



Electromechanical starters and insulated enclosures



Orange

Lovato
electric

100% electricity

Electromechanical starters and insulated enclosures

The new **Orange** system electromechanical starters offer excellent technical performance.

The IP65/Nema 4x protection degree of the enclosures allows installation in places exposed to harsh ambient conditions, such as high dust content, vapours and water jets.

The starter integrity is warranted by the robustness of the plastic materials used, even in the case of strong impacts.

These features make the **Orange** starters meet stringent quality standard requirements of the North American market since they are certified cULus and cCSAus.



Orange



The ideal solution for every sort of motor and pump starting

The modularity system of the **orange** electromechanical starters provides for a simple assembly of diverse electrical equipment, in a rapid and safe way, as open frame or in plastic enclosures.

It is a flexible solution, ideal for the industrial field and service industry, for instance in greenhouses, irrigation systems, machine tools, swimming pools, pumps, civil plumbing systems, etc.

Direct-on-line starters

Power ratings at 400VAC in AC3: 0.18-45kW



In insulated IP65/Nema 4x enclosure

Reversing and changeover contactors

Power ratings at 400VAC in AC3: 4-12.5kW



Open frame

Star-delta starters

Power ratings at 400VAC in AC3: 7.5-30kW



In insulated IP65 enclosure



Open frame

Empty insulated IP65/Nema 4x enclosures



M0



M1



M2



M3



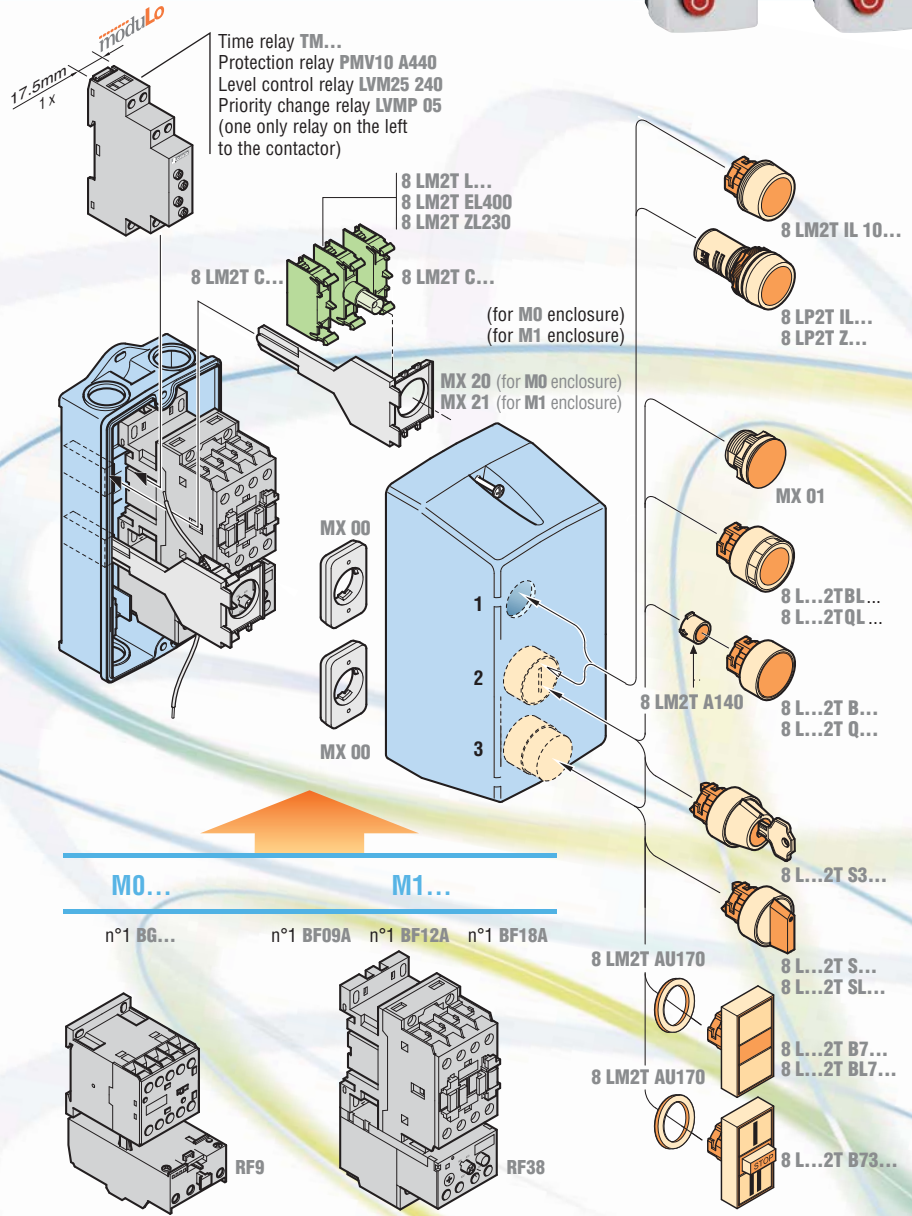
M0... and M1...



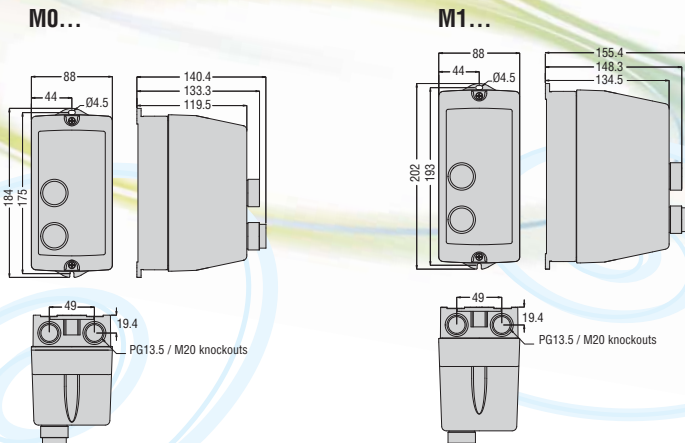
Inside the M0 and M1 enclosures, in addition to the starter composed by a contactor and thermal overload relay, one of the following devices of the **moduLo** series can be fitted:

- Time relays
- Phase sequence-phase loss relays
- Level control relays
- Start-up priority change relays.

The **moduLo** devices to fit need to be 17.5mm wide (1 module) and must be positioned on the left side next to the contactor.



Dimensions



M2...

Inside the M2 enclosures, in addition to the starter composed by a contactor and thermal overload relay, the following devices of the **moduLo** series can be fitted:

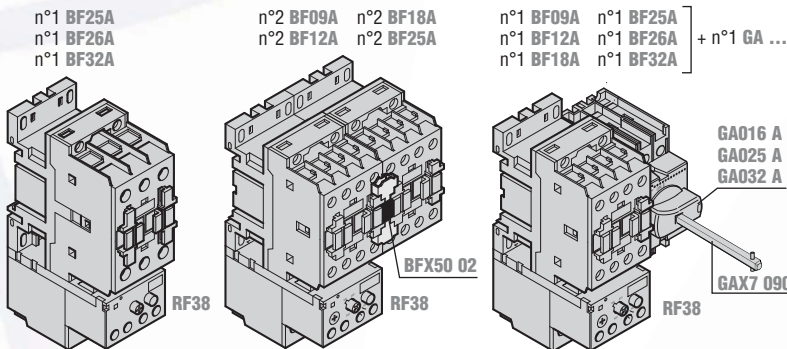
- Time relays
- Voltage relays
- Current relays
- Frequency relays
- Level control relays
- Start-up priority change relays.

The combinations are as follows:

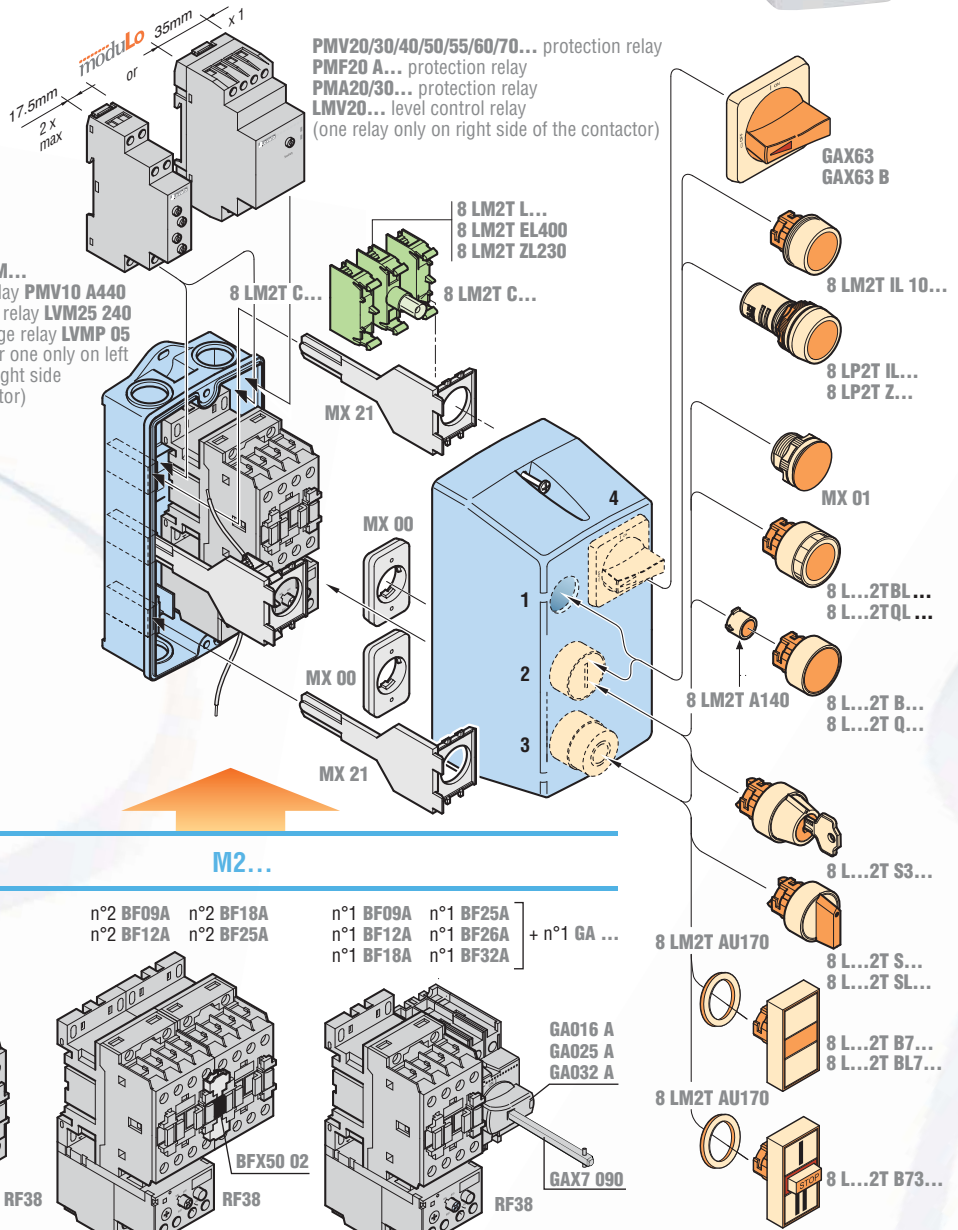
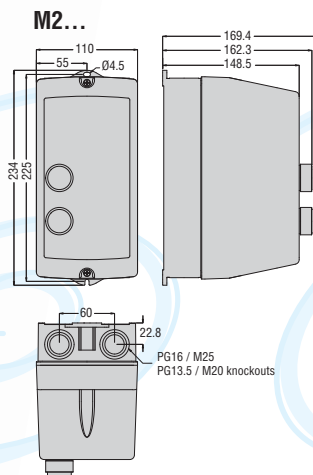
- One 35mm wide module on the right side next to the contactor
- Two 17.5mm wide modules on the right side next to the contactor
- Two 17.5mm wide modules, one on the right and one on the left next to the contactor.

A switch disconnecter, GA016A-GA032A type, can also be installed.

Instead of the contactor and thermal overload relay, reversing or changeover contactor assemblies can also be fitted with a thermal overload relay.



Dimensions



M3... W3...

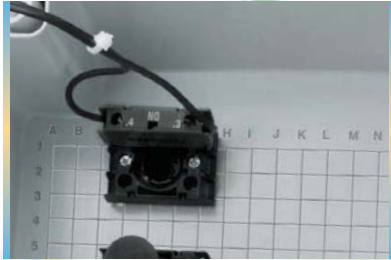


By means of new designed **hinges**, the cover remains attached to the base while the wiring work is being carried out.

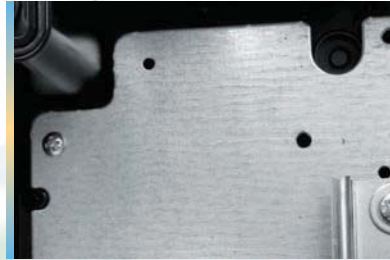
By applying slight pressure on the **hinges**, the cover can be released from the base.

In addition to a direct-on-line starter or reversing contactor assembly, a star-delta starter also can be installed, as illustrated in Fig. 4 below, along with various other electromechanical elements.

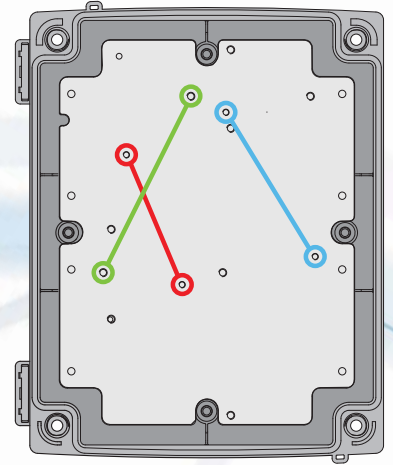
The M3 enclosure cover is totally dedicated for the installation of push buttons, measuring instruments and switch disconnectors, GA016A-GA0125A type.



Grid references, marked by letters and numbers are engraved on the inside cover surface. This **grid** allows to quickly identify the exact drilling points where push buttons, handles or pilot lights will be mounted. For example: to fit the handle of a switch disconnector, the cover is to be drilled at "F7" position.



A proper metal predrilled **mounting plate** permits to quickly and precisely fix equipment in place; see the figure to the right.



BF50...110 + RF95 3... / BF38 + RF95 2...
GA063A...GA125A

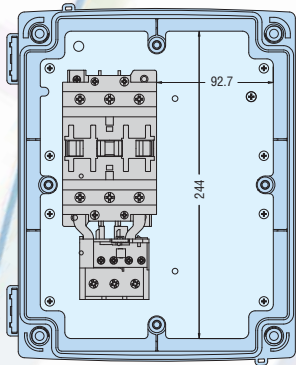


Fig. 1

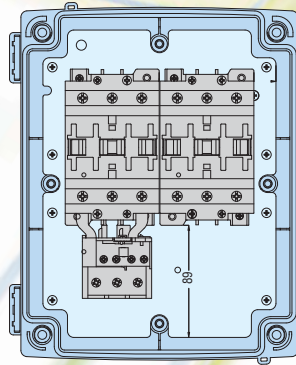


Fig. 2

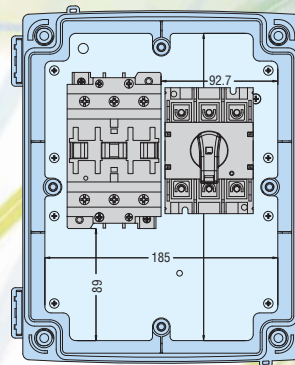


Fig. 3

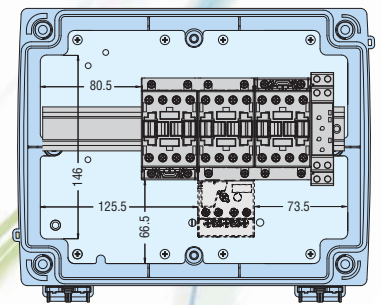
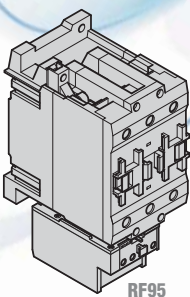


Fig. 4

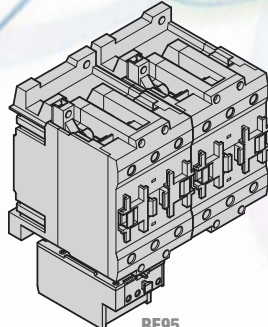
M3...

n°1 BF38A n°1 BF80
n°1 BF50 n°1 BF95
n°1 BF65 n°1 BF110



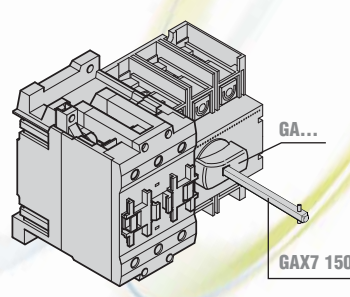
RF95

n°2 BF38A n°2 BF80
n°2 BF50 n°2 BF95
n°2 BF65 n°2 BF110



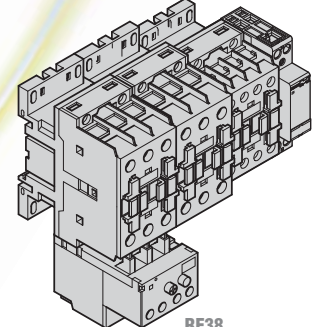
RF95

n°1 BF38A n°1 BF80
n°1 BF50 n°1 BF95
n°1 BF65 n°1 BF110



GAX7 150

Star-delta combinations with
BF09A BF12A BF18A
BF25A BF25A BF38A



RF38

DIRECT-ON-LINE STARTERS IN INSULATED IP65 ENCLOSURE

Direct-on-line starters with thermal overload relay

Order code	Relay adj. range	Operat. characteristics		Qty per pkg	Wt
	[A]	Max le at ≤440VAC [A]	Max power at 400V [kW]	n°	[kg]
Starters with Start and Stop/Reset push buttons ^② .					
M0 P009 1201	0.6-1	1	0.18-0.25	1	0.760
M0 P009 1201V5	0.9-1.5	1.5	0.37	1	0.760
M0 P009 1202V3	1.4-2.3	2.3	0.55-0.75	1	0.760
M0 P009 12033	2-3.3	3.3	1.1	1	0.760
M0 P009 1205	3-5	5	1.5-2.2	1	0.760
M0 P009 12075	4.5-7.5	7.5	2.2-3	1	0.760
M0 P009 12010	6-10	10	3-4	1	0.760
M0 P012 12015	9-15	12	5.5	1	0.760
M1 P009 120A4	0.63-1	1	0.25	1	1.040
M1 P009 120A5	1-1.6	1.6	0.37-0.55	1	1.040
M1 P009 120A6	1.6-2.5	2.5	0.75	1	1.040
M1 P009 120A7	2.5-4	4	1.1-1.5	1	1.040
M1 P009 120A8	4-6.5	6.5	2.2-3	1	1.040
M1 P009 120A9	6.3-10	10	3-4	1	1.040
M1 P009 120B0	9-14	13	5.5	1	1.040
M1 P018 120B1	13-18	18	7.5	1	1.040
M2 P025 120B2	17-23	23	11	1	1.210
M2 P025 120B3	20-25	25	11	1	1.210
M2 P032 120B4	24-32	32	15	1	1.285
M3 P038 120B5	28-42	38	18.5	1	2.500
M3 P050 120B6	35-50	50	18.5-22	1	3.450
M3 P065 120B7	46-65	65	30	1	3.450
M3 P080 120B8	60-82	80	37-45	1	3.450
M3 P095 120B9	70-95	95	45	1	3.450

Starters with Reset push button^②.

To purchase starters with Reset button only, replace the **P** letter in the order codes above with **R**. E.g. **M0 P009 1201** becomes **M0 R009 1201**.

Components			
Insulated IP65 enclosure	Contactor	Thermal overload relay	Auxiliary contacts
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 2500	-
M2 PA	BF25 10A	RF38 2300	-
M2 PA	BF32 00A	RF38 3200	G418 10
M3 PA	BF38 00A	RF95 2 42	G418 10
M3 PA	BF50 00	RF95 3 50	G418 10
M3 PA	BF65 00	RF95 3 65	G418 10
M3 PA	BF80 00	RF95 3 82	G418 10
M3 PA	BF95 00	RF95 3 95	G418 10



M... P...



M... R...



The cover closing captive screws and the wall fixing holes are placed **outwardly** with respect to the sealing gasket. This warrants the enclosure protection against liquid penetration - IPx5 per IEC (4X per NEMA for M...UL version only).



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



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

Direct-on-line starters without thermal overload relay

Order code	Max operating current ≤440V	Qty per pkg	Wt
	[A]	n°	[kg]
Starters with Start and Stop/Reset push buttons ^② .			
M0 P009 100	10	1	0.677
M0 P012 100	12	1	0.677
M1 P009 100	13	1	0.917
M1 P018 100	18	1	0.917
M2 P025 100	25	1	1.060
M2 P032 100	32	1	1.162
M3 P038 100	38	1	2.360
M3 P050 100	50	1	3.110
M3 P065 100	65	1	3.110
M3 P080 100	80	1	3.110
M3 P095 100	95	1	3.110

Starters with Reset push button^②.

To purchase starters with Reset button only, replace the **P** letter in the order codes above with **R**. E.g. **M0 P009 100** becomes **M0 R009 100**.

Components			
Insulated IP65 enclosure	Contactor	Thermal overload relay ^③	Auxiliary contacts
M0 PA	BG09 10A	RF9	-
M0 PA	BG12 10A	RF9	-
M1 PA	BF09 10A	RF38	-
M1 PA	BF18 10A	RF38	-
M2 PA	BF25 10A	RF38	-
M2 PA	BF32 00A	RF38	G418 10
M3 PA	BF38 00A	RF95 2	G418 10
M3 PA	BF50 00	RF95 3	G418 10
M3 PA	BF65 00	RF95 3	G418 10
M3 PA	BF80 00	RF95 3	G418 10
M3 PA	BF95 00	RF95 3	G418 10



M... P...



M... R...



- Complete order code with coil voltage digit for 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).
- Protection fuses are to be installed externally by the user.
- To be purchased separately. For a choice, consult our general catalogue or contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com) for assistance.

Special M3... versions

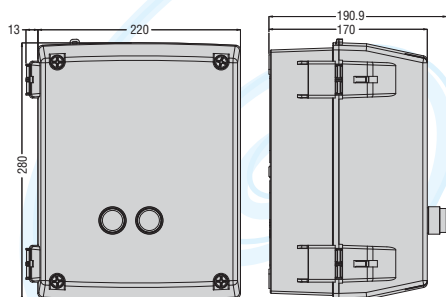
In addition to standard-indicated versions, cULus certified starters are available up to 52A/NEMA 4x rating max. Add suffix UL to the order code, e.g. M3 P050 12 024 B6UL.

Certifications and compliance

Certifications obtained: cULus and cCSA us for M0, M1 and M2 types; cULus only for M3... UL types. Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1, UL508, CSA C22.2 n° 14.

Dimensions

M3...



REVERSING AND CHANGEOVER CONTACTOR ASSEMBLIES

Reversing contactors, open frame

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

AC COIL.

Terminals: clamp screws.
External mechanical interlock with power and auxiliary wiring.

11 BGR09 01 A ①	9	4	0	1 ②	1	0.374
11 BGR12 01 A ①	12	5.7	0	1 ②	1	0.374

External mechanical interlock with power wiring.

BFA009 42 ①	9	4.2	0	1 ②	1	0.700
BFA012 42 ①	12	5.7	0	1 ②	1	0.700
BFA018 42 ①	18	7.5	0	1 ②	1	0.700
BFA025 42 ①	25	12.5	0	1 ②	1	0.700

Built-in mechanical interlock with power wiring.

11 BGT09 10 A ①	9	4	1 ③	0	1	0.366
11 BGT12 10 A ①	12	5.7	1 ③	0	1	0.366

Rear terminals: PCB solder pins.

Built-in mechanical interlock.

11 BGTP09 01 A ①	9	4 ④	0	1 ②	1	0.340
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DC COIL.

Terminals: clamp screws.
External mechanical interlock with power and auxiliary wiring.

11 BGR09 01 D ①	9	4	0	1 ②	1	0.384
11 BGR12 01 D ①	12	5.7	0	1 ②	1	0.384

Built-in mechanical interlock with power wiring.

11 BGT09 10 D ①	9	4	1 ③	0	1	0.376
11 BGT12 10 D ①	12	5.7	1 ③	0	1	0.376

Rear terminals: PCB solder pins.

Built-in mechanical interlock.

11 BGTP09 01 D ①	9	4 ④	0	1 ②	1	0.350
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Changeover contactors, open frame

Order code	Operating current (AC1)			Qty per pkg	Wt
	≤40°C	≤55°C	≤60°C		
	[A]	[A]	[A]	n°	[kg]

AC COIL.

Terminals: clamp screws.
Built-in mechanical interlock.

11 BGC09 T4 A ①	20	18	15	1	0.340
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DC COIL.

Terminals: clamp screws.
Built-in mechanical interlock.

11 BGC09 T4 D ①	20	18	15	1	0.350
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- ① Complete order code with coil voltage digit for 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).



11 BGR



BFA...



11 BGT...



11 BGTP...



11 BGC09 ...

Certifications and compliance

Certifications obtained:
cULus for BGR, BFA, BGT and BGC; eULus for BGTP.

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

“Recognized”.
Products having this type of marking are intended for use as components of complete workshop-assembled equipment.

- ② Complete order code with coil voltage digit.
Standard voltages are as follows:
- DC 012 / 024 / 048 / 060 / 110 / 125 / 220V.
③ One auxiliary contact for each contactor.
④ Maximum voltage is limited to 300V for UL certified product.
For the certified type up to 600V, contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com).

STAR-DELTA STARTERS

In insulated IP65 enclosure

Order code	le (AC3) ≤440V ≤55°C	Max AC3 power at 400V ≤55°C	Qty per pkg	Wt
	[A]	[kW]	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.

M3P009 70 ⑥	16	7.5	1	2.420
M3P012 70 ⑥	22	11	1	2.420
M3P018 70 ⑥	28	15	1	2.420
M3P025 70 ⑥	35	18.5	1	2.520
M3P026 70 ⑥	43	22	1	2.520
M3P032 70 ⑥	50	25	1	4.110
M3P038 70 ⑥	60	30	1	4.110

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	⑦
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Star-delta starters are available up to 375kW ratings at 400VAC.
Contact our Customer Service (Tel. +39 035 4282422;
email: service@LovatoElectric.com).



M3P...



BFA...

Open frame version

Order code	Three-phase motor control. Max operating current and power ≤440V		Qty per pkg	Wt
	[A]	[kW]		

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

BFA009 70 ⑥	16	7.5	1	1.424
BFA012 70 ⑥	22	11	1	1.424
BFA018 70 ⑥	28	15	1	1.424
BFA025 70 ⑥	35	18.5	1	1.524
BFA026 70 ⑥	43	22	1	1.524
BFA032 70 ⑥	50	25	1	2.108
BFA038 70 ⑥	60	30	1	2.108

- ⑥ Complete order code with coil voltage digit for 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).
⑦ The thermal overload relay is not included and must be purchased separately. For a correct choice of the RF38 relay, the relay adjustment range needs to be selected considering a value equal to 58% of rated motor current (e.g. I_e = 10A; 58% I_e = 5.8A).
Appropriate relay range: 4-6.5A = RF38 0650).
For higher powers and voltages, or suitable for heavy-duty starting (centrifugal fans, mills, crushers) that is with starting time exceeding 12s, contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com).
⑦ Contact our Customer Service for details (Tel. +39 035 4282422; email: service@LovatoElectric.com).

EMPTY INSULATED IP65 ENCLOSURES

Empty enclosures

Order code	Contactor ①	Thermal overload relay ②	Maximum operating current ≤440V	Qty per pkg	Wt
			[A]	n°	[kg]
Enclosures with Start and Stop/Reset buttons.					
M0PA	BG06 BG09 BG12	RF9	12	1	0.490
M1PA	BF09A BF12A BF18A	RF38	18	1	0.545
M2PA ③	BF25A BF26A BF32A	RF38	32	1	0.715
M3PA ③	BF38A BF50 BF65, BF80, BF95, BF110	RF95 2 RF95 3	110	1	1.900

Enclosures with Reset button.

To purchase enclosures with Reset button only, replace the **PA** suffix in the order codes above with **RA**. E.g. **M0 PA** becomes **M0 RA**③.

Enclosures with no external push-buttons.

To purchase enclosures with no push-buttons, replace the **PA** suffix in the order codes above with **N**. E.g. **M0 PA** becomes **M0 N**.

① To be purchased separately. For a choice, consult our general catalogue or contact our Customer Service (Tel. +39 035 4282422; email: service@LovatoElectric.com) for assistance.

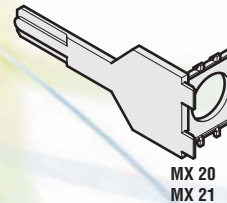
② Reversing contactor assemblies can be fitted as well.

③ MX 30 metal mounting plate is included with M3 PA and M3 RA types only.



Accessories and spare parts

Order code	Description	Qty per pkg	Wt
		n°	[kg]
MX 00	Button actuator fixing adapter	10	0.006
MX 01	White threaded plug for unused drilled holes	10	0.006
MX 10	Stop/Reset button extension rod for M0 enclosure	5	0.010
MX 11	Stop/Reset button extension rod for M1 enclosure	5	0.006
MX 12	Stop/Reset button extension rod for M2 enclosure	5	0.008
MX 20	Mounting base for 8LM2T C... contact on M0 enclosure	5	0.014
MX 21	Mounting base for 8LM2T C... contact on M1 or M2 enclosure	5	0.014
MX 30	Metal mounting plate for M3N	1	0.500



Operational characteristics

Ambient conditions

- Operating temperature: -25...+60°C
- Storage temperature: -40...+70°C.

Special M3... versions

In addition to standard-indicated versions, cULus certified starters and enclosures are available up to 52A/NEMA 4x rating max. (MX30 plate, earth and neutral terminals are always included in this case).

Add suffix UL to the order code, e.g. M3N UL.

Certifications and compliance

Certifications obtained: cULus and cCSAus for M0, M1 and M2 type enclosures only; cULus only for M3...UL version. Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-4-1, UL508, CSA C22.2 n° 14; UL508A for M3...UL types.

Enclosures are equipped with the following accessories:

Enclosure		M0 PA	M1 PA	M2 PA	M0 RA	M1 RA	M2 RA
Contact mounting base	MX 20	1					
	MX 21		1	1			
Stop/Reset button	8 LP2T B1176				1	1	1
	8 LP2T B2104	1	1	1			
Start button	8 LP2T B1113	1	1	1			
Contact element for Start button	8 LM2T C10	1	1	1			
Actuator mounting adapter	MX 00	2	2	2	1	1	1
	MX 10	1			1		
Stop/Reset button extension rod	MX 11		1			1	
	MX 12			1			1
Threaded plug for unused holes	MX 01				1	1	1

M3 type enclosures are equipped with the following accessories:

- M3 PA: two Start and Stop/Reset push buttons, two G285 auxiliary terminals and one MX 30 mounting plate
- M3 RA: one Reset push button, two G285 auxiliary terminals and one MX 30 mounting plate
- M3N: without accessories or MX 30 mounting plate, to be purchased separately.

new
2011



Switch disconnectors
16 to 1600A



Fuse holders



Modular digital multimeters



Flush-mount digital multimeters
and power analyzers



Energy meters



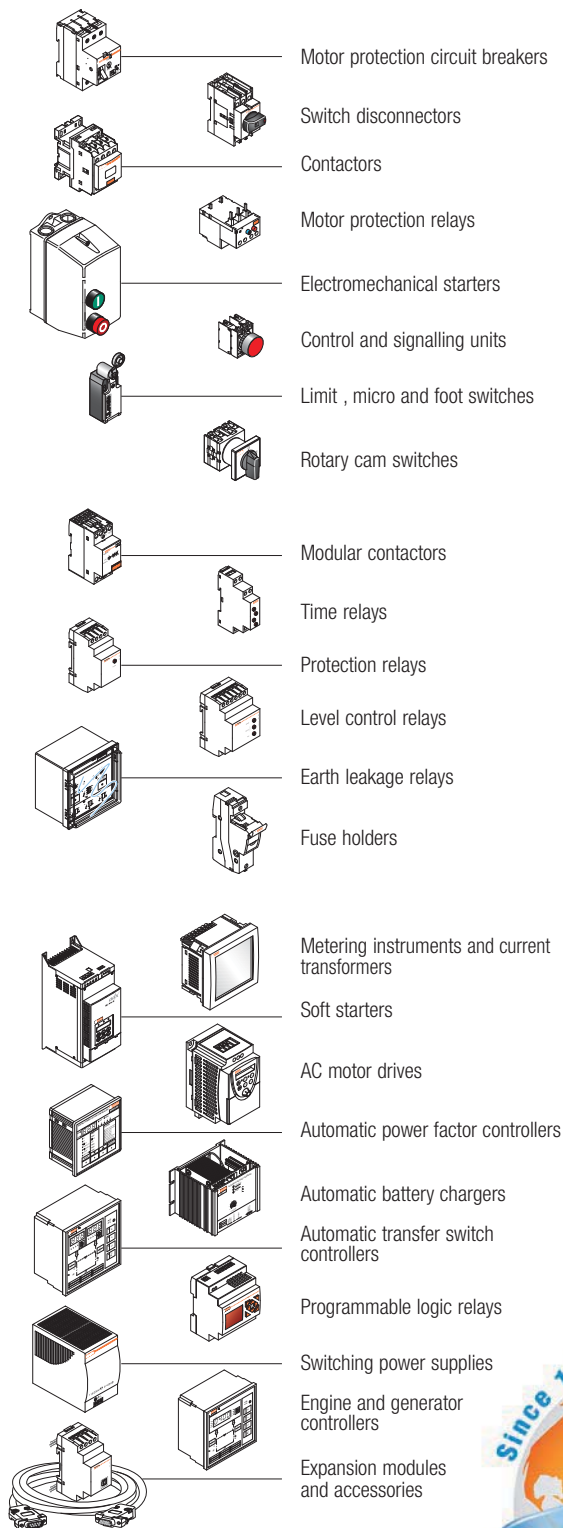
BCF battery chargers

Lovato
electric
100% electricity

Planet Switch

Planet Din

Planet Logic



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