squirrel cage induction motors. Models are available to work with single-phase motors, as well as one or two control phase versions for three-phase motors.



TIME (less than one second)



TIME (less than one second)

Starting Torque Controllers help reduce mechanical and electrical stress on motor circuits and systems by limiting the torque surge at start-up.

Starting torque controllers are ideal for adding on to existing across the line starters. They allow for adjustable initial torque and ramp time.

Ideal applications include basic material handling, fans, pumps, and single phase reduced voltage starting applications.

LISTEN.
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SOLVE.

Single-Phase with single control phase Starting Torque Controllers

Current Rating [A]	Rated Power @ 40C (104 F)			Control Voltage	
		115V	230V	24V AC/DC	100...240VAC
12	Hp	0.5	2	154-SP1C12NAR	154-SP1C12NAD
	kW	0.55	1.1		
16	Hp	0.5	2	154-SP1C16NAR	154-SP1C16NAD
	kW	0.75	1.5		
25	Hp	1	3	154-SP1C25NAR	154-SP1C25NAD
	kW	1.5	3		

Three-Phase with one control phase Starting Torque Controllers

Current Rating [A]	Rated Power @ 40C (104 F)					Control Voltage	
		220V	400V	460V	575V	24V AC/DC	100...240VAC
12	Hp	3	5	7.5	10	154-TP1C12NCR	154-TP1C12NCD
	kW	3	5.5	6.3	6.3		
16	Hp	5	7.5	10	10	154-TP1C16NCR	154-TP1C16NCD
	kW	4	7.5	7.5	7.5		
25	Hp	7.5	10	15	20	154-TP1C25NCR	154-TP1C25NCD
	kW	6.3	11	13	15		

Three-Phase with two control phases Starting Torque Controllers

Current Rating [A]	Rated Power @ 40C (104 F)					Control Voltage	
		220V	400V	460V	575V	24V AC/DC	100...240VAC
12	Hp	3	5	7.5	10	154-TP2C12NCR	154-TP2C12NCD
	kW	3	5.5	6.3	6.3		
16	Hp	5	7.5	10	10	154-TP2C16NCR	154-TP2C16NCD
	kW	4	7.5	7.5	7.5		
25	Hp	7.5	10	15	20	154-TP2C25NCR	154-TP2C25NCD
	kW	6.3	11	13	15		

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