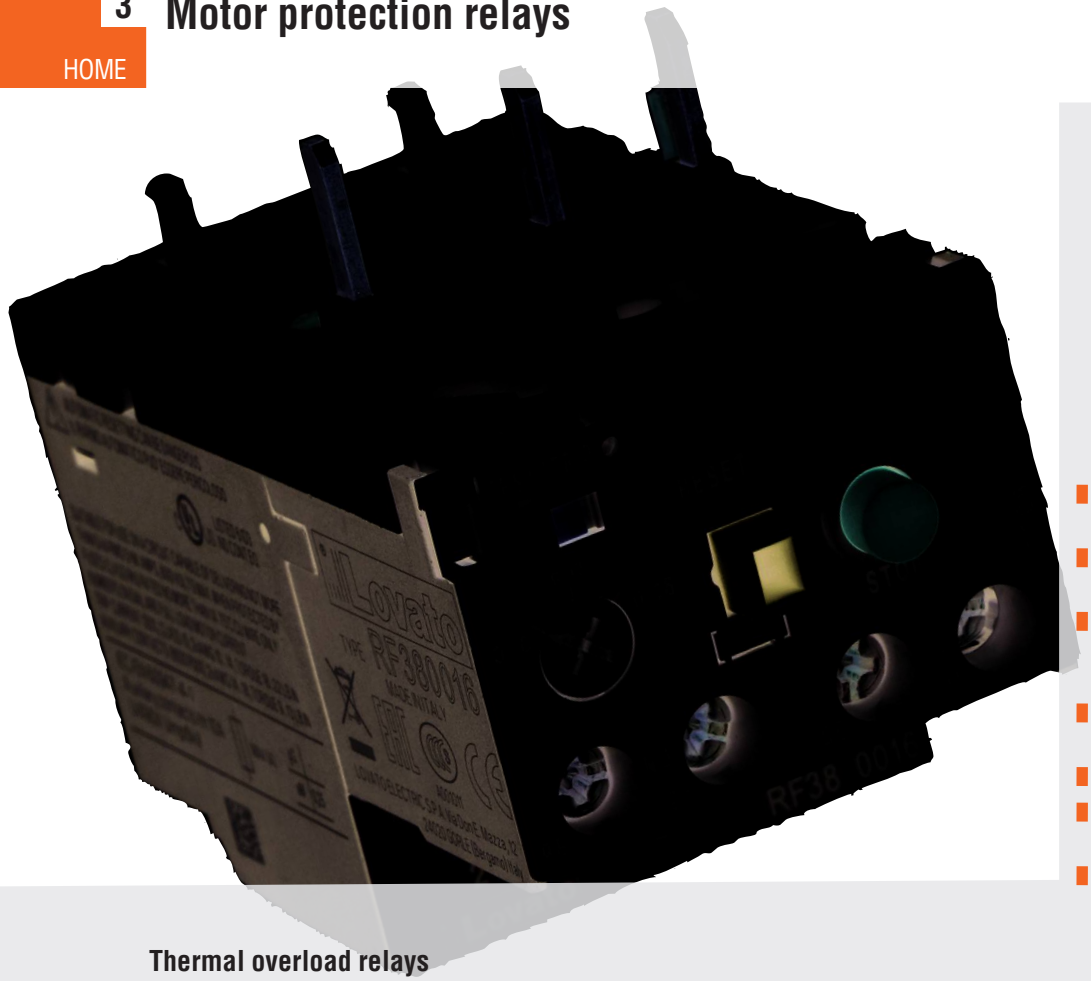
Motor control and protection

Motor protection relays



- Thermal overload relays for currents between 0.09 and 420A
- Electronic thermal overload relays for currents between 0.4 and 45A
- Electronic thermal overload relays with selectable tripping class: 5-10-20-30
- Phase failure sensitive and non phase failure sensitive versions
- Automatic and/or manual resetting
- Independent or direct mounting on contactor
- Thermistor protection relay.

SEC. - PAGE

Thermal overload relays
For BG series mini-contactors ..... 3 - 2
For BF series contactors ..... 3 - 4
For BF and B series contactors ..... 3 - 8
Accessories ..... 3 - 10

Electronic thermal overload relays
For BF series contactors ..... 3 - 11

Electronic relay
Thermistor protection relays ..... 3 - 12

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	TYPE OF THERMAL OVERLOAD RELAY					ELECTRONIC THERMAL OVERLOAD RELAYS	
Type of contactor	Phase failure / single phase sensitive		Non phase failure / non single phase sensitive		Pages	Phase failure / single phase sensitive Manual/hand or automatic reset	Pages
	Manual/hand reset	Automatic reset	Manual/hand reset	Automatic reset			
BG06...BG12	**RF9**	**RFA9**	**RFN9**	**RFNA9**	3-2 and 3-3	—	—
BF09...BF38	**RF38**		**RFN38**		3-4 and 3-6	RFE45	3-11
BF40...BF94	**RF82**	**RFA82**	**RFN82**	**RFNA82**	3-5 and 3-7	—	—
BF95...BF150❶	**RF110**	**RFA110**	**RFN110**	**RFNA110**	3-5 and 3-7	—	—
BF160...BF230	**RF200**		**RFN200**		3-8 and 3-9	—	—
BF195...BF400	**RF400**		**RFN400**				

❶ For currents higher than 110A use RF200 (independent mounting).



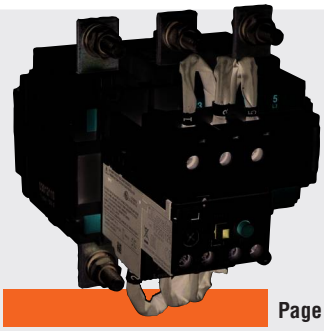
Page 3-2

FOR BG SERIES MINI-CONTACTORS
- Type RF9, phase failure sensitive, manual resetting
- Type RFA9, phase failure sensitive, automatic resetting
- Type RFN9, non phase failure sensitive, manual resetting
- Type RFNA9, non phase failure sensitive,automatic resetting.



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FOR BF SERIES CONTACTORS
- Type RF38, phase failure sensitive, manual or automatic resetting
- Type RFN38, non phase failure sensitive,manual or automatic resetting
- Type RF82 and RF110, phase failure sensitive, manual resetting
- Type RFA82 and RFA110, phase failure sensitive, automatic resetting
- Type RFN82 and RFN110, non phase failure sensitive, manual resetting
- Type RFNA82 and RFNA110, non phase failure sensitive, automatic resetting.



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FOR BF AND B SERIES CONTACTORS
- Type RF200 and RF420, phase failure sensitive, manual or automatic resetting
- Type RFN200 and RFN420, non phase failure sensitive, manual or automatic resetting.



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ELECTRONIC THERMAL OVERLOAD RELAYS FOR BF SERIES CONTACTORS
- Phase failure sensitive, manual or automatic resetting
- Selectable tripping class: 5-10-20-30
- High reliability and accuracy of tripping
- Minimal heat dissipation
- Wide current adjustment range.



Page 3-12

THERMISTOR PROTECTION RELAY
- 24VDC and 24 to 240VAC supply types.

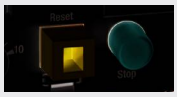
LOVATO Electric motor protection relays are suitable for new motors with high IE3 efficiency values

RF38 features

FRONT PROTECTION COVER OF THERMAL OVERLOAD RELAYS
A sealable protection cover is available. When fitted on to the relay front, it precludes all possible adjuster tampering and involuntary activation of the “Reset” and “Stop” buttons of the thermal overload relay.



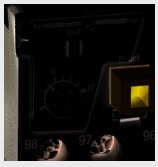
CLEAR IDENTIFICATION OF THERMAL OVERLOAD RELAY MANUAL OR AUTOMATIC RESETTING
The RF38 thermal overload relay is supplied configured for manual resetting. Breaking the plate below the “Reset” button allows for the automatic resetting configuration.



FIXING EASE OF THE THERMAL OVERLOAD RELAY
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal.
Complete relay fixing is done in a single operation, with no need of other connections.



SEALABLE RELAY COVER
A handy closing flap feature excludes any tampering of the thermal overload relay adjuster.



Lovato electric

Phase failure / single phase sensitive Three poles (three phase)



11RF9...



11RFA9...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RF9015	0.09...0.15	0.25	—	—	1	0.116
11RF9023	0.14...0.23	0.5	—	1	1	0.116
11RF9033	0.2...0.33	0.5	1	1	1	0.116
11RF905	0.3...0.5	1	2	3	1	0.116
11RF9075	0.45...0.75	1	2	3	1	0.116
11RF91	0.6...1	2	4	3	5	0.116
11RF91V5	0.9...1.5	2	4	6	5	0.116
11RF92V3	1.4...2.3	4	6	10	5	0.116
11RF933	2...3.3	4	10	10	5	0.116
11RF95	3...5	6	16	15	5	0.116
11RF975	4.5...7.5	8	20	25	5	0.116
11RF910	6...10	10	32	30	5	0.116
11RF915	9...15	16	40	45	5	0.116
AUTOMATIC RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RFA9015	0.09...0.15	0.25	—	—	1	0.116
11RFA9023	0.14...0.23	0.5	—	1	1	0.116
11RFA9033	0.2...0.33	0.5	1	1	1	0.116
11RFA905	0.3...0.5	1	2	3	1	0.116
11RFA9075	0.45...0.75	1	2	3	1	0.116
11RFA91	0.6...1	2	4	3	1	0.116
11RFA91V5	0.9...1.5	2	4	6	1	0.116
11RFA92V3	1.4...2.3	4	6	10	1	0.116
11RFA933	2...3.3	4	10	10	1	0.116
11RFA95	3...5	6	16	15	1	0.116
11RFA975	4.5...7.5	8	20	25	1	0.116
11RFA910	6...10	10	32	30	1	0.116
11RFA915	9...15	16	40	45	1	0.116

NOTE: two pole (single phase) versions are available on request.
Add the letter "S" in the order code e.g. 11RF9015 is three pole; 11RFS9015 two pole.
The appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

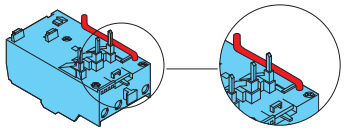
Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard power ratings exist; select relay according to current consumption.

NOTE: to facilitate connection between the auxiliary NC contact of the RF...9 thermal relay and terminal A2 of the contactor, insert the conductor into the appropriate conduit as shown.

RF9...
RFA9...



Certifications and compliance
Certifications obtained:

Type	cULus	CSA	EAC	CCC
RF9... - RFA9...	●	●	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

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.

Non phase failure / non single phase sensitive Three poles (three phase)



11RFN9...



11RFNA9...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RFN9015	0.09...0.15	0.25	—	—	1	0.123
11RFN9023	0.14...0.23	0.5	—	1	1	0.123
11RFN9033	0.2...0.33	0.5	1	1	1	0.123
11RFN905	0.3...0.5	1	2	3	1	0.123
11RFN9075	0.45...0.75	1	2	3	1	0.123
11RFN91	0.6...1	2	4	3	1	0.123
11RFN91V5	0.9...1.5	2	4	6	1	0.123
11RFN92V3	1.4...2.3	4	6	10	1	0.123
11RFN933	2...3.3	4	10	10	1	0.123
11RFN95	3...5	6	16	15	1	0.123
11RFN975	4.5...7.5	8	20	25	1	0.123
11RFN910	6...10	10	32	30	1	0.123
11RFN915	9...15	16	40	45	1	0.123
AUTOMATIC RESETTING. Direct mounting on BG06, BG09, BG12 mini-contactors.						
11RFNA9015	0.09...0.15	0.25	—	—	1	0.123
11RFNA9023	0.14...0.23	0.5	—	1	1	0.123
11RFNA9033	0.2...0.33	0.5	1	1	1	0.123
11RFNA905	0.3...0.5	1	2	3	1	0.123
11RFNA9075	0.45...0.75	1	2	3	1	0.123
11RFNA91	0.6...1	2	4	3	1	0.123
11RFNA91V5	0.9...1.5	2	4	6	1	0.123
11RFNA92V3	1.4...2.3	4	6	10	1	0.123
11RFNA933	2...3.3	4	10	10	1	0.123
11RFNA95	3...5	6	16	15	1	0.123
11RFNA975	4.5...7.5	8	20	25	1	0.123
11RFNA910	6...10	10	32	30	1	0.123
11RFNA915	9...15	16	40	45	1	0.123

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

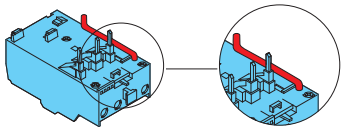
Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11
❷	❷	❷	0.06
❷	0.06	0.06	0.09
❷	0.09	0.09	0.12
0.06	0.12	0.12	0.18
0.09-0.12	0.18	0.18	0.25-0.37
0.12	0.25	0.25-0.37	0.55
0.18	0.37	0.55	0.75
0.25-0.37	0.55-0.75	0.75	1.1-1.5
0.55	1.1	1.1-1.5	1.5-2.2
0.75	1.5	2.2	3
1.1-1.5	2.2-3	3-4	4-5.5
2.2	4	4-5.5	7.5
3	5.5	7.5	11

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard power ratings exist; select relay according to current consumption.

NOTE: to facilitate connection between the auxiliary NC contact of the RFN...9 thermal relay and terminal A2 of the contactor, insert the conductor into the appropriate conduit as shown.

RFN9...
RFNA9...



Certifications and compliance
Certifications obtained:

Type	cULus	CSA	EAC	CCC
RFN9... - RFNA9...	●	●	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

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.

Phase failure / single phase sensitive Three poles (three phase)



RF38...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Direct mounting on BF09...BF38 contactors. Independent mounting with RFX3804 base.						
RF380016	0.1...0.16	0.25	—	1	1	0.160
RF380025	0.16...0.25	0.5	—	1	1	0.160
RF380040	0.25...0.4	0.5	1	3	1	0.160
RF380063	0.4...0.63	1	2	3	1	0.160
RF380100	0.63...1	2	4	3	5	0.160
RF380160	1...1.6	2	4	6	5	0.160
RF380250	1.6...2.5	4	6	10	5	0.160
RF380400	2.5...4	4	6	15	5	0.160
RF380650	4...6.5	8	16	25	5	0.160
RF381000	6.3...10	10	20	40	5	0.160
RF381400	9...14	16	32	50	5	0.160
RF381800	13...18	25	40	70	5	0.160
RF382300	17...23	25	50	90	5	0.160
RF382500	20...25	32	50	100	5	0.160
RF383200	24...32	40	63	120	1	0.160
RF383800	32...38	40	63	150	1	0.160

NOTE: two pole (single phase) versions are available on request.
Add the letter "S" in the order code e.g. RF381000 is three pole; RFS381000 two pole.
The appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06-0.09	0.09-0.12
0.06	0.09	0.12	0.18
0.09	0.12-0.18	0.18	0.25
0.12	0.25	0.25-0.37	0.37-0.55
0.18-0.25	0.37-0.55	0.55-0.75	0.75
0.37	0.75	1.1	1.1-1.5
0.55-0.75	1.1-1.5	1.5-2.2	2.2-3
1.1-1.5	2.2	3	4
1.5-2.2	3-4	4-5.5	5.5-7.5
3	5.5	5.5-7.5	11
4	7.5	11	15
5.5	11	11	18.5
5.5	11	15	22
7.5	15	18.5	30
11	18.5	22	30

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard powers ratings exist; select relay according to current consumption.

Certifications and compliance
Certifications obtained:

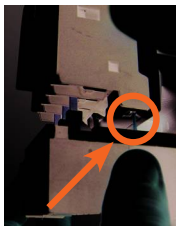
Type	c UL us	CSA	EAC	CCC	Register of shipping LROS
RF38	●	—	●	●	—

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

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.

FIXING EASE OF THE THERMAL OVERLOAD RELAY
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections.



Phase failure / single phase sensitive Three poles (three phase)



RF82...



RF110...



RFA82...



RFA110...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RF823300	20...33	40	63	110	1	0.365
RF824200	28...42	50	80	150	1	0.365
RF825000	35...50	50	100	175	1	0.365
RF826500	46...65	80	125	200	1	0.365
RF828200	60...82	100	200	250	1	0.365
RF829500	70...95	100	200	250	1	0.365
MANUAL RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RF110082	60...82	100	200	250	1	0.365
RF110095	70...95	100	200	350	1	0.365
RF110110	90...110	125	200	350	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RFA823300	20...33	40	63	110	1	0.365
RFA824200	28...42	50	80	150	1	0.365
RFA825000	35...50	50	100	175	1	0.365
RFA826500	46...65	80	125	200	1	0.365
RFA828200	60...82	100	200	250	1	0.365
RFA829500	70...95	100	200	250	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RFA110082	60...82	100	200	250	1	0.365
RFA110095	70...95	100	200	350	1	0.365
RFA110110	90...110	125	200	350	1	0.365

NOTE: two pole (single phase) versions are available on request.
Add the letter "S" in the order code e.g. RF828200 is three pole; RFS828200 two pole.
The appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

❷ For BF150 contactor used at current higher than 110A, use RF200 thermal overload relay (independent mounting).

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
5.5-7.5	11-15	15-18.5	18.5-22
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90
5.5-7.5	11-15	15-18.5	18.5-22
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

Certifications and compliance

Certifications obtained:

Type	cULus	CSA	EAC
RF82	●	—	●
RFA82	●	—	●
RF110	●	—	—
RFA110	●	—	—

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 82A FLA range and 10000 Amps RMS for 95A and 110A FLA range; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

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.

FIXING EASE OF THE THERMAL OVERLOAD RELAY

While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections (for RF...A... version characteristic not present).



Non phase failure / non single phase sensitive Three poles (three phase)



RFN38...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Direct mounting on BF09...BF38 contactors. Independent mounting with RFX3804 base.						
RFN380016	0.10...0.16	0.25	—	1	1	0.160
RFN380025	0.16...0.25	0.5	—	1	1	0.160
RFN380040	0.25...0.40	0.5	1	3	1	0.160
RFN380063	0.40...0.63	1	2	3	1	0.160
RFN380100	0.63...1	2	4	3	1	0.160
RFN380160	1...1.6	2	4	6	1	0.160
RFN380250	1.6...2.5	4	6	10	1	0.160
RFN380400	2.5...4	4	6	15	1	0.160
RFN380650	4...6.5	8	16	25	1	0.160
RFN381000	6.3...10	10	20	40	1	0.160
RFN381400	9...14	16	32	50	1	0.160
RFN381800	13...18	25	40	70	1	0.160
RFN382300	17...23	25	50	90	1	0.160
RFN382500	20...25	32	50	100	1	0.160
RFN383200	24...32	40	63	125	1	0.160
RFN383800	32...38	40	63	150	1	0.160

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
❷	❷	❷	0.06
❷	0.06	0.06-0.09	0.09-0.12
0.06	0.09	0.12	0.18
0.09	0.12-0.18	0.18	0.25
0.12	0.25	0.25-0.37	0.37-0.55
0.18-0,.25	0.37-0.55	0.55-0.75	0.75
0.37	0.75	1.1	1.1-1.5
0.55-0.75	1.1-1.5	1.5-2.2	2.2-3
1.1-1.5	2.2	3	4
1.5-2.2	3-4	4-5.5	5.5-7.5
3	5.5	5.5-7.5	11
4	7.5	11	15
5.5	11	11	18.5
5.5	11	15	22
7.5	15	18.5	30
11	18.5	22	30

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.
❷ No standard power ratings exist; select relay according to current consumption.

Certifications and compliance
Certifications obtained:

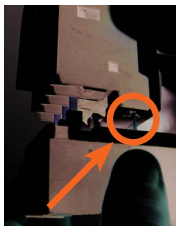
Type	cULus	CSA	EAC	CCC
RFN38	●	—	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

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.

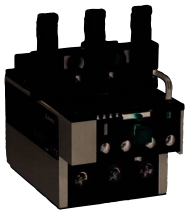
FIXING EASE OF THE THERMAL OVERLOAD RELAY
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections.



Non phase failure / non single phase sensitive Three poles (three phase)



RFN82...



RFN110...



RFNA82...



RFNA110...

Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RFN824200	28...42	50	80	150	1	0.365
RFN825000	35...50	50	100	175	1	0.365
RFN826500	46...65	80	125	200	1	0.365
RFN828200	60...82	100	200	250	1	0.365
RFN829500	70...95	100	200	250	1	0.365
MANUAL RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RFN110082	60...82	100	200	250	1	0.365
RFN110095	70...95	100	200	350	1	0.365
RFN110110	90...110	125	200	350	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF40...BF94 contactors. Independent mounting with 11G270 base.						
RFNA824200	28...42	50	80	150	1	0.365
RFNA825000	35...50	50	100	175	1	0.365
RFNA826500	46...65	80	125	200	1	0.365
RFNA828200	60...82	100	200	250	1	0.365
RFNA829500	70...95	100	200	250	1	0.365
AUTOMATIC RESETTING. Direct mounting on BF95...BF150 contactors❷. Independent mounting with 11G270 base.						
RFNA110082	60...82	100	200	250	1	0.365
RFNA110095	70...95	100	200	350	1	0.365
RFNA110110	90...110	125	200	350	1	0.365

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

❷ For BF150 contactor used at current higher than 110A, use RFN200 thermal overload relay (independent mounting).

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90
11	15-18.5	18.5-22	30-37
11	22	30	37-45
15-18.5	22-30	37-45	45-55
18.5-22	37-45	45-55	75
22	45	55	75-90
18.5-22	37-45	45-55	75
22	45	55	75-90
30	55	75	90

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

Certifications and compliance

Certifications obtained:

Type	cULus	CSA	EAC
RFN82	●	—	●
RFNA82	●	—	●
RFN110	●	—	—
RFNA110	●	—	—

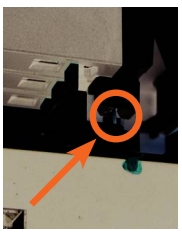
● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 82A FLA range and 10000 Amps RMS for 95A and 110A FLA range; the trip current is 120% FLA.
CSA – CSA certified for Canada only (File 54332) as Auxiliary Devices for use with magnetic contactors.

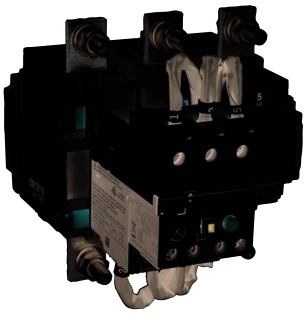
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

FIXING EASE OF THE THERMAL OVERLOAD RELAY

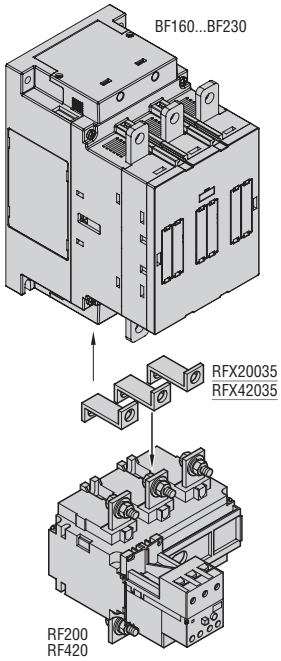
While the thermal overload relay is being linked to the contactor, its auxiliary contact fits on and connects to the coil terminal by rigid terminal. Complete relay fixing is done in a single operation, with no need of other connections (for RF...A... version characteristic not present).

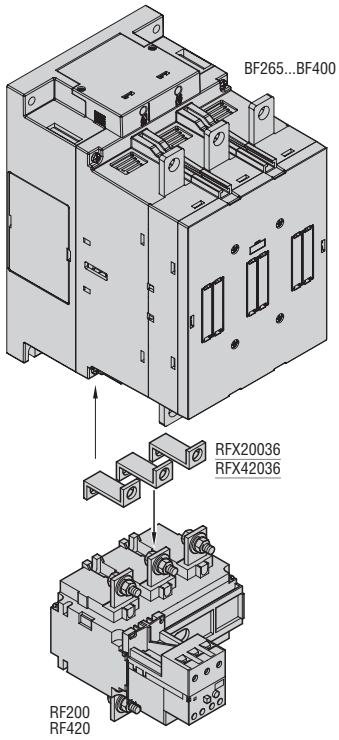


Phase failure / single phase sensitive Three poles (three phase)



RF200... - RF420...





Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX20035 links. BF265-BF330-BF400 using RFX20036 links.						
RF200100	60...100	100	160	500	1	2.150
RF200125	75...125	125	200	500	1	2.150
RF200150	90...150	160	250	500	1	2.150
RF200200	120...200	200	315	500	1	2.150
Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX42035 links. BF265-BF330-BF400 using RFX42036 links.						
RF420250	150...250	250	400	800	1	2.460
RF420300	180...300	315	500	800	1	2.460
RF420420	250...420	500	630	800	1	2.460

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

RELAYS FOR B500 AND B630 CONTACTORS

MANUAL OR AUTOMATIC RESETTING.
Consult Technical support for the relative order codes and detailed information; see contact details on inside front cover.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
18.5-25	33-51	45-63	59-92
22-37	40-63	55-80	75-110
25-45	51-80	63-100	92-140
37-59	75-100	92-140	129-184
45-75	92-132	110-162	140-220
55-92	100-162	129-198	180-280
75-110	129-198	180-280	250-368

NOTE: for 1000V powers, consult Technical support for information;see contact details on inside front cover.

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment .

Certifications and compliance
Certifications obtained:

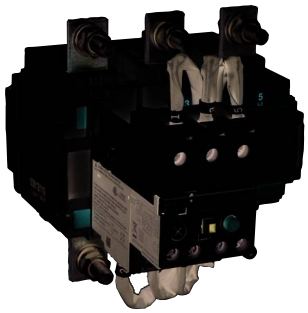
Type	c U L us	E A C
RF200	●	●
RF420	●	●

● Certified products.

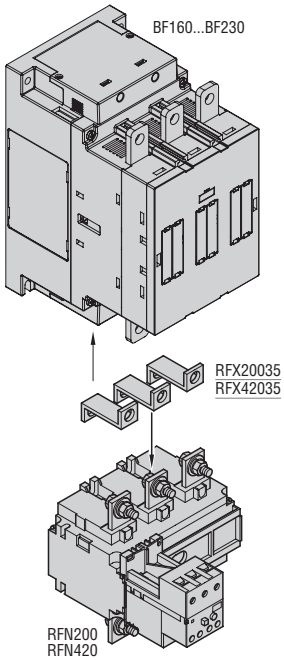
cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 150A FLA range, 10000 Amps RMS for 200A up to 300A FLA range and 18000 Amps for the 420A; the trip current is 120% FLA.

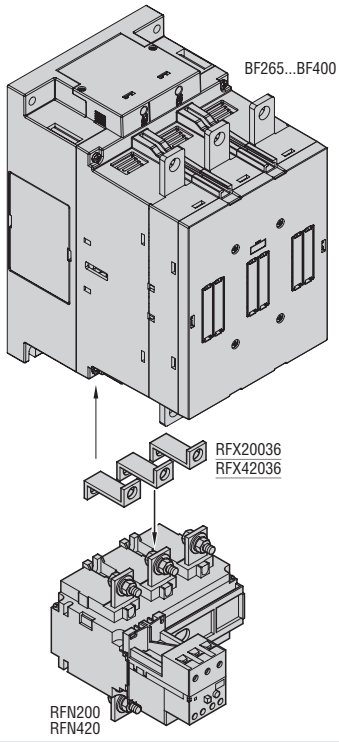
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Non phase failure / non single phase sensitive Three poles (three phase)



RFN200... - RFN420...





Order code	Adjustment range	Protection fuses IEC aM	gG	UL K5	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX20035 links. BF265-BF330-BF400 using RFX20036 links.						
RFN200100	60...100	100	160	500	1	2.150
RFN200125	75...125	125	200	500	1	2.150
RFN200150	90...150	160	250	500	1	2.150
RFN200200	120...200	200	315	500	1	2.150
Independent screw fixing or direct mounting on contactors: BF160-BF195-BF230 using RFX42035 links. BF265-BF330-BF400 using RFX42036 links.						
RFN420250	150...250	250	400	800	1	2.460
RFN420300	180...300	315	500	800	1	2.460
RFN420420	250...420	500	630	800	1	2.460

NOTE: the appropriate adjustment range of the overload relay should be selected on the basis of the motor nameplate full-load current when direct, across the line starting is considered.

RELAYS FOR B500 AND B630 CONTACTORS.

MANUAL OR AUTOMATIC RESETTING.
Consult Technical support for the relative order codes and detailed information; see contact details on inside front cover.

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
18.5-25	33-51	45-63	59-92
22-37	40-63	55-80	75-110
25-45	51-80	63-100	92-140
37-59	75-100	92-140	129-184
45-75	92-132	110-162	140-220
55-92	100-162	129-198	180-280
75-110	129-198	180-280	250-368

NOTE: for 1000V powers, consult Technical support for information;see contact details on inside front cover.

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

Certifications and compliance
Certifications obtained:

Type	c U L us	E A C
RFN200	●	●
RFN420	●	●

● Certified products.

cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices – Thermal Overload Relays, 600VAC, open type, ambient compensated, 5000 Amps RMS symmetrical short circuit rating up to 150A FLA range, 10000 Amps RMS for 200A up to 300A FLA range and 18000 Amps for the 420A; the trip current is 120% FLA.

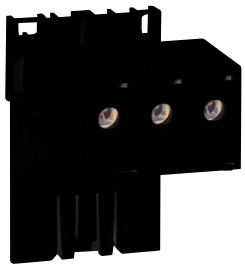
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1, UL 60947-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.


RFX20035


RFX3802


RFX3803


11G363


RFX3804


11G228

Order code	For relay		Qty per pkg	Wt
			n°	[kg]
Set of links for direct contactor mounting.				
RFX20035	RF...200 on contactor	BF160-BF195-BF230	1	0.250
RFX20036		BF265-BF330-BF400	1	0.360
RFX42035	RF...420 on contactor	BF160-BF195-BF230	1	0.313
RFX42036		BF265-BF330-BF400	1	0.500
Protection cover for thermal overload relay-contactor assembly.				
RFX3802	RF38 on contactor BF09-BF12-BF18-BF25		10	0.014
RFX3803	RF38 on contactor BF26-BF32-BF38		10	0.014
Protection shrouds for power terminals.				
BFX815❶	RF...200		6	0.026
BFX816❶	RF...420		6	0.046
Independent mounting. Screw fixing or 35mm DIN rail (IEC/EN/BS 60715) mounting.				
RFX3804	RF...38 and RFE45		5	0.082
11G270	RF...82 - RF...110		10	0.148
Electrical reset.				
11G228❷	RF...9 - RF...82 - RF...110		5	0.072
Sealing device.				
RFX3801	RF...38 - RF...200 - RF...420		10	0.002
11G233	RF...9 - RF...82 - RF...110		1	0.006

❶ Code for a single terminal.
To protect all thermal overload relay terminals order 6 pcs.
N.B. The terminals equipped with the links for direct contactor mounting RFX200... and RFX420... don't accept the protection.
❷ Replace with voltage digit. Standard voltages are:
– AC 50/60Hz 24V / 48V / 110-125V / 220-240V / 380-415V.

Operational characteristics
ELECTRICAL RESET 11G228

Control circuit voltage AC (50/60Hz)	V	12...550
Power consumption in AC	VA	300
Minimum reset time	ms	20
Terminals	Faston	6.3x0.8

NOTE: coils can remain supplied for a maximum interval of 500ms; 3 consecutive operations are allowed, followed by a 5 minute interval. Reset only if at least 1min has passed from overload tripping.It is recommended to use the wiring diagram on page 3-14.

INDEPENDENT MOUNTING
– Conductor cross section with one cable:
  • 6...10mm² / AWG 8 for RFX3804
  • 35mm² / AWG 2 for 11G270
– Tightening torque:
  • 2...2.5Nm / 18...22lb.in for RFX3804
  • 3.9Nm / 34lb.in for 11G270.

Certifications and compliance
Certifications obtained:

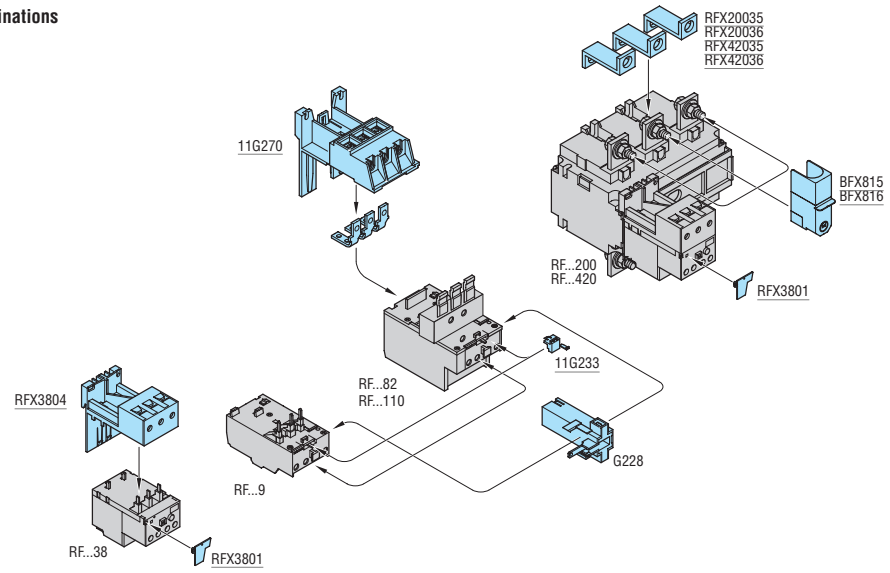
Type	c UL us	CSA	EAC
G361-G363 G373-G376-RFX20035-RFX42035	—	●	●
11G270	●	—	●
RFX3804	●	—	●

● Certified products.

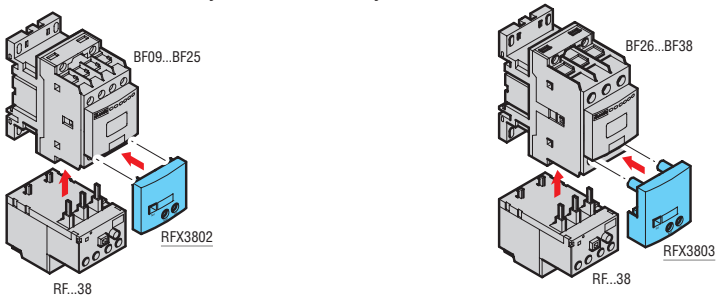
cULus – UL Listed for USA and Canada (cULus - File E93601) as Auxiliary Devices for thermal overload relays.
CSA – CSA certified for Canada only (File 54332) as Kits for industrial control equipment.

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.

Combinations



Protection cover for thermal overload relay-contactor assembly



Phase failure / single phase sensitive Three poles (three phase)



RFE45...

Order code	Adjustment range	Protection fuses IEC aM	gG	Qty per pkg	Wt
	[A]	[A]	[A]	n°	[kg]
MANUAL OR AUTOMATIC RESETTING. Direct mounting on BF09...BF38 contactors. Independent mounting with RFX3804.					
RFE450200	0.4...2	4	6	1	0.195
RFE450800	1.6...8	10	20	1	0.195
RFE453200	6.4...32	40	63	1	0.195
RFE454500	9...45	50	63	1	0.195

Three-phase IEC motor powers ❶

230V [kW]	400V [kW]	500V [kW]	690V [kW]
0.09...0.37	0.12...0.75	0.18...0.75	0.25...1.1
0.37...0.55	0.75...3	1.1...4	1.1...5.5
1.5...7.5	3...15	6.8...28	5.5...30
3...11	4...22	5.5...30	7.5...45

❶ The indicated powers apply to 4-pole motors; it is advisable to always check that the nameplate motor current is within the relay adjustment range.

General characteristics

The RFE... electronic thermal overload relays for BF series contactors are characterized by a wide current adjustment range and high reliability and accuracy of tripping. They are self powered by the main circuit current and therefore do not require separate auxiliary supply voltage. RFE electronic thermal overload relays are suitable for all types of motor starting thanks to the possibility to select several tripping classes. A single front push button is used to select the reset function, manual or automatic, and to activate or deactivate the STOP function.

Operational characteristics

- IEC power circuit rated insulation voltage Ui: 690V
- IEC auxiliary circuit rated insulation voltage Ui: 690V
- rated impulse withstand voltage: 8kV
- rated frequency: 50/60Hz
- maximum rated current: 45A
- heat dissipation per phase: <1W
- selectable tripping classes: 5-10-20-30
- phase failure sensitive
- mounting position: Any
- sealable current adjuster and dip switches for tripping class selection
- degree of protection: IP20 on front.

Certifications and compliance

Certifications obtained: cULus.
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.

Thermistor protection relays



31DRPT...

Order code	Rated auxiliary supply voltage	Qty per pkg	Wt.
	[V]	n°	[kg]
DC supply (version for 35mm DIN rail IEC/EN/BS 60715).			
31DRPTC24	24VDC❶	1	0.269
AC supply (version for 35mm DIN rail IEC/EN/BS 60715).			
31DRPT24	24VAC	1	0.269
31DRPT110	110VAC	1	0.269
31DRPT220	220...240VAC	1	0.269
Accessories.			
Order code	Description	Qty per pkg	Wt
		n°	[kg]
31CE106	Adapter for screw fixing of DRPT relay on mounting plate.	10	0.008

❶ Galvanic isolation between supply and measuring circuits does not exist.

General characteristics
The DRPT is a thermal protection relay for motors equipped with thermistor PTC sensors immersed in the winding heads. The maximum number of thermistors to be used is limited by the resistance of all the sensors connected in series; total ohmic value is not to exceed 1.5kΩ at 25°C.
The DRPT type has fail-safe operation: the protective feature trips even in the case the PTC circuit is disconnected or there is a lack of voltage.
Resetting is manual or automatic.

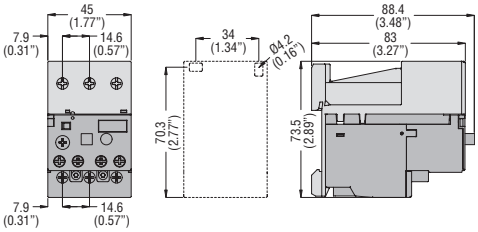
Operational characteristics
– Supply circuit:
  • Rated frequency: 50-60Hz for AC types only
  • Operational limits: 0.85...1.1 Us
  • Maximum dissipation: 2.5W
  • Connection: Permanent
– Measuring circuit:
  • Type of connectable PTC sensor: According to DIN 44081
  • Total PTC resistance at 25°C: ≤1.5kΩ
  • Tripping resistance: 2.7...3.1kΩ
  • Resetting resistance: 1.5...1.8kΩ
  • Voltage at PTC terminals: ≤ 2.5VDC
– Remote resetting:
  • Control: NC contact opening
  • Contact voltage: 5VDC
  • Current consumption: About 1mA
– Relay output:
  • Arrangement: 1 relay with 2 changeover contacts
  • Rated operational voltage Ue: 250VAC
  • Conventional free air thermal current Ith: 5A
  • Designation to IEC/EN/BS 60947-5-1: B300
  • Mechanical life: $50x10^6$ cycles
  • Electrical life (with rated load): $2x10^5$ cycles
– Indications:
  • Green LED indicator for power ON
  • Red LED indicator for relay state TRIP
– Connections:
  • Conductor section $2x1.5mm^2$ with ferrule (max)
  • Tightening torque: 0.8-1.2Nm
– Ambient conditions:
  • Operating temperature: -10...+60°C
  • Storage temperature: -30...+80°C
– Housing:
  • Snap on 35mm DIN rail (IEC/EN/BS 60715)
  • For screw fixing, use CE106 adapter
  • Degree of protection
    – IP40 housing
    – IP20 terminals.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60255-5.

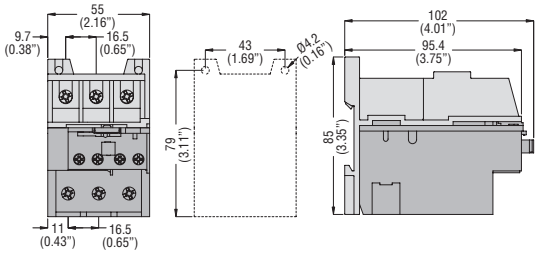
THERMAL OVERLOAD RELAYS DIMENSIONS WITH CONTACTORS SEE ON CHAPTER 2

ACCESSORIES FOR THERMAL OVERLOAD RELAYS

RFX3804 base c/w RF...38 thermal relay

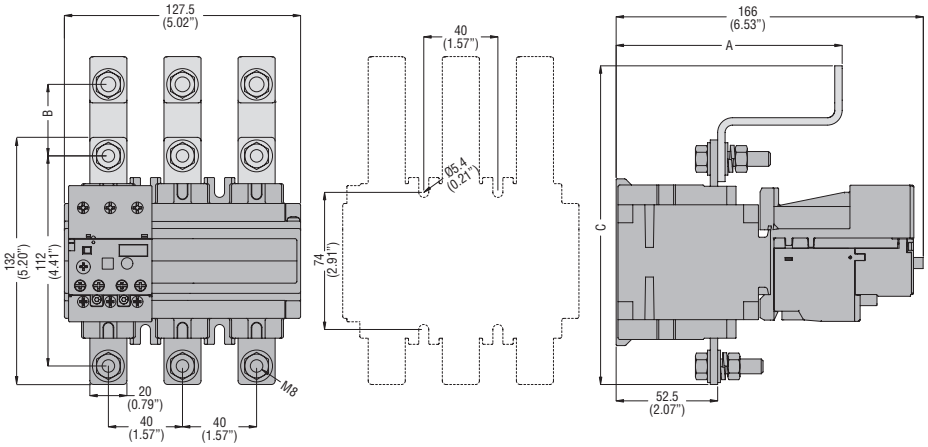


11G270 base c/w RF...82 and RF...110 thermal relay



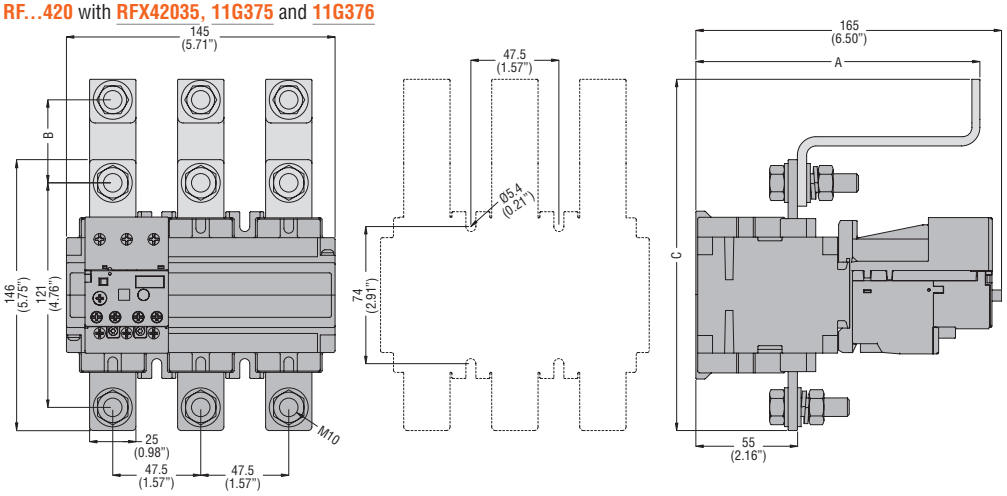
THERMAL RELAYS WITH LINKS

RF...200 with **RFX20035**, **11G372** and **11G373**



	A	B	C
RFX20035	120 (4.72")	40 (1.57")	174.5 (6.87")
RFX20036	146 (5.75")	45 (1.77")	179.5 (7.07")

RF...420 with **RFX42035**, **11G375** and **11G376**

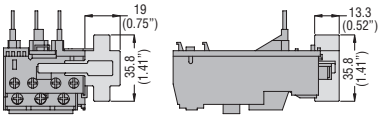


	A	B	C
RFX42035	122.5 (4.82")	45 (1.77")	191 (7.52")
RFX42036	148 (5.83")	45 (1.77")	191 (7.52")

ADD-ON BLOCKS FOR THERMAL OVERLOAD RELAYS

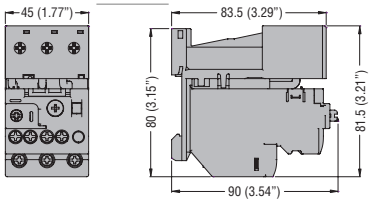
RF...9, RF...82 and RF...110

11G228... reset



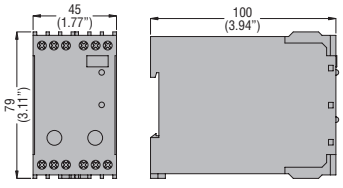
ELECTRONIC THERMAL OVERLOAD RELAYS

RFE45 with RFX3804

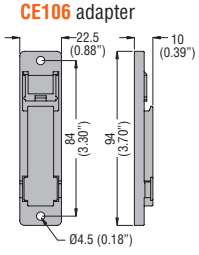


THERMISTOR PROTECTION RELAYS

DRPT

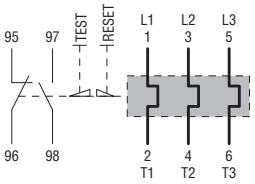


CE106 adapter

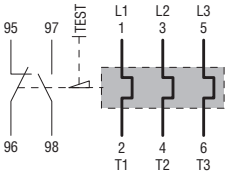


THERMAL OVERLOAD RELAYS FOR BG MINI-CONTACTORS

RF9 - RFN9

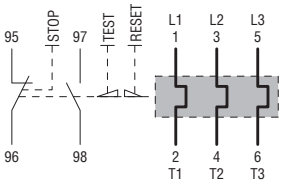


RFA9 - RFNA9

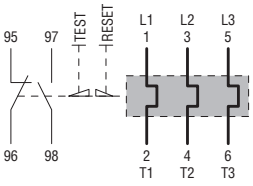


THERMAL OVERLOAD RELAYS FOR BF CONTACTORS

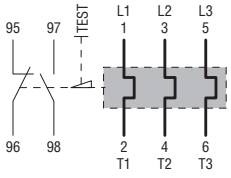
RF38 - RFN38



RF82 - RFN82 - RF110 - RFN110

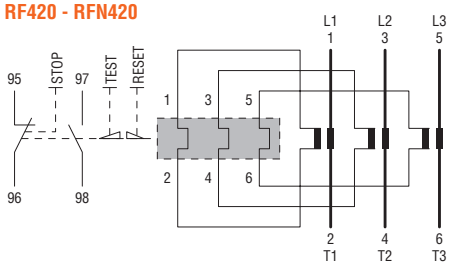


RFA82 - RFNA82 - RFA110 - RFNA110



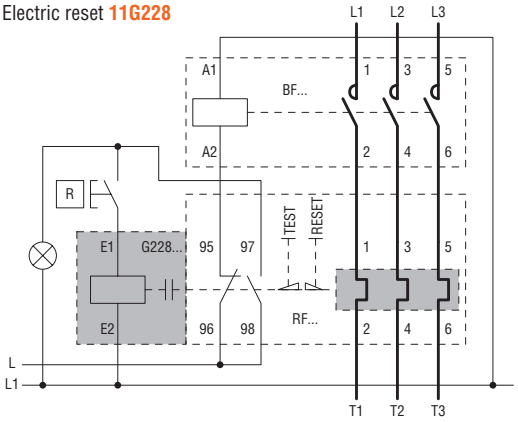
THERMAL OVERLOAD RELAYS FOR B CONTACTORS

RF200 - RFN200
RF420 - RFN420



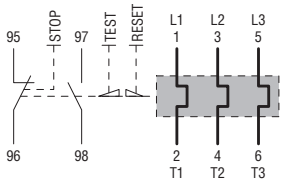
ADD-ON BLOCKS FOR THERMAL OVERLOAD RELAYS RF9 - RF82 - RF110

Electric reset **11G228**



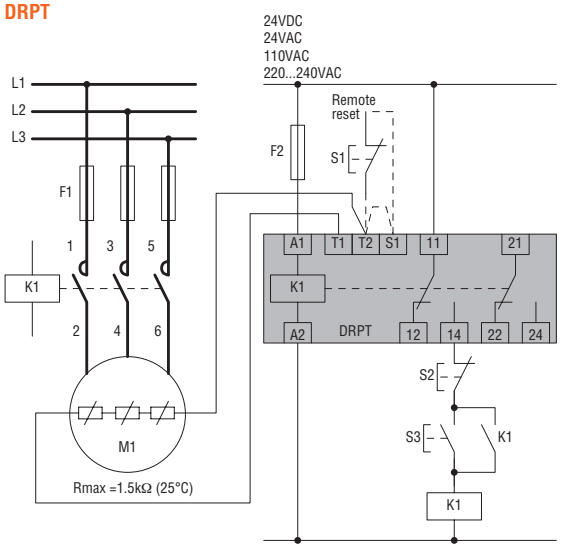
ELECTRONIC THERMAL OVERLOAD RELAYS

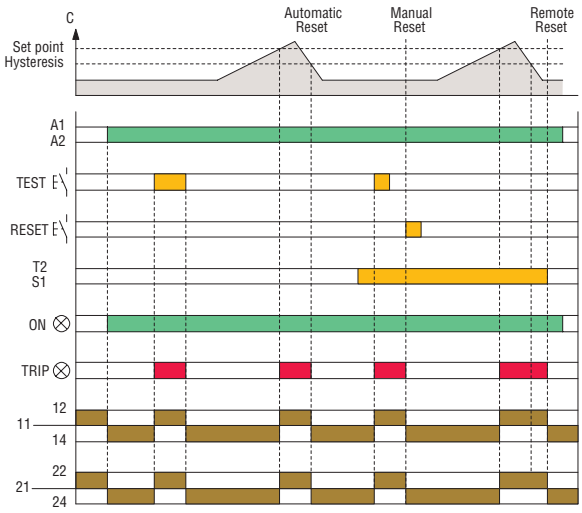
RFE45



THERMISTOR PROTECTION RELAYS

DRPT





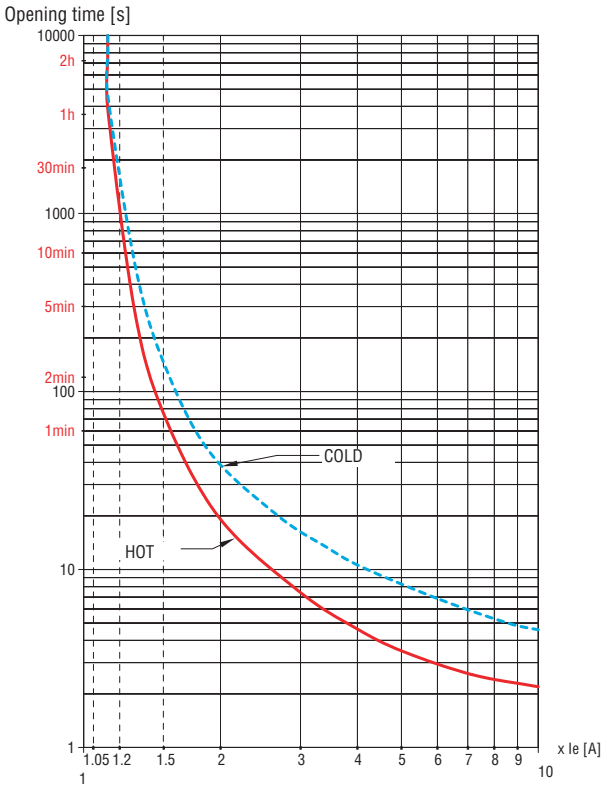
Phase failure/single phase sensitive manual reset Phase failure sensitive automatic reset Non phase failure/non single phase sensitive manual reset Non phase failure/non single phase sensitive automatic reset			**RF9 RFA9 RFN9 RFNA9**	**RF38❶ RFN38❶**	**RF82-RF110 RFA82-RFA110 RFN82-RFN110 RFNA82-RFNA110**		**RFE45**	**RF200❶ RFN200❶**	**RF420❶ RFN420❶**
POWER CIRCUIT CHARACTERISTICS									
IEC rated insulation voltage Ui		V	690	690	690		690	1000	1000
IEC rated impulse withstand voltage Uimp		kV	8 ❻	6	8 ❻		6	6	6
Frequency limit		Hz	0...400	0...400	0...400		50...60	50...60	50...60
Operational range	from	A	0.09	0.1	20	60	0.4	60	150
	to	A	15	38	95	110	45	200	420 ❷
Tripping class			10A				5-10-20-30	10A	
Particular characteristics			Test button - Trip indicator						
Connection			Direct				With current transformers ❸		
Terminals	Type		Screw and washer		Yoke clamp		Screw and washer	Screw and flat washer	
	Screw		M4	M4	M5		M4	M8	M10
	Terminal width	mm	9.8	12.6	9		12	20	25
	Phillips	n°	2	2	2		2	13mm❹	18mm❹
Tightening torque for power terminals		Nm	2.3	2...2.5	3.9		3.1	18	35
		lb.in	20	14...18	34		28	159	310
Maximum conductor section connectable									
	AWG	N°	10	8	2		6	--	--
	Flexible w/o lug	mm²	6	10	35		16	--	--
	Flexible c/w lug	mm²	10	6	--		10	150	2 x 150
	Bar	mm	--	--	--		--	25 x 3	30 x 5
Dissipation per phase		W	0.7...2.4	0.7...2.4	2.0...4.2		<1	0.7...2.4	0.7...2.4
AUXILIARY CIRCUIT CHARACTERISTICS									
Available contacts	NO	N°	1						
	NC	N°	1						
IEC rated insulation voltage		V	690						
IEC conventional free air thermal current Ith		A	10				5	10	
Terminals with screw and washer	Screw		M3.5						
	Terminal width	mm	8				7	8	
	Phillips	n°	1	2	1		2	2	2
Maximum conductor section connectable									
	Flexible w/o lug	mm²	2.5						
	Flexible c/w lug	mm²	2.5						
Tightening torque for auxiliary terminals		Nm	1	0.8...1	1		0.8	0.8...1	0.8...1
		lb.in	8.8	9...13	8.8		9	9...13	9...13
UL/CSA and IEC/EN/BS 60947-5-1 designation			B600-P600 ❺	B600-R300	B600-P600 ❻		B600-R300	B600-R300	B600-R300
AMBIENT CONDITIONS									
Operating temperature		°C	-20...+55	-25...+60	-20...+55		-25...+70	-25...+60	-25...+60
Storage temperature		°C	-55...+70	-50...+70	-55...+70		-55...+80	-50...+70	-50...+70
Compensation temperature		°C	-15...+55	-20...+60	-15...+55		-25...+70	-20...+60	-20...+60
Maximum altitude		m	3000						
Operation position	Normal		On vertical plane						
	Allowable		±30°						
Mounting			On contactor or separately						

❶ With manual and automatic resetting.
❷ For currents higher than 420A, consult Technical support for information; see contact details on inside front cover.
❸ Standard supplied.
❹ Metric wrench/spanner.
❺ C600-R300 for automatic reset type.
❻ 6kV for auxiliary terminals.

TRIP CHARACTERISTIC FOR RF THERMAL OVERLOAD RELAYS (AVERAGE TIME)

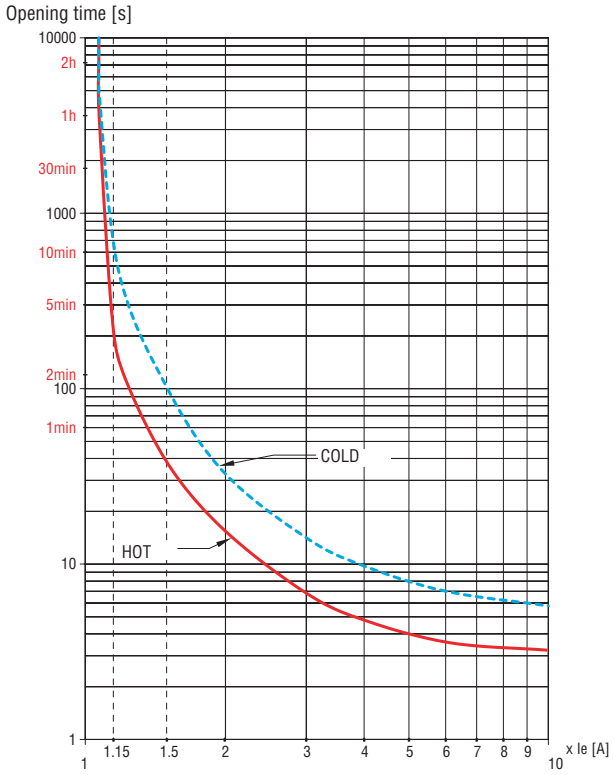
Three-phase balanced operation

RF9 RF38 RF82 RF110
RFA9 RFN38 RFA82 RFA110
RFN9 RFN82 RFN110
RFNA9 RFNA82 RFNA110

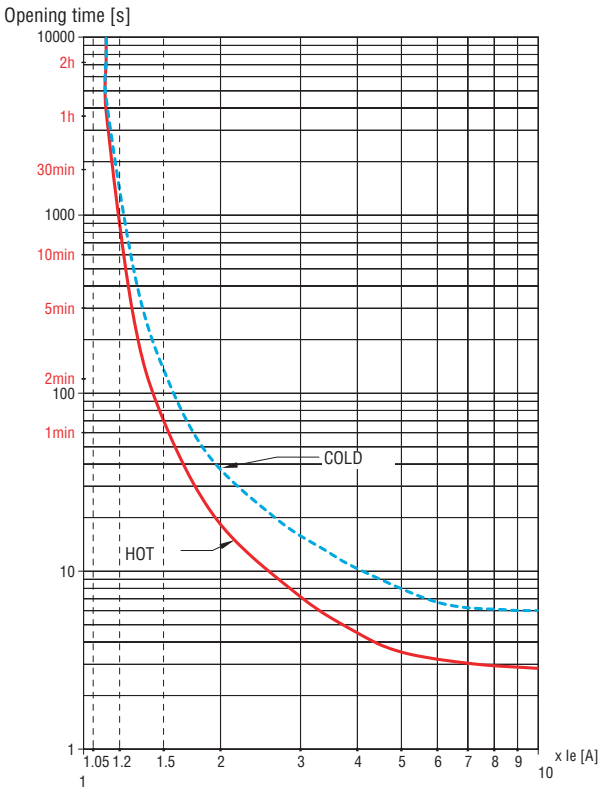


Two-phase operation (phase failure/single phase)

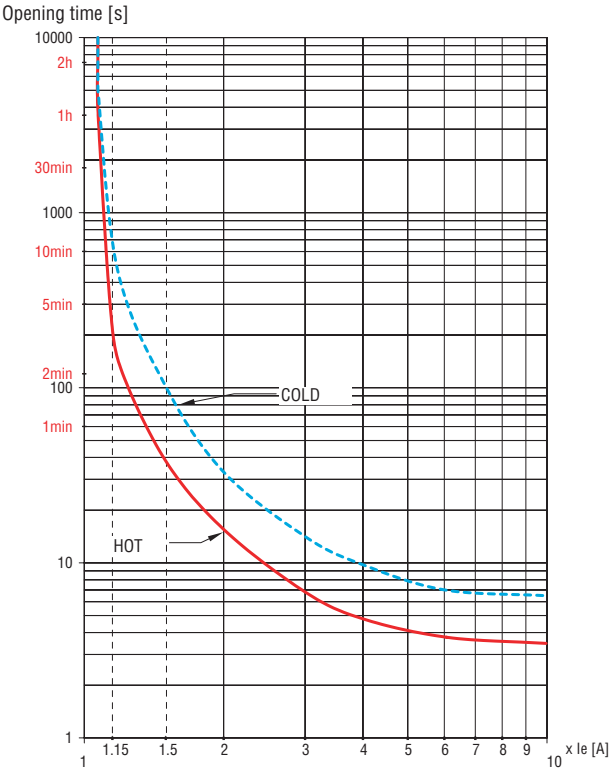
RF9 RF38 RF82 RFA110
RFA9 RFA82 RFNA110



RF200 RF420
RFN200 RFN420



RF200 RF420

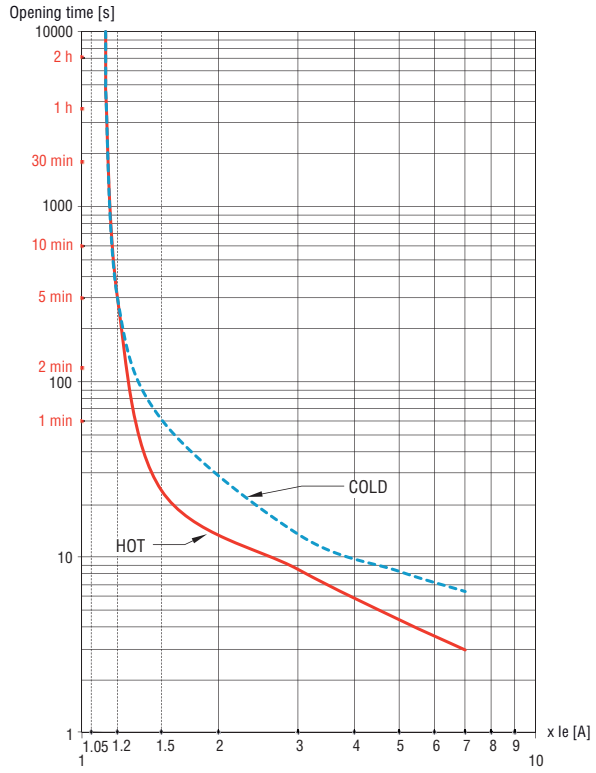


Tripping times can have a ±20% deviation with respect to the average tripping curve values above.

TRIP CHARACTERISTIC FOR RFE ELECTRONIC THERMAL OVERLOAD RELAYS

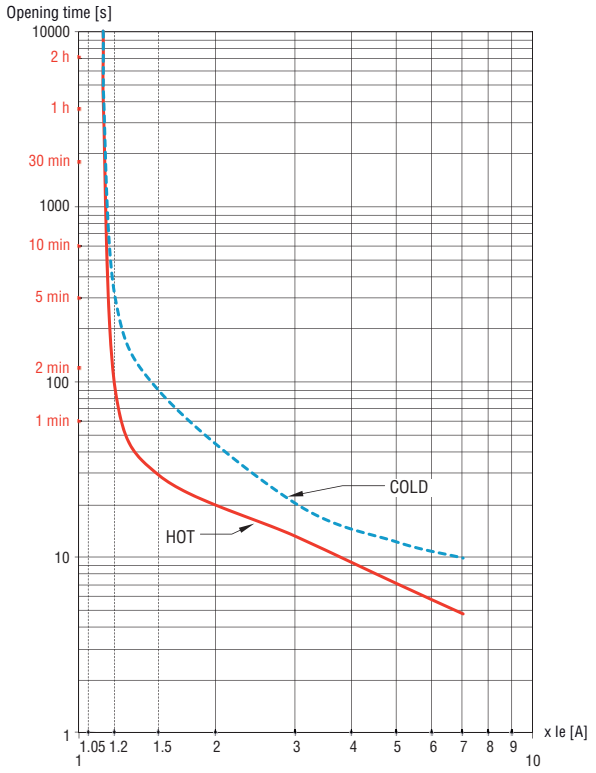
Three-phase balanced operation; class 5

RFE45



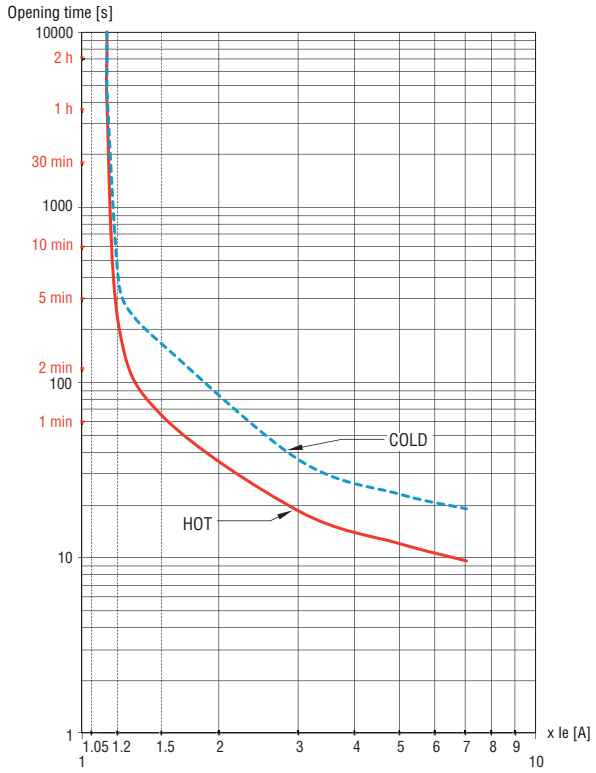
Three-phase balanced operation; class 10

RFE45



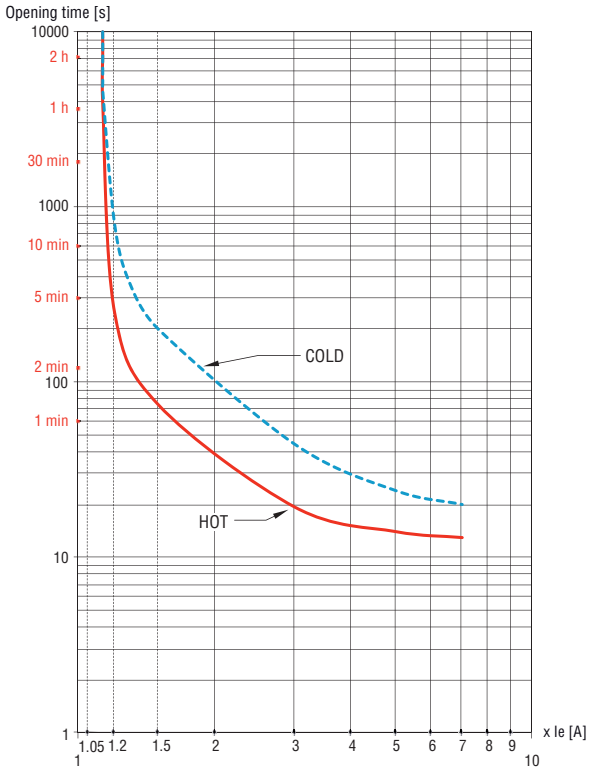
Three-phase balanced operation; class 20

RFE45



Three-phase balanced operation; class 30

RFE45



Note: with phase asymmetry >40% tripping in 3s max.

Electronic and electromechanical starters



- Electronic motor starters in compact enclosure 22.5mm width
- Direct-on-line and reversing starter versions with integrated motor thermal protection
- Versions with or without STO (Safe Torque Off) emergency stop
- Direct-on-line starters in non-metallic enclosure complete with or without thermal relay
- Versions with START/STOP or RESET pushbuttons
- Non-metallic enclosures for customer-assembled starters
- Reversing and changeover contactor assemblies
- Star-delta starters, open frame and in non-metallic enclosure versions.

	SEC. - PAGE
Electronic motor starters	**4 - 2**
Direct-on-line starters - Full voltage across the line - Non reversing	
Enclosed with thermal relay	4 - 3
Enclosed without thermal relay	4 - 4
Enclosed with motor protection circuit breaker	4 - 5
Ratings for USA and CANADA	4 - 26
Reversing contactor assemblies 3 poles	**4 - 6**
Changeover contactor assemblies 4 poles	**4 - 6**
Star-delta starters	
Open frame	4 - 7
Enclosed	4 - 8
Non-metallic enclosure for starters	4 - 8
Empty non-metallic enclosures	
Enclosures	4 - 9
Accessories and spare parts	4 - 9
Combinations	4 - 11
Dimensions	**4 - 17**
Wiring diagrams	**4 - 22**



Page 4-2

ELECTRONIC MOTOR STARTERS

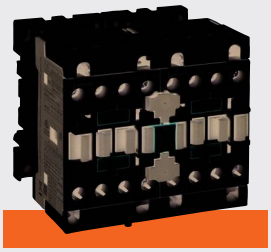
- For the command of motors up to 2.4A or 7A (500V/AC53a)
- Direct-on-line or reversing starters
- Integrated motor thermal protection
- Versions with or without STO (Safe Torque Off) emergency stop
- Compact enclosure 22.5mm width
- 35mm DIN rail mounting.



Page 4-3

DIRECT-ON-LINE STARTERS

- Motor ratings up to 80A 440V in IEC AC3 duty
- Motor rating up to 52A 600V per UL/CSA (see page 4-26)
- 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 3 POLES

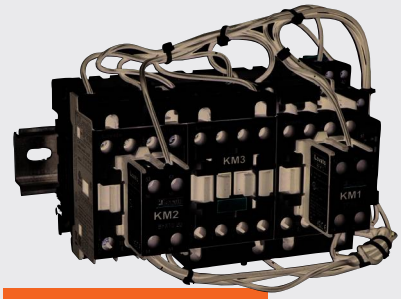
- For three-phase motor control 9...25A 440V / 4...12.5kW 400V, in IEC AC3 duty and up to 15HP 600V per UL/CSA
- Versions with built-in or external mechanical interlock
- Complete with rigid connections
- PCB version 9A 440V / 4kW 400V in IEC AC3 duty; 5HP 300V per UL/CSA.



Page 4-6

CHANGEOVER CONTACTOR ASSEMBLIES 4 POLES

- From 20A to 165A loads at ≤40°C in IEC AC1 duty
- For 20A general use per UL/CSA
- With built-in mechanical interlock.



Page 4-7

STAR-DELTA STARTERS OPEN FRAME

- Suitable for three-phase motor control, 16A...225A 440V / 7.5kW...132kW 400V ratings in IEC AC3 duty.



Page 4-8

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.



Page 4-9

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.

Lovato electric

Electronic motor starters



ME070RD024



ME070RSD024

new

Order code	Rated current Ie AC-53a	Rated power (400VAC)	Adjustment range	Qty per pkg	Wt
	[A]	[kW]	[A]	n°	[kg]
Direct-on-line starters with integrated motor thermal protection, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024FD024	2.4	0.75	0.18-2.4	1	0.300
ME070FD024	7.0	3	1.50-7.0	1	0.300
Reversing starters with integrated motor thermal protection, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024RD024	2.4	0.75	0.18-2.4	1	0.300
ME070RD024	7.0	3	1.50-7.0	1	0.300
Direct-on-line starters with integrated motor thermal protection and STO (Safe Torque Off) emergency stop, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024FSD024	2.4	0.75	0.18-2.4	1	0.300
ME070FSD024	7.0	3	1.50-7.0	1	0.300
Reversing starters with integrated motor thermal protection and STO (Safe Torque Off) emergency stop, operational voltage Ue ≤500VAC, auxiliary and control supply voltage 24VDC.					
ME024RSD024	2.4	0.75	0.18-2.4	1	0.300
ME070RSD024	7.0	3	1.50-7.0	1	0.300

General characteristics

The ME... series of electronic motor starters is achieved in enclosure of just 22.5mm width, ideal solution for applications that require a very high number of starts and space saving inside the cabinet. They are made with hybrid technology, that combines the advantages of extremely long working life of a wear-free semiconductor device and the robustness of a mechanical relay. The range is composed of direct-on-line and reversing starters for motors up to 2.4 or 7A, for systems with rated voltage up to 500VAC. All the types integrate the electronic motor thermal protection and the versions with built-in STO (Safe Torque Off) are provided with emergency stop function. The multiple functions are integrated in one single device of extremely compact dimensions, with the possibility to install side-by-side, making the ME range of electronic starters the best solution for the applications that combine the requirements of space saving, reduction of the installation and wiring time with a high number of operations and a long electrical durability. Typical applications can include conveyors, packaging machines, automatic doors, escalators, sorting equipment, access control systems, augers, hoppers, machine tools and many others.

FUNCTIONALITIES
- Direct-on-line and reversing starters
- Rated motor current 2.4 or 7A
- Control three-phase asynchronous motors up to 500VAC
- Possibility to command also single-phase motors with poles connected in series (only forward running)
- Potentiometer for the adjustment of the rated motor current Ie
- Integrated electronic motor thermal protection with tripping class 10A
- Versions with STO (Safe Torque Off) emergency stop with Safety Integrity Level SIL3 (IEC/EN 61508) and Performance Level “PL e” (ISO 13489).

COMMANDS AND SIGNALLING
- 4 digital inputs:
  - 1 digital input for motor starting in forward direction
  - 1 digital input for motor starting in reversing direction (ME...R... only)
  - 1 digital input for reset mode selection of motor thermal protection alarm (automatic or manual)
  - 1 digital input for manual alarm reset
- 1 button on the front for manual alarm reset
- 3 integrated digital outputs:
  - 1 relay output with changeover contact for alarm signaling
  - 2 PNP digital outputs for motor running direction signaling
- 4 status LEDs on front for diagnostics:
  - POWER = presence of auxiliary supply
  - ALARM = alarm active
  - FORWARD = motor forward running
  - REVERSE = motor reverse running.

PROTECTIONS
- Motor thermal protection, against overload
- Protection against phase loss
- Protection against phase imbalance (current asymmetry) or load loss

Operational characteristics
- Rated thermal voltage Ue 40...500VAC
- Rated frequency 50/60Hz
- Auxiliary and control supply voltage 24VDC ±20%
- Rated operational current Ie AC-53a 2.4A or 7A
- Electrical life: 50 milion cycles
- Mechanical life: 15 milion cycles
- Output rarings:
  - relay output with changeover contact: 3A 230V AC15, 2A 24V DC13
  - PNP digital outputs: 24VDC 40mA max
- Operating temperature: -25...+70°C (see the derating curve on the technical manual)
- Storage temperature: -25...+80°C
- Relative humidity: 20...90% non-condensing
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Protection degree: IP20.

Certifications and compliance

Certifications: cULus.
Compliant with standards: IEC/EN/BS 609474-2, UL 60947-4-2, CSA C22.2 n° 60947-4-2. On the versions type ME...S..., the STO function is certified Safety Integrity Level 3 according to IEC/EN/BS 61508 and Performance Level PL e according to ISO 13849.

Enclosed with thermal overload relay


M0P...12


M0R...12


M1P...12


M1R...12


M2P...12


M2R...12


M25P03812


M25R03812


M3P...12


M3R...12

Order code	Relay adj range	IEC technical characteristics (≤440V) Ie	kW	Qty per pkg	Wt
	[A]	[A]	[kW]	n°	[kg]
Starters with Start and Stop/Reset pushbuttons ❷.					
M0P00912❶1	0.6-1	1	0.18-0.25	1	0.760
M0P00912❶1V5	0.9-1.5	1.5	0.37	1	0.760
M0P00912❶2V3	1.4-2.3	2.3	0.55-0.75	1	0.760
M0P00912❶33	2-3.3	3.3	1.1	1	0.760
M0P00912❶5	3-5	5	1.5-2.2	1	0.760
M0P00912❶75	4.5-7.5	7.5	2.2-3	1	0.760
M0P00912❶10	6-10	10	3-4	1	0.760
M0P01212❶15	9-15	12	5.5	1	0.760
M1P00912❶A4	0.63-1	1	0.25	1	1.040
M1P00912❶A5	1-1.6	1.6	0.37-0.55	1	1.040
M1P00912❶A6	1.6-2.5	2.5	0.75	1	1.040
M1P00912❶A7	2.5-4	4	1.1-1.5	1	1.040
M1P00912❶A8	4-6.5	6.5	2.2-3	1	1.040
M1P00912❶A9	6.3-10	10	3-4	1	1.040
M1P00912❶B0	9-14	13	5.5	1	1.040
M1P01812❶B1	13-18	18	7.5	1	1.040
M2P02512❶B2	17-23	23	11	1	1.220
M2P02512❶B3	20-25	25	11	1	1.220
M2P03212❶B4	24-32	32	15	1	1.300
M25P03812❶B5	32-38	38	18.5	1	2.880
M3P05012❶B6	35-50	50	18.5-22	1	3.760
M3P06512❶B7	46-65	65	30	1	3.760
M3P08012❶B8	60-82	80	37-45	1	3.760
Starters with Reset pushbuttons ❷.					
M0R00912❶1	0.6-1	1	0.18-0.25	1	0.720
M0R00912❶1V5	0.9-1.5	1.5	0.37	1	0.720
M0R00912❶2V3	1.4-2.3	2.3	0.55-0.75	1	0.720
M0R00912❶33	2-3.3	3.3	1.1	1	0.720
M0R00912❶5	3-5	5	1.5-2.2	1	0.720
M0R00912❶75	4.5-7.5	7.5	2.2-3	1	0.720
M0R00912❶10	6-10	10	3-4	1	0.720
M0R01212❶15	9-15	12	5.5	1	0.720
M1R00912❶A4	0.63-1	1	0.25	1	0.995
M1R00912❶A5	1-1.6	1.6	0.37-0.55	1	0.995
M1R00912❶A6	1.6-2.5	2.5	0.75	1	0.995
M1R00912❶A7	2.5-4	4	1.1-1.5	1	0.995
M1R00912❶A8	4-6.5	6.5	2.2-3	1	0.995
M1R00912❶A9	6.3-10	10	3-4	1	0.995
M1R00912❶B0	9-14	13	5.5	1	0.995
M1R01812❶B1	13-18	18	7.5	1	0.995
M2R02512❶B2	17-23	23	11	1	1.165
M2R02512❶B3	20-25	25	11	1	1.165
M2R03212❶B4	24-32	32	15	1	1.260
M25R03812❶B5	32-38	38	18.5	1	2.600
M3R05012❶B6	35-50	50	18.5-22	1	3.410
M3R06512❶B7	46-65	65	30	1	3.410
M3R08012❶B8	60-82	80	37-45	1	3.410

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: 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.

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

Components

Starter enclosure	Contactor	Thermal relay	Auxiliary contact block
M0PA	BG0910A	RF91	—
M0PA	BG0910A	RF91V5	—
M0PA	BG0910A	RF92V3	—
M0PA	BG0910A	RF933	—
M0PA	BG0910A	RF95	—
M0PA	BG0910A	RF975	—
M0PA	BG0910A	RF910	—
M0PA	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
M0RA	BG0910A	RF91	—
M0RA	BG0910A	RF91V5	—
M0RA	BG0910A	RF92V3	—
M0RA	BG0910A	RF933	—
M0RA	BG0910A	RF95	—
M0RA	BG0910A	RF975	—
M0RA	BG0910A	RF910	—
M0RA	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

Operational characteristics
Refer to page 4-4 for details.

Certifications and compliance
Refer to page 4-4 for details.

Special M3... versions
Refer to page 4-4 for details.

UL/CSA HP ratings
See page 4-26.

Enclosed without thermal overload relay


M0P...10


M0R...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 ❷.			
M0P00910❶	10	1	0.667
M0P01210❶	12	1	0.667
M1P00910❶	13	1	0.910
M1P01810❶	18	1	0.910
M2P02510❶	25	1	1.060
M2P03210❶	32	1	1.162
M25P03810❶	38	1	2.360
M3P05010❶	50	1	3.110
M3P06510❶	65	1	3.110
M3P08010❶	80	1	3.110
Starters with Reset pushbutton ❷.			
M0R00910❶	10	1	0.627
M0R01210❶	12	1	0.627
M1R00910❶	13	1	0.867
M1R01810❶	18	1	0.867
M2R02510❶	25	1	1.020
M2R03210❶	32	1	1.110
M25R03810❶	38	1	2.320
M3R05010❶	50	1	3.070
M3R06510❶	65	1	3.070
M3R08010❶	80	1	3.070

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: M0R00910024 for direct-on-line starter in M0 type enclosure with Reset button, 9A /AC3 contactor with 24VAC 50/60Hz coil.
M0P0091002460 for direct-on-line starter in M0 type enclosure with Start and Stop/Reset buttons , 9A /AC3 contactor with 24VAC 60Hz coil.
❷ 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	RF9❸	—
M0PA	BG1210A	RF9❸	—
M1PA	BF0910A	RF38❹	—
M1PA	BF1810A	RF38❹	—
M2PA	BF2510A	RF38❹	—
M2PA	BF3200A	RF38❹	G41810
M25PA	BF3800A	RF38❹	G41810
M3PA	BF5000A	RF82❺	G41810
M3PA	BF6500A	RF82❺	G41810
M3PA	BF8000A	RF82❺	G41810
M0RA	BG0910A	RF9❸	—
M0RA	BG1210A	RF9❸	—
M1RA	BF0910A	RF38❹	—
M1RA	BF1810A	RF38❹	—
M2RA	BF2510A	RF38❹	—
M2RA	BF3200A	RF38❹	G41810
M25RA	BF3800A	RF38❹	G41810
M3RA	BF5000A	RF82❺	G41810
M3RA	BF6500A	RF82❺	G41810
M3RA	BF8000A	RF82❺	G41810

❸ For thermal overload relay selection, refer to pages 3-2 or 3-3.
❹ For thermal overload relay selection, refer to pages 3-4 or 3-6
❺ For thermal overload relay selection, refer to pages 3-5 or 3-7.

General characteristics
The M0..., M1..., M2..., M25... and M3...UL enclosures are made of 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 4-26.

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.

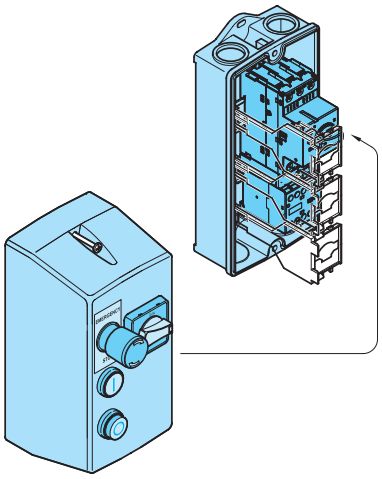
Enclosed with motor protection circuit breaker



M2P00911....

Order code	Thermal trip adjustment range	IEC technical characteristics (≤440V) Ie	kW	Qty per pkg	Wt
	[A]	[A]	[kW]	n°	[kg]
M2P00911❶A4	0.63-1	1	0.25	1	1.450
M2P00911❶A5	1-1.6	1.6	0.37-0.55	1	1.450
M2P00911❶A6	1.6-2.5	2.5	0.75	1	1.515
M2P00911❶A7	2.5-4	4	1.1-1.5	1	1.515
M2P00911❶A8	4-6.5	6.5	2.2-3	1	1.515
M2P00911❶A9	6.3-10	10	3-5	1	1.515
M2P00911❶B0	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 (isolation function), padlockable in OFF position.

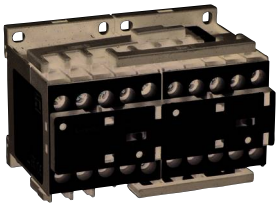
General characteristics
The M2P00911... starters are composed of an IP65 plastic enclosure where the following devices are mounted:
– a motor protection circuit breaker type SM1R... with the short circuit and overload protection function
– a contactor with start / stop function of the motor
– 2 push-buttons 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.

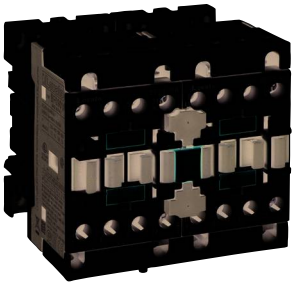
Operational characteristics
– M2... - 2 knockouts PG13.5/M20 or PG16/M25 on enclosure top and bottom
– Ambient conditions:
  • Operating temperature: -25...+60°C
  • Storage temperature: -40...+70°C
– Degree of protection: IEC IP65.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1.

Reversing contactor assemblies 3 poles



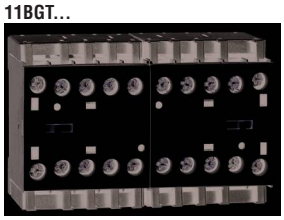
11BGR...



BFA...



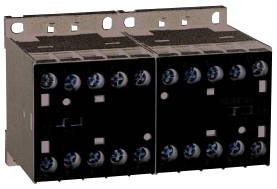
11BGT...



11BGTP...

Order code	IEC Ie (AC3) ≤440V ≤55°C	Max. IEC power AC3 400V at ≤55°C	Built-in auxiliary contacts		Qty per pkg	Wt
	[A]	[kW]	NO	NC	n°	[kg]
AC COIL. Terminals: clamp screw. External interlock with power and auxiliary wiring.						
11BGR0901A❶	9	4	0	1❸	1	0.394
11BGR1201A❶	12	5.7	0	1❸	1	0.394
BFA00942❶	9	4.2	0	1❸	1	0.760
BFA01242❶	12	5.7	0	1❸	1	0.760
BFA01842❶	18	7.5	0	1❸	1	0.760
BFA02542❶	25	12.5	0	1❸	1	0.760
Built-in interlock with power wiring only.						
11BGT0910A❶	9	4	1❸	0	1	0.380
11BGT1210A❶	12	5.7	1❸	0	1	0.380
Rear terminals: PCB solder pins. Built-in interlock only.						
11BGTP0901A❶	9	4❹	0	1❸	1	0.400
DC COIL. Terminals: clamp screw. External interlock with power and auxiliary wiring.						
11BGR0901D❷	9	4	0	1❸	1	0.460
11BGR1201D❷	12	5.7	0	1❸	1	0.460
Built-in interlock with power wiring only.						
11BGT0910D❷	9	4	1❸	0	1	0.445
11BGT1210D❷	12	5.7	1❸	0	1	0.44
Rear terminals: PCB solder pins. Built-in interlock only.						
11BGTP0901D❷	9	4❹	0	1❸	1	0.460

Changeover contactor assemblies 4 poles



11BGC09 ...



BFC150T4A230

Order code	IEC Operating current (AC1) ≤40°C	≤55°C	≤60°C	UL/CSA General Use	Qty per pkg	Wt
	[A]	[A]	[A]	[A]	n°	[kg]
AC COIL. Terminals: clamp screw. Built-in interlock only.						
11BGC09T4A❶	20	18	15	20	1	0.365
AC COIL 230V 50/60HZ. Terminals: screw. Side mount mechanical interlock with 2NC contacts.						
BFC18T4A230	32	26	23	20	1	0.786
BFC38T4A230	56	45	40	20	1	1.068
BFC80T4A230	115	95	80	20	1	2.532
BFC95T4A230	140	115	100	20	1	4.892
BFC150T4A230	165	135	118	20	1	4.892
DC COIL. Terminals: clamp screw. Built-in interlock only.						
11BGC09T4D❷	20	18	15	20	1	0.450

❶ Complete order code with coil voltage digit or with voltage digit followed by 60 if 60Hz. Standard voltages are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 / 460 60 / 575 60 (V).
Example: 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.

❷ 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.

❸ One auxiliary contact for each contactor.

❹ 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 motor protection circuit breakers SM1... can be directly mounted to BGR... and BFA... reversing contactor assemblies by means the rigid connections SM1X3...; for selection, refer to page 1-9.
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	400V	415V	440V	500V	690V
	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]
BGR09	2.2	4	4.3	4.5	5	5
BGT09	2.2	4	4.3	4.5	5	5
BGTP09❹	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)					
BGC09T4	8	14	14	15	16	22

	Maximum UL/CSA horsepower rating Single phase 120V	240V	Three phase 208V	240V	480V	600V
	[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
BGR09	½	1½	2	3	5	5
BGT09	½	1½	2	3	5	5
BGTP09	½	1½	2	3	5❹	-❹
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.

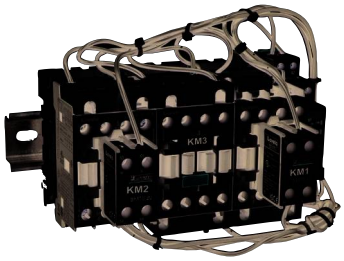
Add-on blocks

Refer to section 2, page 2-20 and page 2-22. 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 2-20 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.

Open frame



BFA009...BFA025

Order code	Three-phase motor control. Max IEC operating current (≤440V)	Thermal overload relay	Qty per pkg	Wt
	[A]		n°	[kg]
Complete star-delta starters, open frame, for starting time up to 12s and a maximum of 30 operations/hour.				
BFA00970❶❷	16	No	1	1.700
BFA01270❶❷	22	No	1	1.700
BFA01870❶❷	28	No	1	1.700
BFA02570❶❷	35	No	1	1.800
BFA02670❶❷	43	No	1	1.800
BFA03270❶❷	50	No	1	1.900
BFA03870❶❷	60	No	1	1.900
BFA05070❶❷	85	No	1	5.200
BFA06570❶❷	110	No	1	5.200
BFA08070❶❷❹	140	No	1	6.265
BFA09570❶❷	160	No	1	6.900
BFA11570❶❷❺	195	No	1	7.500
BFA15070❶❷❺	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	400V	440V	500V
[kW]	[kW]	[kW]	[kW]
4	7.5	7.5	7.5
5.5	11	11	11
7.5	15	11	11
11	18.5	18.5	22
11	22	22	25
15	25	25	25
15	30	30	30
25	45	45	59
30	55	55	75
45	75	75	90
45	90	90	110
55	110	110	132
75	132	132	160

❶ Complete order code with the coil voltage digit or the coil voltage digit followed by 60 if 60Hz. Standard voltage are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 (V).
Example: BFA00970024 for BFA009 star-delta starter with 24VAC 50/60Hz power supply.
BFA0097002460 for BFA009 star-delta starter with 24VAC 60Hz power supply.
❷ The thermal overload relay is not included and must be purchased separately.
Refer to the example given under Thermal relay adjustment range, for a correct choice and then to page 3-4 for the order code.
❸ TMST with auxiliary supply 24...240VAC.
TMSTA440 with auxiliary supply 380...440VAC.
❹ For motors with rated current >115A connect the line side with 50mm² wires crimped with pin terminals or with 2x25mm² wires connected in parallel.
❺ 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	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA01270	BF1210A	BF1201A	BF0910A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA01870	BF1810A	BF1801A	BF1210A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA02570	BF2510A	BF2501A	BF1810A	❷ RF38	TMST❸	BFX1020	—	BFX1011	BFX3131
BFA02670	BF2600A	BF2600A	BF1810A	❷ RF38	TMST❸	BFX1020	BFX1011	BFX1011	BFX3232
BFA03270	BF3200A	BF3200A	BF2510A	❷ RF38	TMST❸	BFX1020	BFX1011	BFX1011	BFX3232
BFA03870	BF3800A	BF3800A	BF2510A	❷ RF38	TMST❸	BFX1020	BFX1011	BFX1011	BFX3232
BFA05070	BF5000A	BF5000A	BF3200A	❷ RF82	TMST❸	BFX1020	BFX1011	BFX1011	BFX3332
BFA06570	BF6500A	BF6500A	BF3200A	❷ RF82	TMST❸	BFX1020	BFX1011	BFX1011	BFX3332
BFA08070	BF8000A	BF8000A	BF5000A	❷ RF82	TMST❸	BFX1020	BFX1011	BFX1011	BFX3331
BFA09570	BF9500A	BF9500A	BF6500A	❷ RF110	TMST❸	BFX1020	BFX1011	BFX1011	BFX3432
BFA11570	BF11500A	BF11500A	BF8000A	❷ RF200	TMST❸	BFX1020	BFX1011	BFX1011	BFX3432
BFA15070	BF15000A	BF15000A	BF8000A	❷ RF200	TMST❸	BFX1020	BFX1011	BFX1011	BFX3432

Certifications and compliance
Certifications obtained: EAC.
Compliant with stardards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-1.

Enclosed starters



M3P...70... - M3PA70



M3P...73...

Order	Three-phase motor control. Max IEC operating current (≤440V)	Qty per pkg	Wt
	[A]	n°	[kg]
Star-delta starters in enclosure with Start and Stop/Reset buttons. Starting time up to 12s and a maximum of 30 operations/hour.			
M3P00970❶❷	16	1	3.540
M3P01270❶❷	22	1	3.540
M3P01870❶❷	28	1	3.540
M3P02570❶❷	35	1	3.650
M3P02670❶❷	43	1	3.650
M3P03270❶❷	50	1	3.800
M3P03870❶❷	60	1	3.800
With switch disconnector, rotary door coupling handle GAX61 and Start and Stop/Reset buttons.			
M3P00973❶❷	16	1	3.700
M3P01273❶❷	22	1	3.700
M3P01873❶❷	28	1	3.700
M3P02573❶❷	35	1	3.800
M3P02673❶❷	43	1	3.800
M3P03273❶❷	50	1	4.300
M3P03873❶❷	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.			
M3PA70❸	—	1	2.240

❶ Complete order code with the coil voltage digit or the coil voltage digit followed by 60 if 60Hz. Standard voltage are as follows:
– AC 50/60Hz 024 / 048 / 110 / 230 / 400V
– AC 60Hz 024 60 / 048 60 / 120 60 / 220 60 / 230 60 (V).
Example: M3P00970024 for M3P009 star-delta starter with 24VAC 50/60Hz power supply.
M3P0097002460 for M3P009 star-delta starter with 24VAC 60Hz power supply.

❷ 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 (Ie).
Example: Ie=10A; 58% Ie = 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.

❸ Suitable for BFA...70 starters.

❹ 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.

Operational characteristics
IEC standard motor powers

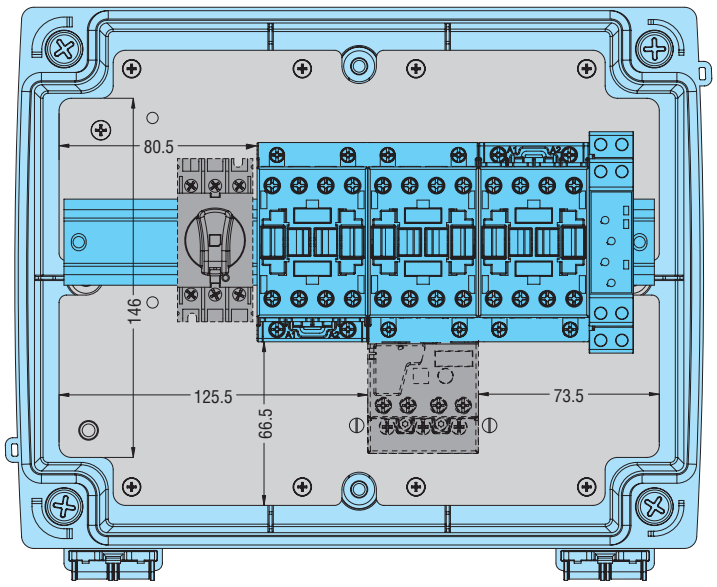
230V [kW]	400V [kW]	440V [kW]	500V [kW]
4	7.5	7.5	7.5
5.5	11	11	11
7.5	15	11	11
11	18.5	18.5	22
11	22	22	25
15	25	25	25
15	30	30	30

– 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. M3PA70**UL**.

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 ❷	Time relay	Auxiliary contacts fitted on contactor:			Rigid connections	Switch disconnector ❺	Handle ❺	Shaft ❺
		Line	Delta	Star			Line	Delta	Star				
M3P00970/73	M3PA70	BF0910A	BF0901A	BF0910A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA016A	GAX61	GAX7150
M3P01270/73	M3PA70	BF1210A	BF1201A	BF0910A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA025A	GAX61	GAX7150
M3P01870/73	M3PA70	BF1810A	BF1801A	BF1210A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA032A	GAX61	GAX7150
M3P02570/73	M3PA70	BF2510A	BF2501A	BF1810A	RF38	TMST❹	BFX1020	—	BFX1011	BFX3131	GA040A	GAX61	GAX7150
M3P02670/73	M3PA70	BF2600A	BF2600A	BF1810A	RF38	TMST❹	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150
M3P03270/73	M3PA70	BF3200A	BF3200A	BF2510A	RF38	TMST❹	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150
M3P03870/73	M3PA70	BF3800A	BF3800A	BF2510A	RF38	TMST❹	BFX1020	BFX1011	BFX1011	BFX3232	GA063SA	GAX61	GAX7150

❺ For M3P...73 types

Empty enclosures


M...PA


M...RA

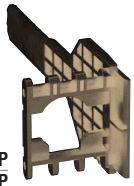

M...N


M2P00911

Order code	Contactor type ❶	Thermal relay ❷	Degree of protect.	Qty per pkg	Wt
				n°	[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, BF25A, BF26A, BF32A	RF38	IP65	1	0.715
M25PA❸	BF26A, BF32A, BF38A	RF38	IP65	1	0.990
M3PA❹	BF40A, BF50A, BF65A, BF80A, BF94A	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, BF25A, BF26A, BF32A	RF38	IP65	1	0.670
M25RA❸	BF26A, BF32A, BF38A	RF38	IP65	1	0.970
M3RA❹	BF40A, BF50A, BF65A, BF80A, BF94A	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, BF25A, BF26A, BF32A	RF38	IP65	1	0.640
M24N❸❺	BG06...BG12, BF09A...BF25A	❷	IP65	1	0.625
M25N❸	BF09A, BF12A, BF18A, BF26A, BF32A, BF38A	RF38	IP65	1	0.940
M3N	BF40A, BF50A, BF65A, BF80A, BF94A	RF82	IP65	1	1.800
Enclosures with Start, Stop, Emergency stop pushbuttons and handle to operate motor protection circuit breaker.					
M2P00911	BG06, BG09, BG12	SM1R ❻	IP65	1	0.950

new

Accessories and spare parts


MX20P
MX21P

Order code	Description	Qty per pkg	Wt
		n°	[kg]
LPXA130	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
MX21P	Mounting base for LPXC... contact on M0 enclosure	5	0.014
MX21P	Mounting base for LPXC... 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
MX02	Earth / Neutral terminal for M0, M1, M2	1	0.035

❶ To be purchased separately; refer to page 2-6 for contactor choice.
❷ To be purchased separately.
Refer to pages 3-2 to 3-9 for thermal overload relay choice. For use of the overload relay in the M24N, consult Technical support; see contact details on inside front cover.
❸ MX31 metal mounting plate included.
❹ MX30 metal mounting plate included.
❺ 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 8.
❻ SM1R motor protection circuit breaker gives the following functions: overload protection, short circuit protection and disconnection.

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
M2P00911	13
M24N	38
M25...	38
M3...	80

General characteristics
Enclosures are supplied with the following accessories:

Accessory		Type of enclosure							
Description	Type	M0PA	M1PA	M2PA	M25PA	M0RA	M1RA	M2RA	M25RA
Contact holder	MX20P	1							
	MX21P		1	1	1				
Buttons: - Stop/Reset - Start	LPCB1176					1	1	1	1
	LPCB2104	1	1	1	1				
	LPCB1113	1	1	1	1				
Contact for Start button	LPXC10	1	1	1	1				
Stop/Reset button extension	MX10P	1				1			
	MX11P		1				1		
	MX12P			1	1			1	1
Unused hole threaded plug	LPXA130					1	1	1	1

– M2P00911 enclosure: Start, Stop, Emergency stop pushbuttons with contacts. Handle to operate motor protection circuit breaker
– M3PA enclosure: n° 2 Start and Stop/Reset pushbuttons and n° 1 MX30 mounting plate
– M3RA enclosure: n° 1 Reset pushbutton and n° 1 MX30 mounting plate
– M3N enclosure: supplied without accessories to be purchased separately including MX30 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
M2P00911 = SM1R... with BG...
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.

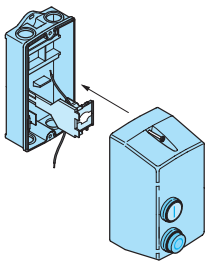
Operational characteristics:
– Cable entry:
  • M0/M1//M2... - 2 knockouts PG13.5/M20 on enclosure top and bottom
  • M24N/M25... - 2 knockouts PG16/M25-PG29/M32 on enclosure top and bottom
  • M3... - Smooth surfaces; can be drilled by customer
– Ambient conditions:
  • Operating/storage temperature: -25...+60°C/-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**.

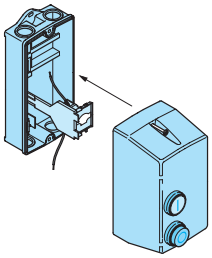
Certifications and compliance
Certifications obtained: EAC for all; for M3NUL type, UL Listed for USA and Canada (cULus – File E300050) as Industrial control panels; for M0/M1/M2PA/RA/N and other M3...UL types, UL Listed for USA and Canada (cULus – File E93602) under magnetic motor controllers as Polymeric 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.

M...PA EMPTY ENCLOSURES

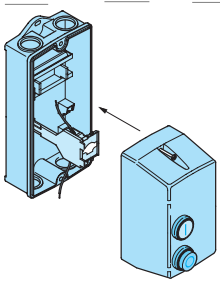
M0PA



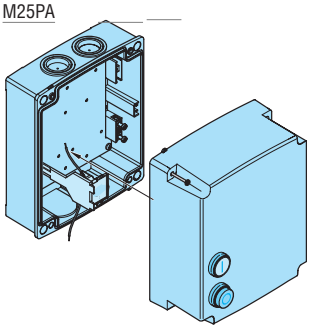
M1PA



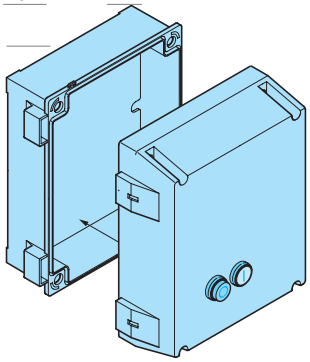
M2PA



M25PA

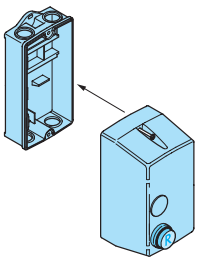


M3PA

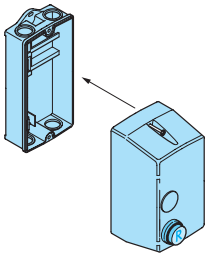


M...RA EMPTY ENCLOSURES

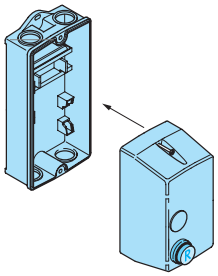
M0RA



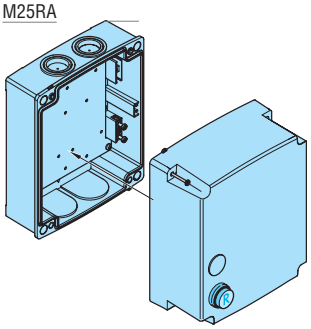
M1RA



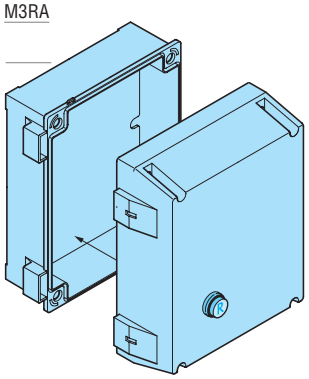
M2RA



M25RA

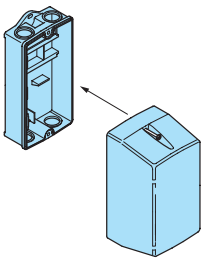


M3RA

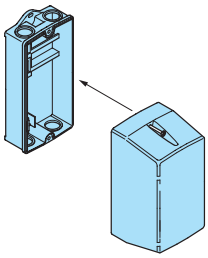


M...N EMPTY ENCLOSURES

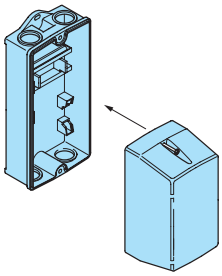
M0N



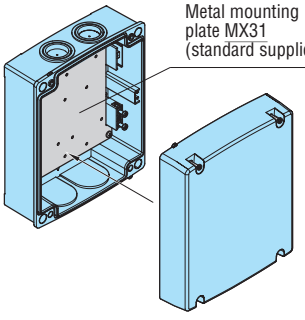
M1N



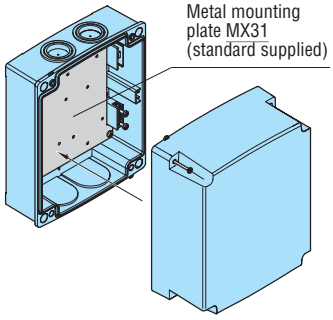
M2N



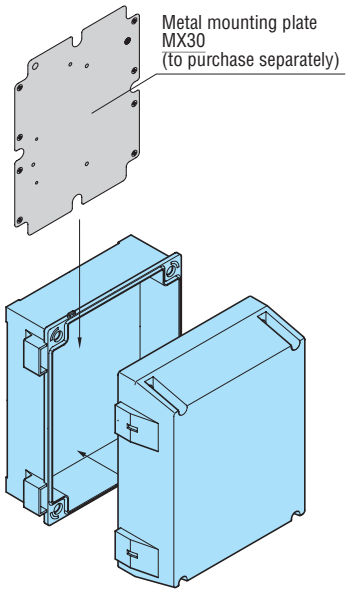
M24N



M25N

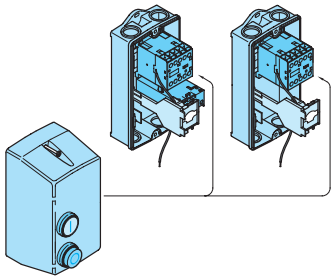


M3N

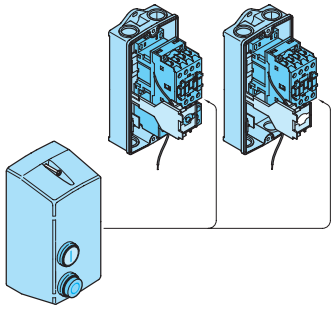


M...P... STARTERS, ENCLOSED

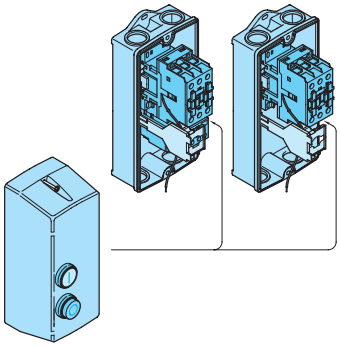
M0P00912... M0P01212... M0P00910... M0P01210...



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

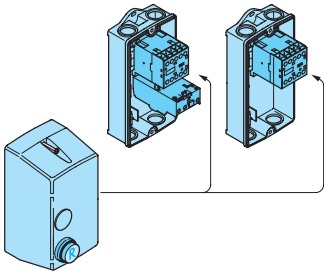


M2P02512... M2P03212... M2P02510... M2P03210...

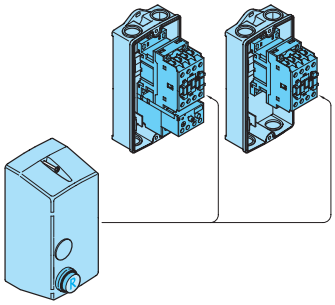


M...R... STARTERS, ENCLOSED

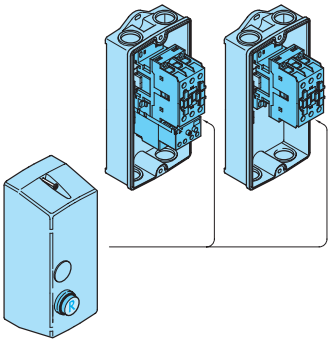
M0R00912... M0R01212... M0R00910... M0R01210...



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

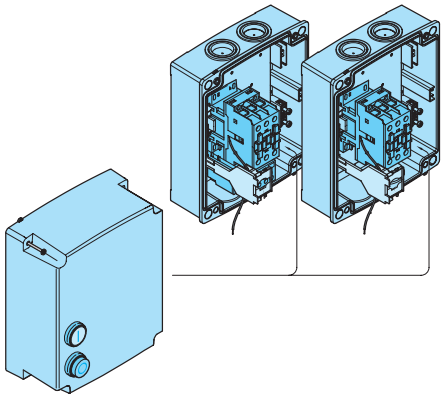


M2R02512... M2R03212... M2R02510... M2R03210...

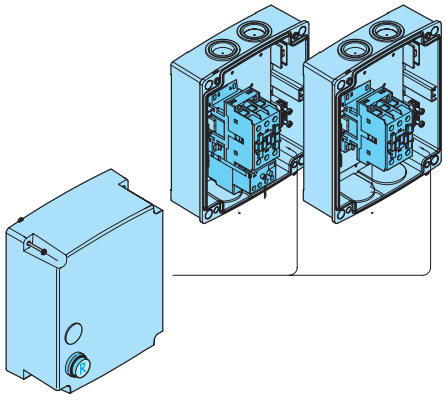


M25... STARTERS, ENCLOSED

M25P03812... M25P03810...

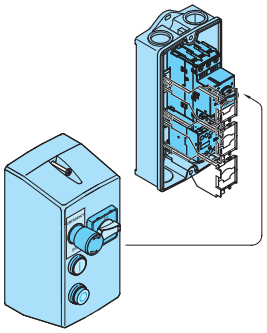


M25R03812... M25R03810...



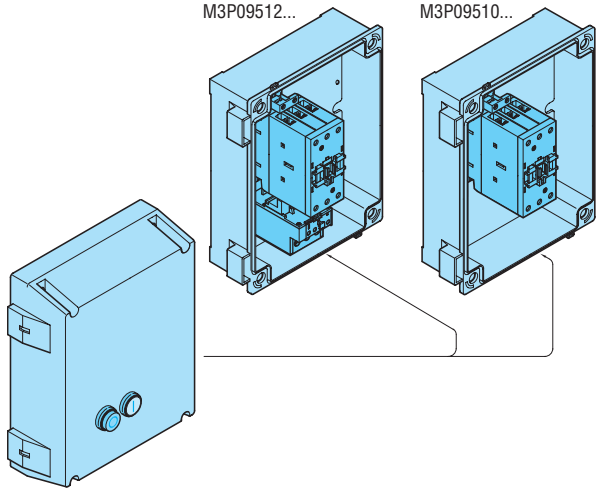
M2... STARTERS, ENCLOSED

M2P00911

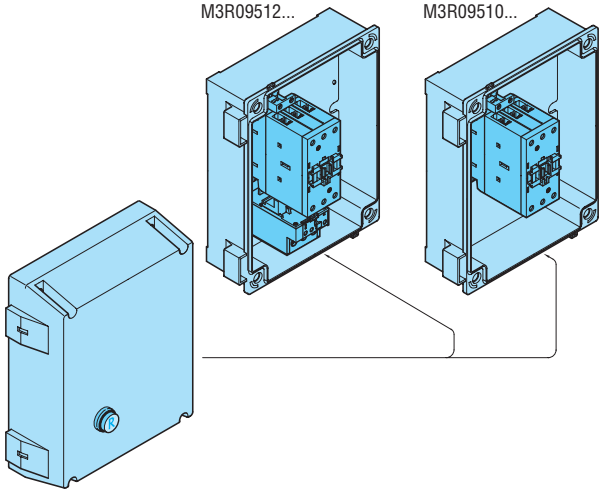


M3... STARTERS, ENCLOSED

M3P05012... to M3P09512... M3P05010... to M3P09510...



M3R05012... to M3R09512... M3R05010... to M3R09510...



Maximum combinations for M0… and M1… starters in enclosure

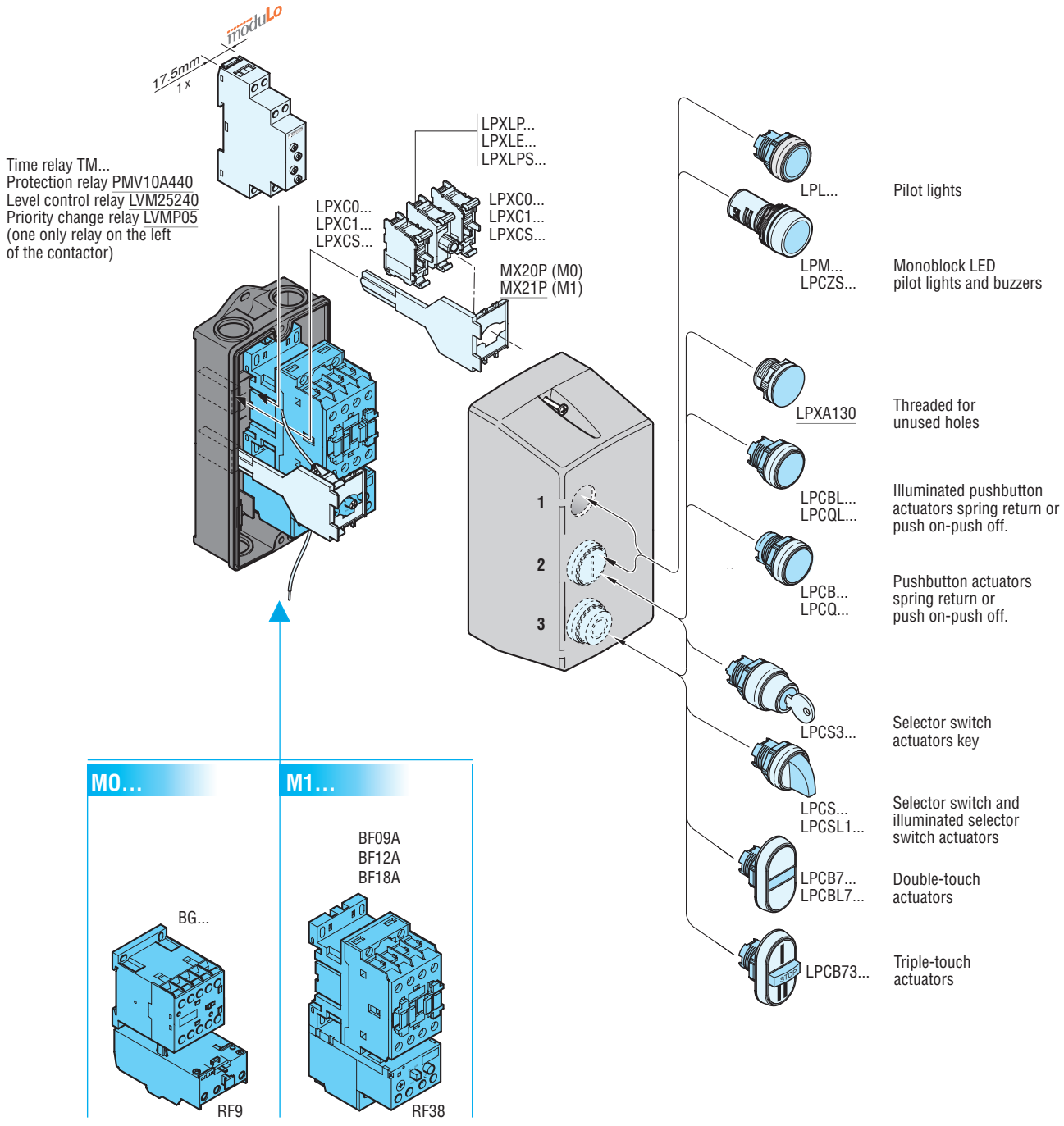
For the fitting of add-on blocks and electronic relays in the starters, consult our Technical support; see contact details on inside front cover.

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 LPXA130.



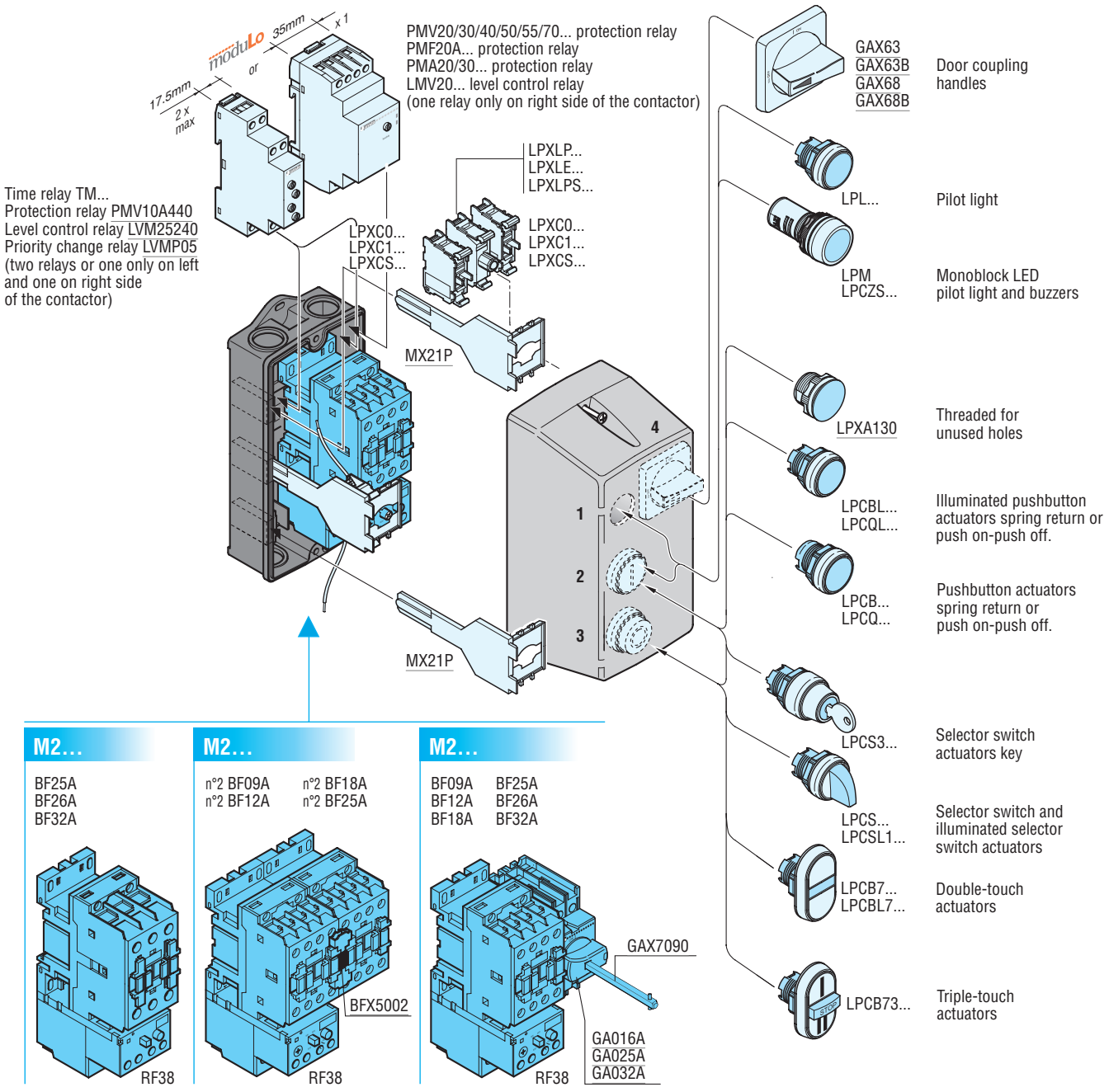
Maximum combinations for M2… starters in enclosure
For the fitting of add-on blocks and electronic relays in the starters, consult our Technical support; see contact details on inside front cover.
The enclosure covers can be equipped with various types of actuators and pilot lights, per following details:

1) Upper position 1
The cover must be drilled in this position with a 22.5mm hole by the user; LPL..., LPM... or LPCZS... pilot light can be fitted.
To fit the LPL... pilot light, the mounting base type MX21P 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 in the side figure.
To fit the actuators, the mounting base type MX 21P must also be purchased.
The contact or LED elements are snapped onto this mounting base.
No adapter or base is needed for LPL..., LPM... and 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 LPXA130.
Various PLatinum (plastic series) actuators can be fitted in this position, such as flush or extended buttons, selectors or pilot lights, as illustrated in the drawing below. To fit the actuators, the mounting base type MX21P 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...

4) Upper position 4
The cover must be drilled in this position with a 22.5mm hole by the user whenever an external handle is needed for a switch disconnector fitted in the enclosure.



Maximum combinations for starters in M24N enclosure

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

Eventually pushbuttons, selector switches and/or other control accessories of the (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 8.

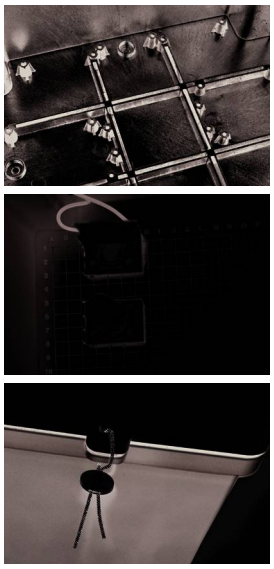
MX31 internal metal mounting plate is standard-supplied.

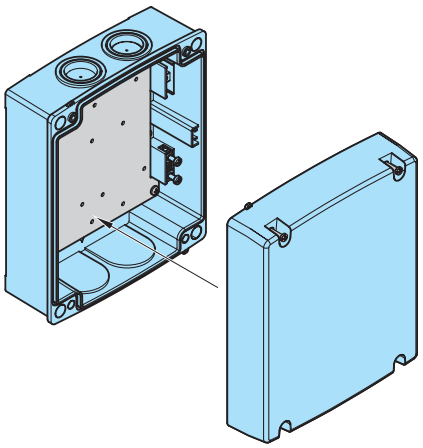
The wall fixing holes and the cover closing captive **screws** are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against infiltrations liquid (IEC IPX5 / UL Type 4X).

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

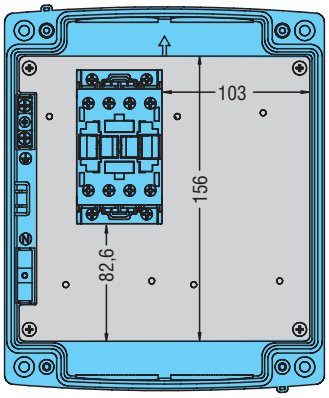
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handles or pilot lights will be mounted.

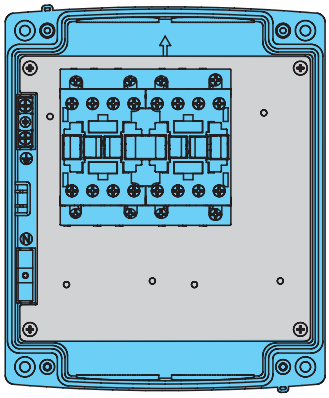
A **safety sealing** system keeps the cover and base together to avoid inopportune opening and tampering.

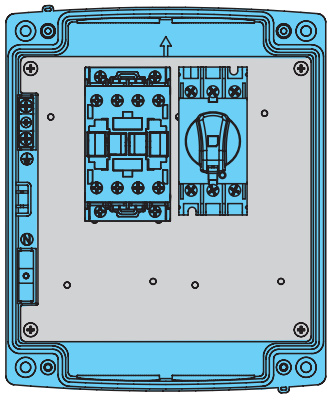




Available space for fitting other electrical or electronic devices

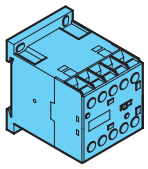






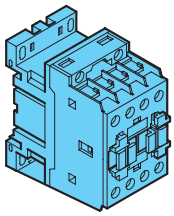
M24N

BG06
BG09
BG12
without overload



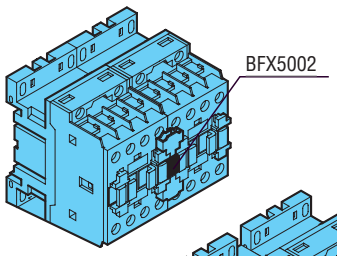
M24N

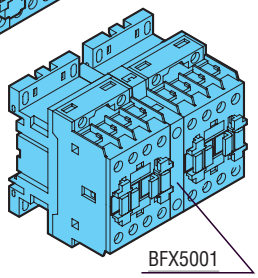
BF09A...BF25A
without overload



M24N

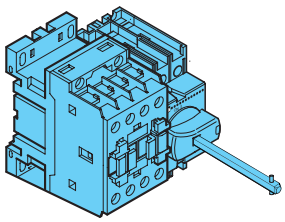
BGR... - BGT... - BGC... without overload
n° 2 BF09A n° 2 BF12A
n° 2 BF18A n° 2 BF25A
All without overload
BFA...42 without overload





M24N

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



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 (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 8.

MX31 internal metal mounting plate is standard-supplied.

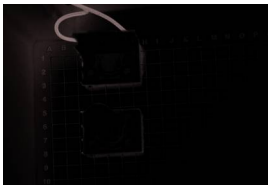
The wall fixing holes and the cover closing captive **screws** are positioned **outwards** with respect to the sealing gasket. This guarantees the protection degree of the enclosure against liquid infiltrations (IEC IPX5 / UL Type 4X).

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

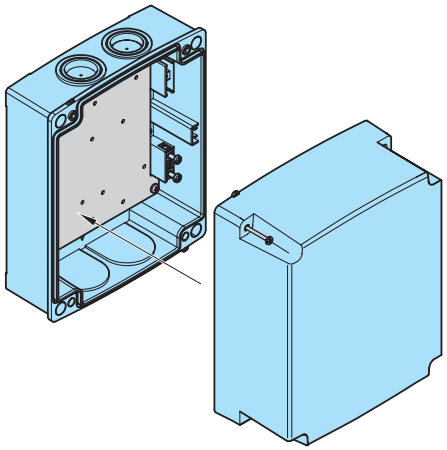
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handles or pilot lights will be mounted.

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

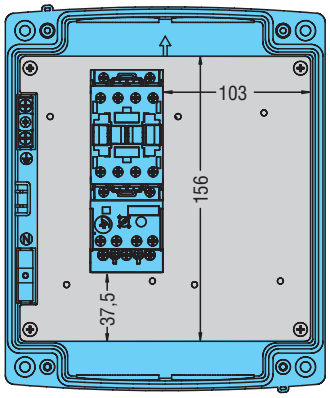


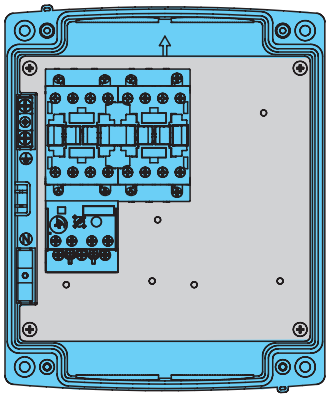


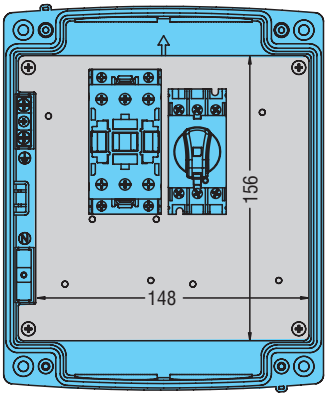




Available space for fitting other electrical or electronic devices

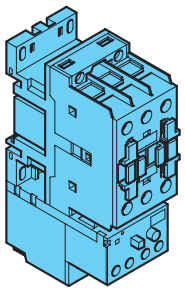






M25…038…

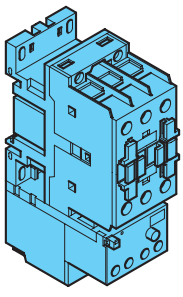
BF38
with or without overload



RF38...

M25…

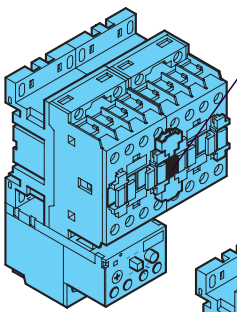
BF26 - BF32
with or without overload



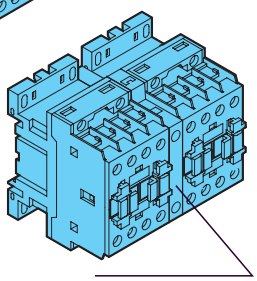
RF38...

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



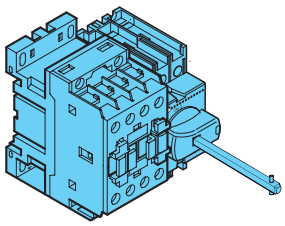
RF38...



BF09A...BF38A with BFX5001

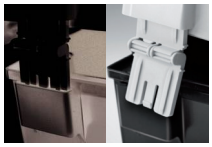
M25…

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



Maximum combinations for starters in M3… enclosure
In addition to a direct-on-line, full voltage across the line, starter or reversing contactor assembly, star-delta starters can be installed as illustrated at the lower right as well as various other electromechanical devices. The cover of the M3 enclosure can be used across the entire surface to mount pushbuttons, measuring instruments or switch disconnectors GA016A...GA125A, etc.
MX30 internal metal mounting plate is standard supplied with M3P… and M3R… types; not included with the M3N, it can be purchased separately.

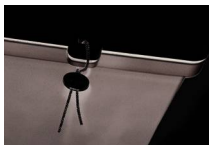
With the specifically designed **hinges**, the cover remains attached to the base, fully open, while the wiring work is being carried out.
By applying **slight pressure** on the hinges, the cover can be released from the base.



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.



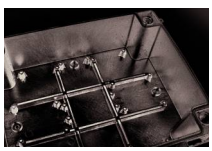
Grid references, marked by letters and numbers, are engraved on the interior surface of the cover. This grid allows to quickly identify the exact drilling points where pushbuttons, handle or pilot lights will be mounted.

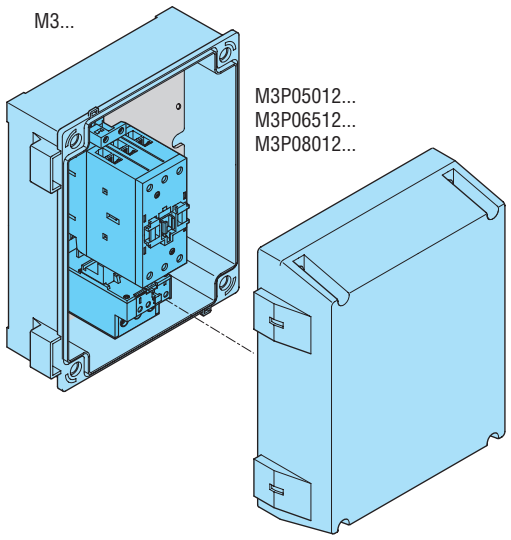


A properly predrilled metal mounting plate (MX30 standard supplied except for M3N) permits to quickly and precisely fix equipment in place.

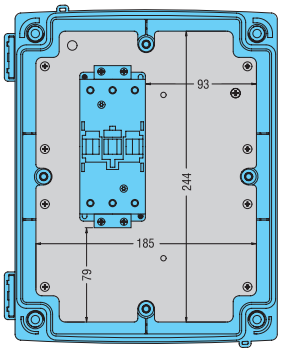


The base has **ribbing** which facilitates the fixing of DIN rails, metal mounting plates and electronic printed boards.



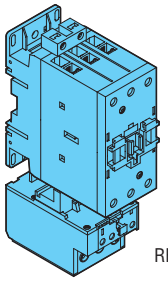


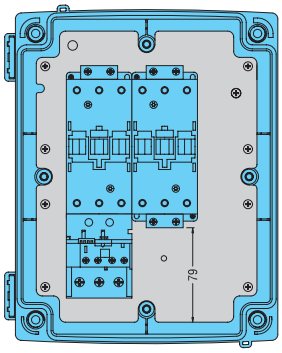
Available space for fitting other electrical or electronic devices



M3…

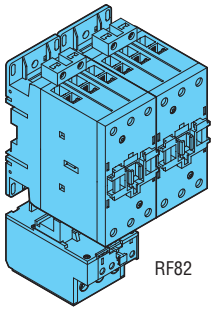
n° 1 BF40 n° 1 BF80
n° 1 BF50 n° 1 BF94
n° 1 BF65

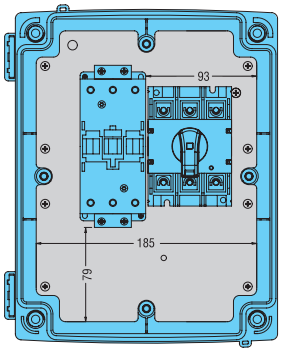




M3…

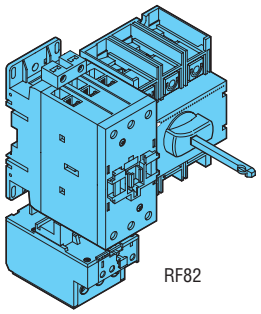
n° 2 BF40 n° 2 BF65 n° 2 BF94
n° 2 BF50 n° 2 BF80

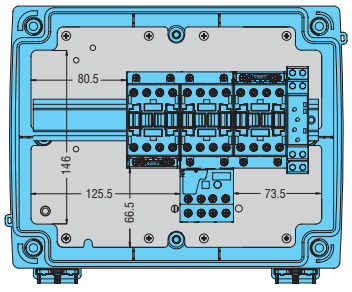




M3…

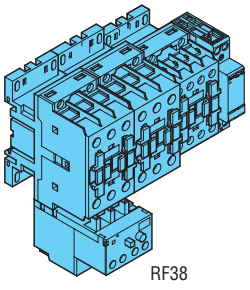
n° 1 BF40 n° 1 BF65 n° 1 BF94 + n° 1 GA...
n° 1 BF50 n° 1 BF80





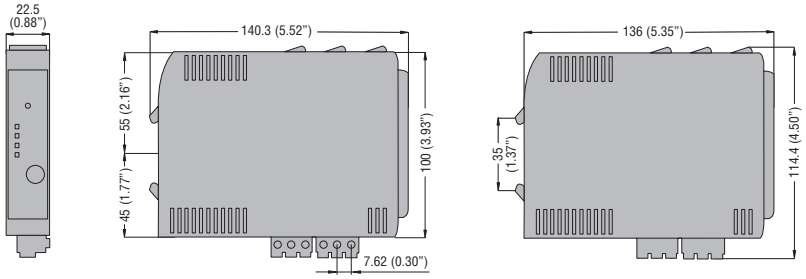
M3P…70

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



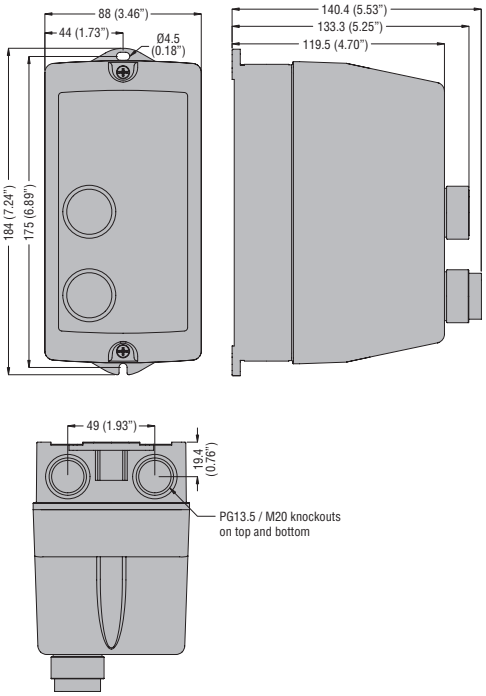
ELECTRONIC MOTOR STARTERS

ME...

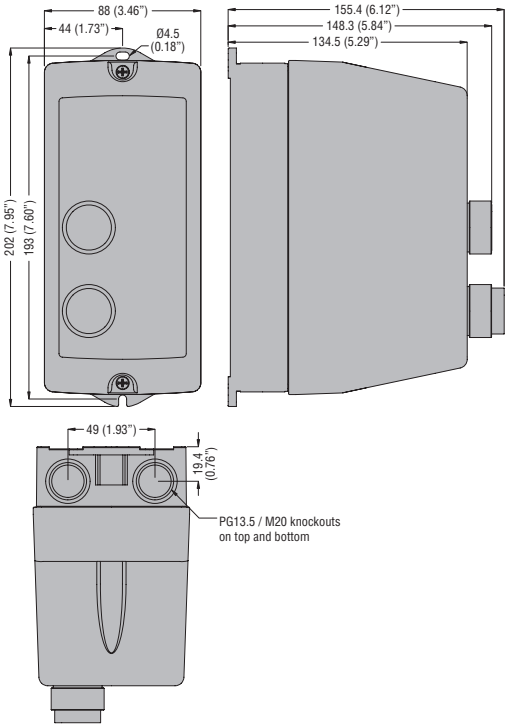


DIRECT-ON-LINE STARTERS - EMPTY ENCLOSURES

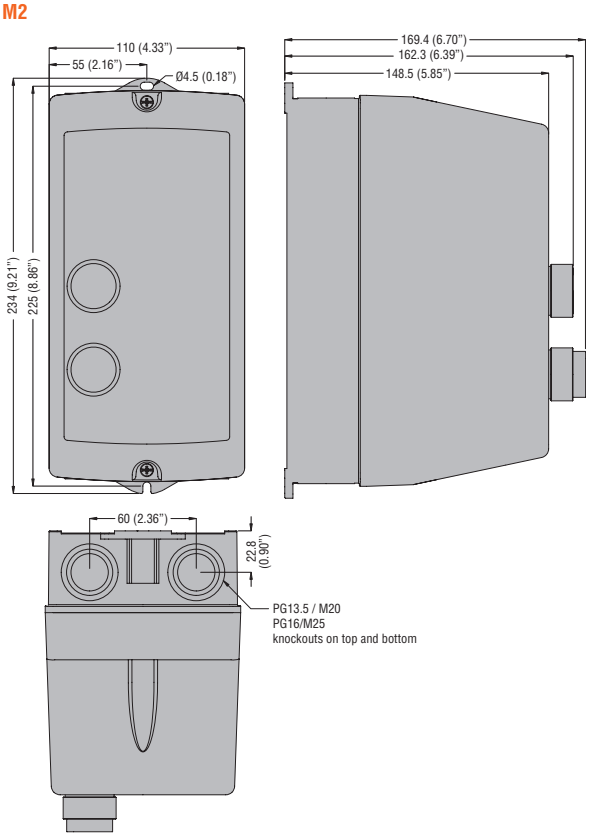
M0

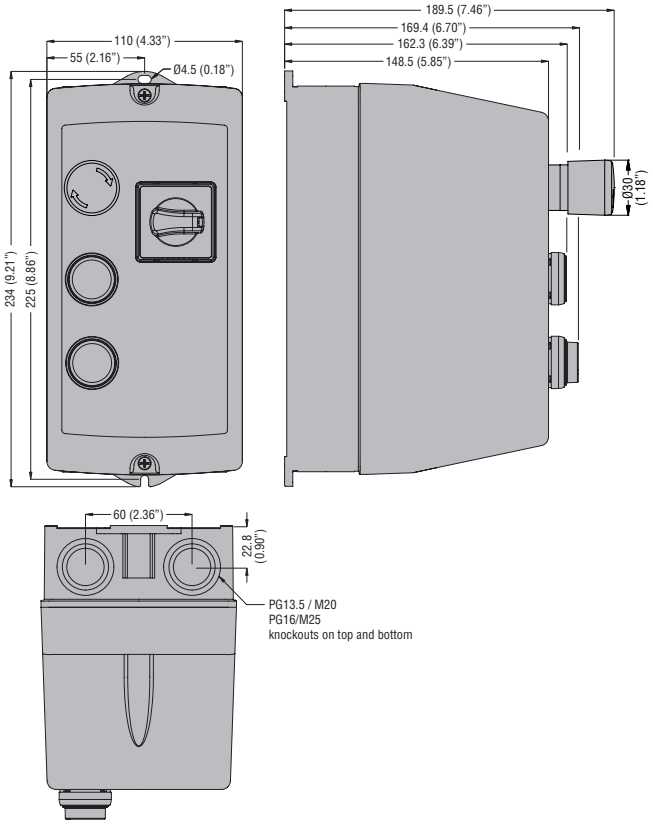


M1

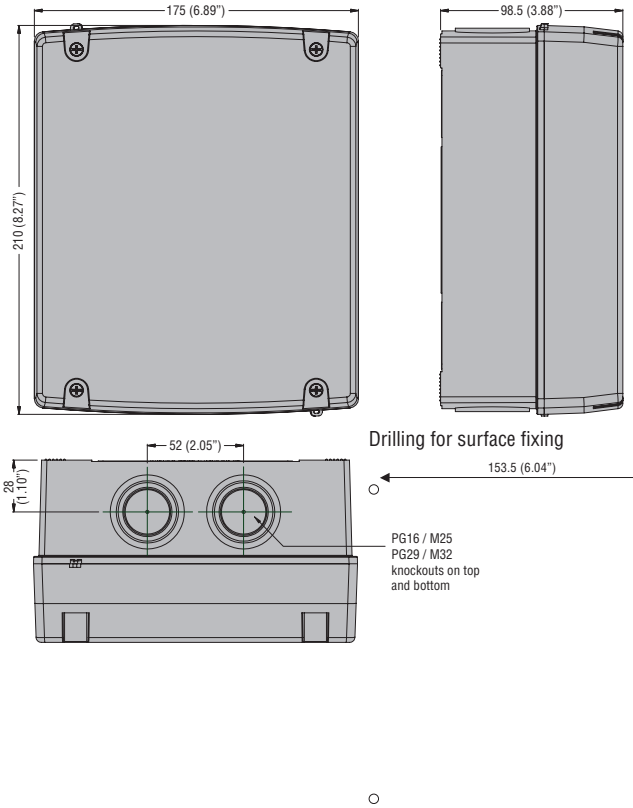


M2

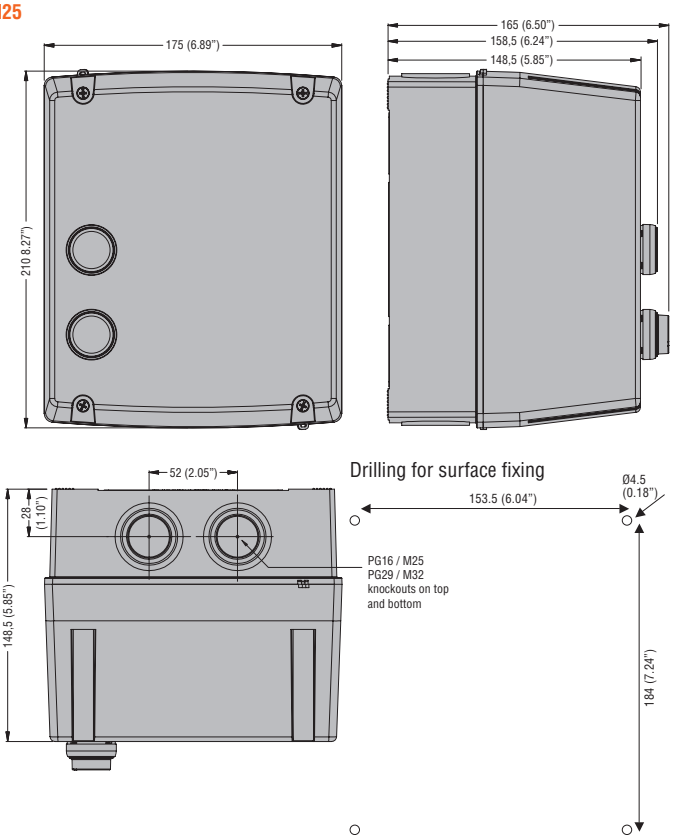




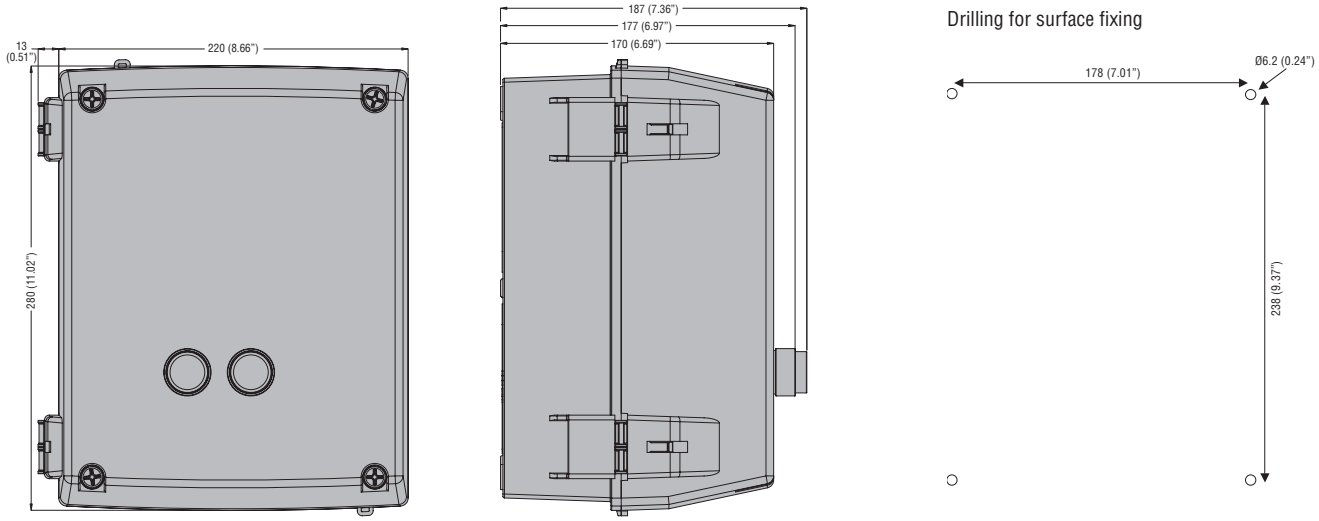
M24N


175 (6.89")
98.5 (3.88")
210 (8.27")
52 (2.05")
28 (1.10")
PG16 / M25
PG29 / M32
knockouts on top
and bottom
Drilling for surface fixing
153.5 (6.04")
Ø4.5 (0.18")
184 (7.24")

M25

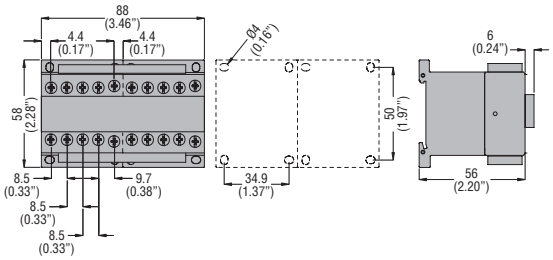

175 (6.89")
165 (6.50")
158,5 (6.24")
148,5 (5.85")
210 8.27")
52 (2.05")
28 (1.10")
148.5 (5.85")
PG16 / M25
PG29 / M32
knockouts on top
and bottom
Drilling for surface fixing
153.5 (6.04")
Ø4.5 (0.18")
184 (7.24")

M3

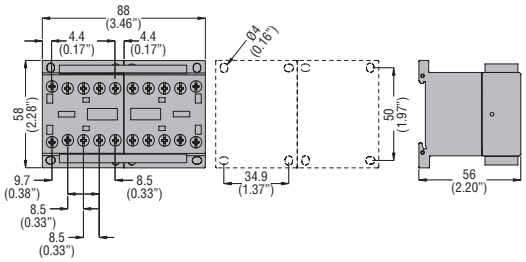

13 (0.51")
220 (8.66")
280 (11.02")
187 (7.36")
177 (6.97")
170 (6.69")
Drilling for surface fixing
178 (7.01")
Ø6.2 (0.24")
238 (9.37")

REVERSING CONTACTOR 3 POLES ASSEMBLIES

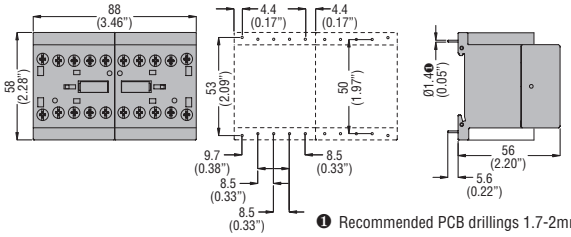
BGR...



BGT...

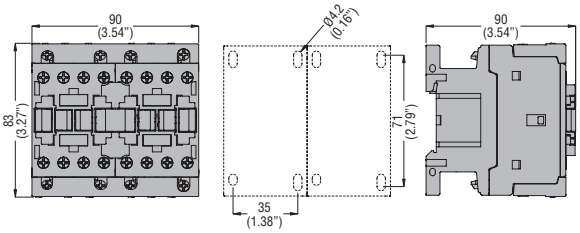


BGTP...



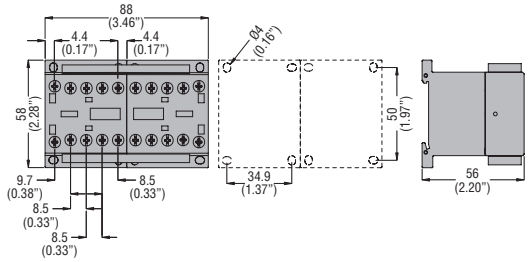
❶ Recommended PCB drillings 1.7-2mm (0.07-0.08").

BFA...42

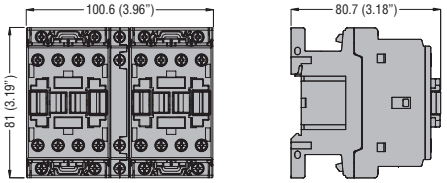


CHANGEOVER CONTACTOR 4 POLES ASSEMBLIES

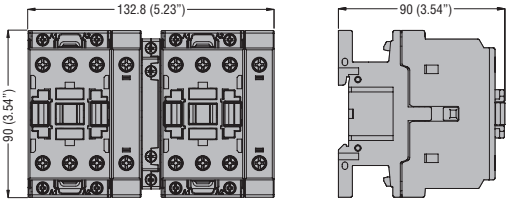
BGC09T4...



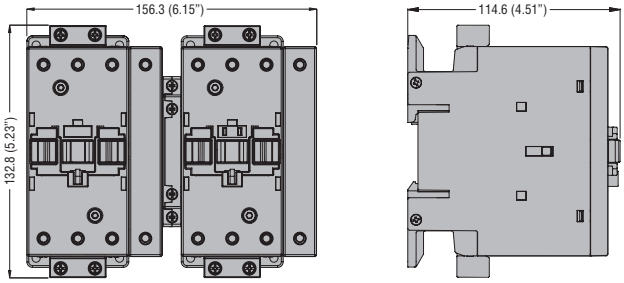
BFC18T4A230



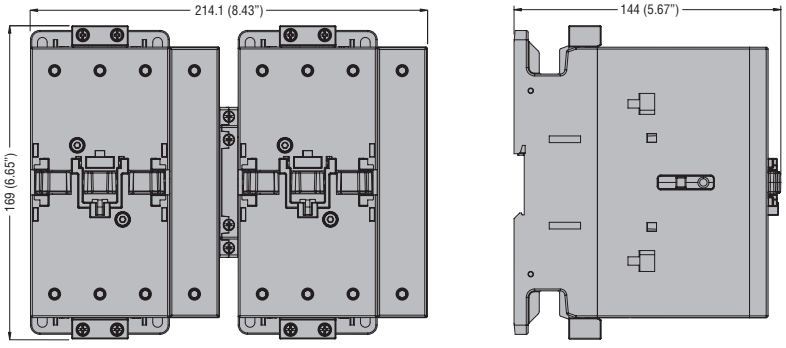
BFC38T4A230



BFC80T4A230

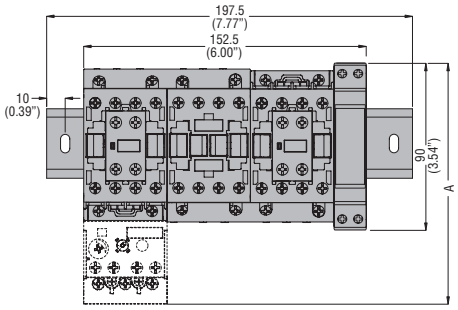


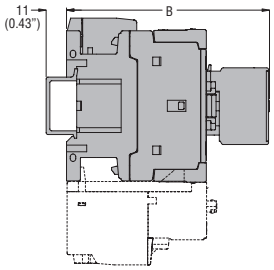
BFC95T4A230 - BFC150T4A230



STAR-DELTA STARTERS OPEN FRAME

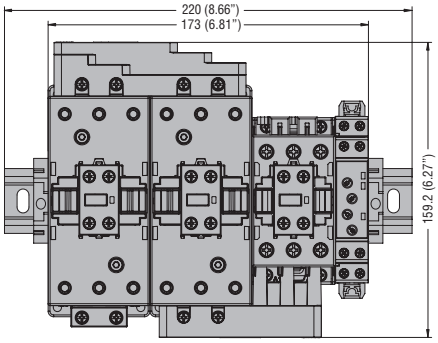
BFA00970...BFA03870

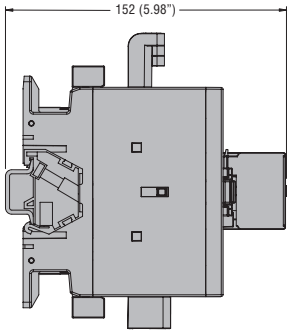




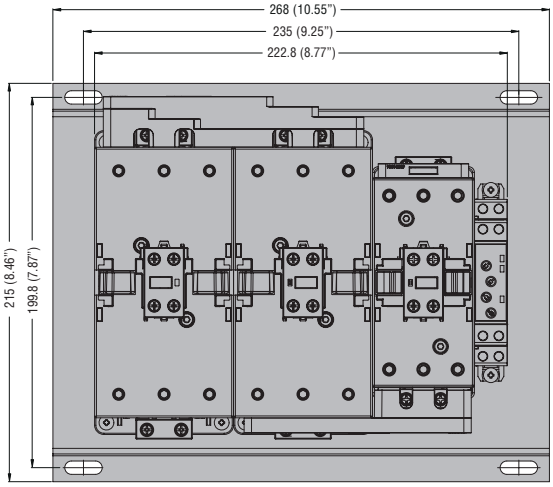
STARTER TYPE	A	B
BFA00970	130.5 (5.14")	109.5 (4.31")
BFA01270	130.5 (5.14")	109.5 (4.31")
BFA01870	130.5 (5.14")	109.5 (4.31")
BFA02570	130.5 (5.14")	109.5 (4.31")
BFA02670	135 (5.14")	119 (4.68")
BFA03270	135 (5.14")	119 (4.68")
BFA03870	135 (5.14")	119 (4.68")

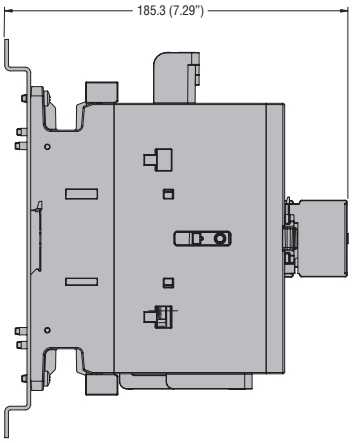
BFA05070...BFA08070





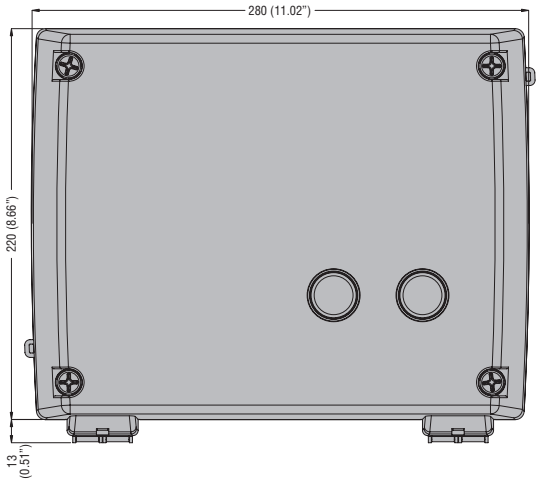
BFA09570...BFA15070

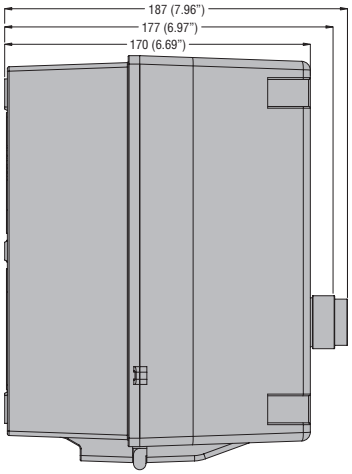




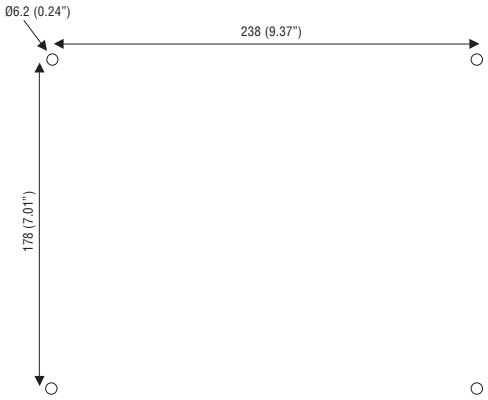
STAR-DELTA STARTERS IN ENCLOSURE - EMPTY ENCLOSURE FOR STAR-DELTA STARTERS

M3P...70 - M3PA70

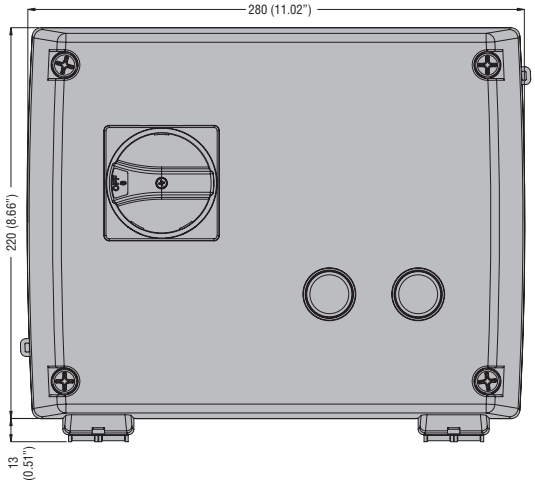


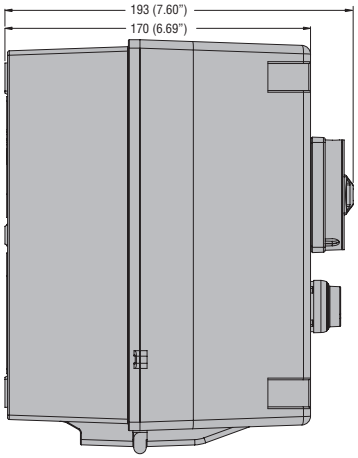


Drilling for surface fixing

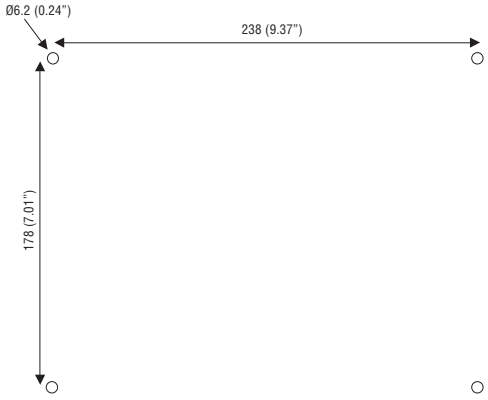


M3P...73





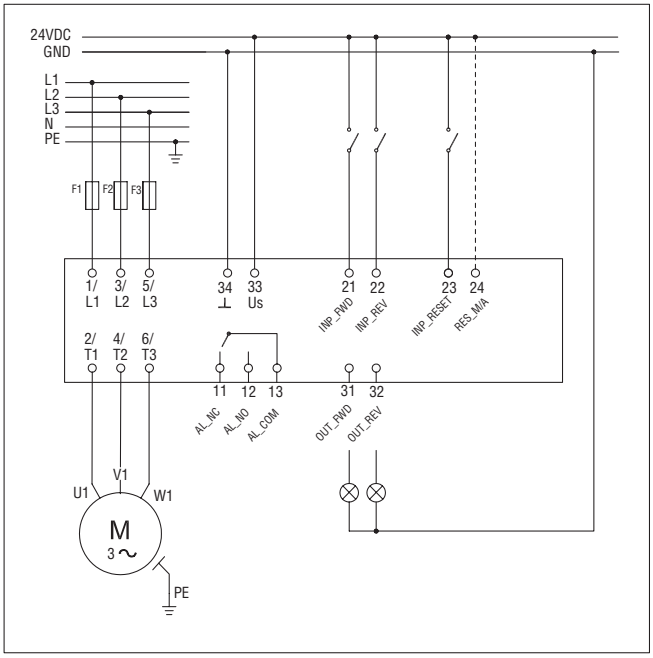
Drilling for surface fixing



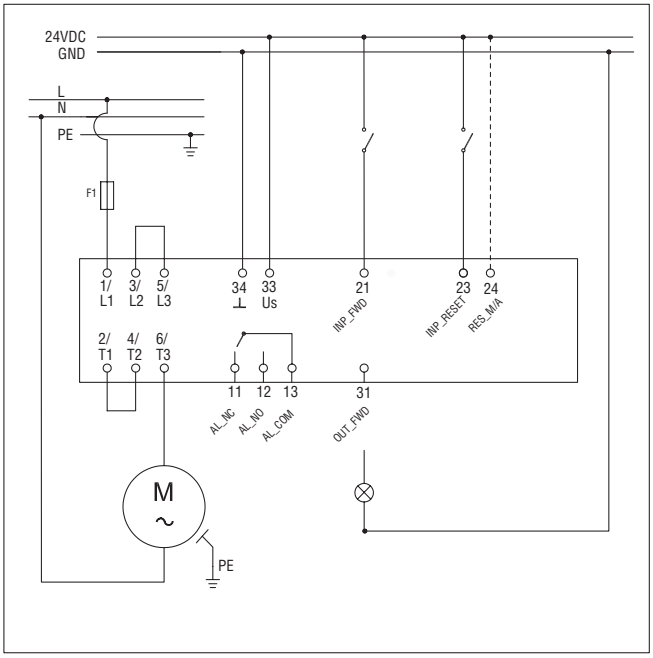
ELECTRONIC MOTOR STARTERS

ME...

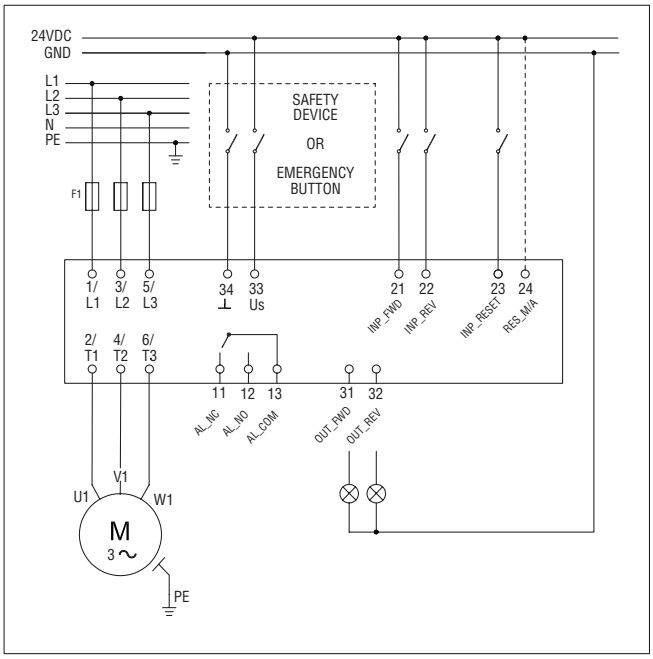
Wiring diagram for three-phase motors



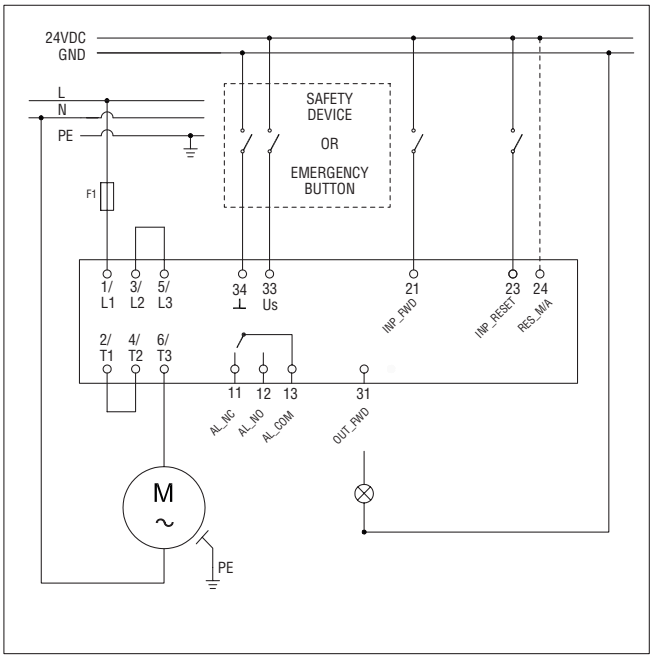
Wiring diagram for single-phase motors



Wiring diagram for three-phase motors for safety applications



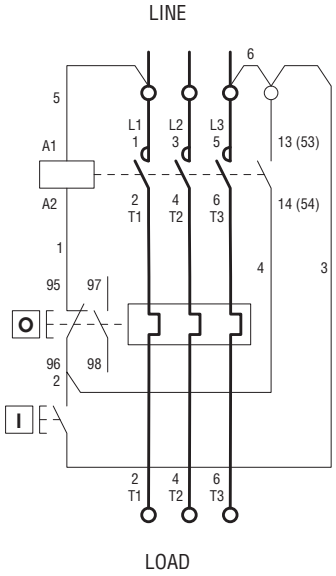
Wiring diagram for single-phase motors for safety applications



DIRECT-ON-LINE STARTERS IN ENCLOSURE

M...P

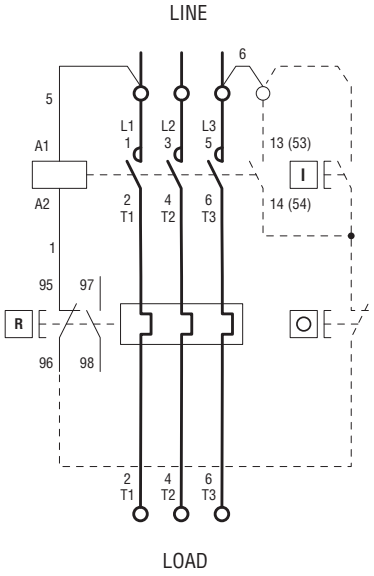
Diagram 1 - Incorporated button control for 3-phase motors



I = Start; O = Stop/Reset

M...R

Diagram 2 - External button control for 3-phase motors



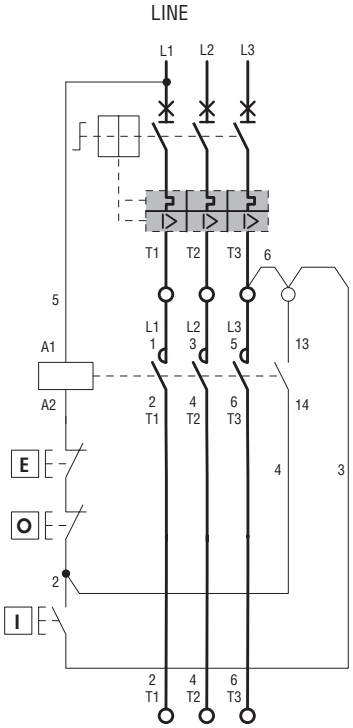
R = Reset; I = Start; O = Stop

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.

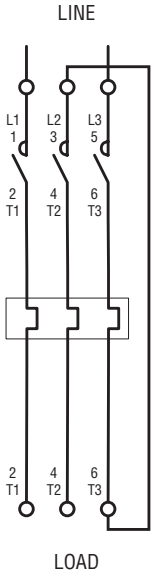
M2P00911...

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



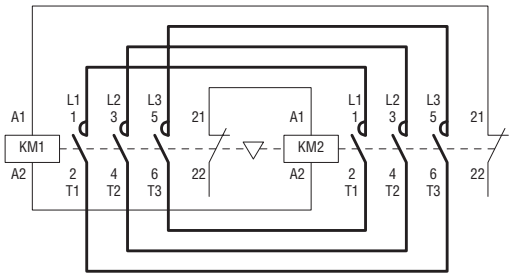
I = Start; O = Stop; E = Emergency Stop

Diagram 4 - Power connection for 1-phase motors

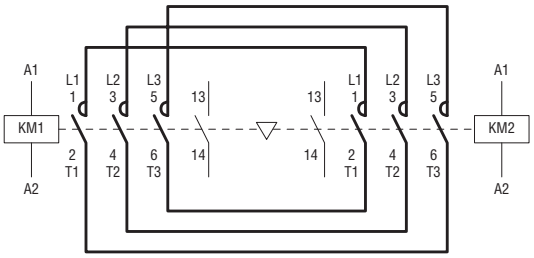


REVERSING CONTACTOR ASSEMBLY

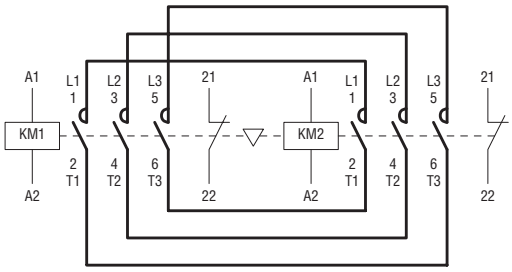
BGR...



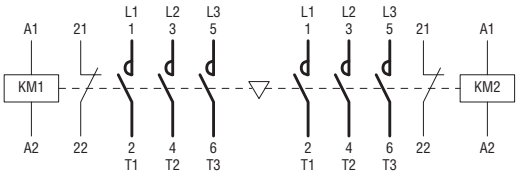
BGT...



BFA...42

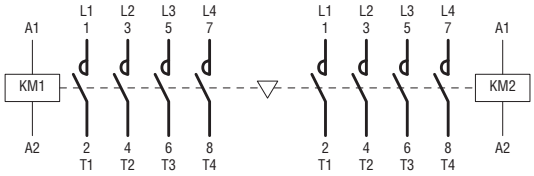


BGTP09...

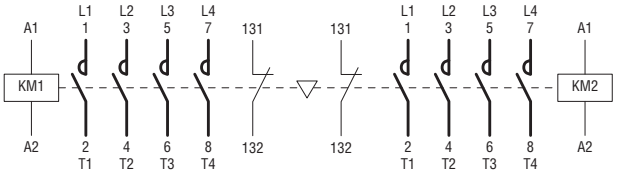


CHANGEOVER CONTACTOR ASSEMBLY

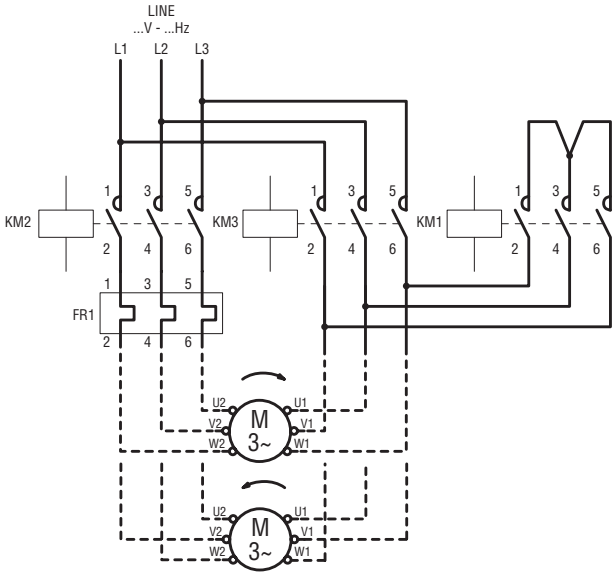
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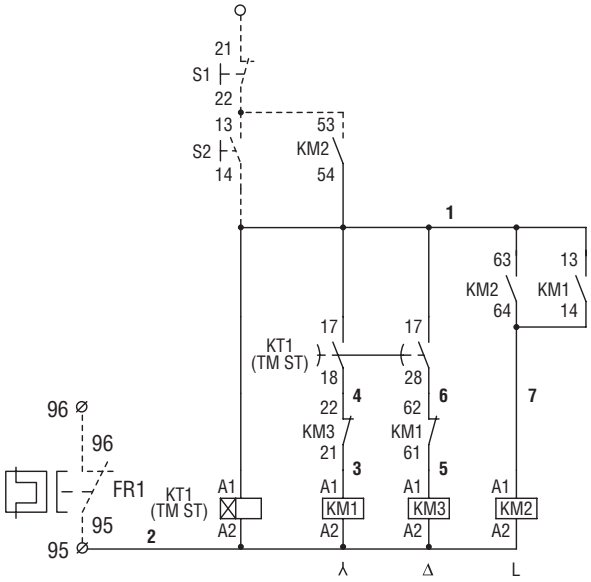
BFC...



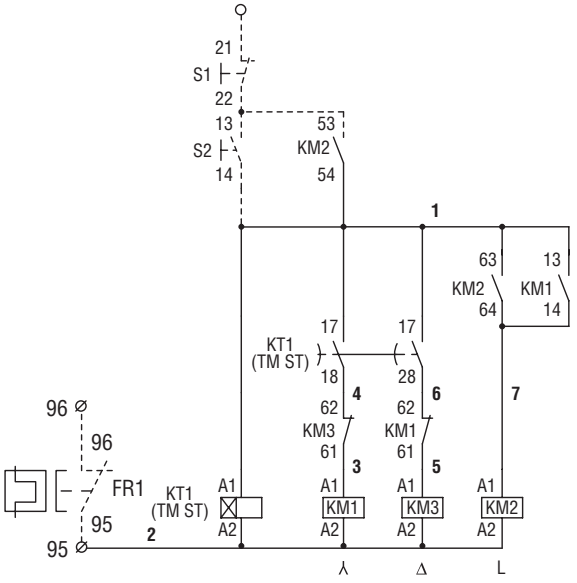
STAR-DELTA STARTERS, OPEN FRAME
BFA009…03870 - M3P009…03870



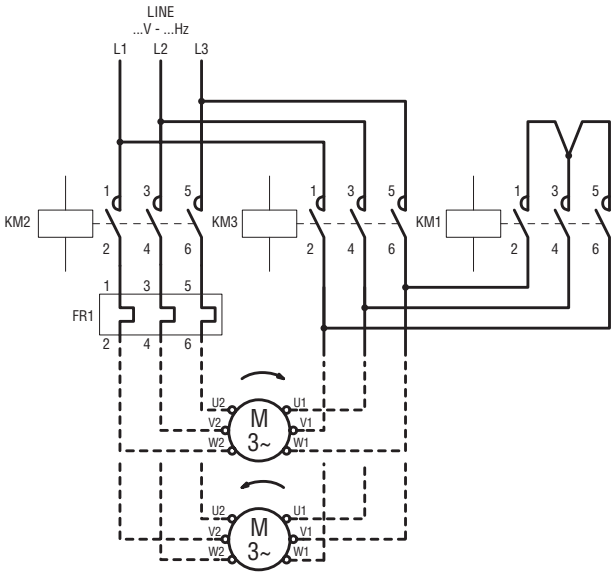
BFA00970… BFA02570
M3P00970…M3P02570

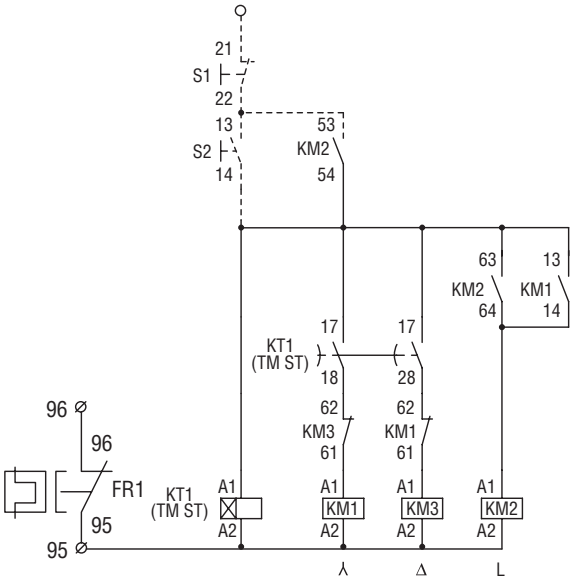


BFA2670…BFA03870
M3P02670…M3P03870



BFA050…BFA150





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	600V
M0P009❶❷1	0.6 - 1	-	-	-	-	½	½
M0P009❶❷1V5	0.9 - 1.5	-	-	-	-	¾	¾
M0P009❶❷2V3	1.4 - 2.3	-	-	-	½	1	1
M0P009❶❷33	2 - 3.3	-	¼	¾	1½	1½	2
M0P009❶❷5	3 - 5	-	½	1	1	3	3
M0P009❶❷75	4.5 - 7.5	-	¾	1½	2	5	5
M0P009❶❷10	6 - 10	½	1½	2	3	5	5
M0P012❶❷15	9 - 15	½	1½	3	3	7½	10
M1P009❶❷A4	0.63 - 1	-	-	-	-	-	½
M1P009❶❷A5	1 - 1.6	-	-	-	-	½	¾
M1P009❶❷A6	1.6 - 2.5	-	-	½	½	1	1½
M1P009❶❷A7	2.5 - 4	-	-	¾	¾	2	3
M1P009❶❷A8	4 - 6.5	¼	½	1	1½	3	5
M1P009❶❷A9	6.3 - 10	½	1½	2	3	5	7½
M1P009❶❷B0	9 - 14	¾	2	3	3	5	7½
M1P012❶❷B0	9 - 14	1	2	5	5	7½	10
M1P018❶❷B1	13 - 18	1	3	5	5	10	15
M2P025❶❷B2	17 - 23	1½	3	5	7½	15	15
M2P025❶❷B3	20 - 25	2	3	7½	7½	15	15
M2P026❶❷B2	17 - 23	1½	3	5	7½	15	20
M2P026❶❷B3	20 - 25	2	5	7½	7½	15	20
M2P026❶❷B4	24 - 32	2	5	7½	7½	15	20
M2P032❶❷B4	24 - 32	3	7½	10	10	20	25
M25P038❶❷B5	32 - 38	3	7½	10	15	30	30
M3P050❶❷B6UL	35 - 50	5	10	15	20	40	40
M3P065❶❷B7UL❸	46 - 65	-	-	20	25	50	60
M3P080❶❷B8❶	60 - 82	-	-	25❹	30❹	60❹	75❹



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.

THREE-PHASE POWER RATINGS		Rated motor current								
		200V	230V	**220-240V**	**380-415V**	400V	**440-480V**	500V	**550-600V**	690V
[HP]	[kW]	**[A]**	[A]	**[A]**	**[A]**	[A]	**[A]**	[A]	**[A]**	[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**	-

THREE-PHASE POWER RATINGS	Rated motor current	
[HP]	**[A] a 120V**	**[A] a 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.



- Sizes from 6 to 640A
- For standard and severe duty
- Versions with 2 or 3 phase control
- Versions with advanced functions for the control of the motor
- Startup with torque control, voltage ramp with current limit
- Protection functions for the motor and the soft starter
- Digital control and adjustment
- NFC connectivity for a simple, fast and intuitive programming with smartphone and App
- Versions with optional communication port for control and supervision

Soft starters — Sec. - Page

ADXN... series - 2 phase control ultra compact ..... 5 - 8
ADXL... series - 2 phase control ..... 5 - 10
ADXT... series - 3 phase control ..... 5 - 12
51ADX... series - 3 phase control ..... 5 - 15

Dimensions ..... **5 - 16**
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Technical characteristics ..... **5 - 21**



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ADXN...

- Two phase control
- For standard duty
- IEC rated soft starter current Ie 6...45A
- IEC rated motor power 2.2...22kW (400VAC)
- Rated operational voltage 208...600VAC
- Version with auxiliary supply voltage 24VAC/DC or 100...240VAC
- Built-in bypass relay
- Starting with voltage ramp
- Basic version with parameter setting with potentiometers on front
- Version with NFC connectivity for the programming with smartphone and App
- Advanced version with potentiometers and NFC connectivity, optical port, integrated motor thermal protection and optional RS485 module, Modbus-RTU protocol
- Integrated protections for the motor and soft starter
- LEDs for status signaling and diagnostics
- Compact housing, 45mm width
- Screw fixing or 35mm DIN rail mounting
- cULus certification.



Pag. 5-10

51ADX...

- Three phase control
- For severe duty
- IEC rated soft starter current Ie 17...640A
- IEC rated motor power 7.5...355kW (400VAC)
- Rated operational voltage 208...500VAC (51ADX...B), 208...415VAC (51ADX...)
- Auxiliary supply voltage 208...240VAC
- Built-in bypass contactor up to 245A. Predisposed for external bypass contactor for the upper sizes
- Starting with voltage ramp or torque control
- Maximum starting current limitation
- Backlit LCD icon display
- LEDs for status signaling and diagnostics
- Built-in RS232 port for remote control from PC, Modbus-RTU and property ASCII protocols
- Built-in RS485 port for the connection of the optional remote keypad.



Pag. 5-8

ADXL...

- Two phase control
- For standard and severe duty
- IEC rated soft starter current Ie 18....320A
- IEC rated motor power 7.5...160kW (400VAC)
- Rated operational voltage 208...600VAC
- Auxiliary supply voltage 100...240VAC
- Built-in bypass relay
- Starting with voltage ramp or torque control
- Maximum starting current limitation
- Integrated protections for the motor and soft starter
- Backlit LCD icon display
- LEDs for status signaling and diagnostics
- Optical port for programming, data download and diagnostics from PC
- NFC connectivity for the programming with smartphone and App
- Optional RS485 communication card, Modbus-RTU protocol
- cULus certification.



Pag. 5-10

ADXT...

- Three phase control
- For standard and severe duty
- IEC rated soft starter current Ie 34...554A
- IEC rated motor power 18.5...315kW (400VAC)
- Rated operational voltage 380...690VAC
- Versions with auxiliary supply voltage 110...120VAC and 220...240VAC, or version 24VAC/DC
- Built-in bypass contactor
- In-line or inside delta connection
- Starting with constant current, current ramp, voltage ramp or adaptive control
- Maximum starting current limitation
- Integrated protections for the motor and soft starter
- Backlit LCD graphic display
- LEDs for status signaling and diagnostics
- Optional RS485 (Modbus-RTU protocol) or Ethernet (Modbus-TCP protocol) communication cards
- cULus certification.

Guide for selecting






	ADXN	ADXL	ADXT	51ADX
Number of controlled phases	2	2	3	3
Built-in bypass	●	●	●	● (up to 245A)
Built-in display and keypad	—	●	●	●
Languages	—	6	8	4
View measurements	—	●	●	●
Torque control	—	●	●	●
Adjustable current limit	● (ADXNP)	●	●	●
Dynamic braking	—	—	●	●
Kick start function	—	●	●	●
Electronic motor thermal protection	● (ADXNP)	●	●	●
Motor protection thermistor input	—	●	●	●
Inside delta connection	—	—	●	—
Protection against phase loss	●	●	●	●
Protection against phase inversion	●	●	●	●
Protection against locked rotor	● (ADXNP)	●	●	●
Protection against thyristor overtemperature	●	●	●	●
Protection against low load	● (ADXNP)	●	●	●
Programmable alarm functions	● (ADXNF, ADXNP)	●	●	●
Digital inputs	● (start)	●	●	●
Analog input	—	—	—	●
Digital outputs	●	●	●	●
Analog output	—	—	●	●
Communication port	○ (ADXNP, RS485)	○ (RS485)	○ (RS485, Ethernet)	● (RS232)
Optical port for programming	● (ADXNP)	●	—	—
USB port for programming	—	—	●	—
Event log	—	●	●	●
Motor hour counter	—	●	●	●
Motor startup counter	—	●	●	●
Clock calendar	—	—	●	●
Remote external keypad	○ (ADXNP)	○	○	○
cULus certification	●	●	●	—

● Standard
○ With optional module or card
— Not available

Lovato electric

ADXN SERIES: SIMPLE, COMPACT AND FUNCTIONAL



The soft starters ADXN series are the ideal solution for those who need a **simple, compact and fast to configure** product for the gradual control of the starting and stopping of the motors.
Their **versatility** makes them suitable for several applications such as the control of pumps, fans, conveyor belts, compressors and they are available with **rated currents from 6 to 45A**.

VERSIONS

The soft starters ADXN series are available in three versions.

Basic version (ADXNB)



Ideal solution for those who need a soft starter with basic functions and extremely simple to configure, with only the need to control the gradual starting and the stopping of the motor. The configuration requires the settings of only 3 parameters (starting voltage, acceleration ramp and deceleration ramp) adjusted with 3 **potentiometers** present on the front of the soft starter.

NFC version (ADXNF)



Version provided with **NFC** (Near Field Communication) connectivity for the programming via smartphone and LOVATO NFC App. The default settings make it ready to use for the control of scroll compressors, typically used in conditioning systems, refrigerators and heating pumps without need for any programming. Thanks to the NFC antenna integrated on the front, it is however, possible to modify the parameters of the soft starter via smartphone for the control of loads different from compressors, like pumps, fans, conveyors, etc, solution which makes ADXNF extremely flexible for any kind of application.
The setting of parameters in digital format guarantees accuracy and repeatability, with possibility to set the programming on the smartphone to be immediately transferred to other ADXNF devices. It is also possible to configure a password for the locking of the settings to protect the soft starter against tampering of the parameters by unauthorized personnel.

Advanced version (ADXNP)



Version which provides the **electronic thermal protection** of the motor, obtained thanks to the presence of integrated current transformers, which allow the protection of the motor against overload and the management of starting ramps with current limiting, which are automatically adapted to follow the load variations. The soft starter ADXNP can also be equipped with an **optional RS485 communication module (CX04)** in order to be integrated in a remote control and supervision system. It is provided with both **potentiometers** on front for the setting of the basic parameters (starting voltage, acceleration ramp and deceleration ramp) and **NFC connectivity** for the programming of the advanced parameters through the LOVATO NFC App, such as the rated motor current, the tripping thermal class, protection thresholds, password, communication parameters, the function of the relay outputs and alarm properties. The **frontal optical port** allows the programming, data download and diagnostics from PC and App with the optional USB (CX01) and Wi-Fi (CX02) devices.

COMPACT DIMENSIONS

The soft starters ADXN series are characterized by two phase control and are realized in an extremely compact enclosure **only 45mm wide** for the entire range up to 45A (divided in 2 mechanical sizes that differ in height and depth).



SIMPLICITY

They are extremely **simple and quick to configure**. The control of the motor requires only the setting of **few and intuitive parameters**, such as the ramp times and the starting voltage, which can be configured according to the version with potentiometers on front or via smartphone with NFC connectivity and LOVATO NFC App, available for free for iOS and Android smart devices.

WIDE OPERATIONAL VOLTAGE RANGE

They are characterized by a wide rated line voltage range, which extends **from 208 to 600VAC**; this makes them suitable for every market, every market, including North America, without needs to manage different codes according to the supply voltage available in the system.

AUXILIARY POWER SUPPLY

All the three versions of ADXN are available with 2 auxiliary supply voltages: **24VAC/DC**, typical voltage available in the automation control panels, or **100-240VAC**, typical voltage available for example in the panels for pumps control.

INTEGRATED PROTECTION FUNCTIONS

They integrate several functions for the protection of the motor and the soft starter, such as:
- soft starter thermal protection made by a built-in temperature probe
- controls on the line voltage: voltage and frequency out of limits, phase loss, wrong phase sequence
- electronic thermal protection of the motor (ADXNP version only).

The protection thresholds and tripping delays are configurable on the versions provided with NFC connectivity (ADXNF and ADXNP) and can be individually enabled or disabled.

NFC CONNECTIVITY

The ADXNF and ADXNP versions are provided with NFC connectivity integrated on the front, which allows the modification of the parameters in a **fast, simple and intuitive** way directly from the **smartphone** with **LOVATO NFC App.**
The programming can be saved on the smartphone to be copied to other soft starters of the same model series extremely quickly, even with the device powered off, a solution ideal for those who make programming in series. It is also possible to set a password to protect the parameters against tampering by unauthorized personnel.
The LOVATO NFC App is available for **Android and iOS** smart devices and it is freely downloadable from Google Play Store and App Store.

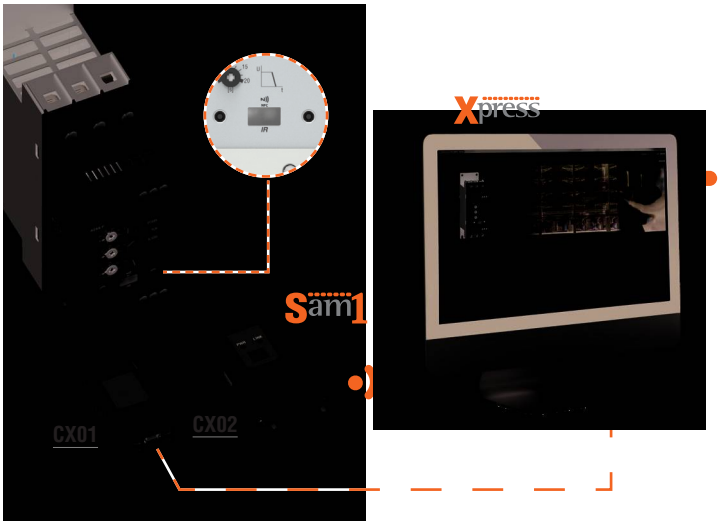


ELECTRONIC MOTOR THERMAL PROTECTION (ADXNP version only)

The advanced version ADXNP integrates current transformers for the measure of the current flowing in the motor phases, allowing the soft starter to thermally protect the motor commanding it to stop when the current exceeds the rated value for an extended time, without the need to install an external thermal overload relay, resulting in cost, space, wiring and installation time savings. The thermal protection is electronic type and it is possible to set a double protection class: one for the starting and one for the running, and choice between class 10, 15, 20 and 25 according to the duty level of the application.

OPTICAL PORT FOR COMMUNICATION (ADXNP version only)

The advanced version ADXNP is provided with optical port on front for the connection of the optional USB (CX01) or Wi-Fi (CX02) devices, by which the soft starter can be connected to a PC with software Xpress, smartphone and tablet with LOVATO Sam1 App programming and diagnostic in simple and safe way, by operating directly from the front of the soft starter without the need to disconnect the electrical power supply.



RS485 COMMUNICATION PORT (ADXNP version only)



CX04

The advanced version ADXNP can be equipped with the optional RS485 Modbus-RTU communication module CX04. This enables the integration in a supervision and monitoring system or to communicate with a Modbus master like a PLC, an HMI or the remote display unit EXCRDU2, display unit EXCRDU2, through which it is possible to control and monitor up to 32 starters connected in RS485. The module is supplied 24VAC/DC and it connects in simple and fast way to the optical port of the soft starter with screw fixing. Compatible with Synergy supervision and energy management software.



EXCRDU2

BUILT-IN BYPASS

All the versions integrate a **bypass** relay which automatically deactivates the thyristors circuit once the acceleration ramp is completed and the motor reaches its rated speed, reducing the heat and the power dissipation, which consequently results in **energy saving**. The presence of the bypass also increases the reliability of the soft starter, by protecting the internal thyristors against unpredictable phenomena on the network during the motor running, such as short circuits, overcurrents or overvoltages.

2 RELAY OUTPUTS INTEGRATED

The soft starters ADXN have 2 built-in relay outputs with NO contact for signaling functions or for the command of external devices. The function of the outputs is fixed on the basic version ADXNB, while it is programmable on the versions ADXNF and ADXNP and choice between line contactor control, TOR (Top Of Ramp), alarm and maximum torque.

PASSWORD FOR THE PROTECTION OF THE SETTINGS

The access to the parameters of the soft starters ADXNF and ADXNP can be locked with a password configurable with the LOVATO NFC App to protect the settings against tampering by unauthorized personnel.

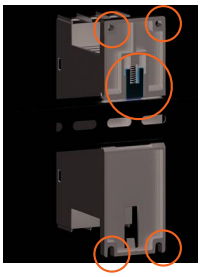
FRONTAL LEDS

All the three versions have 3 LEDs on the front for the signalling of the presence of auxiliary power supply, run status and alarm. In case of active alarm the alarm LED is flashing and the type of alarm in progress can be identified by the number of flashes.



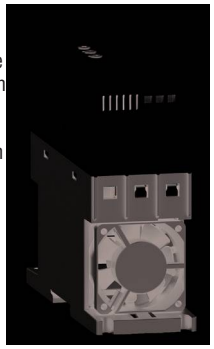
MOUNTING

The soft starters ADXN can be fixed with screws on the rear panel or on 35mm DIN rail (IEC/EN/BS 60715). For the screw fixing there are 4 holes on the base of the soft starter, while for the DIN rail fixing there is a rubber pad insert which prevents the soft starter from sliding on the DIN rail.



FAN

It is possible to install on the soft starter ADXN up to 30A an optional fan **40x40mm** (already built-in on the sizes 38A and 45A) to improve the heating dissipation performances and increase the number of starts per hour. The fan is supplied directly by the soft starter through a pre-wired cable which is completely hidden inside the soft starter enclosure. The presence of the fan doesn't affect the dimensions of the soft starter ensuring the maintenance of compact dimensions.

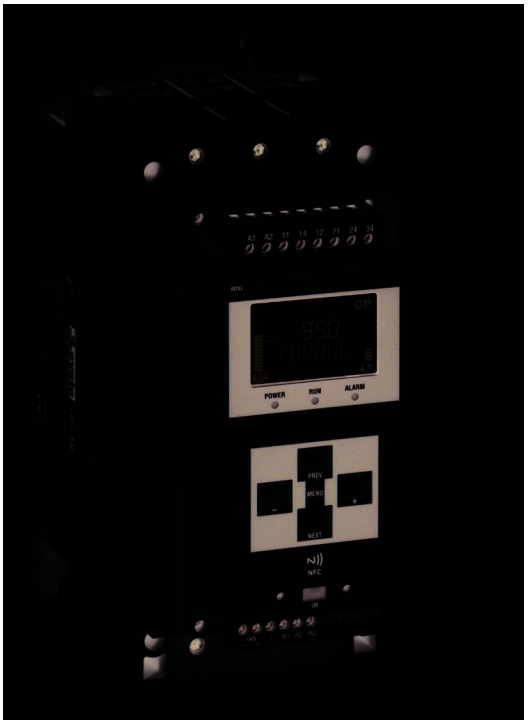


RIGID CONNCECTION FOR THE DIRECT MOUNTING TO A MOTOR PROTECTION CIRCUIT BREAKER (MPCB)

The rigid connection SM1X3150R allows the direct mounting of the ADXN to a motor protection circuit breaker type SM1R (rotary knob type) up to size 38A, creating a compact starter and reducing installation time. SM1X3150R includes an accessory for the support of the weight of the soft starter when hooked to the MPCB, to be fixed with screws to the panel and compatibile with both high and low DIN rail.



ADXL SERIES: SIMPLE, EFFICIENT AND SAFE MOTOR CONTROL



SIMPLE
The ADXL soft starter series is equipped with a backlit LCD display with icons and NFC connectivity, for a simple configuration via smartphones and tablets. They are ideal for "plug and play" applications, thanks to the installation AUTO SET wizard, and for high-performance applications, with control and protection during the motor startup and operation.

EFFICIENCY
The two phase control during the start and stop of the motor allows a reduction of the power consumption and the heat dissipation. Once the starting ramp is completed, the soft starter closes the internal bypass contacts and reduces the energy consumption.

SAFETY
ADXL integrated functions allow to protect the motor and the soft starter; it's capable of monitoring the motor thermal status, to manage the thermal protection, and its internal temperature, in order to protect the thyristors from overtemperature. Furthermore, a motor overtemperature protection can be enabled through an external PTC temperature sensor.

AUTO SET
Upon startup, the soft starter launches a user wizard to simplify the setup. The user can set the device through 4 simple parameters:
- **language:** it is possible to choose the text view by selecting the preferred language, at choice between: English, Italian, French, Spanish, Portuguese, German;
- **rated motor current:** the motor nominal current can be set between 50% and 100% of the rated soft starter current;
- **application type:** it includes predefined setups for the most common applications: centrifugal pump, fire fighting pump, conveyor belt, fan, mixer and general purpose. By selecting one type, the soft starter automatically updates the parameter programming to adapt to the requested application.
- **soft starter duty level:** the same application, based on the load connected to the motor, can be more or less heavy-duty. ADXL is capable of automatically adapting to standard or heavy-duty startups by adjusting the maximum starting current limit based on the user selection.

Expert users can customize the settings through the complete parameter menu.

EASY SETUP
The ADXL series soft starters are equipped with NFC connectivity to simplify the parameter setting procedure. Using a compatible smartphone or tablet, the user, can download, save and edit the parameters using the LOVATO NFC App even with the soft starter powered off. On the front it has a built-in optical port compatible with the CX01 device, to connect the ADXL via USB to a PC with Xpress software, and the CX02 device, for Wi-Fi connection to a PC with Xpress software or to smartphone and tablet with LOVATO Sam1 App.

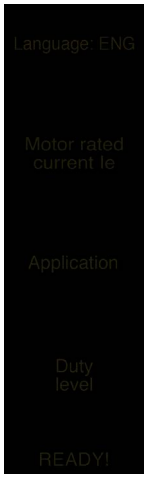


LOVATO NFC App and LOVATO Sam1 App freely downloadable from Google Play Store and App Store.

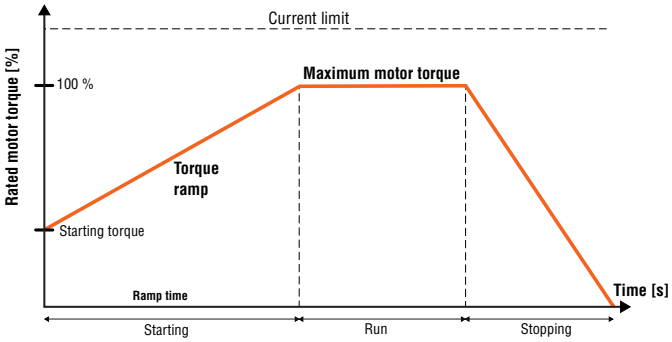
ANDROID APP ON Google play

Available on the App Store

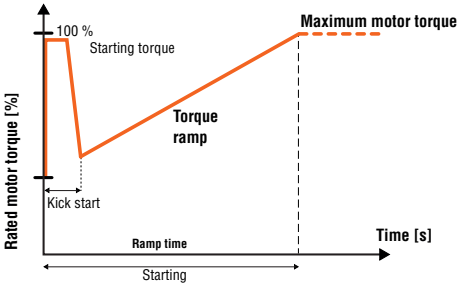
ADXL: from start-up to operation in 4 steps



TORQUE CONTROL
The torque control function allows to perform gradual accelerations and decelerations of the motor, with significant reduction of mechanical faults and wear of the transmission devices.



KICK START
This function allows to start the motor when the initial torque is not sufficient to overcome friction forces typical of high inertia loads, by providing a high torque during the very first moments of the startup.



EMERGENCY START
In situations where the motor operation is absolutely prioritized over the possibility of motor or soft starter failure, it is possible to program a digital input to inhibit the activation of all protections and alarms that prevent the motor start-up.

FIRE FIGHTING PUMP PRESET SETUP
In the AUTO SET wizard it is possible to select the fire fighting pump application. This setting is optimized to start fire fighting pumps overriding all alarms and protections. In this situation, the main priority is the pump start-up, without considering the possible consequences for the pump starter and motor.

INPUTS, OUTPUTS, LIMITS AND REMOTE VARIABLES
The input and output functions are preset with the most common settings; however, the user can easily edit the preset configuration to adapt the soft starter to the application needs. All inputs and outputs can be edited. There are three types of programmable internal variables:
– limit thresholds
– remote variables
– user alarms.

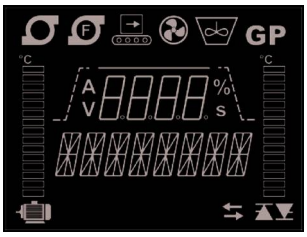
MAINTENANCE COUNTERS
ADXLs have two maintenance counters dedicated for the counting of the number of motor starts and the motor working hours, on which it is possible to set a threshold, that when exceeded, an alarm is triggered.

COOLING FAN
It is possible to equip the ADXL soft starters from 18 to 115A with an optional fan (built-in as standard for the higher sizes) to improve the heating dissipation performance and increase the number of permissible starts per hour. The fan is supplied directly by the soft starter that controls its activation and it monitors its status, by signaling anomalies with dedicated alarms.

DIN RAIL MOUNTING
For sizes from 18 to 115A, the EXP8003 accessory is available to mount the soft starter on a 35mm DIN rail.



USER INTERFACE
A backlit icon display shows the data to the user in a clear and immediate way.
- Alarm texts available in 6 languages (ENG-ITA-FR-ES-POR-DE)
- 6 icons indicate the default setup in use: centrifugal pump, fire fighting pump, conveyor belt, fan, mixer and general purpose
- Two graphic bars show the motor and thyristors thermal status
- An alphanumeric display shows texts and measures
- A status bar shows the soft starter status: start, bypass, run, stop.

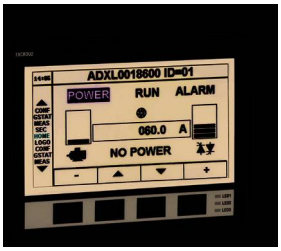


PASSWORD
Access to the soft starter parameters can be protected by user customizable passwords. There are two access levels, user and advanced.
Furthermore, it's possible to block the serial communication using the remote control password.

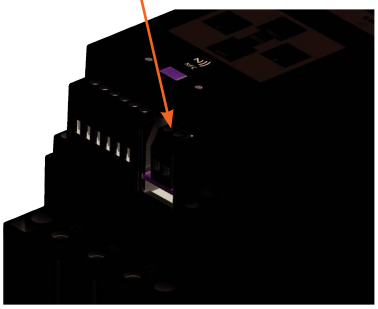
RS485 COMMUNICATION AND REMOTE DISPLAY UNIT
ADXL soft starters are equipped with a slot for the optional RS485 card with Modbus-RTU protocol EXC1042. RS485 communication can be used to connect the soft starter to a supervision software (e.g. Synergy) or for the connection to the EXCRDU2 remote display unit, for the monitoring of the measures, the command of motor start and stop, and the setup from the panel door.



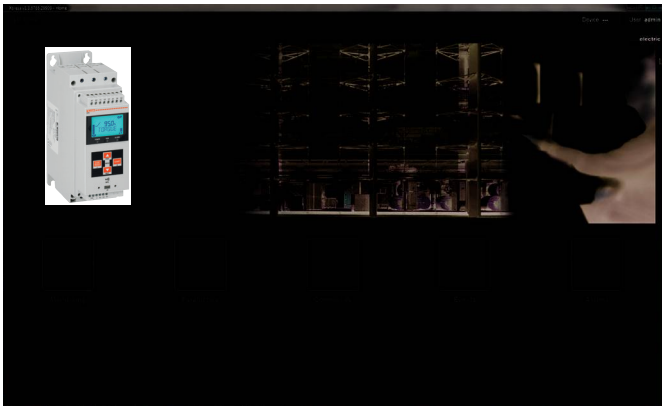
EXC1042



EXCRDU2



MONITORING AND REMOTE CONTROL
Through the optional EXC1042 communication card and compatibility with the supervision and energy management software Synergy, setup and remote control software Xpress, it's possible to constantly monitor all the measures available on the soft starter, the soft starter status, see live trends and edit the parameters.



ADXT SERIES: HIGH PERFORMANCE, GREAT FUNCTIONALITIES

ADXT is the ideal soft starter for applications that require high performance, great reliability and robustness. Provided with advanced features and integrated protections, it provides an accurate control of the motor starting and stopping and allows to reduce the energy consumption for constant speed applications.



THREE PHASE CONTROL

The three phase control allows the soft starter to provide a higher torque in the very first instants of the starting ramp compared to a soft starter with two controlled phases at the same current. This characteristic makes it particularly suitable for the control of heavy-duty applications, characterized by high inertia, such as crushers, fans, vertical or inclined conveyors, screw compressors, centrifuges, propellers, mills, band or circular saws, shredders.

WIDE OPERATING VOLTAGE RANGE UP TO 690VAC

ADXT can be installed in systems with rated voltage from 380 to 690VAC, a selling point that makes it extremely versatile for every market, including North America.
Two versions are available, which differ in the auxiliary supply voltage: version with supply 110...120VAC and 220...240VAC and version with supply 24VAC/DC.

INTEGRATED BYPASS

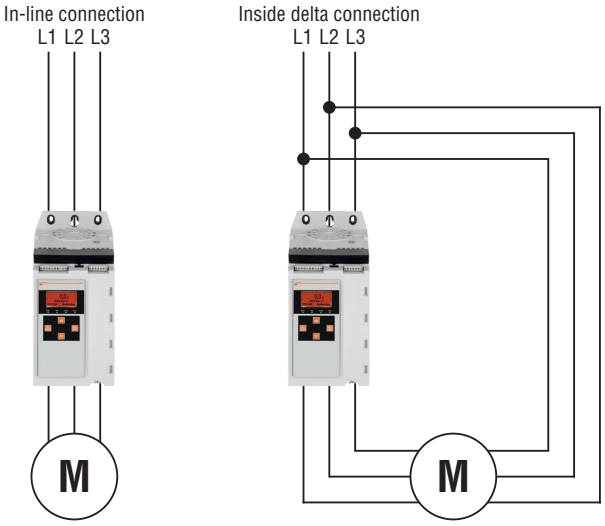
The entire range integrates the bypass contactor, that disables the thyristors once the motor starting is completed, reducing the energy consumption, the heating generated and the power dissipation.

MULTI-LANGUAGE GRAPHICAL DISPLAY

The backlit LCD graphic display provides a clear and complete visualization of the status of the soft starter and electrical measurements, with extended texts, feedback messages, and a real-time performance graph. It supports 8 languages (English, Italian, French, Spanish, Portuguese, German, Chinese, Russian), and allows the customization of the display screens with the desired parameters.

IN-LINE OR INSIDE DELTA CONNECTION

The ADXT soft starters can be installed either with the traditional in-line connection or with the inside delta connection (six-wire connection), with thyristors connected in series to each motor winding, a configuration common in the United States and many other countries. In this configuration, which requires special six-wire motors, the soft starter is only crossed by the phase current, significantly lower than the line current. This allows the use of a smaller starter, resulting in cost savings, and simplifies the replacement of star-delta starters since the existing wiring is retained.





QUICK SETUP AND SIMULATION

A quick setup menu is available for the fast configuration of the soft starter, which guides the user during the configuration by suggesting typical settings for the most common applications. Additionally, with the simulation mode, it's possible to simulate the start-up, operation, and shutdown of the motor to verify the correct functioning of the soft starter and the associated equipment.



STANDARD OR HEAVY DUTY SERVICE

They are suitable for controlling both standard loads, with typical starting currents between 3 and 4 times the rated current of the motor, and heavy loads with higher starting currents such as 5 times the rated current. Depending on the starting current and the ramp-up time, the soft starter is capable of providing a more or less high continuous output current. The tables present in the catalog offer a guide for the proper selection of the code according to the duty level of the load.

INTEGRATED PROTECTIONS

Several integrated functions are available for the protection of the motor, system, and the soft starter, including: motor thermal protection against overload, overcurrent, phase loss, incorrect phase sequence, load too low (protection against dry running), overvoltage, undervoltage, excessive starting time, current asymmetry, overtemperature, motor protection with thermistor, and many others.

MOTOR CONTROL MODES

The ADXT soft starters integrate several modes for controlling the motor start and stop, making them extremely versatile for any type of application: starting with constant current, current ramp, voltage ramp, adaptive control, kick start, starting with current limitation, pump cleaning cycles, controlled or coasting stop, DC injection braking, gradual braking with braking contactor control, contactor control for reverse direction, jog function, and scheduled starts.



❶ Early acceleration
❷ Constant acceleration
❸ Late acceleration
❹ Late deceleration
❺ Constant deceleration
❻ Early deceleration

POWER THROUGH AND EMERGENCY MODE

Two functions are available for the starting of the motor in emergency situations:

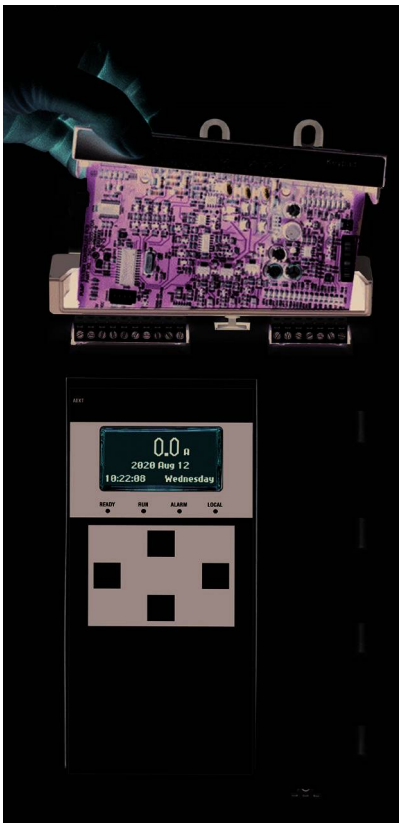
- The function PowerThrough, if enabled, allows the soft starter to control the motor even if one of the three thyristors is damaged, allowing the motor to start with control over two phases, minimizing machine downtime.
- The emergency mode function, controlled via a digital input, instead allows the soft starter to keep the motor running, ignoring any fault or alarm condition, prioritizing motor control in case of emergency.

USB PORT AND OPTIONAL COMMUNICATION CARDS

On the top of the soft starter, there is a USB port for the connection of a USB pen drive through which it is possible to:

- upload the parameter configuration file
- download the event log
- modify the languages
- update the soft starter firmware.

The configuration of the exportable files via USB is done with a PC with the software ADXTSW, downloadable from the website www.LovatoElectric.com. If it is necessary to integrate the soft starter into a control and supervision network, two optional communication cards are also available with an RS485 (Modbus-RTU protocol) or Ethernet (Modbus-TCP protocol) port.



SCHEDULED START

It is possible to configure the soft starter to automatically start or stop the motor at a specific time of day or on certain days of the week based on the integrated clock calendar.

cULus CERTIFICATION

The ADXT soft starters are cULus certified, an essential requirement for sales in the US and Canadian markets.

Basic version ADXNB... type



ADXNB...

Order code	IEC rated starter current Ie	Rated motor power ≤40°C 400V	400-480V	550-600V	Qty per pkg	Wt
	[A]	[kW]	[HP]	[HP]	n°	[kg]
Parameters setting with potentiometers. Built-in bypass relay and 2 relay outputs. Rated operational voltage 208...600VAC Auxiliary supply voltage 100...240VAC.						
ADXNB006	6	2.2	3	5	1	0.540
ADXNB012	12	5.5	7.5	10	1	0.540
ADXNB018	18	7.5	10	15	1	0.540
ADXNB025	25	11	15	20	1	0.720
ADXNB030	30	15	20	25	1	0.720
ADXNB038	38	18.5	25	30	1	0.750
ADXNB045	45	22	30	40	1	0.750
Auxiliary supply voltage 24VAC/DC.						
ADXNB00624	6	2.2	3	5	1	0.540
ADXNB01224	12	5.5	7.5	10	1	0.540
ADXNB01824	18	7.5	10	15	1	0.540
ADXNB02524	25	11	15	20	1	0.720
ADXNB03024	30	15	20	25	1	0.720
ADXNB03824	38	18.5	25	30	1	0.750
ADXNB04524	45	22	30	40	1	0.750

NFC version ADXNF... type



ADXNF...

Order code	IEC rated starter current Ie	Rated motor power ≤40°C 400V	400-480V	550-600V	Qty per pkg	Wt
	[A]	[kW]	[HP]	[HP]	n°	[kg]
NFC connectivity for parameters setting with smartphone and App. Built-in bypass relay and 2 relay outputs. Rated operational voltage 208…600VAC Auxiliary supply voltage 100...240VAC.						
ADXNF006	6	2.2	3	5	1	0.540
ADXNF012	12	5.5	7.5	10	1	0.540
ADXNF018	18	7.5	10	15	1	0.540
ADXNF025	25	11	15	20	1	0.730
ADXNF030	30	15	20	25	1	0.730
ADXNF038	38	18.5	25	30	1	0.760
ADXNF045	45	22	30	40	1	0.760
Auxiliary supply voltage 24VAC/DC.						
ADXNF00624	6	2.2	3	5	1	0.540
ADXNF01224	12	5.5	7.5	10	1	0.540
ADXNF01824	18	7.5	10	15	1	0.540
ADXNF02524	25	11	15	20	1	0.730
ADXNF03024	30	15	20	25	1	0.730
ADXNF03824	38	18.5	25	30	1	0.760
ADXNF04524	45	22	30	40	1	0.760

General characteristics
ADXN... is a soft starter with two phase control for the gradual control of the start and stop of asynchronous motors. Its main strengths are the simplicity of configuration, thanks to a short set of parameters which allows the programming simple and fast, and the compactness, thanks to the enclosure only 45mm wide which makes it suitable for the installation in panels with limited spaces.
It can be used for several applications such as the control of pumps, fans, compressors, conveyor belts and mixers.
It is available with rated current from 6 to 45A, suitable for the installation in systems with rated line voltage from 208 to 600VAC 50/60Hz.
The series consists of 3 versions which differs in the type of programming mode (settings with potentiometers on front or via smartphone with NFC connectivity and App) and integrated functions.
Every version is available in double variant with auxiliary supply voltage 24VAC/DC or 100...240VAC to suit every need based on the voltage present in the plant.

BASIC VERSION ADXNB
The soft starter ADXNB is the ideal solution for those who need a soft starter with basic functions and extremely simple to configure. The configuration requires the settings of only 3 parameters adjusted with potentiometers present on the front of the soft starter.
The general characteristics are the following:
– Built-in bypass relay
– Programming with potentiometers on front: starting voltage, acceleration ramp and deceleration ramp
– Voltage ramp startup
– Free wheel or controlled stop
– Integrated overtemperature protection
– 2 built-in relay outputs with normally open contact, with function line contactor control and TOR (Top Of Ramp)
– Suitable for the control of pumps, fans, blowers, conveyor belts, compressors and general purpose applications.

NFC VERSION ADXNF
The soft starter ADXNF is a version provided with NFC connectivity for the programming via smartphone and LOVATO NFC App. The default settings make it ready to use for the control of scroll compressors, typically used in air conditioning systems, refrigerators and heating pumps but the parameters can be modified via smartphone and LOVATO NFC App for the control of every kind of application, like pumps, fans, conveyor belts, etc.
It is also possible to configure a password for the locking of the settings.
The general characteristics are the following:
– Built-in bypass relay
– Programming with smartphone with NFC connectivity and LOVATO NFC App, available for Android and iOS smart devices, freely downloadable from Google Play Store and App Store.
– Default settings with pre-configured parameters for the control of scroll compressors
– Voltage ramp startup
– Free wheel or controlled stop
– Integrated overtemperature protection
– 2 built-in relay outputs with normally open contact with programmable function line contactor control, TOR (Top Of Ramp) and alarm
– Suitable for the control of scroll compressors (air conditioning systems, refrigerators and heating pumps), pumps, fans, blowers, conveyor belts, compressors and general purpose applications with parameters settings via NFC connectivity and LOVATO NFC App.

Operational characteristics ADXN...
See page 5-9.

Certifications and compliance
See page 5-9.

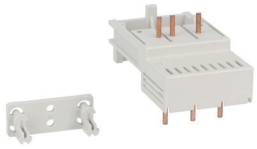
Advanced version ADXNP... type



ADXNP...

Order code	IEC rated starter current Ie	Rated motor power ≤40°C 400V	400-480V	550-600V	Qty per pkg	Wt
	[A]	[kW]	[HP]	[HP]	n°	[kg]
Setting of basic parameters with potentiometers and advanced parameters with NFC connectivity and App. Integrated motor electronic thermal protection. Built-in bypass relay and 2 relay outputs. Built-in optical port on front. Optional RS485 Modbus-RTU module. Rated operational voltage 208...600VAC Auxiliary supply voltage 100...240VAC.						
ADXNP006	6	2.2	3	5	1	0.560
ADXNP012	12	5.5	7.5	10	1	0.560
ADXNP018	18	7.5	10	15	1	0.560
ADXNP025	25	11	15	20	1	0.750
ADXNP030	30	15	20	25	1	0.750
ADXNP038	38	18.5	25	30	1	0.780
ADXNP045	45	22	30	40	1	0.780
Auxiliary supply voltage 24VAC/DC.						
ADXNP00624	6	2.2	3	5	1	0.560
ADXNP01224	12	5.5	7.5	10	1	0.560
ADXNP01824	18	7.5	10	15	1	0.560
ADXNP02524	25	11	15	20	1	0.750
ADXNP03024	30	15	20	25	1	0.750
ADXNP03824	38	18.5	25	30	1	0.780
ADXNP04524	45	22	30	40	1	0.780

Accessories for ADXN...



SM1X3150R



EXP8007

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Accessories for soft starters ADXN... type			
SM1X3150R	Rigid connection for soft starters type ADXN from 6 to 38 A for the direct mounting to a motor protection circuit breaker type SM1R❶	1	0.053
EXP8007	Fan for soft starters type ADXN from 6 to 30 A for the increasing of number of operations per hour (ADXN size 38 and 45A already have a built-in fan as standard)	1	0.044

❶ For details about motor protection circuit breakers type SM1R refer to the chapter 1.

Communication devices and remote display unit for ADXNP... type



CX01



CX02



CX04



EXCRDU2

new

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Communication devices			
CX01	USB connection device PC ↔ ADXNP with optical connector for programming, data download, diagnostics and firmware update	1	0.090
CX02	Wi-Fi connection device PC/smartphone ↔ ADXNP for data download, programming and diagnostics	1	0.090
CX04	RS485 communication module for ADXNP, Modbus-RTU protocol. Auxiliary supply voltage 24VAC/DC.	1	0.046
Remote display unit			
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420

ADVANCED VERSION ADXNP
The soft starter ADXNP provides the motor electronic current thermal protection, obtained thanks to the presence of integrated current transformers, which allow the motor protection against overload and the management of starting ramps with current limiting, which are automatically adapted to follow the load variations. It is provided with both potentiometers on front for the setting of the basic parameters and NFC connectivity and optical port for the programming of the advanced parameters through the LOVATO NFC App.
ADXNP can also be equipped with an optional RS485 communication module in order to be integrated in a supervision network.
The general characteristics are the following:
- Built-in bypass relay
- Integrated electronic thermal protection of the motor, with double class configurable (starting and running)
- Programming of basic parameters with potentiometers on front (which can be disabled via NFC if preferable): starting voltage, acceleration ramp and deceleration ramp
- Programming of advanced parameters (rated motor current, starting current limit, tripping thermal class, protection thresholds, communication parameters, password, relay outputs function and alarm properties) with smartphone with NFC connectivity and LOVATO NFC App, available for Android and iOS smart devices, freely downloadable from Google Play Store and App Store
- Voltage ramp startup with current limiting
- Free wheel or controlled stop
- Integrated overtemperature protection
- 2 built-in relay outputs with normally open contact with programmable function line contactor control, TOR (Top Of Ramp), alarm and maximum torque
- Optical port on front for the connection of USB (CX01) or Wi-Fi (CX02) optional devices for programming, data download and diagnostics from PC with Sam1 software or smart devices with LOVATO Xpress App, freely downloadable from Google Play Store and App Store
- Optional RS485 module (CX04), Modbus-RTU protocol
- Suitable for the control of pumps, fans, blowers, conveyor belts, compressors mixers and general purpose applications.

Operational characteristics ADXN...
- Two phase control
- Rated operational voltage: 208...600VAC ±10%
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage: 24VAC/DC (ADXN...24), 100...240VAC (ADXN...) -15%/+10%
- IEC rated soft starter current Ie: 6...45A
- Rated motor power: 2.2...22kW (400VAC) and 5...40HP (600VAC)
- 3 LEDs: presence of auxiliary power supply, ramp in progress / TOR, alarm
- 1 digital input for start command
- 2 relay outputs with normally open contact, programmable on ADXNF and ADXNP, fixed function on ADXNB
- Operating temperature: -20...+60°C (above 40°C with derating of the soft starter current by 1%/°C)
- Storage temperature: -30...+80°C
- Screw fixing or 35mm DIN rail mounting (IEC/EN/BS 60715)
- Protection degree: IP20.

Software Synergy, Xpress, Sam1 and App NFC
See the chapter 36.

Certifications and compliance for soft starters ADXN...
Certifications: cULus, EAC, RCM (pending).
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2, UL 60947-4-2, CSA C22.2 n° 60947-4-2.

Certifications and compliance for accessories
Certifications: cULus (EXP8007 and CX04), cETLus (only for EXCRDU2), EAC (excluded EXCRDU2).
Compliant with standards: CX01: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3; CX02: IEC/EN/BS 60950-1, EN 62311, EN301 489-1 V2.2.0, EN 301 489-17 V3.2.0, EN300 328 V2.1.1. SM1X3150R: IEC/EN/BS 60947-1; CX04: IEC/EN/BS 61010-1, UL 61010-1, CSA C22.2 n° 61010-1; EXCRDU2: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

ADXL... series



ADXL0018600...ADXL0060600



ADXL0135600...ADXL0162600

Order code	IEC rated starter current Ie	Rated motor power ≤40°C IEC (400V)		Qty per pkg	Wt
	[A]	[kW]	[HP]	n°	[kg]
For standard and heavy-duty applications. Built-in bypass relay. Rated operational voltage 208...600VAC. Auxiliary supply voltage 100...240VAC.					
ADXL0018600	18	7.5	10	1	2.100
ADXL0030600	30	15	15	1	2.100
ADXL0045600	45	22	25	1	2.100
ADXL0060600	60	30	30	1	2.100
ADXL0075600	75	37	40	1	2.900
ADXL0085600	85	45	50	1	2.900
ADXL0115600	115	55	60	1	2.900
ADXL0135600	135	75	75	1	7.800
ADXL0162600	162	90	75	1	7.800
ADXL0195600	195	110	100	1	13.900
ADXL0250600	250	132	150	1	13.900
ADXL0320600	320	160	200	1	13.900

IEC power ratings ≤40°C (50Hz)

Order code	Rated starter current Ie	Rated motor power ❶		
		230V	400V	500V
	[A]	[kW]	[kW]	[kW]
ADXL0018600	18	4	7.5	11
ADXL0030600	30	7.5	15	18.5
ADXL0045600	45	11	22	30
ADXL0060600	60	15	30	37
ADXL0075600	75	22	37	45
ADXL0085600	85	22	45	55
ADXL0115600	115	37	55	75
ADXL0135600	135	37	75	90
ADXL0162600	162	45	90	110
ADXL0195600	195	55	110	132
ADXL0250600	250	75	132	160
ADXL0320600	320	90	160	200

UL power ratings ≤40°C (60Hz)

Order code	Rated starter current FLA	Rated motor power ❷				
		208V	220-240V	380-415V	440-480V	550-600V
	[A]	[HP]	[HP]	[HP]	[HP]	[HP]
ADXL0018600	18	5	5	10	10	15
ADXL0030600	28	10	10	15	20	25
ADXL0045600	44	10	15	25	30	40
ADXL0060600	60	20	20	30	40	50
ADXL0075600	75	25	25	40	50	60
ADXL0085600	83	25	30	50	60	75
ADXL0115600	114	40	40	60	75	100
ADXL0135600❸	130	40	50	75	100	125
ADXL0162600❸	156	50	60	75	125	150
ADXL0195600❸	192	60	75	100	150	200
ADXL0250600❸	248	75	100	150	200	250
ADXL0320600❸	320	100	125	200	250	300

❶ Preferred rated values according to IEC/EN/BS 60072-1.
❷ Horsepower and current values according to UL508 (60Hz).
❸ Terminal lug kits and shrouds are required for UL. See page 5-11.

General characteristics

The ADXL soft starter with two phase control and built-in bypass relay allows the control of the start and stop of three-phase asynchronous motors. ADXL is equipped with a backlit display with icons and NFC connectivity, for a simple, intuitive and fast configuration, with smartphones and tablets.
ADXL is ideal for simple "plug and play" applications, thanks to the installation wizard, and for high-performance applications, with control and protection during the motor start-up and operation.
The ADXL includes protection features for the soft starter and motor, and it's possible to enable specific alarms to signal maintenance needs, such as the number of startups performed or the operation hours of the motor.

It has the following main features:
- Two phase control
- Backlit LCD icon display
- Texts available in 6 languages (ENG-ITA-FR-ES-POR-DE)
- Built-in bypass relay
- Voltage or torque ramp startup
- Torque control
- Kick start
- Starting with current limitation
- Free wheel or controlled stop
- 3 programmable digital inputs, one of which configurable as digital or PTC input
- 3 programmable relay outputs: 1 with changeover contact, 2 with NO contact
- 3 indicator LEDs: presence of power supply, ramp in progress/TOR, alarm
- 4 configurable sets of motor parameters
- Optical port for programming, data download and diagnostics with the software Xpress and LOVATO Sam1 App, freely downloadable from Google Play Store and App Store
- NFC connectivity for parameter settings with LOVATO NFC App, freely downloadable from Google Play Store and App Store
- Optional RS485 communication card, Modbus-RTU protocol
- Supervision and energy management software Synergy
- Measures visible on display: max current, phase currents, torque, voltage, active power, power factor, motor thermal status, heatsink temperature, energy, motor hour counter, number of starts counter
- Protections:
  - motor: motor thermal protection with double class (starting and running), protection with PTC probe, locked rotor, current asymmetry, starting too long, low torque, motor not connected
  - auxiliary supply: voltage too low or micro-interruption
  - power line: lack of voltage, phase loss, wrong phase sequence, voltage or frequency out of limits
  - soft starter: overtemperature, overcurrent, thyristor failure, bypass relay failure, temperature sensor failure, fan failure
- Events log.

Operational characteristics
- Rated operational voltage: 208...600VAC ±10%
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage: 100...240VAC
- IEC rated soft starter current Ie from 18 to 320A
- Rated motor current selectable from the 50% to the 100% of rated soft starter current Ie
- Rated motor power 7.5...160kW (400VAC) and 15...300HP (600VAC)
- Operating temperature: -20...+60°C (above 40°C with derating of the soft starter current by 0.5%/°C)
- Storage temperature: -30...+80°C
- Number of starts per hour: see page 5-23.
- Screw fixing or 35mm DIN rail mounting for ADXL0018600...ADXL0115600 with optional accessory EXP8003
- Protection degree: IP00

Certifications and compliance

Certifications obtained: cULus, EAC, RCM.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2, UL508, CSA C22.2 n°14.

Accessories for ADXL...


CX01


CX02



EXCRDU2


EXC1042

new


EXCGLB...

new


EXCCON02

new


EXCM4G01


EXP8003


EXP8004


EXA01


EXA02


EXA03


EXA04

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Communication devices			
CX01	USB connection device PC ↔ ADXL with optical connector for programming, data download, diagnostics and firmware update	1	0.090
CX02	Wi-Fi connection device PC/smartphone ↔ ADXL for data download,programming, diagnostics and cloning	1	0.090
EXC1042	RS485 communication card, Modbus-RTU protocol	1	0.020
Remote display unit			
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420
Gateway and converters			
EXCGLB01	Gateway data logger, 1 RS485 port, 1 Ethernet port, Wi-Fi connection	1	0.190
EXCGLB02	Gateway data logger, 1 RS485 port, 1 Ethernet port, LTE connection, GNSS (GPS)	1	0.190
EXCGLB03	Gateway data logger, 1 RS485 port, 2 Ethernet ports, 4G (LTE) connection	1	0.190
EXCM4G01	4G Gateway with RS485 and Ethernet port, Modbus-RTU/TCP protocol	1	0.300
EXCCON02	RS485/Ethernet converter, 9...48VDC, with Modbus-RTU/TCP protocol conversion functionality	1	0.400
Accessories.			
EXP8003	35mm DIN rail mounting accessory for ADXL0018600... ADXL0115600	1	0.200
EXP8004	Fan for ADXL0018600... ADXL0115600 (codes ADXL0075600...ADXL0115600 max of two EXP8004 fans)	1	0.040
EXA01	Kit of 3 UL terminal lugs for ADXL0135600, ADXL0162600, and ADXL0195600	1	0.141
EXA02	Kit of 3 terminals protection covers for ADXL0135600, ADXL0162600 and ADXL0195600	1	0.125
EXA03	Kit of 3 UL terminal lugs for ADXL0250600 and ADXL0320600	1	0.314
EXA04	Kit of 3 terminals protection covers for ADXL0250600 and ADXL0320600	1	0.154

General characteristics
Communication devices to connect LOVATO Electric products to:
– PC
– Smartphones
– Tablets.

CX01
This USB/optical device, complete with cable, allows the frontal connection of products compatible with PC with Xpress software without the need to remove the power supply from the electric panel.

CX02
Via Wi-Fi connection, compatible LOVATO Electric products can be viewed on PCs, smartphones and tablets with no need for cabling. Compatible with Xpress software and LOVATO Sam1 App.

For dimensions, wiring diagrams and technical characteristics, consult the manuals available on the website www.LovatoElectric.com

EXCRDU2
With the EXCRDU2 remote display unit it is possible to command and monitor up to 32 starters via RS485 communication, at choice between soft starters ADXL... or ADXNP... series and variable speed drives VLB... series.
– Auxiliary power supply: 100...240VAC 50/60Hz, 110...250VDC
– Widescreen colour LCD graphic display 118x96mm
– Isolated RS485 communication port, Modbus-RTU protocol
– Configurable communication parameters
– Integrated optical port for firmware update
– Flush mount, standard 92x92mm cut-out
– Compatible with soft starters ADXL... series equipped with RS485 communication card, code EXC1042
– RS485 cable included, 3m length
– IEC degree of protection: IP65 frontal with gasket (provided as standard), IP20 housing and terminals.

EXGLB..., EXCCON02, EXCM4G01
For details please see section 34.

Certifications and compliance
Certifications obtained: cULus for EXA..., EXP8003 and EXP8004, cETLus for EXCRDU2, EAC (except EXA... and EXCRDU2).
Compliant with standard:
CX01: IEC/EN/BS 61010-1, IEC/EN/BS 61000-6-2, IEC/EN/BS 61000-6-3;
CX02: IEC/EN/BS 60950-1, EN 62311, EN 301 489-1 V2.2.0, EN 301 489-17 V3.2.0, EN 300 328 V2.1.1.
EXC1042: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2;
EXCRDU2: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

ADXT... series
In-line connection



ADXT...

Order code	IEC rated soft starter current Ie in-line connection Starting current (starting time)					Qty per pkg	Wt
	3*Ie (10s)	3.5*Ie (15s)	4*Ie (10s)	4*Ie (20s)	5*Ie (5s)		
	[A]	[A]	[A]	[A]	[A]	n°	[kg]
For standard and heavy-duty applications. Built-in bypass contactor. Rated operational voltage 380...690VAC. Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	42	34	34	27	31	1	4.800
ADXT0060	64	62	60	50	53	1	4.900
ADXT0084	105	86	84	68	76	1	5.500
ADXT0104	115	107	104	86	95	1	5.500
ADXT0126	135	129	126	103	115	1	5.500
ADXT0139	184	143	139	115	127	1	12.700
ADXT0165	200	170	165	138	150	1	12.700
ADXT0187	229	194	187	157	170	1	12.700
ADXT0230	250	244	230	200	202	1	12.700
ADXT0311	397	322	311	262	288	1	15.500
ADXT0410	410	410	410	379	400	1	15.500
ADXT0506	550	526	506	427	462	1	19.000
ADXT0554	580	578	554	469	507	1	19.000
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	42	34	34	27	31	1	4.800
ADXT006024	64	62	60	50	53	1	4.900
ADXT010424	115	107	104	86	95	1	5.500
ADXT013924	184	143	139	115	127	1	12.700
ADXT023024	250	244	230	200	202	1	12.700

Inside-delta connection



ADXT...

Order code	IEC rated soft starter current Ie inside-delta connection Starting current (starting time)					Qty per pkg	Wt
	3*Ie (10s)	3,5*Ie (15s)	4*Ie (10s)	4*Ie (20s)	5*Ie (5s)		
	[A]	[A]	[A]	[A]	[A]	n°	[kg]
For standard and heavy-duty applications. Built-in bypass contactor. Rated operational voltage 380...690VAC. Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	63	51	51	41	47	1	4.800
ADXT0060	96	93	90	75	80	1	4.900
ADXT0084	158	129	126	102	114	1	5.500
ADXT0104	173	161	156	129	143	1	5.500
ADXT0126	203	194	189	155	173	1	5.500
ADXT0139	276	215	209	173	191	1	12.700
ADXT0165	300	255	248	207	225	1	12.700
ADXT0187	344	291	281	236	255	1	12.700
ADXT0230	375	366	345	300	303	1	12.700
ADXT0311	596	484	466	393	433	1	15.500
ADXT0410	615	615	615	568	600	1	15.500
ADXT0506	825	789	758	640	694	1	19.000
ADXT0554	870	868	832	704	760	1	19.000
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	63	51	51	41	47	1	4.800
ADXT006024	96	93	90	75	80	1	4.900
ADXT010424	173	161	156	129	143	1	5.500
ADXT013924	276	215	209	173	191	1	12.700
ADXT023024	375	366	345	300	303	1	12.700

General characteristics

ADXT... is a soft starter with three phase control for the progressive starting and stopping of three phase asynchronous motors. It is mainly used for the control of heavy loads, thanks to the high torque available during the starting phase, which allows overcoming the inertia of applications such as crushers, fans, vertical or inclined conveyors, screw compressors, centrifuges, propellers, mills, band or circular saws, shredders, and many others. The entire range integrates a bypass contactor, which allows a reduction of the power consumption and heat dissipation once the motor is started. Programming can be done either through the integrated keyboard with display or from a PC and USB pen drive and it offers advanced features and integrated protections for the motor control.

The main features are the following:
- Three phase control
- Backlit LCD graphic display
- Texts available in 8 languages (English, Italian, French, Spanish, Portuguese, German, Chinese, Russian)
- Built-in bypass contactor
- Several motor control modes available: constant current, current ramp, voltage ramp, adaptive control (starting with acceleration profile that adapts automatically based on information from previous starts)
- Kick start
- Starting with current limitation
- Free wheel or controlled stop
- DC current braking
- Soft brake with braking contactor for loads with high inertia or variable loads requiring maximum possible braking torque
- Pump clean cycles, to temporarily start the motor forwards and backwards via a dedicated input, to remove any debris present in the impeller before starting
- Control of reversing contactor to operate the motor in reverse direction
- Jog operation, with the run of the motor at reduced speed, to allow alignment of the load or to assist servicing
- Possibility to install the soft starter with the in-line connection or inside delta connection (6-wires wiring)
- Timed starting and stopping management based on the clock calendar
- PowerThrough function for motor starting even with damaged soft starter on one phase, with control on two phases
- Emergency mode for the running of the motor ignoring alarm conditions
- 4 digital inputs: 1 for start/stop, 1 for reset, and 2 programmable
- 1 thermistor input
- 3 relay outputs: 1 programmable with changeover contact, 2 with NO contact (1 for line contactor control and 1 programmable)
- 1 programmable analog output, type 0/4…20mA
- 4 indicator LEDs: soft starter ready, ramp in progress/TOR, alarm, control with remote keypad
- 2 configurable sets of motor parameters
- Integrated USB port for parameter transfer and event log export to csv file on USB pen drive
- Optional RS485 communication card, Modbus-RTU protocol
- Optional Ethernet communication card, Modbus-TCP protocol
- Measures visible on display: current, motor voltage, phase voltage, mains frequency, motor power factor, motor power, motor temperature %, operating hours, number of starts, analog output value, heatsink temperature, SCR temperature, soft starter thermal capacity, information about the last start
- User-configurable display screens
- Real-time performance trend on display
- Protections:
  - motor: thermal protection, overtemperature, overcurrent, locked rotor, current asymmetry, starting too long, current too low, power too high or too low, motor not connected
  - auxiliary supply: voltage too low
  - power line: lack of voltage, phase loss, wrong phase sequence, voltage or frequency out of limits
  - soft starter: overtemperature, overcurrent, thyristors failure, bypass overload
- Events log
- Calendar clock.

ADXT... series

Rated power
In-line connection

Order code	Rated soft starter current Ie (starting 4*Ie 10s)	Rated motor power IEC ≤40°C (50Hz)			Rated motor power UL ≤40°C (60Hz)		
		400V	500V	690V	380-415V	440-480V	550-600V
	[A]	[kW]	[kW]	[kW]	[HP]	[HP]	[HP]
Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	34	18.5	22	30	20	25	30
ADXT0060	60	30	37	55	30	40	50
ADXT0084	84	45	55	75	50	60	75
ADXT0104	104	55	75	90	60	75	100
ADXT0126	126	55	90	110	75	100	125
ADXT0139	139	75	90	132	75	100	125
ADXT0165	165	90	110	160	100	125	150
ADXT0187	187	90	132	185	100	150	200
ADXT0230	230	132	160	200	125	150	200
ADXT0311	311	160	220	315	150	250	300
ADXT0410	410	220	280	400	250	300	400
ADXT0506	506	280	355	500	300	400	500
ADXT0554	554	315	400	560	300	450	500
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	34	18.5	22	30	20	25	30
ADXT006024	60	30	37	55	30	40	50
ADXT010424	104	55	75	90	60	75	100
ADXT013924	139	75	90	132	75	100	125
ADXT023024	230	132	160	200	125	150	200

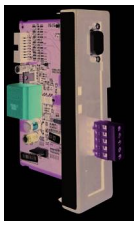
Rated power
Inside delta connection

Order code	Rated soft starter current Ie (starting 4*Ie 10s)	Rated motor power IEC ≤40°C (50Hz)			Rated motor power UL ≤40°C (60Hz)		
		400V	500V	690V	380-415V	440-480V	550-600V
	[A]	[kW]	[kW]	[kW]	[HP]	[HP]	[HP]
Auxiliary supply voltage 110...120VAC and 220...240VAC.							
ADXT0034	51	22	30	45	30	30	40
ADXT0060	90	45	55	75	50	60	75
ADXT0084	126	55	75	110	60	100	125
ADXT0104	156	75	110	132	75	125	150
ADXT0126	189	90	132	160	100	150	150
ADXT0139	209	110	132	200	125	150	200
ADXT0165	248	132	160	200	150	200	250
ADXT0187	281	160	200	250	150	200	250
ADXT0230	345	160	250	315	200	250	350
ADXT0311	466	250	315	400	250	350	450
ADXT0410	615	355	400	630	350	500	600
ADXT0506	758	400	500	710	400	600	700
ADXT0554	832	450	600	800	500	600	700
Auxiliary supply voltage 24VAC/DC.							
ADXT003424	51	22	30	45	30	30	40
ADXT006024	90	45	55	75	50	60	75
ADXT010424	156	75	110	132	75	125	150
ADXT013924	209	110	132	200	125	150	200
ADXT023024	345	160	250	315	200	250	350

Operational characteristics
- Rated operational voltage: 380...690VAC ±10%
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage:
  - ADXT...: 110...120VAC and 220...240VAC -15%/+10%
  - ADXT...24: 24VAC/DC ±20%
- IEC rated soft starter current Ie from 34 to 554A
- Possibility to increase the rated current for light loads (see the selection table at page 5-12)
- Rated motor power 18.5...315kW (400VAC), 20...300HP (400VAC)
- Operating temperature: -10...+60°C (above 40°C with derating of the soft starter current, see the technical manual, available on the website www.LovatoElectric.com)
- Storage temperature: -25...+60°C
- Number of starts per hour: see the technical manual, available on the website www.LovatoElectric.com
- Screw fixing
- Protection degree: IP20 up to ADXT0126, IP00 for higher sizes (IP20 with fingerguards type ADXTFG)

Certifications and compliance
Certifications (pending): cULus, RCM.
Compliant with standards: IEC/EN/BS 60947-4-2, UL 60947-4-2, CSA C22.2 n°60947-4-2.

Accessories for ADXT...



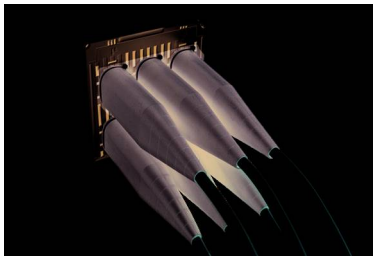
ADXTRTU



ADXTTCP



ADXTC01KIT



ADXTFG

Order code	Description	Qty per pkg	Wt
		n°	[kg]
Communication cards.			
ADXTRTU	RS485 communication card, Modbus-RTU protocol❶	1	0.330
ADXTTCP	Ethernet communication card, Modbus-TCP protocol ❶	1	0.330
Accessories.			
ADXTC01KIT	Remote keypad kit composed by IP65 type 12 remote keypad ADXTC01, connection card to ADXT... and connection cable 3m length	1	0.560
ADXTFG	IP20 fingerguards kit for ADXT0139...ADXT0554	6	0.850

❶ The communication cards integrate the port for the connection of the optional ADXTC01 remote keypad.

General characteristics

COMMUNICATION CARDS

The ADXTRTU and ADXTTCP cards equip the ADXT soft starter with a communication port type RS485 (Modbus-RTU) or Ethernet (Modbus-TCP) for interfacing with a control and monitoring system. The cards integrate also the DB9 connector for the connection of the optional remote keypad type ADXTC01.

REMOTE KEYPAD KIT

The ADXTC01 remote keypad allows the control and monitoring of the ADXT soft starter from the panel door. With the keypad, it is possible to control the motor's start and stop operations and set the parameters. The kit includes the remote keypad, a card for the connection of the keypad to the soft starter (not necessary if ADXT is already equipped with a communication card type ADXTRTU or ADXTTCP), DB9 connection cable, IP65 gasket, and fixing screws.

FINGERGUARDS KIT

They are installed on the power terminals of the ADXT0139...ADXT0554 soft starters to prevent accidental contact with live terminals. The kit includes 6 terminal covers with respective mounting brackets and cable ties, offering IP20 protection when used with cables of diameter equal to or greater than 22mm.

Certifications and compliance

Certifications (pending): cULus for ADXTC01KIT.
Compliant with standards: ADXTC01KIT: IEC/EN/BS 60947-4-2, IEC/EN/BS 60529, UL60947-4-2, CSA C22.2 n° 60947-4-2.
ADXTRTU and ADXTTCP: IEC/EN/BS 60947-4-2.

51ADX... series



51ADX0017B...51ADX0045B



51ADX0060B...51ADX0085B



51ADX0110B...51ADX0125B

Order code	IEC rated starter current Ie	IEC rated motor power ≤40°C 400V	380-415V	Qty per pkg	Wt
	[A]	[kW]	[HP]	n°	[kg]
For severe duty. Built-in bypass contactor. Rated operational voltage 208...500VAC. Auxiliary supply voltage 208...240VAC.					
51ADX0017B	17	7.5	7.5	1	8.970
51ADX0030B	30	15	15	1	9.240
51ADX0045B	45	22	25	1	9.240
51ADX0060B	60	30	30	1	14.200
51ADX0075B	75	37	40	1	14.400
51ADX0085B	85	45	50	1	14.400
51ADX0110B	110	55	60	1	17.700
51ADX0125B	125	55	60	1	17.700
51ADX0142B	142	75	75	1	28.000
51ADX0190B	190	90	100	1	37.300
51ADX0245B	245	132	150	1	39.300
For severe duty. Predisposed for external bypass contactor. Rated operational voltage 208...415VAC. Auxiliary supply voltage 208...240VAC.					
51ADX0310	310	160	150	1	48.900
51ADX0365	365	200	200	1	49.300
51ADX0470	470	250	250	1	95.000
51ADX0568	568	315	350	1	95.000
51ADX0640	640	355	400	1	106.000

Accessories for 51ADX...



51ADXTAST



51C4

Order code	Description	Qty per pkg	Wt
		n°	[kg]
51ADXTAST	Remote keypad 96x96mm, IP41 2x16 characters backlit LCD, 208...240VAC supply, provided with 51C8 cable, 3m/10ft length	1	0.350
31PA96X96	IP54 protective cover for remote keypad 51ADXTAST	1	0.076
51C2	PC (RS232) ↔ 51ADX connecting cable, 1.8m/6ft length	1	0.062
51C4	PC (RS232) ↔ RS232/ RS485 converter drive connecting cable, 1.8m/6ft length	1	0.147
51C6	51ADX ↔ RS232/RS485 converter drive connecting cable, 1.8m/6ft length	1	0.102
51C8	51ADX ↔ 51ADXTAST remote keypad connecting cable, 3m/10ft length	1	0.080

General characteristics
The 51ADX... is a soft starter with three phase control for the progressive starting and stopping of three phase asynchronous motors. Its high robustness and the considerable torque available during the startup make it the ideal solution for controlling heavy loads with high inertia, such as fans, cutting machines, turbines, crushers, mixers, band saws, mills, crushers, etc.... Startup can be performed using a voltage ramp with torque control and limitation of the maximum starting current. The internal bypass contactor (built-in only on versions 51ADX...B) allows for a drastic reduction in heat dissipation once the ramp is completed, reducing the need for oversized electrical panels or ventilation systems.

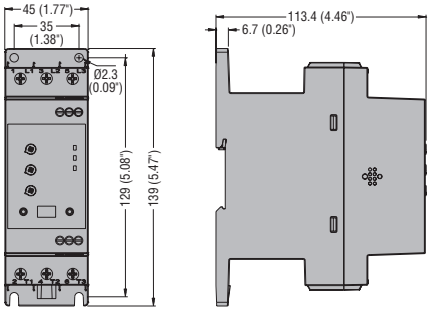
The main features are the following:
- Three phase control
- Backlit LCD display 2 rows x 16 characters
- Texts available in 4 languages (English, Italian, French, Spanish)
- Built-in bypass contactor up to size 245A (51ADX...B), predisposed for external bypass contactor for the higher sizes
- Starting with voltage ramp with torque control, starting with current limiting, torque boost
- Free wheel or controlled stop, dynamic breaking
- In emergency conditions: starting without protection, direct-on-line starting using integrated bypass contactor
- 3 digital inputs: start and stop/reset + 1 programmable digital/analog
- 4 relay outputs: 1 with changeover contact for alarm signaling, 3 programmable with NO contact
- 1 programmable analog output, type 0/4…20mA
- 3 indicator LEDs: presence of power supply, ramp in progress/TOR, alarm
- 2 configurable sets of motor parameters
- Built-in RS232 port with Modbus-RTU protocol for setup and control from PC with 51ADXSW software, freely downloadable from the website www.LovatoElectric.com. The connection between 51ADX and PC can be made through 51C2 serial cable, RS232/RS485 converter or GSM modem
- Built-in RS485 port for the connection to the 51ADXTAST remote keypad through 51C8 cable (included with the remote keypad, 3m length) for setup, measures monitoring and parameter transfer
- Measures visible on display: phase voltage, phase currents, active and apparent power, power factor, energy
- Protections:
  - motor: motor thermal protection with double class (starting and running) or by PTC sensor, locked rotor, current asymmetry, minimum torque and starting time too long
  - auxiliary supply: voltage too low
  - power line: lack of voltage, phase loss, wrong phase sequence, voltage or frequency out of limits
  - soft starter: overtemperature, overcurrent, thyristors failure, bypass failure
- Events log
- Calendar clock with backup battery.

Operational characteristics
- Rated operational voltage:
  - 208...500VAC ±10% (51ADX...B)
  - 208...415VAC ±10% (51ADX...)
- Rated frequency: 50/60Hz ±5%
- Auxiliary supply voltage: 208...240VAC ±10%
- IEC rated soft starter current Ie:
  - 17A...245A (51ADX...B)
  - 310A...640A (51ADX...)
- Overload current:
  - 105% Ie for 51ADX...B
  - 115% Ie for 51ADX...
- Operating temperature: -10...+55°C (above 45°C with derating of the soft starter current by 1.5%/°C)
- Storage temperature: -30...+70°C
- Number of starts per hour: see the technical manual available on the website www.LovatoElectric.com
- Screw fixing
- Protection degree: IP20 for 51ADX0017B…51ADX0125B, IP00 for higher sizes.

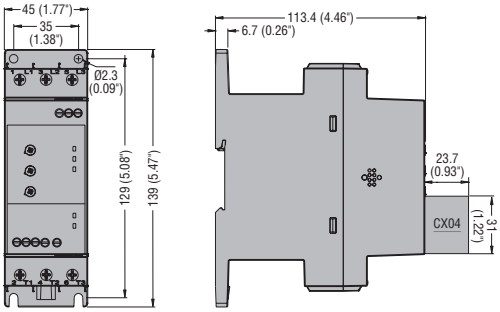
Certifications and compliance
Certifications: EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-4-2.

SOFT STARTER

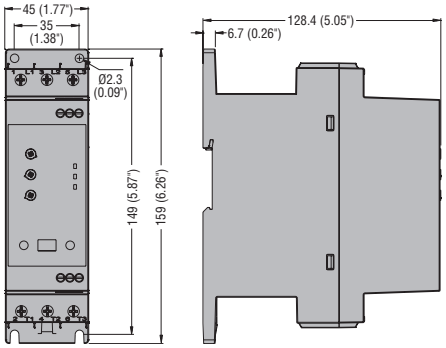
ADXN...006... - ADXN...018...



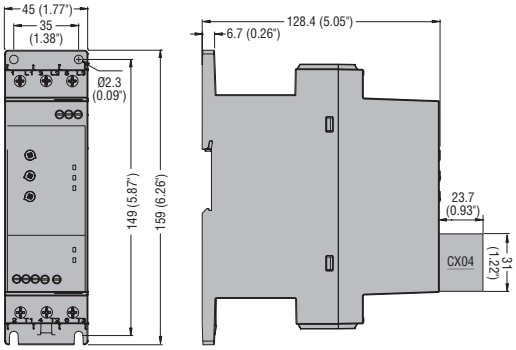
ADXNP006... - ADXNP018... with CX04 RS485 communication module.



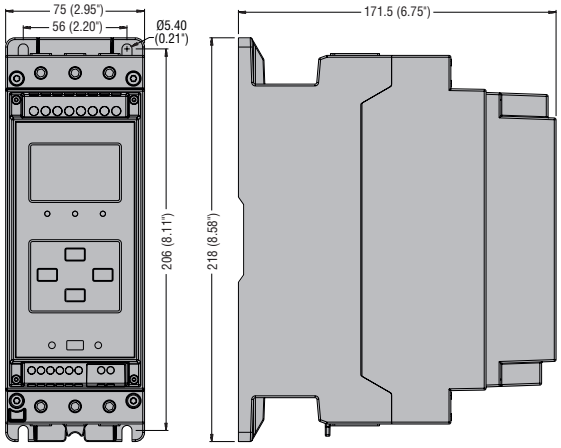
ADXN...025... - ADXN...045...



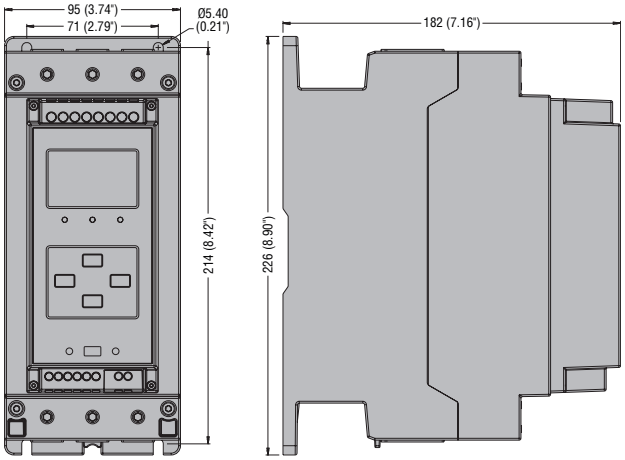
ADXNP025... - ADXNP045... with CX04 RS485 communication module.



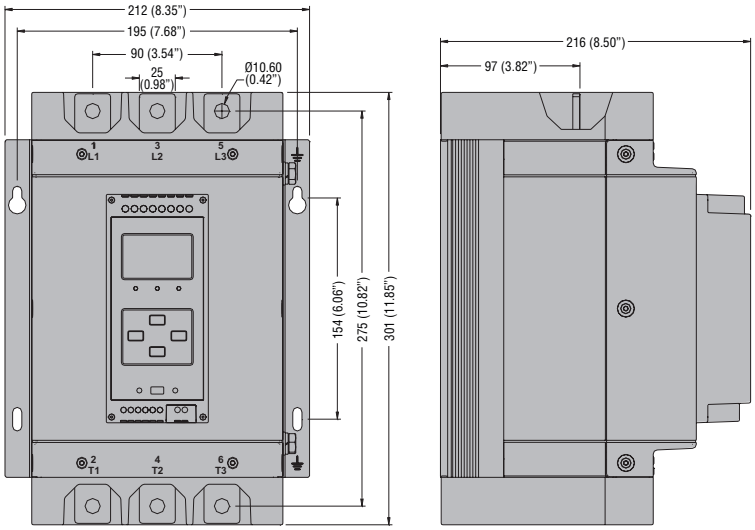
ADXL0018600...ADXL0060600



ADXL0075600...ADXL0115600

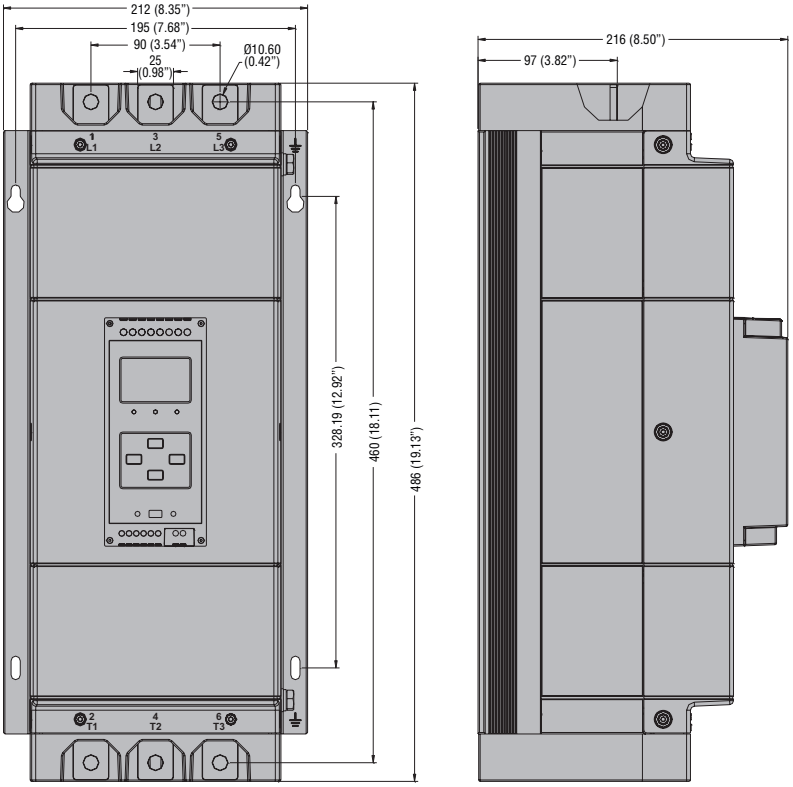


ADXL0135600 - ADXL0162600



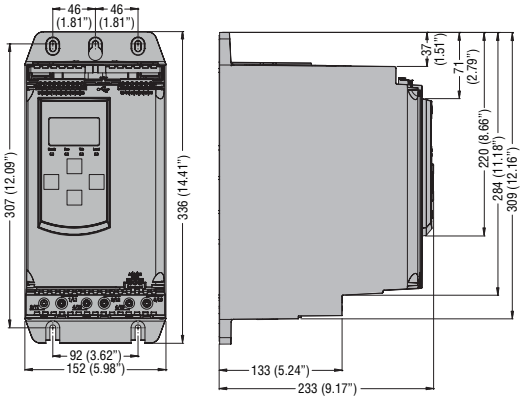
For the dimensions of ADXL0135600 and ADXL0162600 complete with UL terminal lugs and protection covers (type EXA...) refer to the technical manual of the ADXL soft starters, available on the website www.LovatoElectric.com.

ADXL0195600...ADXL0320600

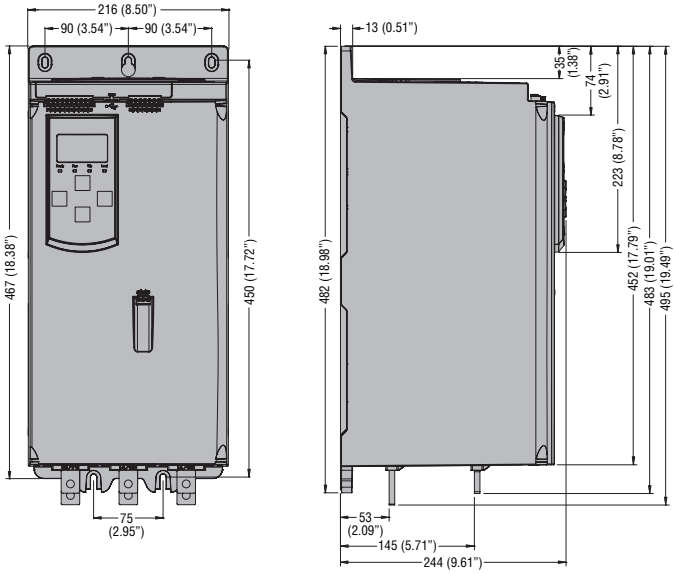


For the dimensions of ADXL0195600, ADXL0250600 and ADXL0320600 complete with UL terminal lugs and protection covers (type EXA...) refer to the technical manual of the ADXL soft starters, available on the website www.LovatoElectric.com.

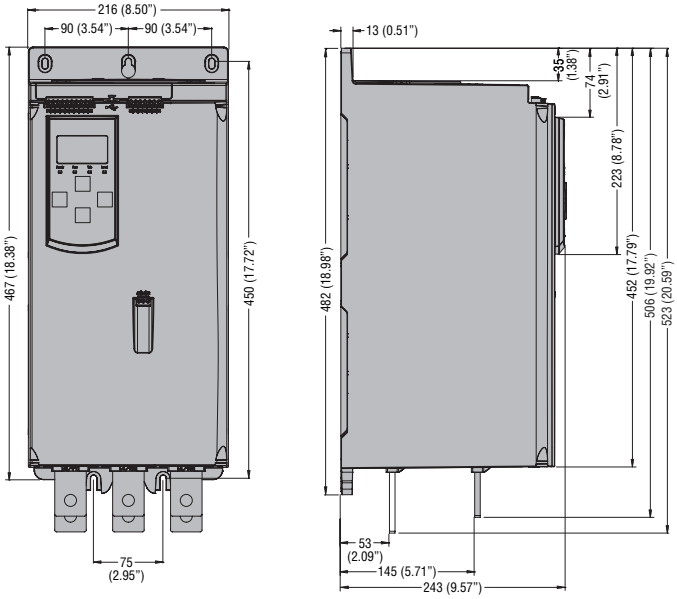
ADXT0034...ADXT0126



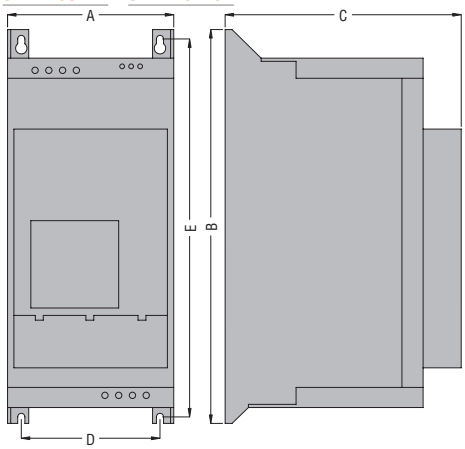
ADXT0139...ADXT0230



ADXT0311...ADXT0554

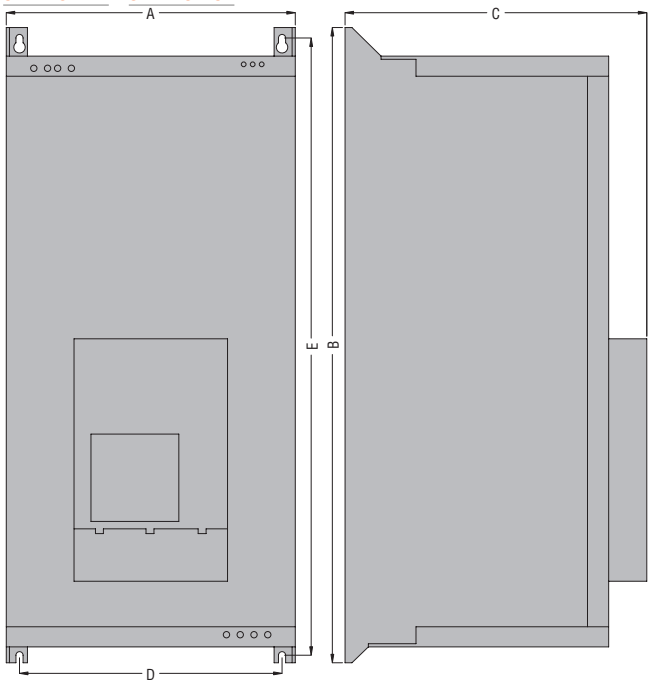


51ADX0017B...51ADX0125B



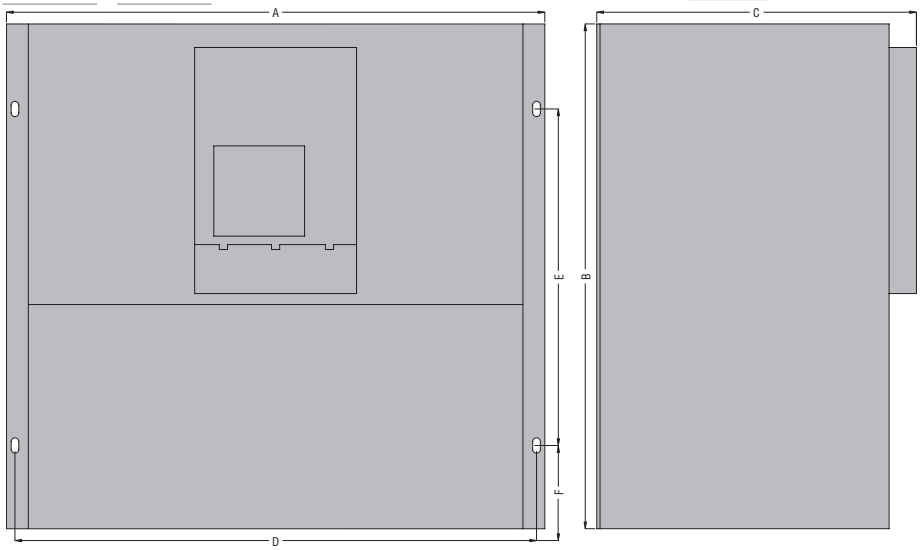
TYPE	A	B	C	D	E
51ADX0017B	157 (6.18")	372 (14.64")	223 (8.78")	131 (5.16")	357 (14.05")
51ADX0030B	157 (6.18")	372 (14.64")	223 (8.78")	131 (5.16")	357 (14.05")
51ADX0045B	157 (6.18")	372 (14.64")	223 (8.78")	131 (5.16")	357 (14.05")
51ADX0060B	157 (6.18")	534 (21.02")	250 (9.84")	132 (5.20")	517 (20.35")
51ADX0075B	157 (6.18")	534 (21.02")	250 (9.84")	132 (5.20")	517 (20.35")
51ADX0085B	157 (6.18")	534 (21.02")	250 (9.84")	132 (5.20")	517 (20.35")
51ADX0110B	157 (6.18")	584 (22.99")	250 (9.84")	132 (5.20")	567 (22.32")
51ADX0125B	157 (6.18")	584 (22.99")	250 (9.84")	132 (5.20")	567 (22.32")

51ADX0142B...51ADX0245B



TYPE	A	B	C	D	E
51ADX0142B	273 (10.75")	600 (23.62")	285 (11.22")	230 (9.05")	560 (25.20")
51ADX0190B	273 (10.75")	680 (26.77")	310 (12.20")	230 (9.05")	640 (25.20")
51ADX0245B	273 (10.75")	680 (26.77")	310 (12.20")	230 (9.05")	640 (25.20")

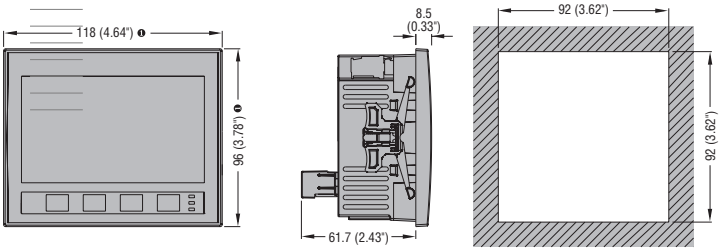
51ADX0310...51ADX0640



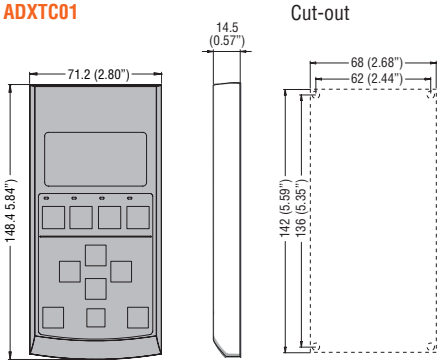
TYPE	A	B	C	D	E	F
51ADX0310	640 (25.20")	600 (23.62")	380 (14.96")	620 (24.41")	400 (15.75")	100 (3.94")
51ADX0365	640 (25.20")	600 (23.62")	380 (14.96")	620 (24.41")	400 (15.75")	100 (3.94")
51ADX0470	790 (31.10")	650 (25.59")	430 (16.93")	770 (30.31")	450 (17.72")	100 (3.94")
51ADX0568	790 (31.10")	650 (25.59")	430 (16.93")	770 (30.31")	450 (17.72")	100 (3.94")
51ADX0640	790 (31.10")	650 (25.59")	430 (16.93")	770 (30.31")	450 (17.72")	100 (3.94")

REMOTE KEYPADS

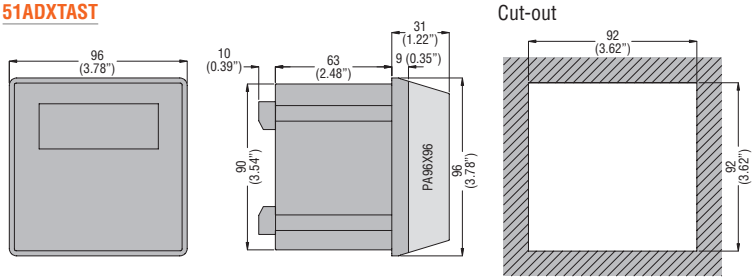
EXCRDU2



ADXTC01



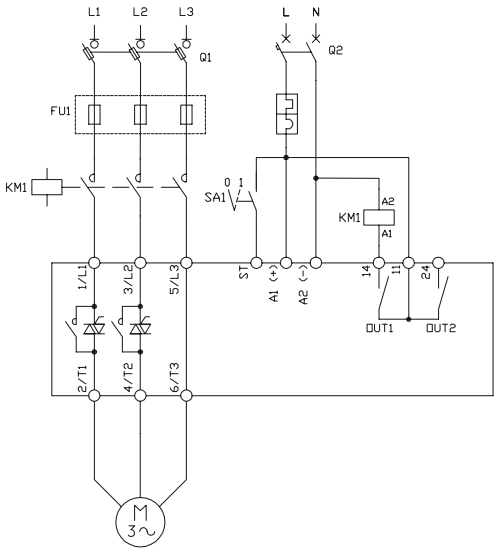
51ADXTAST



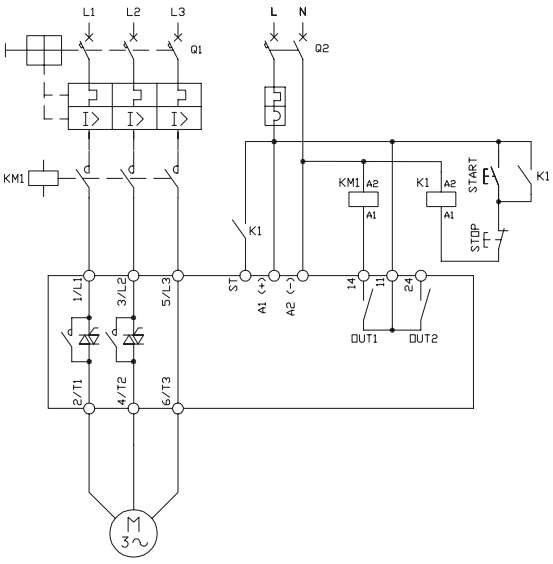
❶ Dimensions with gasket: 122x100mm.

ADXN...

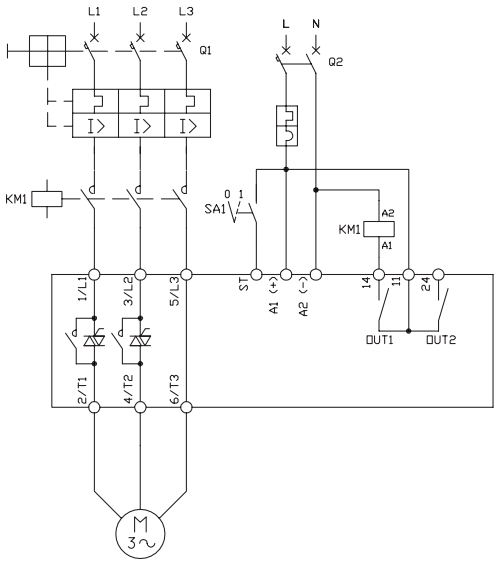
Switch disconnector + fuses + contactor, control by switch (type 0-1)



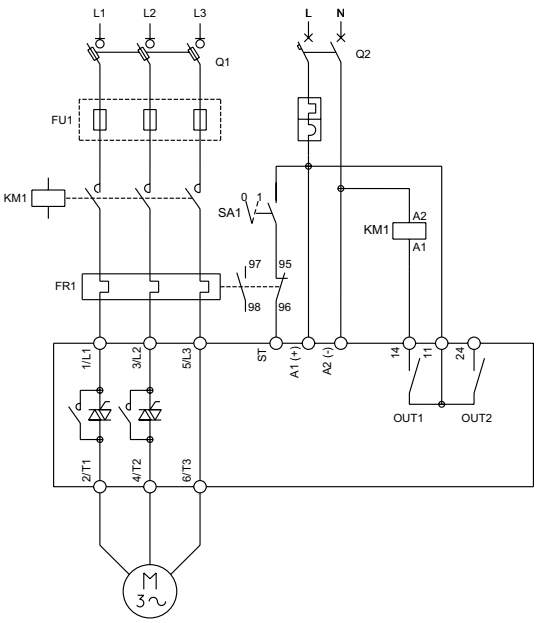
MPCB + contactor, control by pushbuttons



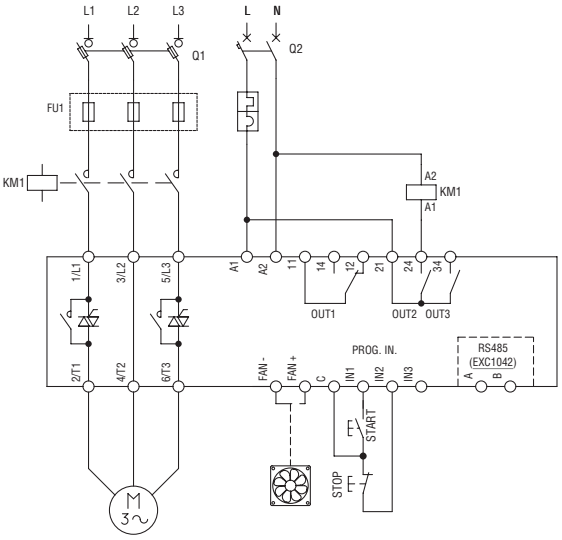
MPCB + contactor, control by switch (type 0-1)



Switch disconnector + fuses + contactor + thermal overload relay, control by switch (type 0-1)

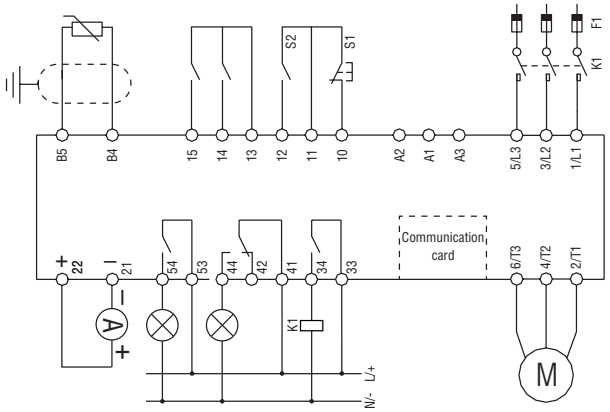


ADXL...

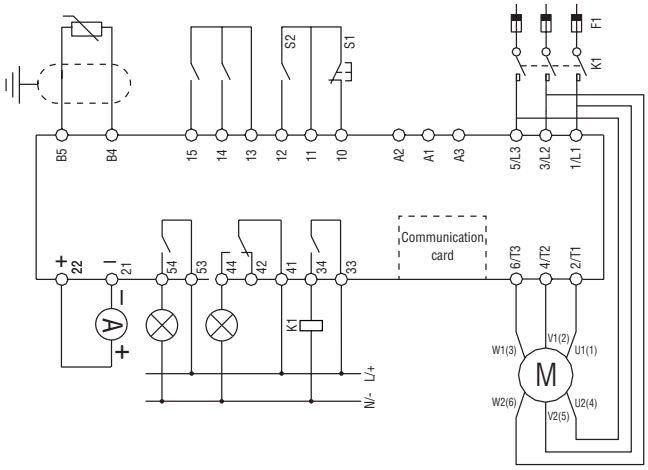


ADXT...

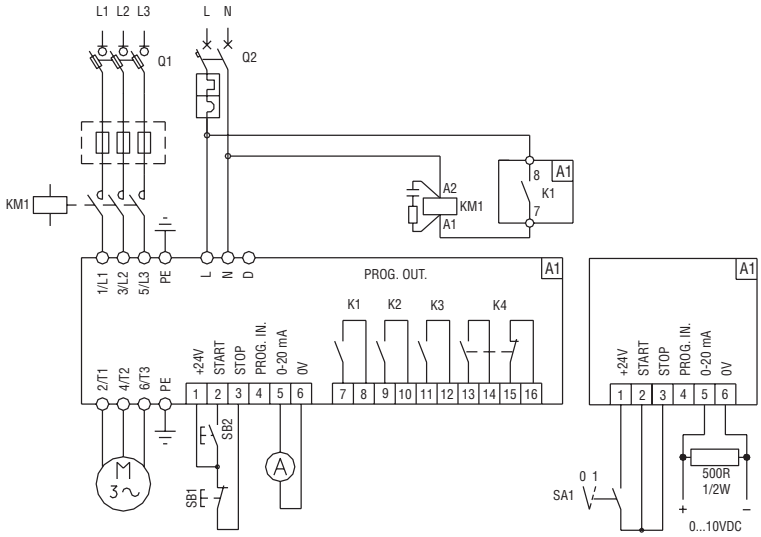
In-line connection



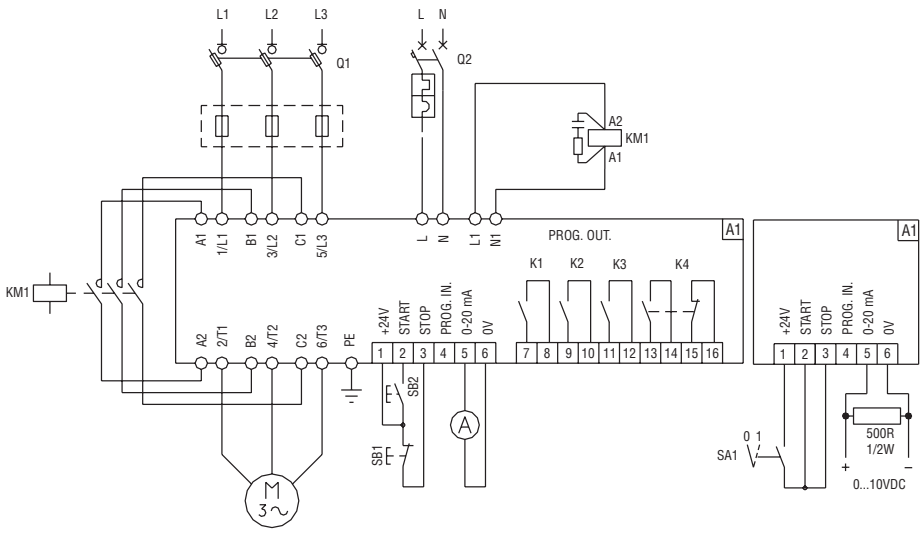
Inside delta connection



51ADX...B



51ADX...



TYPE (with 2 controlled phases)		ADXNB...	ADXNF...	ADXNP...
Motor	Type	Asynchronous three phase		
	Power	1.1...11kW (230VAC), 2.2...22kW (400VAC), 3...30kW (500VAC) 1.5...15HP (220-240VAC), 3...30HP (440-480VAC), 5...40HP (550-600VAC)		
	Rated current	6...45A		
Supply voltage	Line voltage	208...600VAC ±10%		
	Auxiliary supply voltage	100...240VAC for ADXN..., 24VAC/DC for ADXN...24 -15%/+10%		
	Frequency	50 or 60Hz ±5%		
Bypass relay		Integrated		
Cooling system	Natural	ADXN...006... - ADXN...030...		
	Forced	ADXN...038... - ADXN...045..., optional for ADXN...006... - ADXN...030...		
Number of starts per hour		See page 5-23		
PROTECTIONS				
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits, wrong phase sequence		
Motor		–	–	Electronic current thermal protection (overload), locked rotor, current asymmetry, load too low, starting too long
Soft starter		Overtemperature	Overtemperature	Overcurrent and overtemperature
START AND STOP SETTINGS				
Starting		Voltage ramp	Voltage ramp	Voltage ramp with current limit
Stop		Voltage ramp or free-wheel stop		
Braking		–		
PROGRAMMING INTERFACES				
Potentiometers		Settings: starting voltage, acceleration ramp time, deceleration ramp time	–	Settings: starting voltage, acceleration ramp time, deceleration ramp time. Note. The potentiometers can be disabled via NFC.
NFC connectivity		–	Settings: starting voltage, acceleration ramp time, deceleration ramp time, protection thresholds, password, relay outputs function and alarm properties	Settings: rated motor current, starting current limit, thermal protection class, protection thresholds, communication parameters, password, relay outputs function and alarm properties
Optical port		–	–	Connection with USB device CX01 for the connection to a PC with Xpress software. Connection to Wi-Fi device CX02 for the connection to a PC with Xpress software or Android and iOS smartphone and tablet with LOVATO SAM1 App. Connection of the RS485 communication module CX04, Modbus-RTU protocol.
LEDs		3: POWER (presence of auxiliary power supply), RUN (ramp in progress/Top Of Ramp), ALARM (alarm, with identification of the type of active alarm with number of flashes of the LED)		
DIGITAL INPUT ST (start)				
Input type		Volt-free contact		
Input function		Motor start		
RELAY OUTPUTS				
Number of outputs		2		
Outputs arrangement		2 NO contacts with the same common, 5A 250VAC AC1 – 5A 30VDC		
Outputs function		Line contactor, TOR (Top Of Ramp)	Programmable: Line contactor, TOR (Top Of Ramp), alarm	Programmable: Line contactor, TOR (Top Of Ramp), alarm, max torque
COMMUNICATION INTERFACES				
RS485 port		–	–	Optional, with communication module CX04 (RS485, Modbus-RTU protocol)
AMBIENT CONDITIONS				
Operating temperature		-20...+60°C (above 40°C with derating of the starter current by 1%/°C)		
Storage temperature		-30...+80°C		
Relative humidity		<80%		
Maximum altitude		1000m without derating (above 1000m with derating of starter current ❶)		
Pollution degree		2		
Overvoltage category		III		
Operating position		Vertical		
HOUSING				
Mounting		Screw fixing or mounting on 35mm DIN rail (IEC/EN/BS 60715)		
IEC degree of protection		IP20		

❶ Consult the ADXN technical manual, available on the website www.LovatoElectric.com.

TYPE (with 2 controlled phases)		**ADXL...600**
Motor	Type	Asynchronous three phase
	Power	7.5...160kW (400VAC) 15...300HP (550...600VAC)
	Rated current	18...320A (the motor current can be set between the 50% and 100% of the rated soft starter current Ie)
Supply voltage	Line voltage	208...600VAC ±10%
	Auxiliary supply voltage	100...240VAC ±10%
	Frequency	50 or 60Hz ±5%
Bypass relay		Integrated
Cooling system	Natural	ADXL0018600...ADXL0115600
	Forced	ADXL0135600...ADXL0320600 Optional for ADXL0018600...ADXL0115600
Number of starts per hour		See table at page 5-23
PROTECTIONS		
Auxiliary supply		Voltage too low
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits, wrong phase sequence
Motor		Overload at starting (trip class 2, 10A, 10, 15, 20, 25, 30, 35 and 40), overload during running (trip class 2, 10A, 10, 15, 20, 25 and 30), locked rotor, current asymmetry, minimum torque and starting too long
Soft starter		Overcurrent and overtemperature
START AND STOP SETTINGS		
Starting		Torque ramp with current limit, voltage ramp with current limit
Stop		Torque ramp, voltage ramp or free-wheel stop
Braking		—
DISPLAY AND PROGRAMMING		
		Using the built-in keyboard and display, PC with CX01 and CX02 with software Xpress, smartphone or tablet with LOVATO NFC App or LOVATO SAM1 App with CX02 and remote display unit EXCRDU2 with EXC1042
Display		Backlit icon LCD display
Measure view		Maximum current, L1 current, L2 current, L3 current, torque, line voltage, power factor, motor thermal status, soft starter temperature, active power, active energy, motor hour counter, startup counter
Other views		Operational status, events, alarms, measures
LEDs		3: POWER (presence of auxiliary supply voltage), RUN (ramp in progress/bypass), ALARM (alarm)
DIGITAL INPUTS		
Number of inputs		3
Input type		2 programmable digital inputs with volt-free contact, 1 programmable input configurable as digital input with volt-free contact or PTC input
Inputs function		OFF, motor start, motor stop, free-wheel stop, motor preheating, local control, alarm inhibition, thermal status reset, keyboard lock, motor selection, user alarm, command, alarm reset
RELAY OUTPUTS		
Number of outputs		3
Outputs arrangement		- 2 NO programmable: 3A 250VAC AC1 - 3A 30VDC - 1 changeover programmable: NO contact 5A 250VAC AC1 - 5A 30VDC; NC contact 3A 250VAC AC1 - 3A 30VDC
Outputs function		OFF, line contactor, run (ramp completed), global alarm, limits, remote variable, alarm
COMMUNICATION INTERFACES		
		NFC, front optical port, optional RS485 (EXC1042)
VARIOUS FUNCTIONS		
Calendar clock		—
Event memory		60 events
Operational data memory		Energy meter, startup counter, motor hour meter and maintenance hour counter
AMBIENT CONDITIONS		
Operating temperature		-20...+60°C (above 40°C with derating of starter current by 0.5%/°C)
Storage temperature		-30°...+80°C
Maximum altitude		1000m without derating (above 1000m with derating of starter current of 0.5%/100mt)
Pollution degree		2
Operating position		Vertical
HOUSING		
Mounting		Screw-mount on panel or 35mm DIN rail (IEC/EN/BS 60715) with EXP8003 accessory for ADXL0018600...ADXL0115600
IEC degree of protection		IP00

NUMBER OF STARTS PER HOUR ADXN... SERIES
The following data are based on an ambient temperature of 40°C, starting current of 4*In and ramp time 6 seconds. In=Rated motor current.

	NUMBER OF STARTS PER HOUR WITHOUT FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
3A	ADXN006																			
6A	ADXN006												ADXN012							
9A	ADXN012								ADXN018											
12A	ADXN012 - ADXN018																			
18A	ADXN018		ADXN025		ADXN030															
25A	ADXN025		ADXN030																	
30A	ADXN030																			
38A																				
45A																				

ADXN038… and ADXN045… have built-in fan

	NUMBER OF STARTS PER HOUR WITH FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
3A	ADXN006																			
6A	ADXN006																		ADXN012	
9A	ADXN012																		ADXN018	
12A	ADXN012														ADXN018				ADXN025	
18A	ADXN018												ADXN025			ADXN030				
25A	ADXN025														ADXN030					
30A	ADXN030												ADXN038		ADXN045					
38A	ADXN038								ADXN045											
45A	ADXN045																			

NUMBER OF STARTS PER HOUR ADXL... SERIES
The following data are based on an ambient temperature of 40°C, starting current of 4*In and ramp time 6 seconds. In=Rated motor current.

	NUMBER OF STARTS PER HOUR WITHOUT FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
16A	ADXL0018600										ADXL0030600									
30A	ADXL0030600								ADXL0045600				ADXL0060600							
37A	ADXL045600							ADXL0060600			ADXL0075600									
45A	ADXL0045600					ADXL0060600		ADXL0075600				ADXL0085600								
60A	ADXL0060600			ADXL0075600			ADXL0085600	ADXL0115600												
66A	ADXL0075600					ADXL0085600	ADXL0115600													
75A	ADXL0075600			ADXL0085600	ADXL0115600															
85A	ADXL0085600			ADXL0115600																
97A	ADXL0115600																			
115A	ADXL0115600																			
135A																				
162A																				
195A																				
250A																				
320A																				

ADXL0135600...ADXL0320600 have two integrated fans as standard

	NUMBER OF STARTS PER HOUR WITH FAN																			
In	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
16A	ADXL0018600														ADXL0030600					
30A	ADXL0030600												ADXL0045600				ADXL0060600			
37A	ADXL0045600													ADXL0060600					ADXL0075600	
45A	ADXL0045600												ADXL0060600				ADXL0075600		ADXL0085600	
60A	ADXL0060600									ADXL0075600					ADXL0085600			ADXL0115600		
66A	ADXL0075600													ADXL0085600			ADXL0115600			
75A	ADXL0075600												ADXL0085600			ADXL0115600		ADXL0135600		
85A	ADXL0085600											ADXL0115600				ADXL0135600			ADXL0162600	
97A	ADXL0115600										ADXL0135600			ADXL0162600				ADXL0195600		
115A	ADXL0115600								ADXL01355600					ADXL0162600			ADX0 ADXL0195600			
135A	ADXL0135600										ADXL0162600					ADXL0195600			ADXL0250600	
162A	ADXL0162600								ADXL0195600				ADXL0250600				ADXL0320600			
195A	ADXL0195600									ADXL0250600					ADXL0320600					
250A	ADXL0250600						ADXL0320600													
320A	ADXL0320600																			

TYPE (with 3 controlled phases)		**ADXT...**
Motor	Type	Asynchronous three phase
	Power at 400VAC	18.5...315kW (400VAC), 20...300HP (400VAC)
	Rated current	See the selection tables at page 5-12 and 5-13
Supply voltage	Line voltage	380...690VAC ±10%
	Auxiliary supply voltage	ADXT...: 110...120VAC and 220...240VAC -15%/+10%, ADXT...24: 24VAC/DC ±20%
	Frequency	50 or 60Hz ±5%
Bypass contactor		Integrated
Cooling system		Forced
PROTECTIONS		
Auxiliary supply		Voltage too low
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits and wrong phase sequence
Motor		Thermal protection, overtemperature, overcurrent, locked rotor, current asymmetry, starting too long, current too low, power too low or too high, motor not connected
Soft starter		Overcurrent and overtemperature
START AND STOP SETTINGS		
Starting		Constant current, current ramp, voltage ramp, adaptive control
Stop		Voltage ramp, adaptive control or free-wheel stop
Braking		DC braking, soft brake with braking contactor
DISPLAY AND PROGRAMMING		
		Using the built-in keypad and display, PC with software ADXTSW and USB pen drive
Display		Backlit LCD graphic display
Measure view		Current, motor voltage, phase voltage, network frequency, motor power factor, motor power, motor temperature %, motor hour counter, number of starts, analog output value, heatsink temperature, SCR temperature, soft starter thermal capacity
Other views		Status, events, alarms, performance trend
LED		4: READY (soft starter ready), RUN (ramp in progress/TOR), ALARM (alarm), REMOTE (control via optional remote keypad)
DIGITAL AND ANALOG INPUTS		
Number of inputs		5
Inputs type		4 digital inputs with volt-free contact (2 for start/stop and reset, 2 programmable), 1 input for motor thermistor
Inputs function		Input trip, zero speed sensor, motor set select, emergency mode, reverse direction, jog forward, jog reverse, pump clean
RELAY OUTPUTS		
Number of outputs		3
Output arrangement		2 NO (1 for line contactor + 1 programmable) + 1 C/O (programmable): 10A 250VAC AC1, 5A 250VAC AC15
Outputs function		Off, ready, line contactor, run (TOR), warning, alarm, low current, high current, motor overtemperature, soft brake relay, reversing contactor, failsafe alarm
ANALOG OUTPUT		
Type		0...20mA or 4...20mA
Associated measure		Current %, motor temperature %, motor power factor, motor power %, heatsink temperature
COMMUNICATION INTERFACES		
RS485		Optional, with ADXTRTU card, Modbus-RTU protocol
Ethernet		Optional, with ADXTTCP card, Modbus-TCP protocol
USB		Integrated, for loading configuration files, download parameters and event logs
VARIOUS FUNCTIONS		
Calendar clock		Calendar clock with backup battery
Event memory		384 events with date and time
Operational data memory		Startup counter, motor operating hours counter, number of thermal status reset counter
AMBIENT CONDITIONS		
Operating temperature		-10...+60°C (above 40°C with derating of the soft starter current ❶)
Storage temperature		-25...+60°C
Maximum altitude		1000m without derating (higher up with derating of the soft starter current ❶)
Pollution degree		3
Operating position		Vertical
HOUSING		
Mounting		Screw-mount on panel
IEC degree of protection		IP20 for ADXT0034...ADXT0126, IP00 for higher sizes (IP20 with optional ADXTFG fingerguards)

❶ Consult the ADXT technical manual, available on the website www.LovatoElectric.com.

TYPE (with 3 controlled phases)		51ADX...B	51ADX...
Motor	Type	Asynchronous three phase	
	Rated power (at 400VAC)	7.5...132kW	160...355kW
	Rated current	17...245A	310...640A
Supply voltage	Line voltage	208...500VAC ±10%	208...415VAC ±10%
	Auxiliary supply voltage	208...240VAC ±10%	
	Frequency	50 or 60Hz ±5%	
Bypass contactor		Integrated	Predisposed for external bypass contactor
Cooling system	Natural	51ADX0017B...51ADX0045B	—
	Forced	51ADX0060B...51ADX0245B	All types
PROTECTIONS			
Auxiliary supply		Voltage too low	
Line voltage		Lack of line voltage, phase loss, voltage out of limits, frequency out of limits and wrong phase sequence	
Motor		Overload at starting (trip class 2, 10A, 10, 15, 20, 25, 30, 35, and 40), overload during running (trip class 2, 10A, 10, 15, 20, 25 and 30), locked rotor, current asymmetry, minimum torque and maximum starting time	
Soft starter		Overcurrent and overtemperature	
START AND STOP SETTINGS			
Starting		Torque ramp with maximum current control	
Stop		Torque ramp, voltage ramp or free-wheel stop	
Braking		DC braking, soft brake with braking contactor	
DISPLAY AND PROGRAMMING			
		Integrated keypad on front, remote keypad 51ADXTAST or PC with software 51ADXSW	
Display		Backlit LCD 2x16 characters	
Measure view		Voltage, current, torque, active power, apparent power, power factor, thermal status of motor and starter, energy	
Other views		Operating status, events, alarms, event log, data	
LEDs		"POWER", "RUN" and "FAULT"	
DIGITAL AND ANALOG INPUTS			
Number of inputs		3 (2 digital + 1 digital/analog)	
Input type		Volt-free contact	
Inputs with fixed functions		2 inputs for starting and stopping/reset	
Multifunction input PROG.IN configured as digital input		Free-wheel stop, external alarm, motor preheat, local control, alarm inhibition, thermal protection, manual reset, cascade starting and keypad lock	
Multifunction input PROG.IN configured as analog input		Motor protection via PTC probe, acceleration and/or deceleration ramp via analog input, analog input thresholds for motor starting and stopping, analog input thresholds for programmable relay enable and disable, PT100 input thresholds for motor starting and stopping and PT100 input thresholds for programmable relay enable and disable	
RELAY OUTPUTS			
Number of outputs		4	
Output arrangement		1NO+1NC (global alarm) and 3 NO programmable: 5A 250VAC AC1	
Outputs function		Motor running, motor started, braking, current threshold triggering, maintenance schedule, cascaded startup, PROG-IN thresholds, alarm	
ANALOG OUTPUT			
Type		0...20mA, 4...20mA or 0...10V (with external 500Ω resistor)	
Associated measure		Current, torque, motor thermal status, power factor and active power	
COMMUNICATION INTERFACES			
RS232		Setup and remote control with software 51ADXSW	
RS485		Dedicated only for the connection of 51ADXTAST optional remote keypad	
VARIOUS FUNCTIONS			
Calendar clock		Calendar clock with backup battery	
Event memory		20 events with date and time	
Operational data memory		Energy meter, startup counter, motor hour meter and maintenance hour counter	
AMBIENT CONDITIONS			
Operating temperature		-10...+55°C (above 45°C with derating of the starter current of 1.5%/°C)	
Storage temperature		-30°...+70°C	
Pollution degree		3	
Maximum altitude		1000m without derating (above 1000m with derating of the starter current of 0.5%/100mt)	
Operating position		Vertical	
HOUSING			
Mounting		Screw-mount on panel	
IEC degree of protection		IP20 for 51ADX0017B...51ADX0125B. IP00 for higher sizes	

Motor control and protection

Variable speed drives



- Versions with single-phase input up to 2.2kW / 3HP and three-phase input up to 110kW / 150HP
- Special function for pump and fan control using PID algorithm
- EMC suppressor integrated in all versions
- Selectable motor control modes: V/f, vector control, energy saving
- Selectable digital and analog input and output functions
- Integrated functions for motor protection
- STO (Safe Torque Off) module.

	SEC. - PAGE
Variable speed drives	
VT1 series (single-phase ultra-compact with RS485)	6 - 3
VLA1 series (single-phase)	6 - 4
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Accessories	
Three-phase chokes	6 - 9
Braking resistors	6 - 9
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VT1… SERIES

- Single-phase 200...240VAC supply
- Three-phase motor power 0.2...2.2kW / 0.25...3HP, ratings at 240VAC
- Built-in EMC suppressor cat. C2 (IEC/EN/BS 61800-3)
- Built-in RS485 port, Modbus-RTU and BACnet protocol
- Ultra-compact.



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VLA1… SERIES

- Single-phase 200...240VAC supply
- Three-phase motor power 0.25...2.2kW / 0.33...3HP, ratings at 240VAC
- Built-in EMC suppressor cat. C2 (IEC/EN/BS 61800-3)
- Optional USB module for parameter programming with software
- “Book style” housing.



Page 6-5

VLB1… SERIES

- Single-phase 200...240VAC supply
- Three-phase motor power 0.4...2.2kW / 0.5...3HP, ratings at 240VAC
- Built-in EMC suppressor cat. C1 and C2 (IEC/EN/BS 61800-3)
- Modular structure
- Built-in braking chopper
- Optional communication protocols: Modbus-RTU, Modbus-TCP, CANopen, ProfiBUS, ProfiNET, Ethercat and IO-Link
- Optional STO (Safe Torque Off) module
- Optional USB and Wi-Fi modules for programming with software
- “Book style” housing.



Page 6-6

VLB3… SERIES

- Three-phase 400...480VAC supply
- Three-phase motor power 0.4...110kW / 0.5...150HP for heavy load, up to 132kW / 175HP for standard load, ratings at 400VAC
- Built-in EMC suppressor cat. C1 (up to 2.2kW) and C2 (IEC/EN/BS 61800-3)
- Modular structure
- Built-in braking chopper
- Optional communication protocols: Modbus-RTU, Modbus-TCP, CANopen, ProfiBUS, ProfiNET, Ethercat and IO-Link
- Optional STO (Safe Torque Off) module
- Optional USB and Wi-Fi modules for programming with software
- “Book style” housing.



Page 6-8

VLG3… SERIES

- Three-phase 380...480VAC supply
- Three-phase motor power 0.4...22kW / 0.5...30HP for heavy load, 0.75...30kW / 1...40HP for standard load, ratings at 400VAC
- Built-in EMC suppressor cat. C3 (IEC/EN/BS 61800-3)
- Built-in braking chopper
- Built-in RS485 port, Modbus-RTU protocol
- Optional Ethernet communication module, Modbus-TCP protocol.

Description		 VT1 single-phase ultra-compact with RS485	 VLA1 single-phase	 VLB1 single-phase advanced	 VLB3 three-phase advanced	 VLG3 three-phase
Three-phase motor power (kW)	heavy load❶	0.2...2.2kW (240V)	0.25...2.2kW (240V)	0.4...2.2kW (240V)	0.4...110kW (400V)	0.4...22kW (400V)
	standard load❷	—	—	—	5.5...132kW (400V)	0.75...30kW (400V)
Motor control modes						
	V/f linear	●	●	●	●	●
	V/f quadratic (for pumps and fans)	●	●	●	●	●
	Sensorless vector control	●	●	●	●	●
	Servo control with encoder feedback	—	—	●	●	—
	Energy saving mode (ECO)	—	—	●	●	—
	V/f closed loop with encoder feedback	●	—	●	●	●
	Multipoint V/f curve	—	—	●	●	—
	Torque setpoint	—	●	●	●	—
	Sensorless control for synchronous motors	—	—	●	● (up to 22kW)	—
Maximum output frequency		599Hz	599Hz	599Hz	599Hz	400Hz
Current overload		150% for 60s	150% for 60s	150% for 60s	Heavy load: 150% for 60s standard load: 120% for 60s	Heavy load: 150% fpr 60s standard load: 120% for 60s
Communication port		RS485 (Modbus-RTU and BACnet protocols	—	Optional, a choice between: Modbus-RTU, Modbus-TCP, ProfiBUS, ProfiNET, Ethercat, IO-Link or without communication	RS485 (Modbus-RTU) on complete drives, other optional available protocols: Modbus-TCP, ProfiBUS, ProfiNET, Ethercat, IO-Link or without communication	RS485 (Modbus-RTU), optional module with Modbus-TCP protocol
Digital inputs		5	5	5	5	5
Digital outputs		1	2	2	2	2
Analog inputs		2	2	2	2	2
Analog outputs		1	1	1	1	1
Sequencer (frequency/time cycles)		●	●	●	●	—
Onboard potentiometer		●	—	—	—	●
PID control with sleep and wake-up thresholds		●	●	●	●	●
Jog		●	●	●	●	●
3-wire motor control		●	●	●	●	●
DC braking		●	●	●	●	●
Braking with resistor		—	—	●	●	●
Preset frequencies		●	●	●	●	●
Multi-pump PID control		●	●	●	●	—
Flying restart		—	●	●	●	●
Motor PTC thermistor input		●	—	●	●	●
Fire mode		—	—	—	—	●
STO (Safe Torque Off) module		—	—	Optional	Optional	—

❶ Current overload 150% for 60s.

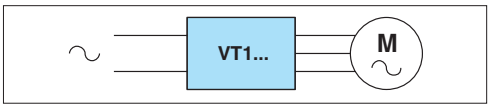
❷ Higher operational current, reduced current overload 120% for 60s.

VT1 series (single-phase ultra-compact with RS485)



VT1...

Order code	Output current Ie	3-phase motor power at 240V		Qty per pkg	Weight
	[A]	[kW]	[HP]	n°	[kg]
Single-phase supply 200...240VAC 50/60Hz. Three-phase motor output 240VAC max. Built-in RS485 communication port. Built-in EMC suppressor.					
VT102A240	1.8	0.2	0.25	1	1.0
VT104A240	2.6	0.4	0.5	1	1.0
VT107A240	4.3	0.75	1	1	1.0
VT115A240	7.5	1.5	2	1	2.0
VT122A240	10.5	2.2	3	1	2.0



Accessories for VT1



VT1XC01



VT1XC02

Order code	Description	Qty per pkg	Weight
		n°	[kg]
VT1XC01	Cable RS485/USB for the connection VT1-PC ❶, 1.8m length	1	0.080
VT1XC02	Remote keypad (Ethernet connection cable ❷ not included), IP20	1	0.122

❶ Software for programming and monitoring VT1XSW freely downloadable from the website www.LovatoElectric.com, download section.
❷ Use a standard Ethernet cable (CAT.5 or higher) max. 5m length.

General characteristics
VT1 is an ultra-compact variable speed drive with single phase input and built-in RS485 communication port. Simple and versatile, it can be used in several applications such as control of pumps and fans, conditioning systems, packaging machines, conveyor belts, control of automatic doors, etc.
The extremely compact dimensions make it suitable for the installation in panels or machinery with limited space.
The integrated RS485 communication port allows the remote control and monitoring of the drive from a supervision system or a controller such as a PLC or HMI. It supports the communication protocols Modbus-RTU, Modbus-ASCII and BACnet.
VT1 is extremely simple to install and configure from the frontal keypad with 7 segment LED display. Alternatively, it is possible to program the parameters from a PC with software VT1XSW and dedicated USB connection cable VT1XC01.
The different integrated motor control modes, like the linear or quadratic V/f control, multipoint curve and sensorless vector control, make it perfectly suitable for several types of loads and applications.

SPEED REFERENCE SIGNALS
- Front jog dial control (potentiometer)
- External potentiometer 1...10kΩ
- Voltage or current analog signals
- 8 preset speeds via digital inputs
- Optional remote keypad
- RS485 serial signals.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 voltage analog input 0...10VDC
- 1 current analog input 0/4...20mA
- 1 relay output with NO contact
- 1 voltage analog output 0...10VDC.

PROTECTIONS
- Motor and drive overload
- Overvoltage and undervoltage
- Phase loss
- Overtemperature
- Overspeed.

FUNCTIONS
- Speed control
- V/f linear or quadratic curves
- V/f customizable multipoint curve
- Sensorless (open loop) vector control
- Preset speeds
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Sequencer (programmable frequency/time cycles)
- Multi-pump PID for the control of up to 4 VT1... drives in master-slave configuration
- Software for programming and monitoring VT1XSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 200...240VAC single-phase
- Output voltage: 0...240VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s
- Operating temperature:
  - -10...+40°C (50°C with derating of 40% of the output current) for sizes 0.2...0.75kW
  - -10...+50°C for sizes 1.5 and 2.2kW
- Maximum altitude: 1000m, (3000m with derating)
- Relative humidity <95% (with no condensing)
- Built-in EMC suppressor, cat. C2 (EN/BS 61800-3)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications:
- VT1...A240: cULus, EAC, RCM
- VT1XC...: EAC.

Compliant with standards: EN/BS 61800-5-1, UL 508C, CSA C22.2 No. 274.

VLA1 series (single-phase)



VLA1...

Order code	Output current Ie	3-phase motor power at 240VAC		Qty per pkg	Weight
	[A]	[kW]	[HP]	n°	[kg]
Single phase supply 200...240VAC 50/60Hz. Three-phase motor output 240VAC max. Built-in EMC suppressor.					
VLA102A240	1.7	0.25	0.33	1	0.750
VLA104A240	2.4	0.4	0.5	1	0.750
VLA107A240	4.2	0.75	1	1	0.950
VLA115A240	7	1.5	2	1	1.350
VLA122A240	9.6	2.2	3	1	1.350



Accessories for VLA1



VLAXC01



VLAXC02



VLAXP01

Order code	Description	Qty per pkg	Weight
		n°	[kg]
VLAXC01	Display and keypad	1	0.050
VLAXC02	USB communication module❶	1	0.050
VLAXP01	Door-mount installation kit for the keypad VLAXC01. IP65, Type 4X. Connecting cable included, 3m long	1	0.340

❶ Software for programming and monitoring VLBXSW freely downloadable from the website www.LovatoElectric.com

IE2 COMPLIANT

The drive efficiency is 25% higher than the reference value for the IE1 class.

General characteristics

VLA1 is an ultra-compact drive (book style housing) with high performance. It integrates different motor control modes, like V/f linear and quadratic and sensorless vector control. VLA1... is extremely versatile and can be used in several applications such as conveyor belts, machine tools, control of automatic doors, packaging machines and in particular to manage pumps and fans thanks to specific integrated functions like the PID control and flying restart. Simple to install and configure.
The user interface, which comprises of a built-in keypad and display, allows to access the setting parameters easily, thanks to the use of extended texts describing the functions and codes. Using the optional USB communication module, the programming, monitoring and diagnostics can be performed using a PC with software VLBXSW, freely downloadable from the website www.LovatoElectric.com.

SPEED REFERENCE SIGNALS
- External potentiometer 1...10kΩ
- Voltage or current analog signals
- Buttons on front keypad
- Door-mount installation kit
- 15 preset speeds via digital inputs
- Motor potentiometer.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 digital output
- 1 changeover relay output
- 2 analog inputs: 1 configurable as voltage input 0/2...10VDC, 0...5VDC or current input 0/4...20mA, 1 voltage input 0/2...10VDC, 0...5VDC
- 1 analog output configurable as voltage output 0/2...10VDC, 0...5VDC or current output 0/4...20mA.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I^2t)
- Overspeed
- Speed reverse.

FUNCTIONS
- Speed or torque control
- V/f linear or quadratic curves
- Sensorless vector control
- Flying restart
- DC braking and DC injection at start
- Preset speeds
- PID control with sleep and wake up thresholds
- Multi-pump PID control (1 main pump frequency regulated + 2 auxiliary pumps activated in on-off mode in case of necessity)
- Sequencer (programmable frequency/time cycles)
- Different parameter configurations
- Programming and monitoring software VLBXSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 200...240VAC single-phase
- Output voltage: 0...240VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s; 200% for 3s
- Operating temperature: -10...+45°C (up to 55°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: 5...95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor, cat. C2 (EN/BS 61800-3)
- IE2 efficiency level (EN/BS 50598-2)
- IEC degree of protection: IP20.

Certifications and compliance

Certifications: cULus, EAC, RCM (excluded VLAXP01).
Compliant with standards: EN/BS 61800-5-1, UL 61800-5-1, CSA C22.2 No. 274.

VLB1 series (single-phase advanced)



VLB1…A240XX

new

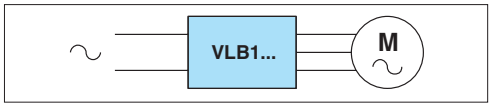
Order code	Output current Ie	3-phase motor power at 240VAC		Qty per pkg	Weight
	[A]	[kW]	[HP]	n°	[kg]
POWER UNITS❶. Single phase supply 200...240VAC (50/60Hz). Three-phase motor output max 240VAC. Built-in EMC suppressor.					
VLB104A240XX	2.4	0.4	0.5	1	0.850
VLB107A240XX	4.2	0.75	1	1	1.050
VLB115A240XX	7	1.5	2	1	1.400
VLB122A240XX	9.6	2.2	3	1	1.400

LOGIC UNITS
See page 6-7

CONTROL UNITS
See page 6-7

ACCESSORIES
See page 6-7

❶ To be completed with logic unit VLBXL.. and control unit VLBXC...
See page 6-7.



IE2 COMPLIANT

The drive efficiency is 25% higher than the reference value for the IE1 class.

Modularity of the VLB1… variable speed drive
Every VLB1... variable speed drive must be composed of:
- a power unit type VLB1...A240XX, to be chosen according to the motor size
- a logic unit type VLBXL..., to be chosen according to the desired communication protocol
- a control unit type VLBXC..., at choice between keypad with display, USB module and Wi-Fi module
- any optional accessories.

POWER UNIT | LOGIC UNIT | CONTROL UNIT



VLB1…A240XX
available sizes:
0.4...2.2kW

+



VLBXL…

+



VLBXC01
Keypad and display

or



VLBXC02
USB module

or



VLBXC03
Wi-Fi module

General characteristics
VLB1 is a variable speed drive with single phase input 200...240VAC and advanced functionalities. The "book" shape and the modular structure, composed by power unit, logic unit and control unit, allows to create a compact drive with the desired features to meet the requirements of any facility. Available in sizes from 0.4 to 2.2kW, it is suitable for the command of pumps, fans, conveyor belts, compressors, packaging machines, elevators, automatic doors and many other applications. The optional keypad VLBXC01 allows for simple and intuitive programming, alternatively to the optional USB and Wi-Fi modules for configuration from a PC with VLBXSW software.
It integrates the EMC suppressor and it supports a logic unit type VLBXL..., that completes the drive with the I/Os and a communication port, with a choice of Modbus-RTU, Modbus-TCP, CANopen, ProfiBUS, ProfiNET, Ethercat, IO-Link or version without communication.
VLB1... offers advanced features, the same of the three-phase series VLB3..., with which it also shares the optional accessories, including the STO (Safe Torque Off) safety module and the fieldbus, realizing a single-phase drive with high performance.

SPEED REFERENCE SIGNALS
- External potentiometer 1...10kΩ
- Voltage or current analog signals
- Buttons on front keypad
- Remote control panel
- 15 preset speeds via digital inputs
- Motor potentiometer
- Setting via communication protocol.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 digital output, 1 changeover relay output
- 2 analog inputs configurable as voltage inputs (0/2...10VDC, -10...+10VDC, 0...5VDC) or current inputs 0/4...20mA
- 1 analog output configurable as voltage output 0...10VDC or current output 0/4...20mA.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I^2t)
- Motor PTC heat protection
- Drive, motor and braking resistor overload
- Overspeed and speed reverse.

FUNCTIONS
- Speed or torque control
- V/f linear or quadratic curves
- Open or closed loop vector control
- Energy-saving ECO control
- S-shape curves
- Flying restart
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Multi-pump PID control (1 main pump frequency regulated + 2 auxiliary pumps activated in on-off mode in case of necessity)
- Sequencer (programmable frequency/time cycles)
- Suitable for AC three-phase asynchronous or synchronous motors
- Different parameter configurations
- Safe Torque Off (STO) function with optional module
- Programming and monitoring software VLBXSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 200...240VAC single-phase
- Output voltage: 0...240VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s; 200% for 3s
- Operating temperature: -10...+45°C (up to 60°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: 5...95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor, cat. C1 and C2 (EN/BS 61800-3)
- IE2 efficiency level (EN/BS 50598-2)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications obtained: cULus, RCM.
Compliant with standards: EN/BS 61800-5-1, UL 61800- 5-1, CSA C22.2 n° 274.

VLB3 series (three-phase advanced)



VLB3...A480



VLB3...A480XX

Order code	Output current Ie❸	3-phase motor power at 400VAC with heavy load❹		Qty per pkg.	Weight
	[A]	[kW]	[HP]	n°	[kg]
COMPLETE DRIVES❶ Three-phase supply 400...480VAC 50/60Hz. Three-phase motor output max 480VAC. Built-in EMC suppressor.					
VLB30004A480	1.3	0.4	0.5	1	1.000
VLB30007A480	2.4	0.75	1	1	1.200
VLB30015A480	3.9	1.5	2	1	1.550
VLB30022A480	5.6	2.2	3	1	1.550
VLB30040A480	9.5	4	5	1	1.550
VLB30055A480	13	5.5	7.5	1	2.500
VLB30075A480	16.5	7.5	10	1	3.950
VLB30110A480	23.5	11	15	1	3.950
VLB30150A480	32	15	20	1	10.650
VLB30185A480	40	18.5	25	1	10.650
VLB30220A480	47	22	30	1	10.650
VLB30300A480	61	30	40	1	10.650
POWER UNITS❷ Three-phase supply 400...480VAC 50/60Hz. Three-phase motor output max 480VAC. Built-in EMC suppressor.					
VLB30004A480XX	1.3	0.4	0.5	1	0.850
VLB30007A480XX	2.4	0.75	1	1	1.050
VLB30015A480XX	3.9	1.5	2	1	1.400
VLB30022A480XX	5.6	2.2	3	1	1.400
VLB30040A480XX	9.5	4	5	1	1.400
VLB30055A480XX	13	5.5	7.5	1	2.350
VLB30075A480XX	16.5	7.5	10	1	3.750
VLB30110A480XX	23.5	11	15	1	3.750
VLB30150A480XX	32	15	20	1	10.350
VLB30185A480XX	40	18.5	25	1	10.350
VLB30220A480XX	47	22	30	1	10.350
VLB30300A480XX	61	30	40	1	10.350
VLB30370A480XX	76	37	50	1	17.250
VLB30450A480XX	89	45	60	1	17.250
VLB30550A480XX	110	55	75	1	24.050
VLB30750A480XX	150	75	100	1	24.050
VLB30900A480XX	180	90	120	1	35.650
VLB31100A480XX	212	110	150	1	35.650

LOGIC UNITS
See page 6-7

CONTROL UNITS
See page 6-7

ACCESSORIES
See page 6-7

Operational characteristics for standard load❺
(available only for variable speed drives from 4kW upwards)

Order code		Ie❸	3-phase motor power at 400VAC with standard load	
Complete drives❶	Power units❷	[A]	[kW]	[HP]
VLB30040A480	**VLB30040A480XX**	11.9	5.5	7.5
VLB30055A480	**VLB30055A480XX**	15.6	7.5	10
VLB30075A480	**VLB30075A480XX**	23	11	15
VLB30110A480	**VLB30110A480XX**	28.2	15	20
VLB30150A480	**VLB30150A480XX**	38.4	18.5	25
VLB30185A480	**VLB30185A480XX**	48	22	30
VLB30220A480	**VLB30220A480XX**	56.4	30	40
VLB30300A480	**VLB30300A480XX**	73.2	37	50
–	**VLB30370A480XX**	91.2	45	60
–	**VLB30450A480XX**	107	55	75
–	**VLB30550A480XX**	132	75	100
–	**VLB30750A480XX**	180	90	120
–	**VLB30900A480XX**	216	110	150
–	**VLB31100A480XX**	254	132	175

IE2 COMPLIANT

The drive efficiency is 25% higher than the reference value for the IE1 class.

❶ Complete drive: power unit + logic unit with Modbus-RTU + control unit with keypad and display
❷ To be completed with logic unit VLBXL.. and control unit VLBXC... See page 6-7
❸ Operation up to 45°C without power derating
❹ Heavy load: 150% overload for 60s
❺ Standard load: 120% overload for 60s

General characteristics
VLB3 is a variable speed drive with compact dimensions and three-phase supply 400...480VAC. Its versatility and the numerous integrated functions make it suitable for the control of applications like pumps, fans, compressors, textile machines, conveyor belts, packaging machines, elevators. The modular structure, composed of power unit, logic unit and control unit, makes it extremely flexible to satisfy any plant requirement. Moreover, the compact "book" shape housing allows the side-by-side installation without the need of space for side ventilation. The user interface, consisting of a keypad with display, allows for quick and intuitive parameter configuration. Alternatively, it can be programmed from a PC with software VLBXSW via connection with optional USB or Wi-Fi modules. The integrated EMC suppressor and the RS485 communication port with Modbus-RTU (integrated on complete drives type VLB3... A480) complete the hardware equipment. Alternatively, several optional logic units with the most common fieldbuses are available, as well as a wide range of accessories for expanding functionalities, including the Safe Torque Off (STO) module for safety purposes.

SPEED REFERENCE SIGNALS
- External potentiometer: 1...10kΩ
- Voltage or current analog signals
- Buttons on front keypad
- Remote control panel
- 15 preset speeds via digital inputs
- Motor potentiometer
- Setting via communication protocol.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 1 digital output, 1 changeover relay output
- 2 analog inputs configurable as voltage inputs (0/2...10VDC, -10...+10VDC, 0...5VDC) or current inputs 0/4...20mA
- 1 analog output configurable as voltage output 0/2...10VDC, 0...5VDC or current output 0/4...20mA.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I^2t)
- Motor PTC heat protection
- Drive, motor and braking resistor overload
- Overspeed and speed reverse.

FUNCTIONS
- Speed or torque control
- V/f linear or quadratic curves
- Open or closed loop vector control
- Energy-saving ECO control
- S-shape curves
- Flying restart
- Direct access to DC bus
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Multi-pump PID control (1 main pump frequency regulated + 2 auxiliary pumps activated in on-off mode in case of necessity)
- Sequencer (programmable frequency/time cycles)
- Suitable for AC three-phase asynchronous or synchronous motors (up to 22kW)
- Different parameter configurations
- Safe Torque Off (STO) function with optional module
- Programming and monitoring software VLBXSW freely, downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 400...480VAC three-phase
- Output voltage: 0...480VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...599Hz
- Current overload: 150% for 60s (heavy load), 120% for 60s (standard load)
- Operating temperature: -10...+45°C (up to 60°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: 5...95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor cat. C1 (up to 2.2kW) and C2 (EN/BS 61800-3)
- IE2 efficiency level (EN/BS 50598-2)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications obtained: cULus, EAC, RCM.
Compliant with standards: EN/BS 61800-5-1, UL 61800-5-1, CSA C22.2 No. 274.

Logic units for VLB1 and VLB3



VLBXL...

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLBXL01	Logic unit with CANopen	1	0.209
VLBXL02	Logic unit with ProfiBUS	1	0.209
VLBXL03	Logic unit with ProfiNET	1	0.209
VLBXL04	Logic unit with Ethercat	1	0.209
VLBXL06	Logic unit with Modbus-RTU (RS485)	1	0.209
VLBXL07	Logic unit without communication port	1	0.209
VLBXL08	Logic unit with Modbus-TCP (Ethernet)	1	0.209
VLBXL09	Logic unit with IO-Link	1	0.209

new

Control units for VLB1 and VLB3



VLBXC00



VLBXC01



VLBXC02



VLBXC03

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLBXC00	Blanking cover	4	0.128
VLBXC01	Keypad and display	1	0.095
VLBXC02	USB communication module	1	0.095
VLBXC03	Wi-Fi communication module	1	0.095

Accessories for VLB1 and VLB3



VLBXSM



EXCRDU2



VLBXP01

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLBXSM	STO (Safe Torque Off) module	1	0.080
VLBXP01	Door-mount installation kit for the keypad VLBXC01, IP65, Type 4X, connecting cable included 3m long	1	0.340
EXCRDU2	Remote display unit, widescreen colour LCD graphic display, built-in RS485 port, for the monitoring and control of max 32 starters, IP65, 3m cable included	1	0.420

new

Modularity of the VLB... series variable speed drives
Every VLB... variable speed drive must be composed of:
- a power unit, to be chosen according to the type of supply voltage (single-phase or three-phase) and the motor size
- a logic unit, to be chosen according to the desired communication protocol
- a control unit, at choice between keypad with display, USB module and Wi-Fi module
- any optional accessories.

POWER UNIT



+

LOGIC UNIT



VLBXL...

+

CONTROL UNIT



Keypad and display **VLBXC01**

or



USB module **VLBXC02**

or



Wi-Fi module **VLBXC03**

VLB1...A240XX
(single-phase 200...240VAC)
VLB3...A480XX
(three-phase 400...480VAC)

General characteristics
LOGIC UNITS VLBXL...
The variable speed drives VLB... series must be equipped with a logic unit type VLBXL..., which integrates the terminal blocks with I/Os, the program memory and a communication port. Several models are available, which differ in the type of filedbus integrated. The complete drives type VLB3...A480 come standard with the Modbus-RTU logic unit, which can be replaced with any of the other logic units if needed.

CONTROL UNITS VLBXC...
The variable speed drives VLB... series can be programmed with the control unit VLBXC01 (keypad and display) or alternatively from a PC with the software VLBXSW (freely downloadable from the website www.LovatoElectric.com) by using the communication modules type VLBXC02 (USB) and VLBXC03 (Wi-Fi).

SAFE TORQUE OFF (STO) MODULE VLBXSM
The VLBXSM module allows to increase and optimize the safety functions of the drive providing two inputs dedicated to the function Safe Torque Off (STO) with safety class SIL 3 (IEC/EN 62061 and IEC/EN 61508) and Performance Level e (ISO 13849-1).

DOOR-MOUNT INSTALLATION KIT VLBXP01
With the kit VLBXP01 it is possible to mount on the panel door the keypad and display type VLBXC01 (provided as standard on the complete drives VLB3...A480 or purchased as an optional accessory for the power units VLB...XX)
The kit has an IP65 and Type 4X degree of protection and it is provided with an Ethernet connection cable 3 meters long.

REMOTE DISPLAY UNIT EXCRDU2
The EXCRDU2 remote display allows to command and monitor up to 32 starters via RS485 communication, at choice between variable speed drives VLB... series or soft starters ADXL... or ADXNP... series. EXCRDU2 allows to command the motor start and stop, reverse the sense of rotation, adjust the motor frequency and monitor the status and the main measures of the starters connected with graphical pages on the display.
- Auxiliary power supply: 100...240VAC 50/60Hz, 110...250VDC
- Widescreen colour LCD graphic display 118x96mm
- Isolated RS485 communication port, Modbus-RTU protocol
- Configurable communication parameters
- Integrated optical port for firmware update
- Flush mount, standard 92x92mm cut-out
- Compatible with VLB... variables speed drives equipped with RS485 logic unit type VLBXL06 (already integrated as standard on the complete drives type VLB3...A480)
- RS485 cable included, 3m length
- IEC degree of protection: IP65 frontal with gasket (provided as standard), IP20 housing and terminals.

Certifications and compliance
Certifications obtained:
- VLBXC..., VLBXSM and VLBXP01: cULus, EAC, RCM
- VLBXL...: cULus, EAC (excluded VLBXL07, VLBXL08, VLBXL09), RCM
- EXCRDU2: cETLus.

Compliant with standard:
- VLBXC..., VLBXL..., VLBXP01and VLBXSM: EN/BS 61800-5-1, UL61800-5-1, CSA C22.2 n°274
- EXCRDU2: IEC/EN/BS 61010-1, IEC/EN/BS 61010-2-030, IEC/EN/BS 61000-6-2, IEC61000-6-4.

Dimensions
page 6-15

VLG3 series (three-phase)



VLG3...

new

Order code	Output current Ie	3-phase motor power at 400VAC with heavy load❶		Qty per pkg.	Weight
	[A]	[kW]	[HP]	n°	[kg]
Three-phase supply 380…480VAC 50/60Hz. Three-phase motor output max 480VAC Built-in RS485 communication port. Built-in EMC suppressor.					
VLG30004A480	1.3	0.4	0.5	1	1.040
VLG30007A480	2.5	0.75	1	1	1.080
VLG30015A480	4	1.5	2	1	1.440
VLG30022A480	5.5	2.2	3	1	1.460
VLG30040A480	9	4	5	1	1.980
VLG30055A480	12	5.5	7.5	1	3.240
VLG30075A480	16	7.5	10	1	3.280
VLG30110A480	24	11	15	1	5.040
VLG30150A480	31	15	20	1	5.060
VLG30185A480	39	18.5	25	1	7.960
VLG30220A480	45	22	30	1	7.980

Operational characteristics for standard load❷

Order code	Ie	3-phase motor power at 400VAC with standard load	
	[A]	[kW]	[HP]
VLG30004A480	2	0.75	1
VLG30007A480	3.1	1.5	2
VLG30015A480	5.1	2.2	3
VLG30022A480	6.9	4	5
VLG30040A480	10	5.5	7.5
VLG30055A480	16	7.5	10
VLG30075A480	23	11	15
VLG30110A480	31	15	20
VLG30150A480	38	18.5	25
VLG30185A480	45	22	30
VLG30220A480	61	30	40

Accessories for VLG3



VLGXC01

new



VLGXC02



VLGXL01

Order code	Description	Qty per pkg.	Weight
		n°	[kg]
VLGXC01	Cable converter RS485/USB for the connection VLG3-PC❸, 1.8m length	1	0.058
VLGXC02	Remote keypad, IP20. Connection cable included, 3m length	1	0.229
VLGXL01	Ethernet communication module, Modbus-TCP protocol	1	0.210

❶ Heavy load: 150% overload for 60s.
❷ Standard load: 120% overload for 60s.
❸ Programming and monitoring software VLGXSW freely downloadable from the website www.LovatoElectric.com.

General characteristics
VLG3 is a simple and versatile three-phase general purpose variable speed drive. It finds use in numerous industrial sectors for controlling applications such as conveyor belts, textile machines, escalators, lifts, pumps, fans, compressors, washing machines, mixers.The range consists of sizes from 0.4 to 22 kW and it integrates as standard the EMC suppressor and the braking chopper. The compact enclosure allows side-by-side installation, with the possibility of mounting on DIN rail or screw. On the front of the drive, there is a keypad with a 7-segment LED display for the configuration, a potentiometer for frequency adjustment, and an RJ45 connector for connecting peripheral devices such as the optional remote keypad and the PC connection cable for programming via VLGXSW software (downloadable from the website www.LovatoElectric). The built-in RS485 serial port with Modbus-RTU completes the hardware equipment for the interfacing with a supervision and control network or the communication with a master like PLC or HMI. It is also possible to add on to the drive an Ethernet communication port via the optional module installed on the front.

SPEED REFERENCE SIGNALS
- Front jog dial control (potentiometer)
- External potentiometer 1...5kΩ
- Voltage or current analog signals
- Buttons on front keyboard
- Remote control panel
- 8 preset speeds via digital inputs
- Motor potentiometer
- Setting via communication protocol.

PROGRAMMABLE INPUTS AND OUTPUTS
- 5 digital inputs
- 2 relay outputs: 1 with changeover contact and 1 with NO contact
- 2 analog inputs: 1 voltage input (type 0...10VDC or -10...+10VDC) and 1 current input 0/4...20mA
- 1 analog output 0...10VDC.

PROTECTIONS
- Overcurrent
- Output short circuit and earth/ground leakage
- Overvoltage and undervoltage
- Phase loss
- Motor heat overload (I2t)
- Drive and motor overtemperature
- Speed reverse.

FUNCTIONS
- Speed control
- V/f linear or quadratic curves
- Open or closed loop vector control
- S-shape curves
- Flying restart
- DC braking and DC injection at start
- PID control with sleep and wake up thresholds
- Torque boost
- Fire mode
- Programming and monitoring software VLGXSW, freely downloadable from the website www.LovatoElectric.com.

Operational characteristics
- Input voltage: 380...480VAC three-phase
- Output voltage: 0...480VAC three-phase
- Mains frequency: 50/60Hz
- Output frequency: 0...400Hz
- Current overload: 150% for 60s (heavy load), 120% for 60s (standard load)
- Operating temperature: -10...+40°C (up to 50°C with derating)
- Maximum altitude: 1000m (4000m with derating)
- Relative humidity: ≤95% (with no condensing)
- Side-by-side installation
- Built-in EMC suppressor, cat. C3 (EN/BS 61800-3)
- IEC degree of protection: IP20.

Certifications and compliance
Certifications: cULus (excluded accessories).
Compliant with standards: EN/BS 61800-5-1, EN/BS 61800-3, UL 61800-5-1, CSA C22.2 No 274.

Three-phase mains chokes



VLBXL...

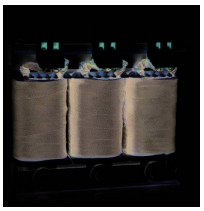
Order code	Ie	Induc-tance	Drive power	Qty per pkg.	Wt
	[A]	[mH]	[kW]	n°	[kg]
Three phase mains chokes for VLB3... variable speed drives.					
VLBXL590	50	0.59	22...30	1	8.350
VLBXL370	80	0.37	37	1	12.500
VLBXL330	90	0.33	45	1	16.000
VLBXL300	100	0.30	55	1	19.000
VLBXL190	160	0.19	75	1	26.000
VLBXL140	200	0.14	90...110	1	32.000

General characteristics
VLBXL... three-phase mains chokes are applied to the input of VLB3... drives from 22kW to 110kW to reduce the harmonic content upstream, with consequent reduction of the input current absorbed by the drives.
For the correct choice, select the inductance with current rating equal to or greater than the rated current of the drive they will be used with.

Operational characteristics
- Current: 50...200A.
- Operating temperature: -10...+40°C (up to 55°C with derating)

Compliance
Compliant with standards: IEC/EN/BS 61558-1.

Three-phase motor chokes



VLXM...

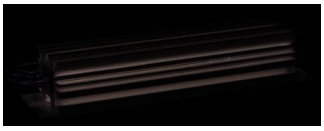
Order code	Ie	Induc-tance	Drive power	Qty per pkg.	Wt
	[A]	[mH]	[kW]	n°	[kg]
Three phase motor chokes for VLA1... - VT1... - VLB1... - VLB3... - VLG3... variable speed drives.					
VLXM012	12.5	1	0.2...4	1	3.000
VLXM025	25	0.6	5.5...11	1	6.000
VLXM050	50	0.2	15...22	1	8.000
VLXM100	100	0.15	30...45	1	16.000
VLXM150	150	0.08	55...75	1	18.000
VLXM300	300	0.04	90...110	1	29.000

General characteristics
Three phase motor chokes VLXM... can be installed to the drive output, to reduce the voltage peaks generated by the drive towards the motor, or when several parallel motors are simultaneously controlled by the drives.
For the correct choice, select the inductance with Ie current rating equal to or greater than the rated current of the drive they will be used with.

Operational characteristics
- Rated mains voltage: 400VAC
- Operating range: 170...530VAC
- Rated frequency: 50/60Hz
- Winding material: Aluminium
- Rated current Ie: 12.5...300A type code according
- Rated power: 150...3390VA type code according
- Saturation current: 1.5*Ie
- THD: about 40%
- Ambient temperature max: 40°C
- Maximum altitude: 1000m
- Insulation class: F
- Working class: F
- Test voltage: 3kV/1 sec
- Protection degree: IP00.

Compliance
Compliant with standards: IEC/EN/BS 61558.

Braking resistors



VLBXR...

Order code	Output	Resistance	Qty per pkg.	Wt
	[W]	[Ω]	n°	[kg]
Resistors for VLB1... - VLB3... - VLG3... variable speed drives❶.				
VLBXR390	100	390	1	0.260
VLBXR180	200	180	1	0.630
VLBXR047	200	47	1	0.500
VLBXR027	200	27	1	0.500
VLBXR018	800	18	1	4.200
VLBXR015	800	15	1	4.200
VLBXR007	1900	7.5	1	9.500

❶ For the correct selection of the resistor see the installation manual of the variable speed drives, available on the website www.LovatoElectric.com.

General characteristics
Braking resistors can be connected to VLB1... - VLB3... - VLG3... drives in order to absorb the power generated during the motor stop phase.

Certifications and compliance
Certifications obtained: EAC.
Compliant with standards: IEC/EN/BS 60204-1, IEC/EN/BS 60664-1.

Other accessories



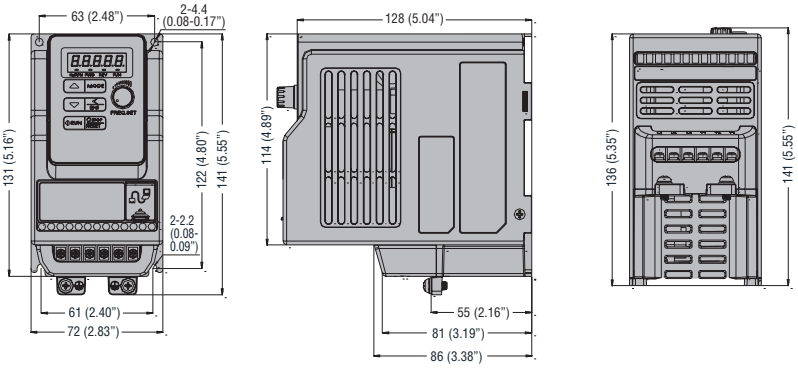
LPCPA001

Order code	Description	Qty per pkg.	Wt
		n°	[kg]
Potentiometer.			
LPCPA001	1kΩ potentiometer 1 turn, complete with operating knob IP66, IP67 and IP69K on front❷	10	0.040

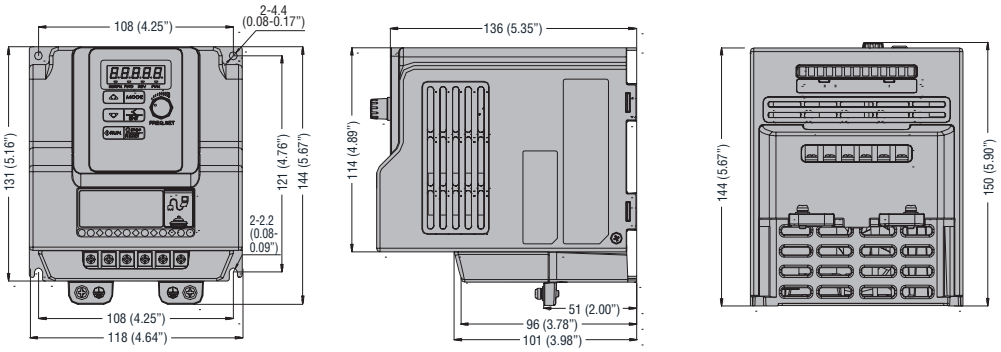
❷ For more information consult page 8-35.

SINGLE-PHASE ULTRA-COMPACT VARIABLE SPEED DRIVES WITH RS485 VT1 SERIES

VT102A240 - VT104A240 - VT107A240

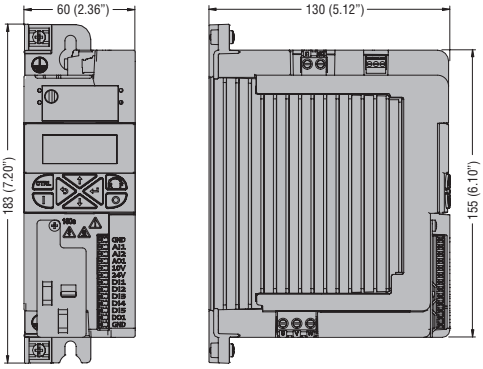


VT115A240 - VT122A240

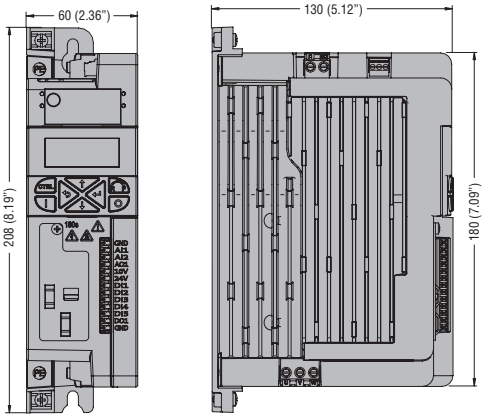


SINGLE-PHASE VARIABLE SPEED DRIVES VLA1 SERIES

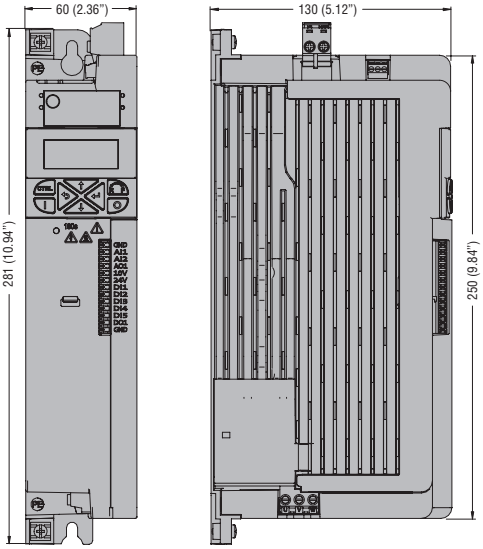
VLA102A240 - VLA104A240



VLA107A240

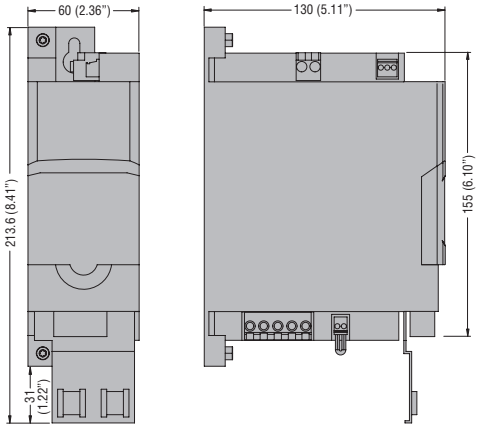


VLA115A240 - VLA122A240

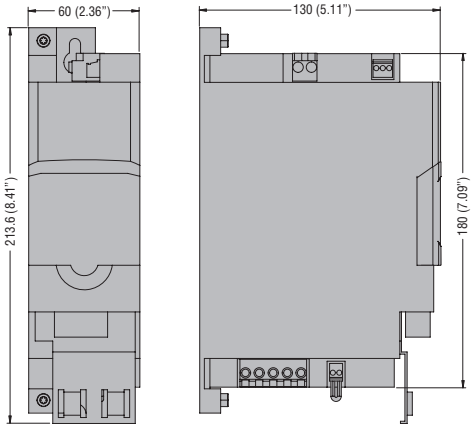


SINGLE-PHASE ADVANCED VARIABLE SPEED DRIVES VLB1 SERIES❶

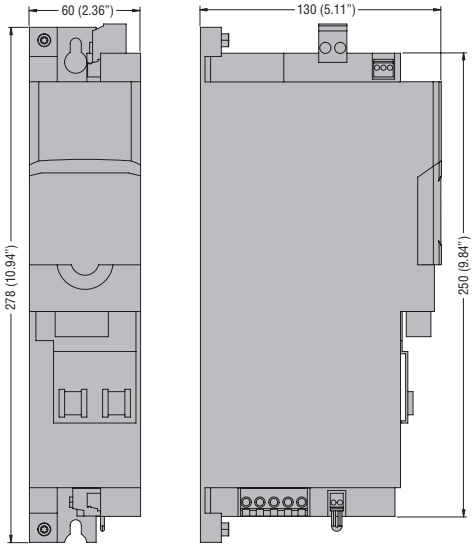
VLB104A240



VLB107A240



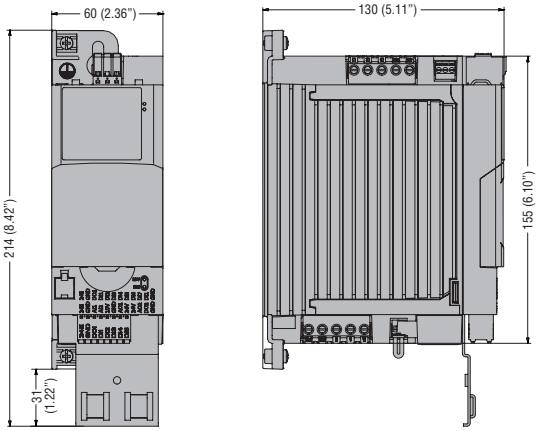
VLB115A240 - VLB122A240



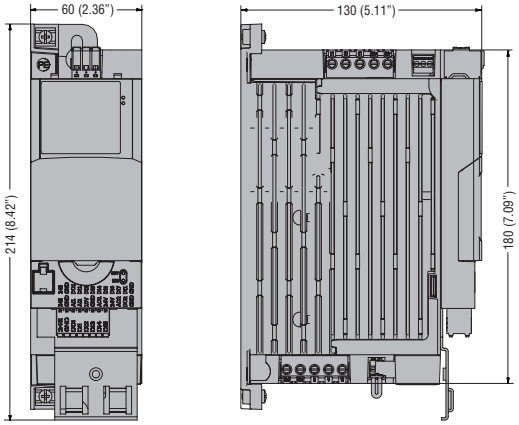
❶ The dimensions refer to complete drives, composed of power unit type VLB1...A240XX, logic unit type VLBXL... and control unit type VLBXC...

THREE-PHASE ADVANCED VARIABLE SPEED DRIVES VLB3 SERIES❶

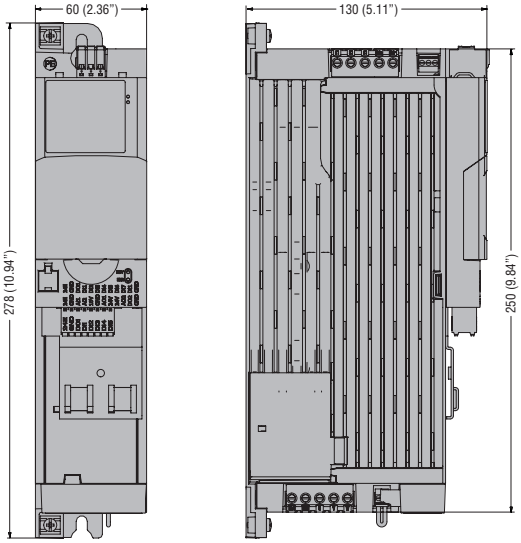
VLB30004A480



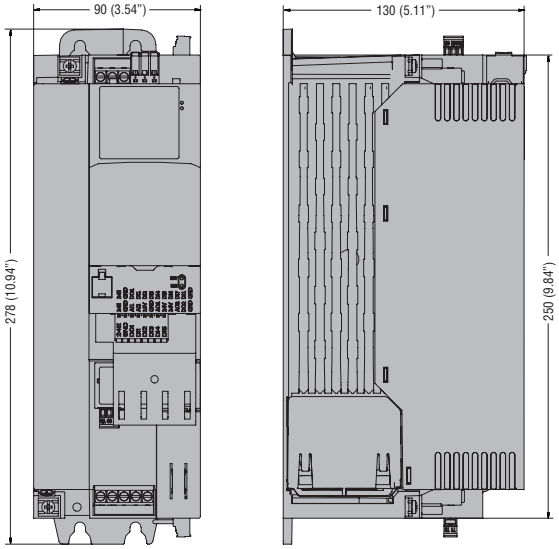
VLB30007A480



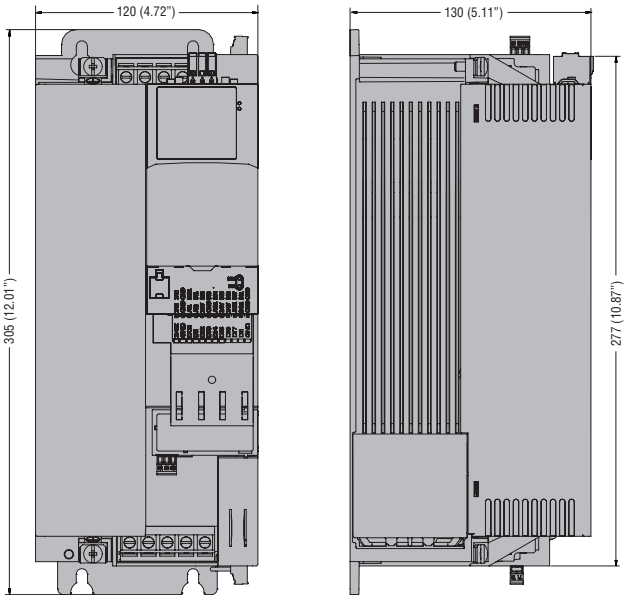
VLB30015A480 - VLB30022A480 - VLB30040A480



VLB30055A480

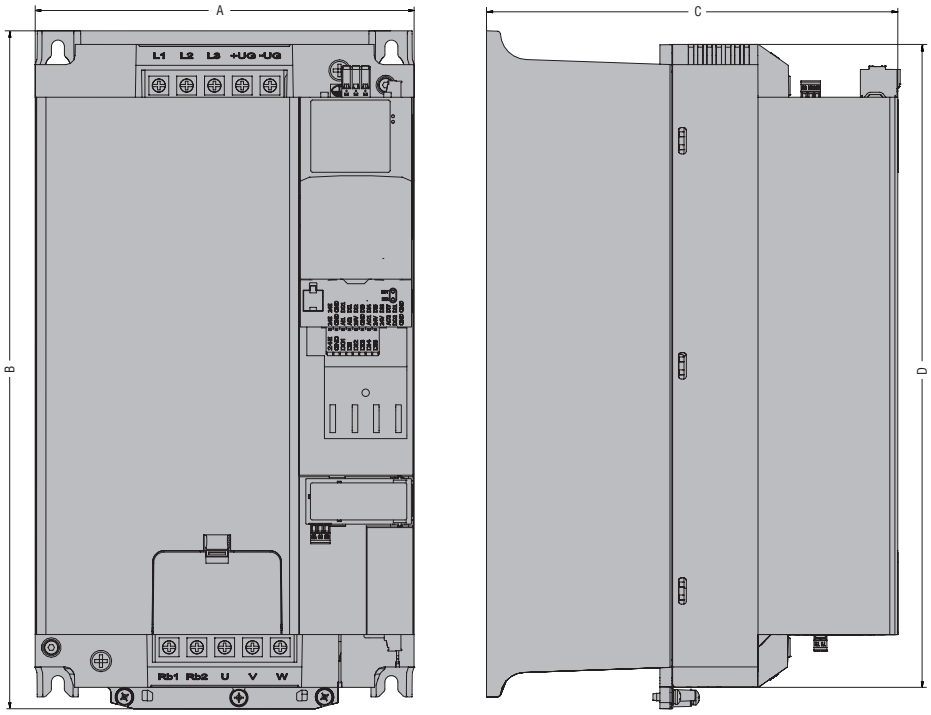


VLB30075A480 - VLB30110A480



❶ The dimensions refer to complete drives, composed of power unit type VLB3...A480XX, logic unit type VLBXL... and control unit type VLBXC...

VLB30150A480...VLB31100A480

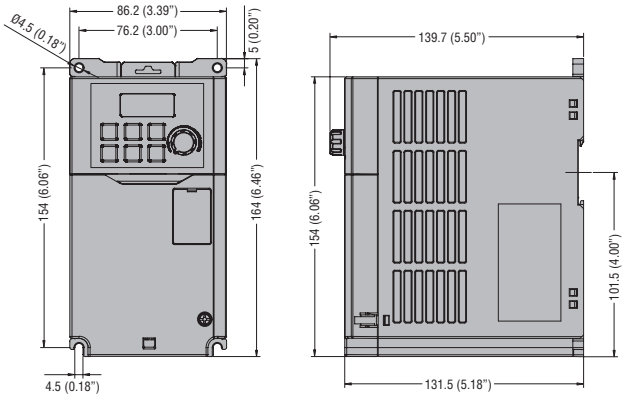


TYPE	A	B	C	D
VLB30150A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30185A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30220A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30300A480❶	180 (7.09")	384 (15.12")	165 (6.50")	342 (13.46")
VLB30370A480	250 (9.84")	520 (20.47")	230 (9.05")	450 (17.72")
VLB30450A480	250 (9.84")	520 (20.47")	230 (9.05")	450 (17.72")
VLB30550A480	250 (9.84")	623 (24.53")	265 (10.43")	536 (21.10")
VLB30750A480	250 (9.84")	623 (24.53")	265 (10.43")	536 (21.10")
VLB30900A480	258 (10.16")	775 (30.51")	304 (11.97")	685 (26.97")
VLB31100A480	258 (10.16")	775 (30.51")	304 (11.97")	685 (26.97")

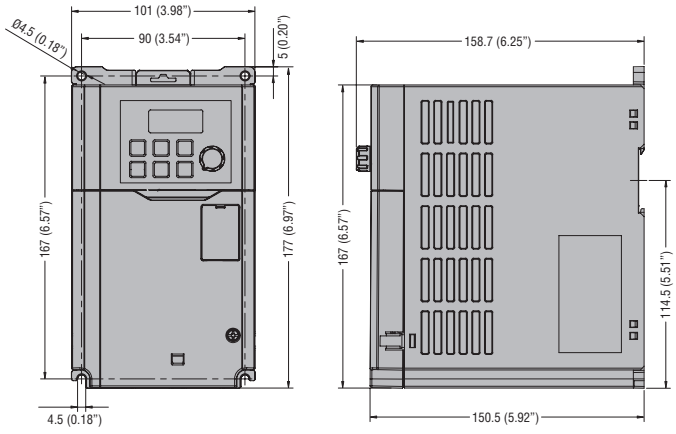
❶ Dimensions valid for variable speed drives with batch number starting with letter E or higher.

THREE-PHASE VARIABLE SPEED DRIVES VLG3 SERIES

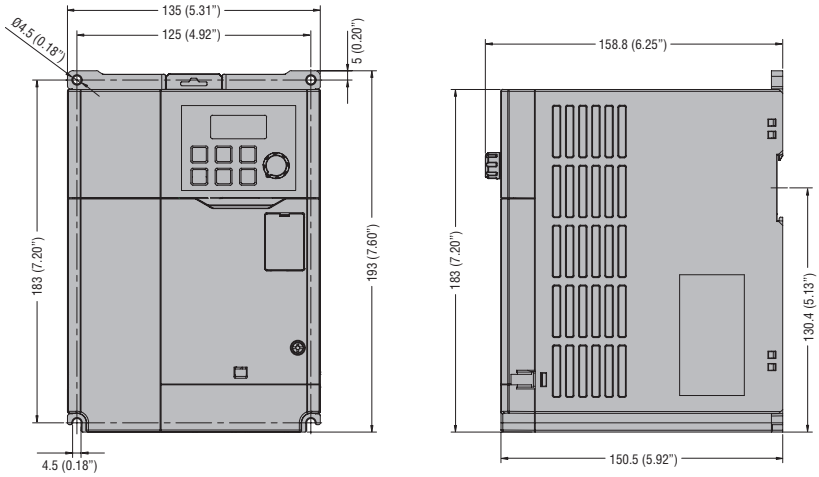
VLG30004A480 - VLG30007A480



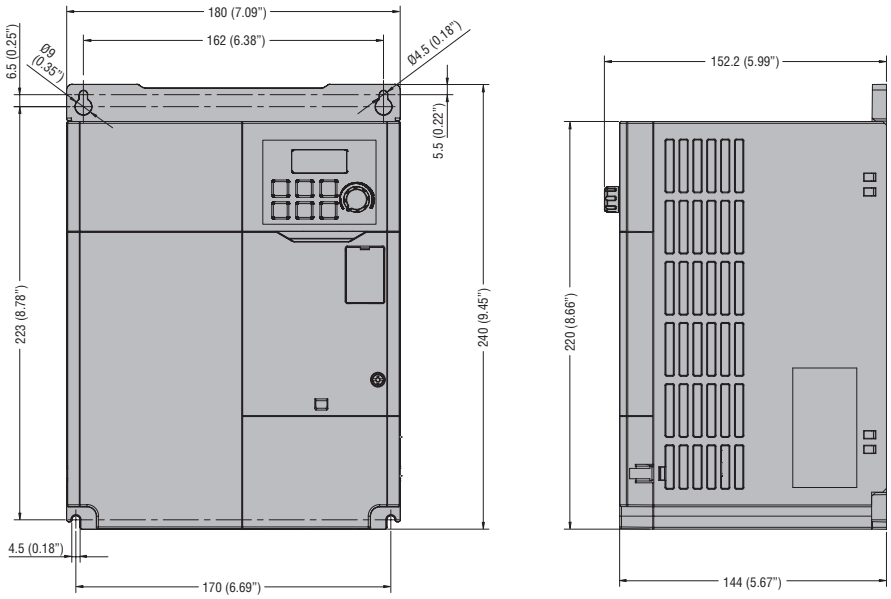
VLG30015A480 - VLG30022A480



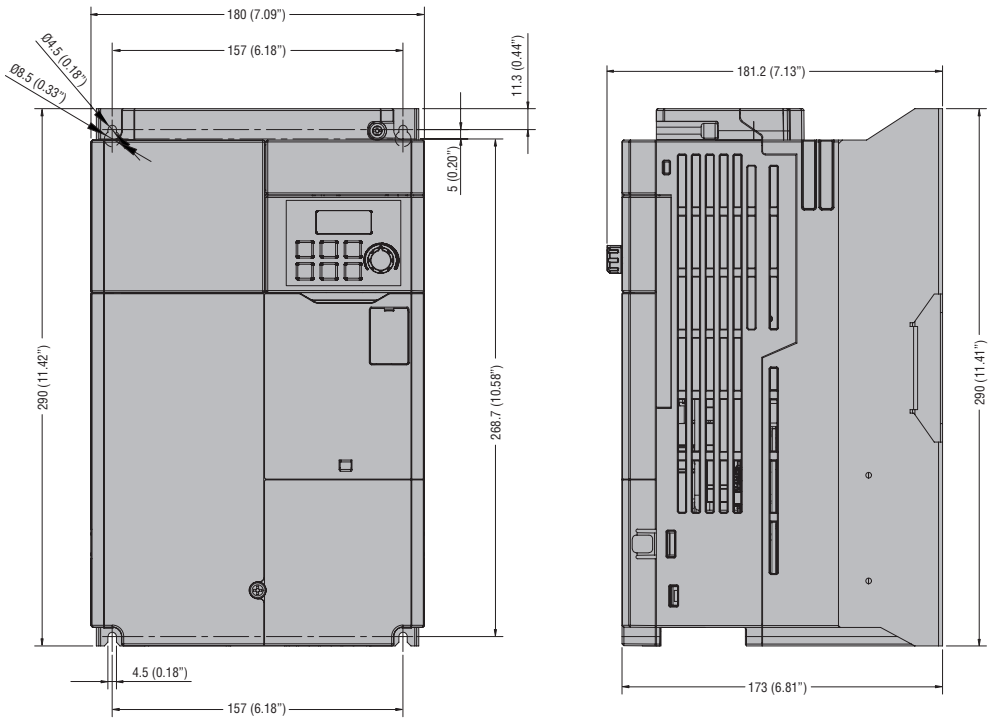
VLG30040A480



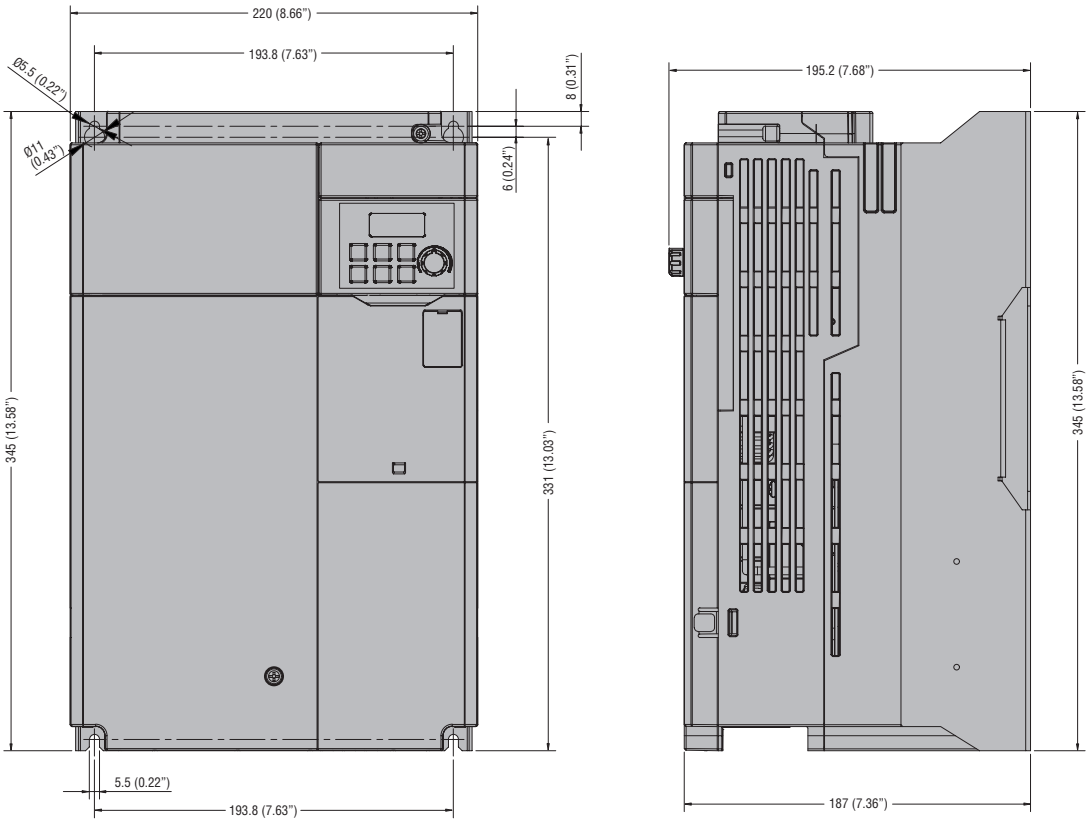
VLG30055A480 - VLG30075A480



VLG30110A480 - VLG30150A480

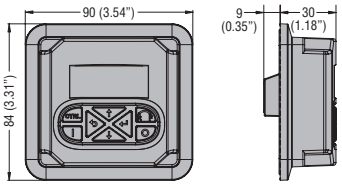


VLG30185A480 - VLG30220A480

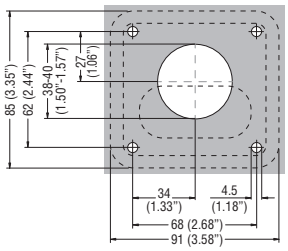


Remote keypads

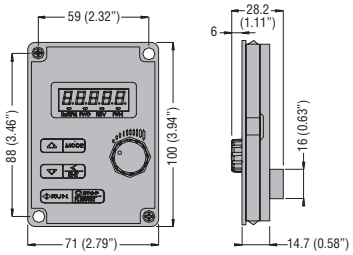
VLAXP01 - VLBXP01



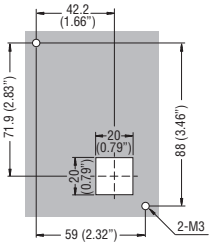
Cut-out



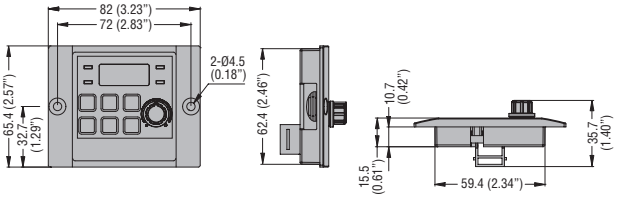
VT1XC02



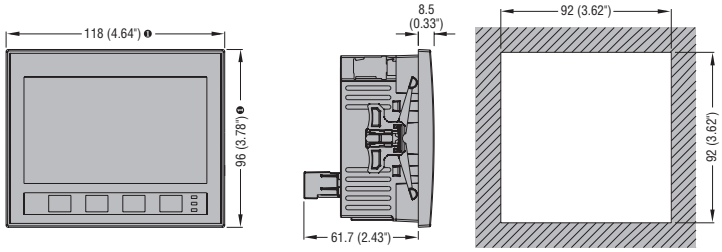
Cut-out



VLGXC02



EXCRDU2



Cut-out

❶ Dimensions with gasket: 122x100mm/4.80x3.94".

Note. For the dimensions of the mains chokes, motor chokes and braking resistor, see the website www.LovatoElectric.com.

Motor control and protection

Solid state relays



- Long electrical and mechanical life
- High switching frequency
- Silent operation
- No electric arc
- In compliance with EN60335 standard.

	Sec. - Page
Solid state relays	
Miniature, single-phase	7 - 2
Hockey puck, single-phase	7 - 2
Hockey puck, two-phase	7 - 2
Complete with heatsink, single-phase	7 - 3
Complete with heatsink, three-phase	7 - 3
Accessories	**7 - 4**
Dimensions	**7 - 5**
Technical characteristics	**7 - 6**



Page 7-2

MINIATURE, SINGLE-PHASE
- Operating current up to 25A
- Operating voltage up to 280VAC
- Faston terminals
- Zero crossing switching
- cURus and VDE certified
- IP00 protection
- Screw fixing.



Page 7-2

HOCKEY PUCK, SINGLE-PHASE
- Operating current up to 130A
- Operating voltage up to 600VAC
- Screw terminals
- Zero crossing switching
- cURus, CSA and VDE certified
- IP20 protection
- Status indicator LED.



Page 7-2

HOCKEY PUCK, TWO-PHASE
- Operating current up to 50A
- Operating voltage up to 600VAC
- Screw terminals
- Zero crossing switching
- cURus, CSA and VDE certified
- IP20 protection
- Status indicator LED.



Page 7-3

COMPLETE WITH HEATSINK, SINGLE-PHASE
- Ready to use
- Operating current up to 60A
- Operating voltage up to 600VAC
- Zero crossing switching
- cULus certified
- IP20 protection
- Status indicator LED
- Screw or on 35mm DIN rail.



Page 7-3

COMPLETE WITH HEATSINK, 3-PHASE, (2 CONTROLLED)
- Ready to use
- Operating current up to 60A
- Operating voltage up to 600VAC
- Zero crossing switching
- cULus certified
- IP20 protection
- Status indicator LED
- 35mm DIN rail.



Page 7-3

COMPLETE WITH HEATSINK, 3-PHASE (3 CONTROLLED)
- Ready to use
- Operating current up to 48A
- Operating voltage up to 600VAC
- Zero crossing switching
- cULus certified
- IP20 protection
- Status indicator LED
- Screw or on 35mm DIN rail.

Miniature and hockey puck, single-phase



HS1A2NN025D024

new



HS1B...

Order code	Load operating voltage	Ie AC-51 at ≤40°C ❶	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Miniature, Faston terminals. Faston: load 6.3x0.8mm - control 4.8x0.8mm.					
HS1A2NN025D024	12...280	25	4...30VDC	Resistive	4
Hockey puck, screw terminals.					
HS1B2NT025D024	12...280	25	3...32VDC	Resistive	1
HS1B2NT025E230	12...280	25	18...280VAC/DC		1
HS1B5NV040D024	24...510	40	3.5...32VDC	Resistive or inductive	1
HS1B5NV040E230	24...510	40	20...265VAC/DC		1
HS1B6NT040D024	24...600	40	3.5...32VDC	Resistive	1
HS1B6NT040E230	24...600	40	18...280VAC/DC		1
HS1B6NN050D024	24...600	50	3.5...32VDC		1
HS1B5NV060D024	24...510	60	3.5...32VDC	Resistive or inductive	1
HS1B5NV060E230	24...510	60	20...265VAC/DC		1
HS1B6NT060D024	24...600	60	3.5...32VDC	Resistive	1
HS1B6NT060E230	24...600	60	18...280VAC/DC		1
HS1B6NT090D024	24...600	90	3.5...32VDC		1
HS1B6NT090E230	24...600	90	18...280VAC/DC		1
HS1B5NV130D024	24...510	130	3.5...32VDC	Resistive or inductive	1
HS1B5NV130E230	24...510	130	20...265VAC/DC		1

Hockey puck, two-phase

new



HS2B...

Order code	Load operating voltage	Ie AC-51 at ≤40°C ❶	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		no.
Hockey puck, Faston terminals.					
HS2B2NN025D024	12...280	25	3...32VDC	Resistive	1
Hockey puck, screw terminals.					
HS2B6NN050D024	24...600	50 ❷	10...30VDC	Resistive	1
HS2B6NN051D024	24...600	50 ❸	10...30VDC		1

❶ Ratings valid with correct heatsink.
❷ I^2t 2800A2s.
❸ I^2t 7200A2s.

General characteristics
Solid state relays (SSRs) can offer significant advantages in electrical control. SSRs have no moving parts, resulting in a very high electrical life and silent operation. SSRs also have fast switching speed and can sustain a very high switching frequency. SSRs are also resistant to vibration and shocks. Furthermore, they do not generate electric arc during the operation. Their primary use is for controlling resistive loads, such as heating elements, but can also operate small motors and other types of inductive loads. The HS... series can control loads up to 130A. Overall, SSRs offer a solid, efficient and durable solution for precise and reliable electrical control.

Operational characteristics
- Control current:
  - HS1A...: <29mA
  - HS1B...: <13mA
  - HS2B...: <24mA
- Switching mode: zero crossing
- Output protection: varistor, TVS or none (V or T or N as 7th digit in the code)
- Status indicator: LED on front (except HS1A...).

Certifications and compliance
Certifications obtained: see table below.
Compliant with standards: IEC/EN/BS 60947-4-3, IEC/EN/BS 60947-4-2, IEC/EN/BS 62314, IEC/EN/BS 6335-1.

	cURus	CSA	VDE
HS1A2NN025D024	●	—	●
HS1B2NT025D024	●	●	●
HS1B2NT025E230	●	—	●
HS1B5NV040D024	●	●	●
HS1B5NV040E230	●	●	●
HS1B6NT040D024	●	●	●
HS1B6NT040E230	●	—	●
HS1B6NN050D024	●	●	●
HS1B5NV060D024	●	●	●
HS1B5NV060E230	●	●	●
HS1B6NT060D024	●	●	●
HS1B6NT060E230	●	—	●
HS1B6NT090D024	●	●	●
HS1B6NT090E230	●	—	●
HS1B5NV130D024	●	●	●
HS1B5NV130E230	●	●	●
HS2B2NN025D024	●	●	●
HS2B6NN050D024	●	●	●
HS2B6NN051D024	●	●	●

Complete with heatsink, single-phase



HS1C...

new

Order code	Load operating voltage	Ie AC-51 at ≤40°C	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Complete with heatsink, ready to use, screw terminals.					
HS1C2HV020D024	12...275	20	3...32VDC	Resistive or inductive	1
HS1C6HV020D024	48...600	20	4...32VDC		1
HS1C6HV020A230	48...600	20	90...280VAC		1
HS1C2HV025D024	12...275	25	3...32VDC		1
HS1C6HV025D024	48...600	25	4...32VDC		1
HS1C6HV025A230	48...600	25	90...280VAC		1
HS1C2HV030D024	12...275	30	3...32VDC		1
HS1C6HV030D024	48...600	30	4...32VDC		1
HS1C6HV030A230	48...600	30	90...280VAC		1
HS1C6HV040D024	48...600	40	4...32VDC		1
HS1C6HV040A230	48...600	40	90...280VAC		1
HS1C6HV060D024	48...600	60	4...32VDC		1
HS1C6HV060A230	48...600	60	90...280VAC		1

Complete with heatsink, three-phase (2 controlled)

new



HS2...

Order code	Load operating voltage	Ie AC-51 at ≤40°C	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Complete with heatsink, ready to use, screw terminals.					
HS2C6HV015D024	48...600	15	4...32VDC	Resistive or inductive	1
HS2C6HV015A230	48...600	15	90...280VAC		1
HS2C6HV030D024	48...600	30	4...32VDC		1
HS2C6HV030A230	48...600	30	90...280VAC		1
HS2C6HV060D024	48...600	60	4...32VDC		1
HS2C6HV060A230	48...600	60	90...280VAC		1

Complete with heatsink, three-phase (3 controlled)

new



HS3C...



HS3D...

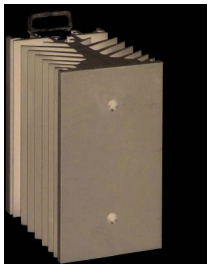
Order code	Load operating voltage	Ie AC-51 at ≤40°C	Control voltage	Type of load	Qty per pkg
	[VAC]	[A]	[V]		n°
Complete with heatsink, ready to use, screw terminals.					
HS3C6HV020D024	48...600	20	4...32VDC	Resistive or inductive	1
HS3C6HV020A230	48...600	20	90...280VAC		1
HS3C6HV025D024	48...600	25	4...32VDC		1
HS3C6HV025A230	48...600	25	90...280VAC		1
HS3C6HV040D024	48...600	40	4...32VDC		1
HS3C6HV040A230	48...600	40	90...280VAC		1
Complete with heatsink, ready to use, screw terminals, high I^2t.					
HS3D5HV024E230	24...520	24	24...255VACDC	Resistive or inductive	4
HS3D5HV048E230	24...520	48	24...255VACDC		1

General characteristics
Solid state relays (SSRs) can offer significant advantages in electrical control. SSRs have no moving parts, resulting in a very high electrical life and silent operation. SSRs also have fast switching speed and can sustain a very high switching frequency. SSRs are also resistant to vibration and shocks. Furthermore, they do not generate electric arc during the operation. Their primary use is for controlling resistive loads, such as heating elements, but can also operate small motors and other types of inductive loads. HS1...H... series can control loads up to 60A. Overall, SSRs offer a solid, efficient, and durable solution for precise and reliable.
HS1... versions have heatsink factory mounted.
They are ready to use and fast mounting on DIN rail.

Operational characteristics
- Control current:
  - HS1...D...: <12mA
  - HS1...A...: <22mA
  - HS2...D...: <21mA
  - HS2...A...: <50mA
  - HS3...D...: <27mA
  - HS3...A...: <50mA
- Input-output insulation: 5kV
- Switching mode: zero crossing
- Output protection: varistor
- Status indicator: LED on front.

Certifications and compliance
Certifications obtained: cULus.
Compliant with standards: IEC/EN/BS 62314; IEC/EN/BS 61000-6-2; IEC/EN/BS 61000-6-3.

Accessories

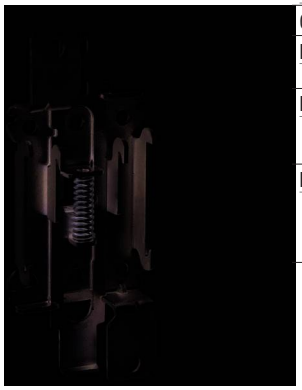


HSBXH1

new



HSBXP...



HSBX80



HSCXM...

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Heatsinks for HS1B... and HS2B... solid state relays.			
HSBXH1	Heatsink 2.2K/W for one HS1B... or HS2B... solid state relay	12	0.290
HSBXH2	Heatsink 1.2K/W for one or two HS1B... or HS2B... solid state relay	2	0.600
HSBXH3	Heatsink 0.9K/W for one or two HS1B... or HS2B... solid state relay	1	1.400
HSBXH4D024	Heatsink 0.3K/W for one HS1B... or HS2B... solid state relay; complete with fan 24VDC	1	1.720
HSBXH5A230	Heatsink 0.3K/W for one or two HS1B... or HS2B... solid state relay; complete with fan 230VAC	1	1.720
Thermal pads for HS1B... and HS2B... solid state relays.			
HSBXP0050	Adhesive thermal pad – 50 pcs	1	0.050
HSBXP0100	Adhesive thermal pad – 100 pcs	1	0.100
HSBXP1000	Adhesive thermal pad – 1000 pcs	1	1.200
Fixing element for HS1B... solid state relays.			
HSBX80	DIN rail adapter. 6K/W dissipation	1	0.080
Current monitoring modules for HS1C... solid state relays.			
HSCXM1	Load current monitoring. Supply 24VDC	1	0.090
HSCXM2	Load current monitoring with Modbus-RTU over RS485 comunication. Supply 24VDC	1	0.090
HSCXM3	Temperature controller and load current monitoring with Modbus-RTU over RS485 comunication. Supply 24VDC	1	0.090

General characteristics

HEATSINKS FOR HS1B... AND HS2B... SOLID STATE RELAYS

The heatsinks HSBXH1, HSBXH2 and HSBXH3 can be fixed by screw or on DIN rail.

HSBXH4D024 and HSBXH5A230 are for mounting on DIN rail only.

All the heatsinks contains the screws to fix the solid state relay.

THERMAL PADS FOR HS1B... AND HS2B... SOLID STATE RELAYS

The thermal pad mounting on the solid state relays is recommended to ensure effective heat dissipation, to prevent overheating and to enhance the overall reliability and performance.

CURRENT MONITORING MODULES FOR HS1C... SOLID STATE RELAYS

The accessory snaps onto the front of the HS1C... solid state relay.

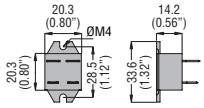
The current monitor modules have a button to set the rated current of the load. In case the current is +10% or -10% of the set threshold, an alarm will be generated.

This alarm, for the version with comunication, will be also trasmitted via Modbus.

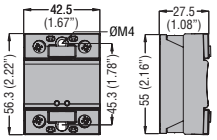
Three LED on the front indicate the working status.

Current measuring range: 2A...40A.

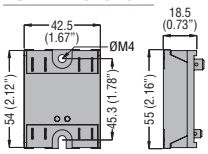
HS1A2NN025D024



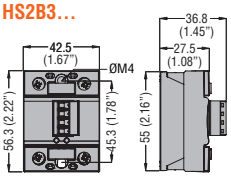
HS1B...



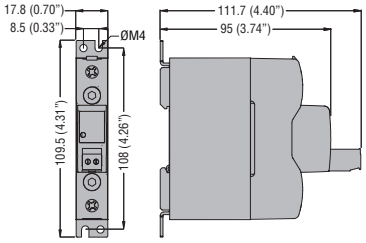
HS2B2NN025D024



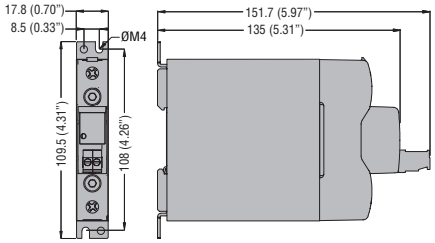
HS2B3...



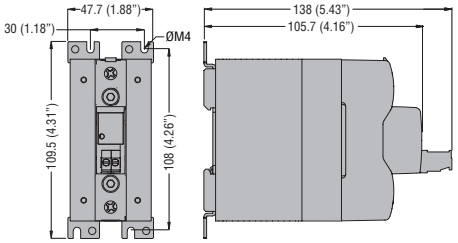
HS1C...020... - HS1C...025...



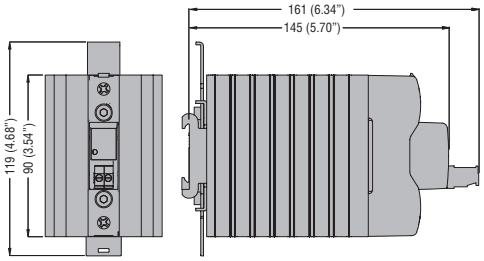
HS1C...030...



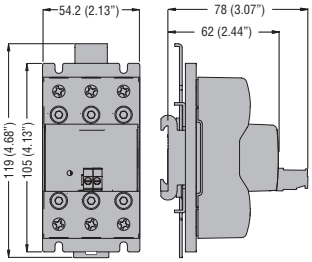
HS1C...040...



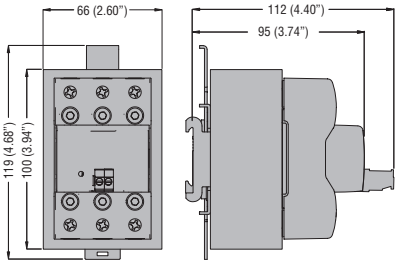
HS1C...060...



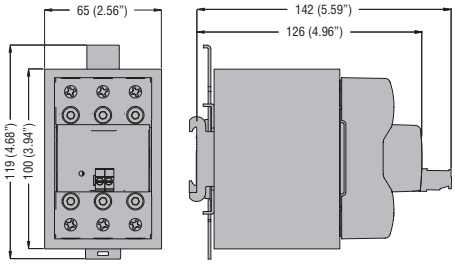
HS2C...015...



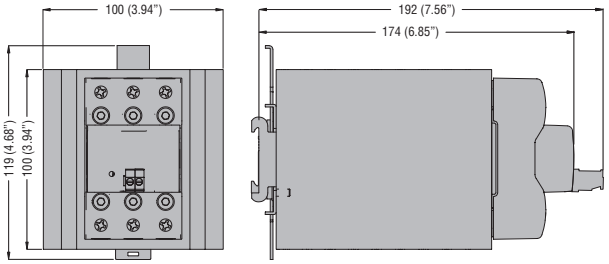
HS2C...030... - HS3C...020...



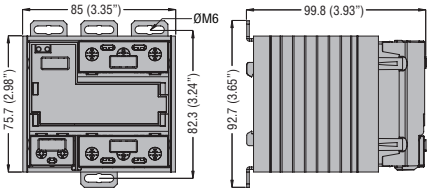
HS3C...025...



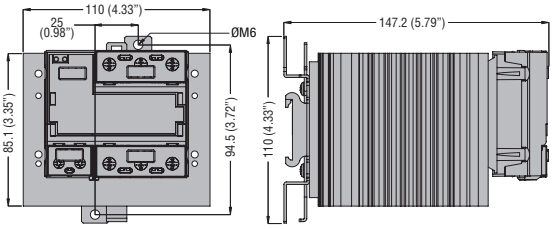
HS2C...060... - HS3C...040...



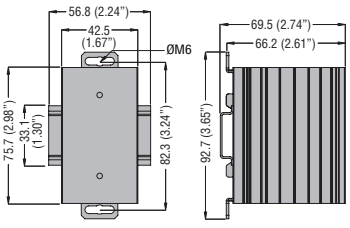
HS3D...024



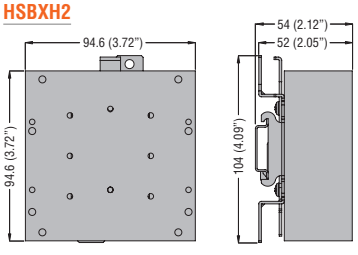
HS3D...048



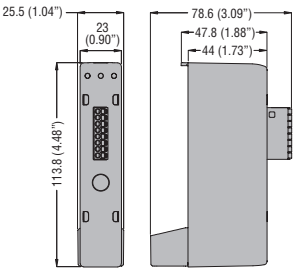
HSBXH1



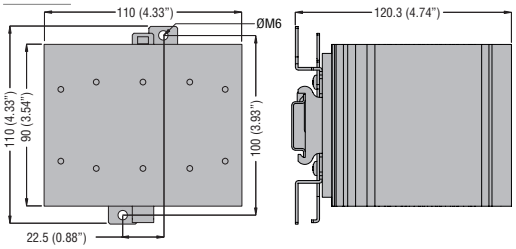
HSBXH2



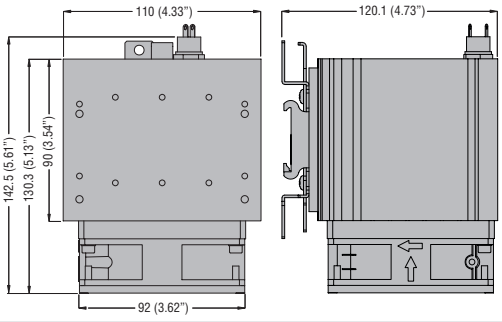
HSCXM...



HSBXH3



HSBXH4



TYPE		HS1A2NN 025D024	HS1B2NT 025D024	HS1B2NT 025E230	HS1B5NV 040D024	HS1B5NV 040E230	HS1B6NT 040D024	HS1B6NT 040E230	HS1B6NN 050D024	HS1B5NV 060D024
MODEL		Single-phase								
INPUT CHARACTERISTICS										
Control voltage		4...30VDC	3...32VDC	18...280VAC/DC	3.5...32VDC	20...265VAC/DC	3.5...32VDC	18...280VAC/DC	3.5...32VDC	3.5...32VDC
Operating voltage limits pick-up	V	4	3	18	3.5	95	3.5	18	3.5	3.5
drop-out	V	1	1	8	2	5	2	8	2	2
Input current at min...max voltage	mA	3...29	10...13	4.5...6	10...13	5...10	10...13	4.5...6	10...13	10...13
OPERATING TIMES										
switching -on		Half cycle max								
switching -off		Half cycle max								
OUTPUT CHARACTERISTICS										
Switching mode		Zero crossing switching								
Rated operating voltage	VAC	12...280	12...280	12...280	24...510	24...510	24...600	24...600	24...600	24...510
Blocking voltage	V	600	600	600	1200	1200	1200	1200	1200	1200
Operational frequency (min...max)	Hz	45...65								
Rated operating current AC-51 (resistive load) at 40°C ❸	A	25	25	25	40	40	40	40	50	60
Rated operating current AC-51 (resistive load) at 55°C ❸	A	22	20	20	35	35	35	35	42	52
Heatsink for use at 40°C and 55°C at rated current AC-51	K/W	≤1.2	≤2.2	≤2.2	≤0.9	≤0.9	≤0.9	≤0.9	≤0.9	≤0.55
Rated operating current AC-53 (motor load) at 40°C	A	7	–	–	7	7	–	–	–	12
Min. operational current	A	0.005	0.05							
Input - Output isolation	V	4000	4000							
Input - Output to metal base	V	2500	4000							
Output protection type		–	TVS		VDR		TVS		–	VDR
I^2t	A^2s	340	600		1250				1680	2800
TERMINAL CHARACTERISTICS										
Control terminals	Type	Faston 4.8x0.8	Screw M4							
Tool	Type	–	PZ 2							
Tightening torque	Nm	–	1.2...2							
	lb.in	–	10.6...17.7							
Conductor section connectable (control terminals) with 1 or 2 wires min...max AWG stranded	n°	16...14 (Faston lug)	18...14							
Flexible w/o lug	mm^2	–	0.75...2.5							
Flexible c/w insulated spade lug	mm^2	0.75...6 (Faston lug)	0.75...2.5							
Load terminals	Type	Faston 6.3x0.8	Screw M5							
Tool	Type	–	PZ 2							
Tightening torque Load terminals (min...max)	Nm	–	2...3							
	lb.in	–	20.4							
Conductor section connectable (load terminals) with 1 or 2 wires min...max AWG stranded	n°	16...10 (Faston lug)	16...10	16...10❷						
Flexible w/o lug	mm^2	–	1.5...6							
Flexible c/w insulated lug	mm^2	0.75...6 (Faston lug)	1.5...6	1.5...6❶						
AMBIENT CONDITIONS										
Operating temperature	°C	-40...+90								-55...+90
Storage temperature	°C	-40...+100								-55...+125
Operating position allowable		Any								
Fixing		Screw								

❶ Wires up to 50mm^2 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.
❷ Wires up to AWG0 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.
❸ Ratings valid with proper heatsink.
❹ 110A max with 0.3K/W heatsink.

	HS1B5NV 060E230	HS1B6NT 060D024	HS1B6NT 060E230	HS1B6NT 090D024	HS1B6NT 090E230	HS1B5NV 130D024	HS1B5NV 130E230	HS2B2NN 025D024	HS2B6NN 050D024	HS2B6NN 051D024
	Single-phase							Two-phase		
	20...265VAC/DC	3.5...32VDC	18...280VAC/DC	3.5...32VDC	18...280VAC/DC	3.5...32VDC	20...265VAC/DC	3...32VDC	10...30VDC	10...30VDC
	20VAC-18VDC	3.5	18	3.5	18	3.5	20VAC-18VDC	3	10	10
	5	2	8	2	8	2	5	2	2	2
	5...10	10...13	4.5...6	10...13	4.5...6	10...13	5...10	10...13	6...24	6...24
	Half cycle max									
	Half cycle max									
	Zero crossing switching									
	24...510	24...600	24...600	24...600	24...600	24...510	24...510	12...280	24...600	24...600
	1200	1200	1200	1200	1200	1200	1200	600	1200	1200
	45...65									
	60	60	60	90	90	130	130	25	50	50
	52	52	52	80	80	105	105	21	37	50
	≤0.55	≤0.55	≤0.55	≤0.3	≤0.3	≤0.3	≤0.3	≤0.3	≤0.3❹	≤0.3❹
	12	–	–	–	–	32	32	–	–	–
	0.05									
	4000									
	4000							2500	4000	
	VDR	TVS				VDR		–	–	–
	2800		7200			22000		340	2800	7200
	Screw M4							Faston 4.8x0.8	Screw	
	PZ 2							–	Blade 3.5mm	
	1.2...2							–	0.5Nm	
	10.6...17.7							–	4.5	
	18...14							16...14 (Faston lug)	28...12	
	0.75...2.5							–	0.75...2.5	
	0.75...2.5							0.75...6 (Faston lug)	0.75...2.5	
	Screw M5							Faston 6.3x0.8	Screw M5	
	PZ 2							–	PZ 2	
	2...3							–	2...3	
	20.4							–	20.4	
	16...10❷							16...10 (Faston lug)	16...10❷	
	1.5...6							–	1.5...6	
	1.5...6❶							0.75...6 (Faston lug)	1.5...6❶	
	-55...+90							-40...+90	-55...+90	
	-55...+125							-40...+100	-55...+125	
	Any									
	Screw									

TYPE		HS1C2HV 020D024	HS1C6HV 020D024	HS1C6HV 020A230	HS1C2HV 025D024	HS1C6HV 025D024	HS1C6HV 025A230	HS1C2HV 030D024	HS1C6HV 030D024	HS1C6HV 030A230	HS1C6HV 040D024	HS1C6HV 040A230
MODEL		Single-phase										
INPUT CHARACTERISTICS												
Control Voltage		3-32VDC	4-32VDC	90-280VAC	3-32VDC	4-32VDC	90-280VAC	3-32VDC	4-32VDC	90-280VAC	4-32VDC	90-280VAC
Operating voltage limits pick-up	V	3	4	45	3	4	45	3	4	45	4	45
Operating voltage limits drop-out	V	2	2	20	2	2	20	2	2	20	2	20
Input current at min...max voltage	mA	4...12	8...12	5...22	4...12	8...12	5...22	4...12	8...12	5...22	8...12	5...22
OPERATING TIMES												
switching -on		Half cycle max										
switching -off		Half cycle max										
OUTPUT CHARACTERISTICS												
Switching mode		Zero crossing switching										
Rated operating voltage	VAC	12...275VAC	48...600VAC		12...275VAC	48...600VAC		12...275VAC	48...600VAC			
Blocking Voltage	V	600	1200		600	1200		600	1200			
Operational frequency (min...max)	Hz	45...65										
AC-51 rated operating current (resistive load) at 40°C	A	20			25			30			40	
AC-51 rated operating current (resistive load) at 55°C	A	17			22			25			32	
AC-53 rated operating current (motor load) at 40°C	A	–										
Min. operational current	A	0.165										
Input - Output isolation	V	5000										
Input - Output to metal base	V	5000										
Output protection type		VDR										
I^2t	A^2s	792			1350							
TERMINAL CHARACTERISTICS												
Control terminals	Type	Screw										
Tool	Type	Blade screwdriver 3.5mm										
Tightening torque	Nm	0.5Nm										
	lb.in	4.5										
Conductor section connectable (control terminals) min...max AWG stranded	n°	28...12										
Flexible w/o lug	mm^2	0.75...2.5										
Flexible c/w insulated spade lug	mm^2	0.75...2.5										
Load terminals	Type	Screw										
Tool	Type	PH2										
Tightening torque Load terminals (Min...Max)	Nm	1.5										
	lb.in	13.3										
Conductor section connectable (load terminals) with 1 or 2 wires min...max AWG stranded	n°	18...10										
Flexible w/o lug	mm^2	1...6										
Flexible c/w insulated lug	mm^2	1...16										
AMBIENT CONDITIONS												
Operating temperature	°C	-40...+80°C										
Storage temperature	°C	-40...+130°C										
Operating position allowable		On vertical plane										
Fixing		Screw or on 35mm DIN rail										

❶ Wires up to 50mm^2 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.
❷ Wires up to AWG0 can be connected with specific spade lugs or ring lugs. Lug width max 12.6mm.

	HS1C6HV 060D024	HS1C6HV 060A230	HS2C6HV 015D024	HS2C6HV 015A230	HS2C6HV 030D024	HS2C6HV 030A230	HS2C6HV 060D024	HS2C6HV 060A230	HS3C6HV 020D024	HS3C6HV 020A230	HS3C6HV 025D024	HS3C6HV 025A230	HS3C6HV 040D024	HS3C6HV 040A230	HS3D5HV 024E230	HS3D5HV 048E230
	Single-phase		Three-phase (2 controlled)						Three-phase (3 controlled)							
	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	4-32VDC	90-280VAC	24...255 VAC/DC	24...255 VAC/DC
	4	45	4	90	4	90	4	90	4	90	4	90	4	90	24	24
	2	20	2	20	2	20	2	20	2	20	2	20	2	20	2	2
	8...12	5...22	13...21	23...50	13...21	23...50	13...21	23...50	17...27	23...50	17...27	23...50	17...27	23...50	4.5...6	4.5...6
	Half cycle max															
	Half cycle max															
	Zero crossing switching															
	48...600VAC														24...520VAC	
	1200														1600	
	45...65															
	60	60	15 (UL 12)	15 (UL 12)	30	30	60 (UL 50)	60 (UL 50)	20	20	25	25	40	40	24	48
	40	40	12 (UL 10)	12 (UL 10)	25	25	48 (UL 40)	48 (UL 40)	17	17	20	20	32	32	18	38
	–	–	7	7	13.5	13.5	15	15	12.5	12.5	13.5	13.5	15	15	12	32
	0.165	0.165	0.16	0.16	0.16	0.16	0.16	0.16	–	–	–	–	–	–	0.05	
	5000														4000	
	5000														4000	
	VDR														VDR	
	1350		1404												2800	22000
	Screw														Screw M4	
	Blade screwdriver 3.5mm														PZ 2	
	0.5Nm														1.2...2	
	4.5														10.6...17.7	
	28...12														18...14	
	0.75...2.5														0.75...2.5	
	0.75...2.5														0.75...2.5	
	Screw														Screw M5	
	PH2														PZ 2	
	1.5														2...3	
	13.3														20.4	
	18...10														6...10❷	
	1...6														1.5...6	
	1...16														1.5...6❶	
	-40...+80°C														-40...+90	
	-40...+130°C														-40...+125	
	On vertical plane														Any	
	Screw or on 35mm DIN rail														Screw	