

# CENTERLINE Medium Voltage SMC Specifications

Bulletin Numbers 1503E, 1560F, 1562F

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## Overview

Rockwell Automation meets and exceeds industry demands with the medium voltage smart motor controller (MV SMC™-50) line of solid-state, reduced-voltage motor controllers. The MV SMC-50 controller is available for soft starting motors rated up to 600 A full load current, 2300...6900V AC, 50/60 Hz. Higher motor currents are possible under certain conditions (consult the factory). The MV SMC-50 control module provides closed-loop microprocessor control to start and stop three-phase medium voltage and low voltage motors. Several standard modes of operation are available within a single controller:

- Soft Start with Selectable Kickstart
- Current Limit Start with Selectable Kickstart
- Sensorless Linear Acceleration with Selectable Kickstart
- Sensorless Linear Deceleration
- Soft Stop
- Dual Ramp Start
- Full Voltage Start
- Pump Control (optional), including start and stop control

## Additional Features

- Solid-state motor protection
- Metering
- Drive Programming Interface (DPI) communication
- LCD display
- Advanced diagnostics with user-configurable alarms and faults
- Keypad programming
- Fiber optic control of medium voltage silicon controlled rectifiers (SCRs) (for isolation)
- Current loop gate driver boards
- Vacuum bypass contactor
- Starting optimized power stacks
- CENTERLINE™ power bus

The Bulletin 1503E, 1560F, and 1562F are solid-state reduced voltage controllers which utilize the same SMC-50 digital control module as the 480/600V Bulletin 150 SMC-50 controllers.

MV SMC-50 Motor Controllers	Bulletin Number
OEM Components	1503E
Retrofit Controller	1560F
Combination Controller, non-reversing	1562F

Custom engineered units available upon request (for example, reversing or multi-motor).

## Codes and Standards

The CENTERLINE Medium Voltage SMC-50 Motor Controller is designed, manufactured, and tested to meet or exceed the applicable requirements of the latest standards published by the following organizations:

- Canadian Standards Association (CSA) Industrial Control Equipment C22.2 No. 253
- American National Standards Institute (ANSI) Instrument Transformers C57.13
- Institute of Electrical & Electronic Engineers (IEEE)
- National Electrical Code (NEC)
- Occupational Safety & Health Act (OSHA)
- National Electrical Manufacturers Association (NEMA) Medium Voltage Controllers Rated 1501...7200V AC ICS 3-2 (formerly ICS 2-324)
- Underwriters Laboratories, Inc. (UL) High Voltage Industrial Control Equipment 347
- European Directives for Safety and EMC

## Environmental Conditions

The controller must be offered in versions that accept nominal plant power of:

- 2400V AC
- 3300V AC
- 4200V AC
- 4800V AC
- 5500V AC
- 6600V AC
- 6900V AC (+5/-10%)
- 7200V AC (+0/-10%), 3 PH, 50/60 Hz ( $\pm 3\%$ ).

The standard controller must operate in an ambient temperature range of 0...40 °C (32...104 °F) with a relative humidity of up to 95% (non-condensing). Higher ambient temperature conditions are supported with factory assistance.

Rockwell Automation products are built using materials that comply with Class 1: Industrial Clean Air Sulphur Environments as defined in IEC Standard 60654-4 (Operating Conditions for Industrial-Process Measurement and Control Equipment), and G1 as defined in ISA-S71.04-1985 (Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants).

The equipment must be capable of being stored in an environment with an ambient temperature range of -30...+65 °C (-22...+149 °F).

The equipment must operate at altitudes from 0...1000 m (0...3300 ft) above sea level, without derating. For applications above 1000 m (3300 ft), the maximum current and basic impulse levels (BIL) of the controllers must be derated, and vacuum contactors may be compensated for operation at the specified altitude.

## Seismic Qualifications

The controller can withstand certain horizontal and vertical accelerations (seismic zones 1, 2, 3, and 4) without overturning or lateral movement when bolted down (mounted) per the recommended installation instructions.

## Basic Data Sheets

### Electrical Ratings

	Description	UL/CSA/NEMA	IEC
Power Circuit	Method of Connection	Motor in delta or star; SCRs between windings and supply	
	Number of Poles	Equipment designed for three phase loads only	
	Rated Voltage (Ur)	2400V AC (-15%, +10%) 3300V AC (-15%, +10%) 4200V AC (-15%, +10%) 6900V AC (-15%, +5%)	3.6 kV 7.2 kV
	Rated Insulation Voltage (Ui)	2500V 5000V 7200V	3.6 kV 7.2 kV
	Rated Impulse Voltage (Uimp)	60 kV	(3.6 kV) 40 kV (7.2 kV) 60 kV
	Dielectric Withstand	(2500V) 7625V AC (5000V) 13,250V AC (7200V) 18,200V AC	(3.6 kV) 10 kV (7.2 kV) 20 kV
	Repetitive Peak Inverse Voltage Rating	2500V max 6500V (2 SCRs per phase) 5000V max 13,000V (4 SCRs per phase) 7200V max 19,500V (6 SCRs per phase)	
	Output Rating	100...7500 Hp	75...5600 kW
	Semi-Conductor Isolation	Fiber optic	
	Operating Frequency	50/60 Hz	
	dv/dt Protection	RC Snubber Network	
	Transient Protection	Integrated overvoltage trigger circuit	
	Rated Current	180 A 360 A 600 A	
	dv/dt	180 A: 1000V/μs 360 A: 2000V/μs 600 A: 2000V/μs	
	di/dt	180 A: 200 A/μs 360 A: 200 A/μs 600 A: 200 A/μs	
	Voltage Drop (Line to Output Terminals)	2.5V per SCR without bypass. Less than 1.0V with bypass, total	
	Overall Efficiency	99.95% with bypass	
	Initial Torque	0...90% of motor locked rotor torque	
	Thermal Capacity	600%, 10 s 450%, 30 s	

**Electrical Ratings (Continued)**

	Description	UL/CSA/NEMA	IEC
Power Circuit (cont'd)	Ramp Time	0...30 s (consult factory for longer time)	
	Kickstart	0...90% of motor locked rotor torque for 0...2 s	
	Approvals	UL E102991 CSA LR12235	Safety: 92/59/EEC (Directive) Ref: BSEN 61010-1: 1993 BSEN 60204-1: 1997 EMC 89/336/EEC, 92/31/EEC, 93/68/EEC (Directives) Ref: EN 61000-6.4:2001 EN 61000-6.2:2001
Short Circuit Protection	The power electronics unit must be protected by current-limiting fuses (to be included by customer in existing starter with 1560F controller). The combination controller includes appropriate fusing (coordinated with motor).		
	Fault Level Withstand as a Fused (E2) Controller according to NEMA at 50 kA	5000V 7200V	430 MVA Sym 620 MVA Sym
Control Circuit	Rated Operation Voltage	120/240V AC (10...-15%)	110/230V ~ (10...-15%)
	Dielectric Withstand	1600V AC	2000V ~
	Operating Frequency	50/60 Hz	50/60 Hz
Enclosure	Enclosure Type	NEMA Type 1, 1G, 12, 3R, and arc resistant accessibility 2B (IEEE C37.20.7)	IP 10, 21, 52, and 34
Overload Characteristics (Control Module)	Type	Solid-state thermal overload with phase loss	
	Current Range	1...1000 A	
	Trip Classes	10, 15, 20, and 30	
	Trip Current Rating	120% of Motor FLC	
	Number of Poles	3	
Power Requirements	Control Modules	75 VA	
	Gate Driver Boards	30 VA (total)	
	Contactors	See <a href="#">Medium Voltage 400 A Contactor Specifications</a> on page 10 or <a href="#">Medium Voltage 800 A Contactor Specifications</a> on page 13.	
Auxiliary Contacts (Control Module)	Rated Operation Voltage (Max.)	20...265V AC, 5...30V DC (resistive)	20...265V ~, 5...30V DC (resistive)
	Rated Insulation Voltage	N/A	277V ~
	Operating Frequency	50/60 Hz, DC	
	Utilization Category	AC-15/DC-12	
Mechanical Ratings (Control Module)	Terminals	Control Terminals: M 3.5 x 0.6 Pozidriv screw with self-lifting clamp plate	
	SCPD Performance	Type 2	
	SCPD List	Class CC 8 A @ 1000 A Available Fault Current	
DPI Communication (Control Module)	Maximum Output Current	280 mA	
Metering Functionality (Control Module)	Voltage, Current, MW, MWh, Displacement Power Factor	Yes	
Tachometer Input (Control Module)	Voltage	0...4.5V DC	
	Current	1.0 mA	

**Environmental Ratings**

Description	UL/CSA/NEMA	IEC
Operating Temperature Range	0...40 °C (32...104 °F)	
Storage and Transportation Temperature Range	-30...+65 °C (-22...+149 °F)	
Altitude	0...1000 m (0...3300 ft) without derating	
Humidity	5...95% (non condensing)	
Pollution Degree	2	
Seismic (UBC Rating) <sup>(1)</sup>	1, 2, 3, 4	

(1) Some units may require special bracing. Contact factory for more information.

**Controller Deratings**

Altitude Range	Power Cell Rating	Reduce Max. Continuous Current Rating By: <sup>(1)</sup>	Reduce BIL Withstand Rating By:
1000...2000 m (3300...6600 ft)	180	5 A	6.0 kV
	360	10 A	
	600	15 A	
2001...3000 m (6601...9900 ft)	180	10 A	12.0 kV
	360	20 A	
	600	30 A	
3001...4000 m (9901...13,200 ft)	180	15 A	18.0 kV
	360	30 A	
	600	45 A	
4001...5000 m (13,201...16,500 ft)	180	20 A	24.0 kV
	360	40 A	
	600	60 A	

(1) Current deratings shown are the minimum levels. Additional derating may be required due to power fuse limitations. Please consult factory for additional details.

**Area Available for Cable Entry/Exit**

Structure Code	Voltage	Top <sup>(1)</sup>		Bottom <sup>(1)</sup>	
		Line	Load	Line	Load
14.60	2300...4160V	5.68 x 9.00 (144 x 229)	Combined with line	5.68 x 9.00 (144 x 229)	Combined with line
14.62	6900V	5.68 x 12.55 (144 x 319)	Combined with line	5.68 x 12.55 (144 x 319)	5.68 x 12.55 (144 x 319)
14.64	All	5.68 x 12.55 (144 x 319)	Combined with line	—	—
14.66	All	5.68 x 12.55 (144 x 319)	Combined with line	15.00 x 15.00 (381 x 381)	Combined with line
14.70	2300...4160V	5.68 x 5.68 (144 x 144)	5.68 X 9.00 (144 X 229)	5.68 x 9.00 (144 x 229)	5.68 x 9.00 (144 x 229)
14.70XP	2300...4160V	5.68 x 5.68 (144 x 144)	5.00 x 9.00 (144 x 229)	5.68 x 9.00 (144 x 229)	5.68 x 9.00 (144 x 229)
14.72	6900V	5.68 x 9.00 (144 x 229)	5.68 X 9.00 (144 X 229)	5.68 x 5.68 (144 x 144)	5.68 x 9.00 (144 x 229)
14.74	2300...4160V	5.68 x 9.00 (144 x 229)	5.68 X 9.00 (144 X 229)	5.68 x 9.00 (144 x 229)	5.68 x 9.00 (144 x 229)
14.76	All	5.68 x 9.00 (144 x 229)	7.25 X 15.88 (184 X 403)	5.68 x 9.00 (144 x 229)	7.25 x 15.88 (184 x 403)

(1) Dimensions are in inches (mm).

**Shipping Weights and Dimensions**

Bulletin	Current Rating (A)	Horsepower (kW)					Dimensions (HxWxD), Approx.	Shipping Weight, lb (kg)
		2400V	3300V	4200V	6600V	6900V		
1560F	200	800 (600)	1000 (746)	1250 (933)	—	—	2315 x 660 x 915 mm (91 x 26 x 36 in.)	800 (363)
		—	—	—	2250 (1678)	2500 (1865)	2315 x 915 x 915 mm (91 x 36 x 36 in.)	1220 (554)
	400	1500 (1119)	2250 (1679)	2750 (2051)	—	—	2315 x 660 x 915 mm (91 x 26 x 36 in.)	800 (363)
		—	—	—	4500 (3357)	5000 (3730)	2315 x 915 x 915 mm (91 x 36 x 36 in.)	1220 (554)
	600 (top exit)	2750 (2051)	4000 (2984)	4500 (3357)	7500 (5595)	7500 (5595)	915 x 1117 x 915 mm (36 x 44 x 36 in.)	1130 (590)
	600 (bottom exit)	2750 (2051)	4000 (2984)	4500 (3357)	7500 (5595)	7500 (5595)	2315 x 1778 x 915 mm (91 x 70 x 36 in.)	2100 (951)
1562F	200	800 (600)	1000 (746)	1250 (932)	—	—	2315 x 915 x 915 mm (91 x 36 x 36 in.)	1400 (363)
		—	—	—	2250 (1676)	2500 (1865)	2315 x 1575 x 915 mm (91 x 62 x 36 in.)	2325 (1056)
	200 (Arc resistant)	800 (600)	1000 (746)	1250 (932)	—	—	3264 x 915 x 1168 mm (129 x 36 x 462 in.)	1950 (886)
	400	1500 (1119)	2250 (1679)	2750 (2051)	—	—	2315 x 915 x 915 mm (91 x 36 x 36 in.)	1400 (363)
		—	—	—	4500 (3357)	5000 (3730)	2315 x 915 x 915 mm (91 x 36 x 36 in.)	2325 (1056)
	400 (Arc resistant)	1500 (1119)	2250 (1679)	2750 (2051)	—	—	3264 x 915 x 1168 mm (129 x 36 x 462 in.)	1950 (886)
	600	2750 (2051)	4000 (2984)	4500 (3357)	7500 (5600)	7500 (5600)	2315 x 2032 x 915 mm (91 x 80 x 36 in.)	2700 (1227)
		>2750 (2051)	>4000 (2984)	>4500 (3357)	>7500 (5600)	>7500 (5600)	2315 x 2540 x 915 mm (91 x 100 x 36 in.)	4000 (1816)

**Power Bus Specifications**

Component	Description	Specification	
Main Horizontal Bus	Bus Bar Material	Tin-plated copper	
	Optional Bus Bar Material	Silver-plated copper	
	Continuous Current Rating at 40 °C (104 °F)	1200, 2000, and 3000 A	
	Maximum Full Load Temperature Rise	65 °C (149 °F)	
	Maximum Full Load Temperature	105 °C (221 °F)	
	Fault Withstand Current Rating (10 cycles)(0.5 s)	50 kA RMS SYM (80 kA ASYM)	
	Type of Bus Bracing	Molded glass polyester anti-hygroscopic	
	Dimensions per Phase	1200A	Qty 1 – 6 x 100 mm (1/4 x 4 in.)
		2000A	Qty 2 – 6 x 100 mm (1/4 x 4 in.)
		3000A	Qty 2 – 9.5 x 127 mm (3/8 x 5 in.)
	Insulating Material Between Phases and Ground	Air (Standard)	
Optional Insulation Material for Main Horizontal Bus	Type:	Sleeve, heat shrink	
	Material:	Polyolefin	
	Thickness:	1.4 mm (0.055 in./55 mils)	
	Anti-hygroscopic:	0.5...1%	
	Electrical Strength:	900V/mil (49.5 kV total)	
Vertical Power Bus	Bus Bar Material	Tin-plated copper	
	Continuous Current Rating at 40 °C (104 °F)	400, 600 and 800 A	
	Fault Withstand Current Rating (½ cycle)	50 kA RMS SYM (80 kA ASYM)	
	Insulation Material for Vertical Bus	Type:	Sleeve, heat shrink
		Material:	Polyolefin
		Thickness:	1.14 mm (0.045 in./45 mils)
Anti-hygroscopic:		0.5...1%	
Electrical Strength:		900V/mil (40.5 kV total)	
Ground Bus	Ground Bus Material	Bare copper	
	Optional Ground Bus Material	Tin-plated copper	
	Continuous Current Rating at 40 °C (104 °F)	600 A	
	Dimensions per Phase	600 A	9.5 x 51 mm (3/8 x 2 in.)
	Cross Sectional Area	600 A	485 mm <sup>2</sup> (0.75 in. <sup>2</sup> ) total



**Power Fuse Specifications**

Component	Description	Specification				
Fuse Types	R-rated, 2...12R	Mersen A480R – 5.0 kV				
	19...38R, 48X, 57X	Mersen A051B – 5.0 kV				
	2...38R, 48X, 57X	Mersen A072 – 7.2 kV				
	Clip-on mounting dimensions	304.8 mm (2.0 in.)				
	Bolt-on mounting dimensions	454.2 mm (7.88 in.), or 511.6 mm (20.14 in.)				
Maximum Heat Dissipation (kW) (Convection)	Controller Rating	Start or Stop Cycle (@ 450% Starting Duty)			Continuous	
			180 A	360 A		600 A
		2500V	13.5	19.2	45.3	0.250
		5000V	27.0	38.5	90.5	0.250
		7200V	40.5	57.7	136.0	0.250
Power Losses	Power Cell Losses	Current (A)	Fuse Size	Losses (kW) ± 10%		
		90	6R	0.125		
		180	12R	0.350		
		240	18R	0.510		
		360	24R	1.000		
		600	48X	1.500		
	Power Bus Losses	Bus Rating (A)	Fully Loaded Bus Losses per 915 mm (36 in.) Section (Watts) ±%			
		1200	150			
		2000	200			
		3000	200			
	Control Power Transformer Losses	The losses from a 500 VA control power transformer fully loaded is approximately 50 W per controller.				
Low Voltage Panel Losses	The losses from the standard control circuit is approximately 25 W per controller.					

**Control and Power Wire Specifications**

Component	Description	Specification
Control Wire	Type	TEW, Stranded Copper Wire (Tinned)
	AWG Size (Control Circuit)	14 AWG – 1.5 mm <sup>2</sup>
	AWG Size (Current Transformer Circuit)	12 AWG – 2.5 mm <sup>2</sup>
	Number of Strands	19
	Maximum Voltage Rating	600V
	Maximum Rated Temperature	105 °C (221 °F)
Power Wire	AWG Size	PT – 8 AWG / CPT – 12 AWG
	Type	Belden EPDM 37508
	Insulation Rating	8.0 kV
	Maximum Temperature Rating	150 °C (302 °F)

The controller must be wired with the following non-shielded, stranded wire-type, based on the current ratings.

Controller Rating (A)	AWG Size	Type	Insulation Rating	Max. Temperature Rating
200	2	EP-CSPE MV90	8.0 kV	90 °C (194 °F)
400	4/0	EP-CSPE MV90	8.0 kV	90 °C (194 °F)
600	(2) x 4/0	EP-CSPE MV90	8.0 kV	90 °C (194 °F)
800	(2) x 350 MCM	EP-CSPE MV90	8.0 kV	90 °C (194 °F)

**Medium Voltage 400 A Contactor Specifications**

**Voltage Rating<sup>(1)</sup>**

Maximum Rated Voltage	7200
System Voltages	2400, 3300, 4160, 4800, 6600, 6900
Dielectric Voltage Withstand Rating	For 60 seconds (kV) 18.2/20 (IEC)
Basic Impulse Level (B.I.L.) Withstand	Phase to Ground, Phase to Phase (kV) 60
Frequency Ratings	Hertz 50/60

(1) The voltage ratings listed are valid up to 1000 m (3300 ft). See [Altitude Derating](#) for ratings above this altitude.

**Current Ratings<sup>(1)</sup>**

Rated Continuous Current (A)	400	
Maximum interrupting current rating	2400V (RMS Sym A)	6000
	5000V (RMS Sym A)	6000
	7200V (RMS Sym A) <sup>(2)</sup>	6000
Maximum interrupting MVA rating	2400V (Sym MVA)	25
	5000V (Sym MVA)	50
	7200V (Sym MVA) <sup>(2)</sup>	75
Short circuit withstand at rated voltage	Current Peak ½ cycle (kA)	55

**Current Ratings<sup>(1)</sup> (Continued)**

Short time current rating capability	For 1 second (kA)	6.0
	For 30 seconds (kA)	2.4
Chop current (average rms amperes)		0.5
Make and Break Capability at Rated Voltage (kA)		4.0
Ambient Temperature	°C (° F)	40 (104)

- (1) The current ratings that are listed are valid up to 1000 m (3300 ft). See [Altitude Derating](#) for ratings above this altitude.  
 (2) The IEC rating at 7200V (RMS Sym.) is 5300 A / 66 MVA.

**Contactor Coil Data**

Control Voltage (V <sub>CTL</sub> )	Coil Voltage (V <sub>CL</sub> )		
<i>Electromechanical Relay Controlled (Mechanical Latch)</i>			
120V AC	110V DC	Close current inrush (A <sub>DC</sub> )	5.6
		Pilot Relay (CR1) pick-up voltage	102
		Minimum trip coil voltage (VAC)	84
		Trip coil current (A)	6
<i>Electromechanical Relay Controlled (Electrically Held)</i>			
120V AC	110V DC	Close current inrush (A <sub>DC</sub> )	7.3
		Economized holding current (A <sub>DC</sub> )	0.13
		Minimum CR1 coil pick-up voltage (VAC)	102
		CR1 coil drop-out voltage (VAC)	75
<i>Electromechanical Relay Controlled (Mechanical Latch)</i>			
230V AC	210V DC	Not available at this control voltage	
<i>Electromechanical Relay Controlled (Electrically Held)</i>			
230V AC	210V DC	Close current inrush (A <sub>DC</sub> )	8.3
		Economized holding current (A <sub>DC</sub> )	0.11
		Minimum CR1 coil pick-up voltage (VAC)	190
		CR1 coil drop-out voltage (VAC)	140
<i>IntelliVAC™ Control (Electrically Held &amp; Mechanical Latch)</i>			
110...240V AC or 110...250V DC <sup>(1)</sup>	V AC: $V_{CL} = \sqrt{2} \times V_{CTL} \text{ (max.)}$  V DC: $V_{CL} = V_{CTL}$	Close current (A <sub>DC</sub> , 200 milliseconds)	4.3
		Hold current (A <sub>DC</sub> )	0.48
		Pick-up voltage <sup>(1)</sup>	95
		Drop-out voltage <sup>(1)</sup>	75
		Trip current (A <sub>DC</sub> , 200 milliseconds)	5.5
		Trip voltage <sup>(1)</sup>	70

(1) Control voltage, as measured at the input of the IntelliVAC control module or the primary voltage to the pilot relay control circuit.

**Operational Characteristics**

Mechanical life (operations) x 1000 <sup>(1)</sup>	Electrically held	2500
	Mechanical latch	100
Electrical life (operations) x 1000 <sup>(1)</sup>		1000
Switching frequency (operations per hour)	Electrically held	600
	Mechanical latch	150

(1) Provided that regular maintenance is performed, as detailed in this manual.

**Opening and Closing Times**

<i>Electromechanical (Relay) Controlled</i>		
Maximum closing time (120V AC) <sup>(1)</sup>	50 Hz or 60 Hz (ms)	160
Maximum opening time (120V AC) <sup>(2)</sup>	50 Hz or 60 Hz (ms)	50
Maximum opening time (120V AC) <sup>(3)</sup>	50 Hz or 60 Hz (ms)	160
<i>IntelliVAC Control (Electrically Held &amp; Mechanical Latch)</i>		
Maximum closing time (50...60 Hz)	120 / 240V AC (ms)	100/70
Maximum opening time (without delay, for 50...60 Hz) <sup>(4)</sup>	120 / 240V AC (ms)	60

(1) Control/Pilot relay, other than the standard Rockwell Automation Control Panel assembly (1503C-E4\_ or 1503C-M4D), must provide a constant closing signal for at least this period of time. The use of control components other than Rockwell Automation products is not recommended and may pose reliability concerns.

(2) Mechanical latched.

(3) Electrically held, normal dropout.

(4) A contactor drop-out delay may be configured with the IntelliVAC control module (refer to publications [1503-UM053](#)).

**Capacitor Switching (max. kVAR)**

System Voltage	2400V	800
	4160V	1400
	6900V	2000

**General**

Standard Altitude Capability <sup>(1) (2)</sup>	-1000...+5000 m (3300...16,500 ft)
Contactors Weight	21.8 kg (48 lb)
Auxiliary Contact Rating	A600
Auxiliary Contacts on the Vacuum Contactor (max.) <sup>(3)</sup>	3 N.O., 3 N. C.

(1) The voltage and current ratings that are listed are valid up to 1000 m (3300 ft). See [Altitude Derating](#) for ratings above this altitude.

(2) The full altitude range is available with the IntelliVAC control module only, and the IntelliVAC is to be configured accordingly (refer to publications [1503-UM053](#)). The standard mechanical latch contactors, if used with electromechanical control, are designed for -1000...+1000 m (-3300...+3300 ft). Higher altitudes are possible by changing the contactor return springs.

(3) The number of contactor auxiliary contacts depends on the contactor type. Some of the contacts are used in the typical control schemes used.

### Altitude Derating

Altitude Rating	Max. Continuous Current Rating <sup>(2)</sup>	Reduce B.I.L. Withstand Rating by:
-1000...0 m (-3300...0 ft) <sup>(1)</sup>	400 A	—
0...1000 m (0...3300 ft)	400 A	—
1001...2000 m (3301...6600 ft)	390 A	6.0 kV
2001...3000 m (6601...9900 ft)	380 A	12.0 kV
3001...4000 m (9901...13,200 ft)	370 A	18.0 kV
4001...5000 m (13,201...16,500 ft)	360 A	24.0 kV

(1) Only supported with IntelliVAC controlled contactors.

(2) Open rating. When enclosed in a controller, see the appropriate controller manual for enclosed contactor derating values.

## Medium Voltage 800 A Contactor Specifications

### Voltage Rating<sup>(1)</sup>

Maximum Rated Voltage	7200V
System Voltages	2400V, 3300V, 4160V, 4800V, 6600V, 6900V
Dielectric Voltage Withstand Rating	For 60 s 18.2 / 20 (IEC) kV
Basic Impulse Level (B.I.L.) Withstand	Phase to Ground, Phase to Phase 60 kV
Frequency Ratings	50/60 Hz

(1) The voltage ratings that are listed are valid up to 1000 m (3300 ft). See [Altitude Code/Derating](#) for ratings above this altitude.

### Current Ratings<sup>(1)</sup>

Rated Continuous Current	800 A	
Maximum Interrupting Current Rating	2400V	12,500 RMS symmetrical amps
	5000V	12,500 RMS symmetrical amps
	7200V	12,500 RMS symmetrical amps
Maximum Interrupting MVA Rating	2400V	50 Sym MVA
	5000V	100 Sym MVA
	7200V	150 Sym MVA
Short-Circuit Withstand at Rated Voltage	Current Peak ½ cycle	85 kA
Short Time Current Rating Capability	For 1 s	12.0 kA
	For 30 s	4.8 kA
Make and Break Capability at Rated Voltage		8.0 kA
Ambient Temperature		40 °C (104 °F)

(1) The current ratings that are listed are valid up to 1000 m (3300 ft). See [Altitude Code/Derating](#) for ratings above this altitude.

**Contactor Coil Data, IntelliVAC Controlled**

Description		Value	
Control Voltage (V <sub>CTL</sub> )	Coil Voltage (V <sub>CL</sub> )		
110...240V AC or 110...250V DC <sup>(1)</sup>	VAC: $V_{CL} = \sqrt{2} \times V_{CTL} \text{ (Max.)}$  VDC: $V_{CL} = C_{CTL}$	Close Current	12 A <sub>DC</sub> (200 ms)
		Hold Current	0.7 A <sub>DC</sub>
		Pick-up Voltage <sup>(1)</sup>	95V
		Dropout Voltage <sup>(1)</sup>	75V
		Trip Current	5.2 A <sub>DC</sub> (200 ms)
		Trip Voltage <sup>(1)</sup>	70V

(1) Control voltage, as measured at the input of the IntelliVAC control module.

**Contactor Coil Data, Electromechanical Relay Controlled**

Description		Value
Control Voltage (V <sub>CTL</sub> ) 120V AC/ 230V AC	Coil Inrush Current – Electrically Held	13.1 A
	Coil Inrush Current – Mechanical Latch	13.1 A
	Coil Inrush Current – Mechanical Latch Trip	5.6 A
	Coil Continuous Current	0.24 A
	Coil Pick-up Voltage	102V AC
	Coil dropout Voltage	75V AC
	Trip Voltage	84V AC
Coil Voltage (V <sub>CL</sub> ), 110V DC/ 208V DC	Coil Inrush Current – Electrically Held	7.1 A
	Coil Continuous Current	0.13 A
	Coil Pick-up Voltage	196V AC
	Coil dropout Voltage	145V AC

**Operational Characteristics**

Mechanical Life <sup>(1)</sup>	Electrically Held	250,000 operations
	Mechanical Latch	100,000 operations
Electrical Life <sup>(1)</sup>		250,000 operations
Switching Frequency	Electrically Held	600 operations per hour
	Mechanical Latch	150 operations per hour

(1) If regular maintenance is performed, as detailed in this manual.

### Opening and Closing Times

<i>Electromechanical Relay Controlled</i>		
Maximum Closing Time (120V AC)	50/60 Hz	200 ms
Maximum Opening Time (Normal Dropout)	50/60 Hz	250 ms
Maximum Opening Time (Fast Dropout and Mechanical Latch)	50/60 Hz	70 ms
<i>IntelliVAC Control</i>		
Maximum Closing Time	120/240V AC	150 ms
Maximum Opening Time (without delay) <sup>(1)</sup>	120/240V AC	70 ms

(1) A contactor drop-out delay can be configured with the IntelliVAC control module (refer to publications [1503-UM053](#)).

### Capacitor Switching

System Voltage	2400V	2000 KVAR
	4160V	3000 KVAR
	6900V	4000 KVAR

### General

Standard Altitude Capability <sup>(1) (2)</sup>	1000...5000 m (3300...16,500 ft)
Contactor Weight	53.5 kg (118 lb)
Auxiliary Contact Rating	A600
Auxiliary Contacts on the Vacuum Contactor (max.) <sup>(3)</sup>	3 N.O. / 3 N.C.

(1) The voltage and current ratings that are listed are valid up to 1000 m (3300 ft). See [Altitude Code/Derating](#) for ratings above this altitude.

(2) Altitude adjustment is required.

(3) The number of contactor auxiliary contacts depends on the contactor type. Some of the contacts are used in the typical control schemes used.

### Altitude Code/Derating

Altitude Range	Reduce Max. 800 A Continuous Current Rating By:	Reduce B.I.L. Withstand Rating By:
0...1000 m (0...3300 ft)	—	—
1001...2000 m (3301...6600 ft)	20 A	6.0 kV
2001...3000 m (6601...9900 ft)	40 A	12.0 kV
3001...4000 m (9901...13,200 ft)	60 A	18.0 kV
4001...5000 m (13,201...16,500 ft)	80 A	24.0 kV

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Medium Voltage 400A Contactor - Series E and F, publication <a href="#">1502-UM052</a>	Provides information on installing, maintaining, and troubleshooting 400 A medium voltage contactors.
Medium Voltage Contactor 800 A, 2400...7200V (Series F), publication <a href="#">1502-UM054</a>	Provides information on installing, maintaining, and troubleshooting 800 A medium voltage contactors.
IntelliVAC Contactor Control Module, publication <a href="#">1503-UM053</a>	Provides information on installation, commissioning, wiring, monitoring, troubleshooting and spare parts for the IntelliVAC control module
CENTERLINE Medium Voltage SMC-50 Motor Controller user manual, publication <a href="#">1560F-UM001</a>	Provides information on installing, commissioning, operation, programming, troubleshooting, and parameter information for MV SMC-50 controllers
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="http://rok.auto/certifications">rok.auto/certifications</a> .	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/global/literature-library/overview.page>.



**Notes:**

# Rockwell Automation Support

Use the following resources to access support information.

<b>Technical Support Center</b>	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	<a href="http://www.rockwellautomation.com/knowledgebase">www.rockwellautomation.com/knowledgebase</a>
<b>Local Technical Support Phone Numbers</b>	Locate the phone number for your country.	<a href="http://www.rockwellautomation.com/global/support/get-support-now.page">www.rockwellautomation.com/global/support/get-support-now.page</a>
<b>Direct Dial Codes</b>	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	<a href="http://www.rockwellautomation.com/global/support/direct-dial.page">www.rockwellautomation.com/global/support/direct-dial.page</a>
<b>Literature Library</b>	Installation Instructions, Manuals, Brochures, and Technical Data.	<a href="http://www.rockwellautomation.com/literature">www.rockwellautomation.com/literature</a>
<b>Product Compatibility and Download Center (PCDC)</b>	Get help determining how products interact, check features and capabilities, and find associated firmware.	<a href="http://www.rockwellautomation.com/global/support/pcdc.page">www.rockwellautomation.com/global/support/pcdc.page</a>

## Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at [http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002\\_-en-e.pdf](http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf).

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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