



- 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 80A 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

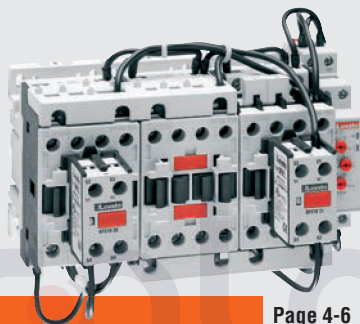
- For three-phase motor control 9...25A 440V / 4...12.5kW 400V, in IEC AC3 duty and up to 15HP 600V per UL/CSA
- Versions with built-in or external mechanical interlock
- Complete with rigid connections
- PCB version 9A 440V / 4kW 400V in IEC AC3 duty; 5HP 300V per UL/CSA.



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CHANGEOVER CONTACTOR ASSEMBLIES

- From 20A to 165A 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...225A 440V / 7.5kW...132kW 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



MOP...12



MOR...12



M1P...12



M1R...12



M2P...12



M2R...12



M25P03812



M25R03812



M3P...12



M3R...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 [Ⓜ]						
M0P0091201	0.6-1	1	0.18-0.25	1	0.760	
M0P0091201V5	0.9-1.5	1.5	0.37	1	0.760	
M0P0091202V3	1.4-2.3	2.3	0.55-0.75	1	0.760	
M0P00912033	2-3.3	3.3	1.1	1	0.760	
M0P0091205	3-5	5	1.5-2.2	1	0.760	
M0P00912075	4.5-7.5	7.5	2.2-3	1	0.760	
M0P00912010	6-10	10	3-4	1	0.760	
M0P01212015	9-15	12	5.5	1	0.760	
M1P009120A4	0.63-1	1	0.25	1	1.040	
M1P009120A5	1-1.6	1.6	0.37-0.55	1	1.040	
M1P009120A6	1.6-2.5	2.5	0.75	1	1.040	
M1P009120A7	2.5-4	4	1.1-1.5	1	1.040	
M1P009120A8	4-6.5	6.5	2.2-3	1	1.040	
M1P009120A9	6.3-10	10	3-4	1	1.040	
M1P009120B0	9-14	13	5.5	1	1.040	
M1P018120B1	13-18	18	7.5	1	1.040	
M2P025120B2	17-23	23	11	1	1.220	
M2P025120B3	20-25	25	11	1	1.220	
M2P032120B4	24-32	32	15	1	1.300	
M25P038120B5	32-38	38	18.5	1	2.880	
M3P050120B6	35-50	50	18.5-22	1	3.760	
M3P065120B7	46-65	65	30	1	3.760	
M3P080120B8	60-82	80	37-45	1	3.760	

Starters with Reset pushbuttons [Ⓜ]						
M0R0091201	0.6-1	1	0.18-0.25	1	0.720	
M0R0091201V5	0.9-1.5	1.5	0.37	1	0.720	
M0R0091202V3	1.4-2.3	2.3	0.55-0.75	1	0.720	
M0R00912033	2-3.3	3.3	1.1	1	0.720	
M0R0091205	3-5	5	1.5-2.2	1	0.720	
M0R00912075	4.5-7.5	7.5	2.2-3	1	0.720	
M0R00912010	6-10	10	3-4	1	0.720	
M0R01212015	9-15	12	5.5	1	0.720	
M1R009120A4	0.63-1	1	0.25	1	0.995	
M1R009120A5	1-1.6	1.6	0.37-0.55	1	0.995	
M1R009120A6	1.6-2.5	2.5	0.75	1	0.995	
M1R009120A7	2.5-4	4	1.1-1.5	1	0.995	
M1R009120A8	4-6.5	6.5	2.2-3	1	0.995	
M1R009120A9	6.3-10	10	3-4	1	0.995	
M1R009120B0	9-14	13	5.5	1	0.995	
M1R018120B1	13-18	18	7.5	1	0.995	
M2R025120B2	17-23	23	11	1	1.165	
M2R025120B3	20-25	25	11	1	1.165	
M2R032120B4	24-32	32	15	1	1.260	
M25R038120B5	32-38	38	18.5	1	2.600	
M3R050120B6	35-50	50	18.5-22	1	3.410	
M3R065120B7	46-65	65	30	1	3.410	
M3R080120B8	60-82	80	37-45	1	3.410	

[Ⓜ] 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: M0R009120241 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.
M0P00912024601 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.

[Ⓜ] Protection fuses are to be mounted externally by the user.

Components

Starter enclosure	Contactor	Thermal relay	Auxiliary contact block
MOPA	BG0910A	RF91	—
MOPA	BG0910A	RF91V5	—
MOPA	BG0910A	RF92V3	—
MOPA	BG0910A	RF933	—
MOPA	BG0910A	RF95	—
MOPA	BG0910A	RF975	—
MOPA	BG0910A	RF910	—
MOPA	BG1210A	RF915	—
M1PA	BF0910A	RF380100	—
M1PA	BF0910A	RF380160	—
M1PA	BF0910A	RF380250	—
M1PA	BF0910A	RF380400	—
M1PA	BF0910A	RF380650	—
M1PA	BF0910A	RF381000	—
M1PA	BF0910A	RF381400	—
M1PA	BF1810A	RF381800	—
M2PA	BF2510A	RF382300	—
M2PA	BF2510A	RF382500	—
M2PA	BF3200A	RF383200	G41810
M25PA	BF3800A	RF383800	G41810
M3PA	BF5000A	RF825000	G41810
M3PA	BF6500A	RF826500	G41810
M3PA	BF8000A	RF828200	G41810
MORA	BG0910A	RF91	—
MORA	BG0910A	RF91V5	—
MORA	BG0910A	RF92V3	—
MORA	BG0910A	RF933	—
MORA	BG0910A	RF95	—
MORA	BG0910A	RF975	—
MORA	BG0910A	RF910	—
MORA	BG1210A	RF915	—
M1RA	BF0910A	RF380100	—
M1RA	BF0910A	RF380160	—
M1RA	BF0910A	RF380250	—
M1RA	BF0910A	RF380400	—
M1RA	BF0910A	RF380650	—
M1RA	BF0910A	RF381000	—
M1RA	BF0910A	RF381400	—
M1RA	BF1810A	RF381800	—
M2RA	BF2510A	RF382300	—
M2RA	BF2510A	RF382500	—
M2RA	BF3200A	RF383200	G41810
M25RA	BF3800A	RF383800	G41810
M3RA	BF5000A	RF825000	G41810
M3RA	BF6500A	RF826500	G41810
M3RA	BF8000A	RF828200	G41810

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 4-24.

4 Electromechanical starters and enclosures

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

Enclosed without thermal overload relay



MOP...10 MOR...10



M1P...10 M1R...10



M2P...10 M2R...10



M25P03810



M25R03810



M3P...10



M3R...10

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

Starters with Start and Stop/Reset pushbuttons ②.

M0P00910②	10	1	0.667
M0P01210②	12	1	0.667

M1P00910②	13	1	0.910
M1P01810②	18	1	0.910

M2P02510②	25	1	1.060
M2P03210②	32	1	1.162

M25P03810②	38	1	2.360
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M3P05010②	50	1	3.110
M3P06510②	65	1	3.110
M3P08010②	80	1	3.110

Starters with Reset pushbutton ②.

M0R00910②	10	1	0.627
M0R01210②	12	1	0.627

M1R00910②	13	1	0.867
M1R01810②	18	1	0.867

M2R02510②	25	1	1.020
M2R03210②	32	1	1.110

M25R03810②	38	1	2.320
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M3R05010②	50	1	3.070
M3R06510②	65	1	3.070
M3R08010②	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: MOR009100241 for direct-on-line starter in M0 type enclosure with Reset button, 9A /AC3 contactor with 24VAC 50/60Hz coil. MOP00910024601 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
-------------------------------------	-----------------------------	--------------------------------------	-------------------------------------

M0PA	BG0910A	RF9②	—
M0PA	BG1210A	RF9②	—

M1PA	BF0910A	RF38④	—
M1PA	BF1810A	RF38④	—

M2PA	BF2510A	RF38④	—
M2PA	BF3200A	RF38④	G41810

M25PA	BF3800A	RF38④	G41810
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M3PA	BF5000A	RF82⑤	G41810
M3PA	BF6500A	RF82⑤	G41810
M3PA	BF8000A	RF82⑤	G41810

M0RA	BG0910A	RF9②	—
M0RA	BG1210A	RF9②	—

M1RA	BF0910A	RF38④	—
M1RA	BF1810A	RF38④	—

M2RA	BF2510A	RF38④	—
M2RA	BF3200A	RF38④	G41810

M25RA	BF3800A	RF38④	G41810
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M3RA	BF5000A	RF82⑤	G41810
M3RA	BF6500A	RF82⑤	G41810
M3RA	BF8000A	RF82⑤	G41810

② For thermal overload relay selection, refer to pages 3-2 or 3-3.
④ For thermal overload relay selection, refer to pages 3-4.
⑤ 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: IEC 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. M3P05010024**UL**.

UL/CSA HP ratings

See page 4-24.

Certifications and compliance

Certifications obtained: 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; EAC for all. Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 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



M2P00911....

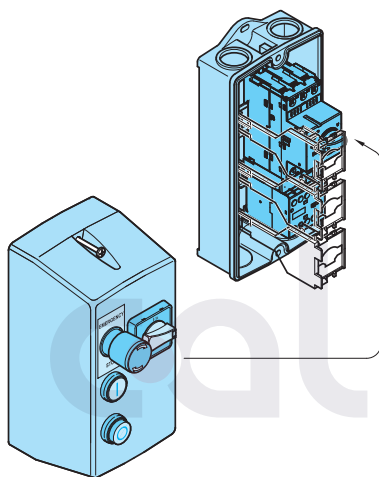
Order code	Thermal trip adjustment range	IEC technical characteristics (≤440V)		Qty per pkg	Wt
		I _e [A]	kW		
M2P009110A4	0.63-1	1	0.25	1	1.450
M2P009110A5	1-1.6	1.6	0.37-0.55	1	1.450
M2P009110A6	1.6-2.5	2.5	0.75	1	1.515
M2P009110A7	2.5-4	4	1.1-1.5	1	1.515
M2P009110A8	4-6.5	6.5	2.2-3	1	1.515
M2P009110A9	6.3-10	10	3-5	1	1.515
M2P009110B0	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: M2P00911400A8 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

M2P00911... is ideal for starting applications on small machines. It is robust and fully functional for machine control: start, stop, emergency stop, overload protection, short circuit protection and disconnection (insulation function), padlockable in OFF position.

General characteristics

The M2P00911... 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, with door coupling function.

These starters are easily and quickly installed. 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.

Certifications and compliance

Certifications obtained: EAC.

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



4 Electromechanical starters and enclosures

Reversing and changeover contactor assemblies

Reversing contactor



11BGR...



BFA...



11BGT...



11BGT...

Changeover contactor assemblies 4 poles



11BGC09 ...

new



BFC150T4A230

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

AC COIL.
Terminals: clamp screw.
External interlock with power and auxiliary wiring.

11BGR0901A	9	4	0	1	1	0.394
11BGR1201A	12	5.7	0	1	1	0.394
BFA00942	9	4.2	0	1	1	0.760
BFA01242	12	5.7	0	1	1	0.760
BFA01842	18	7.5	0	1	1	0.760
BFA02542	25	12.5	0	1	1	0.760

Built-in interlock with power wiring only.

11BGT0910A	9	4	1	0	1	0.380
11BGT1210A	12	5.7	1	0	1	0.380

Rear terminals: PCB solder pins.
Built-in interlock only.

11BGT0901A	9	4	0	1	1	0.400
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DC COIL.
Terminals: clamp screw.
External interlock with power and auxiliary wiring.

11BGR0901D	9	4	0	1	1	0.460
11BGR1201D	12	5.7	0	1	1	0.460

Built-in interlock with power wiring only.

11BGT0910D	9	4	1	0	1	0.445
11BGT1210D	12	5.7	1	0	1	0.445

Rear terminals: PCB solder pins.
Built-in interlock only.

11BGT0901D	9	4	0	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.

11BGC09T4A	20	18	15	20	1	0.365
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AC COIL 230V 50/60HZ.
Terminals: screw.
Side mount mechanical interlock with 2NC contacts.

BFC18T4A230	32	26	23	1	0.786
BFC38T4A230	56	45	40	1	1.068
BFC80T4A230	115	95	80	1	2.532
BFC95T4A230	140	115	100	1	4.892
BFC150T4A230	165	135	118	1	4.892

DC COIL.
Terminals: clamp screw.
Built-in interlock only.

11BGC09T4D	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 02460 / 04860 / 12060 / 22060 / 23060 / 46060 / 57560 (V).
Example: 11BGR0901A024 for reversing contactor assembly with 2 mini-contactors BG09 having 1 NC auxiliary contact each and 24VAC 50/60Hz coil.
11BGR0901A02460 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: 11BGC09T4D012 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 inside front 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 BGX5000, 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, external mechanical interlock BFX5002 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 4 POLES

Supplied complete, ready for quick mounting as follows:

11BGC... with built-in mechanical interlock, BFC... with side mounting mechanical interlock including NC contacts for electrical interlock. The changeover contactor assemblies are made with four-pole contactors.

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	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	-
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 2-18 and page 2-20.

Special add-on auxiliary contacts 11BGX1111 or 11BGX1112 must be used on the left-side contactor of the BGT reversing assemblies. For the right-side contactor, normal 11BGX10... 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.

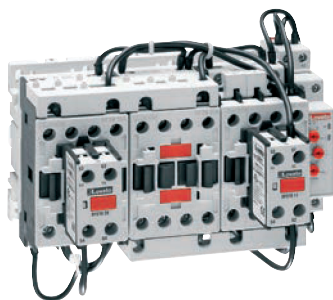
Compliant with standards UL 60947-1, UL 60947-4-1, IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.



4 Electromechanical starters and enclosures

Star-delta starters

Open frame



BFA009...BFA025

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

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

BFA0097000	16	No	1	1.700
BFA0127000	22	No	1	1.700
BFA0187000	28	No	1	1.700
BFA0257000	35	No	1	1.800
BFA0267000	43	No	1	1.800
BFA0327000	50	No	1	1.900
BFA0387000	60	No	1	1.900
BFA0507000	85	No	1	5.200
BFA0657000	110	No	1	5.200
BFA0807000	140	No	1	6.265
BFA0957000	160	No	1	6.900
BFA1157000	195	No	1	7.500
BFA1507000	225	No	1	7.500

Thermal relay adjustment range

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

Example: Ie=100A; 58% Ie=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 [kW]	400V [kW]	440V [kW]	500V [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

- 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: BFA00970024 for BFA009 star-delta starter with 24VAC 50/60Hz power supply.

BFA0097002460 for BFA009 star-delta starter with 24VAC 60Hz power supply.

- 2 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.
- 3 TMST with auxiliary supply 24...240VAC. TMSTA440 with auxiliary supply 380...440VAC.
- 4 For motors with rated current >115A connect the line side with 50mm² wires crimped with pin terminals or with 2x25mm² wires connected in parallel.
- 5 For motors with rated current >175A connect the line side with insulated flexible copper bars or with 2x35mm² 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 inside front cover.

Components

Starter	Contactors			Thermal overload relay	Time relay	Auxiliary contacts fitted on contactor:			Rigid connections
	Line	Delta	Star			Line	Delta	Star	
BFA00970	BF0910A	BF0901A	BF0910A	RF38	TMST	BFX1020	—	BFX1011	BFX3131
BFA01270	BF1210A	BF1201A	BF0910A	RF38	TMST	BFX1020	—	BFX1011	BFX3131
BFA01870	BF1810A	BF1801A	BF1210A	RF38	TMST	BFX1020	—	BFX1011	BFX3131
BFA02570	BF2510A	BF2501A	BF1810A	RF38	TMST	BFX1020	—	BFX1011	BFX3131
BFA02670	BF2600A	BF2600A	BF1810A	RF38	TMST	BFX1020	BFX1011	BFX1011	BFX3232
BFA03270	BF3200A	BF3200A	BF2510A	RF38	TMST	BFX1020	BFX1011	BFX1011	BFX3232
BFA03870	BF3800A	BF3800A	BF2510A	RF38	TMST	BFX1020	BFX1011	BFX1011	BFX3232
BFA05070	BF5000A	BF5000A	BF32 00A	RF82	TMST	BFX1020	BFX1011	BFX1011	BFX3332
BFA06570	BF6500A	BF6500A	BF3200A	RF82	TMST	BFX1020	BFX1011	BFX1011	BFX3332
BFA08070	BF8000A	BF8000A	BF5000A	RF82	TMST	BFX1020	BFX1011	BFX1011	BFX3331
BFA09570	BF9500A	BF9500A	BF6500A	RF110	TMST	BFX1020	BFX1011	BFX1011	BFX3432
BFA11570	BF11500A	BF11500A	BF8000A	RF200	TMST	BFX1020	BFX1011	BFX1011	BFX3432
BFA15070	BF15000A	BF15000A	BF8000A	RF200	TMST	BFX1020	BFX1011	BFX1011	BFX3432

Certifications and compliance

Certifications obtained: EAC.

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



4 Electromechanical starters and enclosures

Enclosed star-delta starters.
Non-metallic enclosure for starters

Enclosed starters



M3P...70... - M3PA70



M3P...73...

- 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: M3P00970024 for M3P009 star-delta starter with 24VAC 50/60Hz power supply.
M3P0097002460 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 TMST with auxiliary supply 24...240VAC;
TMSTA440 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 inside front cover.

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

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

M3P0097002	16	1	3.540
M3P0127002	22	1	3.540
M3P0187002	28	1	3.540
M3P0257002	35	1	3.650
M3P0267002	43	1	3.650
M3P0327002	50	1	3.800
M3P0387002	60	1	3.800

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

M3P0097302	16	1	3.700
M3P0127302	22	1	3.700
M3P0187302	28	1	3.700
M3P0257302	35	1	3.800
M3P0267302	43	1	3.800
M3P0327302	50	1	4.300
M3P0387302	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.

M3PA70 ⑥	—	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.

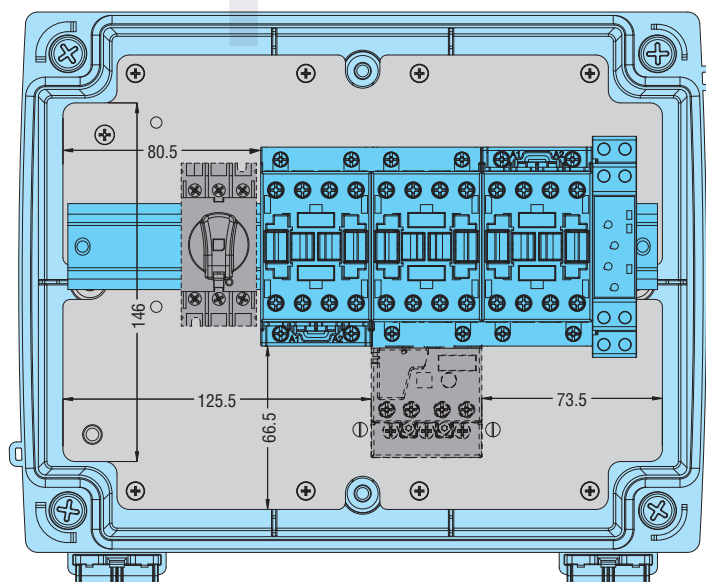
Add suffix **UL** to the order code, e.g. M3PA70UL.

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/BS 60947-1, IEC/EN/BS 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	Handle ⑥	Shaft ⑦
		Line	Delta	Star			Line	Delta	Star				
M3P00970/73	M3PA70	BF0910A	BF0901A	BF0910A	RF38	TMST④	BFX1020	—	BFX1011	BFX3131	GA016A	GAX61	GAX7150
M3P01270/73	M3PA70	BF1210A	BF1201A	BF0910A	RF38	TMST④	BFX1020	—	BFX1011	BFX3131	GA025A	GAX61	GAX7150
M3P01870/73	M3PA70	BF1810A	BF1801A	BF1210A	RF38	TMST④	BFX1020	—	BFX1011	BFX3131	GA032A	GAX61	GAX7150
M3P02570/73	M3PA70	BF2510A	BF2501A	BF1810A	RF38	TMST④	BFX1020	—	BFX1011	BFX3131	GA040A	GAX61	GAX7150
M3P02670/73	M3PA70	BF2600A	BF2600A	BF1810A	RF38	TMST④	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150
M3P03270/73	M3PA70	BF3200A	BF3200A	BF2510A	RF38	TMST④	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150
M3P03870/73	M3PA70	BF3800A	BF3800A	BF2510A	RF38	TMST④	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150

⑥ 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

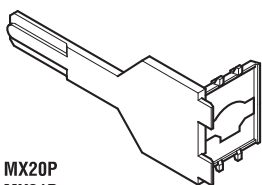
Order code	Contacteur type ①	Thermal relay ②	Degree of protection	Qty per pkg n°	Wt [kg]
Enclosures with Start-Stop/Reset pushbuttons.					
M0PA	BG06, BG09, BG12	RF9	IP65	1	0.490
M1PA	BF09A, BF12A, BF18A	RF38	IP65	1	0.545
M2PA	BF09A, BF12A, BF18A	RF38	IP65	1	0.715
M25PA Ⓞ	BF26A, BF32A	RF38	IP65	1	0.990
M3PA Ⓞ	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	BF09A, BF12A, BF18A	RF38	IP65	1	0.670
M25RA Ⓞ	BF26A, BF32A	RF38	IP65	1	0.970
M3RA Ⓞ	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	BF09A, BF12A, BF18A	RF38	IP65	1	0.640
M24N ⓄⓄ	BG06...BG12 BF09A...BF25A	Ⓞ	IP65	1	0.625
M25N Ⓞ	BF09A, BF12A, BF18A, BF26A, BF32A	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 2-6 for contactor choice.
- ② To be purchased separately.
Refer to pages 3-2 to 9 for thermal overload relay choice.
For use of the overload relay in the M24N, consult Technical support; see contact details on inside front cover.
- Ⓞ MX31 metal mounting plate included.
- Ⓞ MX30 metal mounting plate included.
- Ⓞ To install eventual pushbuttons, selectors and/or other control accessories, use the **PLatinum** series and mount the relay contact elements on the cover using the LPXAU120 mounting adapter. See section 7.

Accessories and spare parts



MX20P
MX21P

Order code	Description	Qty per pkg n°	Wt [kg]
MX01	Threaded plug for unused holes, grey RAL7035	10	0.007
MX10P	Stop/Reset button extension rod for M0 enclosure	5	0.010
MX11P	Stop/Reset button extension rod for M1 enclosure	5	0.010
MX12P	Stop/Reset button extension rod for M2, M25 enclosures	5	0.010
MX20P	Mounting base for LPX C... contact on M0 enclosure	5	0.014
MX21P	Mounting base for LPX C... contact on M1, M2, M25 enclosures	5	0.014
MX30	Metal mounting plate for M3N	1	0.500
MX31	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 (≤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							
		M0PA	M1PA	M2PA	M25PA	M0RA	M1RA	M2RA	M25RA
Contact holder	MX20P MX21P	1							
Buttons:	LPCB1176					1	1	1	1
- Stop/Reset	LPCB2104	1	1	1	1				
- Start	LPCB1113	1	1	1	1				
Contact for Start button	LPXC10	1	1	1	1				
Stop/Reset button extension	MX10P MX11P MX12P	1				1		1	
Unused hole threaded plug	MX01					1	1	1	1

- M3PA enclosure: 2 Start and Stop/Reset pushbuttons and 1 MX30 mounting plate
- M3RA 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

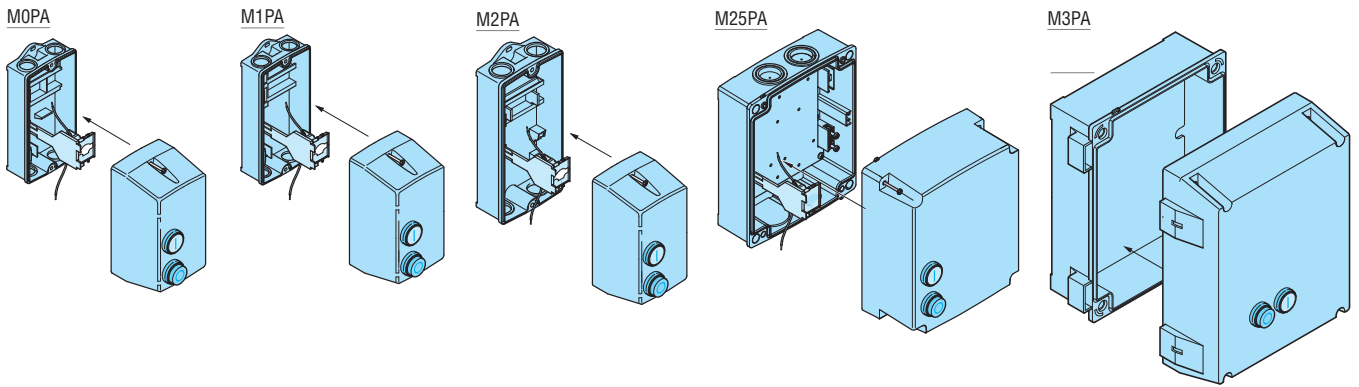
Certifications obtained: EAC for all; for M3NUL type, UL Listed for USA and Canada (cULus - File E300050) as Industrial control panels; for M0/M1/M2PA/RA/N and other M3...UL types, UL Listed for USA and Canada (cULus - File E93602) under magnetic motor controllers as Polymeric enclosures - and CSA certified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



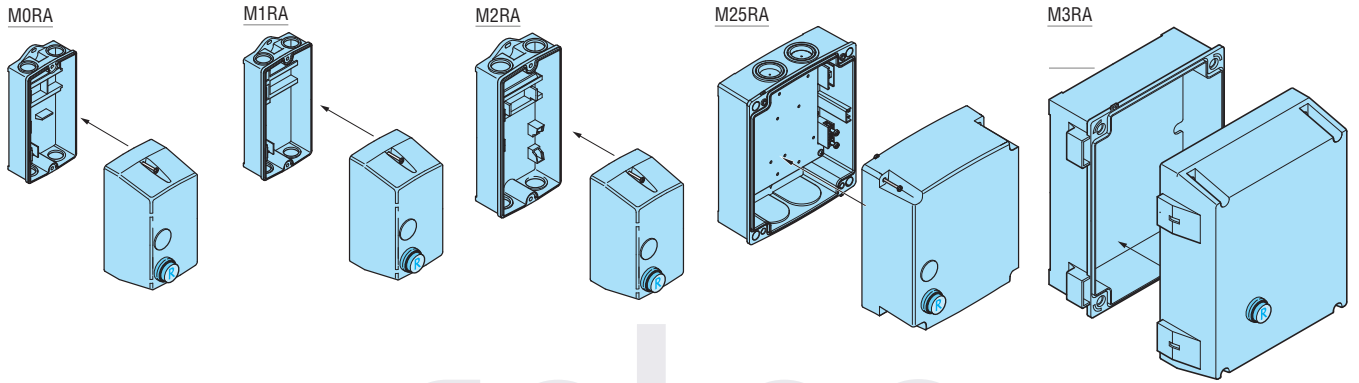
4 Electromechanical starters and enclosures

Empty non-metallic enclosures

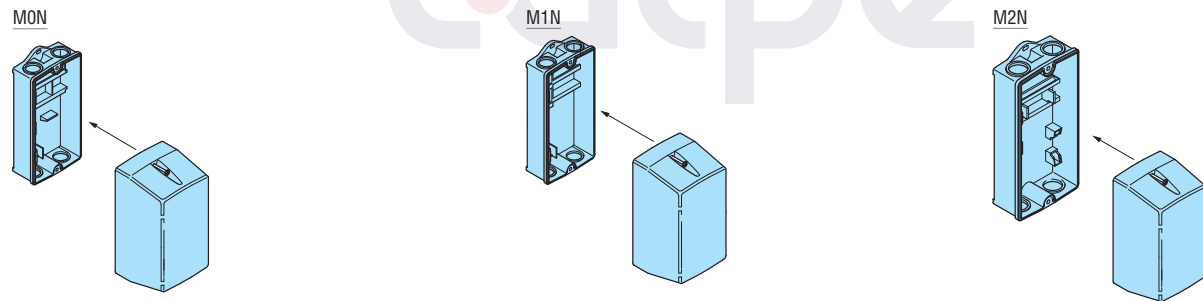
M...PA EMPTY ENCLOSURES



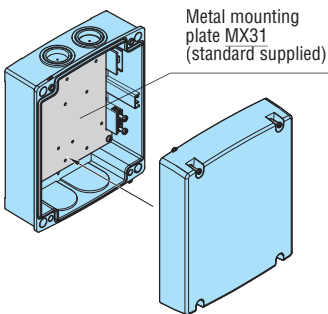
M...RA EMPTY ENCLOSURES



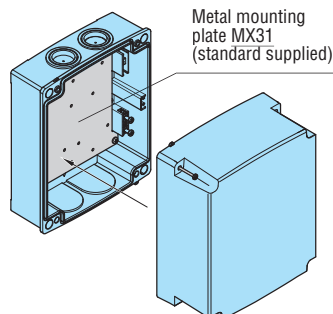
M...N EMPTY ENCLOSURES



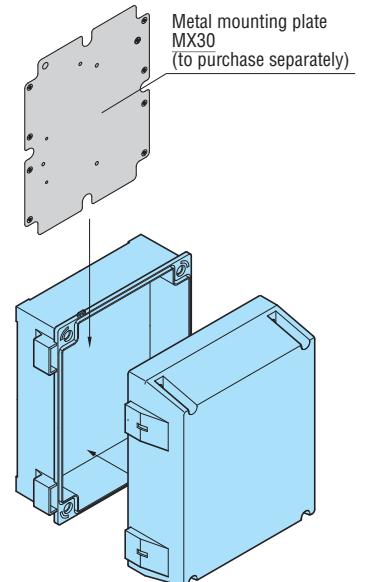
M24N



M25N



M3N



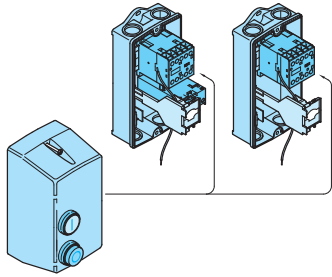


4 Electromechanical starters and enclosures

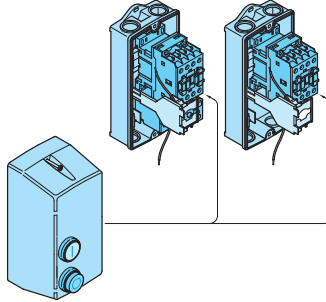
Direct-on-line starters - Full voltage across the line.
Non reversing three phase

M...P... STARTERS, ENCLOSED

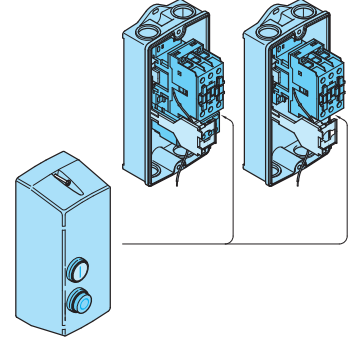
MOP00912... MOP01212...
MOP00910... MOP01210...



M1P00912... M1P01812...
M1P00910... M1P01810...

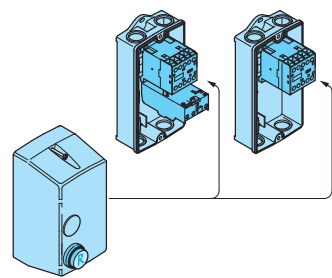


M2P02512... M2P03212...
M2P02510... M2P03210...

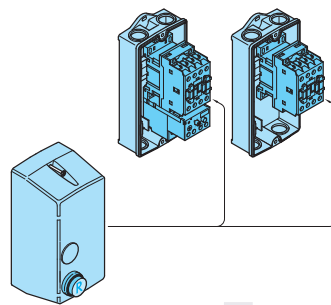


M...R... STARTERS, ENCLOSED

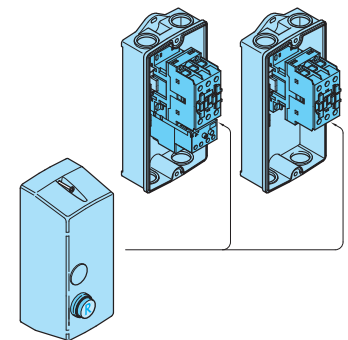
MOR00912... MOR01212...
MOR00910... MOR01210...



M1R00912... M1R01812...
M1R00910... M1R01810...

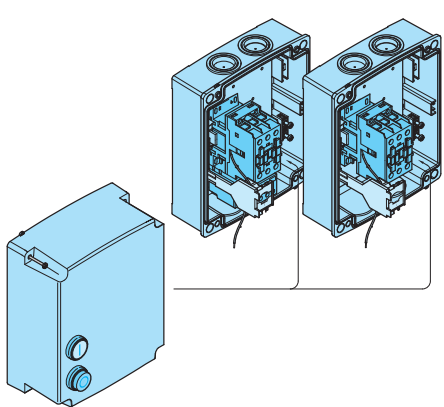


M2R02512... M2R03212...
M2R02510... M2R03210...

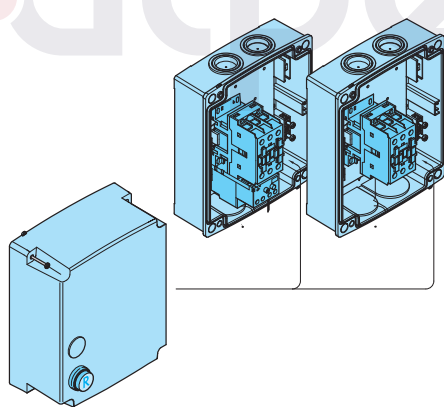


M25... STARTERS, ENCLOSED

M25P03812... M25P03810...

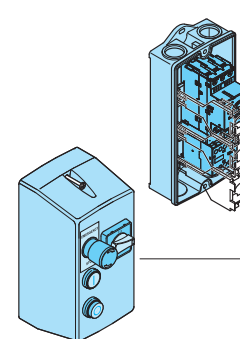


M25R03812... M25R03810...



M2... STARTERS, ENCLOSED

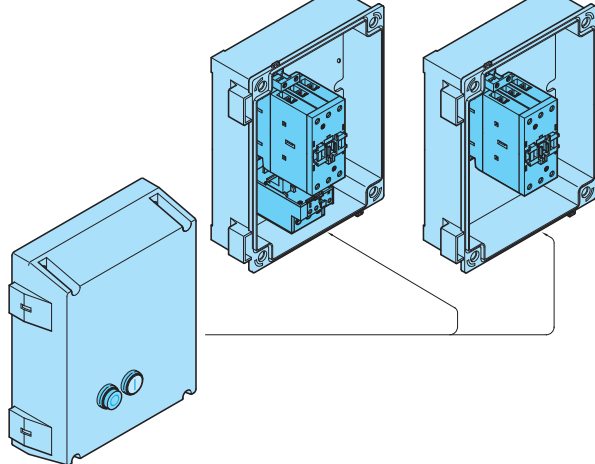
M2P00911



M3... STARTERS, ENCLOSED

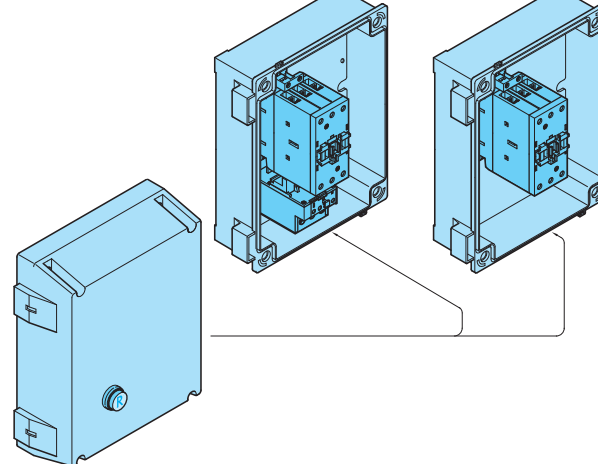
M3P05012... to M3P09512...

M3P05010... to M3P09510...



M3R05012... to M3R09512...

M3R05010... to M3R09510...



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 LPCZS... pilot light can be fitted.

To fit the LPL... pilot light head, the mounting base, type MX20P for M0 enclosure or type MX21P 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 LPCZS...

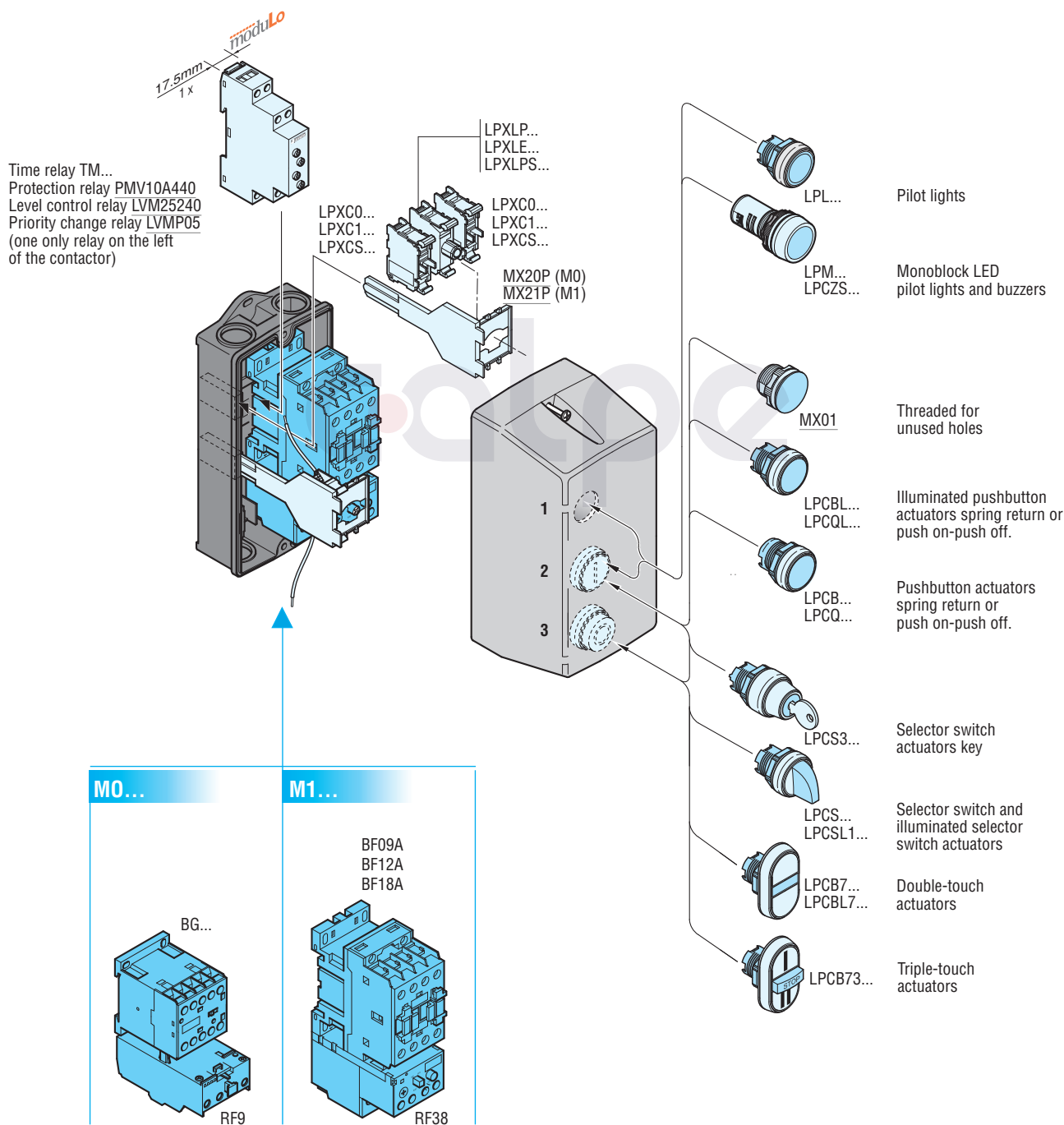
2) Middle position 2

Based on the enclosure type, in this position, the user finds either the Start button or threaded plug. Various **PLatinum** (plastic series) 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 MX20 for M0 enclosure, or type MX21P 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 LPCZS...

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 MX01.



4 Electromechanical starters and enclosures

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 (plastic series) can be used and contact or LED elements can be mounted directly inside on the cover with the LPXAU120 mounting adapter; refer to section 7.

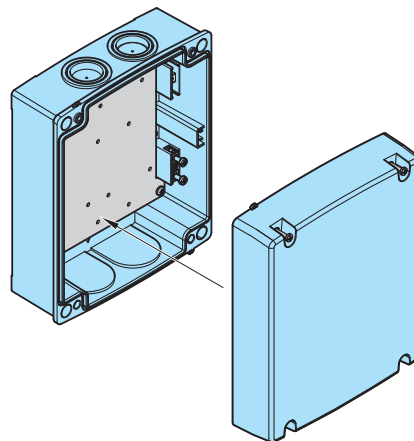
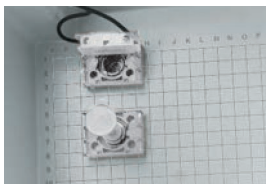
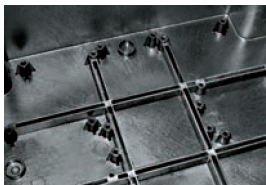
MX31 internal metal mounting plate is standard-supplied.

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).

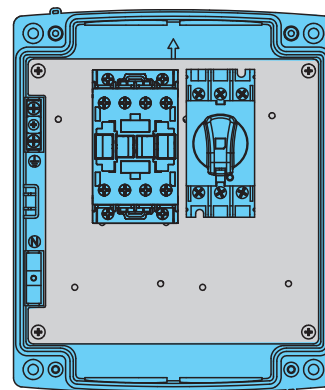
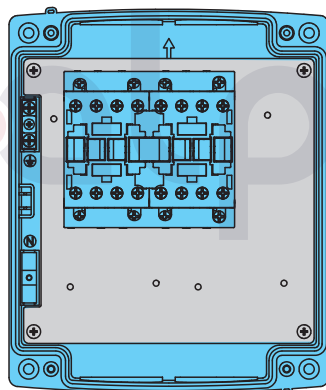
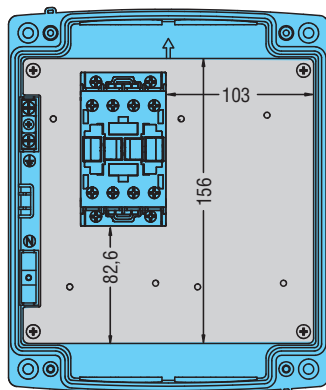
The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

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	M24N	M24N	M24N
BG06 BG09 BG12 without overload	BF09A...BF25A without overload	BGR... - BGT... - BGC... without overload n° 2 BF09A n° 2 BF12A n° 2 BF18A n° 2 BF25A All without overload BFA...42 without overload	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** (plastic series) can be used and contact or LED elements can be mounted directly inside on the cover with the LPXAU120 mounting adapter; refer to section 7.

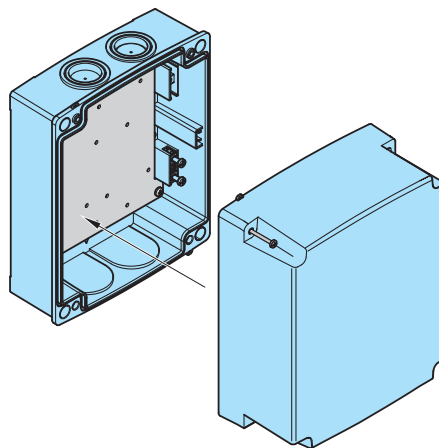
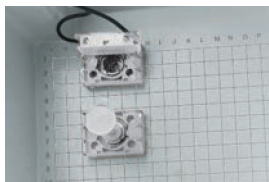
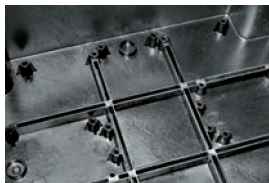
MX31 internal metal mounting plate is standard-supplied.

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).

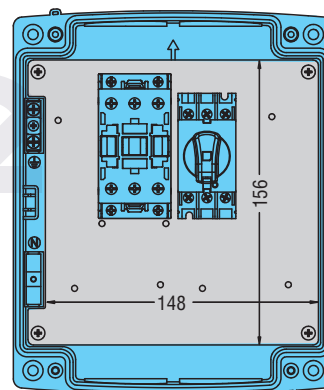
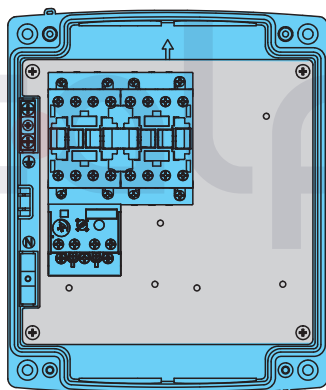
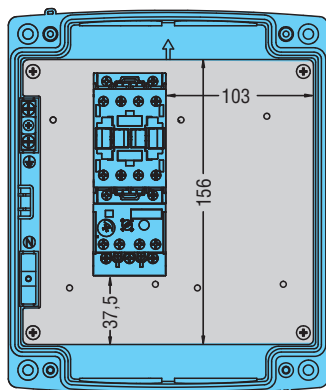
The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.

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.

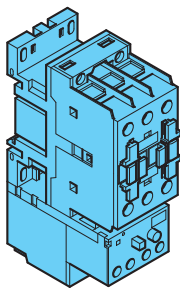


Available space for fitting other electrical or electronic devices



M25...038...

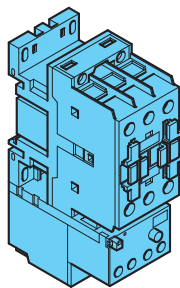
BF38 with or without overload



RF38...

M25...

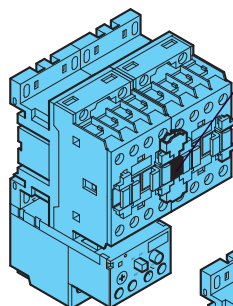
BF26 - BF32 with or without overload



RF38...

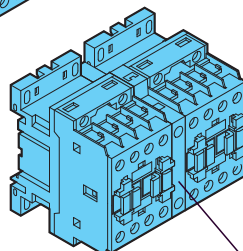
M25...

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...

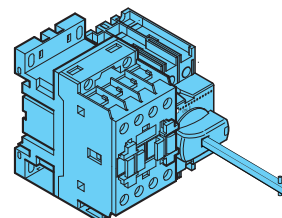
BFX5002



BF09A...BF38A with BFX5001

M25...

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





4 Electromechanical starters and enclosures

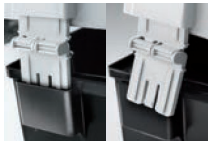
Direct-on-line starters

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.

MX30 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.



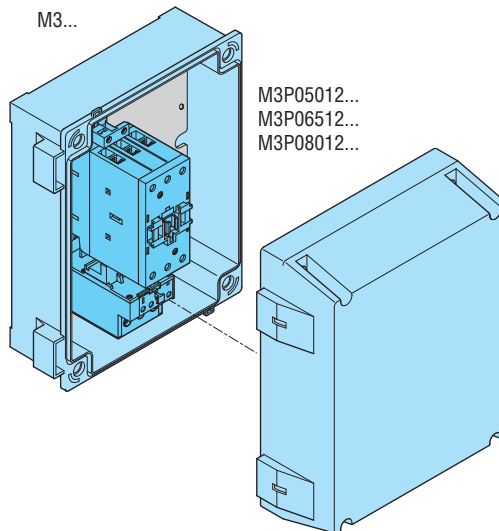
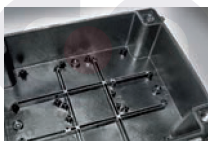
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handle or pilot lights will be mounted.



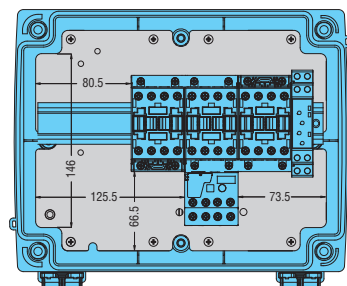
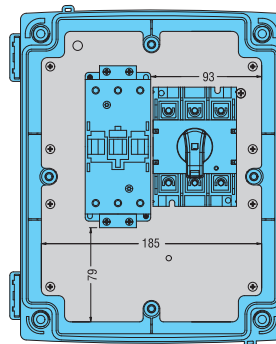
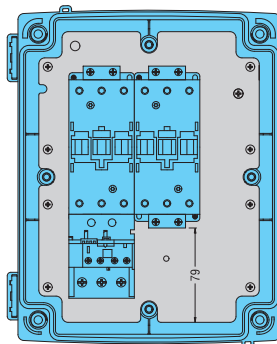
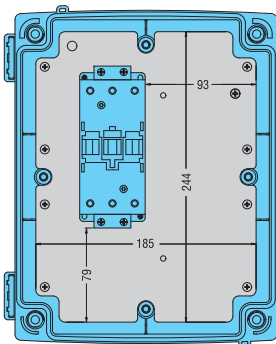
A properly predrilled metal mounting plate (MX30 standard supplied except for M3N) permits to quickly and precisely fix equipment in place.



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

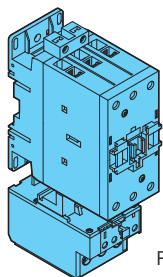


Available space for fitting other electrical or electronic devices



M3...

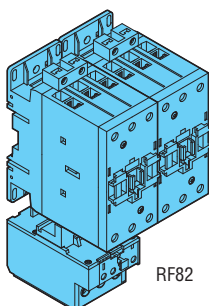
n° 1 BF40 n° 1 BF80
n° 1 BF50 n° 1 BF94
n° 1 BF65



RF82

M3...

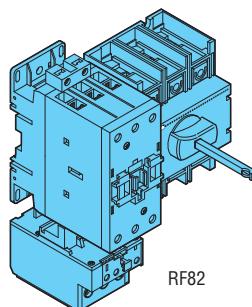
n° 2 BF40 n° 2 BF65 n° 2 BF94
n° 2 BF50 n° 2 BF80



RF82

M3...

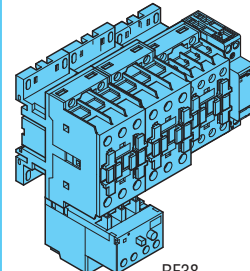
n° 1 BF40 n° 1 BF65 n° 1 BF94 + n° 1 GA...
n° 1 BF50 n° 1 BF80



RF82

M3P..70

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



RF38

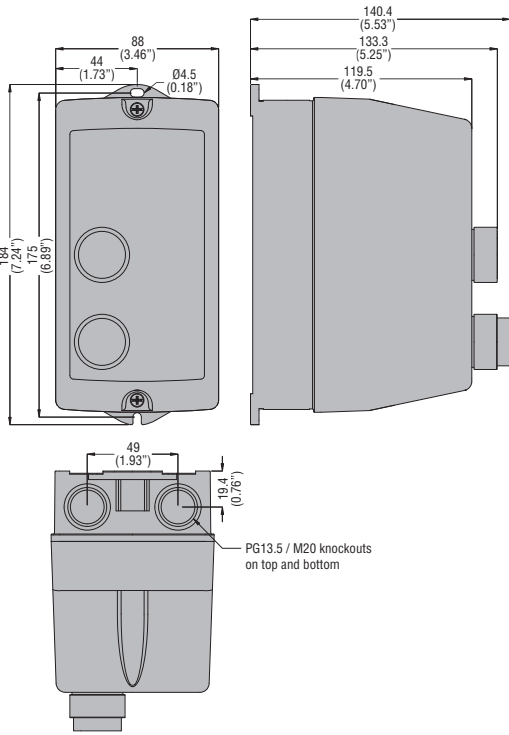


4 Electromechanical starters and enclosures

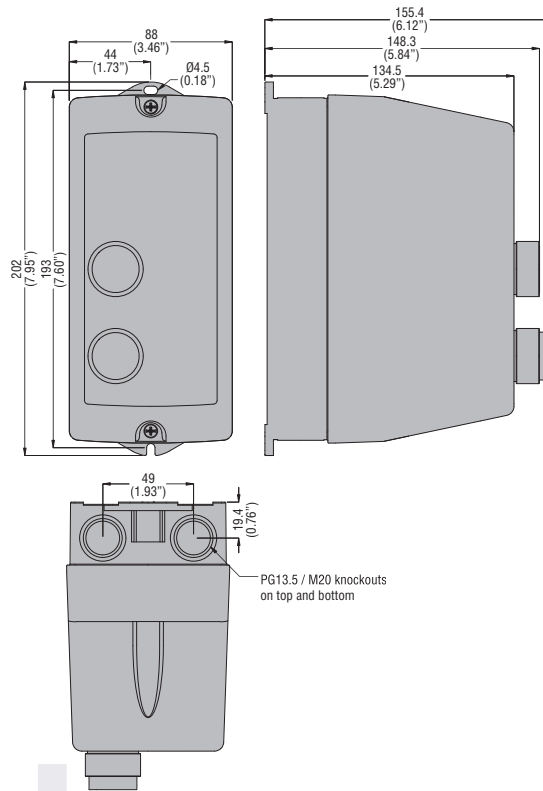
Dimensions [mm (in)]

DIRECT-ON-LINE STARTERS - EMPTY ENCLOSURES

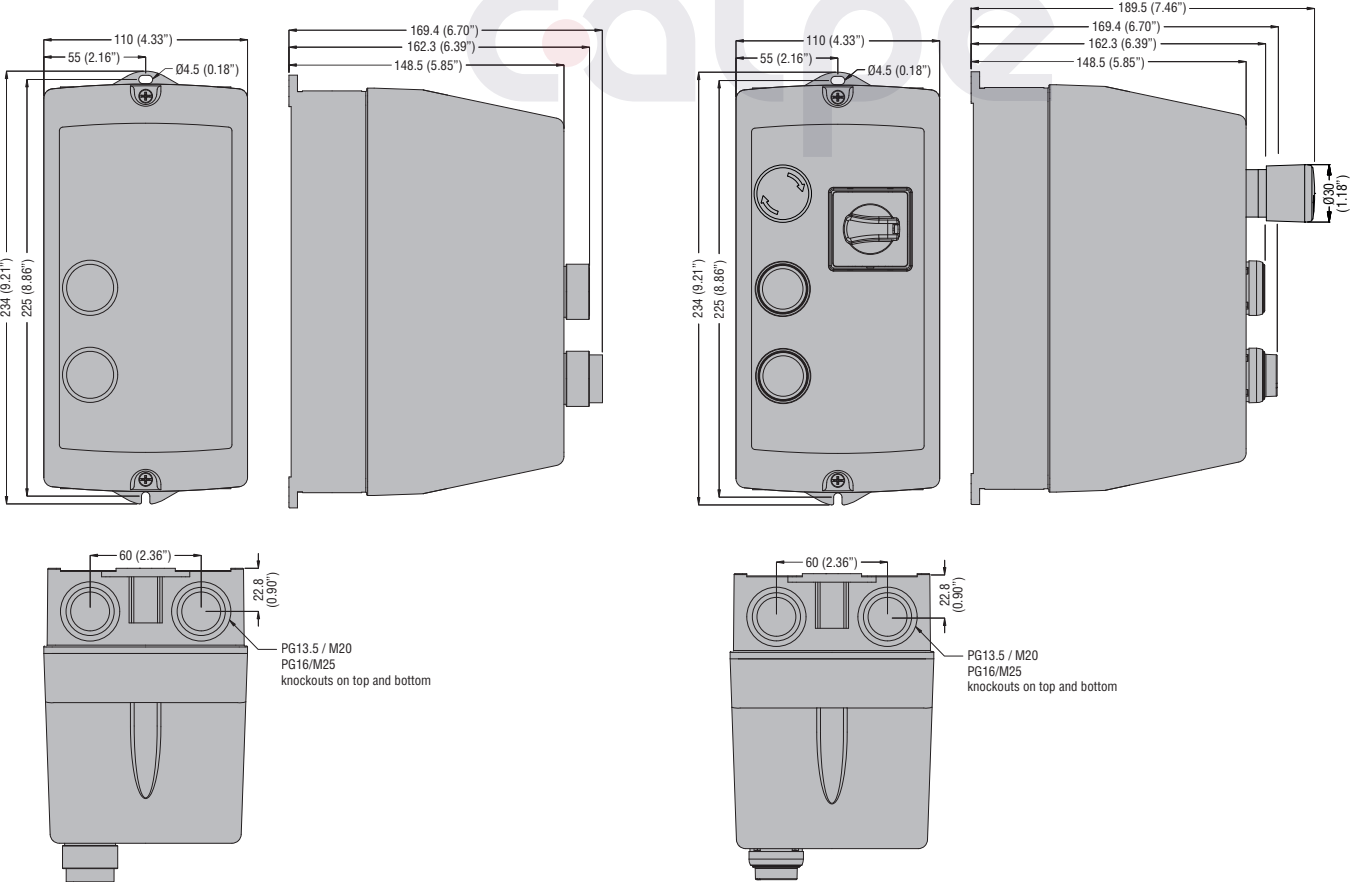
M0



M1



M2

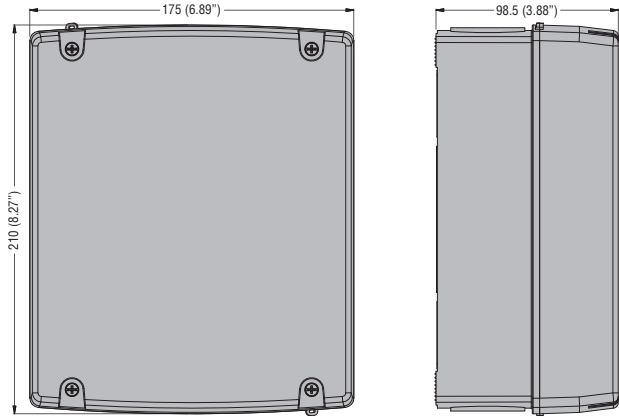




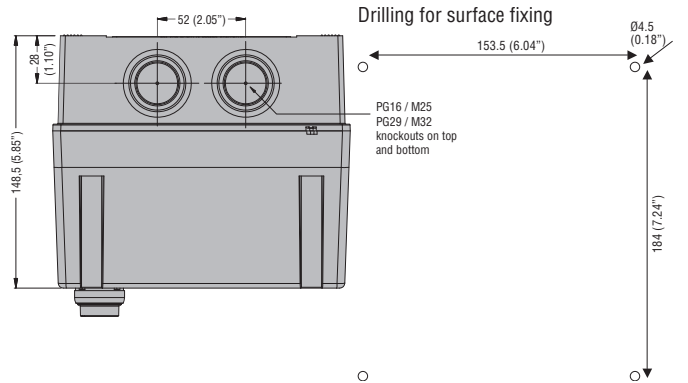
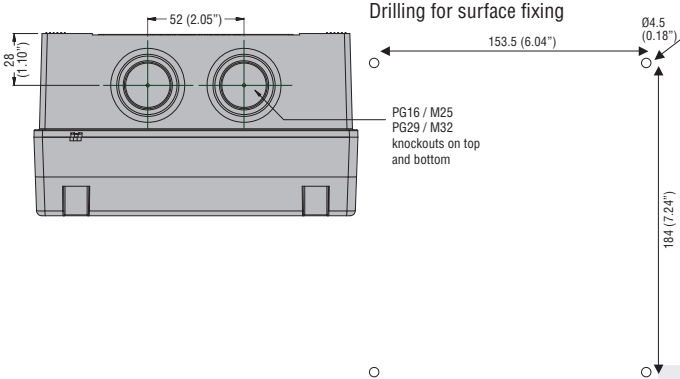
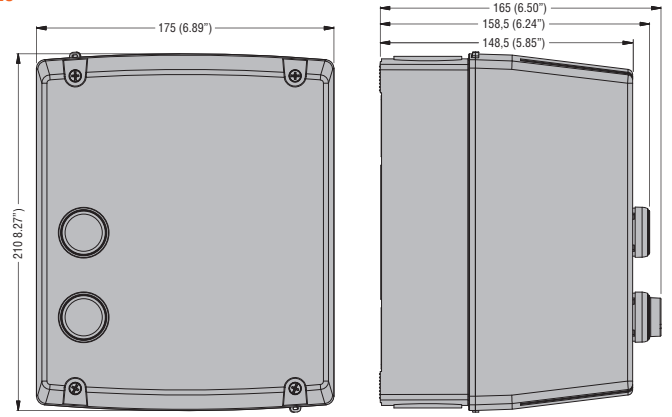
4 Electromechanical starters and enclosures

Dimensions [mm (in)]

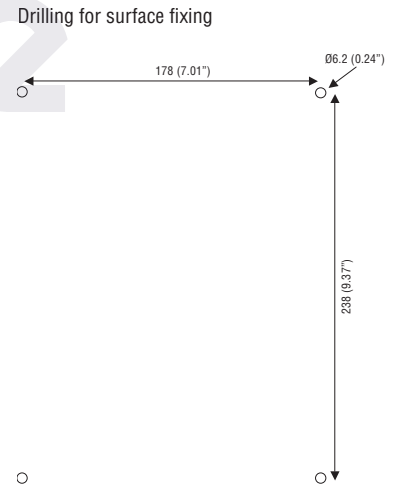
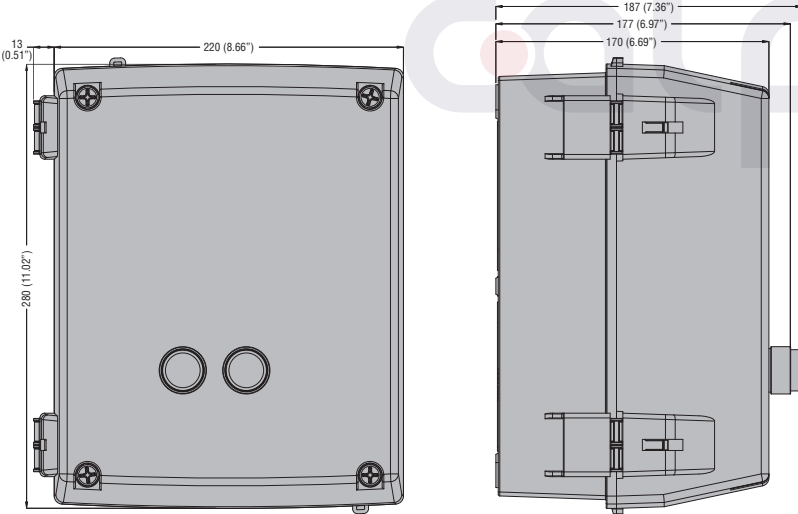
M24N



M25



M3



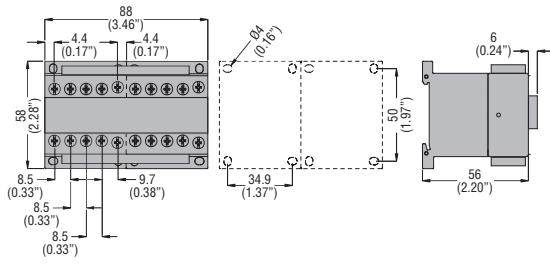


4 Electromechanical starters and enclosures

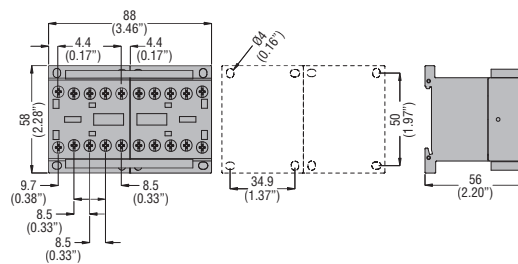
Dimensions [mm (in)]

REVERSING CONTACTOR ASSEMBLIES

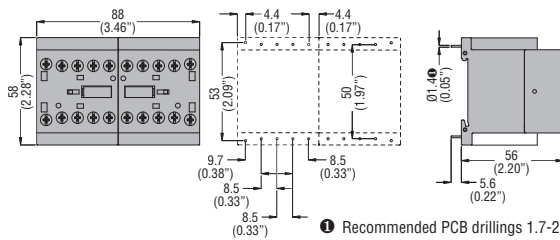
BGR...



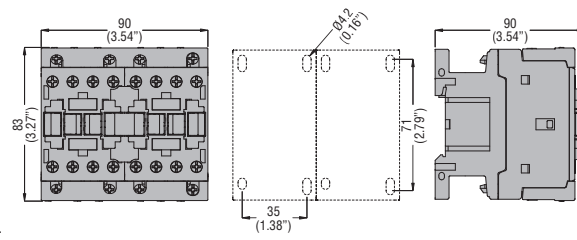
BGT...



BGTP...



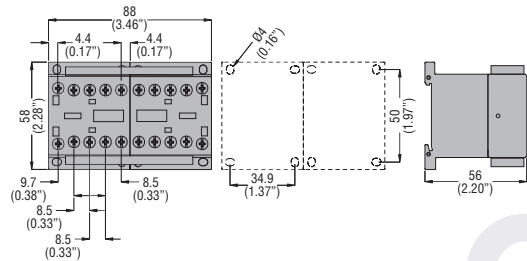
BFA...42



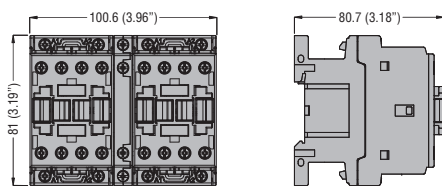
1 Recommended PCB drillings 1.7-2mm (0.07-0.08").

CHANGEOVER CONTACTOR 4 POLES ASSEMBLIES

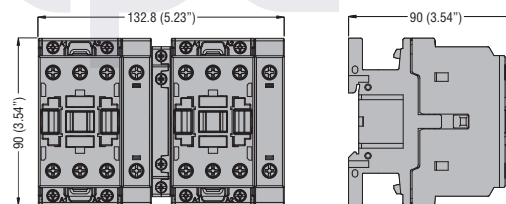
BGC09T4...



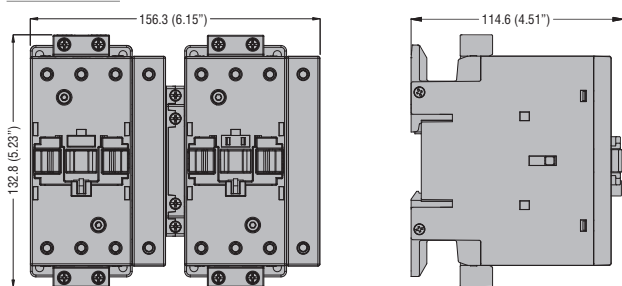
BFC18T4A230



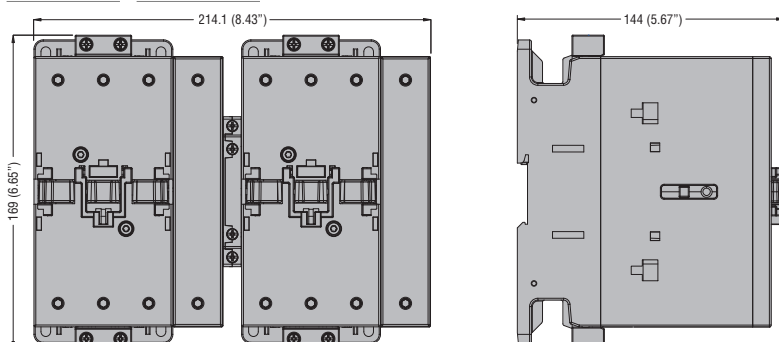
BFC38T4A230



BFC80T4A230



BFC95T4A230 - BFC150T4A230

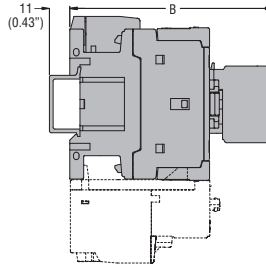
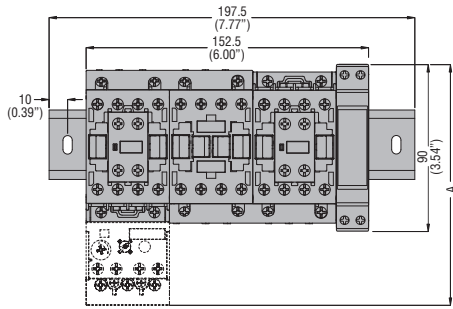




4 Electromechanical starters and enclosures

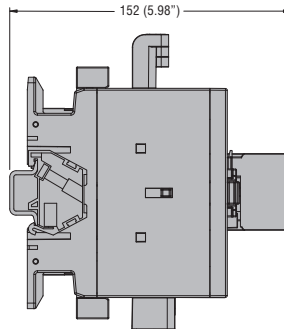
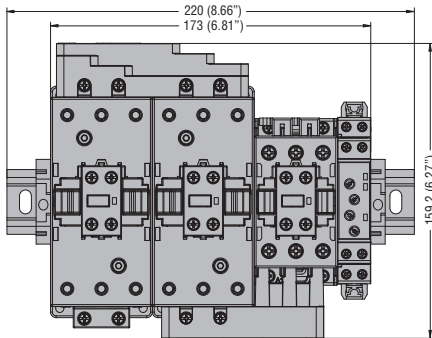
Dimensions [mm (in)]

STAR-DELTA STARTERS OPEN FRAME BFA00970...BFA03870

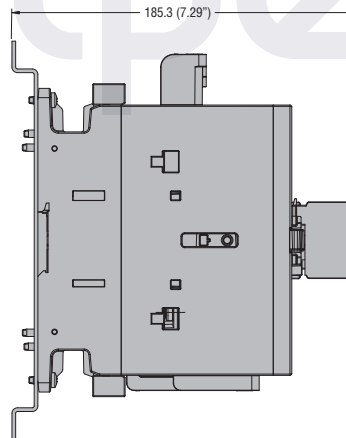
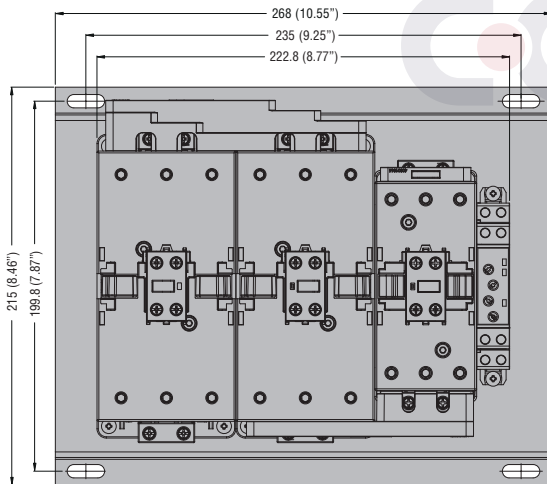


STARTER TYPE	A	B
BFA00970	130.5 (5.14")	109.5 (4.31")
BFA01270	130.5 (5.14")	109.5 (4.31")
BFA01870	130.5 (5.14")	109.5 (4.31")
BFA02570	130.5 (5.14")	109.5 (4.31")
BFA02670	135 (5.14")	119 (4.68")
BFA03270	135 (5.14")	119 (4.68")
BFA03870	135 (5.14")	119 (4.68")

BFA05070...BFA08070



BFA09570...BFA15070

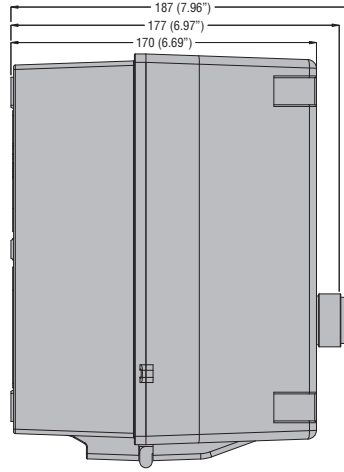
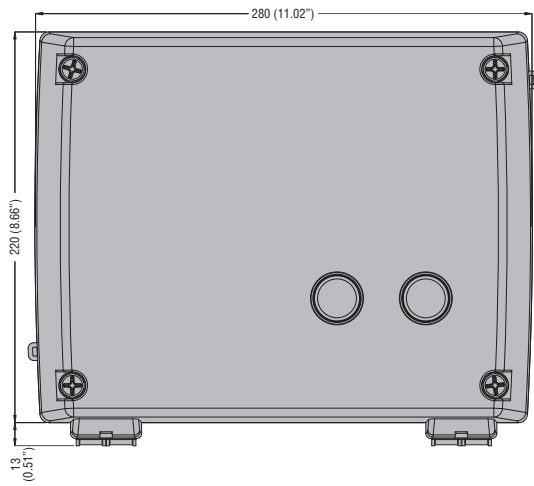


4 Electromechanical starters and enclosures

Dimensions [mm (in)]

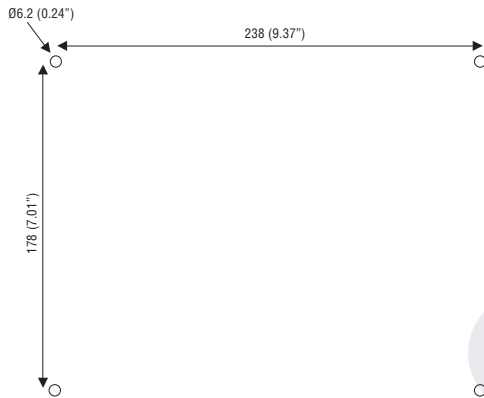
STAR-DELTA STARTERS IN ENCLOSURE - EMPTY ENCLOSURE FOR STAR-DELTA STARTERS

M3P...70 - M3PA70

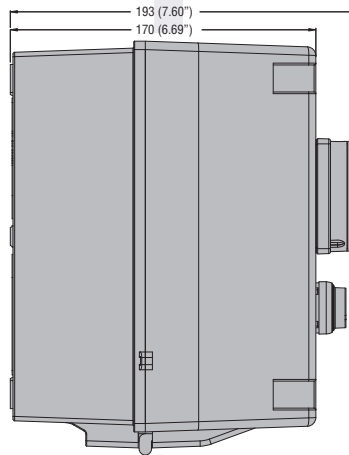
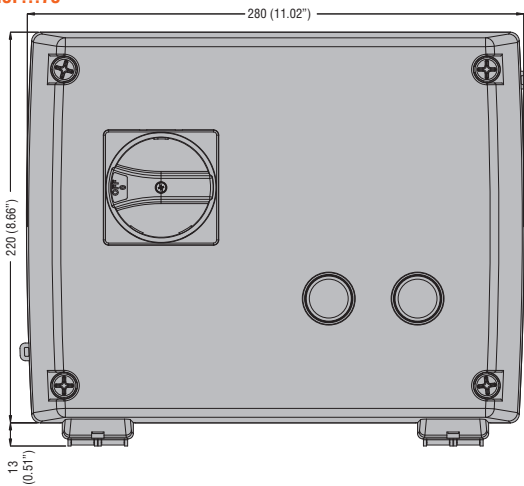


Drilling for surface fixing

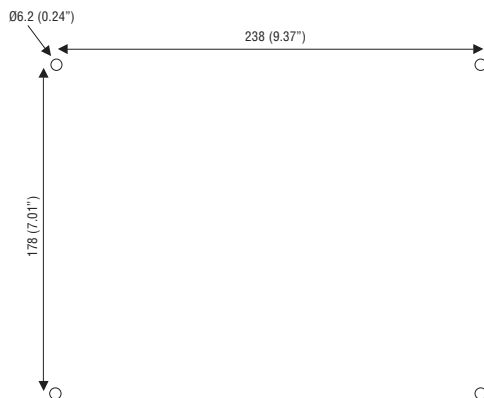
2R0



M3P...73



Drilling for surface fixing





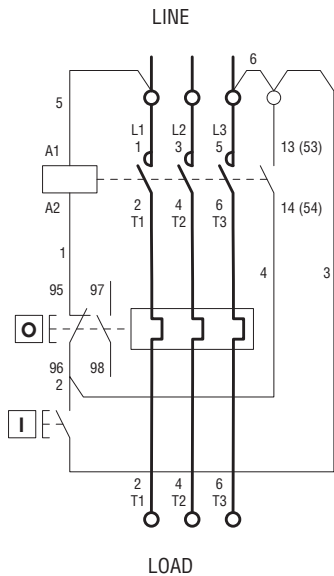
4 Electromechanical starters and enclosures

Wiring diagrams

DIRECT-ON-LINE STARTERS IN ENCLOSURE

M...P

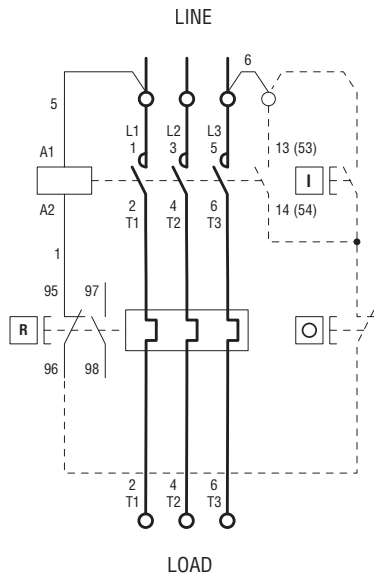
Diagram 1 - Incorporated button control for 3-phase motors



I = Start; O = Stop/Reset

M...R

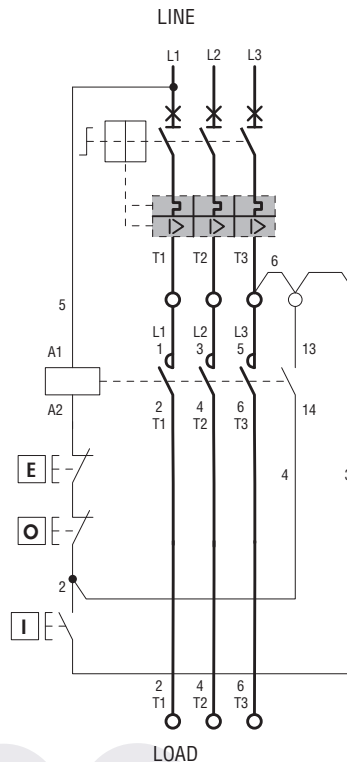
Diagram 2 - External button control for 3-phase motors



R = Reset; I = Start; O = Stop

M2P00911...

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

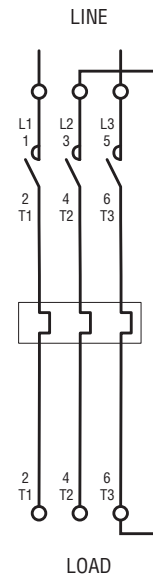


DIAGRAM 2
Connect the eventual two-wire control (e.g. automatism) between terminal 3 of the contactor and terminal 96 of the thermal overload relay.

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 4 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.

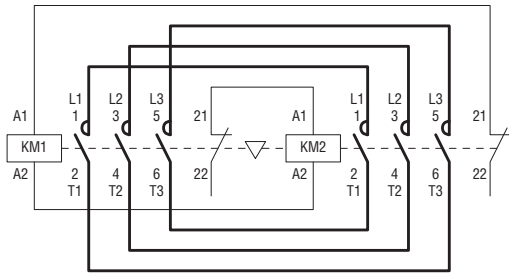


4 Electromechanical starters and enclosures

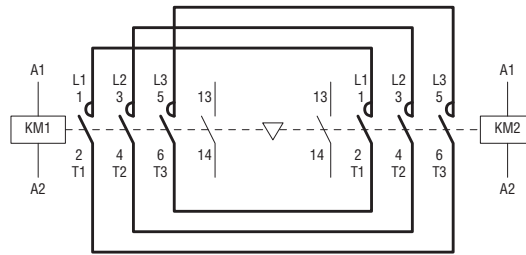
Wiring diagrams

REVERSING CONTACTOR ASSEMBLY

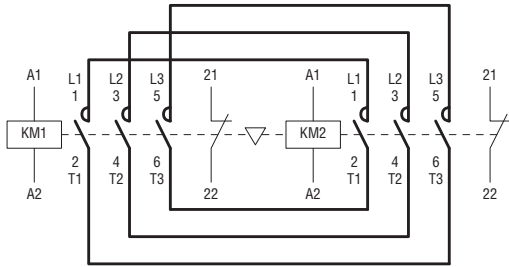
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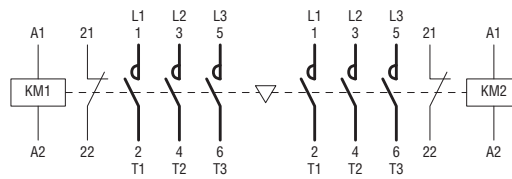
BGT...



BFA...42

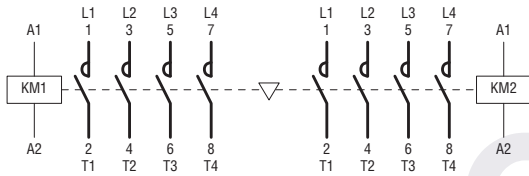


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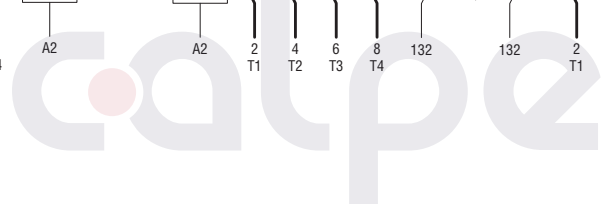
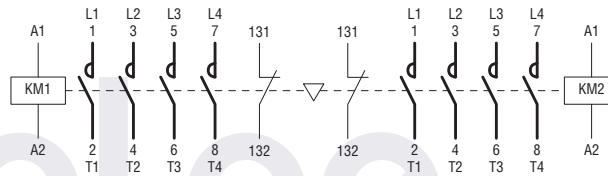


CHANGEOVER CONTACTOR ASSEMBLY

BGC09...



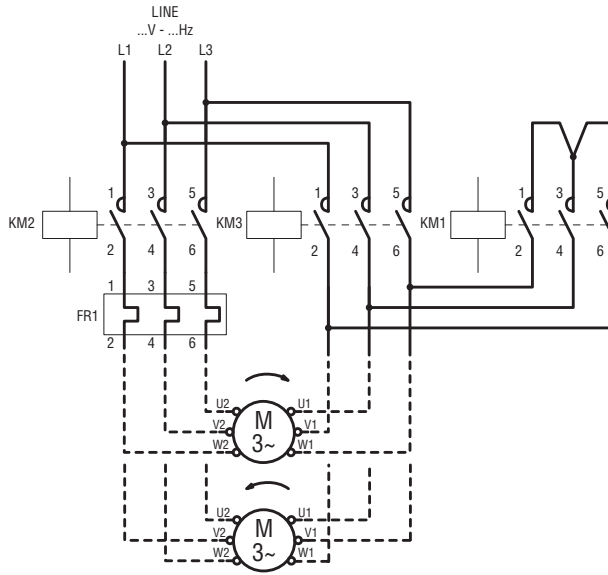
BFC...



4 Electromechanical starters and enclosures

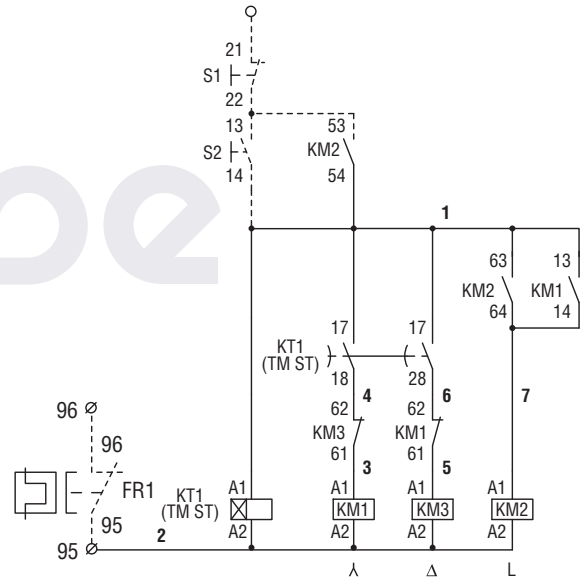
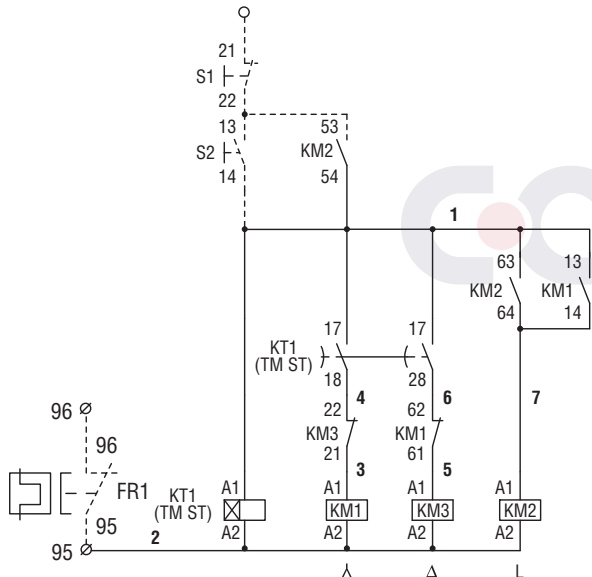
Wiring diagrams

STAR-DELTA STARTERS, OPEN FRAME
BFA009...03870 - M3P009...03870

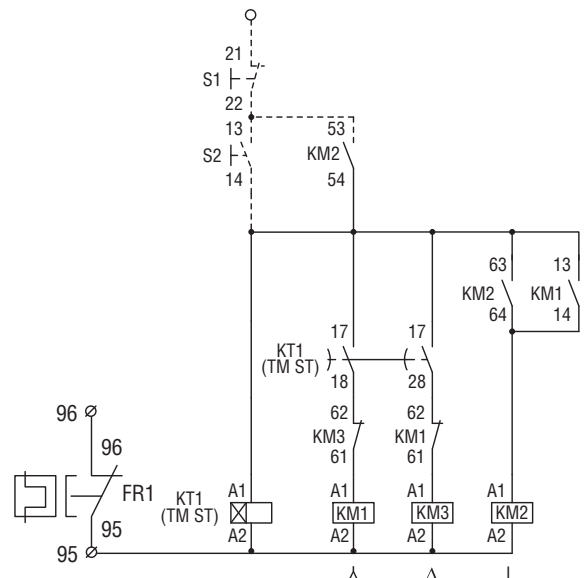
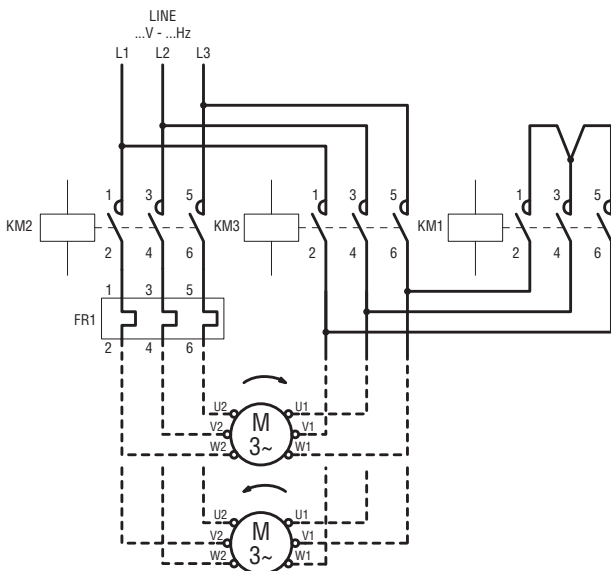


BFA00970... BFA02570
M3P00970...M3P02570

BFA2670...BFA03870
M3P02670...M3P03870



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	MAX UL/CSA HP RATINGS INDICATED ON STARTER (based on t/o relay adj range)					
		Single phase		Three phase			
		[A]	120V	240V	200V	240V	480V
M0P009001	0.6 - 1	-	-	-	-	½	½
M0P009001V5	0.9 - 1.5	-	-	-	-	¾	¾
M0P009002V3	1.4 - 2.3	-	-	-	½	1	1
M0P0090033	2 - 3.3	-	¼	¾	1½	1½	2
M0P009005	3 - 5	-	½	1	1	3	3
M0P0090075	4.5 - 7.5	-	¾	1½	2	5	5
M0P009010	6 - 10	½	1½	2	3	5	5
M0P012015	9 - 15	½	1½	3	3	7½	10
M1P00900A4	0.63 - 1	-	-	-	-	-	½
M1P00900A5	1 - 1.6	-	-	-	-	½	¾
M1P00900A6	1.6 - 2.5	-	-	½	½	1	1½
M1P00900A7	2.5 - 4	-	-	¾	¾	2	3
M1P00900A8	4 - 6.5	¼	½	1	1½	3	5
M1P00900A9	6.3 - 10	½	1½	2	3	5	7½
M1P00900B0	9 - 14	¾	2	3	3	5	7½
M1P01200B0	9 - 14	1	2	5	5	7½	10
M1P01800B1	13 - 18	1	3	5	5	10	15
M2P02500B2	17 - 23	1½	3	5	7½	15	15
M2P02500B3	20 - 25	2	3	7½	7½	15	15
M2P02600B2	17 - 23	1½	3	5	7½	15	20
M2P02600B3	20 - 25	2	5	7½	7½	15	20
M2P02600B4	24 - 32	2	5	7½	7½	15	20
M2P03200B4	24 - 32	3	7½	10	10	20	25
M25P03800B5	32 - 38	3	7½	10	15	30	30
M3P05000B6UL	35 - 50	5	10	15	20	40	40
M3P06500B7UL	46 - 65	-	-	20	25	50	60
M3P08000B8	60 - 82	-	-	25	30	60	75

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 ❶ below for specified standard configurations.

- ❶ 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.
- ❷ 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).
- ❸ Maximum UL ratings is 52A for motor control and 65A for general use.
- ❹ 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/BS 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.