



MSS RANGE SOFT STARTER CATALOGUE

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INTRODUCTION

Soft starters, in combination with AC electric motors, control the acceleration during startup. This process temporarily reduces the load and torque in the powertrain of the motor. The benefit of such a process is the improved lifespan of your system as the mechanical stress on the motor and load has been reduced, as well as the electro dynamic stresses on power cables and the electrical distribution network.

Combining your electric motors with a soft starter not only reduces risk, breakage and maintenance downtime, but also increases your production efficiency and results.

FEATURE LIST

STREAMLINED SETUP PROCESS

- Configuration profiles for common applications
- Built-in metering and inputs/outputs

EASY TO UNDERSTAND INTERFACE

- Multi-language menus and displays
- Descriptive option names and feedback messages
- Real-time performance graphs

SUPPORTS ENERGY EFFICIENCY

- IE3 compatible
- 99% energy efficient when running
- Internal bypass
- Soft start technology avoids harmonic distortion

EXTENSIVE RANGE OF MODELS

- 24 A to 580 A (nominal)
- 200 VAC to 525 VAC
- 380 VAC to 600 VAC
- 380 VAC to 690 VAC*
- *Inside delta installation**

VERSATILE STARTING AND STOPPING OPTIONS

- Adaptive control
- Constant current
- Current ramp
- Timed voltage ramp soft stop
- Coast to stop
- *DC brake**
- *Soft brake**
- *Kickstart**
- *Jog (forward and reverse)**

* Feature exclusive to MSSA type



CUSTOMISABLE PROTECTION AND FUNCTIONS

- Motor overload
- Excess start time
- Undercurrent
- Overcurrent
- Current imbalance
- Input trip
- Motor thermistor
- Auto-reset
- *Scheduled operation (RTC)**
- *SCR fail power-through operation**

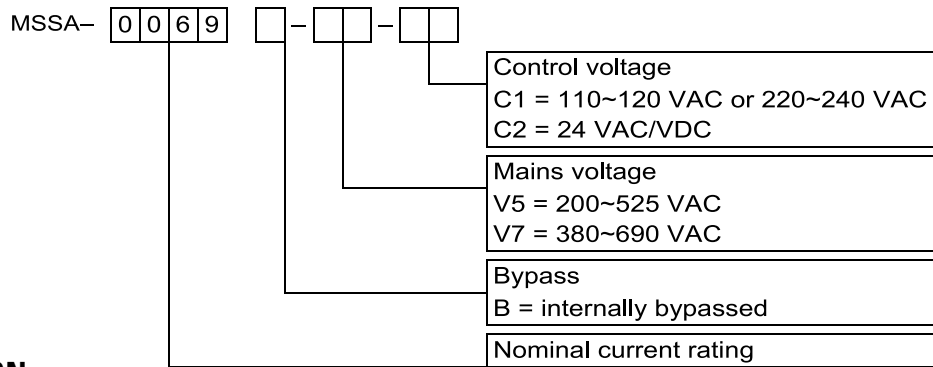
EXTENSIVE INPUT AND OUTPUT OPTIONS

- Remote control inputs (2 x fixed, 2 x programmable)
- Relay outputs (1 x fixed, 2 x programmable)
- Analog output: 0(4) - 20mA

OPTIONAL FEATURES FOR ADVANCED APPLICATIONS

- Smart cards
- Communication options: DeviceNet, Ethernet/IP, Modbus RTU, Modbus TCP, Profibus, Profinet

MODEL CODE



MODEL SELECTION

Starter Sizing

The soft starter must be the correct size for the motor and the application. Select a soft starter that has a current rating at least equal to the motor's full load current (nameplate) rating, at the start duty.

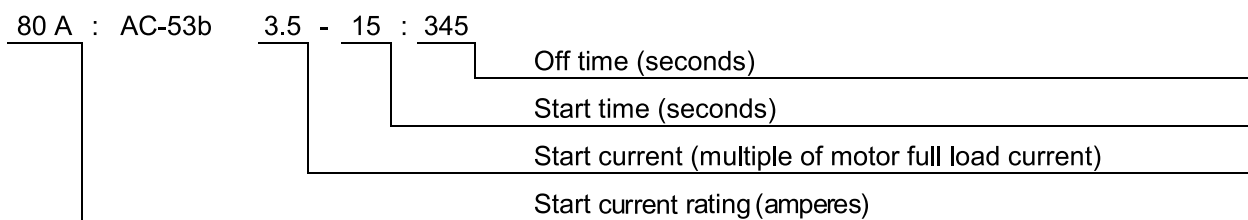
The soft starter's current rating determines the maximum motor size it can be used with. The soft starter's rating depends on the number of starts per hour, the length and current level of the start, and the amount of time the soft starter will be off (not passing current) between starts.

The soft starter's current rating is only valid when used in the conditions specified in the AC53b code - the soft starter may have a higher or lower current rating in different operating conditions.

Current Ratings

For operating conditions not covered by these ratings charts contact your local supplier.

IEC ratings



All ratings are calculated at altitude of 1000 metres and ambient temperature of 40°C.

	3.0-10:350	3.5-15:345	4.0-10:350	4.0-20:340	5.0-5:355
024B	24 (36)	20 (30)	19 (28)	16 (24)	17 (25)
042B	42 (63)	34 (51)	34 (51)	27 (40)	32 (48)
052B	52 (78)	42 (63)	39 (58)	35 (52)	34 (51)
	3.0-10:590	3.5-15:585	4.0-10:590	4.0-20:580	5.0-5:595
064B	64 (96)	63 (94)	60 (90)	51 (76)	54 (81)
069B	69 (103)	69 (103)	69 (103)	62 (93)	65 (97)
105B	105 (157)	86 (129)	84 (126)	69 (103)	77 (115)
115B	115 (172)	108 (162)	105 (157)	86 (129)	95 (142)
135B	135 (202)	129 (193)	126 (189)	103 (154)	115 (172)
184B	184 (276)	144 (216)	139 (208)	116 (174)	127 (190)
200B	200 (300)	171 256)	165 (247)	138 (207)	150 (225)
229B	229 (343)	194 (291)	187 (280)	157 (235)	170 (225)
250B	250 (375)	244 (366)	230 (345)	200 (300)	202 (303)
352B	352 (528)	287 (430)	277 (415)	234 (351)	258 (387)
397B	397 (595)	323 (484)	311 (466)	263 (394)	289 (433)
410B	410 (615)	410 (615)	410 (615)	380 (570)	400 (600)
550B	550 (825)	527 (790)	506 (759)	427 (640)	464 (696)
580B	580 (870)	579 (868)	555 (832)	470 (705)	508 (762)

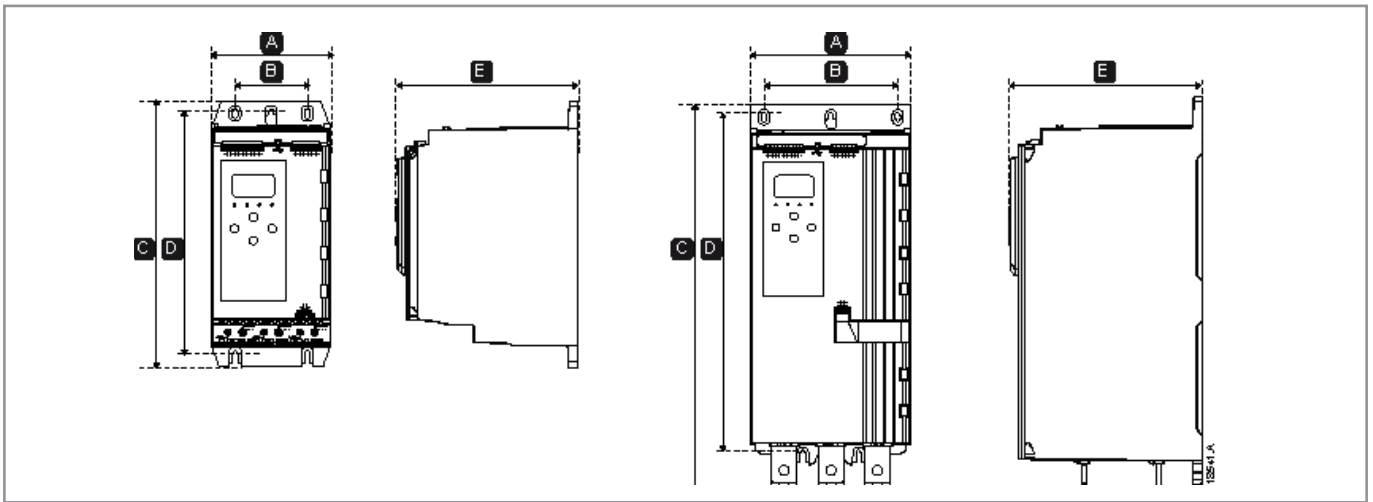
Note: Values in brackets are for inside delta connection, feature exclusive to MSSA type.

Typical Motor FLCs

If you don't have accurate information on your motor's start current characteristics, the table below can help you estimate the likely full load current for a particular motor size. This information can help when choosing a soft starter, but will not provide an optimized solution because the characteristics of different motors can vary considerably.

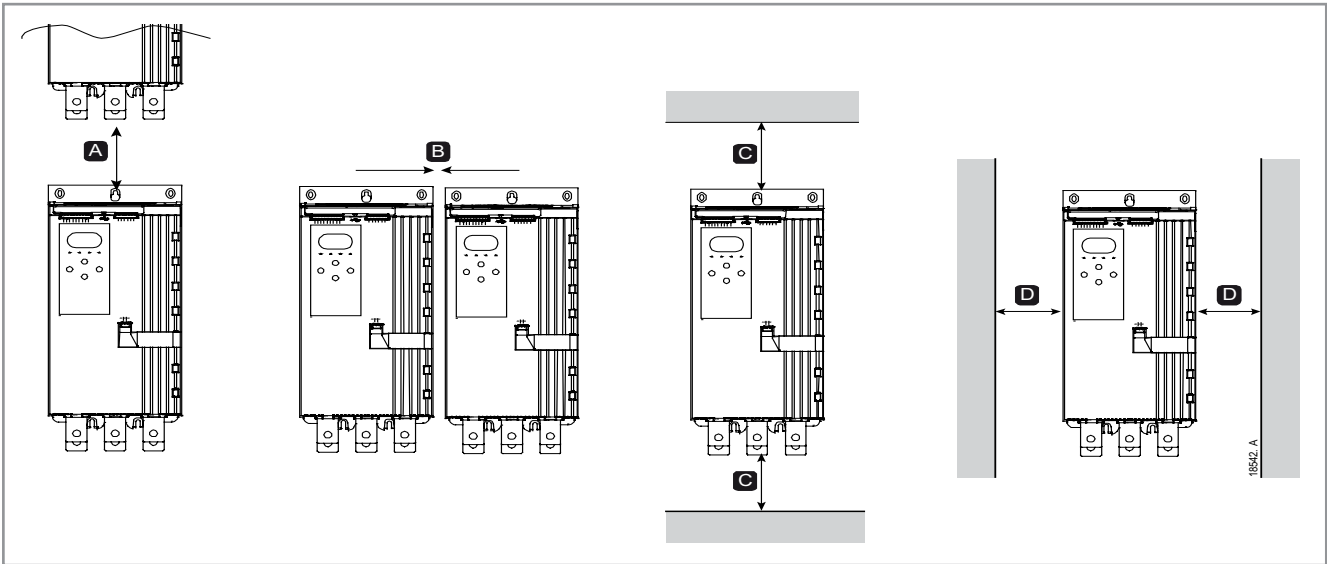
Motor Power		Current rating at different voltages				
kW	HP	220-230 V	380-400 V	440 V	500 V	660-690 V
7.5	10	27	16	14	12	9
11	15	39	22	20	18	14
15	20	52	30	27	23	17
19	25	64	37	33	29	21
22	30	75	44	39	33	25
25	35	85	52	45	39	30
30	40	103	60	52	45	35
37	50	126	72	64	55	42
45	60	150	85	76	65	49
55	75	182	105	90	80	61
75	100	240	138	125	105	82
90	125	295	170	146	129	98
110	150	356	205	178	156	118
132	180	425	245	215	187	140
140	190	450	260	227	200	145
147	200	472	273	236	207	152
150	205	483	280	246	210	159
160	220	520	300	256	220	170
185	250	595	342	295	263	200
200	270	626	370	321	281	215
220	300	700	408	353	310	235
250	340	800	460	401	360	274
257	350	826	475	412	365	280
280	380	900	510	450	400	305
295	400	948	546	473	416	320
300	410	980	565	481	420	325
315	430	990	584	505	445	337
335	450	1100	620	518	472	355
355	480	1150	636	549	500	370
375	500	1180	670	575	527	395
400	545	1250	710	611	540	410
425	580	1330	760	650	574	445
445	600	1400	790	680	595	455
450	610	1410	800	690	608	460
475	645	1490	850	730	645	485
500	680	1570	900	780	680	515
560	760	1750	1000	860	760	570

DIMENSIONS AND WEIGHTS



	Width mm (inch)		Height mm (inch)		Depth mm (inch)	Weight kg (lb)
	A	B	C	D	E	
024B	152 (6.0)	92 (3.6)	336 (13.2)	307 (12.1)	231 (9.1)	4.8 (10.7)
042B						
052B						
064B						
069B						
105B						
115B						
135B						
184B	216 (8.5)	180 (7.1)	495 (19.5)	450 (17.7)	243 (9.6)	12.7 (28.0)
200B						
229B						
250B						
352B			523 (20.6)	15.5 (34.2)		
397B						
410B						
550B					19.0 (41.9)	
580B						

PHYSICAL INSTALLATION



Between Starters		Solid surfaces	
A	B	C	D
> 100 mm (3.9 inch)	> 10 mm (0.4 inch)	> 100 mm (3.9 inch)	> 10 mm (0.4 inch)

ACCESSORIES

DESCRIPTION	PART NUMBER	NAME
REMOTE KEYPAD can be mounted up to 3 metres away from the starter. Each expansion card includes a keypad connection port, or a dedicated keypad connector card is available.	MSS-RC-01	MSS Remote Keypad Card
	MSS-RC-02	MSS Remote Keypad Card+Keypad+Mounting Kit
	MSS-RK-01	MSS Remote Keypad with cable & mounting kit
SMART EXPANSION CARD has been designed to support integration with pumping applications and provides the following additional inputs and outputs: <ul style="list-style-type: none"> • 3 x digital inputs • 3 x 4-20 mA transducer inputs • 1 x RTD input • 1 x USB-B port • Remote keypad connector 	MSS-PC-01	MSS Smart Control Card Pump Application
NETWORK COMMUNICATION is offered via easy-to-install communications expansion cards. Each communications card includes a remote keypad connector port.	MSS-MB-01	MSS Modbus RTU Card
	MSS-DN-01	MSS DeviceNet Card
	MSS-PB-01	MSS Profibus Card
	MSS-MT-01	MSS Modbus TCP Card
	MSS-EI-01	MSS Ethernet IP Card
	MSS-PN-01	MSS Profinet Card
FINGER GUARDS option may be specified for personnel safety. Fitting finger guards over the soft starter terminals prevents accidental contact with live busbars and provide IP20 protection when used with cable of diameter 22 mm or greater. Finger guards are compatible with models 184B ~ 580B.	995-17309-00	MSS Fingerguard Kit (models 184B ~ 580B)

SOFT STARTER MANAGEMENT SOFTWARE

PC software can provide real-time or offline management of soft starters.

- For real-time management in a network of up to 254 starters, the software must connect to the soft starter via a Modbus TCP or Modbus RTU card. The software can monitor, control and program the starter across the network.
- The software can be used to program the starter via the USB port on the pumping smart card.
- For offline management, a configuration file generated in the software can be loaded into the starter via the USB port.

MAIN CONTACTOR

A main contactor is recommended to protect the soft starter from voltage disturbances on the network, while stopped. Select a contactor with an AC3 rating greater than or equal to the full load current rating of the connected motor. Use the main contactor output (33, 34) to control the contactor.

WARNING: To avoid serious injury or death when connecting the soft starter in inside delta configuration, always install a main contactor or shunt trip circuit breaker.

POWER FACTOR CORRECTION

If power factor correction is used, a dedicated contactor should be used to switch in the capacitors.

To use the soft starter to control power factor correction, connect the PFC contactor to a programmable relay set to Run. When the motor reaches full speed, the relay will close and power factor correction will be switched in.

NOTICE: To avoid damage of the equipment or installation, the power factor correction capacitors (if required) must be connected to the input side of the soft starter. Connecting power factor correction capacitors to the output side will damage the soft starter.

SHORT CIRCUIT PROTECTION DEVICES (SCPD)

Fuses may be installed to protect the soft starter or the installation.

Type 1 Coordination

Type 1 coordination requires that, in the event of a short circuit on the output side of a soft starter, the fault must be cleared without risk of injury to personnel. There is no requirement that the soft starter must remain operational after the fault.

HRC fuses (such as Ferraz/Mersen* AJT fuses) can be used for Type 1 coordination according to IEC 60947-4-2 standard.

Type 2 Coordination

Type 2 coordination requires that in the event of a short circuit on the output side of a soft starter, the fault must be cleared without risk of injury to personnel or damage to the soft starter.

Semiconductor fuses for Type 2 circuit protection are additional to HRC fuses or MCCBs that form part of the motor branch circuit protection.

NOTICE: DC Brake: A high brake torque setting can result in peak currents up to motor DOL being drawn while the motor is stopping. To avoid damage of the equipment or installation, the protection fuses installed in the motor branch circuit are selected appropriately.

NOTICE: Integral solid state short circuit protection does not provide branch circuit protection. To avoid damage of the equipment or installation, the branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

EC COORDINATION WITH SHORT CIRCUIT PROTECTION DEVICES

These fuses were selected based on start current of 300% FLC for 10 seconds.

Model	Nominal Rating (A)	SCR I ² T (A ² S)	Type 1 coordination 480 VAC, 65 kA Bussmann* NH fuse links	Type 2 coordination 690 VAC, 65 kA Bussmann* DIN 43 653
024B	24	1150	40NHG000B	170M3010
042B	42	7200	63NHG000B	170M3013
052B	52		80NHG000B	
064B	64	15000	100NHG000B	170M3014
069B	69			
105B	105	80000	160NHG00B	170M3015
115B	115			
135B	135	125000		170M3016
184B	184	320000	250NHG2B	170M3020
200B	200		315NHG2B	
229B	229			
250B	250			
352B	352	202000	355NHG2B	170M6009
397B	397		400NHG2B	
410B	410	320000	425NHG2B	170M6010
550B	550	781000	630NHG3B	170M6012
580B	580			

*Bussmann and Ferraz/Mersen are the trademarks and/or trade names of their respective owners and are not owned or controlled by Regal Beloit Corporation.

UL COORDINATION WITH SHORT CIRCUIT PROTECTION DEVICES

Standard Fault Short Circuit Current Ratings

Suitable for use on a circuit capable of delivering not more than the stated level of amperes (symmetrical rms, refer ##1 in table), 600 VAC maximum.

- **Maximum fuse rating (A) – Standard fault short circuit current**

Model	Nominal Rating (A)	3 cycle short cct rating @600 VAC ##1 †
024B	24	5 kA
042B	42	
052B	52	10 kA
064B	64	
069B	69	
105B	105	
115B	120	
135B	135	
184B	184	18 kA
200B	225	
229B	229	
250B	250	
352B	352	
397B	397	
410B	410	30 kA
550B	550	
580B	580	

† Suitable for use in a circuit with the prospective current noted, when protected by any listed fuses or listed circuit breakers sized according to the NEC.

High Fault Short Circuit Current Ratings

- **Maximum fuse rating (A) – High fault short circuit current**

Suitable for use on a circuit capable of delivering not more than 65,000 rms symmetrical amperes, 480 VAC maximum, when protected by fuses of the stated class and rating (refer ##2 and ##3 in table).

Model	Nominal Rating (A)	Short Circuit Rating @ 480 VAC max.	Listed fuse rating (A) ##3	Fuse class ##2
024B	24	65 kA	30	Any (J, T, K-1, RK1, RK5)
042B	42		50	
052B	52		60	
064B	64		80	
069B	69		80	
105B	105		125	J, T, K-1, RK1
115B	115		125	
135B	135		150	J, T
184B	184		200	
200B	200		225	
229B	229		250	
250B	250		300	Any (J, T, K-1, RK1, RK5)
352B	352		400	
397B	397		450	
410B	410		450	
550B	550		600	
580B	580		600	

• **Circuit breakers – High fault short circuit current**

Suitable for use on a circuit capable of delivering not more than 65,000 rms symmetrical amperes, 480 VAC maximum, when protected by circuit breaker models noted in ##4, ##5 or ##6.

Model	Nominal Rating (A)	Breaker 1: Eaton* (rating, A) ##4	Breaker 2: GE* (rating, A) ##5	Breaker 3: LS* (rating, A) ¹ ##6
024B	24	HFD3030 (30 A)	SELA36AT0060 (60 A)	Any (J, T, K-1, RK1, RK5)
042B	42	HFD3050 (50 A)		
052B	52	HFD3060 (60 A)		
064B	64	HFD3100 (100 A)	SELA36AT0150 (150 A)	J, T, K-1, RK1
069B	69			
105B	105	HFD3125 (125 A)		
115B	120	HFD3150 (150 A)		
135B	135	HFD3250 (250 A)	SELA36AT0250 (250 A)	UTS150H-xxU-250 (250 A)
184B	184			
200B	200			
229B	229	HFD3300 (300 A)	SELA36AT0400 (400 A)	UTS150H-xxU-300 (300 A)
250B	250			
352B	352	HFD3400 (400 A)	SELA36AT0600 (600 A)	UTS150H-xxU-400 (400 A)
397B	397			
410B	410	HFD3600 (600 A)		UTS150H-xxU-600 (600 A)
550B	550			UTS150H-xxU-800 (800 A)
580B	580			UTS150H-NG0-800

¹ For LS breakers, xx represents FM, FT or AT.

FUSE SELECTION FOR TYPE 2 COORDINATION

Type 2 coordination is achieved by using semiconductor fuses. These fuses must be able to carry motor start current and have a total clearing I²t < the I²t of the soft starter SCRs. When selecting semiconductor fuses for the soft starter, use the I²t values in the table. For further information on selecting semiconductor fuses, contact your local distributor.

I²t values for Type 2 coordination

Model	Nominal Rating/ SCR I ² t (A ² s)
024B	1150
042B	7200
052B	
064B	
069B	15000
105B	80000
115B	
135B	125000
184B	320000
200B	
229B	
250B	
352B	202000
397B	
410B	320000
550B	781000
580B	

SPECIFICATIONS

SUPPLY

Mains voltage (L1, L2, L3)

MSSA-xxxxB-V5	200 VAC ~ 525 V AC (± 10%)
MSSA-xxxxB-V7	380 VAC ~ 690 V AC (± 10%)
MSSB-XXX-B-V5	200 VAC ~ 525 VAC (± 10%)
MSSB-XXX-B-V7	380 VAC ~ 600 VAC (± 10%)

Control voltage (A1, A2, A3)

MSSX-XXX-B-XX-C1 (A1, A2)	110~120 VAC (+10%/-15%), 600 mA
MSSX-XXX-B-XX-C1 (A2, A3)	220~240 VAC (+10%/-15%), 600 mA
MSSX-XXX-B-XX-C2 (A1, A2)	24 VAC/VDC (± 20%), 2.8 A
Mains frequency	50 Hz~60 Hz (±5 Hz)
Rated insulation voltage to earth	600 V AC
Rated impulse withstand voltage	6 kV
Form designation	Bypassed or continuous, semiconductor motor starter form 1

SHORT CIRCUIT CAPABILITY

Coordination with semiconductor fuses	Type 2
Coordination with HRC fuses	Type 1

ELECTROMAGNETIC CAPABILITY (COMPLIANT WITH EU DIRECTIVE 2004/108/EC)

EMC Immunity	EC 60947-4-2
EMC Emissions	IEC 60947-4-2 Class B

INPUTS

Input rating	Active 24 V DC, 8 mA approx
Motor thermistor (64, 65)	Trip >3.6 kΩ, reset <1.6kΩ

OUTPUTS

Relay outputs	10A @ 250 VAC resistive, 5A @ 250 VAC
AC15 pf 0.3	
Main contactor (33, 34)	Normally open
Relay output A (41, 42, 44)	Changeover
Relay output B (53, 54?)	Normally open
Analog output (21, 22)	
Maximum load	600 Ω (12 V DC @ 20 mA)
Accuracy	± 5%

ENVIRONMENTAL

Operating temperature	-10 °C to 60 °C, above 40 °C with derating
Storage temperature	-25 °C to + 60 °C
Operating Altitude	0 - 1000 m, above 1000 m with derating
Humidity	5% to 95% relative humidity
Pollution degree	Pollution degree 3
Vibration (MSSX-024-B ~ MSSX-580-B)	EC 60068-2-6
Protection	
024B ~ 135B	IP20
184B ~ 580B	IP00/IP20*

*With optional fingerguard kit (PN.: 995-17309-00)

HEAT DISSIPATION

During start	4.5 watts per ampere
During run	
024B ~ 052B	≤ 39 watts approx
064B ~ 135B	≤ 50 watts approx
184B ~ 250B	≤ 120 watts approx
352B ~ 580B	≤ 140 watts approx

MOTOR OVERLOAD PROTECTION

Default: The default settings of parameters 1C, 1D and 1E provide motor overload
Protection: Class 10, Trip current 105% of FLA (full load amperage) or equivalent.

CERTIFICATION

Marking	CE, RCM
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DISPOSAL INSTRUCTIONS

Equipment containing electrical components may not be disposed of together with domestic waste. It must be collected separately as electrical and electronic waste according to local and currently valid legislation.

marathon®

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APPLICATION CONSIDERATIONS

The proper selection and application of motors, motor control and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Regal Beloit Australia Pty Ltd and its affiliates with respect to the use of products and components is given in good faith and without charge, and Regal assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk. For a copy of our Standard Terms and Conditions of Sale, Disclaimers of Warranty and Limitation of Liability, please contact Customer Service at 1300 888 853 or visit www.regalaustralia.com.au. These terms and conditions of sale, disclaimers and limitations of liability apply to any person who may buy, acquire or use a Regal Beloit Australia Pty Ltd product referred to herein, including any person who buys from a licensed distributor of these branded products.