

- Direct-on-line starters in non-metallic enclosure complete with or without thermal relay
- Versions with RESET or START/STOP pushbuttons
- Non-metallic enclosures for customer-assembled starters
- Reversing and changeover contactor assemblies
- Star-delta starters, open frame and in non-metallic enclosure versions.

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DIRECT-ON-LINE STARTERS

- Motor ratings up to 95A 440V in IEC AC3 duty
- Motor rating up to 52A 600V per UL/CSA
- Versions with Start-Stop/Reset buttons or Reset button
- Versions with and without thermal relay
- Versions with motor protection circuit breaker.



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REVERSING CONTACTOR ASSEMBLIES

- For three-phase motor control 9...25A 440V / 4...12.5kW 400V, in IEC AC3 duty and up to 15HP 600V per UL/CSA
- Versions with built-in or external mechanical interlock
- Complete with rigid connections
- PCB version 9A 440V / 4kW 400V in IEC AC3 duty; 5HP 300V per UL/CSA.



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CHANGEOVER CONTACTOR ASSEMBLIES

- For 20A loads at $\leq 40^{\circ}\text{C}$ in IEC AC1 duty
- For 20A general use per UL/CSA
- With built-in mechanical interlock.



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STAR-DELTA STARTERS OPEN FRAME

- Suitable for three-phase motor control, 16A...690A 440V / 7.5kW...375kW 400V ratings in IEC AC3 duty.



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STAR-DELTA STARTERS IN NON-METALLIC ENCLOSURE

- Suitable for three-phase motor control, 16...60A 440V / 7.5kW...30kW 400V ratings in IEC AC3 duty.



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EMPTY NON-METALLIC ENCLOSURES

- Versions without pushbuttons, with Reset button only or Start-Stop/Reset buttons
- For starters, with pushbuttons and metal plate
- Suitable to contain BG mini-contactor or BF09A to BF80 contactors, up to 110A 440V rating in IEC AC3 duty; up to 52A at 600V for UL/CSA.

4 Electromechanical starters and enclosures

Direct-on-line starters - Full voltage across the line.

Non reversing three phase

Enclosed with thermal overload relay



M0 P...12



M0 R...12



M1 P...12



M1 R...12



M2 P...12



M2 R...12



M25 P038 12



M25 R038 12



M3 P...12



M3 R...12

Order code	Relay adj range	IEC technical characteristics (≤440V) I _e kW		Qty per pkg	Wt
	[A]	[A]	[kW]	n°	[kg]

Starters with Start and Stop/Reset pushbuttons ①.

M0 P009 12①	0.6-1	1	0.18-0.25	1	0.760
M0 P009 12①V5	0.9-1.5	1.5	0.37	1	0.760
M0 P009 12②V3	1.4-2.3	2.3	0.55-0.75	1	0.760
M0 P009 12③33	2-3.3	3.3	1.1	1	0.760
M0 P009 12④5	3-5	5	1.5-2.2	1	0.760
M0 P009 12⑤75	4.5-7.5	7.5	2.2-3	1	0.760
M0 P009 12⑥10	6-10	10	3-4	1	0.760
M0 P012 12⑥15	9-15	12	5.5	1	0.760
M1 P009 12④A4	0.63-1	1	0.25	1	1.040
M1 P009 12④A5	1-1.6	1.6	0.37-0.55	1	1.040
M1 P009 12④A6	1.6-2.5	2.5	0.75	1	1.040
M1 P009 12④A7	2.5-4	4	1.1-1.5	1	1.040
M1 P009 12④A8	4-6.5	6.5	2.2-3	1	1.040
M1 P009 12④A9	6.3-10	10	3-4	1	1.040
M1 P009 12④B0	9-14	13	5.5	1	1.040
M1 P018 12④B1	13-18	18	7.5	1	1.040
M2 P025 12④B2	17-23	23	11	1	1.220
M2 P025 12④B3	20-25	25	11	1	1.220
M2 P032 12④B4	24-32	32	15	1	1.300
M25 P038 12④B5	32-38	38	18.5	1	2.880
M3 P050 12④B6	35-50	50	18.5-22	1	3.760
M3 P065 12④B7	45-65	65	30	1	3.760
M3 P080 12④B8	60-82	80	37-45	1	3.760

Starters with Reset pushbuttons ②.

M0 R009 12①	0.6-1	1	0.18-0.25	1	0.720
M0 R009 12①V5	0.9-1.5	1.5	0.37	1	0.720
M0 R009 12②V3	1.4-2.3	2.3	0.55-0.75	1	0.720
M0 R009 12③33	2-3.3	3.3	1.1	1	0.720
M0 R009 12④5	3-5	5	1.5-2.2	1	0.720
M0 R009 12⑤75	4.5-7.5	7.5	2.2-3	1	0.720
M0 R009 12⑥10	6-10	10	3-4	1	0.720
M0 R012 12⑥15	9-15	12	5.5	1	0.720
M1 R009 12④A4	0.63-1	1	0.25	1	0.995
M1 R009 12④A5	1-1.6	1.6	0.37-0.55	1	0.995
M1 R009 12④A6	1.6-2.5	2.5	0.75	1	0.995
M1 R009 12④A7	2.5-4	4	1.1-1.5	1	0.995
M1 R009 12④A8	4-6.5	6.5	2.2-3	1	0.995
M1 R009 12④A9	6.3-10	10	3-4	1	0.995
M1 R009 12④B0	9-14	13	5.5	1	0.995
M1 R018 12④B1	13-18	18	7.5	1	0.995
M2 R025 12④B2	17-23	23	11	1	1.165
M2 R025 12④B3	20-25	25	11	1	1.165
M2 R032 12④B4	24-32	32	15	1	1.260
M25 R038 12④B5	32-38	38	18.5	1	2.600
M3 R050 12④B6	35-50	50	18.5-22	1	3.410
M3 R065 12④B7	46-65	65	30	1	3.410
M3 R080 12④B8	60-82	80	37-45	1	3.410

① Complete order code with coil voltage digit (if 50/60Hz) or with voltage digit followed by 60 (if 60Hz).

Standard voltages are as follows:

- AC 50/60Hz 024 / 048 / 110 / 230 / 400V
- AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

Example: M0 R009 12 024 1 for direct-on-line starter in M0 type enclosure with Reset button, 9A/AC3 contactor with 24VAC 50/60Hz coil and 0.6-1A thermal overload relay.

M0 P009 12 024 60 1 for direct-on-line starter in M0 type enclosure with Start and Stop/Reset buttons, 9A /AC3 contactor with 24VAC 60Hz coil and 0.6-1A thermal overload relay.

② Protection fuses are to be mounted externally by the user.

Components

CStarter enclosure	Contactor	Thermal relay	Auxiliary contact block
M0 PA	BG09 10A	RF9 1	—
M0 PA	BG09 10A	RF9 1V5	—
M0 PA	BG09 10A	RF9 2V3	—
M0 PA	BG09 10A	RF9 33	—
M0 PA	BG09 10A	RF9 5	—
M0 PA	BG09 10A	RF9 75	—
M0 PA	BG09 10A	RF9 10	—
M0 PA	BG12 10A	RF9 15	—
M1 PA	BF09 10A	RF38 0100	—
M1 PA	BF09 10A	RF38 0160	—
M1 PA	BF09 10A	RF38 0250	—
M1 PA	BF09 10A	RF38 0400	—
M1 PA	BF09 10A	RF38 0650	—
M1 PA	BF09 10A	RF38 1000	—
M1 PA	BF09 10A	RF38 1400	—
M1 PA	BF18 10A	RF38 1800	—
M2 PA	BF25 10A	RF38 2300	—
M2 PA	BF25 10A	RF38 2500	—
M2 PA	BF32 00A	RF38 3200	G418 10
M25 PA	BF38 00A	RF38 3800	G418 10
M3 PA	BF50 00A	RF82 5000	G418 10
M3 PA	BF65 00A	RF82 6500	G418 10
M3 PA	BF80 00A	RF82 8200	G418 10

M0 RA	BG09 10A	RF9 1	—
M0 RA	BG09 10A	RF9 1V5	—
M0 RA	BG09 10A	RF9 2V3	—
M0 RA	BG09 10A	RF9 33	—
M0 RA	BG09 10A	RF9 5	—
M0 RA	BG09 10A	RF9 75	—
M0 RA	BG09 10A	RF9 10	—
M0 RA	BG12 10A	RF9 15	—
M1 RA	BF09 10A	RF38 0100	—
M1 RA	BF09 10A	RF38 0160	—
M1 RA	BF09 10A	RF38 0250	—
M1 RA	BF09 10A	RF38 0400	—
M1 RA	BF09 10A	RF38 0650	—
M1 RA	BF09 10A	RF38 1000	—
M1 RA	BF09 10A	RF38 1400	—
M1 RA	BF18 10A	RF38 1800	—
M2 RA	BF25 10A	RF38 2300	—
M2 RA	BF25 10A	RF38 2500	—
M2 RA	BF32 00A	RF38 3200	G418 10
M25 RA	BF38 00A	RF38 3800	G418 10
M3 RA	BF50 00A	RF82 5000	G418 10
M3 RA	BF65 00A	RF82 6500	G418 10
M3 RA	BF80 00A	RF82 8200	G418 10

Certifications and compliance

Refer to page 4-3 for details.

Special M3... versions

Refer to page 4-3 for details.

UL/CSA HP ratings

See page 4-22.

4 Electromechanical starters and enclosures

Direct-on-line starters - Full voltage across the line.
Non reversing three phase

Enclosed without thermal overload relay



M0 P...10 M0 R...10



M1 P...10 M1 R...10



M2 P...10 M2 R...10



M25 P038 10



M25 R038 10



M3 P...10



M3 R...10

Order code	Maximum operating current ($\leq 440V$)	Qty per pkg	Wt
	[A]	n°	[kg]

Starters with Start and Stop/Reset pushbuttons ②.

M0 P009 10①	10	1	0.667
M0 P012 10①	12	1	0.667

M1 P009 10①	13	1	0.910
M1 P018 10①	18	1	0.910

M2 P025 10①	25	1	1.060
M2 P032 10①	32	1	1.162

M25 P038 10①	38	1	2.360
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M3 P050 10①	50	1	3.110
M3 P065 10①	65	1	3.110
M3 P080 10①	80	1	3.110

Starters with Reset pushbutton ②.

M0 R009 10①	10	1	0.627
M0 R012 10①	12	1	0.627

M1 R009 10①	13	1	0.867
M1 R018 10①	18	1	0.867

M2 R025 10①	25	1	1.020
M2 R032 10①	32	1	1.110

M25 R038 10①	38	1	2.320
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M3 R050 10①	50	1	3.070
M3 R065 10①	65	1	3.070
M3 R080 10①	80	1	3.070

① Complete order code with coil voltage digit if 50/60Hz or with voltage digit followed by 60 if 60Hz.

Standard voltages are as follows:

– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

Example: M0 R009 10 024 1 for direct-on-line starter in M0 type enclosure with Reset button, 9A /AC3 contactor with 24VAC 50/60Hz coil.

M0 P009 10 024 60 1 for direct-on-line starter in M0 type enclosure with Start and Stop/Reset buttons, 9A /AC3 contactor with 24VAC 60Hz coil.

② Protection fuses are to be mounted externally by the user.

Components

Starter enclosure standard supplied	Contactor standard supplied	Thermal relay to purchase separately	Auxiliary contact standard supplied
M0 PA	BG09 10A	RF9⑤	—
M0 PA	BG12 10A	RF9⑤	—

M1 PA	BF09 10A	RF38④	—
M1 PA	BF18 10A	RF38④	—

M2 PA	BF25 10A	RF38④	—
M2 PA	BF32 00A	RF38④	G418 10

M25 PA	BF38 00A	RF38④	G418 10
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M3 PA	BF50 00A	RF82⑥	G418 10
M3 PA	BF65 00A	RF82⑥	G418 10
M3 PA	BF80 00A	RF82⑥	G418 10

M0 RA	BG09 10A	RF9⑤	—
M0 RA	BG12 10A	RF9⑤	—

M1 RA	BF09 10A	RF38④	—
M1 RA	BF18 10A	RF38④	—

M2 RA	BF25 10A	RF38④	—
M2 RA	BF32 00A	RF38④	G418 10

M25 RA	BF38 00A	RF38④	G418 10
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M3 RA	BF50 00A	RF82⑥	G418 10
M3 RA	BF65 00A	RF82⑥	G418 10
M3 RA	BF80 00A	RF82⑥	G418 10

⑤ For thermal overload relay selection, refer to pages 3-2 or 3-3.

④ For thermal overload relay selection, refer to pages 3-4.

⑥ For thermal overload relay selection, refer to pages 3-4 or 3-5.

General characteristics

The M0..., M1..., M2..., M25... and M3...UL enclosures are made in UV protected polycarbonate. They are ideal to assemble starters for stand alone motors; robust and easily customizable adding pushbuttons, selector switches, pilot lights, modular time relays, modular level controls, etc. M3 enclosures are made in ABS plastic material: a version in polycarbonate is available by adding the UL suffix at the end of the code.

Operational characteristics

- Cable entry:
 - M0/M1... - 2 knockouts PG13.5/M20 on enclosure top and bottom
 - M2... - 2 knockouts PG13.5/M20 or PG16/M25 on enclosure top and bottom
 - M25... - 2 knockouts PG16/M25-PG29/M32 on enclosure top and bottom
 - M3... - Smooth surfaces; can be drilled by customer
- Ambient conditions:
 - Operating temperature: -25...+60°C
 - Storage temperature: -40...+70°C
- Degree of protection: IP65 for all; type 4/4X industrial control environment for M1 / M2 / M25... and M3... UL versions.

Special M3... versions

In addition to standard-indicated versions, cULus certified starters are available up to 52A motor control or 65A general use rating max.

Add suffix **UL** to the order code, e.g. M3 P050 10 024**UL**.

UL/CSA HP ratings

See page 4-22.

Certifications and compliance

Certifications obtained: EAC for all; UL Listed for USA and Canada (cULus – File E93602) and CSA certified for Canada and USA (cCSAus – File 94157) as Magnetic Motor Controllers, enclosed type, for all M0-M1-M2-M25P/R... starters and M3P/R50-65...UL types as indicated in “Special M3” above. Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

4 Electromechanical starters and enclosures

Direct-on-line starters - Full voltage across the line.

Non reversing three phase

Enclosed with motor protection circuit breaker



M2 P009 11....

Order code	Thermal trip adjustment range	IEC technical characteristics (≤440V)		Qty per pkg	Wt
		le [A]	kW		
M2 P009 11 0A4	0.63-1	1	0.25	1	1.450
M2 P009 11 0A5	1-1.6	1.6	0.37-0.55	1	1.450
M2 P009 11 0A6	1.6-2.5	2.5	0.75	1	1.515
M2 P009 11 0A7	2.5-4	4	1.1-1.5	1	1.515
M2 P009 11 0A8	4-6.5	6.5	2.2-3	1	1.515
M2 P009 11 0A9	6.3-10	10	3-5	1	1.515
M2 P009 11 0B0	9-14	13	5.5	1	1.515

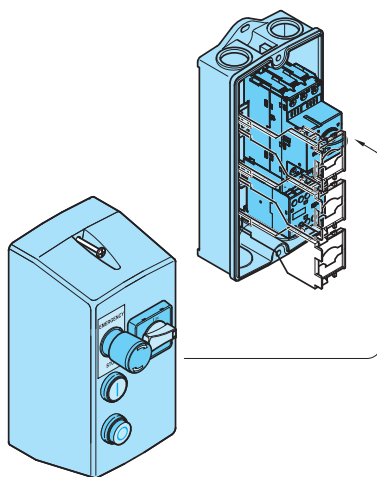
❶ Complete order code with coil voltage digit (if 50/60Hz) or with voltage digit followed by 60 (if 60Hz).

Standard voltages are as follows:

– AC 50/60Hz 024 / 048 / 110 / 230 / 400V

– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

Example: M2 P009 11 400 A8 for direct-on-line starter in M2 type with reset and reset/emergency button, 9A/AC3 contactor with 400VAC 50/60Hz coil and motor protection circuit breaker 4...6.5A.



General characteristics

M2P009.. is ideal to achieve starters on small machines. It is robust and complete of all the functions for a machine control: start, stop, emergency stop, overload protection, short circuit protection and disconnecting (insulation function) padlockable in OFF position.

General characteristics

The M2 P009 11... starters are composed of an IP65 plastic enclosure where the following devices are mounted:

- a motor protection circuit breaker type SM1R... with the short circuit and overload protection function
- a contactor with start / stop function of the motor
- 2 push-buttons for the start and stop
- a mushroom push-button for the emergency stop
- a padlockable rotary actuator, that operates the circuit breaker, for the isolation.

These starters are easily and quickly installable. They are especially suitable to operate the motor of smaller machines where there is no electrical panel.

Inside the enclosure, other components can be added like timers, level relays, protection relays, etc.

Operational characteristics

- M2... - 2 knockouts PG13.5/M20 or PG16/M25 on enclosure top and bottom
- Ambient conditions:
 - Operating temperature: -25...+60°C
 - Storage temperature: -40...+70°C
- Degree of protection: IEC IP65, type 4/4X for UL version.

Certifications and compliance

Certifications obtained: EAC.

Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1.

Reversing contactor assemblies



11 BGR...



BFA...



11 BGT...



11 BGTP...

Changeover contactor assemblies



11 BGC09 ...

Order code	IEC le (AC3) ≤440V ≤55°C	Max. IEC power AC3 400V at ≤55°C	Built-in auxiliary contacts	Qty per pkg	Wt
	[A]	[kW]	NO NC	n°	[kg]

AC COIL.

Terminals: clamp screw.

External interlock with power and auxiliary wiring.

11 BGR09 01 A ①	9	4	0 1 ①	1	0.394
11 BGR12 01 A ①	12	5.7	0 1 ①	1	0.394
BFA009 42 ①	9	4.2	0 1 ①	1	0.760
BFA012 42 ①	12	5.7	0 1 ①	1	0.760
BFA018 42 ①	18	7.5	0 1 ①	1	0.760
BFA025 42 ①	25	12.5	0 1 ①	1	0.760

Built-in interlock with power wiring only.

11 BGT09 10 A ①	9	4	1 ① 0	1	0.380
11 BGT12 10 A ①	12	5.7	1 ① 0	1	0.380

Rear terminals: PCB solder pins.

Built-in interlock only.

11 BGTP09 01 A ①	9	4 ①	0 1 ①	1	0.400
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DC COIL.

Terminals: clamp screw.

External interlock with power and auxiliary wiring.

11 BGR09 01 D ②	9	4	0 1 ①	1	0.460
11 BGR12 01 D ②	12	5.7	0 1 ①	1	0.460

Built-in interlock with power wiring only.

11 BGT09 10 D ②	9	4	1 ① 0	1	0.445
11 BGT12 10 D ②	12	5.7	1 ① 0	1	0.445

Rear terminals: PCB solder pins.

Built-in interlock only.

11 BGTP09 01 D ②	9	4 ①	0 1 ①	1	0.460
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Order code	IEC Operating current (AC1)			UL/CSA General Use	Qty per pkg	Wt
	≤40°C	≤55°C	≤60°C			
	[A]	[A]	[A]	[A]	n°	[kg]

AC COIL.

Terminals: clamp screw.

Built-in interlock only.

11 BGC09 T4 A ①	20	18	15	20	1	0.365
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DC COIL.

Terminals: clamp screw.

Built-in interlock only.

11 BGC09 T4 D ②	20	18	15	20	1	0.450
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① Complete order code with coil voltage digit or with voltage digit followed by 60 if 60Hz.

Standard voltages are as follows:

– AC 50/60Hz 024 / 048 / 110 / 230 / 400V

– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).

Example: 11 BGR09 01 A024 for reversing contactor assembly with 2 mini-contactors BG09 having 1 NC auxiliary contact each and 24VAC 50/60Hz coil.

11 BGR09 01 A024 60 for reversing contactor assembly with 2 mini-contactors BG09 having 1 NC auxiliary contact each and 24VAC 60Hz coil.

② Complete order code with coil voltage digit.

Standard voltages are:

– DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.

Example: 11BGC09 T4 D012 is a changeover contactor assembly with 2 mini-contactors BG09 having 4 main poles each and 12VDC coil.

③ One auxiliary contact for each contactor.

④ Maximum voltage is limited at 300V for UL. For certified type up to 600V, consult Technical support; see contact details on front inside cover.

General characteristics

REVERSING CONTACTOR ASSEMBLIES

Supplied complete, ready for quick mounting.

The various versions are composed as follows:

BGR... Screw termination, external mechanical interlock BGX50 00, power and auxiliary wiring.

BGT... Screw termination, built-in mechanical interlock and power wiring only.

BGTP... Rear PCB solder pin termination, built-in mechanical interlock only.

No thermal overload relay can be directly mounted to BG... reversing contactor assemblies.

BFA... Screw termination, mechanical interlock BFX50 02 and power wiring.

The thermal overload relay RF38... can be directly mounted to BFA... reversing contactor assemblies; for selection, refer to section 3.

CHANGEOVER CONTACTOR ASSEMBLIES

Supplied complete, ready for quick mounting as follows:

BGC09 T4 Four-pole contactors with built-in mechanical interlock. No power or auxiliary wiring included.

Operational characteristics

Type	Maximum IEC operational power at ≤55°C (AC3)					
	230V [kW]	400V [kW]	415V [kW]	440V [kW]	500V [kW]	690V [kW]
BGR09	2.2	4	4.3	4.5	5	5
BGT09	2.2	4	4.3	4.5	5	5
BGTP09 ④	2.2	4	4.3	4.5	5	–
BGR12	3.2	5.7	6.2	5.5	5	5
BGT12	3.2	5.7	6.2	5.5	5	5
BFA009	2.2	4.2	4.5	4.8	5.5	7.2
BFA012	3.2	5.7	6.2	6.2	7.5	10
BFA018	4	7.5	9	9	10	10
BFA025	7	12.5	13.4	13.4	15	11
at ≤40°C (AC1)						
BGC09 T4	8	14	14	15	16	22
Maximum UL/CSA horsepower rating						
Single phase		Three phase				
	120V [HP]	240V [HP]	208V [HP]	240V [HP]	480V [HP]	600V [HP]
BGR09	½	1½	2	3	5	5
BGT09	½	1½	2	3	5	5
BGTP09	½	1½	2	3	5 ④	– ④
BGR12	½	1½	3	3	7½	10
BGT12	½	1½	3	3	7½	10
BFA009	¾	2	3	3	5	7½
BFA012	1	2	5	5	7½	10
BFA018	1	3	5	5	10	15
BFA025	2	3	7½	7½	15	15

NOTE: BGR09, BGT09, BGR12, BGT12... types are UL Listed for USA and Canada as "Magnetic Motor Controller – Reversing Contactors". All these are rated 20A general (purpose) use and suitable for use on a circuit capable of delivering more than 5kA symmetrical amps at 600V max when protected by fuses class K5 rated no more than 30A.

BGTP09 type is UL Recognized for USA and Canada as "Magnetic Motor Controller – Component – reversing contactors". Max HP rating up to 300VAC only; rated 20A general (purpose) use.

BGC... types are UL Listed for USA and Canada as "Magnetic Motor Controller – Changeover contactor".

No coil change or replacement is possible for any BG... types.

Add-on blocks

Refer to section 2, page 2-16.

Special add-on auxiliary contacts 11 BGX11 11 or 11 BGX11 12 must be used on the left-side contactor of the BGT reversing assemblies.

For the right-side contactor, normal 11 BGX10... types of auxiliary contacts can be used instead.

Refer to page 2-16 for details.

Certifications and compliance

Certifications obtained: UL Listed for USA and Canada (File E93602) for BGR09, BGT09, BGR12, BGT12, BFA... and BGC... (see NOTE above), EAC.

UL Recognized, for USA and Canada (cULus - File E93602 Component), for BGTP09; products having this type of marking are intended for use as components of complete workshop-assembled equipment.

Compliant with standards IEC/EN 60947-1, IEC/EN 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

4 Electromechanical starters and enclosures

Star-delta starters

Open frame



BFA009...BFA025

new

- ❶ Complete order code with the coil voltage digit or the coil voltage digit followed by 60 if 60Hz. Standard voltage are as follows:
- AC 50/60Hz 024 / 048 / 110 / 230 / 400V
 - AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 (V).

Example: BFA009 70 024 for BFA009 star-delta starter with 24VAC 50/60Hz power supply.
BFA009 70 024 60 for BFA009 star-delta starter with 24VAC 60Hz power supply.

- ❷ The thermal overload relay is not included and must be purchased separately. Refer to the example given under Thermal relay adjustment range, for a correct choice and then to page 3-4 for the order code.
- ❸ TM ST with auxiliary supply 24...240VAC. TM ST A440 with auxiliary supply 380...440VAC.
- ❹ For motors with rated current >115A connect the line side with 50mm² wires crimped with pin terminals or with 2x 25mm² wires connected in parallel.
- ❺ For motors with rated current >175A connect the line side with insulated flexible copper bars or with 2x50mm² wires in parallel.

NOTE: For higher powers and voltages, or suitable for heavy-duty starting (centrifugal fans, mills, crushers) that is with starting time exceeding 12s, consult Technical support; see contact details on inside front cover.

Order code	Three-phase motor control. Max IEC operating current ($\leq 440V$)	Thermal overload relay	Qty per pkg	Wt
	[A]		n°	[kg]

Complete star-delta starters, open frame, for starting time up to 12s and a maximum of 30 operations/hour.

BFA009 70 024	16	No	1	1.700
BFA012 70 024	22	No	1	1.700
BFA018 70 024	28	No	1	1.700
BFA025 70 024	35	No	1	1.800
BFA026 70 024	43	No	1	1.800
BFA032 70 024	50	No	1	1.900
BFA038 70 024	60	No	1	1.900
BFA050 70 024	85	No	1	5.200
BFA065 70 024	110	No	1	5.200
BFA080 70 024	140	No	1	6.265
BFA095 70 024	160	No	1	6.900
BFA115 70 024	195	No	1	7.500
BFA150 70 024	230	No	1	7.500

Thermal relay adjustment range

Choose the thermal relay adjustment range considering a value equal to 58% of rated motor current (I_e).

Example: I_e=100A; 58% I_e=58A.

The suitable relay range is 46-65A.

During the setup, the relay is to be regulated at 58A.

Operational characteristics

IEC standard motor powers

230V	400V	440V	500V
[kW]	[kW]	[kW]	[kW]

4	7.5	7.5	7.5
5.5	11	11	11
7.5	15	11	11
11	18.5	18.5	22
11	22	22	25
15	25	25	25
15	30	30	30
25	45	45	59
30	55	55	75
45	75	75	90
45	90	90	110
55	110	110	132
75	132	132	160

Components

Starter	Contactors			Thermal overload relay	Time relay	Auxiliary contacts fitted on contactor:			Rigid connections
	Line	Delta	Star			Line	Delta	Star	
BFA009 70	BF09 10A	BF09 01A	BF09 10A	RF38	TM ST	BFX10 20	—	BFX10 11	BFX31 31
BFA012 70	BF12 10A	BF12 01A	BF09 10A	RF38	TM ST	BFX10 20	—	BFX10 11	BFX31 31
BFA018 70	BF18 10A	BF18 01A	BF12 10A	RF38	TM ST	BFX10 20	—	BFX10 11	BFX31 31
BFA025 70	BF25 10A	BF25 01A	BF18 10A	RF38	TM ST	BFX10 20	—	BFX10 11	BFX31 31
BFA026 70	BF26 00A	BF26 00A	BF18 10A	RF38	TM ST	BFX10 20	BFX10 11	BFX10 11	BFX32 32
BFA032 70	BF32 00A	BF32 00A	BF25 10A	RF38	TM ST	BFX10 20	BFX10 11	BFX10 11	BFX32 32
BFA038 70	BF38 00A	BF38 00A	BF25 10A	RF38	TM ST	BFX10 20	BFX10 11	BFX10 11	BFX32 32
BFA050 70	BF50 00A	BF50 00A	BF32 00A	RF82	TM ST	BFX10 20	BFX10 11	BFX10 11	—
BFA065 70	BF65 00A	BF65 00A	BF32 00A	RF82	TM ST	BFX10 20	BFX10 11	BFX10 11	—
BFA080 70	BF80 00A	BF80 00A	BF50 00A	RF82	TM ST	BFX10 20	BFX10 11	BFX10 11	—
BFA095 70	BF95 00A	BF95 00A	BF65 00A	RF110	TM ST	BFX10 20	BFX10 11	BFX10 11	—
BFA115 70	BF115 00A	BF115 00A	BF80 00A	RF200	TM ST	BFX10 20	BFX10 11	BFX10 11	—
BFA150 70	BF150 00A	BF150 00A	BF80 00A	RF200	TM ST	BFX10 20	BFX10 11	BFX10 11	—

Certifications and compliance

Certifications obtained: EAC.

Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1.

4 Electromechanical starters and enclosures

Enclosed star-delta starters.

Non-metallic enclosure for starters

Enclosed starters



M3 P...70... - M3 PA70

- ① Complete order code with the coil voltage digit or the coil voltage digit followed by 60 if 60Hz. Standard voltage are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 (V).
Example: M3P009 70 024 for M3P009 star-delta starter with 24VAC 50/60Hz power supply.
M3P009 70 02460 for M3P009 star-delta starter with 24VAC 60Hz power supply.
- ② The thermal overload relay is not included and must be purchased separately. Choose the thermal relay adjustment range considering a value equal to 58% of rated motor current (I_e).
Example: I_e=10A; 58% I_e = 5.8A. The suitable relay range is 4-6.5A, set at 5.8A, so the order code to select is RF380650).
Refer to page 3-4 for the order codes available.
- ③ Suitable for BFA...70 starters.
- ④ TM ST with auxiliary supply 24...240VAC;
TM ST A440 with auxiliary supply 380...400VAC.

NOTE: For higher powers and voltage ratings or suitable for heavy-duty starting (centrifugal fans, mills, crushers) that is with starting time exceeding 12s, consult Technical support; see contact details on inside front cover.

Order	Three-phase motor control. Max IEC operating current (≤440V)	Qty per pkg	Wt
	[A]	n°	[kg]

Star-delta starters in enclosure with Start and Stop/Reset buttons. Starting time up to 12s and a maximum of 30 operations/hour.

M3 P009 70	16	1	3.540
M3 P012 70	22	1	3.540
M3 P018 70	28	1	3.540
M3 P025 70	35	1	3.650
M3 P026 70	43	1	3.650
M3 P032 70	50	1	3.800
M3 P038 70	60	1	3.800

With switch disconnector, rotary door-coupling handle GAX61 and Start and Stop/Reset buttons.

M3 P009 73	16	1	3.700
M3 P012 73	22	1	3.700
M3 P018 73	28	1	3.700
M3 P025 73	35	1	3.800
M3 P026 73	43	1	3.800
M3 P032 73	50	1	4.300
M3 P038 73	60	1	4.300

Enclosure for star-delta starter, complete with Start and Stop/Reset buttons, metal plate fixed with piece of 35mm DIN (IEC/EN 60715) rail.

M3 PA70	—	1	2.240
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Operational characteristics

IEC standard motor powers

230V	400V	440V	500V
[kW]	[kW]	[kW]	[kW]

4	7.5	7.5	7.5
5.5	11	11	11
7.5	15	11	11
11	18.5	18.5	22
11	22	22	25
15	25	25	25
15	30	30	30

- Enclosure is made in ABS plastic material
- Cable entry: Smooth surface; can be drilled by customer
- Ambient conditions:
 - Operating temperature: -25...+60°C
 - Storage temperature: -40...+70°C
- Degree of protection: IEC IP65 for M3P...; UL Type 1, 12, 4/4X for M3...UL versions.

Special M3... versions

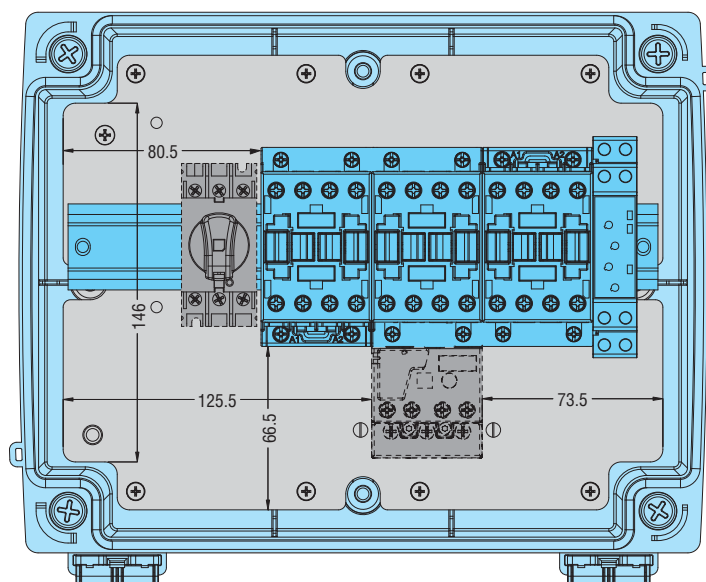
In addition to standard-indicated versions, cULus certified starters are available up to 52A motor control rating max. This is also valid for the enclosure with general use rating of 65A.

Add suffix **UL** to the order code, e.g. M3 PA70UL.

Certifications and compliance

Certifications obtained: UL Listed, for USA and Canada (File E93602), as Magnetic Motor Controllers - Enclosed (starters) and - Enclosures for M3...PUL types.
Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Maximum available space inside M3P...70/73 with star-delta starters BFA...70...



Components

Type	Enclosure	Contactors			T/o relay ②	Time relay	Auxiliary contacts fitted on contactor:			Rigid connections	Switch disconnector ⑤
		Line	Delta	Star			Line	Delta	Star		
M3P009 70/73	M3 PA70	BF09 10A	BF09 01A	BF09 10A	(RF38)	TM ST④	BFX10 20	—	BFX10 11	BFX31 31	GA016 A
M3P012 70/73	M3 PA70	BF12 10A	BF12 01A	BF09 10A	(RF38)	TM ST④	BFX10 20	—	BFX10 11	BFX31 31	GA025 A
M3P018 70/73	M3 PA70	BF18 10A	BF18 01A	BF12 10A	(RF38)	TM ST④	BFX10 20	—	BFX10 11	BFX31 31	GA032 A
M3P025 70/73	M3 PA70	BF25 10A	BF25 01A	BF18 10A	(RF38)	TM ST④	BFX10 20	—	BFX10 11	BFX31 31	GA040 A
M3P026 70/73	M3 PA70	BF26 00A	BF26 00A	BF18 10A	(RF38)	TM ST④	BFX10 20	BFX10 11	BFX10 11	BFX32 32	GA063 SA
M3P032 70/73	M3 PA70	BF32 00A	BF32 00A	BF25 10A	(RF38)	TM ST④	BFX10 20	BFX10 11	BFX10 11	BFX32 32	GA063 SA
M3P038 70/73	M3 PA70	BF38 00A	BF38 00A	BF25 10A	(RF38)	TM ST④	BFX10 20	BFX10 11	BFX10 11	BFX32 32	GA063 SA

⑤ For M3P...73 types

4 Electromechanical starters and enclosures

Empty non-metallic enclosures

Accessories and spare parts

Empty enclosures



M...PA



M...RA



M...N

Order code	Contact type 1	Thermal relay 2	Degree of protect.	Qty per pkg	Wt n° [kg]
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Enclosures with Start-Stop/Reset pushbuttons.

M0PA	BG06, BG09, BG12	RF9	IP65	1	0.490
M1PA	BF09A, BF12A, BF18A	RF38	IP65	1	0.545
M2PA	BF25A, BF26A, BF32A	RF38	IP65	1	0.715
M25PA ③	BF38A	RF38	IP65	1	0.990
M3PA ④	BF40A, BF50A, BF65A, BF80A, BF94A	RF82, RF82	IP65	1	1.900

Enclosures with Reset pushbutton.

M0RA	BG06, BG09, BG12	RF9	IP65	1	0.445
M1RA	BF09A, BF12A, BF18A	RF38	IP65	1	0.500
M2RA	BF25A, BF26A, BF32A	RF38	IP65	1	0.670
M25RA ③	BF38A	RF38	IP65	1	0.970
M3RA ④	BF40A, BF50A, BF65A, BF80A, BF94A	RF82, RF82	IP65	1	1.850

Enclosures without external pushbuttons.

M0N	BG06, BG09, BG12	RFA9	IP65	1	0.405
M1N	BF09A, BF12A, BF18A	RF38	IP65	1	0.460
M2N	BF25A, BF26A, BF32A	RF38	IP65	1	0.640
M24N ⑤ ⑥	BG.../BF09A...BF25A	2	IP65	1	0.625
M25N ⑥	BF38A	RF38	IP65	1	0.940
M3N	BF40A, BF50A, BF65A, BF80A, BF94A	RF82, RF82	IP65	1	1.800

① To be purchased separately; refer to page 2-4 for contactor choice.

② To be purchased separately.

Refer to pages 3-2 to 8 for thermal overload relay choice.

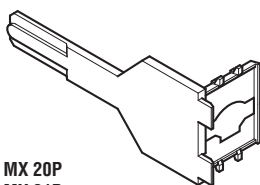
For use of the overload relay in the M24N, consult Technical support; see contact details on inside front cover.

③ MX 31 metal mounting plate included.

④ MX 30 metal mounting plate included.

⑤ To install eventual pushbuttons, selectors and/or other control accessories, use the **PL** aluminum series and mount the relay contact elements on the cover using the LPX AU120 mounting adapter. See section 7.

Accessories and spare parts

MX 20P
MX 21P

Order code	Description	Qty per pkg	Wt n° [kg]
MX 01	Threaded plug for unused holes, grey RAL7035	10	0.007
MX 10P	Stop/Reset button extension rod for M0 enclosure	5	0.010
MX 11P	Stop/Reset button extension rod for M1 enclosure	5	0.010
MX 12P	Stop/Reset button extension rod for M2, M25 enclosures	5	0.010
MX 20P	Mounting base for LPX C... contact on M0 enclosure	5	0.014
MX 21P	Mounting base for LPX C... contact on M1, M2, M25 enclosures	5	0.014
MX 30	Metal mounting plate for M3N	1	0.500
MX 31	Metal mounting plate for M24N and M25 enclosures	1	0.400

General characteristics

The M0..., M1..., M2..., M25... and M3...UL enclosures are made in UV protected polycarbonate.

M3 enclosure is made in ABS plastic material.

Operational characteristics

Enclosure type Maximum operating current ($\leq 440V$) [A]

M0...	12
M1...	18
M2...	32
M24N	38
M25...	38
M3...	80

General characteristics

Enclosures are supplied with the following accessories:

Accessory	Type	Type of enclosure							
		M0 PA	M1 PA	M2 PA	M25 PA	M0 RA	M1 RA	M2 RA	M25 RA
Contact holder	MX 20P	1							
	MX 21P		1	1	1				
Buttons:	LPC B1176					1	1	1	1
- Start/Reset	LPC B2104	1	1	1	1				
- Start	LPC B1113	1	1	1	1				
Contact for Start button	LPX C10	1	1	1	1				
Stop/Reset button	MX 10P	1				1			
button extension	MX 11P		1				1		
	MX 12P			1	1			1	1
Unused hole threaded plug	MX 01					1	1	1	1

– M3 PA enclosure: 2 Start and Stop/Reset pushbuttons and 1 MX30 mounting plate

– M3 RA enclosure: 1 Reset pushbutton and 1 MX30 mounting plate

– M3N enclosure: Supplied without accessories to be purchased separately including MX 30 mounting plate.

Enclosures can house the following devices:

M0 = BG... with/without RF9

M1 = BF09A-BF12A-BF18A with/without RF38

M2 = BF25A-BF26A-BF32A, assemblies BFA...42 with/without RF38

M24N = BG..., BF09A...BF25A, assemblies BGR/BGT/BGC and BFA...42 without overload

M25 = BF26...BF38A, assemblies BGR/BGT/BGC and BFA...42 with/without overload

M3 = BF40...BF94 and all assemblies with/without overload.

Operational characteristics:

– Cable entry:

• M0/M1/M2... - 2 knockouts PG13.5/M20 on enclosure top and bottom

• M24N/M25... - 2 knockouts PG16/M25-PG29/M32 on enclosure top and bottom

• M3... - Smooth surfaces; can be drilled by customer

– Ambient conditions:

• Operating temperature: -25...+60°C

• Storage temperature: -40...+70°C

– Degree of protection: IEC IP65 for all; UL Type 1, 12, 4/4X for M0/M1/M2/M24N/M25... types and M3...UL versions.

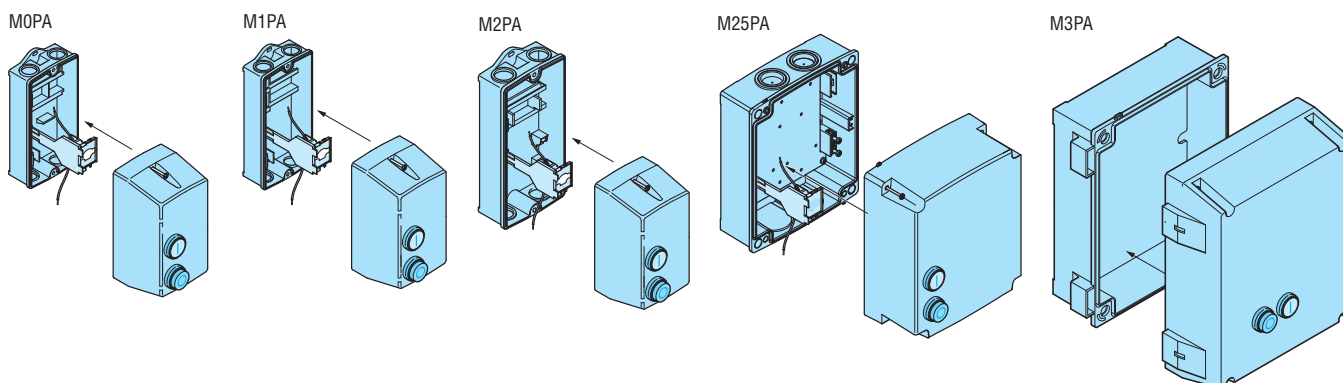
Special M3... versions

In addition to standard-indicated versions, cULus certified starters and enclosures are available up to 52A - motor control and 65A general use rating max (MX30 plate, earth/ground and neutral terminal plates are always included in this case). Add suffix **UL** to the order code of enclosures e.g. M3N UL.

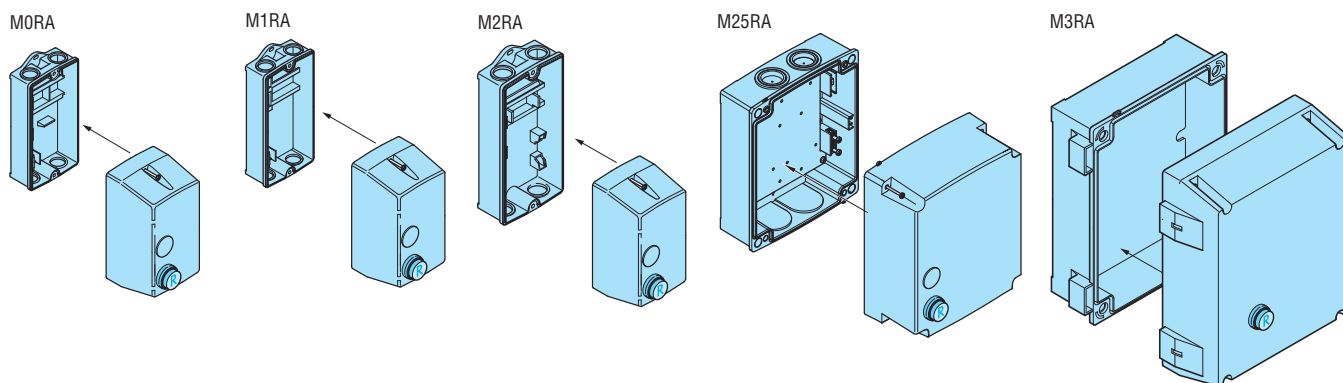
Certifications and compliance

Certifications obtained: EAC for all; for M3NUL type, UL Listed for USA and Canada (cULus – File E300050) as Industrial control panels; for M0/M1/M2PA/RA/N and other M3...UL types, UL Listed for USA and Canada (cULus – File E93602) under magnetic motor controllers as Polymeric enclosures - and CSA certified for Canada and USA (cCSAus – File 94157) as Non-metallic enclosures. Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

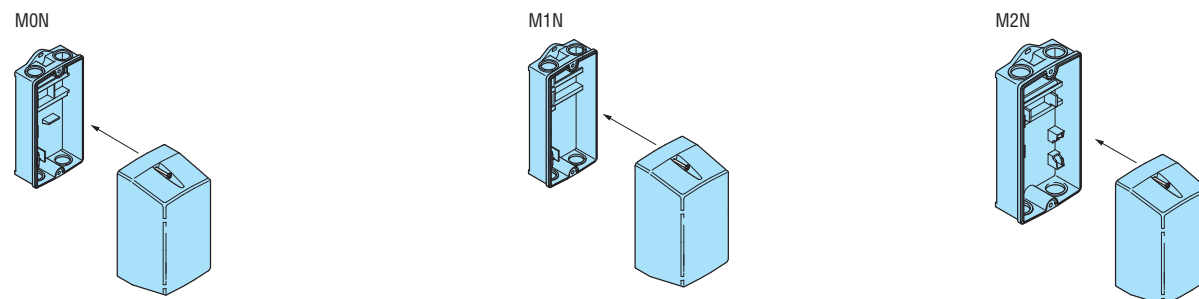
M...PA EMPTY ENCLOSURES



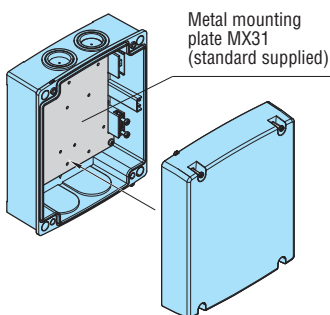
M...RA EMPTY ENCLOSURES



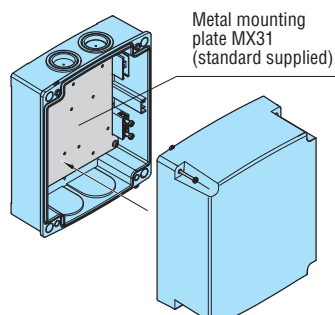
M...N EMPTY ENCLOSURES



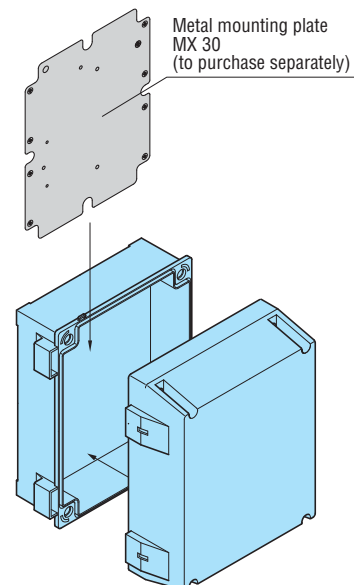
M24N



M25N



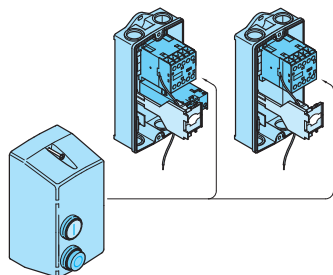
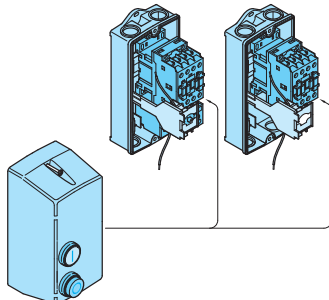
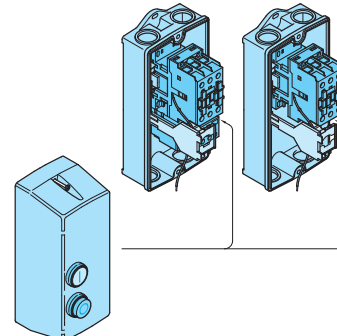
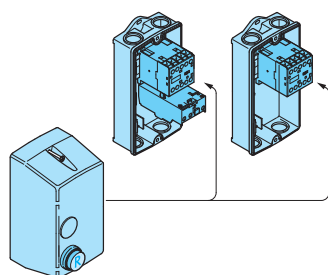
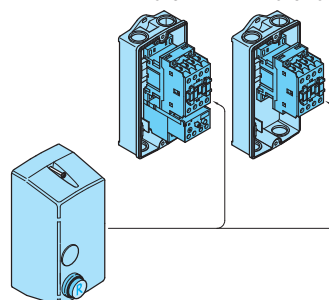
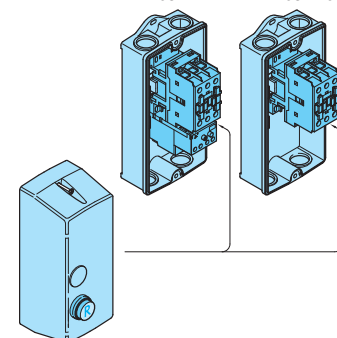
M3N



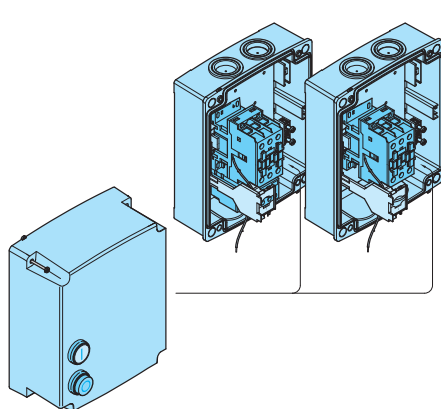
4 Electromechanical starters and enclosures

Direct-on-line starters - Full voltage across the line.

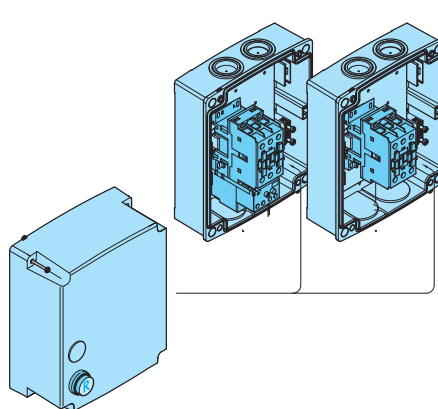
Non reversing three phase

M...P... STARTERS, ENCLOSEDM0 P009 12... M0 P012 12...
M0 P009 10... M0 P012 10...M1 P009 12... M1 P018 12...
M1 P009 10... M1 P018 10...M2 P025 12... M2 P032 12...
M2 P025 10... M2 P032 10...**M...R... STARTERS, ENCLOSED**M0 R009 12... M0 R009 10...
M0 R012 12... M0 R012 10...M1 R009 12... M1 R009 10...
M1 R018 12... M1 R018 10...M2 R025 12... M2 R025 10...
M2 R032 12... M2 R032 10...**M25... STARTERS, ENCLOSED**

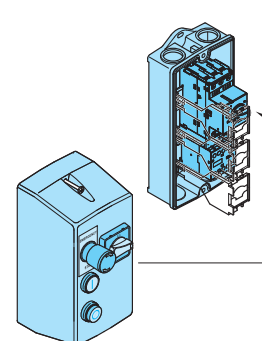
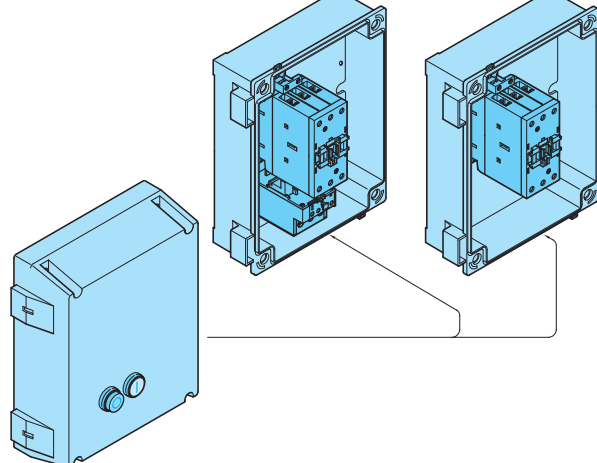
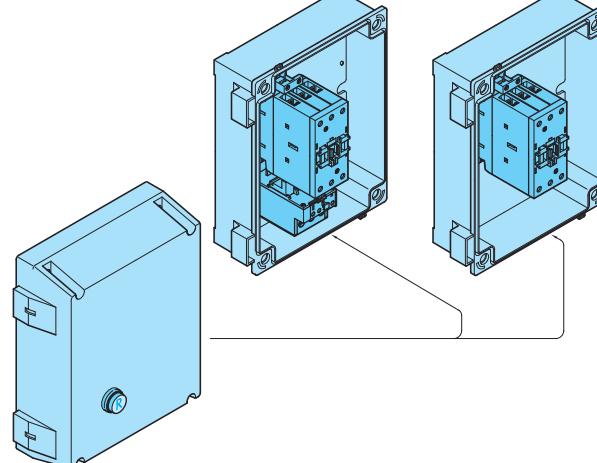
M25 P03812... M25 P03810...



M25 R03812... M25 R03810...

**M2... STARTERS, ENCLOSED**

M2 P00911

**M3... STARTERS, ENCLOSED**M3 P050 12... to
M3 P095 12...M3 P050 10... to
M3 P095 10...M3 R050 12... to
M3 R095 12...M3 R050 10... to
M3 R095 10...

4 Electromechanical starters and enclosures

Direct-on-line starters - Full voltage across the line.
Accessories and spare parts

Maximum combinations for M0... and M1... starters in enclosure

For the fitting of add-on blocks and electronic relays in the starters, consult our Technical support; see contact details on inside front cover.

The enclosure cover can be equipped with various types of actuators and pilot lights, per following details:

1) Upper position 1

The cover must be drilled in this position, with a 22.5mm hole, by the user and LPL..., LPM... and LPC ZS... pilot light can be fitted.

To fit the LPL... (not type 8 LP2T IL...) pilot light head, the mounting base, type MX 20P for M0 enclosure or type MX 21P for M1 enclosure, must also be purchased. The LED element is snapped onto this mounting base.

No adapter or base is needed for LPL..., LPM... and LPC ZS...

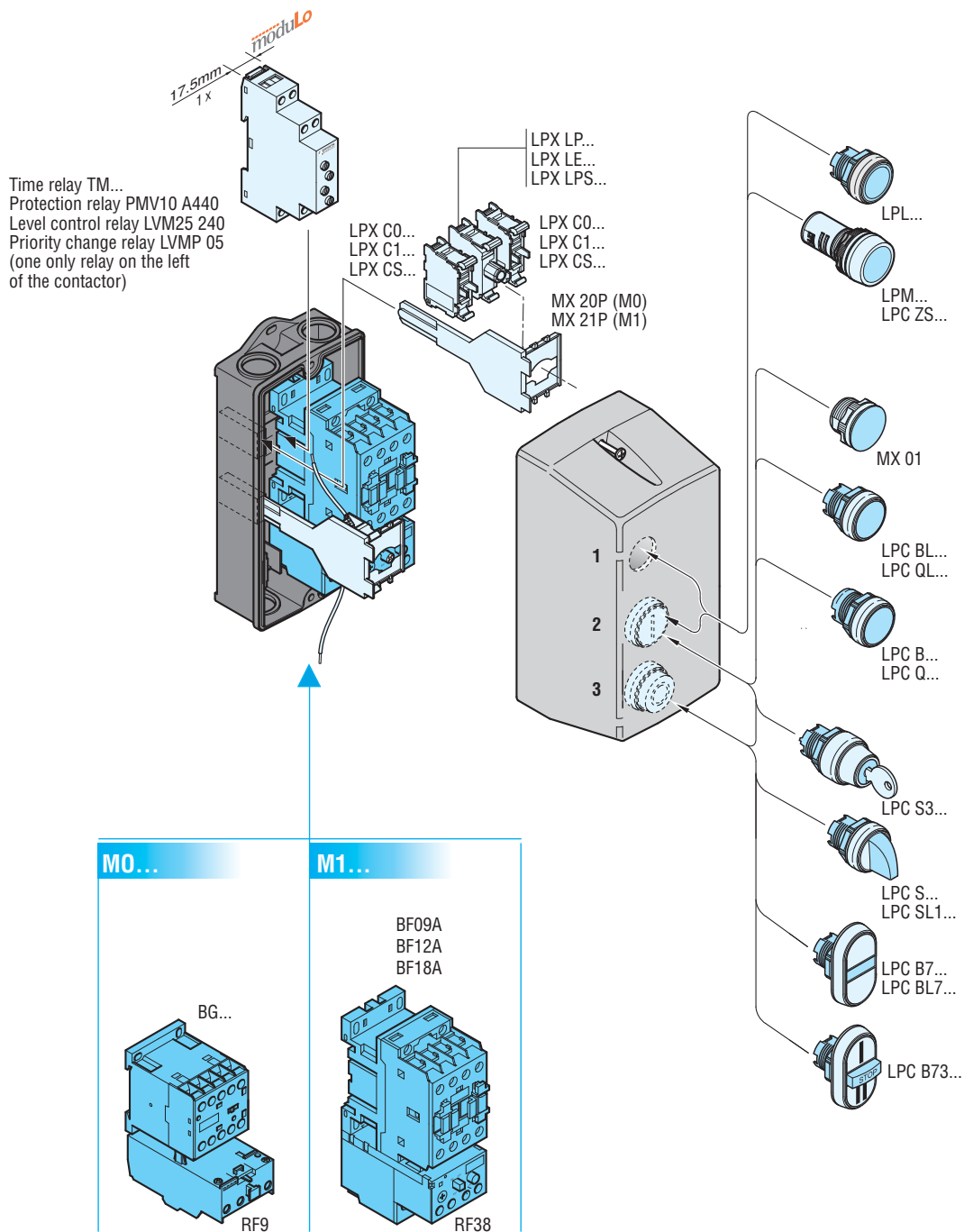
2) Middle position 2

Based on the enclosure type, in this position, the user finds either the Start button or threaded plug. Various **PLatinum** actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated below. To fit the actuators, the mounting base, type MX 20 for M0 enclosure, or type MX 21P for M1 enclosure, must also be purchased. The contact or LED elements are snapped onto this mounting base. No adapter or base is needed for LPL..., LPM... and LPC ZS...

3) Lower position 3

The STOP/RESET button is mounted in this position, except for the enclosure without buttons. This button activates the thermal overload relay via a mechanical actuator.

In eventual applications without thermal overload relay, this button can be removed and the hole closed up by the threaded plug MX 01.



4 Electromechanical starters and enclosures

Direct-on-line starters - Full voltage across the line.

Accessories and spare parts

Maximum combinations for M2... starters in enclosure

For the fitting of add-on blocks and electronic relays in the starters, consult our Technical support; see contact details on inside front cover.

The enclosure covers can be equipped with various types of actuators and pilot lights, per following details:

1) Upper position 1

The cover must be drilled in this position with a 22.5mm hole by the user; LPL..., LPM... or LPC ZS... pilot light can be fitted.

To fit the LPL... pilot light, the mounting base type MX 21P must also be purchased. The LED element is snapped onto this mounting base.

No adapter or base is needed for LPL..., LPM... and LPC ZS...

2) Middle position 2

Based on the enclosure type, in this position, the user finds either the Start button or threaded plug.

Various **PLatinum** actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated in the side figure.

To fit the actuators (not required for 8 LP2T IL...P pilot light), the mounting base type MX 21P must also be purchased.

The contact or LED elements are snapped onto this mounting base.

No adapter or base is needed for LPL..., LPM... and LPC ZS...

3) Lower position 3

The STOP/RESET button is mounted in this position, except for the enclosure without buttons.

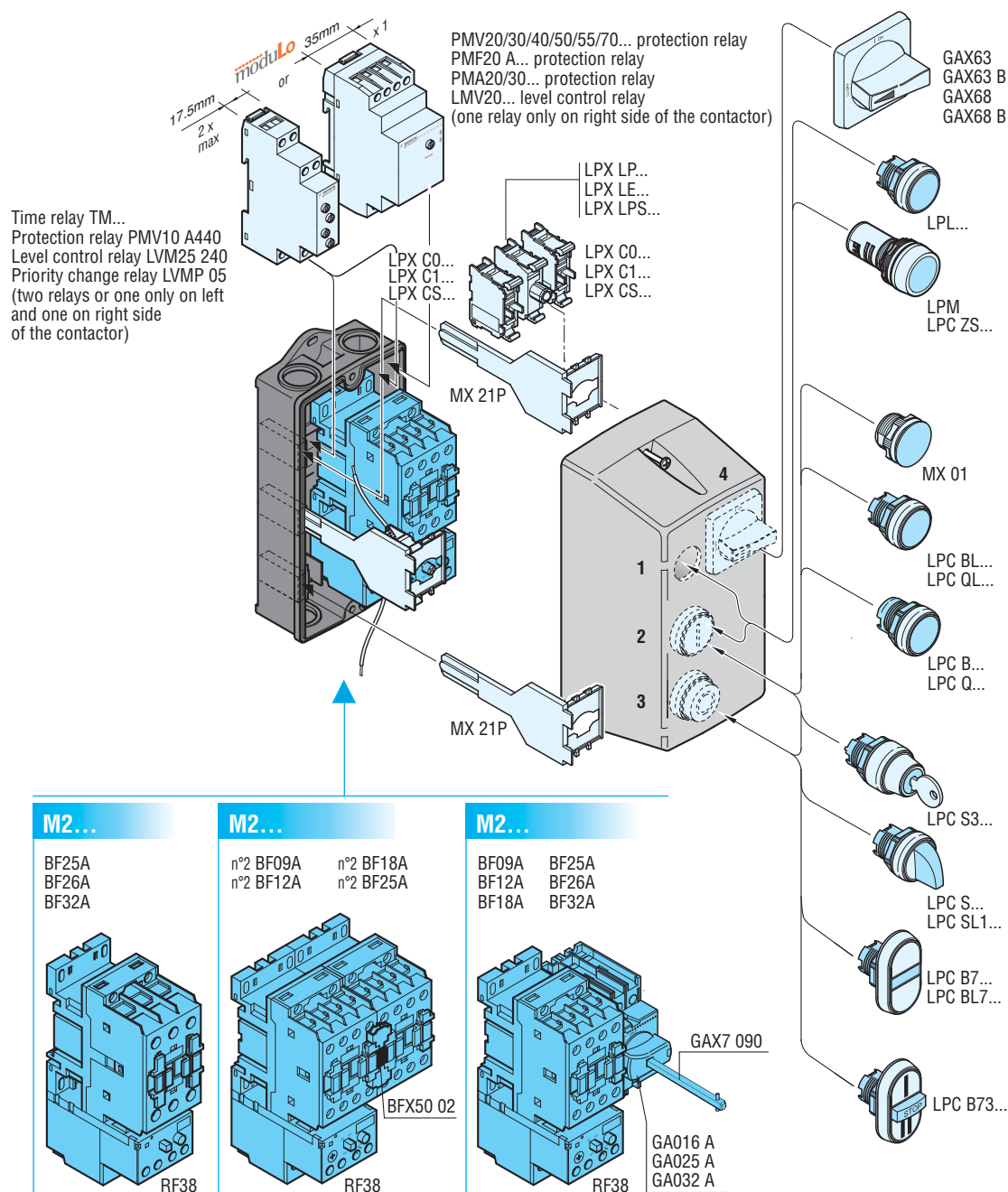
This button activates the thermal overload relay via a mechanical actuator. In eventual applications without thermal overload relay, this button can be removed and the hole closed up by the threaded plug MX 01.

Various **PLatinum** actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated in the drawing below. To fit the actuators (not required for 8 LP2T IL...P pilot light), the mounting base type MX 21P must also be purchased. The contact or LED elements are snapped onto this mounting base.

No adapter or base is needed for LPL..., LPM... and LPC ZS...

4) Upper position 4

The cover must be drilled in this position with a 22.5mm hole by the user whenever an external handle is needed for a switch disconnector fitted in the enclosure.



Maximum combinations for starters in M24N enclosure

In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, various other electromechanical devices can be fitted. The cover of the M24N enclosure can be used across the entire surface to mount pushbuttons, measuring instruments, switch disconnectors GA016A...GA040A and GA063SA type. No contact blocks or other additional accessories can be mounted on the contactor face of AC BF series; they can only be fitted on the contactor side since the cover is shallow.

Eventually pushbuttons, selector switches and/or other control accessories of the **PLatinum** series can be used and contact or LED elements can be mounted directly inside on the cover with the LPX AU120 mounting adapter; refer to section 7.

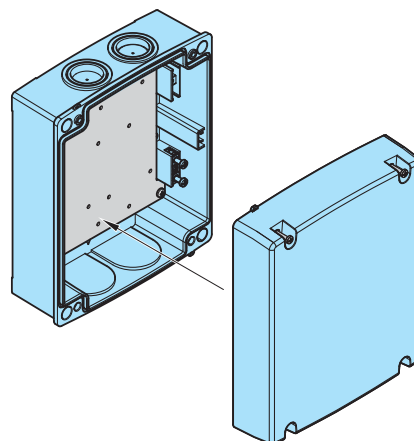
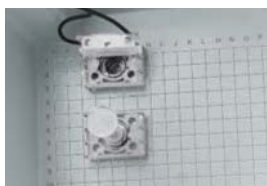
MX 31 internal metal mounting plate is standard-supplied.

The wall fixing holes and the cover closing captive **screws** are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against infiltrations liquid (IEC IPX5 / UL Type 4X).

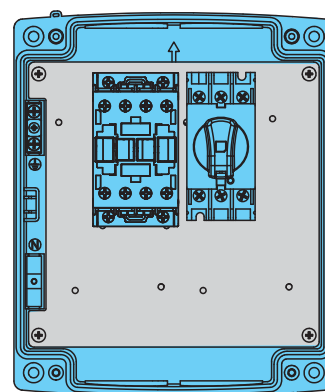
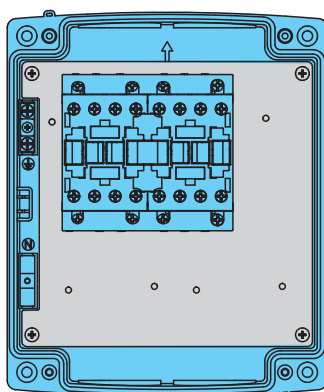
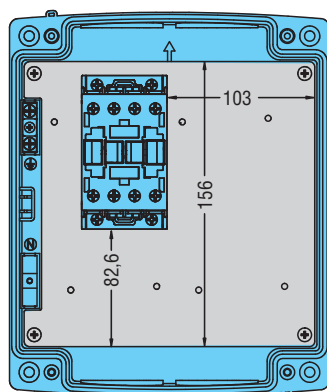
The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handles or pilot lights will be mounted.

A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.

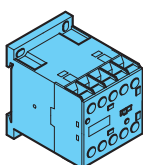


Available space for fitting other electrical or electronic devices



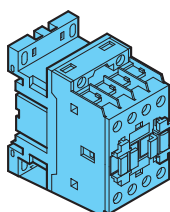
M24N

BG06
BG09
BG12
without overload



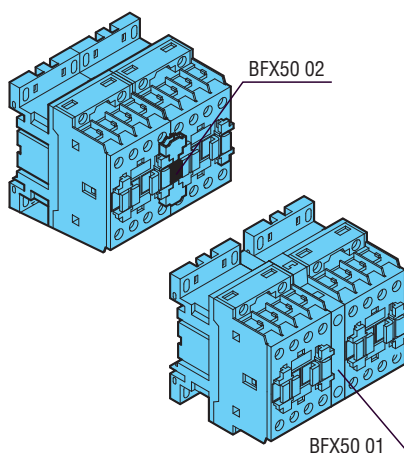
M24N

BF09A...BF25A
without overload



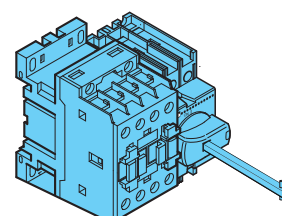
M24N

BGR... - BGT... - BGC... without overload
n° 2 BF09A n° 2 BF12A
n° 2 BF18A n° 2 BF25A
All without overload
BFA...42 without overload



M24N

BF09A BF12A
BF18A BF25A
with GA016A...GA040A and GA063SA



4 Electromechanical starters and enclosures

Maximum combinations for starters in M25... enclosure

In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, various other electromechanical devices can be fitted. The cover of the M25 enclosure can be used across the entire surface to mount pushbuttons, measuring instruments, switch disconnectors GA016A...GA040A and GA063SA type. Possible contact blocks or other additional accessories can be mounted on the contactor face of AC or DC BF series or on the contactor side since the cover is deep. Eventually pushbuttons, selector switches and/or other control accessories of the **PLatinum** series can be used and contact or LED elements can be mounted directly inside on the cover with the LPX AU120 mounting adapter; refer to section 7.

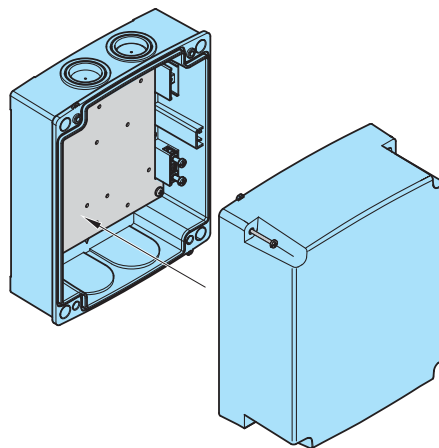
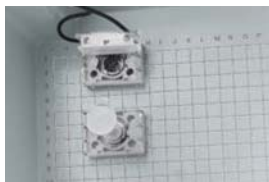
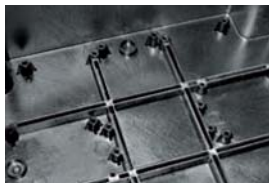
MX 31 internal metal mounting plate is standard-supplied.

The wall fixing holes and the cover closing captive **screws** are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against liquid infiltrations (IEC IPX5 / UL Type 4X).

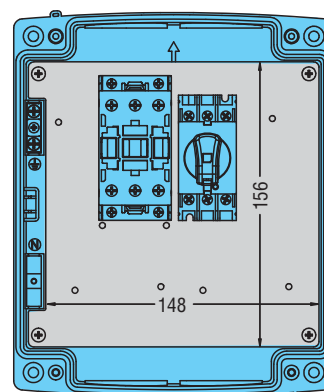
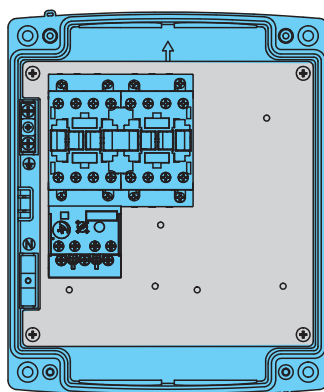
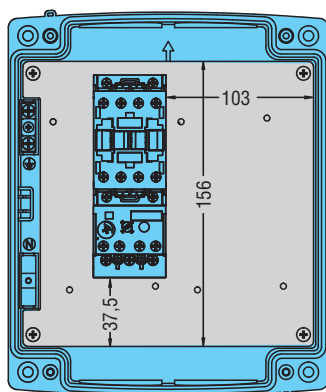
The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handles or pilot lights will be mounted.

A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.

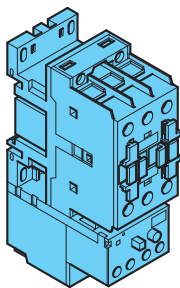


Available space for fitting other electrical or electronic devices



M25...038...

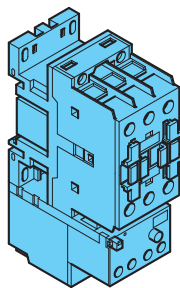
BF38
with or without
overload



RF38...

M25...

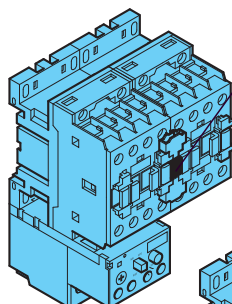
BF26 - BF32
with or without
overload



RF38...

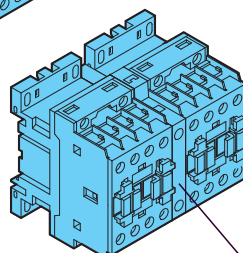
M25...

BGR... - BGT... - BGC with or without overload RF9
n° 2 BF26 - n° 2 BF32 - n° 2 BF38 with or without
overload RF38
BFA...42 with or without overload RF38



RF38...

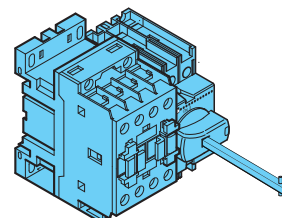
BFX50 02



BF09A...BF38A with
BFX50 01

M25...

BF09 BF12 BF18
BF26 BF32 BF38
with GA016A...GA040A and GA063SA



Maximum combinations for starters in M3... enclosure

In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, star-delta starters can be installed as illustrated at the lower right as well as various other electromechanical devices. The cover of the M3 enclosure can be used across the entire surface to mount pushbuttons, measuring instruments or switch disconnectors GA016A...GA125A, etc.

MX 30 internal metal mounting plate is standard supplied with M3P... and M3R... types; not included with the M3N, it can be purchased separately.

With the specifically designed **hinges**, the cover remains attached to the base, fully open, while the wiring work is being carried out. By applying **slight pressure** on the hinges, the cover can be released from the base.



The cover closing captive **screws** and the wall fixing holes are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against liquids infiltrations (IEC IPX5 / UL Type 4X).



A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.



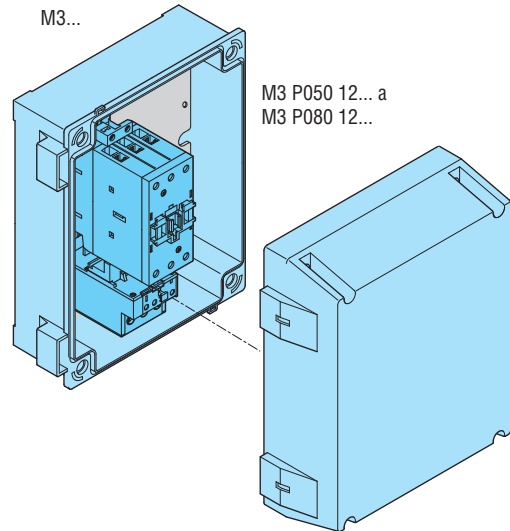
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handle or pilot lights will be mounted.



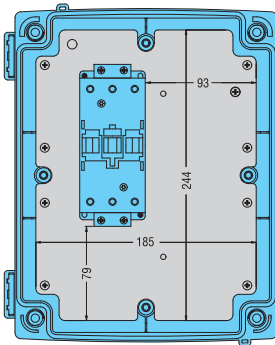
A properly predrilled metal mounting plate (MX 30 standard supplied except for M3N) permits to quickly and precisely fix equipment in place.



The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

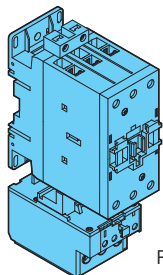


Available space for fitting other electrical or electronic devices

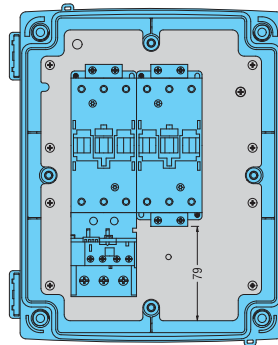


M3...

n° 1 BF40 n° 1 BF80
n° 1 BF50 n° 1 BF94
n° 1 BF65

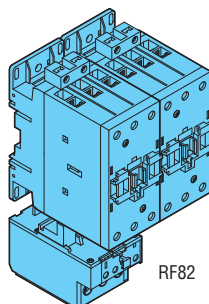


RF82

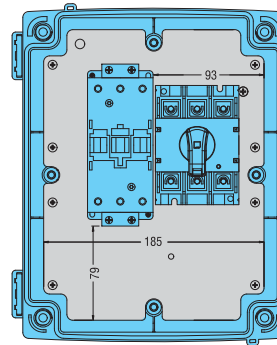


M3...

n° 2 BF40 n° 2 BF65 n° 2 BF94
n° 2 BF50 n° 2 BF80

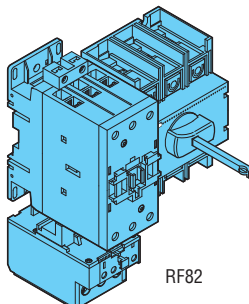


RF82

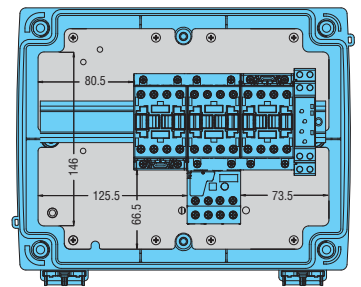


M3...

n° 1 BF40 n° 1 BF65 n° 1 BF94 + n° 1 GA...
n° 1 BF50 n° 1 BF80

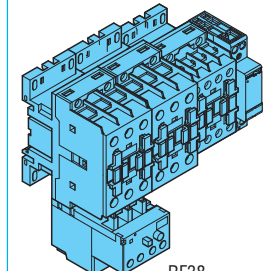


RF82



M3P...70

Star-delta configuration with RF38 relay,
TM ST time relays and contactors:
BF09A BF12A BF18A
BF25A BF26A BF38A



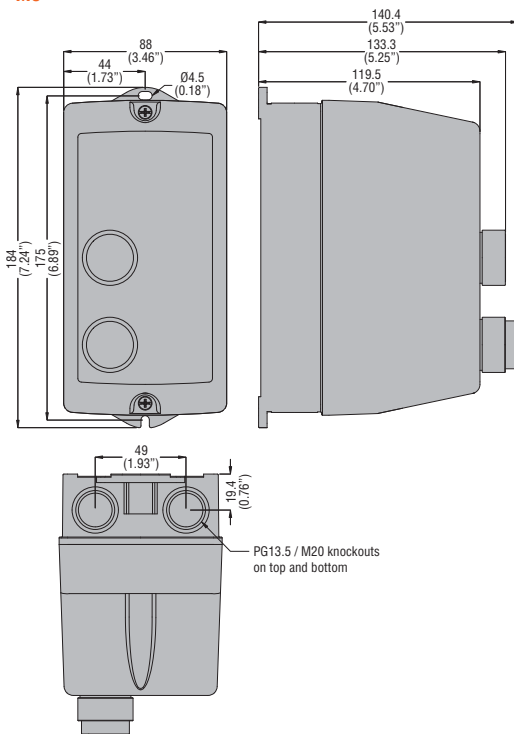
RF38

4 Electromechanical starters and enclosures

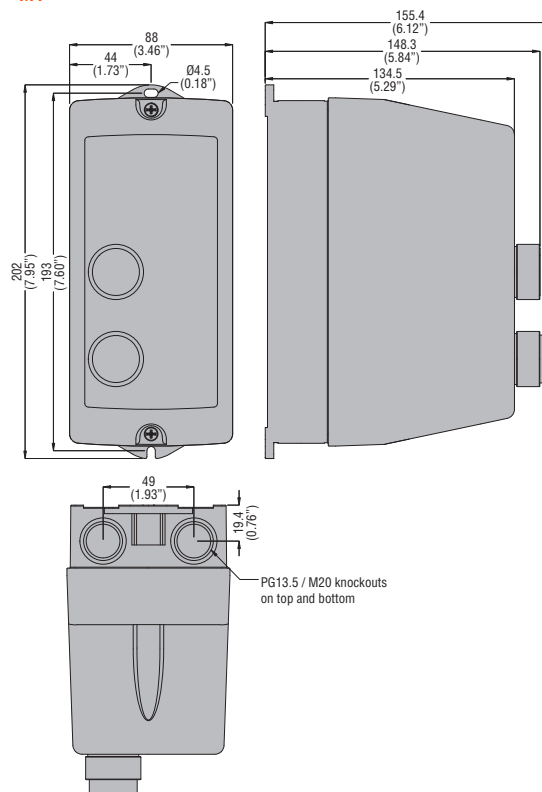
Dimensions [mm (in)]

DIRECT-ON-LINE STARTERS - EMPTY ENCLOSURES

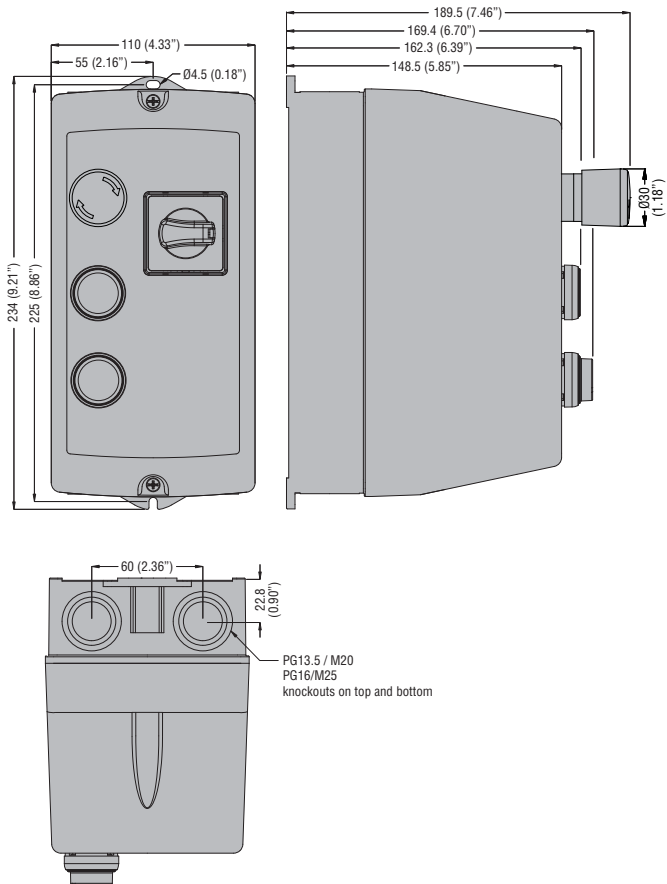
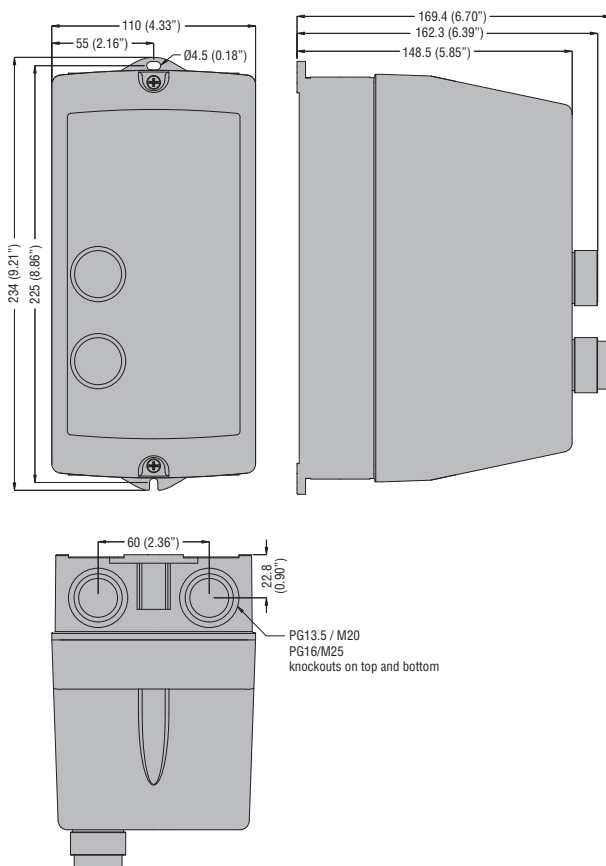
M0



M1



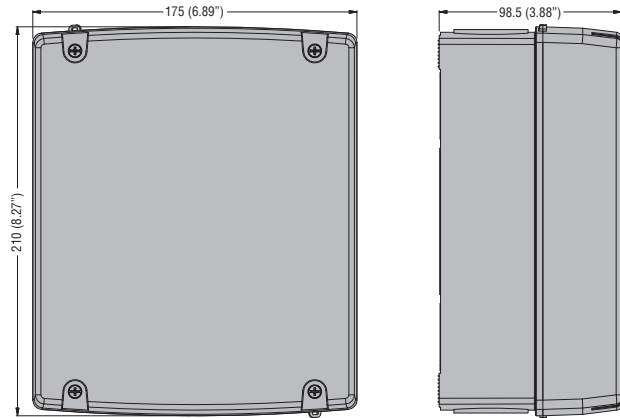
M2



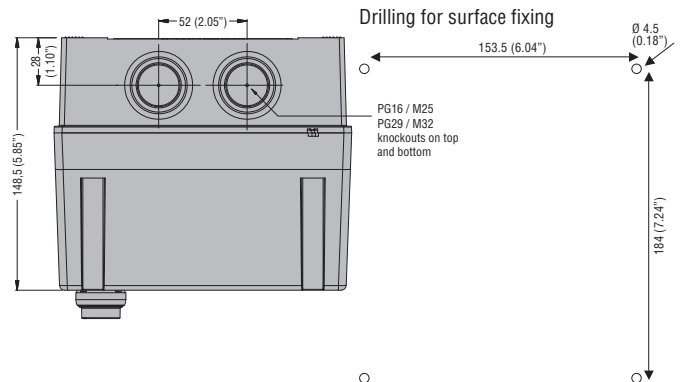
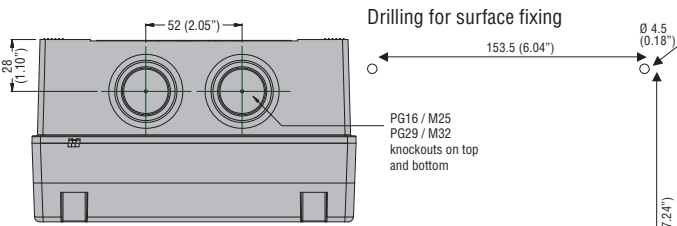
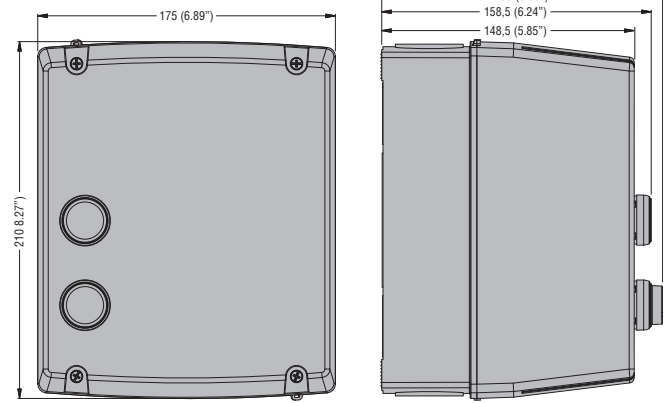
4 Electromechanical starters and enclosures

Dimensions [mm (in)]

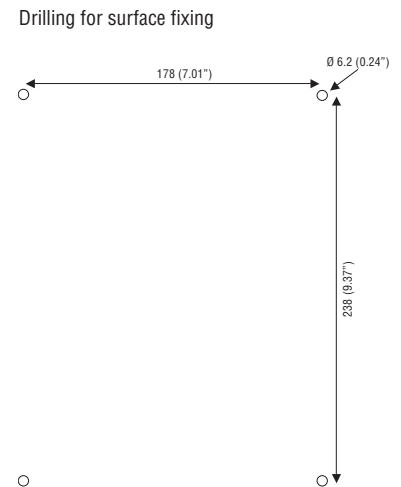
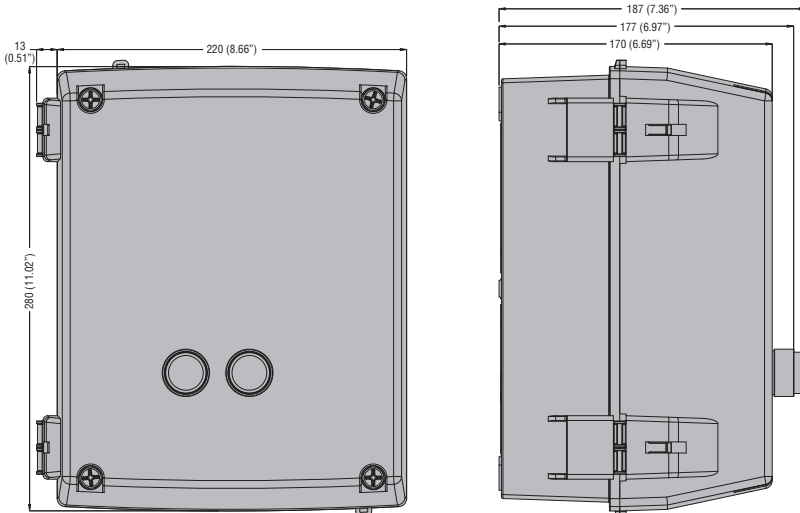
M24N



M25

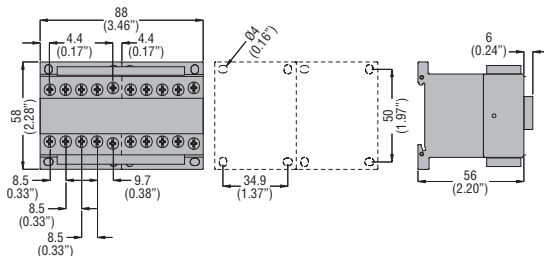


M3

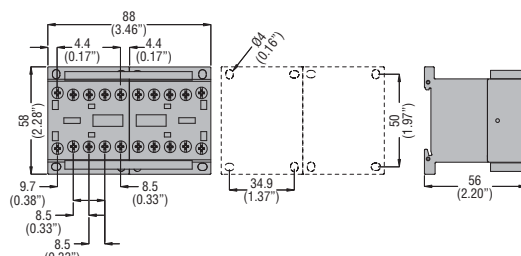


REVERSING CONTACTOR ASSEMBLIES

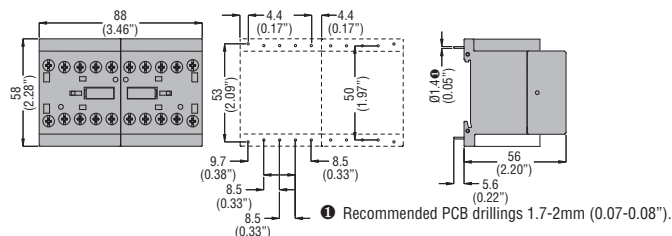
BGR...



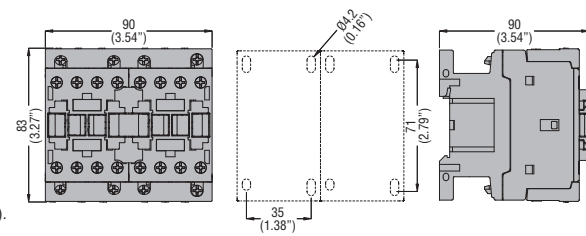
BGT...



BGTP...



BFA...42

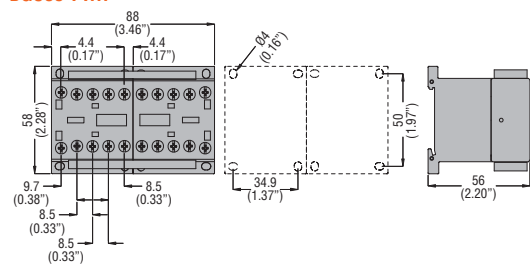


4 Electromechanical starters and enclosures

Dimensions [mm (in)]

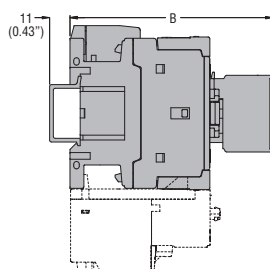
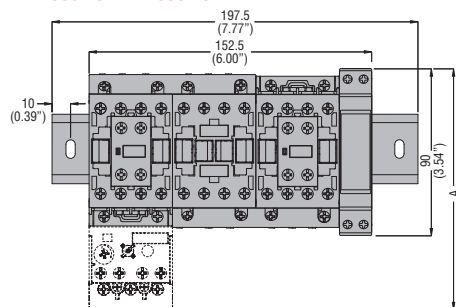
CHANGEOVER CONTACTOR ASSEMBLIES

BGC09 T4...



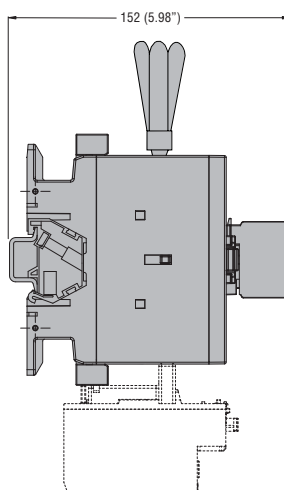
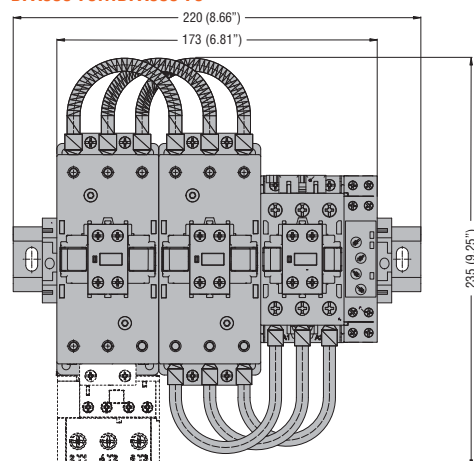
STAR-DELTA STARTERS OPEN FRAME

BFA009 70...BFA038 70

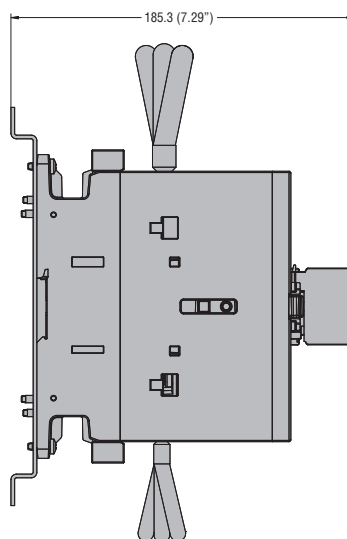
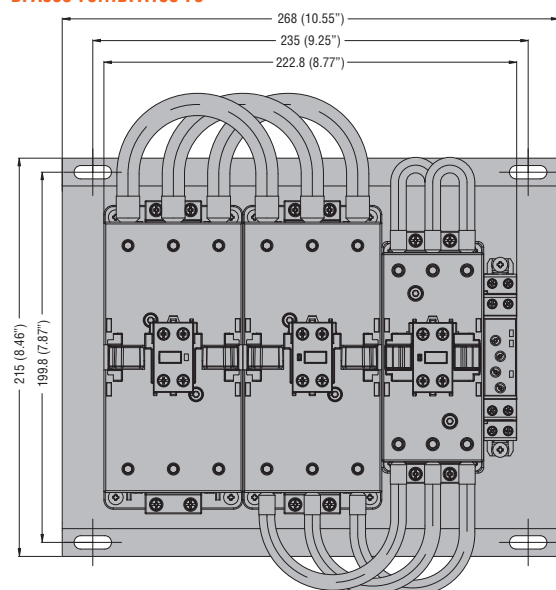


STARTER TYPE	A	B
BFA009 70	130.5 (5.14")	109.5 (4.31")
BFA012 70	130.5 (5.14")	109.5 (4.31")
BFA018 70	130.5 (5.14")	109.5 (4.31")
BFA025 70	130.5 (5.14")	109.5 (4.31")
BFA026 70	135 (5.14")	119 (4.68")
BFA032 70	135 (5.14")	119 (4.68")
BFA038 70	135 (5.14")	119 (4.68")

BFA050 70...BFA080 70



BFA095 70...BFA150 70

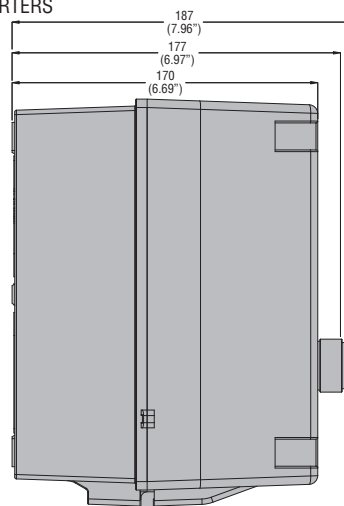
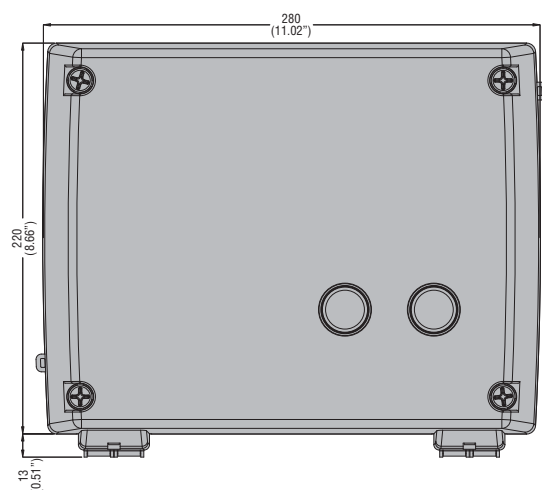


4 Electromechanical starters and enclosures

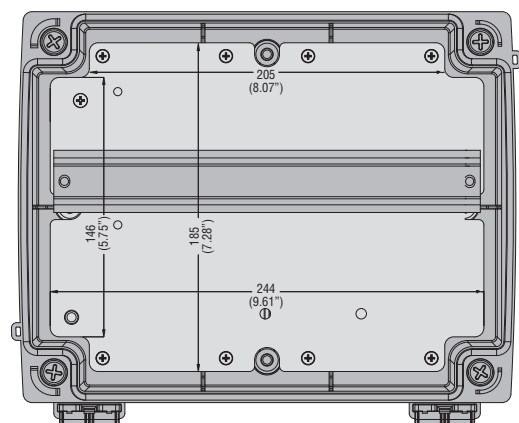
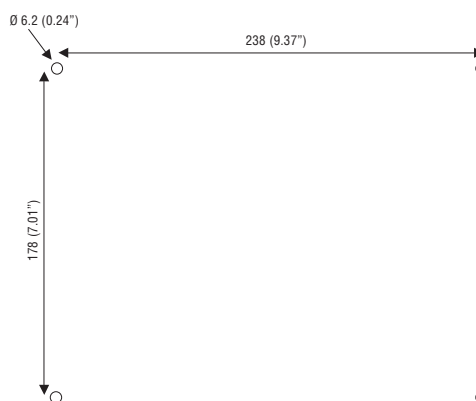
Dimensions [mm (in)]

STAR-DELTA STARTERS IN ENCLOSURE - EMPTY ENCLOSURE FOR STAR-DELTA STARTERS

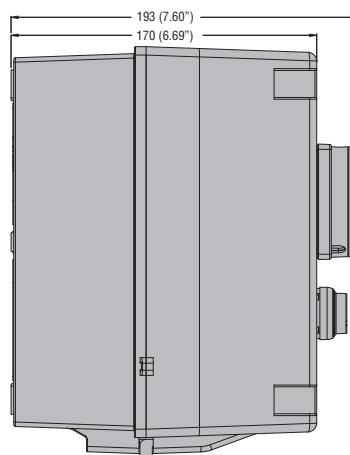
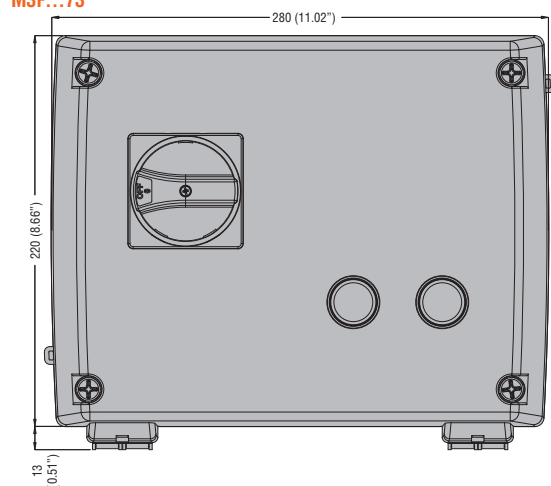
M3P...70 - M3 PA70



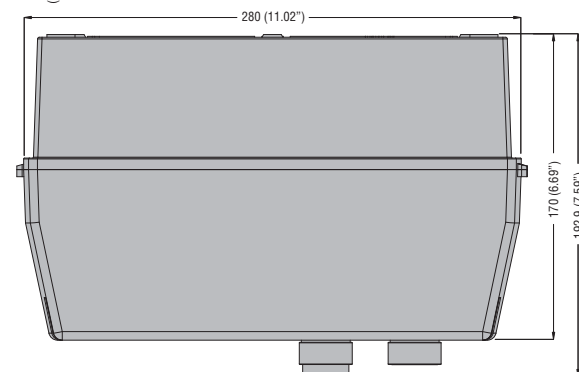
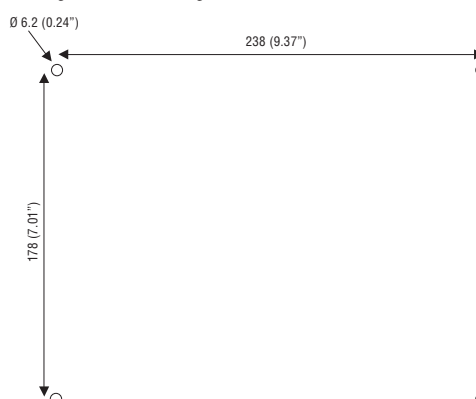
Drilling for surface fixing



M3P...73



Drilling for surface fixing



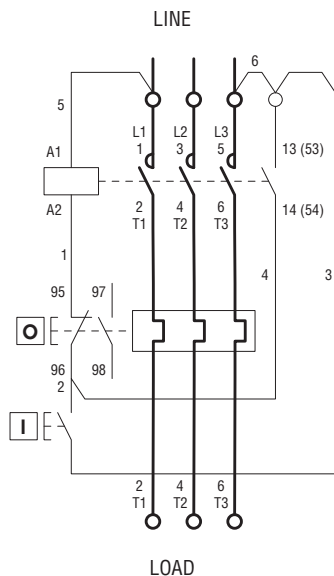
4 Electromechanical starters and enclosures

Wiring diagrams

DIRECT-ON-LINE STARTERS IN ENCLOSURE

M...P

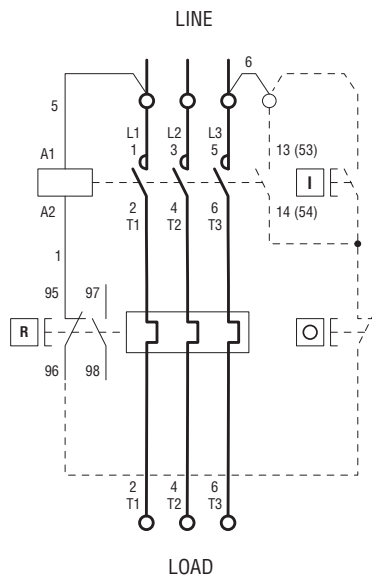
Diagram 1 - Incorporated button control for 3-phase motors



I = Start; O = Stop/Reset

M...R

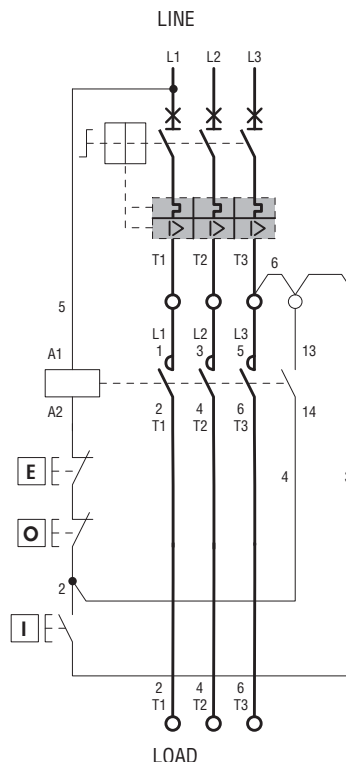
Diagram 2 - External button control for 3-phase motors



R = Reset; I = Start; O = Stop

M2 P00911...

Diagram 3 - Incorporated button control and rotary actuator for 3-phase motors



I = Start; O = Stop; E = Emergency Stop

Diagram 4 - Power connection for 1-phase motors

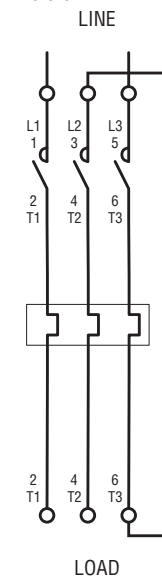


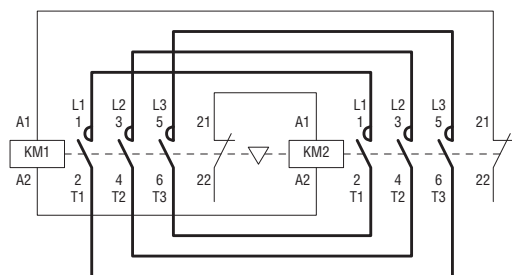
DIAGRAM 2:
Connect the eventual two-wire control (e.g. automatism) between terminal 3 of the contactor and terminal 96 of the thermal overload relay.

IMPORTANT

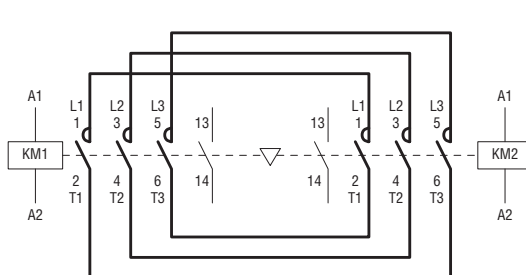
- Remove jumpers 5 and 6 and connect the auxiliary line to terminals A1 and 3 for a control circuit with a voltage value different than the supply.
- Remove jumper 5 and connect the neutral to terminal A1 for a control circuit between phase and neutral.
- SINGLE-PHASE SUPPLY
The main circuit must be configured according to Diagram 3 in the case of a single-phase line or motor.
- FUSES
A set of three fuses must be connected upstream of the starter in the event no appropriate protection is included in the system.

REVERSING CONTACTOR ASSEMBLY

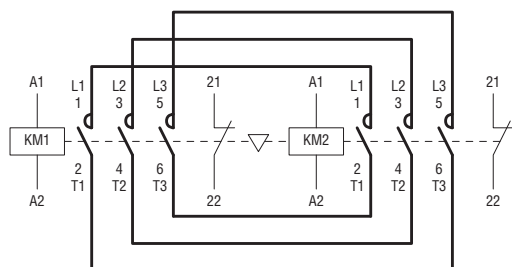
BGR...



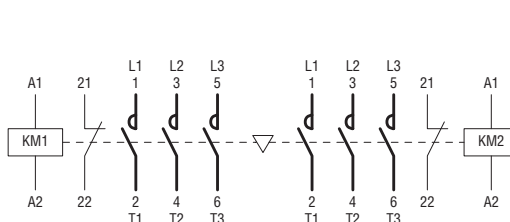
BGT...



BFA...42

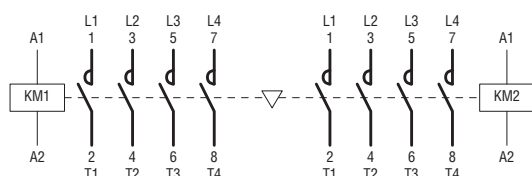


BGTP09...



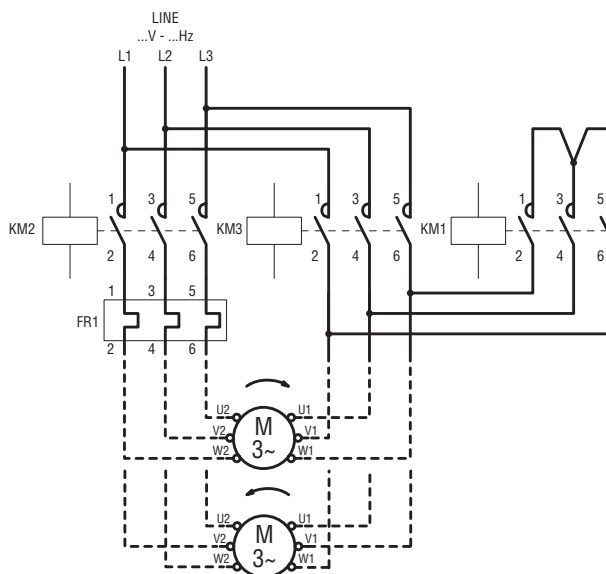
CHANGEOVER CONTACTOR ASSEMBLY

BGC09...

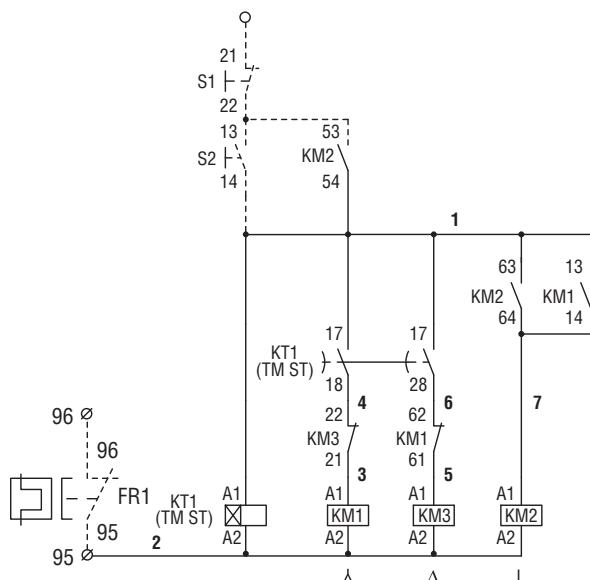


STAR-DELTA STARTERS, OPEN FRAME

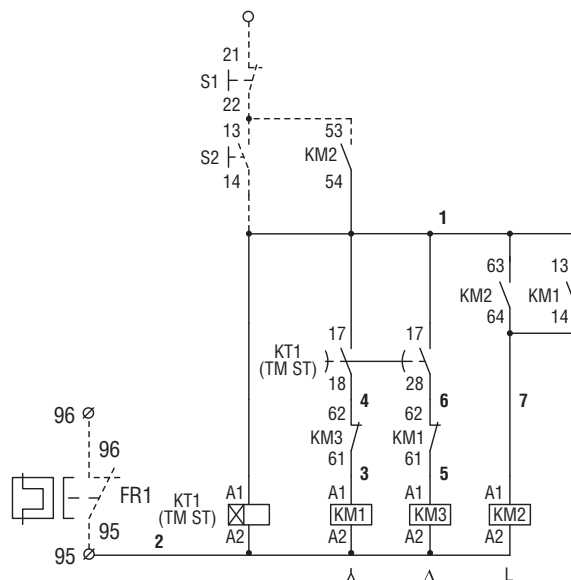
BFA009...038 70 - M3P009...038 70



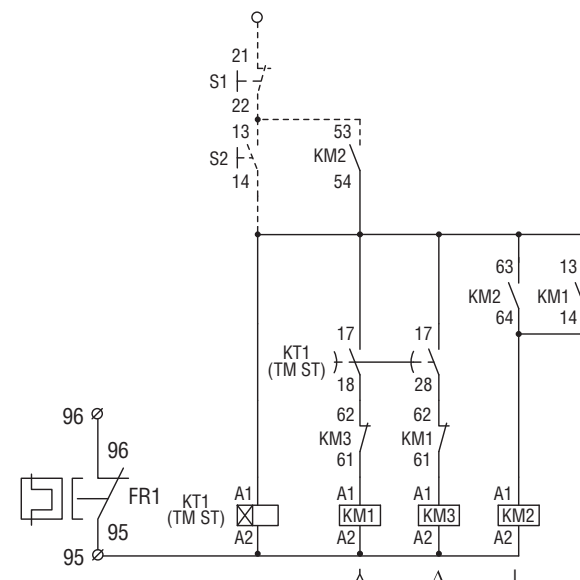
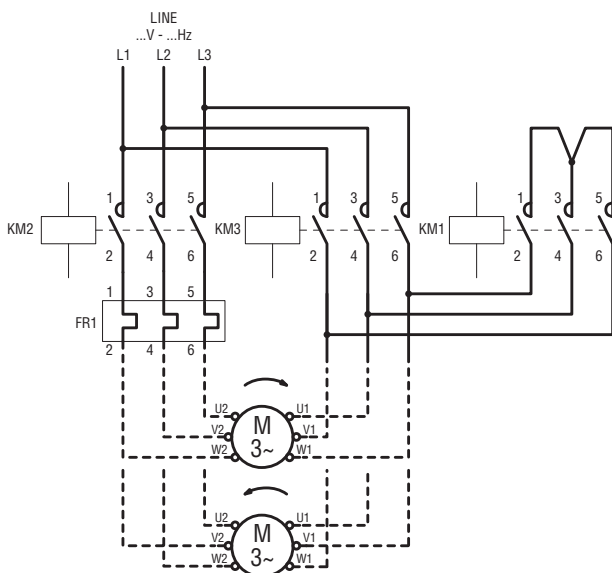
BFA009 70... BFA025 70
M3P009 70...M3P025 70



BFA26 70... - BFA038 70
M3P026 70...M3P038 70



BFA050...BFA150



4 Electromechanical starters and enclosures

Direct-on-line starters – Full voltage across the line.

Non reversing

RATINGS FOR USA AND CANADA.

Order code for magnetic motor starters in non-metallic enclosure with 2 push buttons	T/O RELAY ADJ RANGE [A]	MAX UL/CSA HP RATINGS INDICATED ON STARTER (based on t/o relay adj range)					
		Single phase		Three phase			
		120V	240V	200V	240V	480V	600V
M0P009 ¹ ² 1	0.6 - 1	-	-	-	-	½	½
M0P009 ¹ ² 1V5	0.9 - 1.5	-	-	-	-	¾	¾
M0P009 ¹ ² 2V3	1.4 - 2.3	-	-	-	½	1	1
M0P009 ¹ ² 33	2 - 3.3	-	¼	¾	1½	1½	2
M0P009 ¹ ² 5	3 - 5	-	½	1	1	3	3
M0P009 ¹ ² 75	4.5 - 7.5	-	¾	1½	2	5	5
M0P009 ¹ ² 10	6 - 10	½	1½	2	3	5	5
M0P012 ¹ ² 15	9 - 15	½	1½	3	3	7½	10
M1P009 ¹ ² A4	0.63 - 1	-	-	-	-	-	½
M1P009 ¹ ² A5	1 - 1.6	-	-	-	-	½	¾
M1P009 ¹ ² A6	1.6 - 2.5	-	-	½	½	1	1½
M1P009 ¹ ² A7	2.5 - 4	-	-	¾	¾	2	3
M1P009 ¹ ² A8	4 - 6.5	¼	½	1	1½	3	5
M1P009 ¹ ² A9	6.3 - 10	½	1½	2	3	5	7½
M1P009 ¹ ² B0	9 - 14	¾	2	3	3	5	7½
M1P012 ¹ ² B0	9 - 14	1	2	5	5	7½	10
M1P018 ¹ ² B1	13 - 18	1	3	5	5	10	15
M2P025 ¹ ² B2	17 - 23	1½	3	5	7½	15	15
M2P025 ¹ ² B3	20 - 25	2	3	7½	7½	15	15
M2P026 ¹ ² B2	17 - 23	1½	3	5	7½	15	20
M2P026 ¹ ² B3	20 - 25	2	5	7½	7½	15	20
M2P026 ¹ ² B4	24 - 32	2	5	7½	7½	15	20
M2P032 ¹ ² B4	24 - 32	3	7½	10	10	20	25
M25P038 ¹ ² B5	32 - 38	3	7½	10	15	30	30
M3P050 ¹ ² B6UL	35 - 50	5	10	15	20	40	40
M3P065 ¹ ² B7UL ³	46 - 65	-	-	20	25	50	60
M3P080 ¹ ² B8 ⁴	60 - 82	-	-	25 ⁴	30 ⁴	60 ⁴	75 ⁴

NOTE: The HP / FLA values vary from one motor to another; if possible, always verify the HP and FLA (or rated current) on the motor nameplate. Enclosure UL Type 1, 12, 4 and 4X industrial control environment for M1, M2, M25 and M3...UL versions; designation of control units can be:

N – without push buttons

R – with reset button only

P – per table, with start-stop push buttons.

Consult Technical support for any other combination required (e.g. with other type of contactors, contactor assemblies or definite-purpose version, different overload version or range, additional pilot lights, extra electrical or electronic elements); see contact details on inside front cover. Refer to ¹ below for specified standard configurations.

¹ Complete the order code by indicating:

– 10 if required without thermal overload relay

– 12 if required with three-phase overload relay

– 17 if required with disconnect switch for M2 and M3 types.

² Complete order code with coil voltage digit (if 50/60Hz) or with voltage digit followed by 60 (if 60Hz).

Standard voltages are as follows:

– AC 50/60Hz 024 / 048 / 110 / 230 / 400V

– AC 60Hz 024 60 / 048 60 / 120 60 / 220

60 / 230 60 / 460 60 /

575 60 (V).

³ Maximum UL ratings is 52A for motor control and 65A for general use.

⁴ No CSA or UL certification. Indicated values correspond to UL/CSA magnetic contactor ratings and for indication and reference purposes only.

Certifications obtained:

– CSA certified for Canada and USA (cCSAus - File 94157) as Magnetic Motor Controllers at max 600VAC, max 15HP per single phase, max 60HP three phase, max 125A with general purpose enclosure.

– UL Listed for USA and Canada (cULus - File E93602) as Magnetic Motor Controllers – Enclosed.



4 Electromechanical starters and enclosures

Typical full-load current values of single and three phase electric motors

THREE-PHASE POWER RATINGS		Rated motor current								
[HP]	[kW]	200V [A]	230V [A]	220-240V [A]	380-415V [A]	400V [A]	440-480V [A]	500V [A]	550-600V [A]	690V [A]
-	0.37	-	1.9	-	-	1.1	-	0.88	-	0.64
1/2	-	2.5	-	2.2	1.3	-	1.1	-	0.9	-
-	0.55	-	2.6	-	-	1.5	-	1.2	-	0.87
3/4	-	3.7	-	3.2	1.8	-	1.6	-	1.3	-
1	-	4.8	-	4.2	2.3	-	2.1	2	1.7	-
-	0.75	-	3.3	-	-	1.9	-	1.5	-	1.1
-	1.1	-	4.7	-	-	2.7	-	2.2	-	1.6
1-1/2	-	6.9	-	6	3.3	-	3	-	2.4	-
2	-	7.8	-	6.8	4.3	-	3.4	-	2.7	-
-	1.5	-	6.3	-	-	3.6	-	2.9	-	2.1
-	2.2	-	5.5	-	-	4.9	-	3.9	-	2.8
3	-	-	11.3	-	-	6.5	-	5.2	-	3.8
-	4	-	15	-	-	8.5	-	6.8	-	4.9
5	-	17.5	-	15.2	9.7	-	7.6	-	6.1	-
-	5.5	-	20	-	-	11.5	-	9.2	-	6.7
7-1/2	-	25.3	-	22	14	-	11	-	9	-
10	-	32.2	-	28	18	-	14	-	11	-
-	7.5	-	27	-	-	15.5	-	12.4	-	8.9
-	11	-	38	-	-	22	-	17.6	-	12.8
15	-	48	-	42	27	-	21	-	17	-
20	-	62.1	-	54	34	-	27	-	22	-
-	15	-	51	-	-	29	-	23	-	17
-	18.5	-	61	-	-	35	-	28	-	21
25	-	78.2	-	68	44	-	34	-	27	-
-	22	-	72	-	-	41	-	33	-	24
30	-	92	-	80	51	-	40	-	32	-
40	-	120	-	104	66	-	52	-	41	-
-	30	-	96	-	-	55	-	44	-	32
-	37	-	115	-	-	66	-	53	-	39
50	-	150	-	130	83	-	65	-	52	-
60	-	177	-	154	103	-	77	-	62	-
-	45	-	140	-	-	80	-	64	-	47
-	55	-	169	-	-	97	-	78	-	57
75	-	221	-	192	128	-	96	-	77	-
100	-	285	-	248	165	-	124	-	99	-
-	75	-	230	-	-	132	-	106	-	77
-	90	-	278	-	-	160	-	128	-	93
125	-	359	-	312	208	-	156	-	125	-
-	110	-	340	-	-	195	-	156	-	113
150	-	414	-	360	240	-	180	-	144	-
-	132	-	400	-	-	230	-	184	-	134
200	-	552	-	480	320	-	240	-	192	-
-	160	-	487	-	-	280	-	224	-	162
250	-	-	-	604	403	-	302	-	242	-
-	200	-	609	-	-	350	-	280	-	203
300	-	-	-	722	482	-	361	-	289	-
-	250	-	748	-	-	430	-	344	-	250
350	-	-	-	828	560	-	414	-	336	-
400	-	-	-	954	636	-	477	-	382	-
-	315	-	940	-	-	540	-	432	-	313
450	-	-	-	1030	-	-	515	-	412	-
-	355	-	1061	-	-	610	-	488	-	354
500	-	-	-	1180	786	-	590	-	472	-

SINGLE-PHASE POWER RATINGS		Rated motor current	
[HP]		[A] at 120V	[A] at 240V
1/10		3	1.5
1/8		3.8	1.9
1/6		4.4	2.2
1/4		5.8	2.9
1/3		7.2	3.6
1/2		9.8	4.9
3/4		12.8	6.9
1		16	8
1-1/2		20	10
2		24	12
3		34	17
5		56	28
7-1/2		80	40
10		100	50
15		135	68

The information in the chart has been obtained from the IEC/EN 60947-4-1 standards. The kW ratings are preferred rated values according to IEC 60072-1 (primary series) at 50/60Hz while Horsepower and corresponding current values are according to UL 508 Industrial Control Standard at 60Hz.

The full load current values listed are for motors running at standard speeds with normal torque characteristics. Motors which are non-standard, such as low speed, high torque or other special applications may have higher full load currents.

Caution: For accurate and reliable motor protection, motor nameplate current should be used to obtain actual motor full load amps for all motors. The information given is for indication and reference purposes only.