OptiStart
Start-control devices

OptiStart electric motor control and protection devices represent reliable high-quality equipment for technically complex solutions, strategic industries, as well as for automation and load management.

OptiStart MP Motor protection circuit breakers

347

OptiStart MP-32RH

Ie (400 V):
0,1 to 40 A
Icu (400 V):
up to 100 kA
Operating temperature up to +60 °C

OptiStart MP-32RHI

Ie (400 V):
0,1 to 40 A
Icu (400 V):
up to 100 kA
Magnetic release only

OptiStart MP-63R

Ie (400 V):
32 to 63 A
Icu (400 V):
up to 50 kA
Operating temperature up to +60 °C

OptiStart MP-100R

Ie (400 V):
55 to 100 A
Icu (400 V):
up to 50 kA
Operating temperature up to +60 °C

Three-pole contactors

364

OptiStart K-F

Ith (A):
16 to 1600
Ie (AC-3 440 V):
6 to 630 A
Prated (AC-3 440 V):
2.2 to 335 kW
AC, DC or AC/DC coil

OptiStart K-AF

Ith (A):
70 to 350
Ie (AC-3 440 V):
40 to 230 A
Prated (AC-3 440 V):
18.5 to 110 kW
Electronically controlled AC/DC coil

Four-pole contactors

364

OptiStart K-AF

Ith (A):
70 to 350
Ie (AC-3 440 V):
40 to 230 A
Prated (AC-3 440 V):
18.5 to 110 kW
Electronically-controlled AC/DC coil

OptiStart K-F

Ith (A):
16 to 1600
Ie (AC-3 440 V):
6 to 630 A
Prated (AC-3 440 V):
2.2 to 335 kW
AC, DC or AC/DC coil

Capacitor contactors

OptiStart K-FK

364

Completed with current-limiting resistors
Qrated (400 V):
7.5 to 100 kVAr
AC control coil

Contactors for DC switching

OptiStart K-FD

364

With permanent magnet installed for arc control
Ie (DC1, 600 V at ≤55 °C):
up to 350 A
AC control coil or electronically-controlled AC/DC coil

Contactor relays

OptiStart K-FR

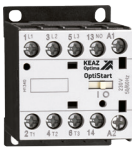
364

For switching and galvanic isolation of low-current circuits and control circuits
Up to 11 contacts with various NO and NC combinations. AC or DC control coil

Mini-contactors

OptiStart K-M

444



Ith (A): 16 to 20
Ie (AC-3 440 V): 6 to 12 A
Prated (AC-3 440 V):
2,5 kPa to 5.5 kW
AC or DC coil

Overload relay

OptiStart TF

461

Thermal overload relays
0.1 to 100 A
Trip class: 10 A
Electr. overload relays 0.4 to 45 A
Trip type 5E-10E-20E-30E adjustable

OptiStart MP

↗ Motor protection circuit breakers

OptiStart MP electric motor protection circuit breakers are designed to protect electric motors against short circuit, overload and two-phase operation modes, and are also used to start and stop them. The series range is represented by models designed for up to 100 A (45 kW at 400 V) with a breaking capacity of up to 100 kA to allow the use of equipment to protect industrial installations with high short-circuit currents.

OptiStart MP motor protection circuit breakers have a wide range of operating temperatures and a built-in temperature compensation function to ensure the guaranteed disconnection according to the time-current characteristic without operating temperature correction. They can be used to protect both three-phase and single-phase electric motors.

The range of accessories is represented by auxiliary contacts, signal contacts, minimum voltage releases, remote releases, comb busbars, as well as extended handles and mounting accessories.

Designation

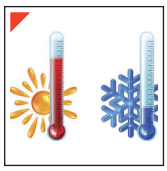
OptiStart MP - 32 R H I - 10 - T2

1	Series	OptiStart — Motor control and protection equipment		
2	Configuration	MP — Motor protection circuit breakers		
3	Standard size	32	63	100
4	Designation of control knob type	R — rotating type		
5	Designation of closure and breaking capacity	H — enhanced	no letter – normal	
6	Model designation with electromagnetic release only (without overload protection)	I — no thermal release	-	
7	Maximum current of thermal release setpoint range, A	0,16 to 100		
8	Designation of circuit breaker version	T2		

Series advantages

The series range is represented by models designed for up to 100 A (100 kW at 400 V) with a breaking capacity of up to 100 kA to allow the use of equipment to protect industrial installations with high short-circuit currents.

All devices have visible tripping indication in case of emergency, and OptiStart MP-32RH..-T2 models are equipped with a special electromagnetic release trip indicator to facilitate searching for the tripping cause and troubleshooting.



A wide operating temperature range from -20 to +60 °C, as well as a built-in temperature compensation function ensure both stable operation without false tripping and guaranteed disconnection according to the time-current characteristic without operating temperature adjustment.

Connection modules used enable direct connection of circuit breakers to OptiStart K contactors without the use of auxiliary conductors, which simplifies installation and ensures an ergonomic solution.

The circuit breakers are compatible and tested with motor control devices, i.e. OptiStart contactors, which enables implementing proven solutions for starting electric motors with type 1 or 2 coordination.

All models can be equipped with a wide range of accessories, such as auxiliary and signal contacts, independent releases, comb busbars, mounting components and extended handles to enable implementation of solutions meeting the customer requirements.

Items

Motor protection circuit breakers with overload and short-circuit protection

Appearance	Motor rated power (400 V), kW [1]	Rated current setpoint range, A [2]	Electromagnetic release setpoint, A [3]	Breaking capacity Icu at 400 V AC, kA	Code	Product name	Weight, kg
	0,03	0,1–0,16	1,6	100	340132	OptiStart MP-32RH-0,16-T2	0,28
	0,06	0,16–0,25	2,5	100	340133	OptiStart MP-32RH-0,25-T2	0,28
	0,09	0,25–0,4	5,2	100	340134	OptiStart MP-32RH-0,4-T2	0,28
	0,18	0,4–0,63	8,2	100	340135	OptiStart MP-32RH-0,63-T2	0,28
	0,25	0,63–1	13	100	340136	OptiStart MP-32RH-1-T2	0,28
	0,55	1–1,6	20,8	100	340137	OptiStart MP-32RH-1,6-T2	0,28
	0,75	1,6–2,5	32,5	100	340141	OptiStart MP-32RH-2,5-T2	0,28
	1,5	2,5–4	52	100	340145	OptiStart MP-32RH-4-T2	0,34
	3	4–6,5	84,5	100	340146	OptiStart MP-32RH-6,5-T2	0,34
	4	6,3–10	130	100	340138	OptiStart MP-32RH-10-T2	0,34
	5,5	9–14	182	100	340139	OptiStart MP-32RH-14-T2	0,34
	7,5	13–18	234	100	340140	OptiStart MP-32RH-18-T2	0,34
	11	17–23	299	50	340142	OptiStart MP-32RH-23-T2	0,34
	11	20–25	325	50	340143	OptiStart MP-32RH-25-T2	0,34
	15	24–32	416	50	340144	OptiStart MP-32RH-32-T2	0,34
	18,5	30–40	520	20	357845	OptiStart MP-32RH-40-T2	0,34
	22	34–50	650	50	348546	OptiStart MP-63R-50-T2	1
	30	45–63	819	50	348544	OptiStart MP-63R-63-T2	1
	37	55–75	975	50	348547	OptiStart MP-100R-75-T2	2,2
	45	70–90	1170	50	348537	OptiStart MP-100R-90-T2	2,2
	55	80–100	1300	50	348538	OptiStart MP-100R-100-T2	2,2

Motor protection circuit breakers with short-circuit protection only

Appearance	Motor rated power (400 V), kW [1]	Rated current, A	Electromagnetic release setpoint, A [3]	Breaking capacity Icu at 400 V AC, kA	Code	Product name	Weight, kg
	0,03	0,16	2,08	100	340147	OptiStart MP-32RHI-0,16-T2	0,28
	0,06	0,25	3,25	100	340148	OptiStart MP-32RHI-0,25-T2	0,28
	0,09	0,4	5,2	100	340149	OptiStart MP-32RHI-0,4-T2	0,28
	0,18	0,63	8,2	100	340150	OptiStart MP-32RHI-0,63-T2	0,28
	0,25	1	13	100	340151	OptiStart MP-32RHI-1-T2	0,28
	0,55	1,6	20,8	100	340152	OptiStart MP-32RHI-1,6-T2	0,28
	0,75	2,5	32,5	100	340156	OptiStart MP-32RHI-2,5-T2	0,28
	1,5	4	52	100	340160	OptiStart MP-32RHI-4-T2	0,34
	3	6,5	84,5	100	340161	OptiStart MP-32RHI-6,5-T2	0,34
	4	10	130	100	340153	OptiStart MP-32RHI-10-T2	0,34
	5,5	14	182	100	340154	OptiStart MP-32RHI-14-T2	0,34
	7,5	18	234	100	340155	OptiStart MP-32RHI-18-T2	0,34
	11	23	299	50	340157	OptiStart MP-32RHI-23-T2	0,34
	11	25	325	50	340158	OptiStart MP-32RHI-25-T2	0,34
	15	32	416	50	340159	OptiStart MP-32RHI-32-T2	0,34
	18,5	40	520	20	357846	OptiStart MP-32RHI-40-T2	0,34

Notes:
[1] The rated motor power values are provided for reference only and may vary depending on the motor manufacturer and number of poles.
[2] Motor protection circuit breakers should be selected so that the actual motor current is within the setpoint range; however, when several circuit breakers are operated simultaneously and installed close to each other, the controller setpoint should be 15% higher than the rated motor current.
[3] The time-current characteristics are provided in the Operation Manual.

Technical specification

Circuit breaker type			MP-32RH, MP-32RHI	MP-63R	MP-100R
Number of poles			3		
Rated current In, max, A			40	63	100
Ambient temperature					
Storage and transportation, °C			-50...+80		
Operation, °C			-20...+60 [1]		
Rated insulation voltage Ui, V			690	1000	
Rated pulse withstand voltage Uimp, kV			6	8	
Rated operating voltage Ue, V			690		
Rated frequency, Hz			50/60		
Overcurrent release operating current setpoint Ii, A			13In ±20 % [2]		
Utilization category	GOST R 50030.2-2010		A		
	GOST IEC 60947-4-1-2021		AC-3		
Overcurrent release trip class as per GOST IEC 60947-4-1-2021 [3]			10A	10	
Ambient temperature compensation			Yes		
Open-phase protection as per GOST IEC 60947-4-1-2021			Yes		
Dissipation power by one breaker pole depending on In, W		0,16-1,6	2,3	–	
		2,5-26	2,8	–	
		32	4,4	–	
		50-63	-	9,7	–
		75-100	–	–	17,8
Protection degree in accordance with GOST 14254-2015			IP20	IP20 from the front side	
Wear resistance, cycles	mechanical		100000	50000	
	switching		100000	25000	
Maximum number of activations per hour in utilization category AC-3			25		
Conductors connection to control circuit					
Conductor cross-section, mm²	multi-core with no terminal		1x1...10	1x1...35	1x2,5...70
	single-core with no terminal		2x1...6	2x1...25	2x2,5...50
	multi-core with terminal		2x1...6	1x1...25 2x1...16	1x2,5...50 2x2,5...35
Stripped insulation length, mm			10	13	17
Screw tightening torque, N·m			0,8...2	3...4,5	4...6
Tool			Отвертка с профилем Philips №2		⎔ 4 мм

[1] When installing several circuit breakers with simultaneous operation next to each other, the regulator setpoint shall be 15% higher than the rated motor current.
[2] Overcurrent release operating current setpoint 10In ±20% for circuit breakers with an overload current release setpoint of 0.1...0.16 A and 0.16...0.25.
[3] Breaking current of overcurrent releases 125 %.

Rated ultimate short-circuit maximum breaking capacity Icu, rated operating short-circuit maximum breaking capacity Ics

Setpoint range, A	Rated current, In, A	230 V		400 V		690 V	
		Icu, kA	Ics, kA	Icu, kA	Ics, kA	Icu, kA	Ics, kA
Breaker type MP-32RH, MP-32RHI							
0,1-0,16	0,16	100	100	100	100	100	100
0,16-0,25	0,25	100	100	100	100	100	100
0,25-0,4	0,4	100	100	100	100	100	100
0,4-0,63	0,63	100	100	100	100	100	100
0,63-1	1	100	100	100	100	100	100
1-1,6	1,6	100	100	100	100	100	100
1,6-2,5	2,5	100	100	100	100	10	10
2,5-4	4	100	100	100	100	10	10
4-6,5	6,5	100	100	100	100	4	2
6,3-10	10	100	100	100	100	4	2
9-14	14	100	100	100	100	4	2
13-18	18	100	100	100	100	4	2
17-23	23	100	100	50	25	4	2
20-25	25	100	100	50	25	4	2
24-32	32	100	100	50	25	4	2
Breaker type MP-63R							
34-50	50	100	100	50	50	5	5
45-63	63	100	100	50	50	5	5
Breaker type MP-100R							
55-75	75	100	100	50	38	5	4
70-90	90	100	100	50	38	5	4
80-100	100	100	100	50	38	5	4

Technical information

OptiStart K series switch and contactor combination for type 1 and 2 coordination

Type 1 coordination. In case of short circuit, the contactor and thermal relay damage is possible, which may render them unsuitable for further operation without repair and parts replacement. However, these devices should not pose a danger to people and equipment, for example, due to starter parts flying out of the enclosure.

Rated voltage: 400 V AC
Conditional short-circuit current: 50 kA

Rated motor power, kW	Rated motor current [1] at 400 V, A	Circuit breaker model	Contactor model	Current adjustment range of thermal release, A
0,06	0,2	OptiStart MP-32RH-0,25-T2	OptiStart K-F-09-...	0,16...0,25
0,09	0,3	OptiStart MP-32RH-0,4-T2	OptiStart K-F-09-...	0,25...0,4
0,12	0,44	OptiStart MP-32RH-0,63-T2	OptiStart K-F-09-...	0,4...0,63
0,18	0,6	OptiStart MP-32RH-0,63-T2	OptiStart K-F-09-...	0,4...0,63
0,25	0,85	OptiStart MP-32RH-1-T2	OptiStart K-F-09-...	0,63...1
0,37	1,1	OptiStart MP-32RH-1,6-T2	OptiStart K-F-09-...	1...1,6
0,55	1,5	OptiStart MP-32RH-1,6-T2	OptiStart K-F-09-...	1...1,6
0,75	1,9	OptiStart MP-32RH-2,5-T2	OptiStart K-F-09-...	1,6...2,5
1,1	2,7	OptiStart MP-32RH-4-T2	OptiStart K-F-09-...	2,5...4
1,5	3,6	OptiStart MP-32RH-4-T2	OptiStart K-F-09-...	2,5...4
2,2	4,9	OptiStart MP-32RH-6,5-T2	OptiStart K-F-09-...	4...6,5
3	6,5	OptiStart MP-32RH-10-T2	OptiStart K-F-09-...	6,3...10
4	8,5	OptiStart MP-32RH-10-T2	OptiStart K-F-09-...	6,3...10
5,5	11,5	OptiStart MP-32RH-14-T2	OptiStart K-F-12-...	9...14
7,5	15,5	OptiStart MP-32RH-18-T2	OptiStart K-F-18-...	13...18
11	22	OptiStart MP-32RH-23-T2	OptiStart K-F-25-...	17...23
15	29	OptiStart MP-32RH-32-T2	OptiStart K-F-32-...	24...32
18,5	35	OptiStart MP-63R-50-T2	OptiStart K-F-38-...	34...50
22	41	OptiStart MP-63R-50-T2	OptiStart K-F-50-...	34...50
30	55	OptiStart MP-63R-63-T2	OptiStart K-F-65-...	45...63
37	66	OptiStart MP-100R-75-T2	OptiStart K-F-80-...	55...75
45	80	OptiStart MP-100R-90-T2	OptiStart K-F-94-...	70...90
55	97	OptiStart MP-100R-100-T2	OptiStart K-F-115-...	80...100

Coordination type 2. In short circuit conditions, welding of contacts is permitted, provided that they are easily disconnected (e.g. by a screwdriver) without noticeable deformation. The contactor and thermal relay should not pose a danger to people and equipment and should remain suitable for further operation after recovery of normal conditions.

Rated voltage: 400 V AC
Conditional short-circuit current: 50 kA

Rated motor power, kW	Rated motor current [1] at 400 V, A	Circuit breaker model	Contactor model	Current adjustment range of thermal release, A
0,06	0,2	OptiStart MP-32RH-0,25-T2	OptiStart K-F-09-...	0,16...0,25
0,09	0,3	OptiStart MP-32RH-0,4-T2	OptiStart K-F-09-...	0,25...0,4
0,12	0,44	OptiStart MP-32RH-0,63-T2	OptiStart K-F-09-...	0,4...0,63
0,18	0,6	OptiStart MP-32RH-0,63-T2	OptiStart K-F-09-...	0,4...0,63
0,25	0,85	OptiStart MP-32RH-1-T2	OptiStart K-F-09-...	0,63...1
0,37	1,1	OptiStart MP-32RH-1,6-T2	OptiStart K-F-09-...	1...1,6
0,55	1,5	OptiStart MP-32RH-1,6-T2	OptiStart K-F-09-...	1...1,6
0,75	1,9	OptiStart MP-32RH-2,5-T2	OptiStart K-F-09-...	1,6...2,5
1,1	2,7	OptiStart MP-32RH-4-T2	OptiStart K-F-09-...	2,5...4
1,5	3,6	OptiStart MP-32RH-4-T2	OptiStart K-F-09-...	2,5...4
2,2	4,9	OptiStart MP-32RH-6,5-T2	OptiStart K-F-09-...	4...6,5
3	6,5	OptiStart MP-32RH-10-T2	OptiStart K-F-09-...	6,3...10
4	8,5	OptiStart MP-32RH-10-T2	OptiStart K-F-09-...	6,3...10
5,5	11,5	OptiStart MP-32RH-14-T2	OptiStart K-F-26-...	9...14
7,5	15,5	OptiStart MP-32RH-18-T2	OptiStart K-F-26-...	13...18
11	22	OptiStart MP-32RH-23-T2	OptiStart K-F-26-...	17...23
15	29	OptiStart MP-32RH-32-T2	OptiStart K-F-32-...	24...32
18,5	35	OptiStart MP-63R-50-T2	OptiStart K-F-38-...	34...50
22	41	OptiStart MP-63R-50-T2	OptiStart K-F-50-...	34...50
30	55	OptiStart MP-63R-63-T2	OptiStart K-F-65-...	45...63
37	66	OptiStart MP-100R-75-T2	OptiStart K-F-80-...	55...75
45	80	OptiStart MP-100R-90-T2	OptiStart K-F-80-...	70...90
55	97	OptiStart MP-100R-100-T2	OptiStart K-F-115-...	80...100

[1] The motor rated currents are provided for reference only and may vary depending on the motor manufacturer and number of poles.

Accessories

Auxiliary contacts

Appearance	Compatible devices	Mounting method	Contacts NO	Contacts NC	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	Frontal (transverse)	1	1	OptiStart MP-HQ11-T2	340185	0,04
			2	0	OptiStart MP-HQ20-T2	340186	0,04
		Side, left	0	2	OptiStart MP-HS02-T2	340187	0,02
			1	1	OptiStart MP-HS11-T2	340188	0,02
			2	0	OptiStart MP-HS20-T2	340189	0,02
	MP-63R-...-T2 MP-100R-...-T2	Frontal (transverse)	0	2	OptiStart MP-HQ02-63/100-T2	348543	0,02
			1	1	OptiStart MP-HQ11-63/100-T2	348574	0,02
			2	0	OptiStart MP-HQ20-63/100-T2	348575	0,02
		Side, left	0	2	OptiStart MP-HS02-63/100-T2	348576	0,04
			1	1	OptiStart MP-HS11-63/100-T2	348577	0,04
			2	0	OptiStart MP-HS20-63/100-T2	348580	0,04

Signal contacts

Appearance	Compatible devices	Mounting method	Tripping condition	Contacts NO	Contacts NC	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	Side, left	Any disabling	1	1	OptiStart MP-MA11-T2	340191	0,04
			At short circuit only	1	1	OptiStart MP-M11-T2	340190	0,04
	MP-63R-...-T2		Any disabling	1	1	OptiStart MP-MA11-63/100-T2	348545	0,04

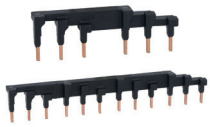
Undervoltage release

Appearance	Compatible devices	Mounting method	Rated voltage, V, 50 Hz	Contacts	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	Side, right	24	-	OptiStart MP-U24-T2	340194	0,10
			110-127	-	OptiStart MP-U110-T2	340192	0,10
			220-230	-	OptiStart MP-U230-T2	340193	0,10
			380-400	-	OptiStart MP-U400-T2	340195	0,10
			24	1 NO with advance tripping	OptiStart MP-UX24-T2	340198	0,10
			110-127		OptiStart MP-UX110-T2	340196	0,10
			220-230		OptiStart MP-UX230-T2	340197	0,10
			380-400		OptiStart MP-UX400-T2	340199	0,10
	MP-63R-...-T2 MP-100R-...-T2		220-230	-	OptiStart MP-U230-63/100-T2	348583	0,13
			380-400	-	OptiStart MP-U400-63/100-T2	348584	0,13

Shunt trip

Appearance	Compatible devices	Mounting method	Rated voltage, V, 50 Hz	Operating voltage	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	Side, right	24	16,8–26,4	OptiStart MP-A24-T2	340183	0,10
			110	77–121	OptiStart MP-A110-T2	340181	0,10
			230	161–253	OptiStart MP-A230-T2	340182	0,10
			400	280–440	OptiStart MP-A400-T2	340184	0,10
	MP-63R-...-T2 MP-100R-...-T2		24	16,8–26,4	OptiStart MP-A24-63/100-T2	348570	0,13
			110	77–121	OptiStart MP-A110-63/100-T2	348571	0,13
			230	161–253	OptiStart MP-A230-63/100-T2	348573	0,13
			400	280–440	OptiStart MP-A400-63/100-T2	348539	0,13

Comb busbars (three-phase busbars)

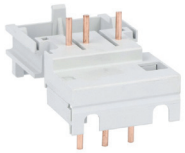
Appearance	Compatible devices	Rated operating current, A	Number of circuit breakers	Possible number of side contacts	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	63	2	0	OptiStart MP-32-S2-T2	340168	0,03
		63	3	0	OptiStart MP-32-S3-T2	340169	0,05
		63	4	0	OptiStart MP-32-S4-T2	340170	0,08
		63	5	0	OptiStart MP-32-S5-T2	340171	0,10
		63	2	1	OptiStart MP-32-S2-54-T2	340172	0,04
		63	3	1	OptiStart MP-32-S3-54-T2	340173	0,06
		63	4	1	OptiStart MP-32-S4-54-T2	340174	0,09
		63	5	1	OptiStart MP-32-S5-54-T2	340175	0,09
		63	Terminal block for connecting the input cable		OptiStart MP-32-ST-T2	357847	0,05
		-	Protective cover for unused pins		OptiStart MP-32-SF-T2	340176	0,01

Door-mounted rotary mechanism (extended handle)

Appearance	Compatible devices	Type	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	Black extended handle with 200 mm stem	OptiStart MP-32R-EH1-200-T2	340165	0,15
		Yellow-red extended handle with 200 mm stem	OptiStart MP-32R-EHN1-200-T2	340164	0,15
		Stem holder	OptiStart MP-32R-EN-T2	349886	0,03
	MP-63R-...-T2 MP-100R-...-T2	Black extended handle with 200 mm stem	OptiStart MP-63/100-EH1-200	345667	0,12

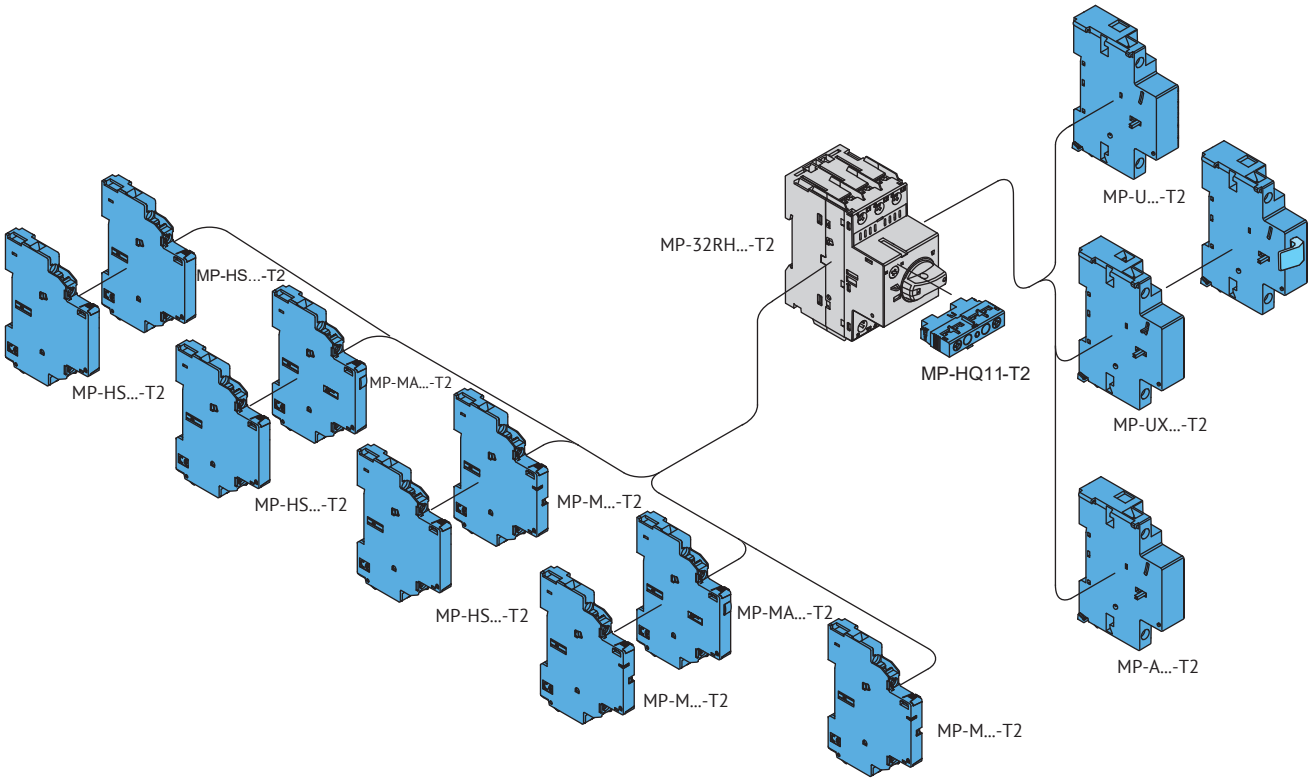
Appearance	Compatible devices	Type	Product name	Code	Weight, kg
	MP-63R-...-T2 MP-100R-...-T2	Yellow-red extended handle with 200 mm stem	OptiStart MP-63/100-EHN1-200	345666	0,12

Другие аксессуары

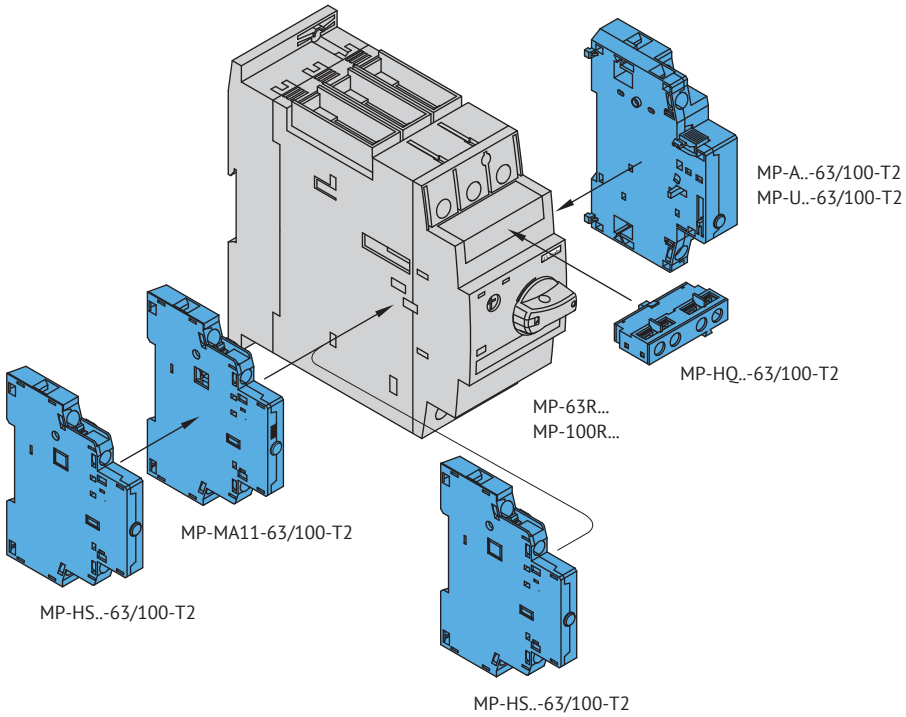
Appearance	Compatible devices	Type	Product name	Code	Weight, kg
	MP-32RH-...-T2 MP-32RHI-...-T2	Connection module with OptiStart K-F-09...25 contactor with AC coil	OptiStart MP-32-KF25A-T2	340178	0,04
		Connection module with OptiStart K-F-09...25 contactor with DC coil	OptiStart MP-32-KF25D-T2	340179	0,05
		Connection module with OptiStart K-F-26...38 contactor with AC coil	OptiStart MP-32-KF38A-T2	340180	0,05
		Connection module with OptiStart K-M mini-contactor	OptiStart MP-32-KM-T2	340177	0,02
		Enclosure for circuit breaker with black handle	OptiStart MP-32R-PFH4-T2	340166	0,25
		Enclosure for circuit breaker with yellow-red handle	OptiStart MP-32R-PFHN4-T2	340167	0,35
		Bracket for screw fixing on mounting plate	OptiStart MP-32-L-T2	340163	0,01

Delivery package

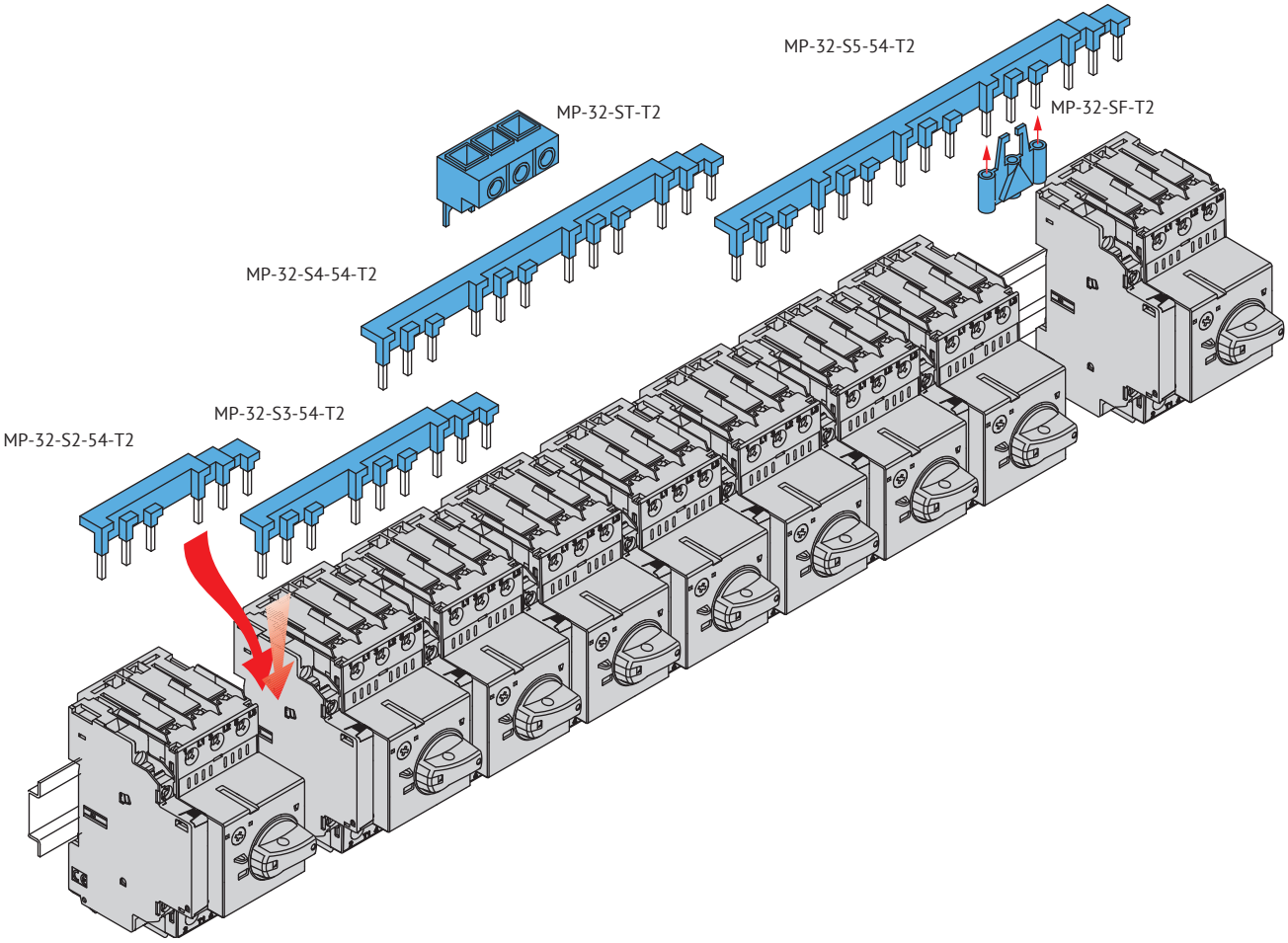
Installation and maximum combination of auxiliary and signaling contact units, undervoltage releases and shunt trips on MP-32RH...-T2 and MP-32RHI...-T2 circuit breakers



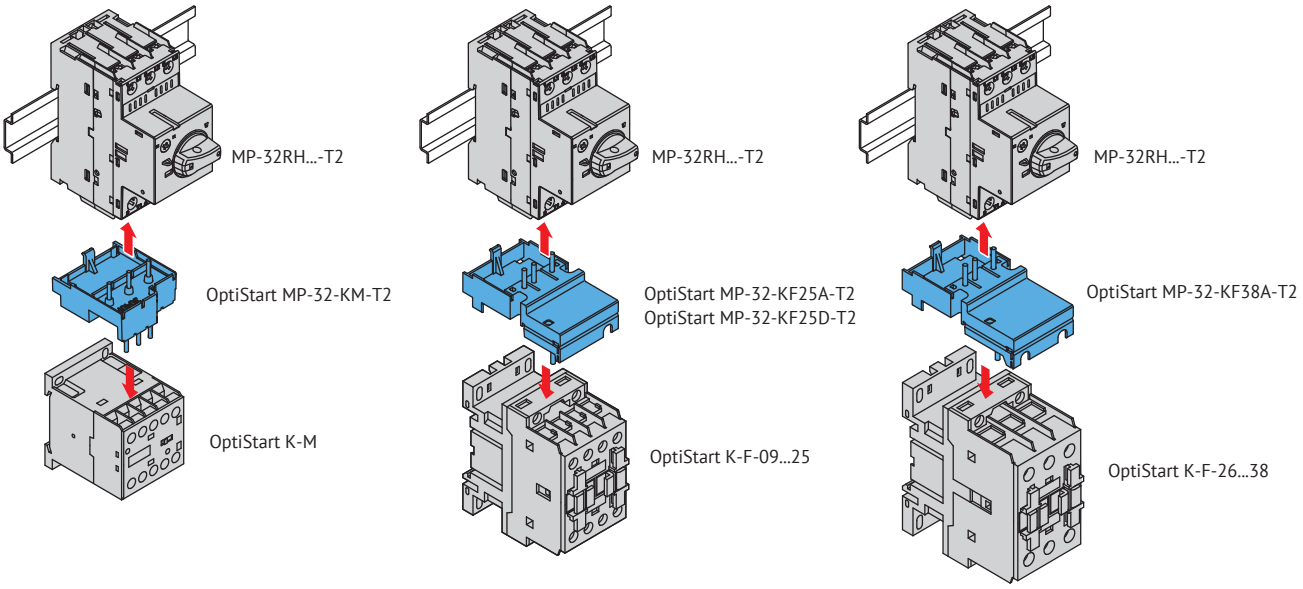
Installation and maximum combination of auxiliary and signaling contact units, undervoltage releases and shunt trips on MP-63R...-T2 and MP-100R...-T2 circuit breakers



Installation diagrams for three-phase busbars (comb busbars) for parallel connection of circuit breakers



Connection modules for compact assembly of circuit breakers with series OptiStart K contactors



Casing with protection degree IP65 for separate installation of MP-32RH...-T2 and MP-32RHI...-T2 circuit breakers and their maximum configuration

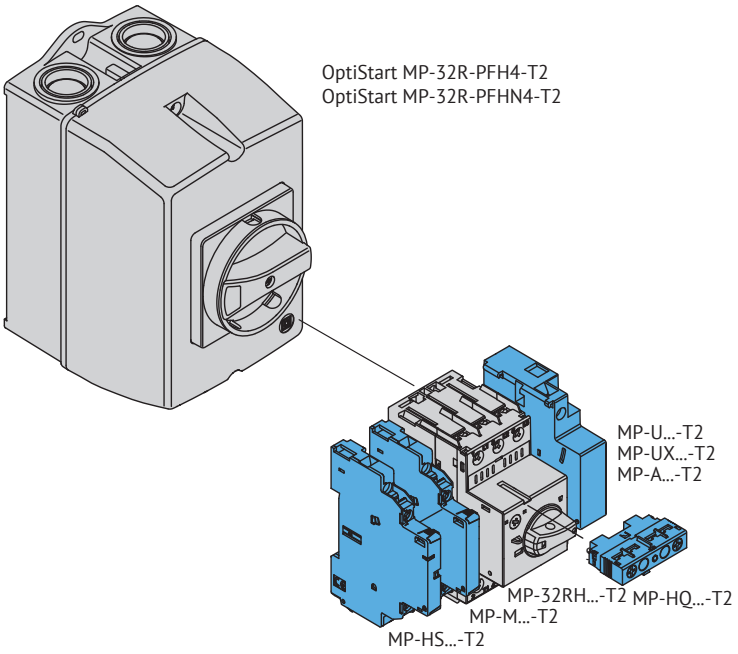


Diagram of the door-mounted rotary mechanism (extended handle), designed to control MP-32RH...-T2 and MP-32RHI...-T2 circuit breakers installed in enclosure or distribution cabinet

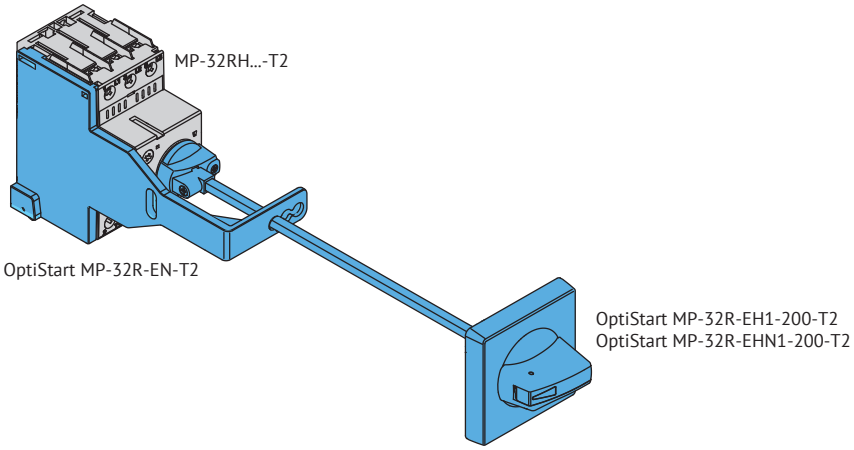
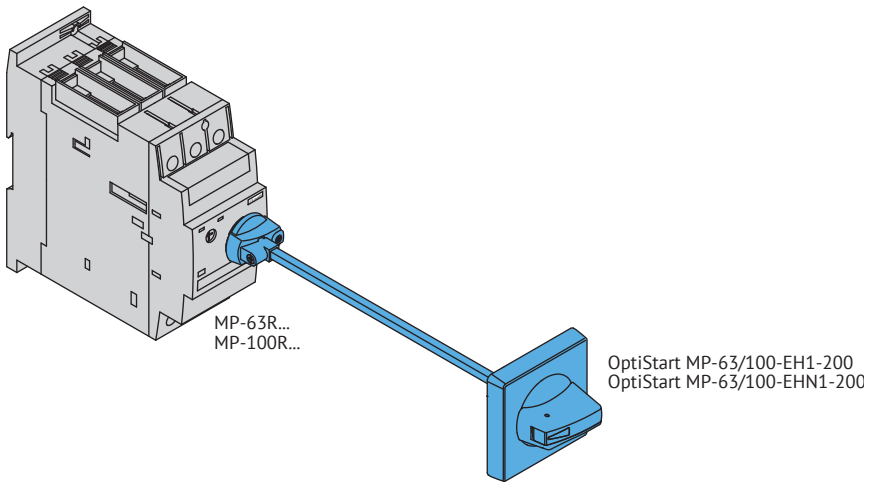
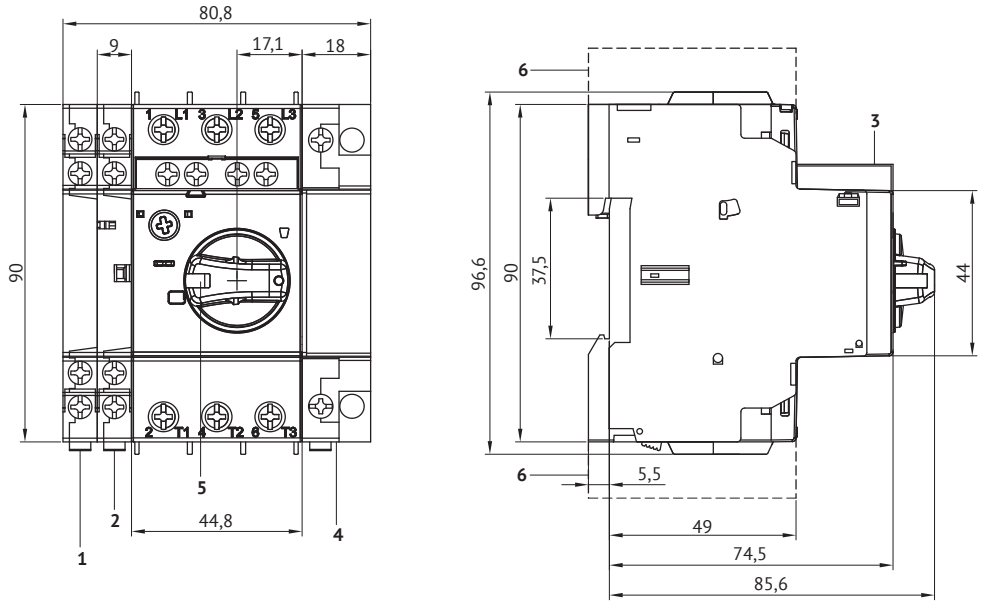


Diagram of the door-mounted rotary mechanism (extended handle) designed to control MP-63R...-T2 and MP-100R...-T2 circuit breakers installed in enclosure or distribution cabinet



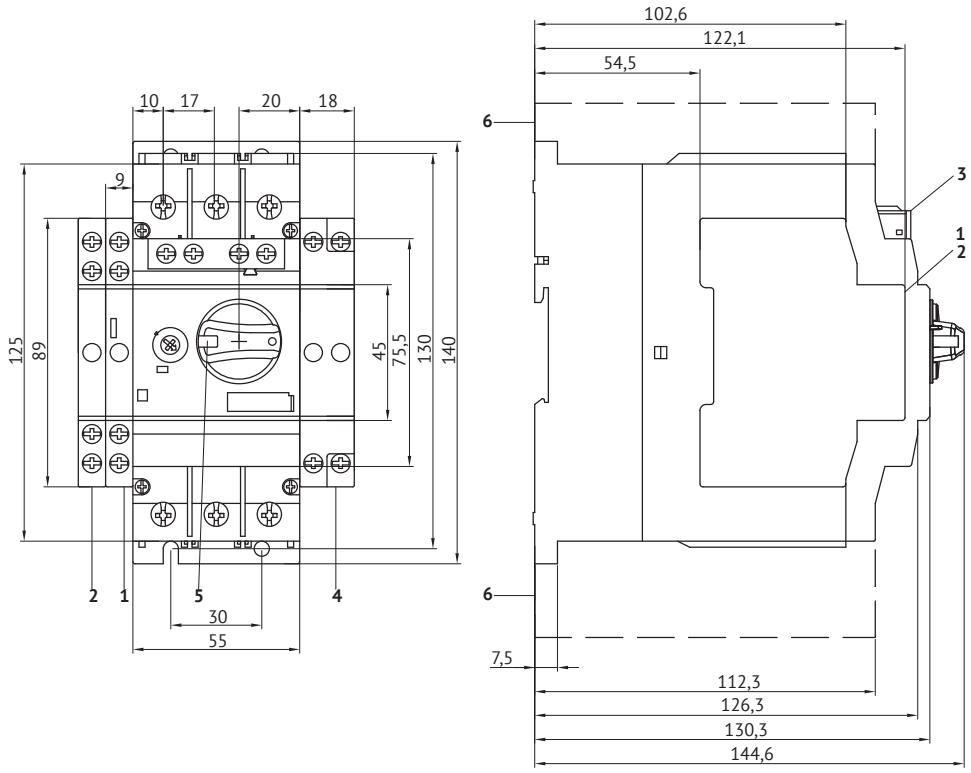
Overall dimensions (mm)

Circuit breakers MP-32RH...-T2 and MP-32RHI...-T2



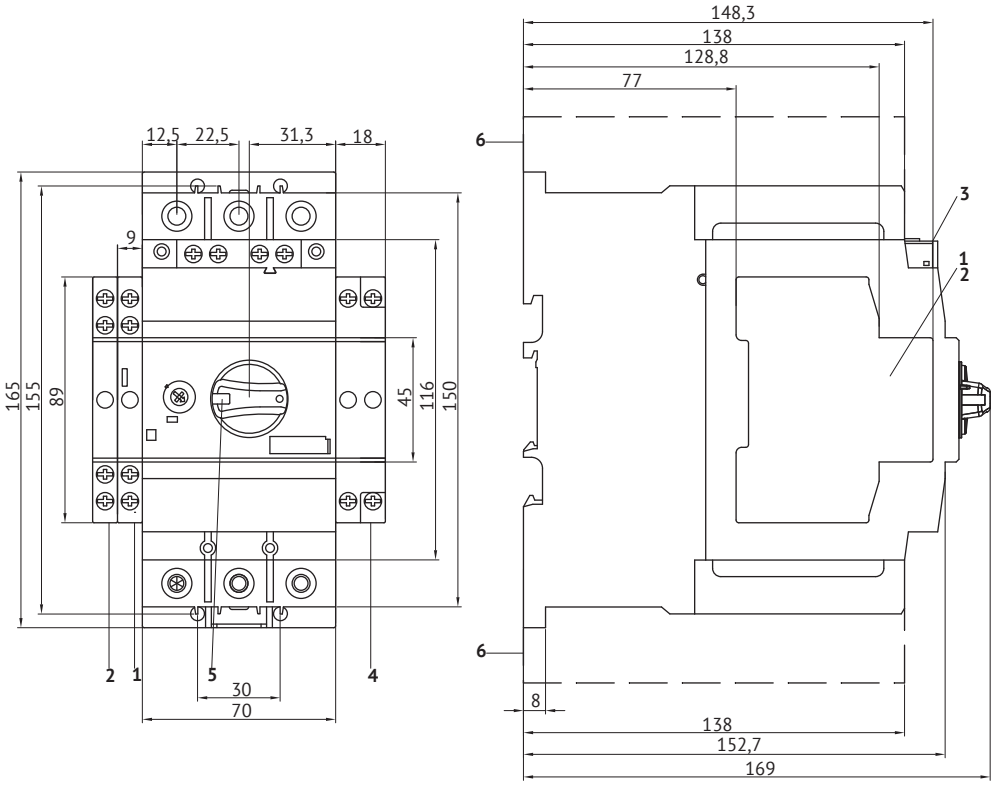
1 — side auxiliary contact MP-HS...-T2;
2 — signal contact MP-M11-T2, MP-MA11-T2;
3 — transverse (front) auxiliary contact MP-HQ...-T2;
4 — shunt trip MP-A...-T2, undervoltage release MP-U...-T2 or MP-UX...-T2;
5— handle lock in «off» position (Ø5 mm).

Circuit breakers MP-63R...-T2



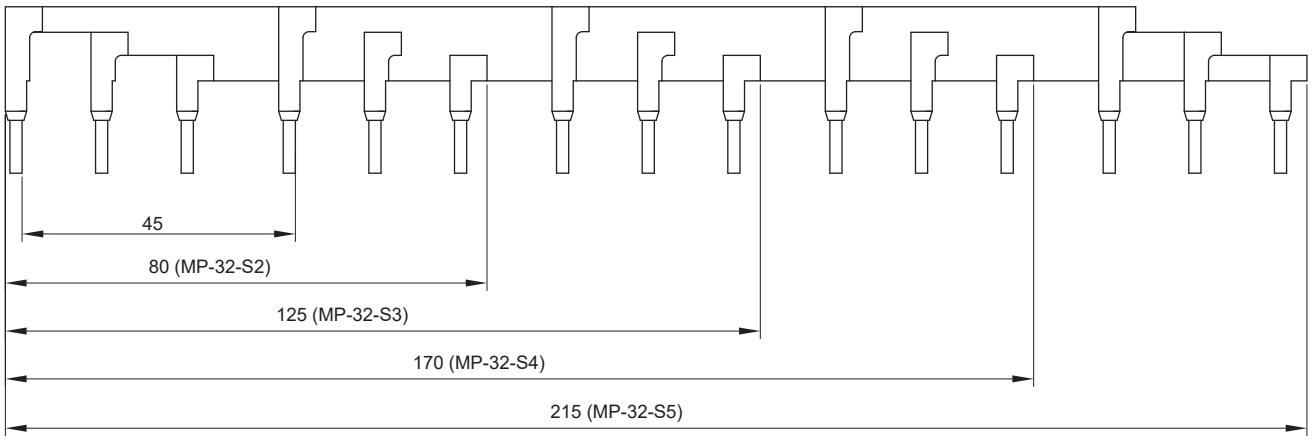
1 — Signal contact MP-MA11-63/100-T2
2 — Side auxiliary contact MP-HS...-T2
3 — Transverse (front) auxiliary contact MP-HQ-...-63/100-T2
4 — shunt trip MP-A..., undervoltage release MP-U...-T2;
5— handle lock in «off» position (Ø5 mm).

Circuit breakers MP-100R...-T2

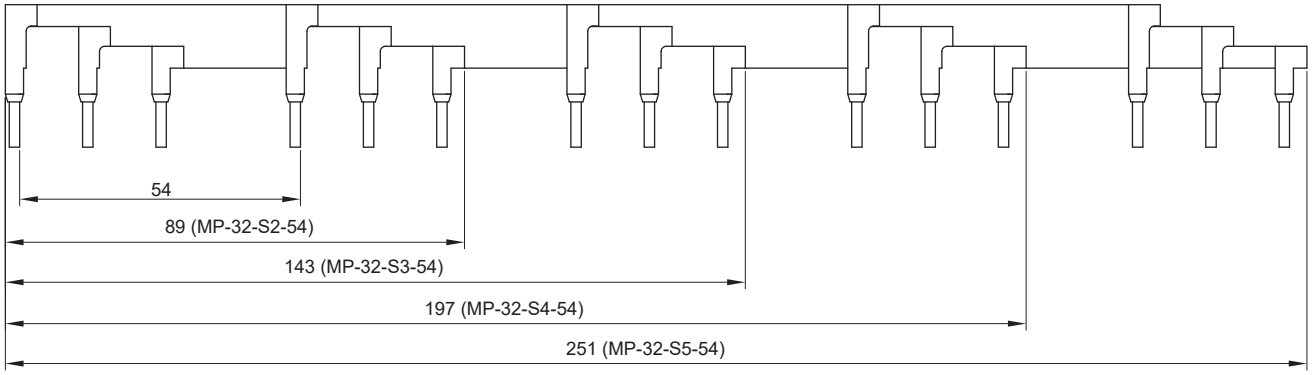


1 — Signal contact MP-MA11-63/100-T2
2 — Side auxiliary contact MP-HS...-T2
3 — Transverse (front) auxiliary contact MP-HQ-...-63/100-T2
4 — Shunt trip MP-A..., undervoltage release MP-U...-T2
5 — Handle lock in the «off» position (Ø5 mm)

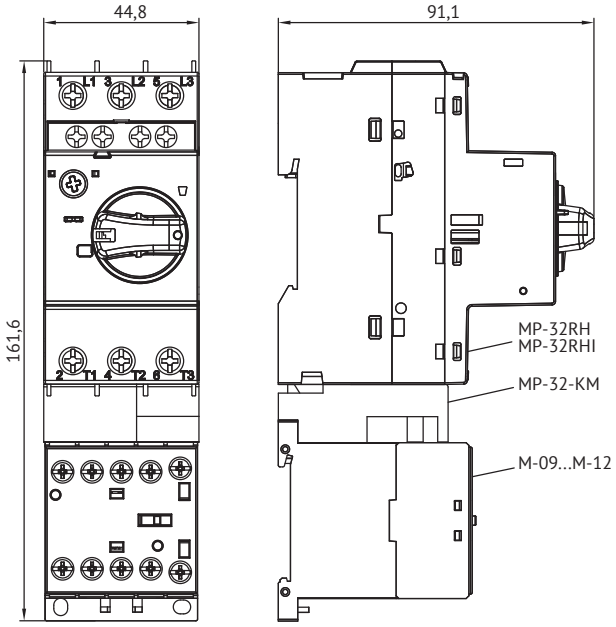
Three-phase insulated busbars MP-32-S...-T2



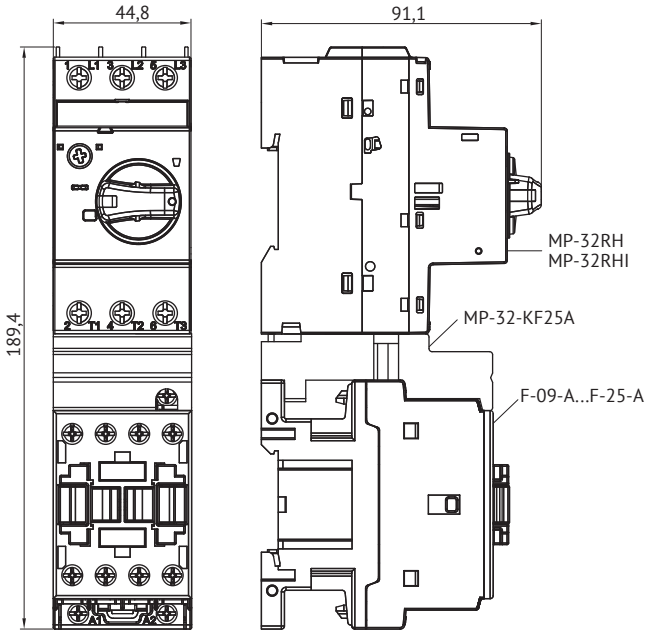
Three-phase insulated busbars MP-32-S...-54



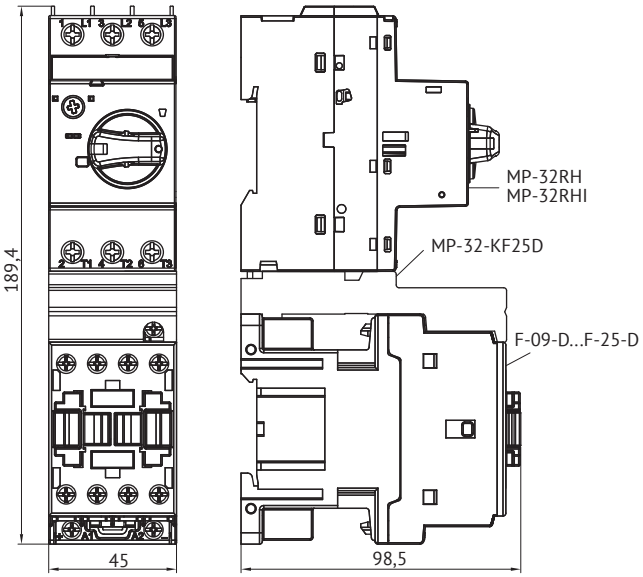
Assembly MP-32RH(I)...-T2 + MP-32-KM-T2 + M-09...M-12



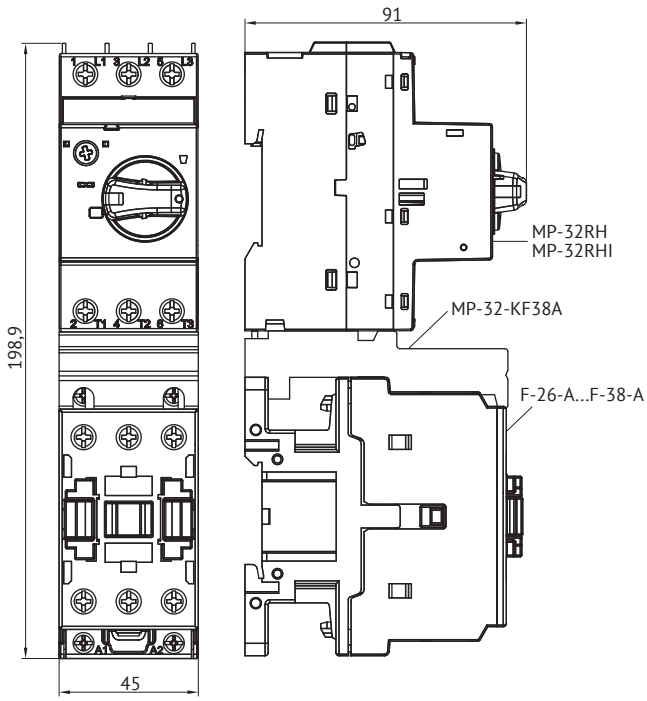
Assembly MP-32RH(I)...-T2 + MP-32-KF25A-T2 + F-09-A...F-25-A



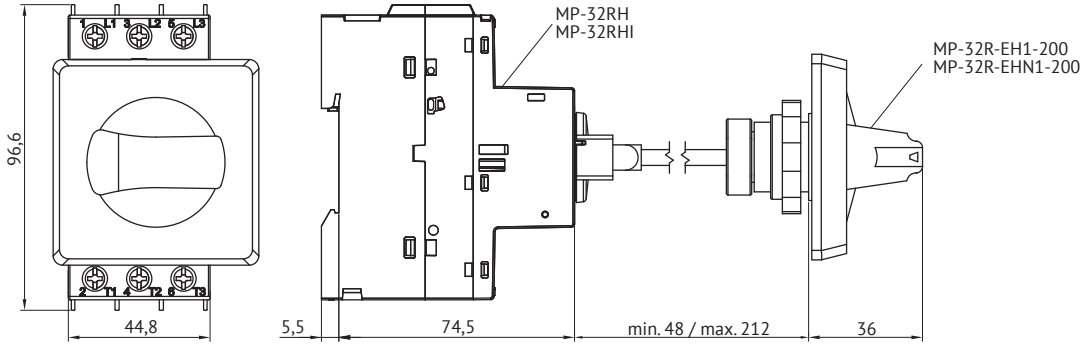
Assembly MP-32RH(I)...-T2 + MP-32-KF25A-T2 + F-09-D...F-25-D

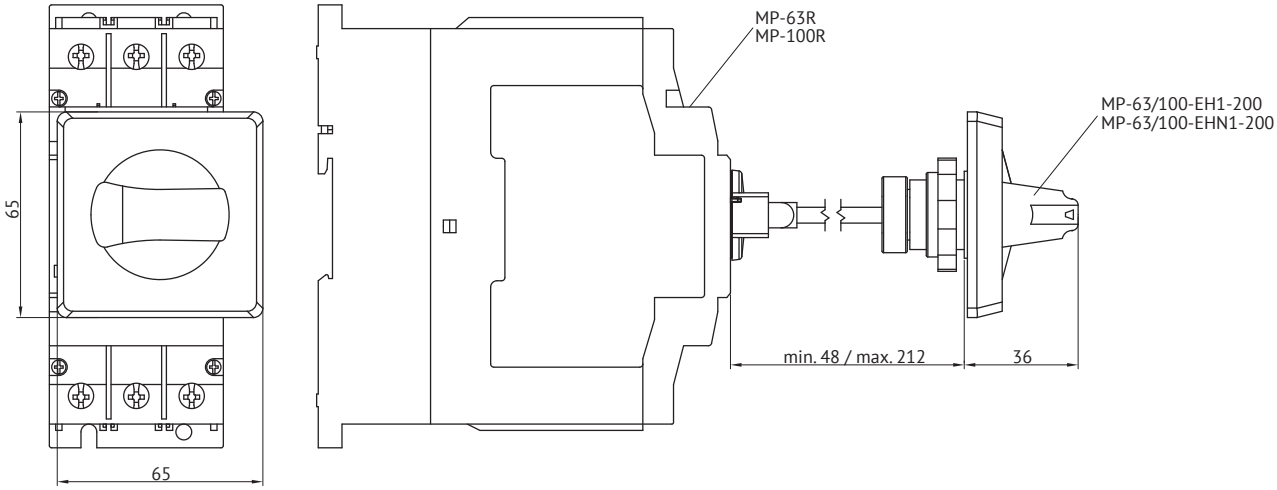


Assembly MP-32RH(I)...-T2 + MP-32-KF38A-T2 + F-26-A...F-38-A

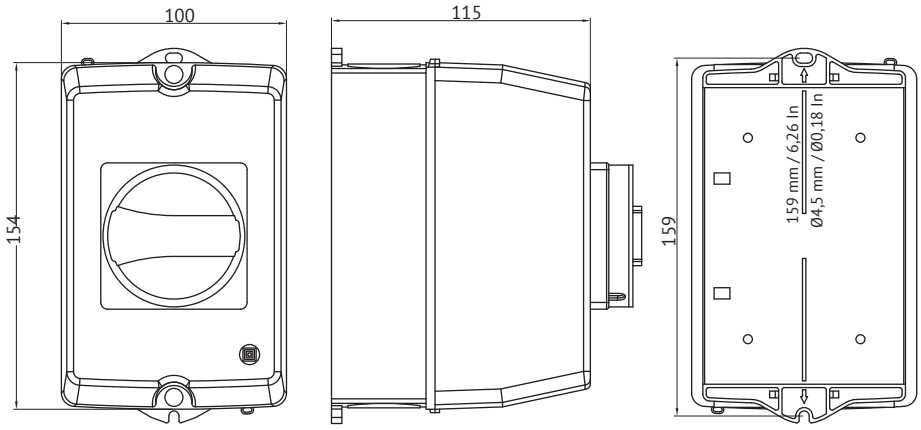


Door-mounted rotary mechanism MP-32R-EH(N)1-200-T2 and OptiStart MP-63/100-EH(N)1-200

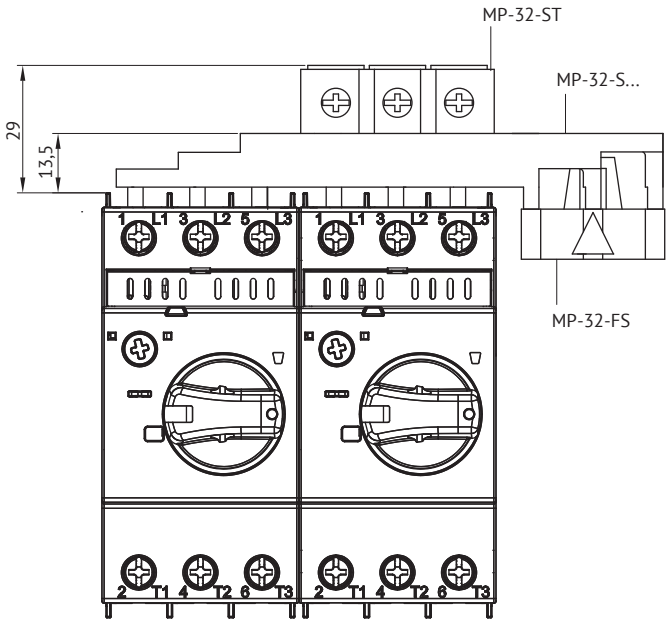


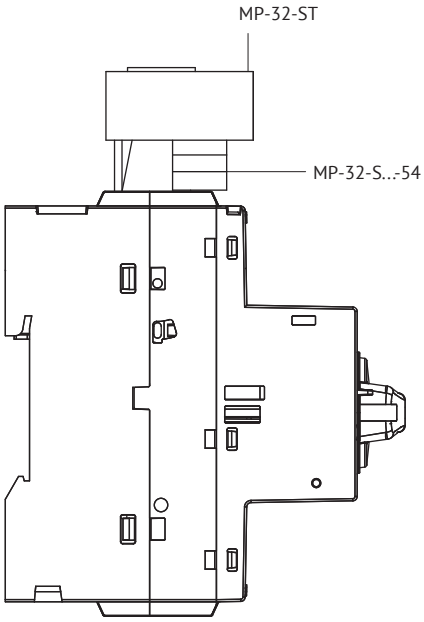


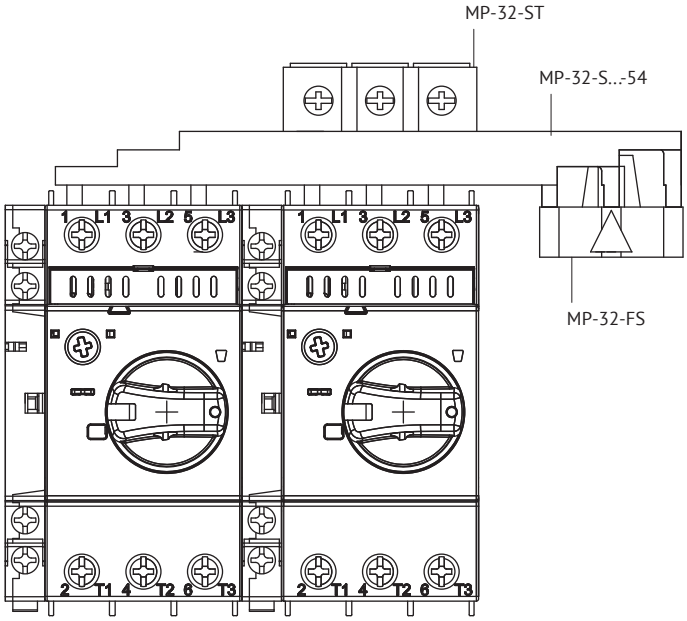
Enclosure OptiStart MP-32R-PFH(N)4-T2

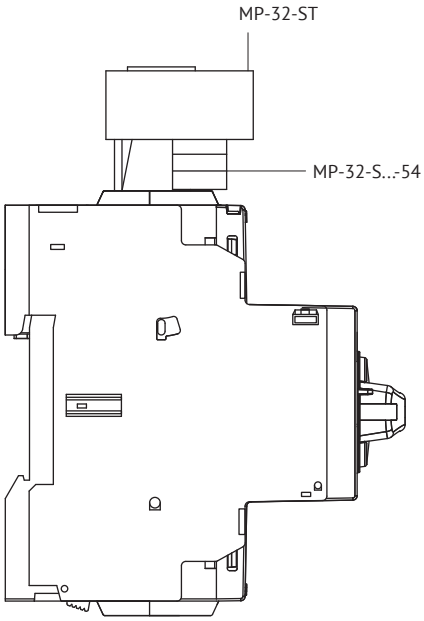


Terminal block MP-32-ST and other mounting accessories



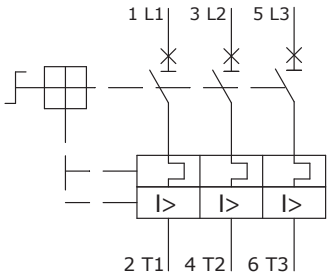




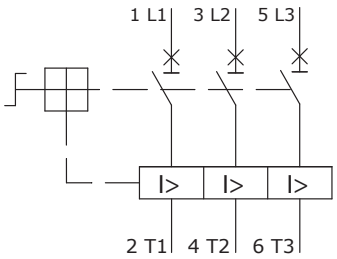


Circuit diagrams

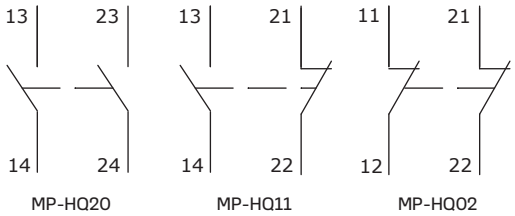
Circuit breakers MP-32RH...-T2, MP-63R...-T2 and MP-100R...-T2



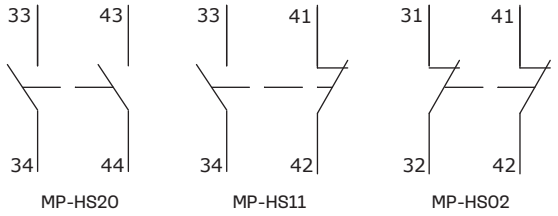
Circuit breakers MP-32RHI...-T2



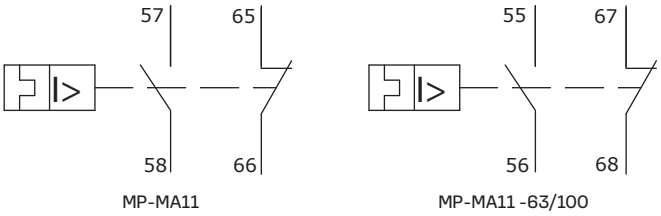
Transverse (front) auxiliary contact units MP-HQ...-T2



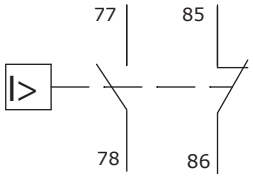
Side auxiliary contact units MP-HS...-T2



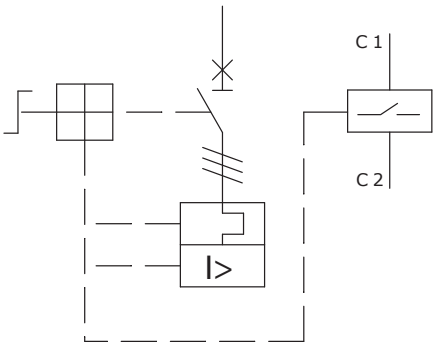
Side auxiliary contact units MP-MA11...-T2



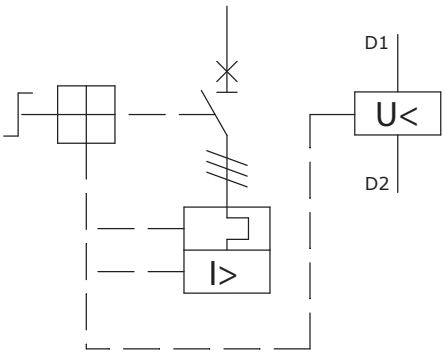
Side signal contact units MP-M11...-T2



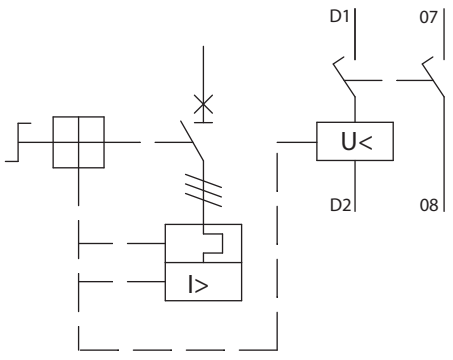
Shunt trip MP-A...-T2



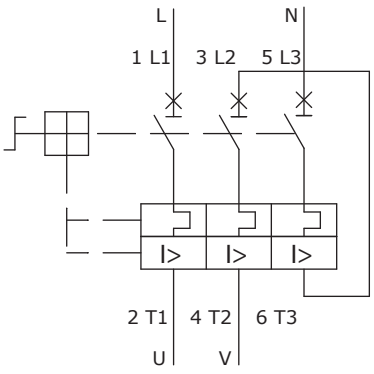
Undervoltage release MP-U...-T2



Undervoltage release MP-UX...-T2



Series connection of poles for single-phase motor connection



OptiStart K
↗ Contactors

The new contactor series OptiStart K is represented by the most modern solutions for electric motors control. The range includes both classic solutions with an AC, DC or AC/DC control coil, and modern OptiStart K-AF contactors with an electronic control coil power supply system, which feature numerous advantages compared to traditional solutions and fully meet all requirements of the modern market.
The range of the updated series is represented by OptiStart K-F electromagnetic block contactors designed for currents from 9 to 630 A AC-3 (1600 A AC-1), available in both three-pole and four-pole versions, OptiStart K-AF contactors with an electronic control coil power supply system, OptiStart K-M mini-contactors for currents up to 12 A (20 A AC-1), OptiStart K-FR contactor relays, OptiStart K-MR mini-contactor relays, as well as solutions for switching capacitor banks and DC circuits.
All product lines and versions include a wide range of accessories aimed at obtaining the required configuration and precise matching the customer's Terms of Reference.

Three-pole contactors

– I_{th} (AC-1 at ≤40 °C): 16 to 1600 A;
– I_e (AC-3 440 V): от 6 до 630 A;
– P_{rated} (AC-3 440 В): от 2,2 до 335 kW;
– AC, DC, AC/DC control coil or electronically-controlled AC/DC coil;
– reduced power consumption and built-in surge arrester versions;
– wide range of accessories with quick snap-on installation.

Four-pole contactors

– I_{th} (AC-1 at ≤40 °C): 25 to 1600 A;
– P_{rated} (AC-1 400 V): 14 to 950 kW;
– 4 NO or 2 NO + 2 NC or 4 NC design;
– AC, DC, AC/DC control coil or electronically-controlled AC/DC coil;
– reduced power consumption and built-in surge arrester versions;
– wide range of accessories with quick snap-on installation.

Capacitor contactors

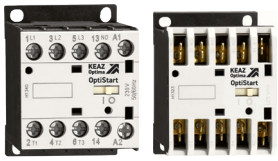
- current-limiting resistors included;
- Q_{rated} (400 V): 7.5 to 100 kVAr;
- AC control coil.

DC switching contactors

- with permanent magnet installed for arc control;
- I_e (DC1, 600 V at ≤55 °C): up to 350 A;
- AC control coil or electronically-controlled AC/DC coil.

Contactor relays

- for switching and galvanic isolation of low-current circuits and control circuits;
- up to 11 contacts with various NO and NC combinations;
- AC or DC control coil;
- reduced power consumption and built-in surge arrester versions.



Mini-contactors and mini-contactor relays

– I_{th} (AC-1 at ≤40 °C): 16 to 20 A;
– I_e (AC-3 440 V): 6 to 12 A;
– P_{rated} (AC-3 440 V): 2,5 to 5,5 kW;
– AC or DC control coil;
– reduced power consumption versions;
– three- and four-pole designs with various pole combinations;
– versions with screw terminals, faston terminals and solder pins;
– four-pole mini-contactors for switching and galvanic isolation of low-current circuits and control circuits.

Designation

Series F contactors

OptiStart K - AF - 150 - 30 - 00 - E 230

1 2 3 4 5 6 7 8

1	Group	OptiStart — Motor control and protection equipment					
2	Series	K — Contactors					
3	Version	**AF** — Contactor with electronically-controlled coil and wide AC/DC supply voltage range **F** — Standard version **FD** — DC circuit switching contactor **FK** — Capacitor switching contactor					
4	Rated current, A	The rated current is specified for utilization category AC-3 at a rated voltage of 400 V. For models F-1000, F-1250 and F-1600, the rated current is specified for utilization category AC-1.					
5	Number of power poles	The first digit stands for the number of NO power contacts. The second digit stands for the number of NC power contacts.					
6	Number of built-in auxiliary contacts	The first digit stands for the number of NO auxiliary contacts. The second digit stands for the number of NC auxiliary contacts.					
7	Control coil type and current type	A — AC control coil	D — DC control coil	U — AC/DC control coil	E — AC/DC control coil with a wide supply voltage range and electronic control	Z — DC control coil with reduced power consumption and ability of direct connection to the PLC	
8	Control coil voltage	Rated supply voltage is specified. Information on the operating voltage range and permissible deviations is provided in the «Technical specifications» section.					

Series FR contactor relays

OptiStart K - FR - 31 - A 230

1 2 3 4 5 6

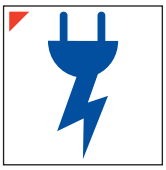
1	Group	OptiStart — Motor control and protection equipment		
2	Series	K — Contactors		
3	Version	FR — Contactor relay		
4	Quantity and type of contacts	The first digit stands for the number of NO contacts. The second digit stands for the number of NC contacts.		
5	Control coil type and current type	A — AC control coil	D — DC control coil	Z — DC control coil with reduced power consumption and ability of direct connection to the PLC
6	Control coil voltage	Rated supply voltage is specified. Information on the operating voltage range and permissible deviations is provided in the «Technical Specifications» section.		

Series advantages

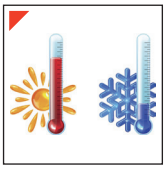
The universal AC/DC coil with a wide voltage range and electronic control in OptiStart K-AF contactors ensures non-stop operation at the unstable supply voltage level and eliminates unscheduled shutdowns during equipment operation due to voltage surges and dips.

The electronic control system continuously monitors the supply voltage, guarantees precise contactor closure or opening and eliminates bounce of power contacts during voltage dips, and also eliminates the alternating current background, which ensures noiseless operation of the contactor and no vibrations.

Power consumption of OptiStart K-AF contactors is decreased down to 90% compared to classic versions, which reduces operating costs and heat dissipation of contactors, which is most demanded in solutions with an increased degree of protection, where installation of ventilation systems is unacceptable.



All OptiStart K-AF contactors, as well as OptiStart K-F with DC control coil, are equipped with a built-in surge arrester, which minimizes the impact of switching overvoltages on other equipment in the control circuit.

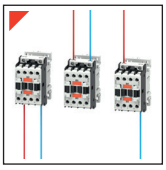


The new contactors series OptiStart K are capable of operating under extreme operating conditions, since the operating temperature range of most versions is from -50 to +70 °C, which allows to use the equipment in the automation solutions without the need for installation of heating or air conditioning systems.

Contactors OptiStart K-F with DC control coils have an extended control circuit voltage range, which allows to use them in the solutions with unstable supply voltage, including in rail transport according to IEC 60077 / EN50155.

Special versions of contactors with control circuit consumption reduced down to 2.4 W make it possible to connect the contactors directly to the outputs of PLCs and other automation solutions without the use of intermediate relays.

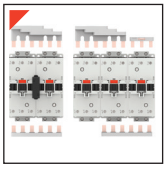
The new generation of contactors is ideal for solutions with limited space, as they have compact dimensions: the width of contactors up to 38 A is 45 mm, up to 95 A — 55 mm, and for currents up to 150 A — only 75 mm.



Contactors for currents up to 150 A are capable of connecting the control coil circuit from both top and bottom, which facilitates the connection process regardless of the conductors location.

Snap-on installation of accessories reduces labor costs and does not require the use of any tools; the process itself takes a few seconds.

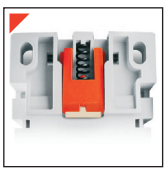
Contactors with rated currents from 40 to 150 A are equipped with double screw terminals to facilitate installation and improve reliability of solutions that require connection of several conductors, for example, to implement reversing assembly.



Implementation of reversing assembly, parallel connection or star-delta motor control solution using connection adapters reduces installation time and eliminates the possibility of errors during connection.

Three-pole contactors for currents from 26 to 150 A can be supplemented with the fourth power pole, which is installed by snapping on and converts a three-pole contactor into the four-pole one.

The range of accessories for interlocking is presented by front and side mounting versions, for mechanical and electromechanical interlocking and also includes versions that are installed between contactors without increasing the overall assembly width.



Installation and removal of contactors on a Din-rail is carried out without the use of tools; the clamps have a special rubber insert that prevents the contactor from moving even when installed on a vertical din-rail.

Selection guide

Three-pole contactors

Appearance	Type	Rated current, A				Maximum power at ≤55 °C (AC-3), kW						
		I_{th} (AC-1)			I_e (AC-3)							
		≤40 °C	≤55 °C	≤70 °C	≤440 V ≤55 °C	230 V	400 V	415 V	440 V	500 V	690 V	1000 V
	F-09-30-01... F-09-30-10...	25	20	18	9	2,2	4,2	4,5	4,8	5,5	7,5	--
	F-12-30-01... F-12-30-10...	28	23	20	12	3,2	5,7	6,2	6,2	7,5	10	--
	F-18-30-01... F-18-30-10...	32	26	23	18	4	7,5	9	9	10	10	--
	F-25-30-01... F-25-30-10...	32	26	23	25	7	12,5	13,4	13,4	15	11	--
	F-26-30-00...	45	36	32	26	7,3	13	14	14	15,6	18,5	--
	F-32-30-00...	56	45	40	32	8,8	16	17	17	20	22	--
	F-38-30-00...	56	45	40	38	11	18,5	18,5	18,5	20	22	--
	F-40-30-00... AF-40-30-00...	70	60	50	40	11	18,5	22	22	22	30	18,5
	F-50-30-00... AF-50-30-00...	90	75	65	50	15	22	30	30	30	37	22
	F-65-30-00... AF-65-30-00...	100	80	70	65	18,5	30	37	37	37	45	30
	F-80-30-00... AF-80-30-00...	115	95	80	80	22	37	45	45	55	55	37
	F-94-30-00... AF-94-30-00...	115	95	80	95	30	45	55	55	55	55	37
	F-95-30-00... AF-95-30-00...	140	115	100	95	30	45	55	55	75	90	45
	F-115-30-00... AF-115-30-00...	160	130	115	115	37	55	55	55	75	110	55
	F-150-30-00... AF-150-30-00...	165	135	118	150	45	75	75	75	90	110	55
	AF-160-30-00...	250	210	180	160	45	75	90	90	110	132	75
	AF-195-30-00...	275	230	200	195	55	90	110	110	132	160	90
	AF-230-30-00...	350	290	250	230	55	110	110	132	132	160	110
	AF-265-30-00...	450	375	325	265	75	132	132	160	160	200	160
	AF-330-30-00...	500	415	360	330	90	160	160	160	200	250	185
	AF-400-30-00...	600	500	435	400	110	200	200	200	250	315	200
	F-500-30-00...	700	550	500	520	156	290	306	328	367	416	312
	F-630-30-00...	800	640	540	630	198	355	368	368	368	440	368
	F-1000-30-00...	1000	850	700	For utilization category AC-1 only							
	F-1250-30-24...	1250	1050	880	For utilization category AC-1 only							
	F-1600-30-24...	1600	1360	1120	For utilization category AC-1 only							

Four-pole contactors

Appearance	Type	Rated current, A				Maximum power at ≤40 °C (AC-1), kW						
		I_{th} (AC1)			I_e (AC3)							
		≤40 °C	≤55 °C	≤70 °C	≤440 V ≤55 °C	230 V	400 V	415 V	440 V	500 V	690 V	1000 V
	F-09-40-00... F-09-22-00...	25	20	18	9	9,5	16	17	18	21	27	–
	F-12-40-00...	28	23	20	12	10	18	19	20	23	32	–
	F-18-40-00... F-18-22-00... F-18-04-00...	32	26	23	18	12	21	22	23	26	36	–
	F-26-40-00... F-26-22-00... F-26-04-00...	45	36	32	26	17	30	31	33	37	51	–
	F-38-40-00... F-38-22-00...	56	45	40	38	21	36	38	40	45	62	–
	F-40-40-00...	70	60	50	40	26	46	48	51	58	79	115
	F-50-40-00...	90	75	65	50	34	59	61	65	74	102	148
	F-65-40-00... AF-65-40-00...	100	80	70	65	38	65	68	72	82	114	165
	F-80-40-00... AF-80-40-00... F-80-22-00... AF-80-22-00...	115	95	80	80	43	76	79	83	95	120	185
	F-95-40-00... AF-95-40-00...	140	115	100	95	53	92	96	101	115	159	230
	F-115-40-00...	160	130	115	115	61	105	109	116	132	182	263
	F-150-40-00... AF-150-40-00...	165	135	118	150	62	110	113	119	136	187	271
	AF-160-40-00...	250	210	180	160	95	165	171	181	206	284	411
	AF-195-40-00...	275	230	200	195	104	181	188	199	226	312	452
	AF-230-40-00...	350	290	250	230	132	230	239	253	288	397	576
	AF-265-40-00...	450	375	325	265	170	296	296	-	326	511	-
	AF-330-40-00...	500	415	360	330	189	329	329	-	362	568	-
	AF-400-40-00...	600	500	435	400	227	395	395	-	434	681	-
	F-500-40-00...	700	550	500	520	252	438	478	500	575	755	1100
	F-630-40-00...	800	640	540	630	288	500	545	580	655	860	1250
	F-1000-40-00...	1000	850	700	–	350	600	630	725	750	1000	1600

Items

Series F contactors

Three-pole series F contactors with AC control coil

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,2	0	1	24	OptiStart K-F-09-30-01-A024	334548
	09	4,2	0	1	48	OptiStart K-F-09-30-01-A048	334549
	09	4,2	0	1	110	OptiStart K-F-09-30-01-A110	334550
	09	4,2	0	1	230	OptiStart K-F-09-30-01-A230	334551
	09	4,2	0	1	400	OptiStart K-F-09-30-01-A400	334552
	09	4,2	1	0	24	OptiStart K-F-09-30-10-A024	334562
	09	4,2	1	0	48	OptiStart K-F-09-30-10-A048	334563
	09	4,2	1	0	110	OptiStart K-F-09-30-10-A110	334564
	09	4,2	1	0	230	OptiStart K-F-09-30-10-A230	334565
	09	4,2	1	0	400	OptiStart K-F-09-30-10-A400	334566
	12	5,7	0	1	24	OptiStart K-F-12-30-01-A024	334595
	12	5,7	0	1	48	OptiStart K-F-12-30-01-A048	334596
	12	5,7	0	1	110	OptiStart K-F-12-30-01-A110	334597
	12	5,7	0	1	230	OptiStart K-F-12-30-01-A230	334598
	12	5,7	0	1	400	OptiStart K-F-12-30-01-A400	334599
	12	5,7	1	0	24	OptiStart K-F-12-30-10-A024	334609
	12	5,7	1	0	48	OptiStart K-F-12-30-10-A048	334610
	12	5,7	1	0	110	OptiStart K-F-12-30-10-A110	334611
	12	5,7	1	0	230	OptiStart K-F-12-30-10-A230	334612
	12	5,7	1	0	400	OptiStart K-F-12-30-10-A400	334613
	18	7,5	0	1	24	OptiStart K-F-18-30-01-A024	334628
	18	7,5	0	1	48	OptiStart K-F-18-30-01-A048	334629
	18	7,5	0	1	110	OptiStart K-F-18-30-01-A110	334630
	18	7,5	0	1	230	OptiStart K-F-18-30-01-A230	334631
	18	7,5	0	1	400	OptiStart K-F-18-30-01-A400	334632
	18	7,5	1	0	24	OptiStart K-F-18-30-10-A024	334642
	18	7,5	1	0	48	OptiStart K-F-18-30-10-A048	334643
	18	7,5	1	0	110	OptiStart K-F-18-30-10-A110	334644
	18	7,5	1	0	230	OptiStart K-F-18-30-10-A230	334645
	18	7,5	1	0	400	OptiStart K-F-18-30-10-A400	334646
	25	12,5	0	1	24	OptiStart K-F-25-30-01-A024	334698
	25	12,5	0	1	48	OptiStart K-F-25-30-01-A048	334699
	25	12,5	0	1	110	OptiStart K-F-25-30-01-A110	334700
	25	12,5	0	1	230	OptiStart K-F-25-30-01-A230	334701
	25	12,5	0	1	400	OptiStart K-F-25-30-01-A400	334702
	25	12,5	1	0	24	OptiStart K-F-25-30-10-A024	334712
	25	12,5	1	0	48	OptiStart K-F-25-30-10-A048	334713
	25	12,5	1	0	110	OptiStart K-F-25-30-10-A110	334714
	25	12,5	1	0	230	OptiStart K-F-25-30-10-A230	334715
	25	12,5	1	0	400	OptiStart K-F-25-30-10-A400	334716
	26	13	0	0	24	OptiStart K-F-26-30-00-A024	334726
	26	13	0	0	48	OptiStart K-F-26-30-00-A048	334727
	26	13	0	0	110	OptiStart K-F-26-30-00-A110	334728
	26	13	0	0	230	OptiStart K-F-26-30-00-A230	334729
	26	13	0	0	400	OptiStart K-F-26-30-00-A400	334730
	32	16	0	0	24	OptiStart K-F-32-30-00-A024	334780
	32	16	0	0	48	OptiStart K-F-32-30-00-A048	334781
	32	16	0	0	110	OptiStart K-F-32-30-00-A110	334782
	32	16	0	0	230	OptiStart K-F-32-30-00-A230	334783
	32	16	0	0	400	OptiStart K-F-32-30-00-A400	334784
	38	18,5	0	0	24	OptiStart K-F-38-30-00-A024	334794
	38	18,5	0	0	48	OptiStart K-F-38-30-00-A048	334795
	38	18,5	0	0	110	OptiStart K-F-38-30-00-A110	334796
	38	18,5	0	0	230	OptiStart K-F-38-30-00-A230	334797
	38	18,5	0	0	400	OptiStart K-F-38-30-00-A400	334798

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			HO	NC			
	40	18,5	0	0	24	OptiStart K-F-40-30-00-A024	334836
	40	18,5	0	0	48	OptiStart K-F-40-30-00-A048	334837
	40	18,5	0	0	110	OptiStart K-F-40-30-00-A110	334838
	40	18,5	0	0	230	OptiStart K-F-40-30-00-A230	334839
	40	18,5	0	0	400	OptiStart K-F-40-30-00-A400	334840
	50	22	0	0	24	OptiStart K-F-50-30-00-A024	334846
	50	22	0	0	48	OptiStart K-F-50-30-00-A048	334847
	50	22	0	0	110	OptiStart K-F-50-30-00-A110	334848
	50	22	0	0	230	OptiStart K-F-50-30-00-A230	334849
	50	22	0	0	400	OptiStart K-F-50-30-00-A400	334850
	65	30	0	0	24	OptiStart K-F-65-30-00-A024	334856
	65	30	0	0	48	OptiStart K-F-65-30-00-A048	334857
	65	30	0	0	110	OptiStart K-F-65-30-00-A110	334858
	65	30	0	0	230	OptiStart K-F-65-30-00-A230	334859
	65	30	0	0	400	OptiStart K-F-65-30-00-A400	334860
	80	37	0	0	24	OptiStart K-F-80-30-00-A024	334866
	80	37	0	0	48	OptiStart K-F-80-30-00-A048	334867
	80	37	0	0	110	OptiStart K-F-80-30-00-A110	334868
	80	37	0	0	230	OptiStart K-F-80-30-00-A230	334869
	80	37	0	0	400	OptiStart K-F-80-30-00-A400	334870
	94	45	0	0	24	OptiStart K-F-94-30-00-A024	334881
	94	45	0	0	48	OptiStart K-F-94-30-00-A048	334882
	94	45	0	0	110	OptiStart K-F-94-30-00-A110	334883
	94	45	0	0	230	OptiStart K-F-94-30-00-A230	334884
	94	45	0	0	400	OptiStart K-F-94-30-00-A400	334885
	95	45	0	0	24	OptiStart K-F-95-30-00-A024	334886
	95	45	0	0	48	OptiStart K-F-95-30-00-A048	334887
	95	45	0	0	110	OptiStart K-F-95-30-00-A110	334888
	95	45	0	0	230	OptiStart K-F-95-30-00-A230	334889
	95	45	0	0	400	OptiStart K-F-95-30-00-A400	334890
	115	55	0	0	24	OptiStart K-F-115-30-00-A024	334902
	115	55	0	0	48	OptiStart K-F-115-30-00-A048	334903
	115	55	0	0	110	OptiStart K-F-115-30-00-A110	334904
	115	55	0	0	230	OptiStart K-F-115-30-00-A230	334905
	115	55	0	0	400	OptiStart K-F-115-30-00-A400	334906
	150	75	0	0	24	OptiStart K-F-150-30-00-A024	334915
	150	75	0	0	48	OptiStart K-F-150-30-00-A048	334916
	150	75	0	0	110	OptiStart K-F-150-30-00-A110	334917
	150	75	0	0	230	OptiStart K-F-150-30-00-A230	334918
	150	75	0	0	400	OptiStart K-F-150-30-00-A400	334919

Three-pole series F contactors with DC control coil

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			HO	NC			
	09	4,2	0	1	12	OptiStart K-F-09-30-01-D012	334553
	09	4,2	0	1	24	OptiStart K-F-09-30-01-D024	334554
	09	4,2	0	1	48	OptiStart K-F-09-30-01-D048	334555
	09	4,2	0	1	60	OptiStart K-F-09-30-01-D060	334556
	09	4,2	0	1	110	OptiStart K-F-09-30-01-D110	334557
	09	4,2	0	1	125	OptiStart K-F-09-30-01-D125	334558
	09	4,2	0	1	220	OptiStart K-F-09-30-01-D220	334559
	09	4,2	1	0	12	OptiStart K-F-09-30-10-D012	334567
	09	4,2	1	0	24	OptiStart K-F-09-30-10-D024	334568
	09	4,2	1	0	48	OptiStart K-F-09-30-10-D048	334569
	09	4,2	1	0	60	OptiStart K-F-09-30-10-D060	334570
	09	4,2	1	0	110	OptiStart K-F-09-30-10-D110	334571
	09	4,2	1	0	125	OptiStart K-F-09-30-10-D125	334572
	09	4,2	1	0	220	OptiStart K-F-09-30-10-D220	334573
	12	5,7	0	1	12	OptiStart K-F-12-30-01-D012	334600
	12	5,7	0	1	24	OptiStart K-F-12-30-01-D024	334601
	12	5,7	0	1	48	OptiStart K-F-12-30-01-D048	334602
	12	5,7	0	1	60	OptiStart K-F-12-30-01-D060	334603
	12	5,7	0	1	110	OptiStart K-F-12-30-01-D110	334604
	12	5,7	0	1	125	OptiStart K-F-12-30-01-D125	334605
	12	5,7	0	1	220	OptiStart K-F-12-30-01-D220	334606

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			HO	NC			
	12	5,7	1	0	12	OptiStart K-F-12-30-10-D012	334614
	12	5,7	1	0	24	OptiStart K-F-12-30-10-D024	334615
	12	5,7	1	0	48	OptiStart K-F-12-30-10-D048	334616
	12	5,7	1	0	60	OptiStart K-F-12-30-10-D060	334617
	12	5,7	1	0	110	OptiStart K-F-12-30-10-D110	334618
	12	5,7	1	0	125	OptiStart K-F-12-30-10-D125	334619
	12	5,7	1	0	220	OptiStart K-F-12-30-10-D220	334620
	18	7,5	0	1	12	OptiStart K-F-18-30-01-D012	334633
	18	7,5	0	1	24	OptiStart K-F-18-30-01-D024	334634
	18	7,5	0	1	48	OptiStart K-F-18-30-01-D048	334635
	18	7,5	0	1	60	OptiStart K-F-18-30-01-D060	334636
	18	7,5	0	1	110	OptiStart K-F-18-30-01-D110	334637
	18	7,5	0	1	125	OptiStart K-F-18-30-01-D125	334638
	18	7,5	0	1	220	OptiStart K-F-18-30-01-D220	334639
	18	7,5	1	0	12	OptiStart K-F-18-30-10-D012	334647
	18	7,5	1	0	24	OptiStart K-F-18-30-10-D024	334648
	18	7,5	1	0	48	OptiStart K-F-18-30-10-D048	334649
	18	7,5	1	0	60	OptiStart K-F-18-30-10-D060	334650
	18	7,5	1	0	110	OptiStart K-F-18-30-10-D110	334651
	18	7,5	1	0	125	OptiStart K-F-18-30-10-D125	334652
	18	7,5	1	0	220	OptiStart K-F-18-30-10-D220	334653
	25	12,5	0	1	12	OptiStart K-F-25-30-01-D012	334703
	25	12,5	0	1	24	OptiStart K-F-25-30-01-D024	334704
	25	12,5	0	1	48	OptiStart K-F-25-30-01-D048	334705
	25	12,5	0	1	60	OptiStart K-F-25-30-01-D060	334706
	25	12,5	0	1	110	OptiStart K-F-25-30-01-D110	334707
	25	12,5	0	1	125	OptiStart K-F-25-30-01-D125	334708
	25	12,5	0	1	220	OptiStart K-F-25-30-01-D220	334709
	25	12,5	1	0	12	OptiStart K-F-25-30-10-D012	334717
	25	12,5	1	0	24	OptiStart K-F-25-30-10-D024	334718
	25	12,5	1	0	48	OptiStart K-F-25-30-10-D048	334719
	25	12,5	1	0	60	OptiStart K-F-25-30-10-D060	334720
	25	12,5	1	0	110	OptiStart K-F-25-30-10-D110	334721
	25	12,5	1	0	125	OptiStart K-F-25-30-10-D125	334722
	25	12,5	1	0	220	OptiStart K-F-25-30-10-D220	334723
	26	13	0	0	12	OptiStart K-F-26-30-00-D012	334731
	26	13	0	0	24	OptiStart K-F-26-30-00-D024	334732
	26	13	0	0	48	OptiStart K-F-26-30-00-D048	334733
	26	13	0	0	60	OptiStart K-F-26-30-00-D060	334734
	26	13	0	0	110	OptiStart K-F-26-30-00-D110	334735
	26	13	0	0	125	OptiStart K-F-26-30-00-D125	334736
	26	13	0	0	220	OptiStart K-F-26-30-00-D220	334737
	32	16	0	0	12	OptiStart K-F-32-30-00-D012	334785
	32	16	0	0	24	OptiStart K-F-32-30-00-D024	334786
	32	16	0	0	48	OptiStart K-F-32-30-00-D048	334787
	32	16	0	0	60	OptiStart K-F-32-30-00-D060	334788
	32	16	0	0	110	OptiStart K-F-32-30-00-D110	334789
	32	16	0	0	125	OptiStart K-F-32-30-00-D125	334790
	32	16	0	0	220	OptiStart K-F-32-30-00-D220	334791
	38	18,5	0	0	12	OptiStart K-F-38-30-00-D012	334799
	38	18,5	0	0	24	OptiStart K-F-38-30-00-D024	334800
	38	18,5	0	0	48	OptiStart K-F-38-30-00-D048	334801
	38	18,5	0	0	60	OptiStart K-F-38-30-00-D060	334802
	38	18,5	0	0	110	OptiStart K-F-38-30-00-D110	334803
	38	18,5	0	0	125	OptiStart K-F-38-30-00-D125	334804
	38	18,5	0	0	220	OptiStart K-F-38-30-00-D220	334805

Note: All contactor models F-09-...D - F-38-...D include a built-in surge arrester.

Three-pole series F contactors with DC control coil and reduced power consumption (-Z)

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,2	0	1	24	OptiStart K-F-09-30-01-Z024	334560
	09	4,2	0	1	48	OptiStart K-F-09-30-01-Z048	334561
	09	4,2	1	0	24	OptiStart K-F-09-30-10-Z024	334574
	09	4,2	1	0	48	OptiStart K-F-09-30-10-Z048	334575
	12	5,7	0	1	24	OptiStart K-F-12-30-01-Z024	334607
	12	5,7	0	1	48	OptiStart K-F-12-30-01-Z048	334608
	12	5,7	1	0	24	OptiStart K-F-12-30-10-Z024	334621
	12	5,7	1	0	48	OptiStart K-F-12-30-10-Z048	334622
	18	7,5	0	1	24	OptiStart K-F-18-30-01-Z024	334640
	18	7,5	0	1	48	OptiStart K-F-18-30-01-Z048	334641
	18	7,5	1	0	24	OptiStart K-F-18-30-10-Z024	334654
	18	7,5	1	0	48	OptiStart K-F-18-30-10-Z048	334655
	25	12,5	0	1	24	OptiStart K-F-25-30-01-Z024	334710
	25	12,5	0	1	48	OptiStart K-F-25-30-01-Z048	334711
	25	12,5	1	0	24	OptiStart K-F-25-30-10-Z024	334724
	25	12,5	1	0	48	OptiStart K-F-25-30-10-Z048	334725
	26	13	0	0	24	OptiStart K-F-26-30-00-Z024	334738
	26	13	0	0	48	OptiStart K-F-26-30-00-Z048	334739
	32	16	0	0	24	OptiStart K-F-32-30-00-Z024	334792
	32	16	0	0	48	OptiStart K-F-32-30-00-Z048	334793
	38	18,5	0	0	24	OptiStart K-F-38-30-00-Z024	334806
	38	18,5	0	0	48	OptiStart K-F-38-30-00-Z048	334807

Note: All contactor models F-09-...Z — F-38-...Z include a built-in surge arrester.
The list of possible accessories is limited. For more detailed information, see the «Delivery Package» section.

Three-pole series AF contactors with universal electronically-controlled AC/DC coils

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V	Product name	Code
			NO	NC			
	40	18,5	0	0	24-60 V AC / 20-60 V DC	Optistart K-AF-40-30-00-E024	334955
	40	18,5	0	0	60-130 V AC/DC	Optistart K-AF-40-30-00-E110	334956
	40	18,5	0	0	100-250 V AC/DC	Optistart K-AF-40-30-00-E230	334957
	50	22	0	0	24-60 V AC / 20-60 V DC	Optistart K-AF-50-30-00-E024	334958
	50	22	0	0	60-130 V AC/DC	Optistart K-AF-50-30-00-E110	334959
	50	22	0	0	100-250 V AC/DC	Optistart K-AF-50-30-00-E230	334960
	65	30	0	0	24-60 V AC / 20-60 V DC	Optistart K-AF-65-30-00-E024	334961
	65	30	0	0	60-130 V AC/DC	Optistart K-AF-65-30-00-E110	334962
	65	30	0	0	100-250 V AC/DC	Optistart K-AF-65-30-00-E230	334963
	80	37	0	0	24-60 V AC / 20-60 V DC	Optistart K-AF-80-30-00-E024	334967
	80	37	0	0	60-130 V AC/DC	Optistart K-AF-80-30-00-E110	334968
	80	37	0	0	100-250 V AC/DC	Optistart K-AF-80-30-00-E230	334969
	94	45	0	0	24-60 V AC / 20-60 V DC	Optistart K-AF-94-30-00-E024	334976
	94	45	0	0	60-130 V AC/DC	Optistart K-AF-94-30-00-E110	334977
	94	45	0	0	100-250 V AC/DC	Optistart K-AF-94-30-00-E230	334978
	95	45	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-95-30-00-E024	334891
	95	45	0	0	60-130 V AC/DC	OptiStart K-AF-95-30-00-E110	334892
	95	45	0	0	100-250 V AC/DC	OptiStart K-AF-95-30-00-E230	334893
	115	55	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-115-30-00-E024	334907
	115	55	0	0	60-130 V AC/DC	OptiStart K-AF-115-30-00-E110	334908
	115	55	0	0	100-250 V AC/DC	OptiStart K-AF-115-30-00-E230	334909
	150	75	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-150-30-00-E024	334920
	150	75	0	0	60-130 V AC/DC	OptiStart K-AF-150-30-00-E110	334921
	150	75	0	0	100-250 V AC/DC	OptiStart K-AF-150-30-00-E230	334922
	160	75	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-160-30-00-E024	334931
	160	75	0	0	60-130 V AC/DC	OptiStart K-AF-160-30-00-E110	334932
	160	75	0	0	100-250 V AC/DC	OptiStart K-AF-160-30-00-E230	334933
	160	75	0	0	250-500 V AC/DC	OptiStart K-AF-160-30-00-E400	334934
	195	90	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-195-30-00-E024	334939
	195	90	0	0	60-130 V AC/DC	OptiStart K-AF-195-30-00-E110	334940
	195	90	0	0	100-250 V AC/DC	OptiStart K-AF-195-30-00-E230	334941
	195	90	0	0	250-500 V AC/DC	OptiStart K-AF-195-30-00-E400	334942
	230	110	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-230-30-00-E024	334947
	230	110	0	0	60-130 V AC/DC	OptiStart K-AF-230-30-00-E110	334948
	230	110	0	0	100-250 V AC/DC	OptiStart K-AF-230-30-00-E230	334949
	230	110	0	0	250-500 V AC/DC	OptiStart K-AF-230-30-00-E400	334950

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V	Product name	Code
			NO	NC			
	265	132	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-265-30-00-E024	370923
	265	132	0	0	60-130 V AC/DC	OptiStart K-AF-265-30-00-E110	370924
	265	132	0	0	100-250 V AC/DC	OptiStart K-AF-265-30-00-E230	370925
	265	132	0	0	250-500 V AC/DC	OptiStart K-AF-265-30-00-E400	370926
	330	160	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-330-30-00-E024	370931
	330	160	0	0	60-130 V AC/DC	OptiStart K-AF-330-30-00-E110	370932
	330	160	0	0	100-250 V AC/DC	OptiStart K-AF-330-30-00-E230	370933
	330	160	0	0	250-500 V AC/DC	OptiStart K-AF-330-30-00-E400	370934
	400	200	0	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-400-30-00-E024	370939
	400	200	0	0	60-130 V AC/DC	OptiStart K-AF-400-30-00-E110	370940
	400	200	0	0	100-250 V AC/DC	OptiStart K-AF-400-30-00-E230	370941
	400	200	0	0	250-500 V AC/DC	OptiStart K-AF-400-30-00-E400	370942

Three-pole series F contactors with universal AC/DC control coils

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V	Product name	Code
			NO	NC			
	500	290	0	0	48	OptiStart K-F-500-30-00-U48	335094
	500	290	0	0	60	OptiStart K-F-500-30-00-U60	335095
	500	290	0	0	110	OptiStart K-F-500-30-00-U110	335090
	500	290	0	0	220	OptiStart K-F-500-30-00-U220	335091
	500	290	0	0	380	OptiStart K-F-500-30-00-U380	335092
	500	290	0	0	440	OptiStart K-F-500-30-00-U440	335093
	630	355	0	0	48	OptiStart K-F-630-30-00-U48	335112
	630	355	0	0	60	OptiStart K-F-630-30-00-U60	335113
	630	355	0	0	110	OptiStart K-F-630-30-00-U110	335108
	630	355	0	0	220	OptiStart K-F-630-30-00-U220	335109
	630	355	0	0	380	OptiStart K-F-630-30-00-U380	335110
	630	355	0	0	440	OptiStart K-F-630-30-00-U440	335111

Three-pole series F contactors designed for loads with utilization category AC-1 only

Appearance	Rated current (AC-1, 400 V, ≤40 °C), A	Auxiliary contacts		Control coil rated voltage, V	Product name	Code
		NO	NC			
	1000	0	0	48	OptiStart K-F-1000-30-00-U48	335118
	1000	0	0	60	OptiStart K-F-1000-30-00-U60	335119
	1000	0	0	110	OptiStart K-F-1000-30-00-U110	335114
	1000	0	0	220	OptiStart K-F-1000-30-00-U220	335115
	1000	0	0	380	OptiStart K-F-1000-30-00-U380	335116
	1000	0	0	440	OptiStart K-F-1000-30-00-U440	335117
	1250	2	4	110	OptiStart K-F-1250-30-24-A110	334979
	1250	2	4	220	OptiStart K-F-1250-30-24-A220	334980
	1250	4	2	110	OptiStart K-F-1250-30-42-A110	334981
	1250	4	2	220	OptiStart K-F-1250-30-42-A220	334982
	1250	2	4	110	OptiStart K-F-1600-30-24-A110	335004
	1250	2	4	220	OptiStart K-F-1600-30-24-A220	335005
	1250	4	2	110	OptiStart K-F-1600-30-42-A110	335006
	1250	4	2	220	OptiStart K-F-1600-30-42-A220	335007

Four-pole series F contactors with AC control coils

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	25	2	2	24	OptiStart K-F-09-22-00-A024	334576
	09	25	2	2	48	OptiStart K-F-09-22-00-A048	334577
	09	25	2	2	110	OptiStart K-F-09-22-00-A110	334578
	09	25	2	2	230	OptiStart K-F-09-22-00-A230	334579
	09	25	2	2	400	OptiStart K-F-09-22-00-A400	334580
	09	25	4	0	24	OptiStart K-F-09-40-00-A024	334581
	09	25	4	0	48	OptiStart K-F-09-40-00-A048	334582
	09	25	4	0	110	OptiStart K-F-09-40-00-A110	334583
	09	25	4	0	230	OptiStart K-F-09-40-00-A230	334584
	09	25	4	0	400	OptiStart K-F-09-40-00-A400	334585
	12	28	4	0	24	OptiStart K-F-12-40-00-A024	334623
	12	28	4	0	48	OptiStart K-F-12-40-00-A048	334624
	12	28	4	0	110	OptiStart K-F-12-40-00-A110	334625
	12	28	4	0	230	OptiStart K-F-12-40-00-A230	334626
	12	28	4	0	400	OptiStart K-F-12-40-00-A400	334627
	18	32	0	4	24	OptiStart K-F-18-04-00-A024	334656
	18	32	0	4	48	OptiStart K-F-18-04-00-A048	334657
	18	32	0	4	110	OptiStart K-F-18-04-00-A110	334658
	18	32	0	4	230	OptiStart K-F-18-04-00-A230	334659
	18	32	0	4	400	OptiStart K-F-18-04-00-A400	334660
	18	32	2	2	24	OptiStart K-F-18-22-00-A024	334670
	18	32	2	2	48	OptiStart K-F-18-22-00-A048	334671
	18	32	2	2	110	OptiStart K-F-18-22-00-A110	334672
	18	32	2	2	230	OptiStart K-F-18-22-00-A230	334673
	18	32	2	2	400	OptiStart K-F-18-22-00-A400	334674
	18	32	4	0	24	OptiStart K-F-18-40-00-A024	334684
	18	32	4	0	48	OptiStart K-F-18-40-00-A048	334685
	18	32	4	0	110	OptiStart K-F-18-40-00-A110	334686
	18	32	4	0	230	OptiStart K-F-18-40-00-A230	334687
	18	32	4	0	400	OptiStart K-F-18-40-00-A400	334688
	26	45	0	4	24	OptiStart K-F-26-04-00-A024	334740
	26	45	0	4	48	OptiStart K-F-26-04-00-A048	334741
	26	45	0	4	110	OptiStart K-F-26-04-00-A110	334742
	26	45	0	4	230	OptiStart K-F-26-04-00-A230	334743
	26	45	0	4	400	OptiStart K-F-26-04-00-A400	334744
	26	45	2	2	24	OptiStart K-F-26-22-00-A024	334752
	26	45	2	2	48	OptiStart K-F-26-22-00-A048	334753
	26	45	2	2	110	OptiStart K-F-26-22-00-A110	334754
	26	45	2	2	230	OptiStart K-F-26-22-00-A230	334755
	26	45	2	2	400	OptiStart K-F-26-22-00-A400	334756
	26	45	4	0	24	OptiStart K-F-26-40-00-A024	334766
	26	45	4	0	48	OptiStart K-F-26-40-00-A048	334767
	26	45	4	0	110	OptiStart K-F-26-40-00-A110	334768
	26	45	4	0	230	OptiStart K-F-26-40-00-A230	334769
	26	45	4	0	400	OptiStart K-F-26-40-00-A400	334770
	38	56	2	2	24	OptiStart K-F-38-22-00-A024	334808
	38	56	2	2	48	OptiStart K-F-38-22-00-A048	334809
	38	56	2	2	110	OptiStart K-F-38-22-00-A110	334810
	38	56	2	2	230	OptiStart K-F-38-22-00-A230	334811
	38	56	2	2	400	OptiStart K-F-38-22-00-A400	334812
	38	56	4	0	24	OptiStart K-F-38-40-00-A024	334822
	38	56	4	0	48	OptiStart K-F-38-40-00-A048	334823
	38	56	4	0	110	OptiStart K-F-38-40-00-A110	334824
	38	56	4	0	230	OptiStart K-F-38-40-00-A230	334825
	38	56	4	0	400	OptiStart K-F-38-40-00-A400	334826
	40	70	4	0	24	OptiStart K-F-40-40-00-A024	334841
	40	70	4	0	48	OptiStart K-F-40-40-00-A048	334842
	40	70	4	0	110	OptiStart K-F-40-40-00-A110	334843
	40	70	4	0	230	OptiStart K-F-40-40-00-A230	334844
	40	70	4	0	400	OptiStart K-F-40-40-00-A400	334845
	50	90	4	0	24	OptiStart K-F-50-40-00-A024	334851
	50	90	4	0	48	OptiStart K-F-50-40-00-A048	334852
	50	90	4	0	110	OptiStart K-F-50-40-00-A110	334853
	50	90	4	0	230	OptiStart K-F-50-40-00-A230	334854
	50	90	4	0	400	OptiStart K-F-50-40-00-A400	334855

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	65	100	4	0	24	OptiStart K-F-65-40-00-A024	334861
	65	100	4	0	48	OptiStart K-F-65-40-00-A048	334862
	65	100	4	0	110	OptiStart K-F-65-40-00-A110	334863
	65	100	4	0	230	OptiStart K-F-65-40-00-A230	334864
	65	100	4	0	400	OptiStart K-F-65-40-00-A400	334865
	80	115	2	2	24	OptiStart K-F-80-22-00-A024	334871
	80	115	2	2	48	OptiStart K-F-80-22-00-A048	334872
	80	115	2	2	110	OptiStart K-F-80-22-00-A110	334873
	80	115	2	2	230	OptiStart K-F-80-22-00-A230	334874
	80	115	2	2	400	OptiStart K-F-80-22-00-A400	334875
	80	115	4	0	24	OptiStart K-F-80-40-00-A024	334876
	80	115	4	0	48	OptiStart K-F-80-40-00-A048	334877
	80	115	4	0	110	OptiStart K-F-80-40-00-A110	334878
	80	115	4	0	230	OptiStart K-F-80-40-00-A230	334879
	80	115	4	0	400	OptiStart K-F-80-40-00-A400	334880
	95	140	4	0	24	OptiStart K-F-95-40-00-A024	334894
	95	140	4	0	48	OptiStart K-F-95-40-00-A048	334895
	95	140	4	0	110	OptiStart K-F-95-40-00-A110	334896
	95	140	4	0	230	OptiStart K-F-95-40-00-A230	334897
	95	140	4	0	400	OptiStart K-F-95-40-00-A400	334898
	115	160	4	0	24	OptiStart K-F-115-40-00-A024	334910
	115	160	4	0	48	OptiStart K-F-115-40-00-A048	334911
	115	160	4	0	110	OptiStart K-F-115-40-00-A110	334912
	115	160	4	0	230	OptiStart K-F-115-40-00-A230	334913
	115	160	4	0	400	OptiStart K-F-115-40-00-A400	334914
	150	165	4	0	24	OptiStart K-F-150-40-00-A024	334923
	150	165	4	0	48	OptiStart K-F-150-40-00-A048	334924
	150	165	4	0	110	OptiStart K-F-150-40-00-A110	334925
	150	165	4	0	230	OptiStart K-F-150-40-00-A230	334926
	150	165	4	0	400	OptiStart K-F-150-40-00-A400	334927

Four-pole series F contactors with DC control coils

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	25	4	0	12	OptiStart K-F-09-40-00-D012	334586
	09	25	4	0	24	OptiStart K-F-09-40-00-D024	334587
	09	25	4	0	48	OptiStart K-F-09-40-00-D048	334588
	09	25	4	0	60	OptiStart K-F-09-40-00-D060	334589
	09	25	4	0	110	OptiStart K-F-09-40-00-D110	334590
	09	25	4	0	125	OptiStart K-F-09-40-00-D125	334591
	09	25	4	0	220	OptiStart K-F-09-40-00-D220	334592
	18	32	0	4	12	OptiStart K-F-18-04-00-D012	334661
	18	32	0	4	24	OptiStart K-F-18-04-00-D024	334662
	18	32	0	4	48	OptiStart K-F-18-04-00-D048	334663
	18	32	0	4	60	OptiStart K-F-18-04-00-D060	334664
	18	32	0	4	110	OptiStart K-F-18-04-00-D110	334665
	18	32	0	4	125	OptiStart K-F-18-04-00-D125	334666
	18	32	0	4	220	OptiStart K-F-18-04-00-D220	334667
	18	32	2	2	12	OptiStart K-F-18-22-00-D012	334675
	18	32	2	2	24	OptiStart K-F-18-22-00-D024	334676
	18	32	2	2	48	OptiStart K-F-18-22-00-D048	334677
	18	32	2	2	60	OptiStart K-F-18-22-00-D060	334678
	18	32	2	2	110	OptiStart K-F-18-22-00-D110	334679
	18	32	2	2	125	OptiStart K-F-18-22-00-D125	334680
	18	32	2	2	220	OptiStart K-F-18-22-00-D220	334681
	18	32	4	0	12	OptiStart K-F-18-40-00-D012	334689
	18	32	4	0	24	OptiStart K-F-18-40-00-D024	334690
	18	32	4	0	48	OptiStart K-F-18-40-00-D048	334691
	18	32	4	0	60	OptiStart K-F-18-40-00-D060	334692
	18	32	4	0	110	OptiStart K-F-18-40-00-D110	334693
	18	32	4	0	125	OptiStart K-F-18-40-00-D125	334694
	18	32	4	0	220	OptiStart K-F-18-40-00-D220	334695

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	26	45	0	4	12	OptiStart K-F-26-04-00-D012	334745
	26	45	0	4	24	OptiStart K-F-26-04-00-D024	334746
	26	45	0	4	48	OptiStart K-F-26-04-00-D048	334747
	26	45	0	4	60	OptiStart K-F-26-04-00-D060	334748
	26	45	0	4	110	OptiStart K-F-26-04-00-D110	334749
	26	45	0	4	125	OptiStart K-F-26-04-00-D125	334750
	26	45	0	4	220	OptiStart K-F-26-04-00-D220	334751
	26	45	2	2	12	OptiStart K-F-26-22-00-D012	334757
	26	45	2	2	24	OptiStart K-F-26-22-00-D024	334758
	26	45	2	2	48	OptiStart K-F-26-22-00-D048	334759
	26	45	2	2	60	OptiStart K-F-26-22-00-D060	334760
	26	45	2	2	110	OptiStart K-F-26-22-00-D110	334761
	26	45	2	2	125	OptiStart K-F-26-22-00-D125	334762
	26	45	2	2	220	OptiStart K-F-26-22-00-D220	334763
	26	45	4	0	12	OptiStart K-F-26-40-00-D012	334771
	26	45	4	0	24	OptiStart K-F-26-40-00-D024	334772
	26	45	4	0	48	OptiStart K-F-26-40-00-D048	334773
	26	45	4	0	60	OptiStart K-F-26-40-00-D060	334774
	26	45	4	0	110	OptiStart K-F-26-40-00-D110	334775
	26	45	4	0	125	OptiStart K-F-26-40-00-D125	334776
	26	45	4	0	220	OptiStart K-F-26-40-00-D220	334777
	38	56	2	2	12	OptiStart K-F-38-22-00-D012	334813
	38	56	2	2	24	OptiStart K-F-38-22-00-D024	334814
	38	56	2	2	48	OptiStart K-F-38-22-00-D048	334815
	38	56	2	2	60	OptiStart K-F-38-22-00-D060	334816
	38	56	2	2	110	OptiStart K-F-38-22-00-D110	334817
	38	56	2	2	125	OptiStart K-F-38-22-00-D125	334818
	38	56	2	2	220	OptiStart K-F-38-22-00-D220	334819
	38	56	4	0	12	OptiStart K-F-38-40-00-D012	334827
	38	56	4	0	24	OptiStart K-F-38-40-00-D024	334828
	38	56	4	0	48	OptiStart K-F-38-40-00-D048	334829
	38	56	4	0	60	OptiStart K-F-38-40-00-D060	334830
	38	56	4	0	110	OptiStart K-F-38-40-00-D110	334831
	38	56	4	0	125	OptiStart K-F-38-40-00-D125	334832
	38	56	4	0	220	OptiStart K-F-38-40-00-D220	334833

Note: All contactor models F-09-...D - F-38-...D include a built-in surge arrester.

Four-pole series F contactors with DC control coil and reduced power consumption (-Z)

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	25	4	0	24	OptiStart K-F-09-40-00-Z024	334593
	09	25	4	0	48	OptiStart K-F-09-40-00-Z048	334594
	18	32	0	4	12	OptiStart K-F-18-04-00-Z012	334668
	18	32	0	4	24	OptiStart K-F-18-04-00-Z024	334669
	18	32	2	2	24	OptiStart K-F-18-22-00-Z024	334682
	18	32	2	2	48	OptiStart K-F-18-22-00-Z048	334683
	18	32	4	0	24	OptiStart K-F-18-40-00-Z024	334696
	18	32	4	0	48	OptiStart K-F-18-40-00-Z048	334697
	26	45	2	2	24	OptiStart K-F-26-22-00-Z024	334764
	26	45	2	2	48	OptiStart K-F-26-22-00-Z048	334765
	26	45	4	0	24	OptiStart K-F-26-40-00-Z024	334778
	26	45	4	0	48	OptiStart K-F-26-40-00-Z048	334779
	38	56	2	2	24	OptiStart K-F-38-22-00-Z024	334820
	38	56	2	2	48	OptiStart K-F-38-22-00-Z048	334821
	38	56	4	0	24	OptiStart K-F-38-40-00-Z024	334834
	38	56	4	0	48	OptiStart K-F-38-40-00-Z048	334835

Note: All contactor models F-09-...Z — F-38-...Z include a built-in surge arrester.
The list of possible accessories is limited. For more detailed information, see the «Delivery package» section.

Four-pole series AF contactors with universal electronically-controlled AC/DC coils

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage	Product name	Code
			NO	NC			
	65	100	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-65-40-00-E024	334964
	65	100	4	0	60–130 V AC/DC	OptiStart K-AF-65-40-00-E110	334965
	65	100	4	0	100–250 V AC/DC	OptiStart K-AF-65-40-00-E230	334966
	80	115	2	2	24–60 V AC / 20–60 V DC	OptiStart K-AF-80-22-00-E024	334970
	80	115	2	2	60–130 V AC/DC	OptiStart K-AF-80-22-00-E110	334971
	80	115	2	2	100–250 V AC/DC	OptiStart K-AF-80-22-00-E230	334972
	80	115	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-80-40-00-E024	334973
	80	115	4	0	60–130 V AC/DC	OptiStart K-AF-80-40-00-E110	334974
	80	115	4	0	100–250 V AC/DC	OptiStart K-AF-80-40-00-E230	334975
	95	140	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-95-40-00-E024	334899
	95	140	4	0	60–130 V AC/DC	OptiStart K-AF-95-40-00-E110	334900
	95	140	4	0	100–250 V AC/DC	OptiStart K-AF-95-40-00-E230	334901
	150	165	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-150-40-00-E024	334928
	150	165	4	0	60–130 V AC/DC	OptiStart K-AF-150-40-00-E110	334929
	150	165	4	0	100–250 V AC/DC	OptiStart K-AF-150-40-00-E230	334930
	160	250	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-160-40-00-E024	334935
	160	250	4	0	60–130 V AC/DC	OptiStart K-AF-160-40-00-E110	334936
	160	250	4	0	100–250 V AC/DC	OptiStart K-AF-160-40-00-E230	334937
	160	250	4	0	250–500 V AC/DC	OptiStart K-AF-160-40-00-E400	334938
	195	275	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-195-40-00-E024	334943
	195	275	4	0	60–130 V AC/DC	OptiStart K-AF-195-40-00-E110	334944
	195	275	4	0	100–250 V AC/DC	OptiStart K-AF-195-40-00-E230	334945
	195	275	4	0	250–500 V AC/DC	OptiStart K-AF-195-40-00-E400	334946
	230	350	4	0	24–60 V AC / 20–60 V DC	OptiStart K-AF-230-40-00-E024	334951
	230	350	4	0	60–130 V AC/DC	OptiStart K-AF-230-40-00-E110	334952
	230	350	4	0	100–250 V AC/DC	OptiStart K-AF-230-40-00-E230	334953
	230	350	4	0	250–500 V AC/DC	OptiStart K-AF-230-40-00-E400	334954
	265	132	4	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-265-40-00-E024	370927
	265	132	4	0	60-130 V AC/DC	OptiStart K-AF-265-40-00-E110	370928
	265	132	4	0	100-250 V AC/DC	OptiStart K-AF-265-40-00-E230	370929
	265	132	4	0	250-500 V AC/DC	OptiStart K-AF-265-40-00-E400	370930
	330	160	4	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-330-40-00-E024	370935
	330	160	4	0	60-130 V AC/DC	OptiStart K-AF-330-40-00-E110	370936
	330	160	4	0	100-250 V AC/DC	OptiStart K-AF-330-40-00-E230	370937
	330	160	4	0	250-500 V AC/DC	OptiStart K-AF-330-40-00-E400	370938
	400	200	4	0	24-60 V AC / 20-60 V DC	OptiStart K-AF-400-40-00-E024	370943
	400	200	4	0	60-130 V AC/DC	OptiStart K-AF-400-40-00-E110	370944
	400	200	4	0	100-250 V AC/DC	OptiStart K-AF-400-40-00-E230	370945
	400	200	4	0	250-500 V AC/DC	OptiStart K-AF-400-40-00-E400	370946

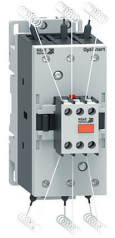
Four-pole series F contactors with universal AC/DC coils

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Power contacts		Control coil rated voltage, V	Product name	Code
			NO	NC			
	500	700	0	0	48	OptiStart K-F-500-40-00-U48	335100
	500	700	0	0	60	OptiStart K-F-500-40-00-U60	335101
	500	700	0	0	110	OptiStart K-F-500-40-00-U110	335096
	500	700	0	0	220	OptiStart K-F-500-40-00-U220	335097
	500	700	0	0	380	OptiStart K-F-500-40-00-U380	335098
	500	700	0	0	440	OptiStart K-F-500-40-00-U440	335099
	630	800	0	0	48	OptiStart K-F-630-40-00-U48	335130
	630	800	0	0	60	OptiStart K-F-630-40-00-U60	335131
	630	800	0	0	110	OptiStart K-F-630-40-00-U110	335126
	630	800	0	0	220	OptiStart K-F-630-40-00-U220	335127
	630	800	0	0	380	OptiStart K-F-630-40-00-U380	335128
	630	800	0	0	440	OptiStart K-F-630-40-00-U440	335129

Four-pole series F contactors designed for loads with utilization category AC-1 only

Appearance	Rated current (AC-1, 400 V, ≤ 40 °C), A	Power contacts		Control coil rated voltage, V	Product name	Code
		NO	NC			
	1000	0	0	48	OptiStart K-F-1000-40-00-U48	335124
	1000	0	0	60	OptiStart K-F-1000-40-00-U60	335125
	1000	0	0	110	OptiStart K-F-1000-40-00-U110	335120
	1000	0	0	220	OptiStart K-F-1000-40-00-U220	335121
	1000	0	0	380	OptiStart K-F-1000-40-00-U380	335122
	1000	0	0	440	OptiStart K-F-1000-40-00-U440	335123

Three-pole series FD contactors for capacitor switching with AC control coils

Appearance	Maximum power (AC-6b, ≤50 °C), kVAr		Auxiliary contacts		Control coil rated voltage, V	Product name	Code
	400 В	690 В	NO	NC			
	7,5	10	1	0	24	OptiStart K-FK-09-30-10-A024	335453
	7,5	10	1	0	48	OptiStart K-FK-09-30-10-A048	335454
	7,5	10	1	0	110	OptiStart K-FK-09-30-10-A110	335455
	7,5	10	1	0	230	OptiStart K-FK-09-30-10-A230	335456
	7,5	10	1	0	400	OptiStart K-FK-09-30-10-A400	335457
	12,5	16	1	0	24	OptiStart K-FK-12-30-10-A024	335458
	12,5	16	1	0	48	OptiStart K-FK-12-30-10-A048	335459
	12,5	16	1	0	110	OptiStart K-FK-12-30-10-A110	335460
	12,5	16	1	0	230	OptiStart K-FK-12-30-10-A230	335461
	12,5	16	1	0	400	OptiStart K-FK-12-30-10-A400	335462
	15	20	1	0	24	OptiStart K-FK-18-30-10-A024	335463
	15	20	1	0	48	OptiStart K-FK-18-30-10-A048	335464
	15	20	1	0	110	OptiStart K-FK-18-30-10-A110	335465
	15	20	1	0	230	OptiStart K-FK-18-30-10-A230	335466
	15	20	1	0	400	OptiStart K-FK-18-30-10-A400	335467
	20	25	0	0	24	OptiStart K-FK-26-30-00-A024	335468
	20	25	0	0	48	OptiStart K-FK-26-30-00-A048	335469
	20	25	0	0	110	OptiStart K-FK-26-30-00-A110	335470
	20	25	0	0	230	OptiStart K-FK-26-30-00-A230	335471
	20	25	0	0	400	OptiStart K-FK-26-30-00-A400	335472
	25	30	0	0	24	OptiStart K-FK-32-30-00-A024	335473
	25	30	0	0	48	OptiStart K-FK-32-30-00-A048	335474
	25	30	0	0	110	OptiStart K-FK-32-30-00-A110	335475
	25	30	0	0	230	OptiStart K-FK-32-30-00-A230	335476
	25	30	0	0	400	OptiStart K-FK-32-30-00-A400	335477
	30	36	0	0	24	OptiStart K-FK-38-30-00-A024	335478
	30	36	0	0	48	OptiStart K-FK-38-30-00-A048	335479
	30	36	0	0	110	OptiStart K-FK-38-30-00-A110	335480
	30	36	0	0	230	OptiStart K-FK-38-30-00-A230	335481
	30	36	0	0	400	OptiStart K-FK-38-30-00-A400	335482
	40	46	0	0	24	OptiStart K-FK-50-30-00-A024	335483
	40	46	0	0	48	OptiStart K-FK-50-30-00-A048	335484
	40	46	0	0	110	OptiStart K-FK-50-30-00-A110	335485
	40	46	0	0	230	OptiStart K-FK-50-30-00-A230	335486
	40	46	0	0	400	OptiStart K-FK-50-30-00-A400	335487
	45	56	0	0	24	OptiStart K-FK-65-30-00-A024	335488
	45	56	0	0	48	OptiStart K-FK-65-30-00-A048	335489
	45	56	0	0	110	OptiStart K-FK-65-30-00-A110	335490
	45	56	0	0	230	OptiStart K-FK-65-30-00-A230	335491
	45	56	0	0	400	OptiStart K-FK-65-30-00-A400	335492
	50	65	0	0	24	OptiStart K-FK-80-30-00-A024	335493
	50	65	0	0	48	OptiStart K-FK-80-30-00-A048	335494
	50	65	0	0	110	OptiStart K-FK-80-30-00-A110	335495
	50	65	0	0	230	OptiStart K-FK-80-30-00-A230	335496
	50	65	0	0	400	OptiStart K-FK-80-30-00-A400	335497
	60	80	0	0	24	OptiStart K-FK-94-30-00-A024	335498
	60	80	0	0	48	OptiStart K-FK-94-30-00-A048	335499
	60	80	0	0	110	OptiStart K-FK-94-30-00-A110	335500
	60	80	0	0	230	OptiStart K-FK-94-30-00-A230	335501
	60	80	0	0	400	OptiStart K-FK-94-30-00-A400	335502

Appearance	Maximum power (AC-6b, ≤50 °C), kVAr		Auxiliary contacts		Control coil rated voltage, V	Product name	Code
	400 B	690 B	NO	NC			
	60	80	0	0	24	OptiStart K-FK-95-30-00-A024	335503
	60	80	0	0	48	OptiStart K-FK-95-30-00-A048	335504
	60	80	0	0	110	OptiStart K-FK-95-30-00-A110	335505
	60	80	0	0	230	OptiStart K-FK-95-30-00-A230	335506
	60	80	0	0	400	OptiStart K-FK-95-30-00-A400	335507
	75	135	0	0	24	OptiStart K-FK-115-30-00-A024	335508
	75	135	0	0	48	OptiStart K-FK-115-30-00-A048	335509
	75	135	0	0	110	OptiStart K-FK-115-30-00-A110	335510
	75	135	0	0	230	OptiStart K-FK-115-30-00-A230	335511
	75	135	0	0	400	OptiStart K-FK-115-30-00-A400	335512
	100	150	0	0	24	OptiStart K-FK-150-30-00-A024	335513
	100	150	0	0	48	OptiStart K-FK-150-30-00-A048	335514
	100	150	0	0	110	OptiStart K-FK-150-30-00-A110	335515
	100	150	0	0	230	OptiStart K-FK-150-30-00-A230	335516
	100	150	0	0	400	OptiStart K-FK-150-30-00-A400	335517

The following auxiliary contacts can be installed on series FK contactors: FX-12..., FX-418..., FX-481..., FX-482... and FX-218.

DC switching contactors

Series FD contactors have special design with permanent magnets in the arc control zone, which allows switching loads at increased DC voltage. Only used when the characteristics of the standard OptiStart K DC contactors (see DC contactor selection table) are not sufficient.

Three-pole series FD contactors for DC switching with AC control coils

Appearance	Rated current (DC-1, ≤55 °C) with 3 poles connected in series, A		Auxiliary contacts		Control coil rated voltage, V	Product name	Code
	600 V	1000 V	NO	NC			
	75	35	0	0	24	OptiStart K-FD-65-30-00-A024	335432
	75	35	0	0	48	OptiStart K-FD-65-30-00-A048	335433
	75	35	0	0	110	OptiStart K-FD-65-30-00-A110	335434
	75	35	0	0	230	OptiStart K-FD-65-30-00-A230	335435
	75	35	0	0	400	OptiStart K-FD-65-30-00-A400	335436
	80	60	0	0	24	OptiStart K-FD-80-30-00-A024	335437
	80	60	0	0	48	OptiStart K-FD-80-30-00-A048	335438
	80	60	0	0	110	OptiStart K-FD-80-30-00-A110	335439
	80	60	0	0	230	OptiStart K-FD-80-30-00-A230	335440
	80	60	0	0	400	OptiStart K-FD-80-30-00-A400	335441

Series FD four-pole contactors for DC switching with AC control coils

Appearance	Rated current (DC-1, ≤55 °C) with 4 poles connected in series, A		Power contacts		Control coil rated voltage, V	Product name	Code
	600 V	1000 V	NO	NC			
	100	80	4	0	24	OptiStart K-FD-80-40-00-A024	335442
	100	80	4	0	48	OptiStart K-FD-80-40-00-A048	335443
	100	80	4	0	110	OptiStart K-FD-80-40-00-A110	335444
	100	80	4	0	230	OptiStart K-FD-80-40-00-A230	335445
	100	80	4	0	400	OptiStart K-FD-80-40-00-A400	335446

Series FD four-pole contactors with universal electronically-controlled AC/DC coils

Appearance	Rated current (DC-1, ≤55 °C) with 4 poles connected in series, A		Power contacts		Control coil rated voltage, V	Product name	Code
	600 B	1000 B	NO	NC			
	100	80	4	0	20–48 V AC/DC	OptiStart K-FD-80-40-00-E024	335447
	100	80	4	0	60–110 V AC/DC	OptiStart K-FD-80-40-00-E110	335448
	100	80	4	0	100–250 V AC/DC	OptiStart K-FD-80-40-00-E230	335449
	165	100	4	0	20–48 V AC/DC	OptiStart K-FD-150-40-00-E024	335450
	165	100	4	0	60–110 V AC/DC	OptiStart K-FD-150-40-00-E110	335451
	165	100	4	0	100–250 V AC/DC	OptiStart K-FD-150-40-00-E230	335452

Series FR contactor relays

Series FR contactor relays with AC control coils

Appearance	Main contacts		Control coil rated voltage, V AC	Product name	Code
	NO	NC			
	0	4	024	Optistart K-FR-04-A024	335201
	0	4	048	Optistart K-FR-04-A048	335202
	0	4	110	Optistart K-FR-04-A110	335203
	0	4	230	Optistart K-FR-04-A230	335204
	0	4	400	Optistart K-FR-04-A400	335205
	2	2	024	Optistart K-FR-22-A024	335206
	2	2	048	Optistart K-FR-22-A048	335207
	2	2	110	Optistart K-FR-22-A110	335208
	2	2	230	Optistart K-FR-22-A230	335209
	2	2	400	Optistart K-FR-22-A400	335210
	3	1	024	Optistart K-FR-31-A024	335211
	3	1	048	Optistart K-FR-31-A048	335212
	3	1	110	Optistart K-FR-31-A110	335213
	3	1	230	Optistart K-FR-31-A230	335214
	3	1	400	Optistart K-FR-31-A400	335215
	4	0	024	Optistart K-FR-40-A024	335216
	4	0	048	Optistart K-FR-40-A048	335217
	4	0	110	Optistart K-FR-40-A110	335218
	4	0	230	Optistart K-FR-40-A230	335219
	4	0	400	Optistart K-FR-40-A400	335220

Series FR contactor relays with DC control coils

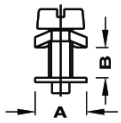
Appearance	Main contacts		Control coil rated voltage, V AC	Product name	Code
	NO	NC			
	0	4	012	Optistart K-FR-04-D012	335221
	0	4	024	Optistart K-FR-04-D024	335222
	0	4	048	Optistart K-FR-04-D048	335223
	0	4	060	Optistart K-FR-04-D060	335224
	0	4	110	Optistart K-FR-04-D110	335225
	0	4	125	Optistart K-FR-04-D125	335226
	0	4	220	Optistart K-FR-04-D220	335227
	2	2	012	Optistart K-FR-22-D012	335230
	2	2	024	Optistart K-FR-22-D024	335231
	2	2	048	Optistart K-FR-22-D048	335232
	2	2	060	Optistart K-FR-22-D060	335233
	2	2	110	Optistart K-FR-22-D110	335234
	2	2	125	Optistart K-FR-22-D125	335235
	2	2	220	Optistart K-FR-22-D220	335236
	3	1	012	Optistart K-FR-31-D012	335239
	3	1	024	Optistart K-FR-31-D024	335240
	3	1	048	Optistart K-FR-31-D048	335241
	3	1	060	Optistart K-FR-31-D060	335242
	3	1	110	Optistart K-FR-31-D110	335243
	3	1	125	Optistart K-FR-31-D125	335244
	3	1	220	Optistart K-FR-31-D220	335245
	4	0	012	Optistart K-FR-40-D012	335248
	4	0	024	Optistart K-FR-40-D024	335249
	4	0	048	Optistart K-FR-40-D048	335250
	4	0	060	Optistart K-FR-40-D060	335251
	4	0	110	Optistart K-FR-40-D110	335252
	4	0	125	Optistart K-FR-40-D125	335253
	4	0	220	Optistart K-FR-40-D220	335254

Series FR contactor relays with DC control coil and reduced power consumption (-Z)

Appearance	Main contacts		Control coil rated voltage, V AC	Product name	Code
	NO	NC			
	0	4	024	OptiStart K-FR-04-Z024	335228
	0	4	048	OptiStart K-FR-04-Z048	335229
	2	2	024	OptiStart K-FR-22-Z024	335237
	2	2	048	OptiStart K-FR-22-Z048	335238
	3	1	024	OptiStart K-FR-31-Z024	335246
	3	1	048	OptiStart K-FR-31-Z048	335247
	4	0	024	OptiStart K-FR-40-Z024	335255
	4	0	048	OptiStart K-FR-40-Z048	335256

Technical specification

Contactors F-09...F-38 and contactor relays FR

Type				FR	F-09	F-12	F-18	F-25	F-26	F-32	F-38
Specifications of power poles											
Number of power poles, pcs.				4	3–4	3–4	3–4	3	3–4	3	3–4
Rated insulation voltage Ui, V				690							
Rated pulse withstand voltage Uimp, kV				6							
Operating frequency, Hz				25...400 (1)							
Operating current, A	Outdoor thermal stability current Ith (AC-1) at		≤40 °C	see data in table below	25	28	32	32	45	56	56/60 (5)
			≤55 °C	--	20	23	26	26	36	45	45/48 (5)
			≤70 °C	--	18	20	23	23	32	40	40/42 (5)
	AC-3 (≤440 V ≤55 °C)			--	9	12	18	25	26	32	38
	AC-4 (400 V) (2)			--	4,9	7,9	8,5	10	11,5	13,5	15,5
Rated short-time withstand current Icw 10 s, A (IEC/EN/BS 60947-1)				--	150	150	200	200	210	320	320
Rated fuse current for short-circuit protection at 400V/50 kA, A			gG	--	25	32	32	50	50	63	63
			aM	--	10	12	20	25	32	32	40
Rated making capacity (effective value), A				--	90	120	180	250	260	320	380
Rated breaking capacity, A			≤440 V	--	72	96	144	200	208	256	304
			500 V	--	72	96	120	184	184	240	240
			690 V	--	71	94	94	102	168	192	192
Resistance, mOhm, and heat dissipation, W, per pole		R	mOhm	--	2,5	2,5	2,5	2,5	2	2	2
		I_{th}	W	--	1,6	2	2,6	2,6	4	6	6
		AC-3	W	--	0,2	0,4	0,8	1,6	1,4	2	2,9
Specifications of connections											
		Type		Screw with washer							
		A		8,3	9,5	9,5	9,5	9,5	13	13	13
		B		3,5	4,5	4,5	4,5	4,5	5,5	5,5	5,5
		Screw		M3,5	M3,5	M3,5	M3,5	M3,5	M4	M4	M4
		Screwdriver type		PH 2	PH 2	PH 2	PH 2	PH 2	PH 2	PH 2	PH 2
Min - max tightening torque of power pole terminals, Nm				1,5–1,8	1,5–1,8	1,5–1,8	1,5–1,8	1,5–1,8	2,5–3,0	2,5–3,0	2,5–3,0
Min - max tightening torque of coil terminals, Nm				0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0
Screwdriver type				PH 2	PH 2	PH 2	PH 2	PH 2	PH 2	PH 2	PH 2
Cross-section of conductors (1 or 2 conductors), min. ... max, mm²	flexible conductors without lugs			1...6	1...6	1...6	1...6	1...6	2.5...16	2.5...16	2.5...16
	flexible conductors with lugs			1...4	1...4	1...4	1...4	1...4	1...10	1...10	1...10
	flexible conductors with fork-type lugs			1...4	1...4	1...4	1...4	1...4	1...10	1...10	1...10
Power terminals protection degree as per IEC/EN/BS 60529				IP20 (3)	IP20 (3)	IP20 (3)	IP20 (3)	IP20 (3)	IP20 (4)	IP20 (4)	IP20 (4)
Specifications of built-in auxiliary contacts											
Contactor types, pcs.				Depending on configuration	1 NO or 1 NC depending on configuration (6)				--		
Conditional thermal current I_{th}, A				10					--		
Specifications as per IEC/EN/BS 60947-5-1			AC	A600					--		
			DC	P600					--		
Operating conditions											
Ambient temperature, °C		at operation		-50...+70							
		during storage		-60...+80							
Maximum height above sea level, m				3000							
Installation position		rated		In a vertical plane							
		permissible		± 30°							
Mounting method				Screw or on 35 mm din-rail							

(1) At frequencies above 60 Hz with derating.
(2) For AC-4 utilization category, the switching life is reduced down to 200 thous. cycles
(3) Protection degree IP20 is provided for devices connected by conductors with a cross-section of at least 1 mm²
(4) Protection degree IP20 on the front side
(5) Increased current is only permissible when connecting a 16 mm2 cable with a fork-type lug
(6) Mechanical characteristics correspond to the data for power poles

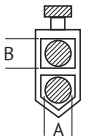
Type				FR	F-09	F-12	F-18	F-25	F-26	F-32	F-38
Specifications of magnetic system											
AC control coil											
Rated voltage at 50/60 Hz, V				12...600							
Control coil rated voltage ranges, % U_s											
Coil with 50/60 Hz supply frequency		50 Hz	closure	80...110							
			opening	20...55							
		60 Hz	closure	80...110	85...110						
			opening	20...55							
Average power consumption at 20 °C, VA											
Coil with 50/60 Hz supply frequency		50 Hz	switching	75							
			retention	9							
		60 Hz	switching	70							
			retention	6,5							
Heat dissipation at ≤20 °C 50 Hz, W				2,5							
DC control coil											
Rated voltage, V				6...415							
Control coil rated voltage ranges, % U_s											
Closure	three-pole version			--	70...125						
	four-pole version			70...125					80...125		
	three- and four-pole versions with reduced consumption (..Z)			80...110							
Opening	all versions			10...40							
Average power consumption at 20 °C, W (switching / retention)			DC coil	5,4							
			Version - Z	2,4							
Время срабатывания											
Average time upon rated voltage control U_s, ms		AC control coil	closure NO	8...24					8...24		
			opening NO	10...20					5...15		
			closure NC	14...28 (1)					9...20 (2)		
			opening NC	7...18 (1)					9...17 (2)		
		DC control coil	closure NO	54...66					53...65		
			opening NO	14...17					14...18		
			closure NC	24...30 (3)					23...28		
			opening NC	47...57 (3)					46...56		
		DC control coil with reduced power consumption (version — Z)	closure NO	75...91					76...92		
			opening NO	15...19					16...20		
			closure NC	24...300 (4)					25...31		
			opening NC	67...810 (4)					63...77		
Wear resistance, mln cycles											
Mechanical				20	20	20	20	20	20	20	20
Electrical (Ie at 400 V AC-3)				2	2	2	1,6	1,2	1,6	1,6	1,4
Maximum switching frequency, cycle/h				3600							

(1) The closing time of contactors with 4 NC power poles and AC control coil is 9...25 ms; the opening time of NC contacts is 9...15 ms.
(2) The closing time of contactors with 4 NC power poles and AC control coil is 11...29 ms; the opening time of NC contacts is 6...14 ms.
(3) The closing time of contactors and contactor relays with 4 NC poles and DC control coil is 23...29 ms; the opening time of NC contacts is 40...49 ms.
(4) The closing time of contactors and contactor relays with 4 NC poles and DC control coil with reduced consumption (..Z) is 25...31 ms; the opening time of NC contacts is 56...68 ms.

Electrical characteristics of built-in auxiliary contacts and series FR contactor relays as per IEC/EN/BS 60947-5-1

Designation	Utilization category as per IEC/EN	Enclosed thermal current I_{the}	Rated operating current, A, at rated operating voltage U_e										Rated power VA, max	
			120 V AC		240 V AC		380 V AC		480 V AC		600 V AC			
Alternating current, A		[A]	Closure	Opening	Closure	Opening	Closure	Opening	Closure	Opening	Closure	Opening	Closure	Opening
A600	AC-15	10	60	6	30	3	19	1,9	15	1,5	12	1,2	7200	720
Direct current			Maximum direct current upon closure and opening										W max	
			125 V DC	250 V DC	301 V DC	400 V DC	500 V DC	600 V DC					300 V or less	
P600	DC-13	5	1,1	0,55	0,2	0,31	0,27	0,2					138	138

Contactors (A)F-40...(A)F-150

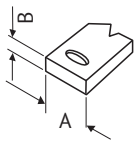
Type				(A)F-40	(A)F-50	(A)F-65	(A)F-80	(A)F-94	(A)F-95	(A)F-115	(A)F-150
Specifications of power poles											
Number of power poles, pcs.				3–4	3–4	3–4	3–4	3	3–4	3–4	3–4
Rated insulation voltage U_i, V				1000							
Rated pulse withstand voltage U_{imp}, kV				8							
Operating frequency, Hz				25...400 (1)							
Operating current, A	Outdoor thermal stability current Ith (AC-1) at		≤40 °C	70	90	100	115	115	140	160	165
			≤55 °C	60	75	80	95	95	115	130	135
			≤70 °C	50	65	70	80	80	100	115	118
	AC-3 (≤440 V ≤55 °C)			40	50	65	80	95	95	115	150
	AC-4 (400 V) (2)			24	28	31	38	45	45	54	70
Rated short-time withstand current I_{cw} 10 s, A (IEC/EN/BS 60947-1)				400	400	640	640	640	760	920	1200
Rated fuse current for short-circuit protection at 400 V / 50 kA, A			gG	100	100	125	125	125	160	200	250
			aM	50	50	80	80	100	100	125	160
Rated making capacity (effective value), A				400	500	650	800	950	1200	1500	1500
Rated breaking capacity, A			≤440 V	320	400	520	640	760	1100	1200	1200
			500 V	265	352	425	625	660	775	850	1025
			690 V	256	312	376	456	475	745	905	905
Resistance, mOhm, and heat dissipation, W, per pole	R		mOhm	0,8	0,8	0,8	0,6	0,6	0,45	0,45	0,45
	I_{th}		W	3,9	6,5	8	7,9	7,9	8,8	11,5	12
	AC-3		W	1,3	2	3,4	3,8	5,4	4,1	6	10,1
Specifications of connections											
			Type	Double screw terminal							
			A	9,5					15		
			B	11					14,5		
			Screw	M6					M8		
			Hexagon size	4					4		
Min – max tightening torque of power pole terminals, Nm				4...5					6...7		
Min – max tightening torque of coil terminals, Nm				0,8–1,0							
Screwdriver type				PH 2							
Cross-section of conductors (1 or 2 conductors), min ... max, mm²	flexible conductors without lugs			1,5...35					1,5...70		
	flexible conductors with lugs			1,5...35					1,5...70		
Power terminals protection degree as per IEC/EN/BS 60529				IP20 from the front side							
Operating conditions											
Ambient temperature, °C	during operation			Series F: -50...+70 Series AF: -40...+70							
	during storage			Series F: -60...+80 Series AF: -50...+80							
Maximum height above sea level, m				3000							
Installation position			rated	In a vertical plane							
			permissible	± 30°							
Mounting method				Screw or on 35 mm din-rail					Screw or on 35 mm din-rail, 15 mm high (TH35-15)		

(1) At frequencies above 60 Hz with derating.
(2) For utilization category AC-4, the switching life is reduced down to 200 thous. cycles.

Type			(A)F-40	(A)F-50	(A)F-65	(A)F-80	(A)F-94	(A)F-95	(A)F-115	(A)F-150
Specifications of magnetic system										
AC control coil / AC supply for series AF										
Rated voltage at 50/60 Hz, V			Series F: 12...600 Series AF: 20...250							
Control coil rated voltage ranges, % U_s										
Coil with 50/60 Hz supply frequency	50 Hz	closure	Series F: 80...110 Series AF: 80...110 (1)							
		opening	Series F: 20...55 Series AF: ≤70 % U_s min							
	60 Hz	closure	Series F: 85...110 Series AF: 80...110 (1)							
		opening	Series F: 40...55 Series AF: ≤70 % U_s min							
Средняя потребляемая мощность при 20 °C, ВА										
Coil with 50/60 Hz supply frequency	50 Hz	switching	Series F: 210 Series AF: 35...120					Series F: 300 Series AF: 70...175		
		retention	Series F: 15 Series AF: 1,5...3,7					Series F: 20 Series AF: 1,7...3,5		
	60 Hz	switching	Series F: 195 Series AF: 35...120					Series F: 275 Series AF: 70...175		
		retention	Series F: 13 Series AF: 1,5...3,7					Series F: 17 Series AF: 1,7...3,5		
Heat dissipation at ≤20 °C 50 Hz, W			Series F: 5 Series AF: 1...2,5					Series F: 210 Series AF: 35...120		
DC power supply (series AF only)										
Rated voltage, V			20...250							
Control coil rated voltage ranges, % U_s										
Closure			80...110 (1)							
Opening			≤75 % U_s min							
Average power consumption at 20 °C, W (switching/ retention)		switching	23...68					70...80		
		retention	1,2...1,9					1,3...1,5		
Trip time, ms										
Average time at rated voltage control U_s	AC control coil / AC supply for series AF	closure NO	Series F: 12...28 Series AF: 40...85					Series F: 16...32 Series AF: 45...90		
		opening NO	Series F: 8...22 Series AF: 20...55					Series F: 9...24 Series AF: 24...60		
	DC power supply (series AF only)	closure NO	40...85					45...90		
		opening NO	20...55					24...60		
Wear resistance, mln cycles										
Mechanical			15	15	15	15	15	15	15	15
Electrical (I_e at 400 V AC-3)			1,5	1,4	1,4	1,3	1,1	1,4	1,2	0,8
Maximum switching frequency, cycle/h			Series F: 3600 Series AF: 1500							

(1) 85 % Us min only for 20...48 V coil with AC supply; 77 % Us min for 100...250 V coil only.
(2) Electromagnetic compatibility: AF-40...AF-94 contactors with 20...48 V AC/DC control coil comply with IEC/EN/BS 60947-1 and IEC/EN/BS 60947-1 for environment B (commercial value). Other contactors are suitable for use in environment A (industrial) and can be adapted for use in environment B by installing appropriate filters.

Contactors AF-160...F-1600

Type			AF-160	AF-195	AF-230	AF-265	AF-330	AF-400	F-500	F-630	F-1000	F-1250	F-1600
Specifications of power poles													
Number of power poles, pcs.			3–4	3–4	3–4	3–4	3	3–4	3–4	3–4	3–4	3–4	3–4
Rated insulation voltage U_i, V			1000										
Rated pulse withstand voltage U_{imp}, kV			8										
Operating frequency, Hz			25...400 (1)										
Operating current, A	Outdoor thermal stability current Ith (AC-1) at	≤40 °C	250	275	350	450	500	600	700	800	1000	1250	1600
		≤55 °C	210	230	290	375	415	500	550	640	850	1050	1360
		≤70 °C	180	200	250	325	360	435	500	540	700	880	1120
	AC-3 (≤440 V ≤55 °C)		160	195	230	265	330	400	520	630	–	–	–
	AC-4 (400 V) (2)		75	95	110	125	160	190	240	260	–	–	–
Rated short-time withstand current I_{cw} 10 s, A (IEC/EN/BS 60947-1)			1280	1560	1840	2120	2640	3200	4050	5040	5600	6500	8300
Rated fuse current for short-circuit protection at 400 V / 50 kA, A		gG	315	315	400	630	630	800	800	1000	1000	1250	1600
		aM	200	250	250	400	500	500	500	630	–	–	–
Rated making capacity (effective value), A			1360	1658	1955	2650	3300	4000	5000	6300	6300	6300	6300
Rated breaking capacity, A		≤440 V	1360	1658	1955	2120	2640	3200	5000	6300	6300	6300	6300
		500 V	1326	1326	1564	1792	2240	2752	4500	5600	5600	5600	5600
		690 V	1139	1377	1377	1624	2000	2504	4000	5000	5000	5000	5000
		1000 V	468	553	638	–	–	–	2700	3400	3400	3400	3400
Resistance, mOhm, and heat dissipation, W, per pole	R	mOhm	0,18	0,18	0,18	0,12	0,12	0,12	0,14	0,14	0,14	0,07	0,07
	I_{th}	W	11	13	21	24,3	30	43,2	68,6	90	140	110	180
	AC-3	W	4,5	6,7	9,3	8,4	13	19	35	56	–	–	–
Specifications of connections													
		A	18	18	18	20	20	20	35	40	60	80	80
		B	5	5	5	5	5	5	6	6	6	10	10
		Screw + hex nut	M8	M8	M8	M10	M10	M10	M10	M12	2xM12	2xM12	2xM12
		Wrench mm	13	13	13	17	17	17	17	19	19	19	19
Min – max tightening torque of power pole terminals, Nm			18	18	18	35	35	35	35	55	55	55	55
Coil terminals (type)			Screw						Faston 1x6.35 or 2x2.8				
Min – max tightening torque of coil terminals, Nm			0,8–1,0						0,8–1,0 (3)				
Screwdriver type			PH 2						PH 2 (3)				
Conductor cross-section (1 or 2 conductors), min ... max, mm^2 / Busbar size, mm	1 or 2 buses		25x5	25x5	25x5	30x4	30x5	30x5	50x5	60x5	60x5	100x5	100x5
	1 cable with lug		185			240	240	240	–	–	–	–	–
	2 cables with lug		185			240	240	240	240	240			
Power terminals protection degree as per IEC/EN/BS 60529			IP00										
Operating conditions													
Ambient temperature, °C	during operation		-40...+70						-50...+70			-20...+60	
	during storage		-50...+80						-60...+80			-30...+80	
Maximum height above sea level, m			3000										
Installation position		rated	In a vertical plane										
		permissible	± 30°										
Mounting method			Screw										

(1) At frequencies above 60 Hz with derating.
(2) For utilization category AC-4, the switching life is reduced down to 200 thous. cycles.
(3) Only applicable when OptiStart K-FX-371 faston-screw connection adapter is installed.

Type		AF-160	AF-195	AF-230	AF-265	AF-330	AF-400	F-500	F-630	F-1000	F-1250	F-1600
Specifications of magnetic system												
Control coil current type		AC/DC						AC or DC			AC	
Rated voltage, V		20...500						48...480	48...480	48...480	110/240	110/240
Control coil rated voltage ranges, % U_s	closure	80 U_s min ...110 U_s max						80...110	80...110	80...110	80...110	80...110
	opening	≤70 % U_s min						20...60	20...60	20...60	20...60	20...60
Average power consumption at 20 °C, VA	switching	160...230			160-320			400	400	400	800	800
	retention	1,5...3,0			3,5-8			18	18	18	45	45
Heat dissipation at ≤20 °C 50 Hz, W		1,5...3,0			3,5-8			18	18	18	40	40
Trip time												
closure NO, ms		50...100			80...120			110...180	110...180	110...180	120...210	300...450
opening NO, ms		30...75			30...75			60...100	60...100	60...110	70...130	70...130
Wear resistance, mln cycles												
Mechanical		10	10	10	5	5	5	5	5	5	5	5
Electrical (I_e at 400 V AC-3)		1	1	1	0,9	0,7	0,7	0,7	0,7	–	–	–
Maximum switching frequency, cycle/h		1000			1000			1200				
Optional functions												
Alarm device		Open or closed state indicator										

Accessory specifications

Type		Auxiliary contact unit						Pneumatic adapter	Fourth power pole			Electromechanical interlocks	Mechanical latch
		FX-418.. FX-428..	FX-484.. FX-10.. FX-12..	FX-218 FX-481..	FX-482 (4)	FX-10C01 FX-10C10	FX-350 FX-354	FX-485.. FX-486.. FX-487..	FX-42 FX-D42	FX-43	FX-44	FX-5001 FX-5301 FX-5401	FX-222.. FX-272.. FX-641..
Conditional thermal current I_{th}, A		10	10	10	0,1 (4)	10	16	10	56	115	165	10	–
Rated insulation voltage U_i, V		690	690	690	690	690	690	690	690	1000	1000	690	–
Type of connection	Screw — type and width, mm	M3,5	M3	–	–	M3,5	–	M3,5	M4	M6	M8	M3	–
		7	7	–	–	7	–	7	12,5	9,6	14,5	7	–
	Faston connector terminal — q-ty and width, mm	–	–	1x6,35	1x6,35	–	1x6,35	–	–	–	–	–	–
				2x2,8	2x2,8		2x2,8						
Tightening torque, Nm		0,8...1	0,8...1	–	–	0,8...1	–	0,8...1	2,5...3	4...5	5,5...6,5	0,8...1	0,8...1
Maximum cross-section (1 or 2 conductors), mm^2	Flexible without lug	2,5	2,5 (3)	–	–	2,5	–	2,5	16	35	70	2,5	4
	Flexible with lug	2,5	2,5	2,5	2,5	2,5	2,5	2,5	16	35	70	2,5	2,5
Ingress protection degree		IP20 (1)	IP20	IP20 (2)	IP20 (4)	IP20 (1)		IP20 (1)	IP20 (5)	IP20 (5)	IP20 (5)	IP20	–
Type as per IEC/EN/BS 60947-5-1	AC	A600	A600	A600	A600	A600	A600	A600	–	–	–	A600	–
	DC	Q600	P600	P600	P600	Q600	Q600	Q600	–	–	–	Q600	–
Mechanical wear resistance, mln cycles		3	10	10	10	5		3	20	15	15	10	0,1
Rated voltage of the control circuit, V	AC (50/60 Hz)	–	–	–	–	–		–	–	–	–	–	24...415
	DC	–	–	–	–	–		–	–	–	–	–	12...240
Control power consumption, VA/W	AC (50/60 Hz)	–	–	–	–	–		–	–	–	–	–	40
	DC	–	–	–	–	–		–	–	–	–	–	70
Maximum pulse duration, ms	for opening	–	–	–	–	–		–	–	–	–	–	–
	for closure	–	–	–	–	–		–	–	–	–	–	–

(1) Protection degree IP20 is ensured when conductors with a cross-section of at least 0.75 mm^2 are connected.
(2) Protection degree IP20 is ensured when conductors with an insulated faston connection are connected.
(3) 1.5 mm^2 for insulated lugs.
(4) Cold-plated contacts in a sealed casing for harsh environmental conditions. The I_{th} value is given for a voltage of 125 V AC or 30 V DC.

Specifications of power poles

Utilization category AC-3: Squirrel-cage motor, opening at a rated current

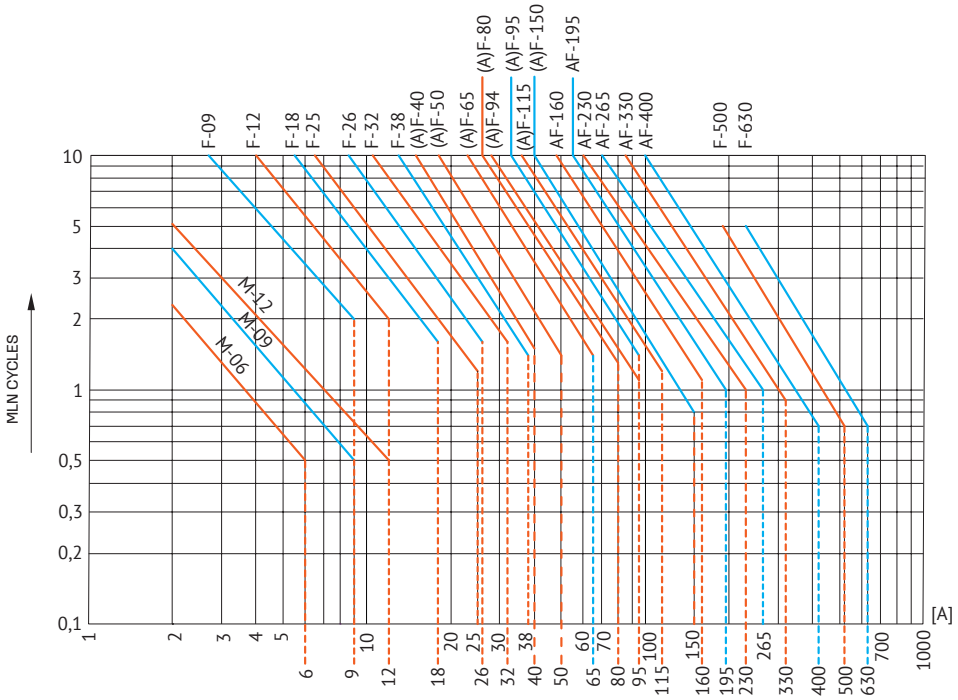
Maximum operating power at ambient temperature ≤55 °C

Contactor type	Operating current, A	Operating power, kW						
	(U_e ≤440 V)	220/230 V	380/400 V	415 V	440 V	500 V	660/690 V	1000 V
M-06	6	1,5	2,2	2,4	2,5	3	3	-
M-09	9	2,2	4	4,3	4,5	5	5	-
M-12	12	3,2	5,7	6,2	5,5	5	5	-
F-09	9	2,2	4,2	4,5	4,8	5,5	7,5	-
F-12	12	3,2	5,7	6,2	6,2	7,5	10	-
F-18	18	4	7,5	9	9	10	10	-
F-25	25	7	12,5	13,4	13,4	15	18	-
F-26	26	7,3	13	14	14	15,6	18,5	-
F-32	32	8,8	16	17	17	20	22	-
F-38	38	11	18,5	18,5	18,5	20	22	-
(A)F-40	40	11	18,5	22	22	22	30	18
(A)F-50	50	15	22	30	30	30	37	22
(A)F-65	65	18,5	30	37	37	37	45	30
(A)F-80	80	22	37	45	45	55	55	37
(A)F-94	95	30	45	55	55	55	55	37
(A)F-95	95	30	45	55	55	75	90	45
(A)F-115	115	37	55	55	55	75	110	55
(A)F-150	150	45	75	75	75	90	110	55
(A)F-160	160	45	75	90	90	110	132	75
(A)F-195	195	55	90	110	110	132	160	90
(A)F-230	230	55	110	110	132	132	160	110
AF-265	265	75	132	132	160	160	200	160
AF-330	330	90	160	160	160	200	250	185
AF-400	400	110	200	200	200	250	315	200
F-500	520	156	290	306	328	367	416	312
F-630	630	198	335	368	368	368	440	368

Operating current with parallel connection of contactor poles

If the contactor poles are connected in parallel, the contactor operating current specified in the table should be multiplied by the below coefficient K, which takes into account the uneven current distribution between different poles.
To minimize such uneven distribution, it is recommended to use jumpers (see the «Accessories» section)
2 of poles connected in parallel: K = 1.6
3 of poles connected in parallel: K = 2.2
4 of poles connected in parallel: K = 2.8

Electrical wear resistance at AC-3 ≤ 440 V



Utilization category DC-...

Maximum operating power at ambient temperature ≤55 °C

Voltage U_e	Contactor	Maximum current Ie, A in categories							
		DC-1 at L/R ≤ 1 ms with poles connected in series				DC-3 — DC-5 at L/R ≤ 15 ms with poles connected in series			
	Standard size	1	2	3	4	1	2	3	4
≤ 24 V	M-06	9	12	14	–	6	7	9	–
	M-09	12	15	16	16	7	8	10	10
	M-12	12	15	16	–	7	8	10	–
	F-09	15	18	20	20	10	13	15	15
	F-12	17	20	22	20	12	15	18	15
	F-18	17	20	22	22	12	15	18	18
	F-25	20	23	23	–	15	18	22	–
	F-26	25	28	28	28	18	20	25	30
	F-32	30	32	32	–	20	25	30	–
	F-38	35	36	36	36	24	28	32	32
	(A)F-40	40	48	48	–	27	32	40	–
	(A)F-50	45	60	60	60	30	35	50	55
	(A)F-65	50	70	70	70	35	45	55	60
	(A)F-80	70	100	100	100	40	60	80	90
	(A)F-94	77	110	110	115	45	65	86	96
	(A)F-95	140	140	140	140	140	140	140	140
	(A)F-115	160	160	160	160	160	160	160	160
	(A)F-150	165	165	165	165	165	165	165	165
48 V	M-06	8	11	14	–	5	7	9	–
	M-09	10	14	16	16	6	8	10	10
	M-12	10	14	16	–	6	8	10	–
	F-09	13	18	20	20	9	11	15	15
	F-12	15	20	22	20	11	13	18	15
	F-18	15	20	22	22	11	13	18	18
	F-25	18	23	23	–	13	18	22	–
	F-26	21	28	28	28	15	20	25	30
	F-32	26	32	32	–	17	22	28	–
	F-38	30	34	34	34	20	25	28	28
	(A)F-40	35	48	48	–	23	30	40	–
	(A)F-50	40	60	60	60	25	35	50	55
	(A)F-65	50	70	70	70	25	40	50	60
	(A)F-80	60	100	100	100	30	50	70	90
	(A)F-94	66	110	110	115	33	55	75	95
	(A)F-95	140	140	140	140	44	63	115	110
	(A)F-115	160	160	160	160	50	72	150	120
	(A)F-150	165	165	165	165	60	82	195	130
75 V	M-06	4	7	8	–	2	4	5	–
	M-09	4	9	10	10	2	5	6	6
	M-12	4	9	10	–	2	5	6	–
	F-09	12	17	20	20	8	10	13	15
	F-12	13	18	20	20	10	12	15	15
	F-18	15	20	20	20	11	13	16	16
	F-25	18	23	23	–	13	16	18	–
	F-26	18	25	25	25	13	18	20	25
	F-32	22	28	32	–	15	20	28	–
	F-38	23	29	33	33	17	22	28	28
	(A)F-40	30	45	48	–	19	27	38	–
	(A)F-50	40	60	60	60	22	30	45	55
	(A)F-65	50	70	70	70	25	40	50	60

Voltage U_e	Contactor	Maximum current Ie, A in categories:							
		DC-1 at L/R ≤ 1 ms with poles connected in series				DC-3 — DC-5 at L/R ≤ 15 ms with poles connected in series			
	Standard size	1	2	3	4	1	2	3	4
75 V	(A)F-80	60	100	100	100	30	50	70	90
	(A)F-94	66	110	110	115	33	55	75	95
	(A)F-95	100	140	155	155	36	60	90	110
	(A)F-115	120	160	160	160	40	65	100	120
	(A)F-150	150	165	165	165	44	70	110	130
	AF-160	250	250	250	250	160	160	160	160
	AF-195	275	275	275	275	180	180	180	180
	AF-230	350	350	350	350	250	250	250	250
	AF-265	350	350	350	350	280	280	280	280
	AF-330	375	375	375	375	310	310	310	310
	AF-400	400	400	400	400	350	350	350	350
	F-500	650	650	650	650	550	550	550	550
	F-630	800	800	800	800	800	800	800	800
110 V	M-06	3	6	8	–	1	3	4	–
	M-09	3	8	10	10	1	4	5	5
	M-12	3	8	10	–	1	4	5	–
	F-09	6	12	15	16	2	7	11	12
	F-12	6	13	16	16	2	8	12	16
	F-18	6	13	16	18	2	8	12	13
	F-25	6	16	18	–	2	10	15	–
	F-26	6	22	24	24	2	13	18	20
	F-32	8	25	27	–	2,5	15	20	–
	F-38	8	32	34	34	2,5	18	23	23
	(A)F-40	8	42	44	–	3	22	27	–
	(A)F-50	8	50	55	60	3	25	30	45
	(A)F-65	8	60	60	70	3	30	35	50
	(A)F-80	8	80	85	100	3	40	60	75
	(A)F-94	8	90	93	110	3	43	64	80
	(A)F-95	10	110	120	140	6	55	85	105
	(A)F-115	10	130	140	160	6	65	100	125
	(A)F-150	10	150	160	165	6	80	120	150
	AF-160	110	150	160	250	80	120	140	140
	AF-195	120	170	170	275	90	140	160	160
	AF-230	145	270	270	350	135	225	250	250
	AF-265	160	300	300	300	150	250	280	280
	AF-330	195	350	350	350	170	290	310	310
	AF-400	250	400	400	400	200	350	350	350
	F-500	320	550	600	600	320	550	550	550
	F-630	460	800	800	800	460	800	800	800
220 V	M-06	–	–	1	–	–	–	0,5	–
	M-09	–	–	2	2	–	–	0,8	0,8
	M-12	–	–	2	–	–	–	0,8	–
	F-09	–	1	10	12	–	2	6	7
	F-12	–	1	11	12	–	2	6	7
	F-18	–	1	11	13	–	2	6	8
	F-25	–	1	12	–	–	2	8	–
	F-26	–	2	20	26	–	3	19	15
	F-32	–	3	23	–	–	3	23	–
	F-38	–	4	30	38	–	3	25	15
	(A)F-40	–	5	56	70	–	5	32	40
	(A)F-50	–	7	75	90	–	5	40	50
	(A)F-65	–	9	90	110	–	5	52	65

Voltage U_e	Contactor	Maximum current Ie, A in categories							
		DC-1 at L/R ≤ 1 ms with poles connected in series				DC-3 — DC-5 at L/R ≤ 15 ms with poles connected in series			
	Standard size	1	2	3	4	1	2	3	4
220 V	(A)F-80	–	9	95	115	–	5	64	80
	(A)F-94	–	9	95	115	–	5	64	80
	(A)F-95	–	12	125	140	–	7	76	95
	(A)F-115	–	14	145	160	–	7	92	115
	(A)F-150	–	14	150	165	–	7	120	150
	AF-160	–	130	150	250	–	90	120	140
	AF-195	–	150	170	275	–	100	140	160
	AF-230	–	225	270	350	–	180	225	225
	AF-265	–	250	300	300	–	200	250	280
	AF-330	–	300	350	350	–	230	290	310
	AF-400	–	350	400	400	–	280	350	350
	F-500	–	450	600	600	–	450	550	550
	F-630	–	700	800	800	–	700	800	800
330 V	AF-160	–	–	130	150	–	–	90	140
	AF-195	–	–	150	170	–	–	100	160
	AF-230	–	–	225	270	–	–	180	210
	AF-265	–	–	250	300	–	–	200	280
	AF-330	–	–	300	350	–	–	230	310
	AF-400	–	–	350	400	–	–	280	350
	F-500	–	–	450	600	–	–	450	550
	F-630	–	–	700	750	–	–	650	700
460 V	AF-160	–	–	–	130	–	–	–	90
	AF-195	–	–	–	150	–	–	–	100
	AF-230	–	–	–	225	–	–	–	180
	AF-265	–	–	–	250	–	–	–	200
	AF-330	–	–	–	300	–	–	–	230
	AF-400	–	–	–	350	–	–	–	280
	F-500	–	–	–	450	–	–	–	450
	F-630	–	–	–	700	–	–	–	700

Selection rules

Parameters to be taken into account when selecting a contactor:
– operating current I_e
– operating voltage U_e
– utilization category and time constant L/R
– electrical wear resistance

Ambient conditions during operation

The specified currents are valid under the following conditions:
– ambient temperature: ≤ 55 °C
– switching frequency: up to 120 cycles/h with 60% load, up to 250 cycles/h with 30% load

Poles connected in series

Depending on the operating voltage, contactors with the specified number of poles connected in series should be used. Poles connected in series can be connected either in one polarity or distributed between both polarities of the circuit.

Note: For voltages below 30 V, it is not recommended to make connections using the connection diagrams shown in the below figure; otherwise a significant voltage drop may occur. In this case, it is preferable to use contactors with poles connected in parallel, following the instructions given in the next paragraph.

Example of series connection of poles

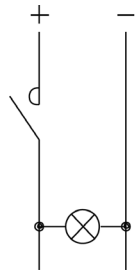


Fig. 1

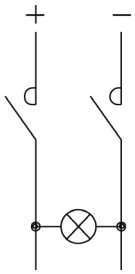


Fig. 2

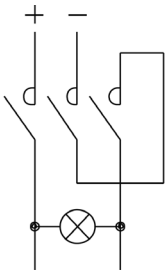


Fig. 3

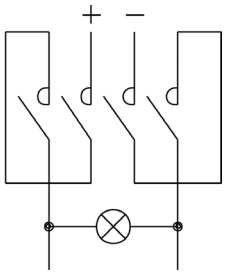


Fig. 4

Poles connected in parallel

In case of operation at a voltage that requires 1 or 2 poles connected in series, the electrical durability can be increased by connecting the poles in parallel. In case of direct current, poles connected in parallel do not increase the maximum operating current specified in the above tables, but make it possible to increase the rated contact current, if the contactor makes no-load switching or is used as a shunt contact.
In this case, the contact current can be calculated by multiplying the rated current of one pole by the below coefficient. For example, if the current of one pole is 10 A, then the current of three poles connected in parallel will be as follows: 10 * 2,2 = 22 A.
Therefore, the working current is the current specified in the tables, which is multiplied by a coefficient that takes into account the uneven current distribution across individual poles.
2 poles connected in parallel: K = 1.6
3 poles connected in parallel: K = 2.2
4 poles connected in parallel: K = 2.8

Fig. 5

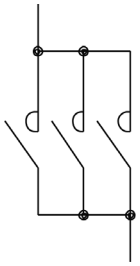


Fig. 6

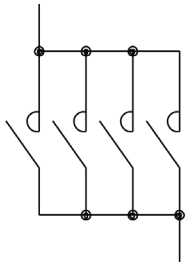


Fig. 7

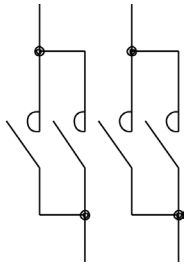


Fig. 8

Switching of lighting circuits

General information

When a contactor is selected for switching the lighting loads, the following characteristics should be taken into account:
– lamp type
– power factor (cos φ)
– availability or absence of reactive power compensation devices
– current upon activation and in the rated mode.

Depending on the type and number of lamps, it is necessary to take into account that the parameters influencing the choice are:
– incandescent lamps and LED lamps: making capacity of the
– lamps without reactive power compensation: rated current in category AC-1
– lamps with reactive power compensation: rated current in category AC-3

Key specifications of the most commonly used types of lamps are listed below.

Lamp type	Activation		Deactivation	
	Multiple of I_n (1)	cos φ	Multiple of I_n (1)	cos φ
Incandescent lamps	15	1	1	1
Self-ballasted mercury lamps	1,3	1	1	1
Fluorescent lamps	1,15...1,3	0,2	1	0,3...0,5 (without reactive power compensation) 1 (with reactive power compensation)
High-pressure mercury lamps	1,5...1,75	0,2	1	0,45...0,7 (without reactive power compensation)
High-pressure sodium lamps	1,3...1,5	0,2	1	0,3...0,5 (without reactive power compensation)
Low-pressure sodium lamps	1	0,2...0,5	1	0,2...0,5 (without reactive power compensation)
Halogen lamps	1,7...2,1	0,2	1	0,4...0,5 (without reactive power compensation)
LED	20...40 (5)	0,6...0,95	1	0,6...0,95

Selection of contactors for switching lighting circuits

Lamp specifications		Power, W	Rated current, A	Capacitance, µF	Maximum number [n] of lamps for each contactor pole (2)										
					M-06 M-09 M-12	F-09 F-12 F-18	F-25	F-26 F-32	F-38	(A)F-40 (A)F-50	(A)F-65 (A)F-80 (A)F-94	(A)F-95	(A)F-115 (A)F-150	AF-160	AF-195 AF-230
LED 220...240 V 50/60 Hz	See note (6)				Each pole can switch 67% of the rated current at AC-3 (6)										
Incandescent lamps 220...240 V	50/60 Hz	60	0,27	–	30	48	92	118	129	203	240	296	370	425	462
		100	0,45	–	18	28	55	71	77	122	144	177	222	255	277
		200	0,91	–	8	14	27	35	38	60	71	87	109	126	137
		300	1,4	–	5	9	17	22	25	39	46	57	71	82	89
		500	2,3	–	3	5	10	13	15	23	28	34	43	50	54
		1000	4,6	–	1	2	5	6	7	11	14	17	21	25	27
Self-ballasted mercury lamps 220...240 V	50/60 Hz	100	0,45	–	20	33	57	77	88	122	144	177	244	311	377
		160	0,72	–	12	20	36	48	55	76	90	111	152	194	236
		250	1,13	–	8	13	23	30	35	48	57	70	97	123	150
		500	2,3	–	4	6	11	15	17	23	28	34	47	60	73
		1000	4,6	–	1	3	5	7	8	11	14	17	23	30	36
Fluorescent lamps with electronic power supply unit 220...240 V 50/60 Hz (EVG)	Single installation	16/18	0,1	(6,8) (3)	48	80	160	220	220	400	450	500	750	1050	1200
		32/36	0,18	(6,8) (3)	27	44	88	122	122	222	250	277	416	583	666
		50/58	0,27	(10) (3)	17	29	59	82	82	148	166	185	277	388	444
	Dual installation	2x16/18	0,18	(10) (3)	26	44	88	122	122	222	250	277	416	583	666
		2x32/36	0,35	(10) (3)	13	22	45	62	62	114	128	142	214	300	342
		2x50/58	0,52	(22) (3)	9	15	30	42	42	76	86	96	144	201	230
Regular fluorescent lamps 220...240 V 50/60 Hz	Without reactive power compensation Single installation	15	0,35	–	25	42	74	100	114	157	185	228	314	400	485
		20	0,37	–	24	40	70	94	108	148	175	216	297	378	459
		40	0,44	–	20	34	59	79	90	125	147	181	250	318	386
		65	0,7	–	12	21	37	50	57	78	92	114	157	200	242
		115	1,5	–	6	10	17	23	26	36	43	53	73	93	113
		140	1,5	–	6	10	17	23	26	36	43	53	73	93	113
Regular fluorescent lamps 220...240 V 50/60 Hz	With reactive power compensation Single installation	15	0,11	4,5	24	40	62	94	94	200	200	200	533	533	533
		20	0,16	4,5	24	40	62	94	94	200	200	200	533	533	533
		40	0,24	4,5	24	40	62	94	94	200	200	200	458	500	520
		65	0,4	7	15	25	40	50	57	125	128	128	275	300	312
		115	0,7	18	6	10	15	23	23	50	50	50	133	133	133
		140	0,7	18	6	10	15	23	23	50	50	50	133	133	133
	With reactive power compensation Dual installation	2x20	0,26 (4)	–	54	57	100	153	153	211	250	307	423	538	653
		2x40	0,46 (4)	–	19	32	56	86	86	119	141	173	239	304	369
		2x65	0,7 (4)	–	12	21	37	57	57	78	92	114	157	200	242
		2x115	1,3 (4)	–	6	11	20	30	30	42	50	61	84	107	130
		2x140	1,5 (4)	–	6	10	17	26	26	36	43	53	73	93	113

Lamp specifications		Power, W	Rated current, A	Capacitance, μF	Maximum number [n] of lamps for each contactor pole (2)										
					M-06 M-09 M-12	F-09 F-12 F-18	F-25	F-26 F-32	F-38	(A)F-40 (A)F-50	(A)F-65 (A)F-80 (A)F-94	(A)F-95	(A)F-115 (A)F-150	AF-160	AF-195 AF-230
High-pressure mercury lamps 220...240 V 50/60 Hz	Without reactive power compensation	50	0,61	–	10	16	26	36	44	65	73	82	122	172	196
		80	0,8	–	7	12	20	27	33	50	56	62	93	131	150
		125	1,2	–	5	8	13	18	22	33	37	41	62	87	100
		250	2,2	–	3	4	7	10	12	18	20	22	34	47	54
		400	3,4	–	2	3	5	6	7	11	13	14	22	30	35
		700	5,5	–	–	1	3	4	4	7	8	9	13	19	21
		1000	8	–	–	1	2	2	3	5	5	6	9	13	15
	With reactive power compensation	50	0,29	7	15	25	40	60	60	128	128	128	258	342	342
		80	0,42	8	13	22	35	52	53	95	107	112	178	250	285
		125	0,7	10	8	14	22	31	35	57	64	71	107	150	171
		250	1,3	18	4	7	12	16	19	30	34	38	57	80	92
		400	2,1	25	2	4	7	10	11	19	21	23	35	50	57
		700	3,6	40	–	2	4	6	6	11	12	13	20	29	33
		1000	5,3	60	–	1	3	4	4	7	8	9	14	19	22
380...415 V 50/60 Hz	Without reactive power compensation	2000	8	–	–	–	1	2	2	3	3	4	5	8	9
	With reactive power compensation	2000	5,5	35	–	–	1	2	2	4	5	5	8	11	13
High-pressure sodium lamps 220...240 V 50/60 Hz	Without reactive power compensation	150	1,8	–	3	5	8	12	15	22	25	27	41	58	66
		250	3	–	2	3	5	7	9	13	15	16	25	35	40
		400	4,7	–	1	2	3	4	5	8	9	10	15	22	25
		600	7,1	–	–	1	2	3	3	5	6	6	10	15	16
		1000	10,4	–	–	–	1	2	2	3	4	4	7	10	11
	With reactive power compensation	150	0,83	20	–	9	14	19	21	45	45	45	90	120	120
		250	1,5	36	–	5	7	10	11	25	25	25	50	66	66
		400	2,4	48	–	3	5	6	7	16	18	18	31	43	50
		600	3,5	68	–	2	3	4	4	10	12	12	20	28	34
		1000	6,3	120	–	1	1	2	2	6	7	7	11	16	19
Low-pressure sodium lamps 220...240 V 50/60 Hz	Without reactive power compensation	35	1,5	–	4	6	10	14	18	26	30	33	50	70	80
		55	1,5	–	4	6	10	14	18	26	30	33	50	70	80
		90	2,4	–	3	4	6	9	11	16	18	20	31	43	50
		135	3,1	–	2	3	5	7	8	12	14	16	24	33	38
		150	3,2	–	2	3	5	6	8	12	14	15	23	32	37
		180	3,3	–	2	3	4	6	8	12	13	15	22	31	36
	With reactive power compensation	35	0,31	20	–	6	10	14	18	45	45	45	120	120	120
		55	0,42	20	–	6	10	14	18	45	45	45	120	120	120
		90	0,63	30	–	4	6	9	11	30	30	30	80	80	80
		135	0,94	40	–	3	5	7	8	22	22	22	60	60	60
		150	1	40	–	3	5	6	8	22	22	22	60	60	60
		180	1,2	40	–	3	4	6	8	22	22	22	60	60	60
Metal halide lamps 220...240 V 50/60 Hz	Without reactive power compensation	35	0,3	–	–	28	50	66	80	100	150	167	250	330	400
		70	0,5	–	–	16	28	40	50	60	90	100	150	200	240
		150	1	–	–	8	14	20	25	30	45	50	75	100	120
		250	3	–	–	3	5	7	9	13	15	16	25	35	40
		400	3,5	–	–	2	4	6	7	11	12	14	21	30	34
		1000	10	–	–	1	1	2	2	4	4	5	7	10	12
		2000	17	–	–		-	1	1	2	2	2	4	6	7
	With reactive power compensation	35	0,17	6	–	33	60	65	65	200	240	260	400	420	440
		70	0,28	12	–	20	36	40	40	120	145	155	240	255	265
		150	0,6	20	–	9	17	18	18	56	68	74	112	118	120
		250	1,5	32	–	5	7	8	10	26	28	28	46	50	53
		400	2	35	–	4	5	6	7	20	22	25	35	37	40
		1000	5,8	95	–	1	1	2	2	6	7	8	12	12	13
		2000	11,5	148	–	–	–	1	1	3	3	4	6	6	6
380...415 V 50/60 Hz	Without reactive power compensation	2000	10,3	–	–	–	–	1	1	2	2	3	4	6	7
		3500	18	–	–	–	–	–	–	1	1	1	2	3	4
	With reactive power compensation	2000	6,6	60	–	–	1	1	1	3	3	4	6	7	7
		3500	11,6	100	–	–	–	–	–	2	2	2	3	3	4

(1) In = lamp rated current
(2) For single-phase networks (between phase and neutral) or two-phase networks (between phase and phase), the maximum number of lamps corresponds to the number given in the table.
For three-phase networks with neutral, the maximum number of lamps switched by the contactor is n * 3
For three-phase networks without neutral, the maximum number of lamps switched by the contactor is n * √3
Electrical endurance at +55 °C: 100,000 cycles
(3) Capacitors built into the power supply unit
(4) Total power
(5) On the AC side of the power supply units
(6) As a rule, each lamp has its own power supply unit (driver). If several lamps are powered by a single power supply unit, it should be taken into account that the sum of rated currents of power supply units connected to each pole of a contactor should not exceed 67% of the rated current for utilization category AC-3

Capacitance load switching

General information and selection criteria

During the transient process, the contactors are exposed to high-frequency current with a large amplitude.
Current frequency range — 1 to 10 kHz Contactors should be selected so that the maximum amplitude of the current passing through the contactor is lower than the maximum permissible current of the selected contactor.

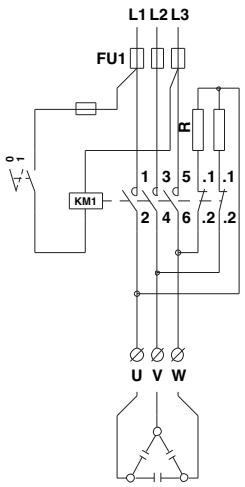
Ambient conditions during operation

Ambient temperature: ≤ 55 °C
At temperatures above +50 °C, the operating power specified in the table should be reduced by a percentage equal to the difference (in percent) between the actual temperature and 50 °C.
Switching frequency: ≤ 120 cycles/hour
Electrical wear resistance: 100,000 cycles min

Contactor type	Rated current, A ≤400 V	Maximum permissible peak current, A	Maximum operating voltage, V	Fuse, A gG	Maximum operating power (AC-6b), kVAr			
					220 V 230 V 240 V	380 V 400 V	415 V 440 V	500 V 660/690 V
F-09	12	500	690	16	4,5	7,5	9	10
F-12	18	550	690	25	7	12,5	12	14
F-18	23	1000	690	32	9	15	16	18
F-25	23	1000	690	32	9	15	16	18
F-26	30	1400	690	40	11	20	22	22
F-32	36	1700	690	50	14	25	27	30
F-38	43	1900	690	63	17	30	30	34
(A)F-40	50	2500	1000	100	20	35	40	45
(A)F-50	58	2500	1000	80	22	40	41	45
(A)F-65	65	2500	1000	100	26	45	50	52
(A)F-80	75	2500	1000	125	30	50	56	60
(A)F-94	75	2500	1000	125	30	50	56	70
(A)F-95	90	3000	1000	125	34	60	75	80
(A)F-115	115	3000	1000	160	45	75	85	135
(A)F-150	144	3000	1000	160	50	100	115	150
AF-160	150	3400	1000	200	57	100	108	130
AF-195	170	3600	1000	250	65	112	122	150
AF-230	215	4500	1000	315	85	140	150	190
AF-265	240	5100	1000	315	91	158	172	210
AF-330	265	5900	1000	315	105	184	200	245
AF-400	320	7500	1000	400	122	211	230	280
F-500	500	9000	1000	630	190	330	360	430
F-630	610	11000	1000	800	230	400	432	520

Current-limiting ballast resistors

Using contactors for switching the load power specified in the table is only possible when the design peak current of the load does not exceed the maximum peak current specified in the table. If the condition is not met, it is necessary to use current-limiting ballast resistors, information on which is presented in the «Accessories» section.



Resistors for fast capacitor discharge

Connecting the resistors according to the specified diagram when the contactor coil is de-energized ensures both instantaneous disconnection of the capacitors and their fast discharge. The resistors specified in the below table ensure discharge in a maximum of 2 s.

Reactive power of capacitors, kVAr	Voltage 220...230 V		Voltage 380...500 V	
	Ω	W	Ω	W
2,5...5	3900	12	8200	12
10...15	1800	25	4300	25
20...50	1000	50	2200	50

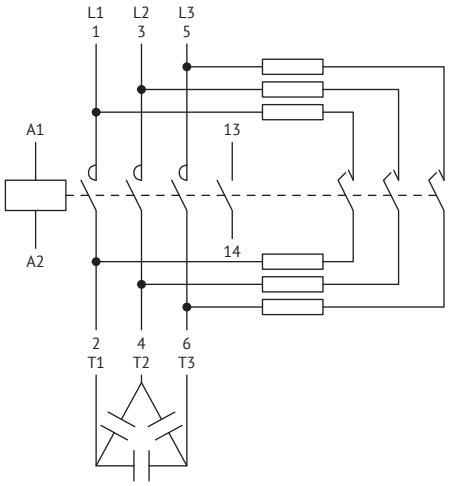
Special contactors for capacitors switching

General information

Series FK contactors are equipped with auxiliary contacts with advance closure. These contacts are designed to connect resistors for a short time (2-3 ms) during the contactor closing period, which limit the capacitors charging current. These resistors are disconnected as soon as the closing process of the main contactor contacts is completed.
This connection diagram allows to reduce the electrical load on all system components and to increase their service life and reliability.
The main scope of application of such contactors is compact automatic reactive power control systems (RPCS), since in this case they do not require a current-limiting inductance and do not dissipate a large amount of heat, which allows to reduce the dimensions of design solutions.

Ambient conditions during operation

Ambient temperature: ≤ 50 °C
At an ambient temperature of 50 to 70 °C, the maximum operating power specified in the table should be reduced by a percentage equal to the difference between the actual ambient temperature and 50 °C.
Frequency of operations: ≤ 120 cycles/h.
Electrical durability: ≥ 400,000 cycles.



Auxiliary contact 13-14 is installed on FK-09...FK-18 contactors only

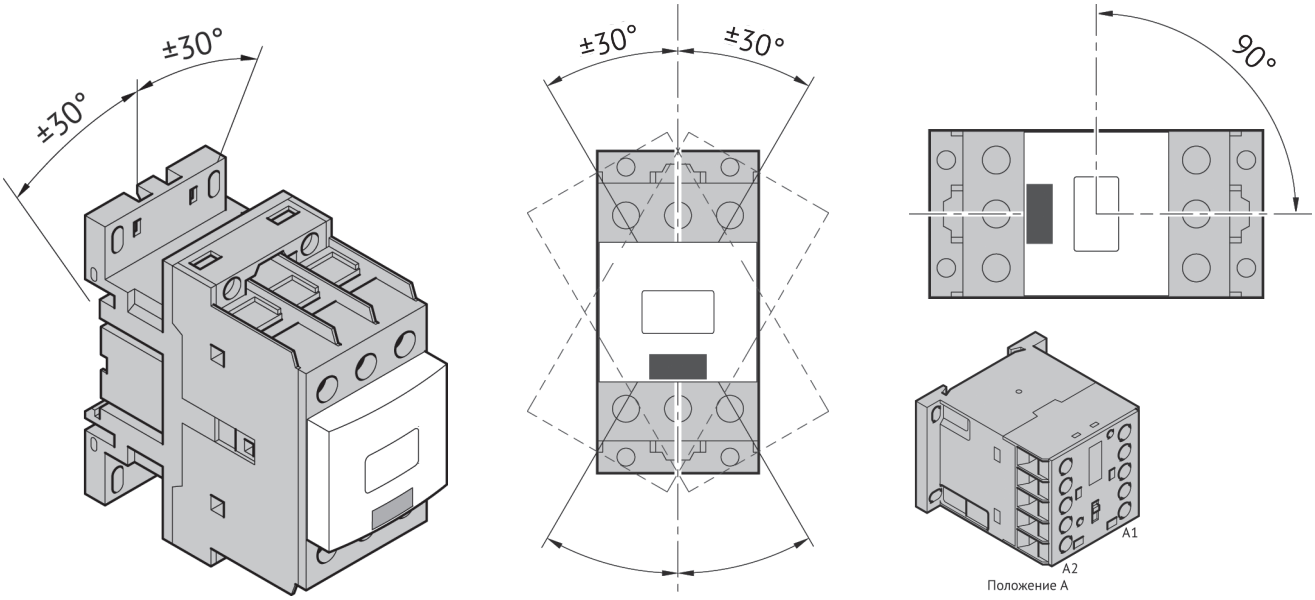
Contactor type	Number of built-in auxiliary contacts, pcs.	Rated operating current, A ≤440 V	Fuse, A gG	Maximum power at ≤50 °C (AC-6b) (1), kBAr			
				220 V 230 V 240 V	380 V 400 V	415 V 440 V	500 V 690 V
FK-09	1	12	16	4,5	7,5	9	10
FK-12	1	18	25	7	12,5	14	16
FK-18	1	23	40	9	15	17	20
FK-26	–	30	40	11	20	22	25
FK-32	–	36	63	14	25	27,5	30
FK-38	–	43	63	17	30	33	36
FK-50	–	58	80	22	40	41	46
FK-65	–	65	100	26	45	50	56
FK-80	–	75	125	30	50	56	65
FK-94 (2)	–	90	125	34	60	75	80
FK-95	–	90	125	34	60	75	80
FK-115	–	115	160	45	75	85	135
FK-150	–	144	160	50	100	115	150

(1) For selection of contactors for inside-delta switching applications, please contact our technical support team
(2) The maximum thermal current Ith of FK-94 contactor is 115 A.

Installation positions

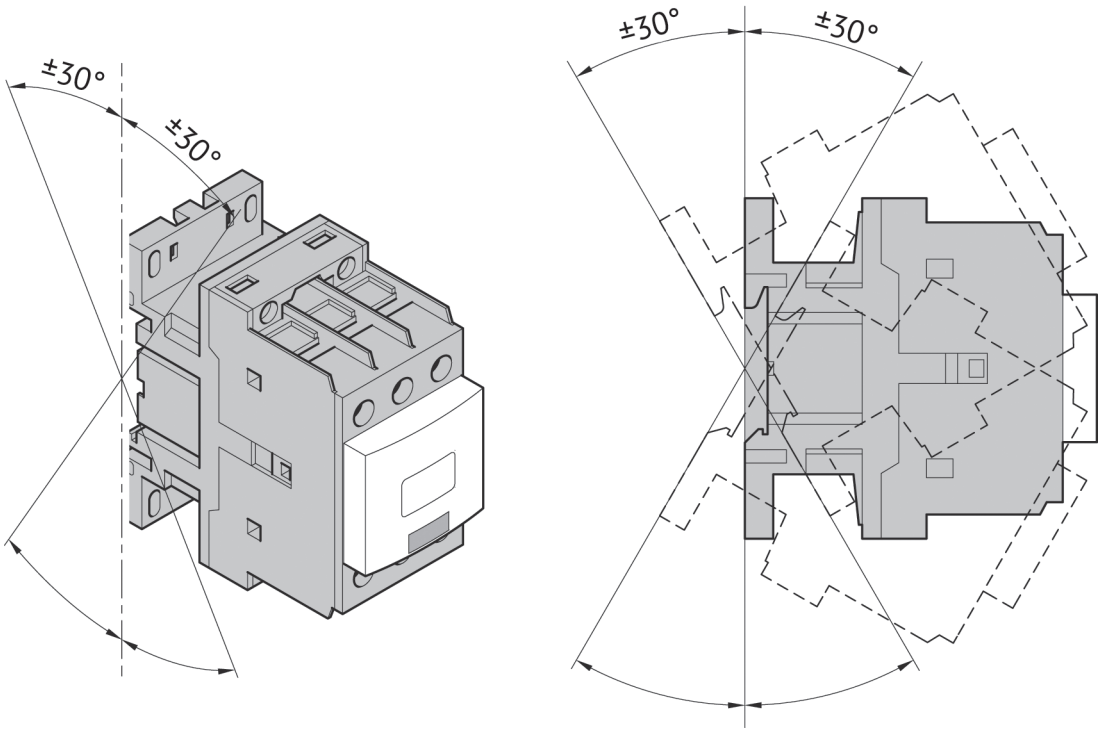
Vertical plane horizontally

The specifications described in this catalog are provided for contactors installed in the vertical plane. All series F contactors can be installed with an inclination of ±30° from their vertical axis without deterioration of their characteristics.
The inclination for F-09...AF-230 contactors may be ± 90°. For series M mini-contactors:
– position A with coil terminals A1-A2 at the bottom is not recommended;
– position A with terminals A1-A2 at the top is not recommended for mini-contactors with NC contacts.



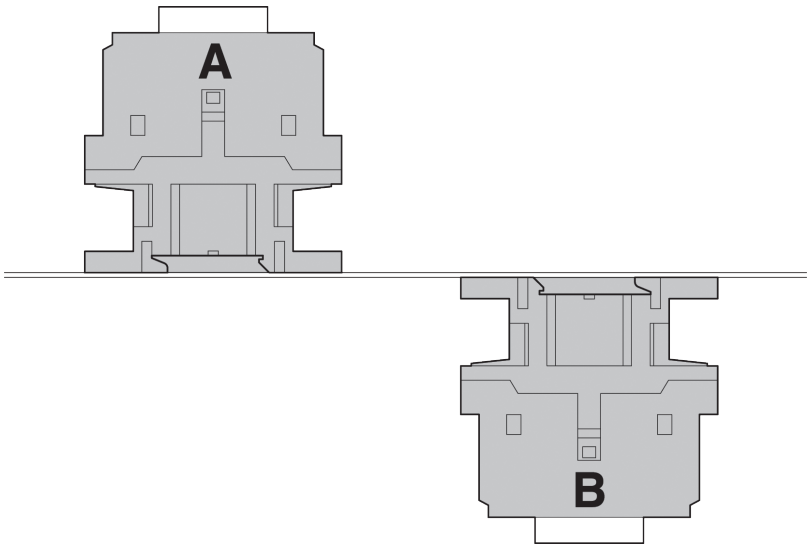
Vertical plane by depth

All contactors can be installed in the vertical plane by depth with an inclination of up to ±30°.
When the contactor is installed in plane with an inclination of -30°, the minimum tripping voltage increases by an average of 5 %.



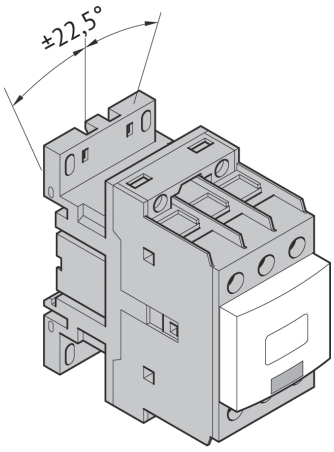
In the horizontal plane (for series F-09...AF-230 only)

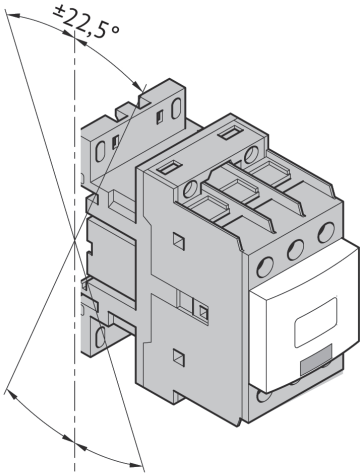
It is necessary to distinguish between two possible installation positions:
– when the contactor is energized, its moving element moves from top down;
– when the contactor is de-energized, its moving element moves from bottom up.
In the first case, a greater force is required to open the contacts, in the second – to close them. The use of position B is not recommended.
Significant deviations from the specifications are possible.

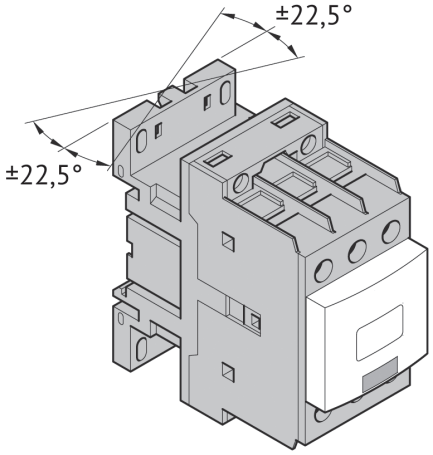


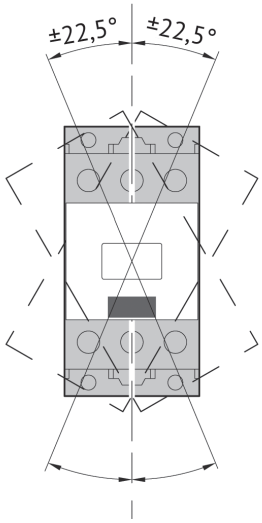
Dynamic tests

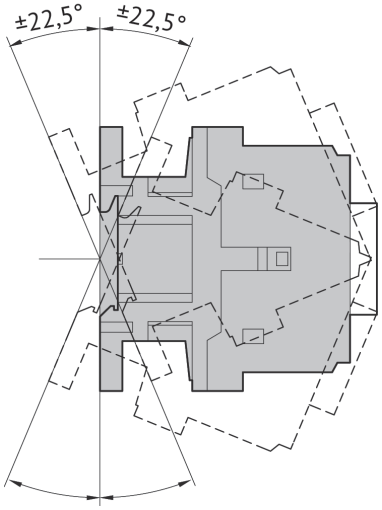
The contactors have passed dynamic tests with the installation positions contactors rotated by ±22.5° relative to three orthogonal axes.

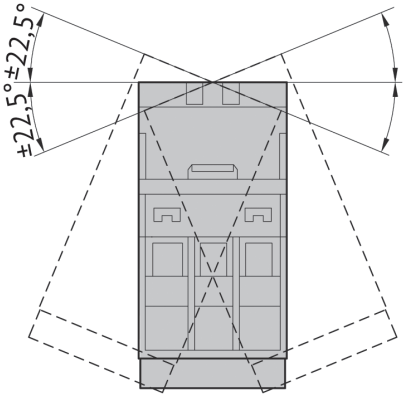












Vertical interlock device between series F-500...F-1000 contactors mounted one above the other

Series FX-356... interlock module available in six versions for different axle spacing of contactor fixing is used. It is possible to interlock contactors of both the same and different standard sizes. The following tables indicate the axle spacing provided by interlock devices of different types; with terminal covers (axle spacing A) and without them (axle spacing B).

Axle spacing A, mm - For contactors with terminal protective covers (Fig. 1)	
KM1	
KM2	F-500 F-630
FX-3566	470...500

For interlocking of 2 F-1000 contactors, only FX-3566 may be used.
For interlocking of two (2) F-1250 and F-1600 contactors, two FX-3566 interlock modules should be used: one on the left side and one on the right side of the contactor.

Axle spacing B, mm - For contactors without protective cover (Fig. 1)	
KM1	
KM2	F-500 F-630
FX-3565	390...425
FX-3566	470...500

The axle spacing B is 470-500 mm for F-1000, F-1250 or F-1600.
Interlocking of F-1250 or F-1600 contactors with series F contactors of other sizes is prohibited.

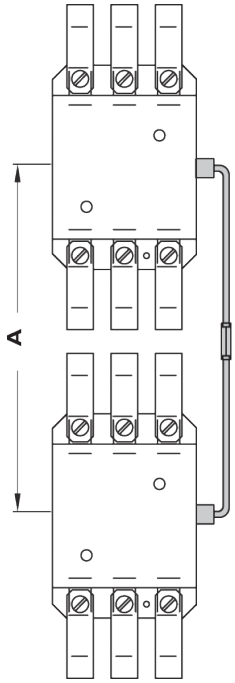


Fig.1

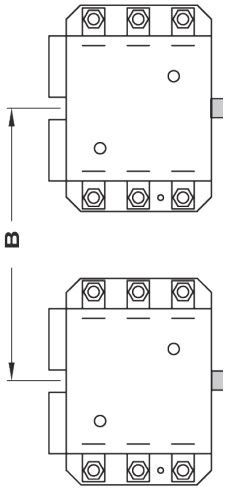


Fig.2

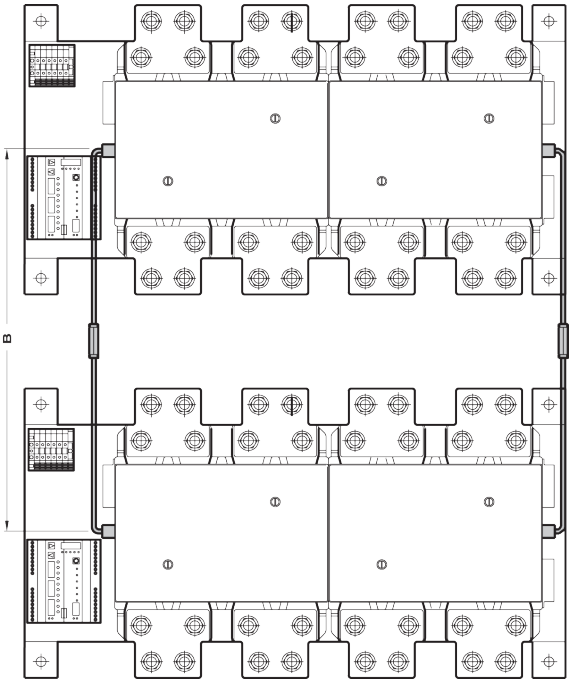
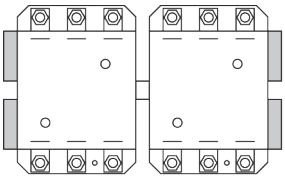


Fig.3

The horizontal and vertical interlock modules FX-355 and FX-356... for contactors F-500...F-630 are used for mutual interlocking of the same contactors or contactors with different sizes (for example: F-500 can be interlocked with F-630).

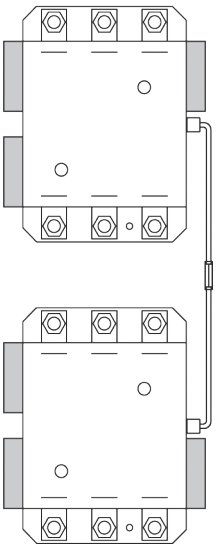
Possible installation positions of FX-350 and FX-354 auxiliary contacts in combination with mechanical interlock modules:

Horizontal FX-355



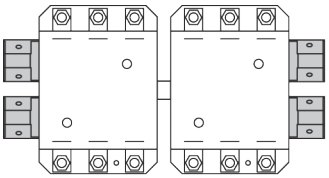
F-500...F-630

Vertical FX-356

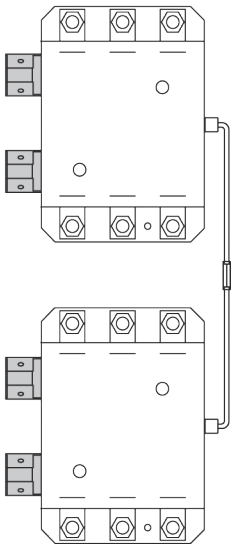


F-500...F-1000

Possible installation positions of FX-358 adapter in combination with mechanical interlock modules:



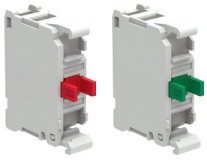
F-500...F-630



F-500...F-1000

Accessories

Front-mounted auxiliary contact units with central attachment with screw terminals

Appearance	Compatible devices	Auxiliary contacts		Product name	Code
		NO	NC		
	F-09..(A)F-150 and FR	0	2	OptiStart K-FX-1002 (1)	335318
	F-09..(A)F-150 and FR	1	1	OptiStart K-FX-1011 (1)	335320
	F-09..(A)F-150 and FR	2	0	OptiStart K-FX-1020 (1)	335323
	F-09..(A)F-150 and FR	1 with advance (2)	1 with delay (3)	OptiStart K-FX-101111	335321
	F-09..(A)F-150 and FR	0	4	OptiStart K-FX-1004	335319
	F-09..(A)F-150 and FR	1	3	OptiStart K-FX-1013	335322
	F-09..(A)F-150 and FR	2	2	OptiStart K-FX-1022	335324
	F-09..(A)F-150 and FR	3	1	OptiStart K-FX-1031	335325
	F-09..(A)F-150 and FR	4	0	OptiStart K-FX-1040	335326
	F-09..(A)F-150 and FR	0	3	OptiStart K-FX-48403 (1)	335300
	F-09..(A)F-150 and FR	1	2	OptiStart K-FX-48412 (1)	335301
	F-09..(A)F-150 and FR	2	1	OptiStart K-FX-48421 (1)	335302
	F-09..(A)F-150 and FR	3	0	OptiStart K-FX-48430 (1)	335303
	AF-160..AF-400	0	1	OptiStart K-FX-10C01	335327
	AF-160..AF-400	1	0	OptiStart K-FX-10C10	335328

Note: For possible combinations and configurations, see the «Installation Positions» section

(1) When OptiStart K-FX-358 adapter is used, installation on F-500...F-1000 contactors is possible.
(2) Normally open contact with advance closure
(3) Normally closed contact with delayed opening

Front-mounted auxiliary contact units with side attachment with screw terminals (1)

Appearance	Compatible devices	Auxiliary contacts		Product name	Code
		NO	NC		
	F-09..(A)F-150 and FR	0	1	OptiStart K-FX-41801	335283
	F-09..(A)F-150 and FR	0	1 with delay (2)	OptiStart K-FX-41801D	335284
	F-09..(A)F-150 and FR	1	0	OptiStart K-FX-41810	335285
	F-09..(A)F-150 and FR	1 with advance (3)	0	OptiStart K-FX-41810A	335286

Note: For possible combinations and configurations, see the «Installation Positions» section

(1) Protection degree IP20 is ensured when conductors with a cross-section of at least 0.75 mm² are connected. Specifications when used with direct current: Q600
(2) Normally closed contact with delayed opening
(3) Normally open contact with advance closure

Front-mounted auxiliary contact units with side attachment with faston terminals (1)

Appearance	Compatible devices	Auxiliary contacts		Product name	Code
		NO	NC		
	F-09..(A)F-150 and FR	0	2	OptiStart K-FX-48102	335295
	F-09..(A)F-150 and FR	1	1	OptiStart K-FX-48111	335296
	F-09..(A)F-150 and FR	2	0	OptiStart K-FX-48120	335297
	F-09..(A)F-150 and FR	1 CO		OptiStart K-FX-482 (2)	335298
	F-09..(A)F-150 and FR	1	or 1	OptiStart K-FX-218	335317

Note: For possible combinations and configurations, see the «Installation Positions» section

(1) Protection degree IP20 is ensured when conductors with an insulated faston connection are connected.
(2) Gold-plated contacts in a sealed casing for harsh environmental conditions.

Bracket for side mounting of auxiliary contacts

Appearance	Compatible auxiliary contact units	Product name	Code
	FX-218..	OptiStart K-FX-280	335282
	FX-418..	OptiStart K-FX-419	335287
	FX-481..; FX-482	OptiStart K-FX-483	335299

Side mounted auxiliary contact units with screw terminals

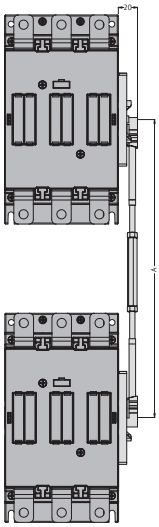
Appearance	Compatible devices	Auxiliary contacts		Product name	Code
		NO	NC		
	F-09..(A)F-150 and FR	0	2	OptiStart K-FX-1202	335331
	F-09..(A)F-150 and FR	1	1	OptiStart K-FX-1211	335332
	F-09..(A)F-150 and FR	2	0	OptiStart K-FX-1220	335333
	F-09..(A)F-150 and FR	0	1	OptiStart K-FX-42801	335288
	F-09..(A)F-150 and FR	0	1 with delay (1)	OptiStart K-FX-42801D	335289
	F-09..(A)F-150 and FR	1	0	OptiStart K-FX-42810	335290
	F-09..(A)F-150 and FR	1 with advance (2)	0	OptiStart K-FX-42810A	335291
	AF-160..AF-400	0	2	OptiStart K-FX-12C02	335334
	AF-160..AF-400	1	1	OptiStart K-FX-12C11	335335
	AF-160..AF-400	2	0	OptiStart K-FX-12C20	335336
	F-500...F-1000	1 2	2 1	OptiStart K-FX-350	335405
	F-500...F-1000	1	1	OptiStart K-FX-354	335406

Note: For possible combinations and configurations, see the «Installation Positions» section

(1) Normally closed contact with delayed opening
(2) Normally open contact with advance closure

Interlock modules for contactors

Appearance	Compatible devices	Type	Mounting method	Product name	Code
	F-09..F-38 and FR	Mechanical	Side	OptiStart K-FX-5000 (1)	335361
	(A)F-40..(A)F-94	Mechanical	Side	OptiStart K-FX-5300	335365
	(A)F-95..(A)F-150	Mechanical	Side	OptiStart K-FX-5400	335368
	F-09..F-38 and FR	Electromechanical	Side	OptiStart K-FX-5001 (1)	335362
	(A)F-40..(A)F-94	Electromechanical	Side	OptiStart K-FX-5301	335366
	(A)F-95..(A)F-150	Electromechanical	Side	OptiStart K-FX-5401	335369

Appearance	Compatible devices	Type	Mounting method	Product name	Code
	F-09..F-38 and FR	Mechanical	Front	OptiStart K-FX-5003	335364
	(A)F-40..(A)F-94	Mechanical	Front	OptiStart K-FX-5303	335367
	(A)F-95..(A)F-150	Mechanical	Front	OptiStart K-FX-5403	335370
	F-09..F-38 and FR	Mechanical	Front with side attachment	OptiStart K-FX-5002	335363
	AF-160..AF-230	Mechanical	Side	OptiStart K-FX-5500	335371
	AF-160..AF-400	Mechanical	Vertical	OptiStart K-FX-5503	335372
	AF-160..AF-400	Mechanical	Vertical	OptiStart K-FX-5504	335373
	F-500...F-1000	Mechanical	Side	OptiStart K-FX-355	335407
	F-500...F-1000	Mechanical	Vertical *	OptiStart K-FX-3566 (2)	335413

(1) Interlocking of contactors of different sizes is possible, for example F-09..F-25 and F-26...F-38.
(2) For permissible axle spacing and combinations, see the «Installation Positions» section.

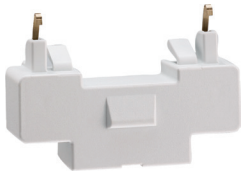
Pneumatic time adapter for contactors (1) (2)

Appearance	Compatible devices	Type of delay	Maximum time	Product name	Code
	F-09..(A)F-150 and FR	Upon activation	3 s	OptiStart K-FX-4853	335306
	F-09..(A)F-150 and FR	Upon activation	6 s	OptiStart K-FX-4856	335308
	F-09..(A)F-150 and FR	Upon activation	15 s	OptiStart K-FX-48515	335305
	F-09..(A)F-150 and FR	Upon activation	30 s	OptiStart K-FX-48530	335307
	F-09..(A)F-150 and FR	Upon activation	60 s	OptiStart K-FX-48560	335309
	F-09..(A)F-150 and FR	Upon activation	120 s	OptiStart K-FX-485120	335304
	F-09..(A)F-150 and FR	Upon deactivation	3 s	OptiStart K-FX-4863	335312
	F-09..(A)F-150 and FR	Upon deactivation	6 s	OptiStart K-FX-4866	335314
	F-09..(A)F-150 and FR	Upon deactivation	15 s	OptiStart K-FX-48615	335311
	F-09..(A)F-150 and FR	Upon deactivation	30 s	OptiStart K-FX-48630	335313
	F-09..(A)F-150 and FR	Upon deactivation	60 s	OptiStart K-FX-48660	335315
	F-09..(A)F-150 and FR	Upon deactivation	120 s	OptiStart K-FX-486120	335310
	F-09..(A)F-150 and FR	Upon deactivation	70 ms	OptiStart K-FX-487	335316

Note: For possible combinations and configurations, see the «Installation Positions» section

(1) Protection degree IP20 is ensured when conductors with a cross-section of at least 1 mm² are connected. Mechanical wear resistance is limited to 3 mln cycles.
(2) When OptiStart K-FX-358 adapter is used, installation on F-250...F-1000 contactors is possible.

Surge arresters

Appearance	Compatible devices	Type	Rated voltage	Product name	Code
	F-09..(A)F-150 and FR	Variable resistor	up to 48 V AC/DC	OptiStart K-FX-77048	335385
	F-09..(A)F-150 and FR	Variable resistor	48–125 V AC/DC	OptiStart K-FX-77125	335386
	F-09..(A)F-150 and FR	Variable resistor	125–240 V AC/DC	OptiStart K-FX-77240	335387
	F-09..(A)F-150 and FR	RC	до 48 V AC/DC	OptiStart K-FX-79048	335388
	F-09..(A)F-150 and FR	RC	48–125 V AC/DC	OptiStart K-FX-79125	335389
	F-09..(A)F-150 and FR	RC	125–240 V AC/DC	OptiStart K-FX-79240	335390
	F-09..(A)F-150 and FR	RC	240–415 V AC/DC	OptiStart K-FX-79415	335391

Fourth power pole

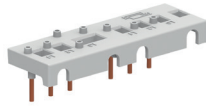
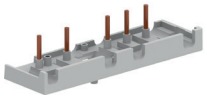
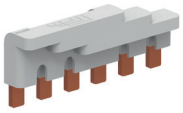
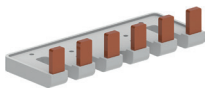
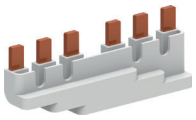
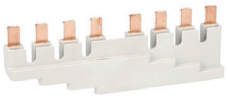
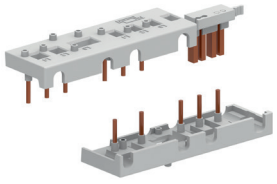
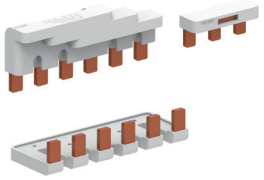
Appearance	Compatible devices	Contactor control coil	Product name	Code
	F-26..F-38	AC	OptiStart K-FX-42	335358
	F-26..F-38	DC	OptiStart K-FX-D42	335402
	(A)F-40..(A)F-94	AC	OptiStart K-FX-43	335359
	(A)F-95..(A)F-150	AC	OptiStart K-FX-44	335360

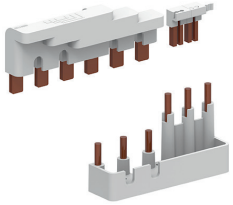
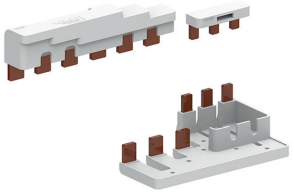
Mechanical latches

Appearance	Compatible devices	Rated voltage	Product name	Code
	F-09..F-38 and FR	24 V AC	OptiStart K-FX-22224	335262
	F-09..F-38 and FR	48 V AC	OptiStart K-FX-22248	335264
	F-09..F-38 and FR	110 V AC	OptiStart K-FX-222110	335260
	F-09..F-38 and FR	220 V AC	OptiStart K-FX-222220	335261
	F-09..F-38 and FR	380 V AC	OptiStart K-FX-222380	335263
	F-09..F-38 and FR	12 V DC	OptiStart K-FX-222C12	335266
	F-09..F-38 and FR	24 V DC	OptiStart K-FX-222C24	335268
	F-09..F-38 and FR	48 V DC	OptiStart K-FX-222C48	335269
	F-09..F-38 and FR	110 V DC	OptiStart K-FX-222C110	335265
	F-09..F-38 and FR	220 V DC	OptiStart K-FX-222C220	335267
	(A)F-40..(A)F-94	24 V AC	OptiStart K-FX-27224	335274
	(A)F-40..(A)F-94	48 V AC	OptiStart K-FX-27248	335276
	(A)F-40..(A)F-94	110 V AC	OptiStart K-FX-272110	335272
	(A)F-40..(A)F-94	220 V AC	OptiStart K-FX-272220	335273
	(A)F-40..(A)F-94	380 V AC	OptiStart K-FX-272380	335275
	(A)F-40..(A)F-94	12 V DC	OptiStart K-FX-272C12	335278
	(A)F-40..(A)F-94	24 V DC	OptiStart K-FX-272C24	335280
	(A)F-40..(A)F-94	48 V DC	OptiStart K-FX-272C48	335281
	(A)F-40..(A)F-94	110 V DC	OptiStart K-FX-272C110	335277
	(A)F-40..(A)F-94	220 V DC	OptiStart K-FX-272C220	335279
	(A)F-95..(A)F-150	24 V AC	OptiStart K-FX-641024	335374
	(A)F-95..(A)F-150	48 V AC	OptiStart K-FX-641048	335375
	(A)F-95..(A)F-150	110 V AC	OptiStart K-FX-641110	335376

Appearance	Compatible devices	Номинальное напряжение	Product name	Code
	(A)F-95..(A)F-150	230 V AC	OptiStart K-FX-641230	335377
	(A)F-95..(A)F-150	380 V AC	OptiStart K-FX-641380	335378
	(A)F-95..(A)F-150	12 V DC	OptiStart K-FX-641D012	335379
	(A)F-95..(A)F-150	24 V DC	OptiStart K-FX-641D024	335380
	(A)F-95..(A)F-150	48 V DC	OptiStart K-FX-641D048	335381
	(A)F-95..(A)F-150	110 V DC	OptiStart K-FX-641D110	335382
	(A)F-95..(A)F-150	220 V DC	OptiStart K-FX-641D230	335383

Connection adapters

Appearance	Compatible devices	Type	Interlock module	Product name	Code
	F-09..F-25	Reversing	FX-5002, FX-5003	OptiStart K-FX-3101	335338
	F-09..F-25	Reversing	FX-5000, FX-5001	OptiStart K-FX-3102	335339
	F-26..F-38	Reversing	FX-5000, FX-5001, FX-5002, FX-5003	OptiStart K-FX-3201	335341
	(A)F-40..(A)F-94	Reversing	FX-5303	OptiStart K-FX-3301	335344
	(A)F-95..(A)F-150	Reversing	FX-5403	OptiStart K-FX-3401	335352
	(A)F-40-30..(A)F-94-30	Parallel	FX-5300, FX-5301	OptiStart K-FX-3361	335347
	(A)F-95-30..(A)F-150-30	Parallel	FX-5400, FX-5401	OptiStart K-FX-3461	335355
	(A)F-40-40..(A)F-94-40	Parallel	FX-5300, FX-5301	OptiStart K-FX-3371	335348
	(A)F-95-40..(A)F-150-40	Parallel	FX-5400, FX-5401	OptiStart K-FX-3471	335356
	F-09..F-25	Star-Delta	-	OptiStart K-FX-3131	335340
	F-26..F-38	Star-Delta	-	OptiStart K-FX-3231	335342
	(A)F-40..(A)F-94	Star-Delta	-	OptiStart K-FX-3331	335345
	(A)F-95..(A)F-150	Star-Delta	-	OptiStart K-FX-3431	335353
	F-26..F-38 and F-09..F-25	Star-Delta	-	OptiStart K-FX-3232	335343

Appearance	Compatible devices	Type	Interlock module	Product name	Code
	(A)F-40..(A)F-94 and F-26..F-38	Star-Delta	-	OptiStart K-FX-3332	335346
	(A)F-95..(A)F-150 and (A)F-40..(A)F-94	Star-Delta	-	OptiStart K-FX-3432	335354

Jumpers for parallel pole connection

Appearance	Compatible devices	Number of poles	Availability of insulation	Product name	Code
	F-09..F-25 and FR	2	-	OptiStart K-FX-A135	335257
	F-26..F-38	2	-	OptiStart K-FX-A235	335258
	(A)F-40..(A)F-94	2	-	OptiStart K-FX-3392	335349
	(A)F-95..(A)F-150	2	-	OptiStart K-FX-3492	335357
	AF-160...AF-230	2	-	OptiStart K-FX-3592	370967
	AF-265...AF-400	2	-	OptiStart K-FX-3692	370969
	F-500..F-1000	2	-	OptiStart K-FX-A1845	335403
	(A)F-40..(A)F-94	3	-	OptiStart K-FX-3393	335350
	(A)F-40..(A)F-94	3	+	OptiStart K-FX-3399 (1)	335351
	(A)F-95..(A)F-150	3	-	OptiStart K-FX-A435	335259
	AF-160...AF-230	3	-	OptiStart K-FX-3593	370968
	AF-265...AF-400	3	-	OptiStart K-FX-3693	370970
	F-500..F-1000	3	-	OptiStart K-FX-A1846	335404

(1) Tightening torque is 13 Nm. Tool: Hex wrench 6

Protective cover

Appearance	Compatible devices	Number of poles	Product name	Code
	(A)F-40..(A)F-94	3	OptiStart K-FX-833	335395
	(A)F-95..(A)F-150	3	OptiStart K-FX-834	335396
	AF-160..AF-230	1	OptiStart K-FX-815	335394
	AF-265...AF-400	1	OptiStart K-FX-816	370959
	AF-160..AF-230	3	OptiStart K-FX-835	335397
	AF-265...AF-400	3	OptiStart K-FX-836	370960
	AF-160..AF-230	4	OptiStart K-FX-845	335398
	AF-265...AF-400	4	OptiStart K-FX-846	370961
	F-500-30	1	OptiStart K-FX-527	335424
	F-500-40	1	OptiStart K-FX-528	335425
	F-630-30; F-1000-30	1	OptiStart K-FX-529	335426
	F-630-40; F-1000-40	1	OptiStart K-FX-530	335427

Adapters for increasing the terminal cross-section

Appearance	Compatible devices	Cross-section, mm²	Product name	Code
	F-09..F-25	6	OptiStart K-FX-231 (1)	335270
	F-26..F-38	16	OptiStart K-FX-232 (2)	335271

(1) Tightening torque 1.5...1.8 Nm. Tool: PH 1
(2) Tightening torque 2.5...3.0 Nm. Tool: PH 2

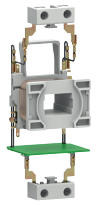
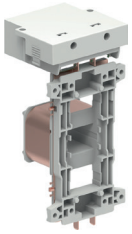
Other accessories

Appearance	Compatible devices	Type	Product name	Code
	F-09..F-38 and FR	Manual closing module	OptiStart K-FX-454	335292
	(A)F-40..(A)F-94	Manual closing module	OptiStart K-FX-455	335293
	(A)F-95..(A)F-150	Manual closing module	OptiStart K-FX-642	335384
	F-09..F-38	Conversion into FK-09..FK-38 kit	OptiStart K-FX-460	335294
	(A)F-40..(A)F-94	Conversion into (A)FK-40..(A) FK-94 kit	OptiStart K-FX-10K3	335329
	(A)F-95..(A)F-110	Conversion into (A)FK-95..(A) FK-110 kit	OptiStart K-FX-10K4	335330
	F-09..F-38	Adapter for connection of reversing contactors	OptiStart K-FX-8910	335401
	F-09..F-38 and FR	Plastic brackets for screw mounting	OptiStart K-FX-8902	335400
	F-09..F-38 and FR	Sealing cover	OptiStart K-FX-80	335392
	F-09..F-38 and FR	Plastic base for screw mounting	OptiStart K-FX-8901	335399
	AF-160..AF-230	Interphase partition	OptiStart K-FX-805	335393
	F-09..(A)F-150 and FR	Nameplate for inscriptions	OptiStart K-FX-30	335337
	FX-10.. / 484.. / 485.. / 486.. / 487	Adapter for auxiliary contacts mounting on F-250..F-1000	OptiStart K-FX-358	335414
	F-250...F-1000	OptiStart K-FX-370 adapter for conversion of faston terminals of the coil and auxiliary contacts to screw terminals	OptiStart K-FX-370	335415
	F-250...F-1000	OptiStart K-FX-371 adapter for conversion of faston coil terminals to screw terminals	OptiStart K-FX-371 (1)	335416

(1) Tightening torque 1 Nm,. Tool: PH 2. Maximum cross-section of connected conductor: 4 mm^2

Spare parts

Control coils

Appearance	Compatible devices	Rated voltage	Product name	Code
	F-09..F-25 and FR	24 V AC	OptiStart K-FS-91A024	335882
	F-09..F-25 and FR	48 V AC	OptiStart K-FS-91A048	335883
	F-09..F-25 and FR	110 V AC	OptiStart K-FS-91A110	335884
	F-09..F-25 and FR	230 V AC	OptiStart K-FS-91A230	335885
	F-09..F-25 and FR	400 V AC	OptiStart K-FS-91A400	335886
	F-26..F-38	24 V AC	OptiStart K-FS-92A024	335887
	F-26..F-38	48 V AC	OptiStart K-FS-92A048	335888
	F-26..F-38	110 V AC	OptiStart K-FS-92A110	335889
	F-26..F-38	230 V AC	OptiStart K-FS-92A230	335890
	F-26..F-38	400 V AC	OptiStart K-FS-92A400	335891
	F-40..F-94	24 V AC	OptiStart K-FS-93A024	335892
	F-40..F-94	48 V AC	OptiStart K-FS-93A048	335893
	F-40..F-94	110 V AC	OptiStart K-FS-93A110	335894
	F-40..F-94	230 V AC	OptiStart K-FS-93A230	335895
	F-40..F-94	400 V AC	OptiStart K-FS-93A400	335896
	F-95..F-150	24 V AC	OptiStart K-FS-94A024	335900
	F-95..F-150	48 V AC	OptiStart K-FS-94A048	335901
	F-95..F-150	110 V AC	OptiStart K-FS-94A110	335902
	F-95..F-150	230 V AC	OptiStart K-FS-94A230	335903
	F-95..F-150	400 V AC	OptiStart K-FS-94A400	335904
	AF-40..AF-94	24–60 V AC / 20–60 V DC	OptiStart K-FS-93E024	335897
	AF-40..AF-94	60–130 V AC/DC	OptiStart K-FS-93E110	335898
	AF-40..AF-94	100–250 V AC/DC	OptiStart K-FS-93E230	335899
	AF-95..AF-150	24–60 V AC / 20–60 V DC	OptiStart K-FS-94E024	335905
	AF-95..AF-150	60–130 V AC/DC	OptiStart K-FS-94E110	335906
	AF-95..AF-150	100–250 V AC/DC	OptiStart K-FS-94E230	335907
	AF-160..AF-230	24–60 V AC / 20–60 V DC	OptiStart K-FS-95E024	335908
	AF-160..AF-230	60–130 V AC/DC	OptiStart K-FS-95E110	335909
	AF-160..AF-230	100–250 V AC/DC	OptiStart K-FS-95E230	335910
	AF-160..AF-230	250–500 V AC/DC	OptiStart K-FS-95E400	335911
	AF-265..AF-400	24–60 V AC / 20–60 V DC	OptiStart K-FS-96E024	370947
	AF-265..AF-400	60–130 V AC/DC	OptiStart K-FS-96E110	370948
	AF-265..AF-400	100–250 V AC/DC	OptiStart K-FS-96E230	370949
	AF-265..AF-400	250–500 V AC/DC	OptiStart K-FS-96E400	370950

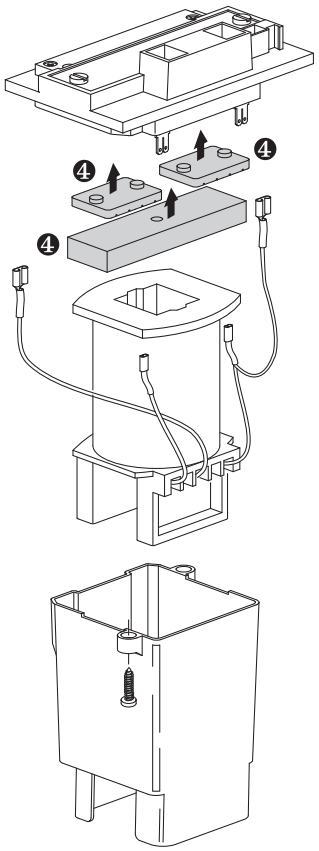
Appearance	Compatible devices	Rated voltage	Product name	Code
	F-500..F-1600	48 V AC/DC	OptiStart K-FS-79648	335962
	F-500..F-1600	110 V AC/DC	OptiStart K-FS-796110	335958
	F-500..F-1600	220 V AC/DC	OptiStart K-FS-796220	335959
	F-500..F-1600	380 V AC/DC	OptiStart K-FS-796380	335960
	F-500..F-1600	440 V AC/DC	OptiStart K-FS-796440	335961
	F-500..F-1000	48 V AC/DC	OptiStart K-FS-80048	335981
	F-500..F-1000	110 V AC/DC	OptiStart K-FS-800110	335977
	F-500..F-1000	220 V AC/DC	OptiStart K-FS-800220	335978
	F-500..F-1000	380 V AC/DC	OptiStart K-FS-800380	335979
	F-500..F-1000	440 V AC/DC	OptiStart K-FS-800440	335980

Power contacts

Appearance	Compatible devices	Number of poles	Product name	Code
	F-26	4	OptiStart K-FS-99026F	335912
	F-26	3	OptiStart K-FS-99026T	335913
	F-32	3	OptiStart K-FS-99032T	335914
	F-38	4	OptiStart K-FS-99038F	335915
	F-38	3	OptiStart K-FS-99038T	335916
	(A)F-40	4	OptiStart K-FS-99040F	335917
	(A)F-40	3	OptiStart K-FS-99040T	335918
	(A)F-50	4	OptiStart K-FS-99050F	335919
	(A)F-50	3	OptiStart K-FS-99050T	335920
	(A)F-65	4	OptiStart K-FS-99065F	335921
	(A)F-65	3	OptiStart K-FS-99065T	335922
	(A)F-80	4	OptiStart K-FS-99080F	335923
	(A)F-80	3	OptiStart K-FS-99080T	335924
	(A)F-94	3	OptiStart K-FS-99094T	335925
	(A)F-95	4	OptiStart K-FS-99095F	335926
	(A)F-95	3	OptiStart K-FS-99095T	335927
	(A)F-115	4	OptiStart K-FS-99115F	335928
	(A)F-115	3	OptiStart K-FS-99115T	335929
	(A)F-150	4	OptiStart K-FS-99150F	335930
	(A)F-150	3	OptiStart K-FS-99150T	335931
	AF-265	4	OptiStart K-FS-99265F	370953
	AF-265	3	OptiStart K-FS-99265T	370954
	AF-330	4	OptiStart K-FS-99330F	370955
	AF-330	3	OptiStart K-FS-99330T	370956
	AF-400	4	OptiStart K-FS-99400F	370957
	AF-400	3	OptiStart K-FS-99400T	370958
	F-500	3	OptiStart K-FS-525	335996
	F-500	4	OptiStart K-FS-5254	335997
	F-630	3	OptiStart K-FS-526	335998
	F-630	4	OptiStart K-FS-5264	336001
	F-1000	3	OptiStart K-FS-537	335999
	F-1000	4	OptiStart K-FS-5374	336000
	F-1250	3	OptiStart K-FS-538	335982
	F-1600	3	OptiStart K-FS-539	335986

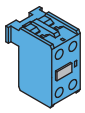
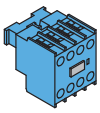
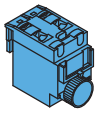
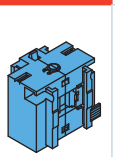
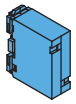
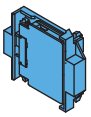
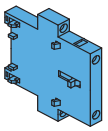
Other spare parts

Appearance	Compatible devices	Type	Product name	Code
	AF-265-30..AF-400-30	Arc chute	OptiStart K-FS-9806F	370952
	AF-265-40..AF-400-40	Arc chute	OptiStart K-FS-9806T	370951
	F-500-30..F-1000-30	Arc chute	OptiStart K-FS-838	335939
	F-500-40..F-1000-40	Arc chute	OptiStart K-FS-839	335940
	F-500..F-1000	Protective casing for coil	OptiStart K-FS-803	335943



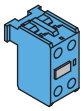
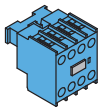
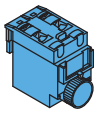
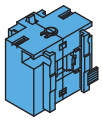
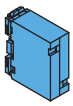
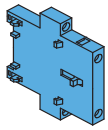
Maximum combination of optional accessories

Contactor relays FR with AC coil
Contactors F-09...F-150 with AC coil
Contactors AF-40...AF-150

		Front installation					Side installation				Front installation with side mount		
													
		FX-1002 FX-1011 FX-1020	FX-1004 FX-1013 FX-1022 FX-1031 FX-1040	FX-485... FX-486... FX-487...		FX-222... (4) FX-272... (4) FX-641... (4)	FX-5002 FX-5003 (1)	FX-5303 FX-5403 (8)		FX-418... FX-218 FX-481... FX-482	FX-428... FX-419 + FX-418... FX-280 + FX-218 FX-483 + FX-481... FX-483 + FX-482		FX-1202 FX-1211 FX-1220 FX-5000 (3)(7) FX-5001 (3)(7)
		number of units (one type only)				number of units	number of units (one type only)			number of units	number of units		number of units
Contactor relays	FR	1	1	1	or	1 (5)	1	–	or	1 or 2 (1)	1 or 2 (1)	or	1 (3)
Three-pole contactors	F-09...F-25	1	1	1		1 (5)	1	–		1 or 2 (1)	1 or 2 (1)		1 (3)
	F-26...F-38	1	1	1		1 (5)	1	–		1 or 2 (1)	1 or 2 (1)		1 (3)
	F-40...-F-150	1	1	1		1 (6)	–	1 (9)		1 or 2 (1)	2		1 (3)
	AF-40...-AF-150	1	1	1		1 (6)	–	1 (9)		1 or 2 (1)	2		1 (3)
Four-pole contactors	F-09...F-25	1	1	1		1 (5)	1	–		1 or 2	1 or 2 (1)		1 (3)
	F-26...F-38	1	1	1		1 (5)	1 (2)	–		1 (1)	1 or 2 (1)		1 (3)
	F-40...-F-150	1	1	1		1 (6)	–	1 (9)		1 or 2	2		1 (3)
	AF-40...-AF-150	1	1	1		1 (6)	–	1 (9)		1 or 2	2		2

(1) Installation is impossible if FX-10... is available with 4 contacts and FX-222.
(2) To install the interlock module, the fourth pole should be shifted so that it is on the outer side, in relation to the interlock, of one of two contactors being interlocked.
(3) When installing FX-500..., only one front-mounted unit with side attachment can be installed per interlocked contactor
(4) Another contact unit FX-10... or pneumatic time adapter FX-48.... can be installed on top of mechanical interlock FX-222, FX-272 and FX-641
(5) Mechanical lock FX-222.
(6) Key lock FX-272 for (A)F-40...(A)F-80; FX-641 for (A)F-95...(A)F-150.
(7) For (A)F-40...(A)F-94, FX-5300 or FX-5301 should be used; for (A)F-95...(A)F-150, FX-5400 or FX-5401 should be used.
(8) FX-5303 for (A)F-40...(A)F-94; FX-5403 for (A)F-95...(A)F-150.
(9) FX-5303 can not be installed if FX-10... unit with 4 contacts (FX-1004, FX-1013, FX-1022, FX-1031, FX-1040) is already installed on the front side.

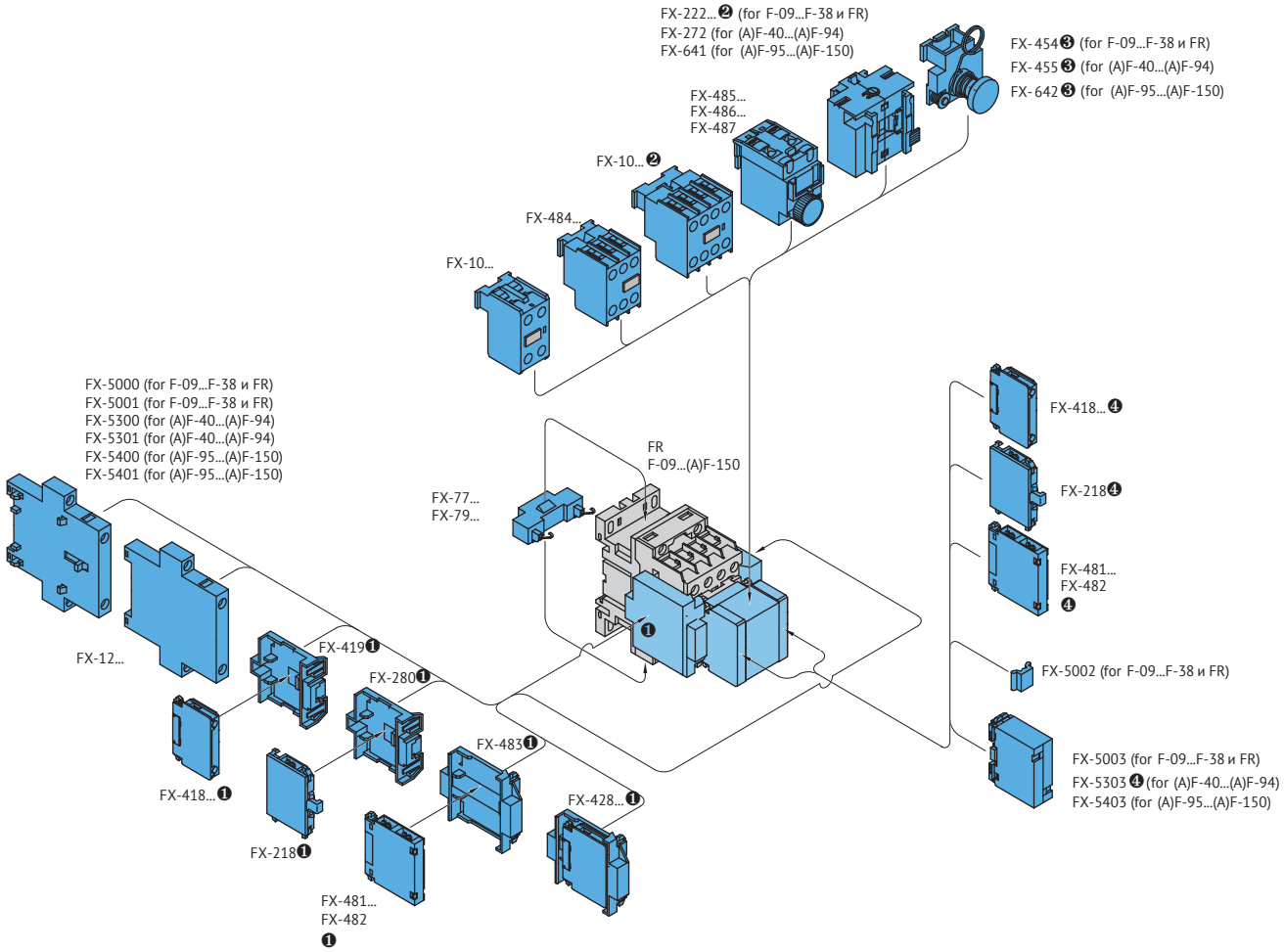
Contactor relays FR with DC coil
Contactors F-09…F-38 with DC coil
Contactors F-09-Z…F-38-Z with DC coil with reduced power consumption

		Front installation											Side installation		Front installation with side mount		
																	
		FX-10…			FX-10…				FX-485… FX-486… FX-487		FX-222… (3)		FX-50… (one type only)				BFX12… (2)
		…02	…11	…20	…04	…13	…22	…31	…40				…02	…03 (1)	…00	…01	
		number of units (one type only)									number of units		number of units (one type only)				
Contactor relays	FR…D	1			1		1		1		1		1	1	1		1
	FR…Z	1			–		1		–		1		1	1	–		–
Three-pole contactors	F-09…F-25…D	1			1		1		1		1		1	1	1		1
	F-26…F-38…D	1			1		1		1		1		1	1	1		1
	F-09…F-25…Z	1			–		1		–		1		1	1	–		–
	F-26…F-38…Z	1			–		1		–		1		1	1	–		–
Four-pole contactors	F-09…F-25…D	1			1		1		1		1		1	1	1		1
	F-26…F-38…D	–	1		–		–		–		1		1 (4)	1 (4)	1		1
	F-09…F-25…Z	1			–		1		–		1		1	1	–		–
	F-26…F-38…Z	–	1		–		–		–		–		1 (4)	1 (4)	–		–

((1) Installation of FX-5003 interlock module is impossible if FX-10… is available with 4 contacts and FX-222.
(2) When installing FX-500…, only one front-mounted unit with side attachment can be installed per interlocked contactor
(3) Another contact unit FX-10… or pneumatic time adapter FX-48…. can be installed on top of mechanical interlock FX-222 and FX-641
(4) To install the interlock module, the fourth pole should be shifted so that it is on the outer side, in relation to the interlock, of one of two contactors being interlocked.

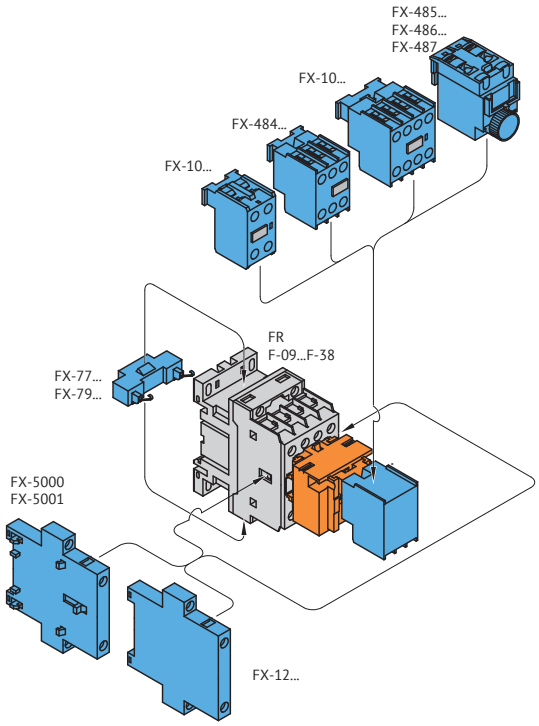
Installation positions of auxiliary contact units

Contactor relays FR with AC coil
Contactors F-09...F-150 with AC coil
Contactors AF-40...AF-150

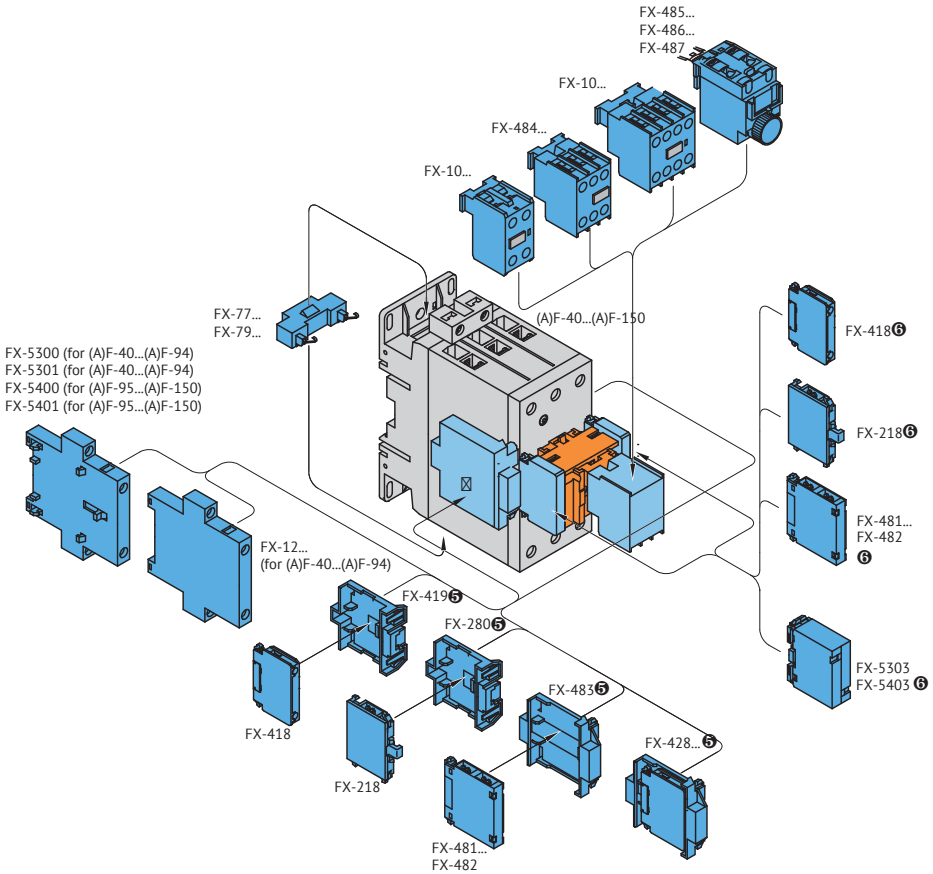


(1) Installation is impossible if a front-mounted unit with side attachment or mechanical interlock device FX-5000 or FX-5001 is available. For F-09...F-38 contactors and FR contactor relays, installation is impossible if FX-10... with 4 contacts and FX-222 are available.
(2) When installing FX-222... mechanical interlock on F-09...F-38 contactors and FR contactor relays, refer to the below drawing and table of maximum accessory combinations.
(3) If the FX-454 or FX-455 manual closing module is available, front mounting of any auxiliary unit is impossible.
(4) FX-5003 and FX-5303 can not be installed if FX-10... unit with 4 contacts (FX-1004, FX-1013, FX-1022, FX-1031, FX-1040) is already installed on the front side.

Contactor relays FR with AC coil and F-09...F-38 contactors with AC coil with installed mechanical latch FX-222...

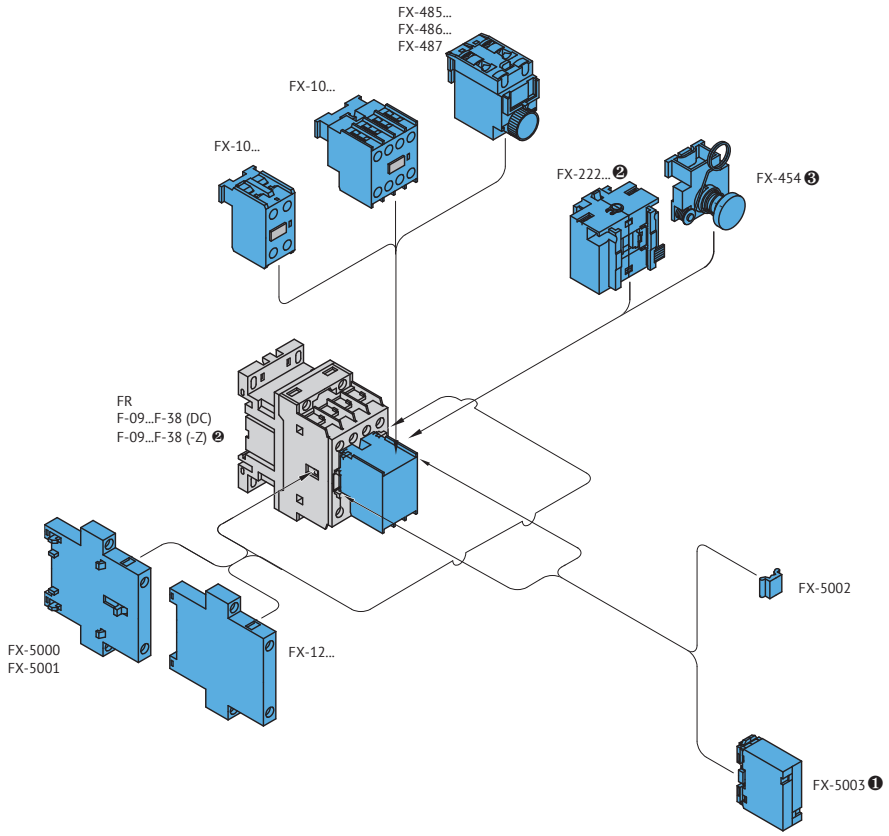


Contactors F-40...F-150 with AC coil and AF-40...AF-150 contactors with installed mechanical latch FX-272... or FX-641...



(5) Installation is impossible if a front-mounted unit with side attachment is available.
(6) Installation is only possible for (A)F-95...(A)F-150.

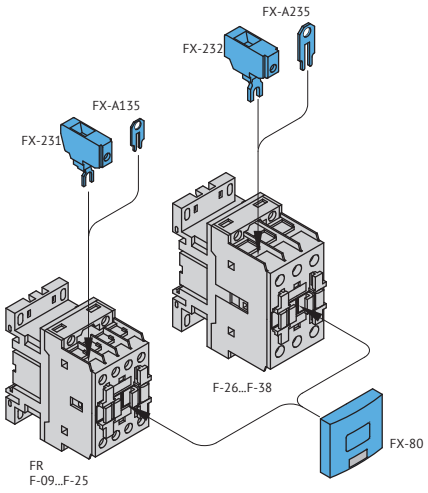
Contactor relays FR with DC coil
Contactors F-09...F-38 with DC coil
Contactors F-09-Z...F-38-Z with DC coil with reduced power consumption

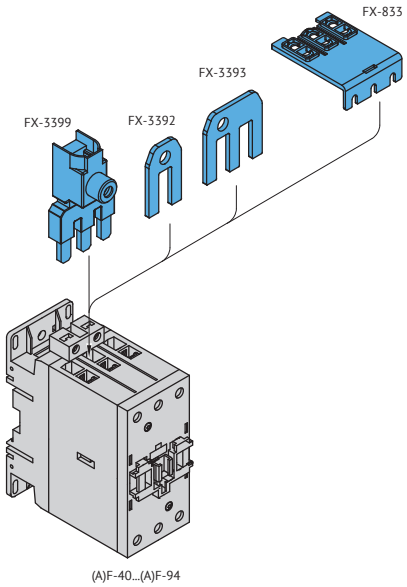


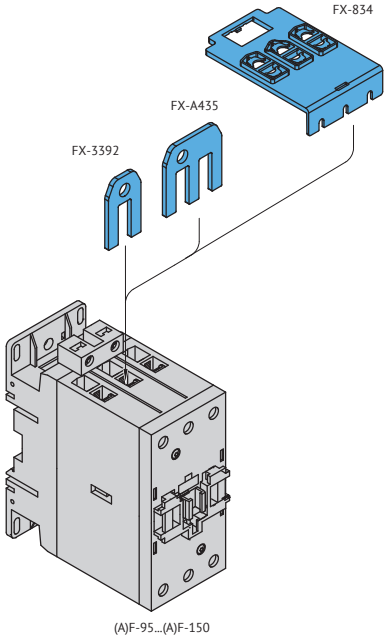
(1) Installation is impossible if mechanical lock FX-222... is available.
(2) It is not possible to install mechanical lock FX-222... on 4-pole contactors F-26-..Z...F-38-..Z with reduced power consumption.
(3) If the FX-454 manual closing module is available, front mounting of any auxiliary unit is impossible.

Installation positions of accessories

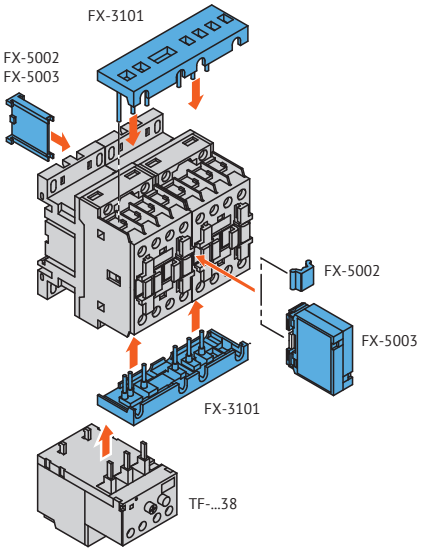
Possible assembly



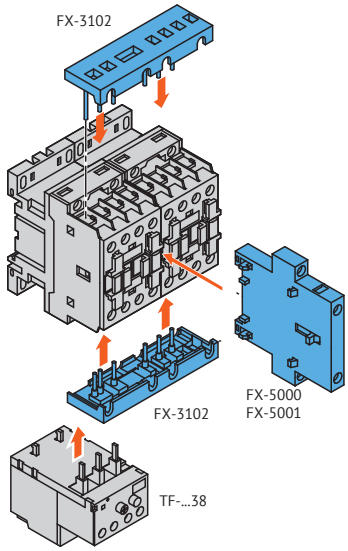




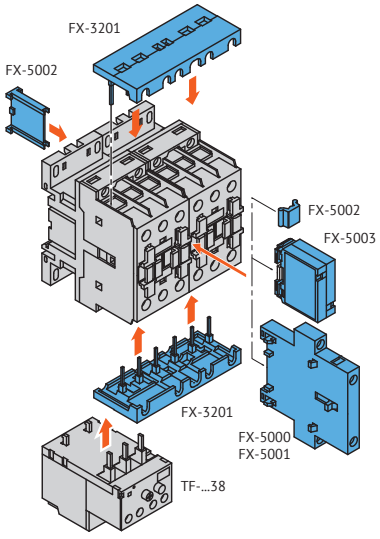
Connection adapters for reversing assemblies using F-09...F-25 contactors



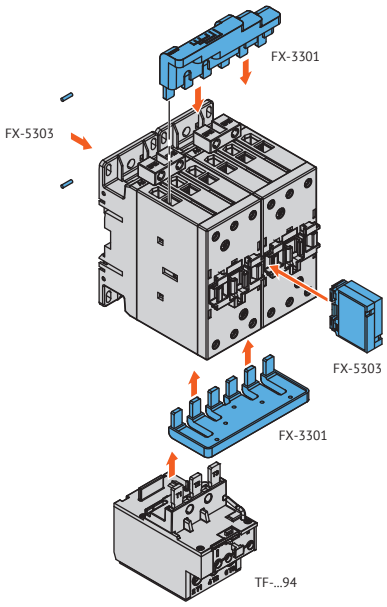
Connection adapters for reversing assemblies using F-09...F-25 contactors and FX-5000 or FX-5001 mechanical interlock



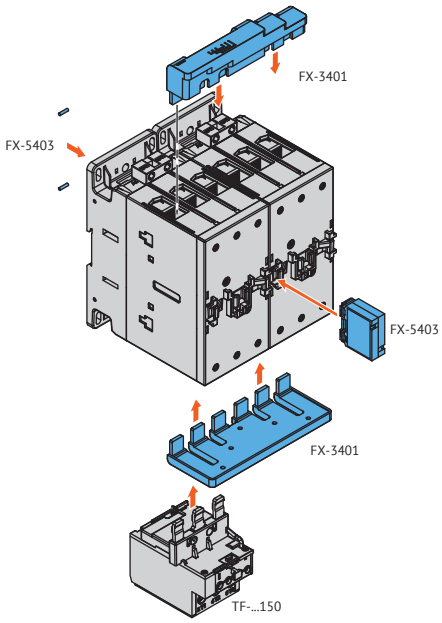
Connection adapters for reversing assemblies using F-26...F-38 contactors



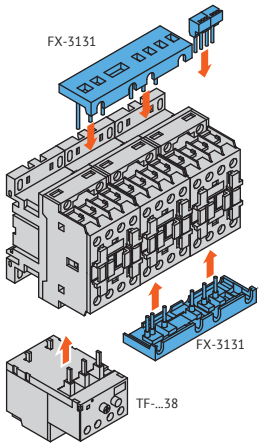
Connection adapters for reversing assemblies using (A)F-40...(A)F-94 contactors



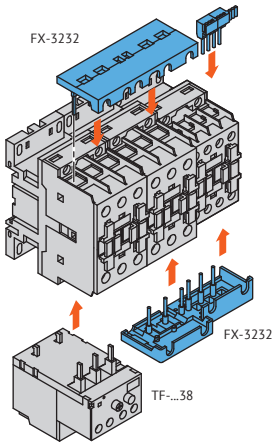
Connection adapters for reversing assemblies using (A)F-95...(A)F-150 contactors



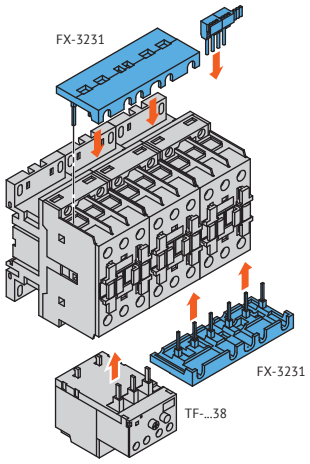
Connection adapters for star-delta assemblies using F-09...F-25 contactors



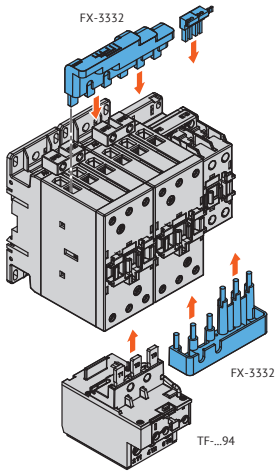
Connection adapters for star-delta assemblies using F-26...F-38 (delta) and F-09...F-25 (star) contactors



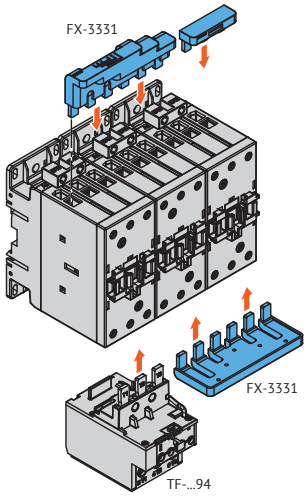
Connection adapters for star-delta assemblies using F-26...F-38 contactors



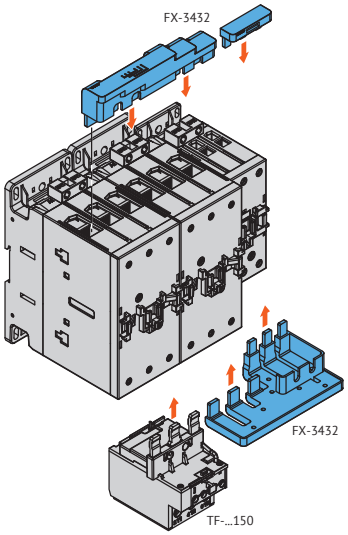
Connection adapters for star-delta assemblies using (A)F-40...(A)F-94 (delta) and F-26...F-38 (star) contactors



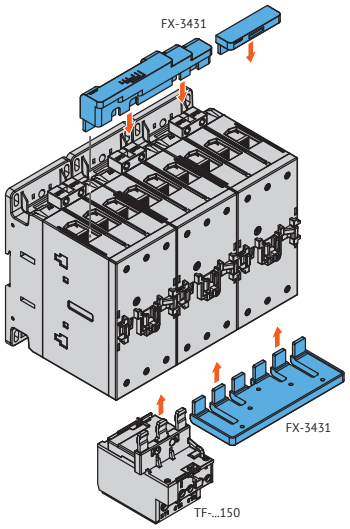
Connection adapters for star-delta assemblies using (A)F-40...(A)F-94 contactors



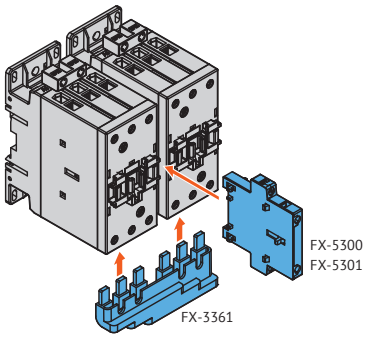
Connection adapters for star-delta assemblies using (A)F-95...(A)F-150 (delta) and (A)F-40...(A)F-94 (star) contactors



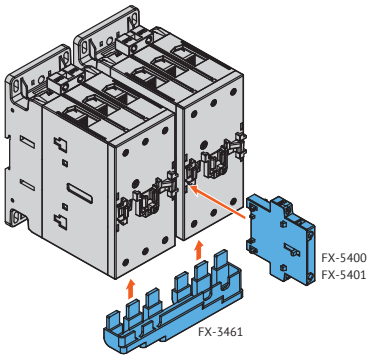
Connection adapters for star-delta assemblies using (A)F-95...(A)F-150 contactors



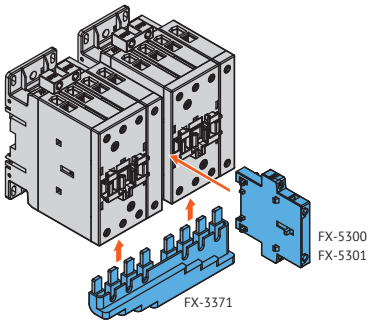
Connection adapters for parallel assemblies using (A)F-40...(A)F-94 contactors



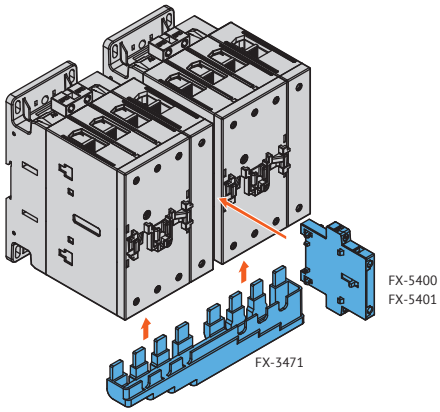
Connection adapters for parallel assemblies using (A)F-95...(A)F-150 contactors



Connection adapters for parallel assemblies using (A)F-40...(A)F-80 four-pole contactors



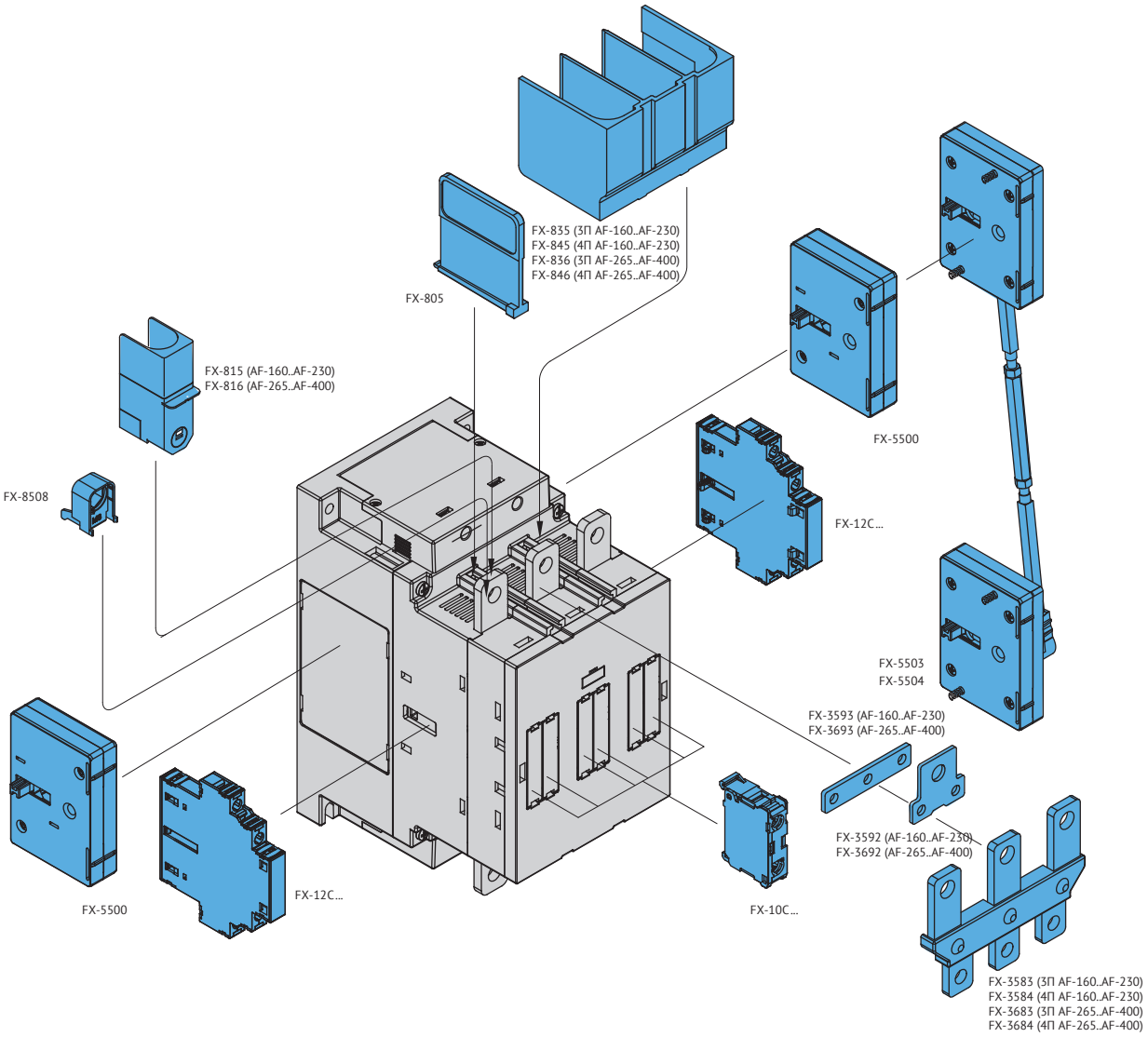
Connection adapters for parallel assemblies using (A)F-95...(A)F-150 four-pole contactors



Installation positions of auxiliary contact units and accessories

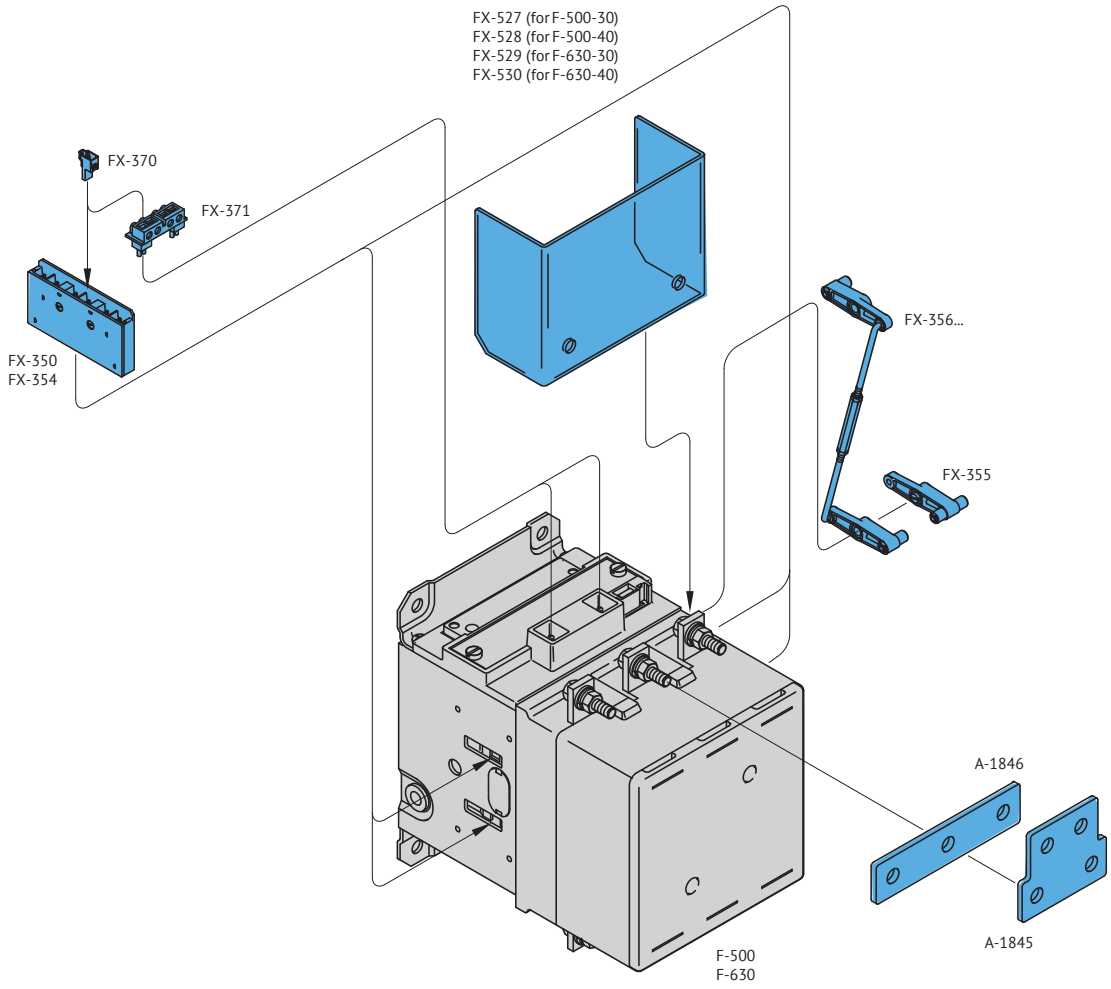
Contactors AF-160 ... AF-400

Possible assembly



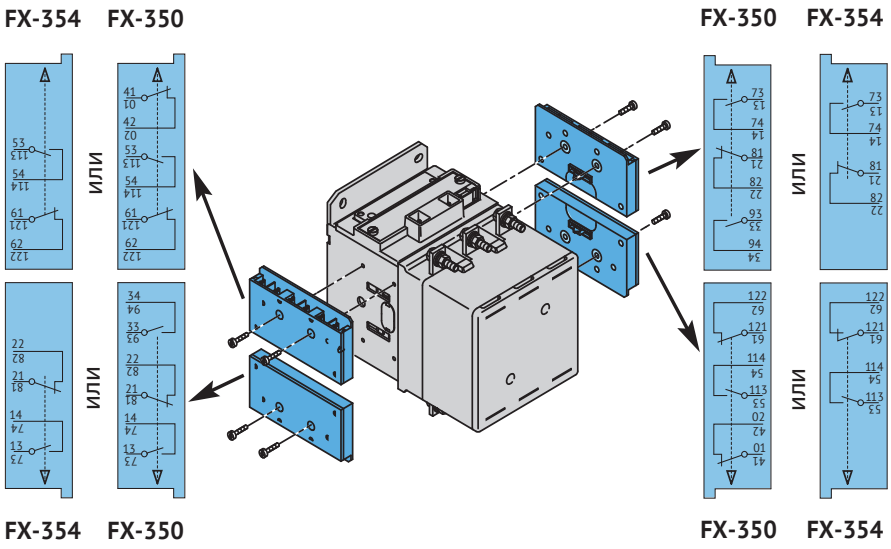
Contactors F-500...F-1000

Possible assembly

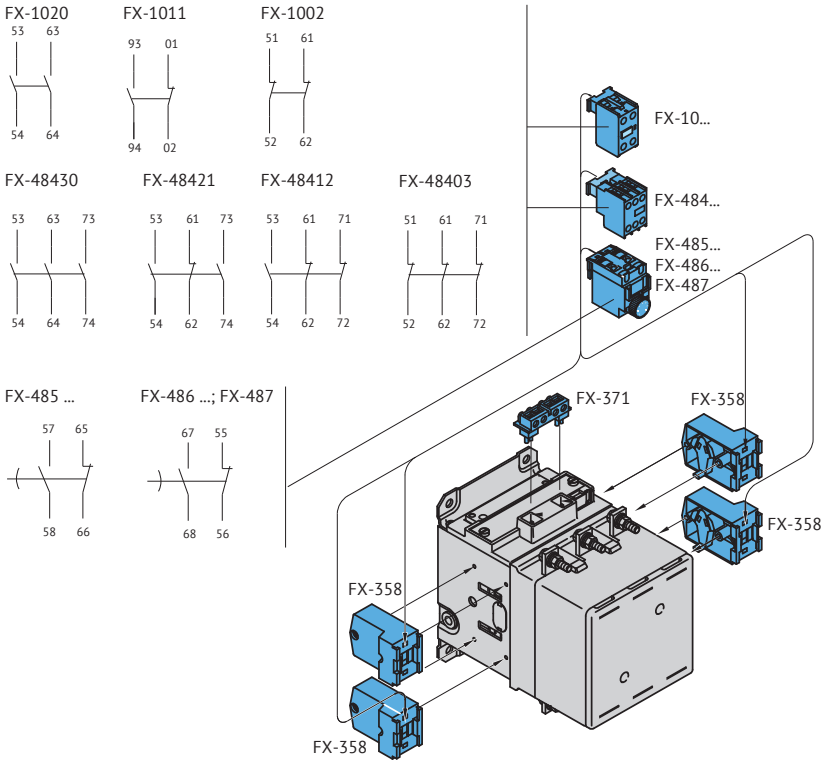


Additional auxiliary contacts FX-350 and FX-354 can be installed on contactors F-250...F-1000 in the amount of no more than 4 units per contactor (a total of 12 contacts maximum).

From unit FX-350, a combination of 2 NO + 1 NC or 1 NC + 2 NO contacts can be obtained depending on the installation position (see drawing), unit FX-354 includes 1 NO + 1 NC contacts.

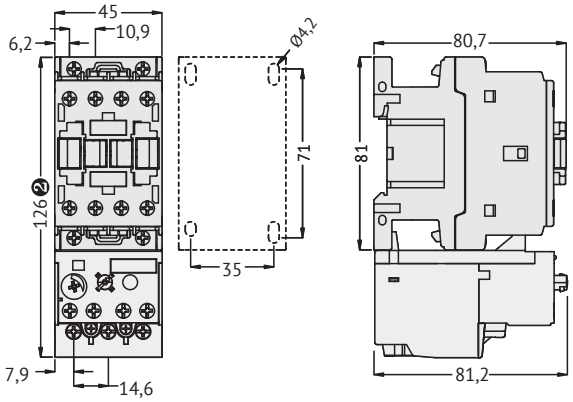


With FX-358 adapter, auxiliary contacts FX-10... with 2 contacts and FX-484..., pneumatic time delay attachments FX-485..., FX-486... and FX-487 can be installed. Four (4) adapters FX-358 can be installed on the contactors. One unit FX-10..., FX-484..., FX-485..., FX-486... and FX-487 can be installed on each FX-358 adapter.



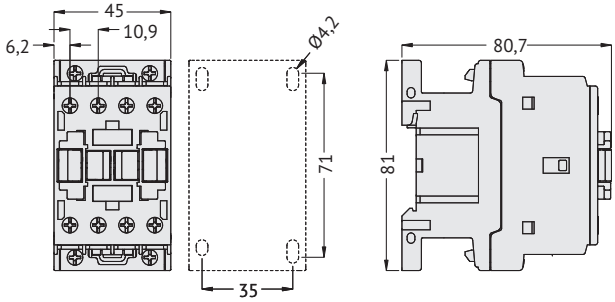
Overall dimensions (mm)

Contactor relays FR with AC coil
Three-pole contactors F-09…F-25 with AC coil and thermal relay TF-…38

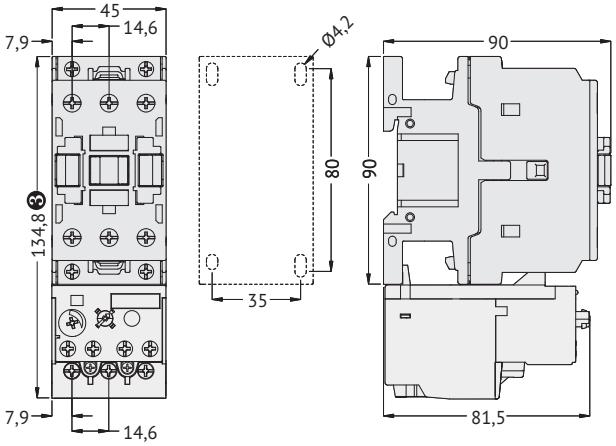


(2) 135 mm for TF-E..38

Four-pole contactors F-09…F-18 with AC coil

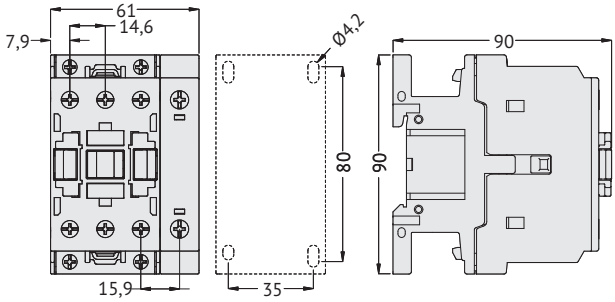


Three-pole contactors F-26…F-38 with AC coil and thermal relay TF-…38

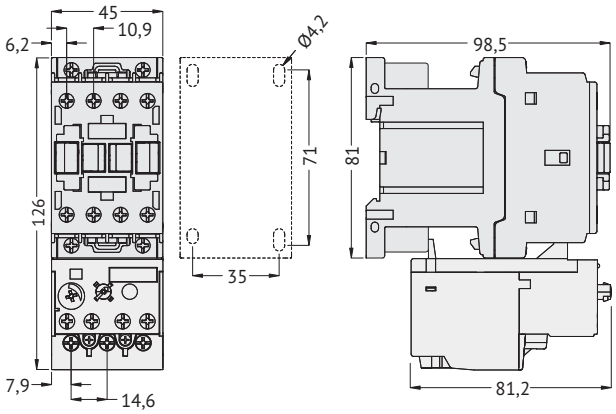


(3) 144 mm for TF-E..38

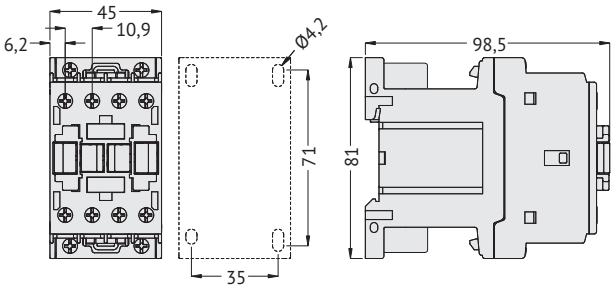
Four-pole contactors F-26…F-38 with AC coil



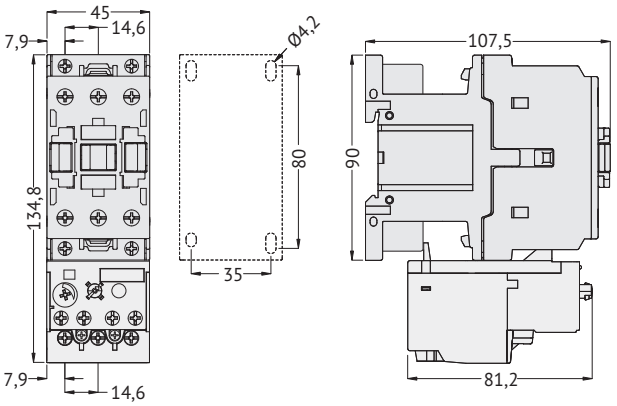
Contactor relays FR with DC coil
Three-pole contactors F-09…F-25 with DC coil and thermal relay TF-…38



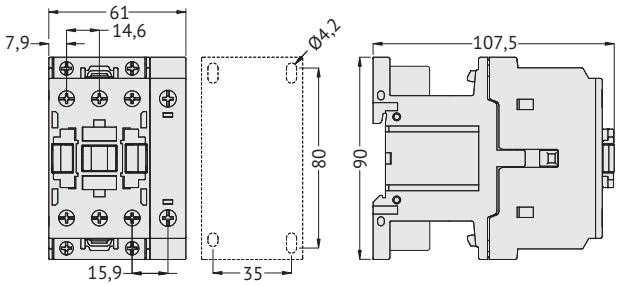
Four-pole contactors F-09…F-18 with DC coil



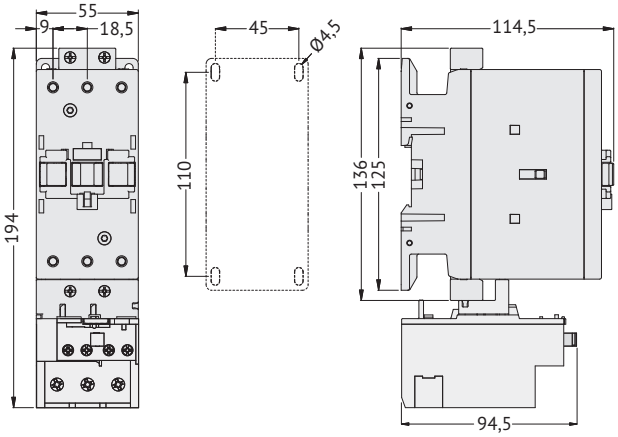
Three-pole contactors F-26...F-38 with DC coil and thermal relay TF-...38



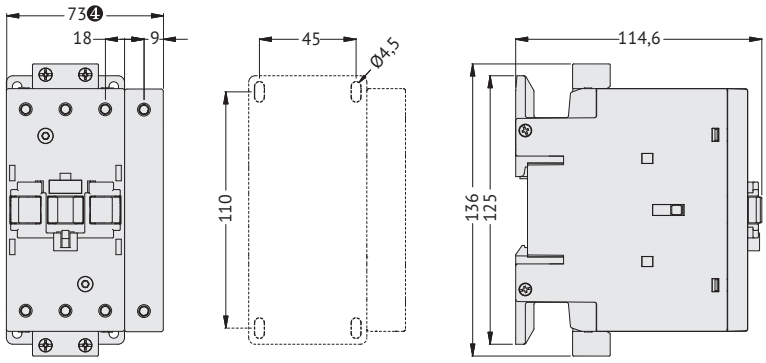
Four-pole contactors F-26...F-38 with DC coil



Three-pole contactors F-40...F-94 with AC coil and thermal relay TF-...94
Three-pole contactors AF-40...AF-94 with AC/DC coil and thermal relay TF-...94

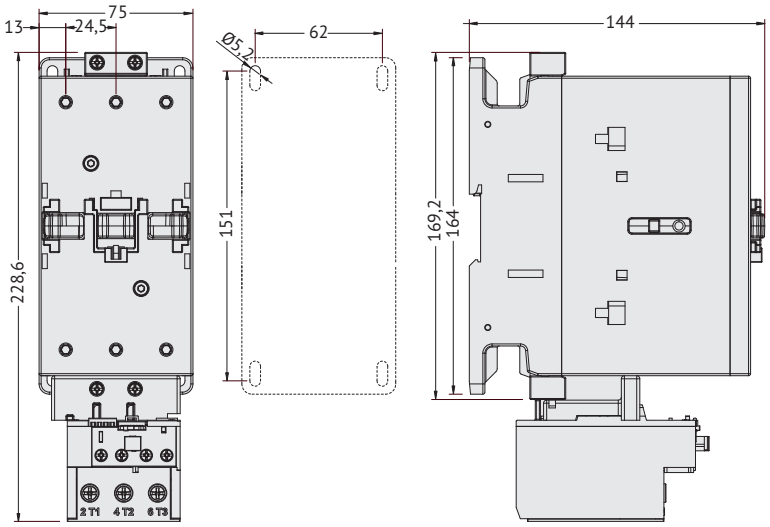


Four-pole contactors F-40...F-80 with AC coil
Four-pole contactors AF-40...AF-80 with AC/DC coil
Contactors FD-65, FD-80

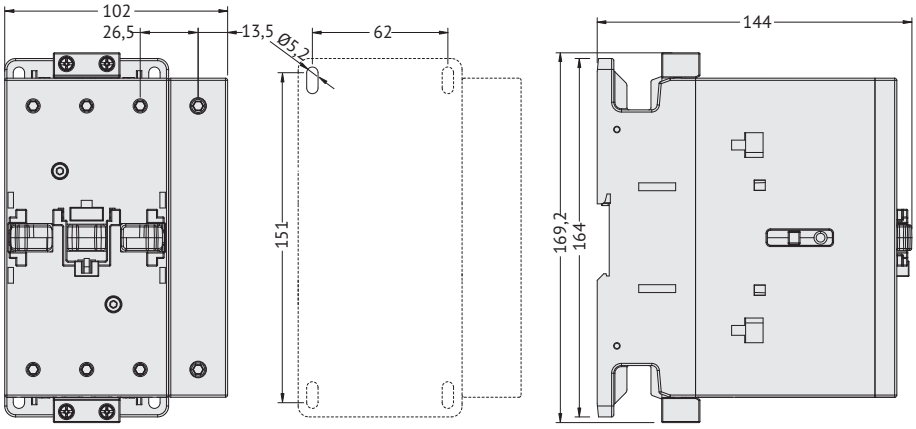


(4) 91 mm for A(F)-80-22... ; 55 mm for FD65 and FD80

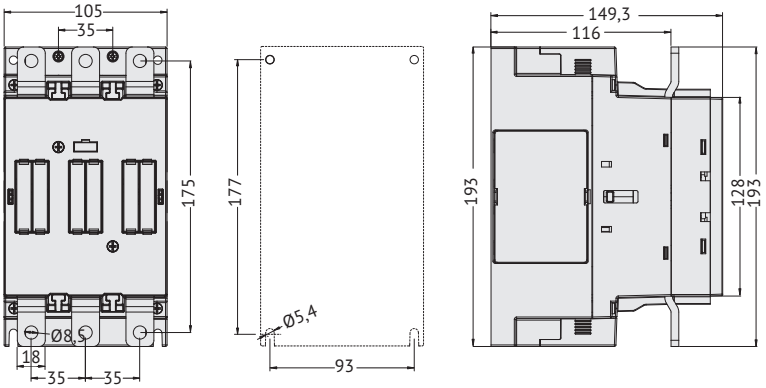
Three-pole contactors F-95…F-150 with AC coil and thermal relay TF-…150
Three-pole contactors AF-95…AF-150 with AC/DC coil and thermal relay TF-…150



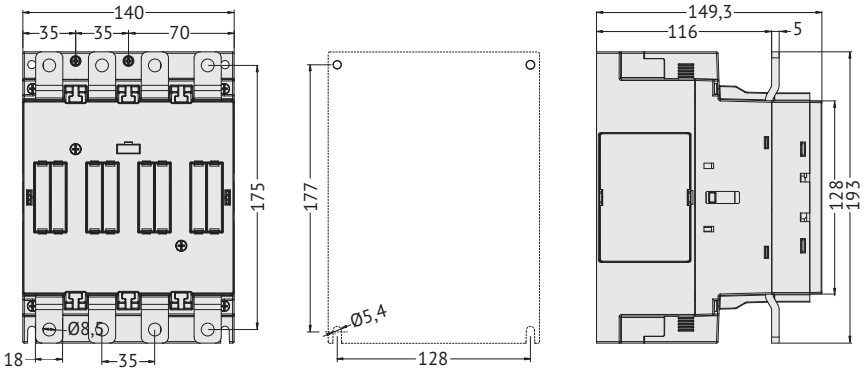
Four-pole contactors F-95…F-150 with AC coil
Four-pole contactors AF-95…AF-150 with AC/DC coil



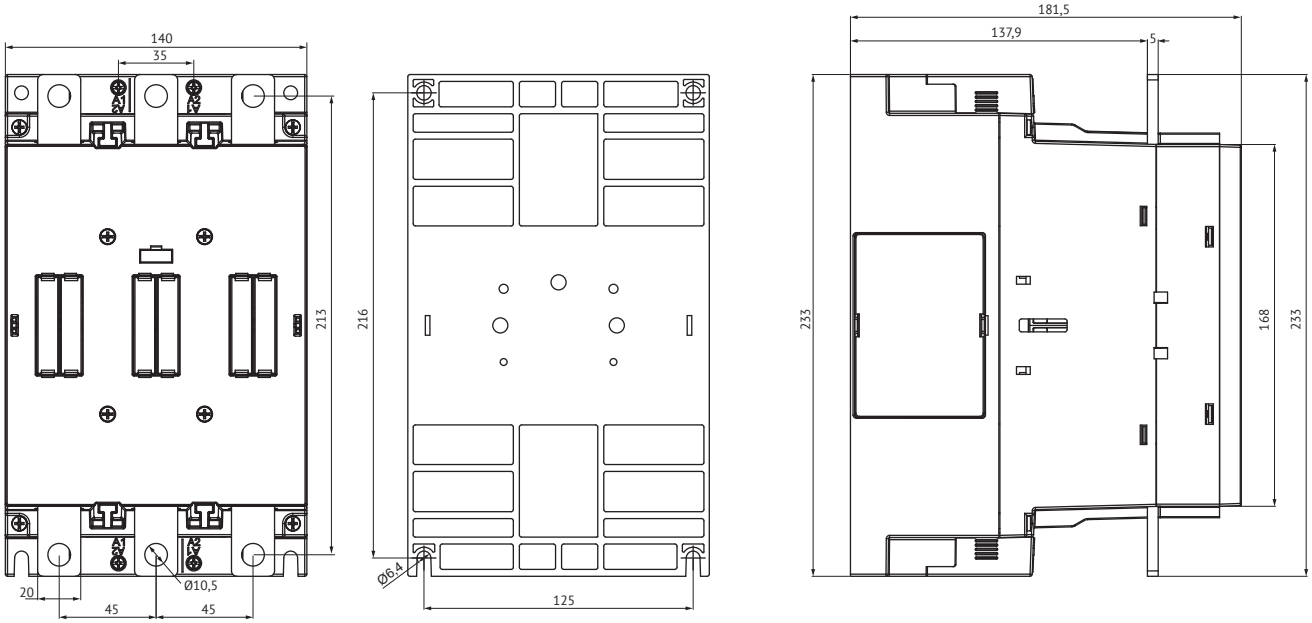
Three-pole contactors AF-160…AF-230 with AC/DC coil



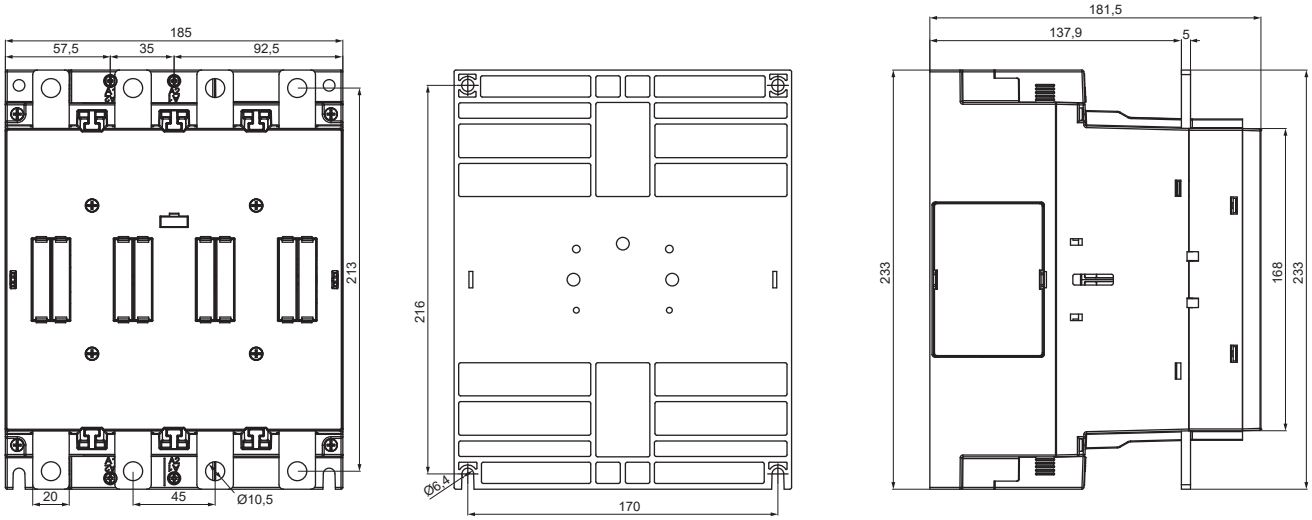
Four-pole contactors AF-160...AF-230 with AC/DC coil



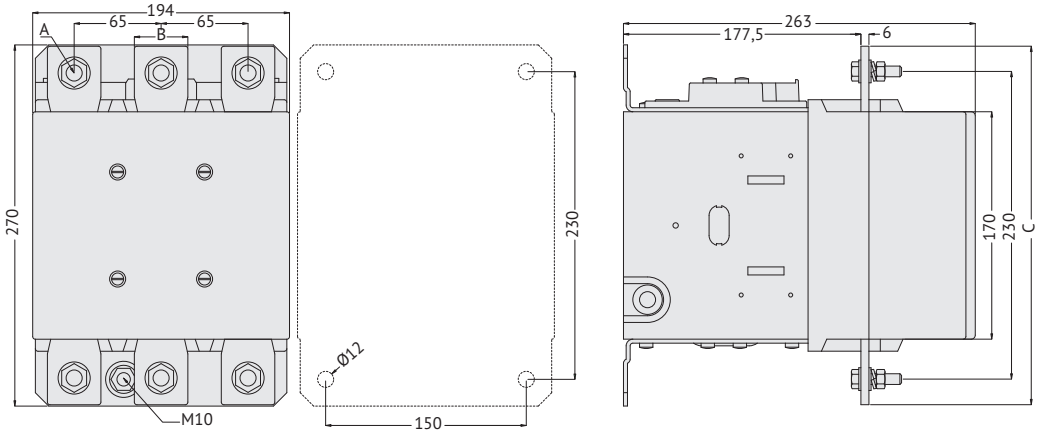
Three-pole contactors AF-265...AF-400 with AC/DC coil



Four-pole contactors AF-265...AF-400 with AC/DC coil

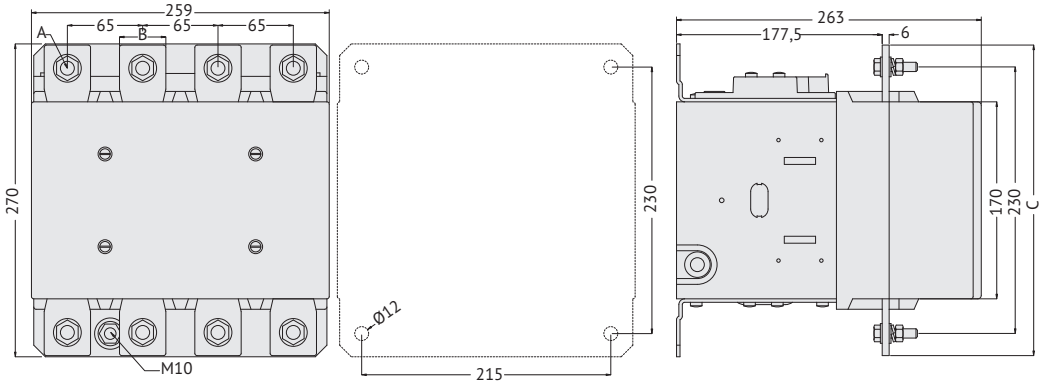


Three-pole contactors F-630 with AC/DC coil



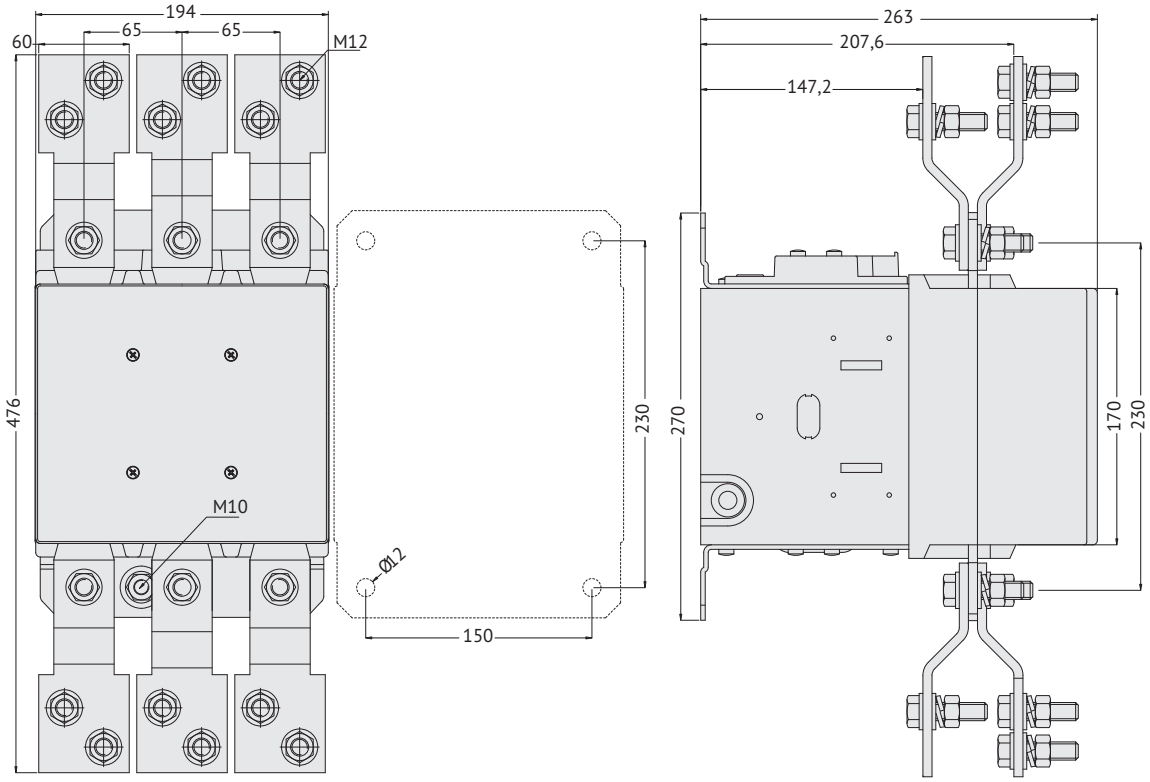
Contactor type	A	B	C
F-500	M10	35	265
F-630	M12	40	270

Four-pole contactors F-630 with AC/DC coil

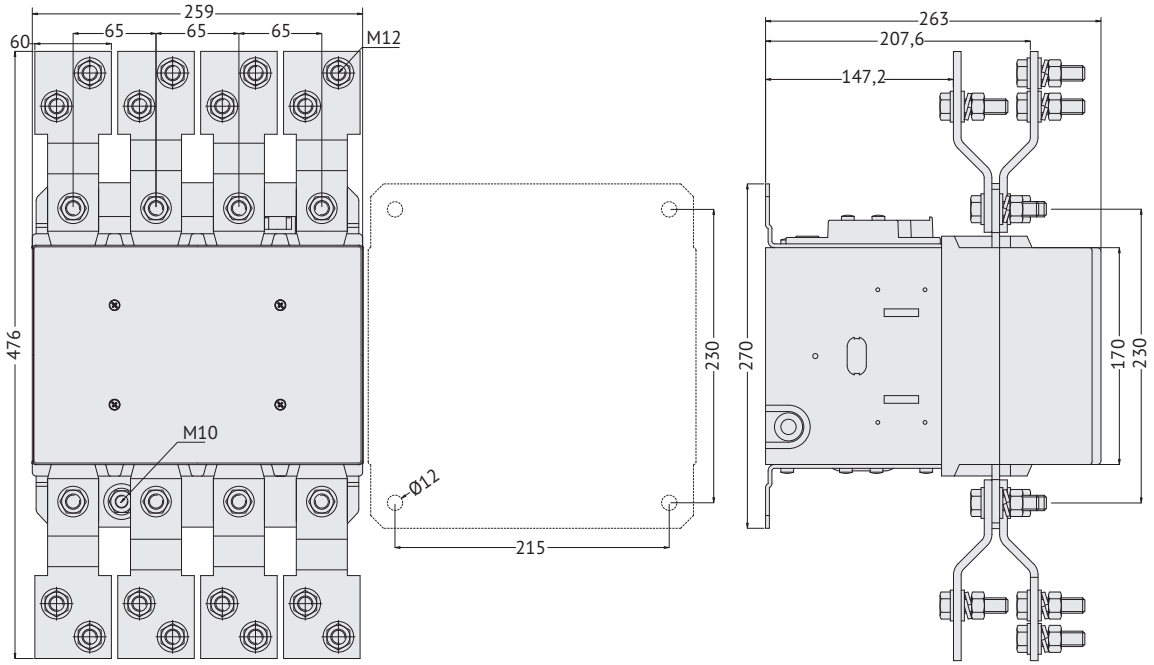


Contactor type	A	B	C
F-500	M10	35	265
F-630	M12	40	270

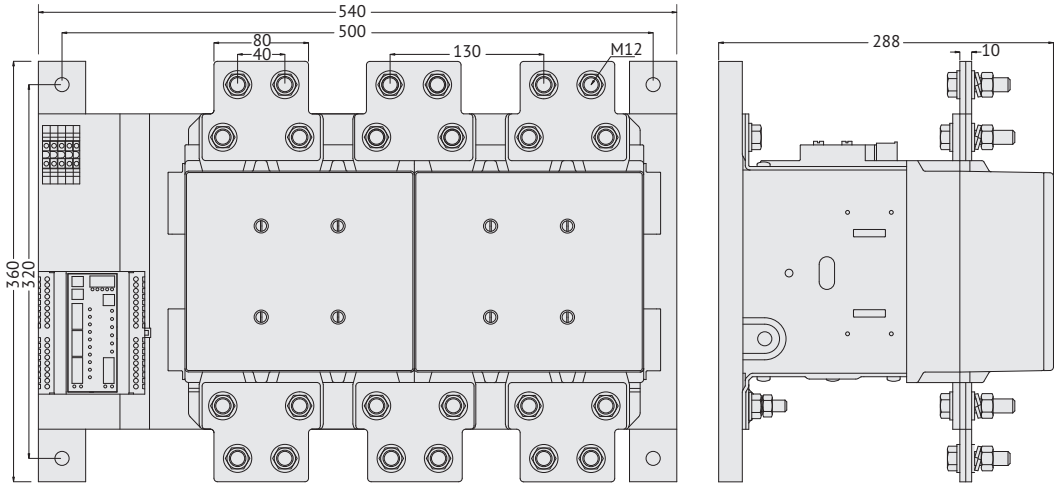
Three-pole contactors F-1000 with AC/DC coil



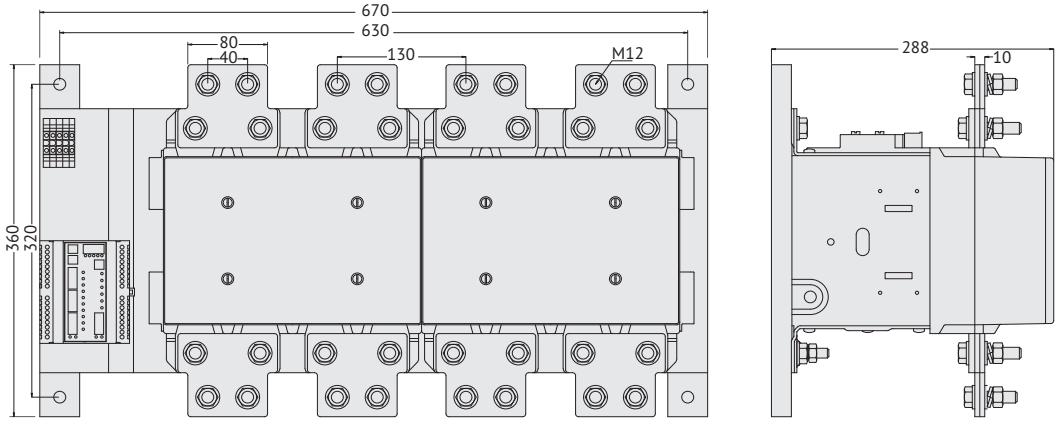
Four-pole contactors F-1000 with AC/DC coil



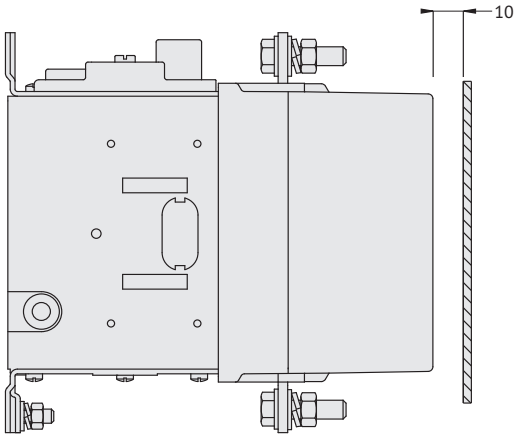
Three-pole contactors F-1250...F-1600 with AC coil



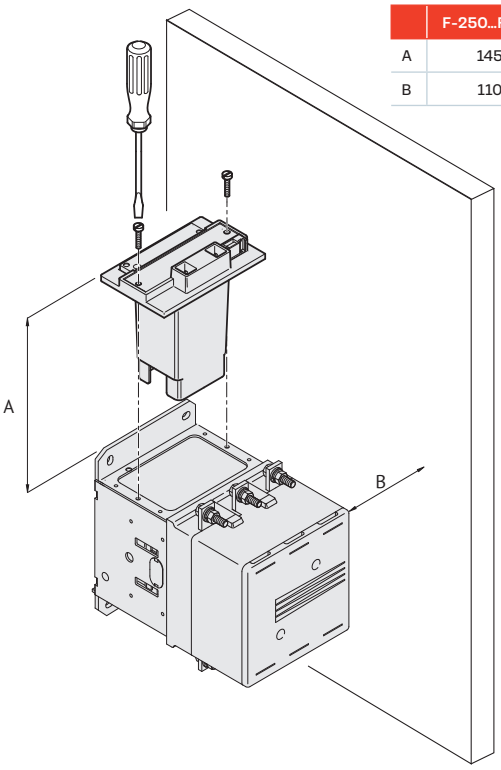
Four-pole contactors F-1250...F-1600 with AC coil



Minimum safe distance between F-250…F-1600 contactor and metal parts



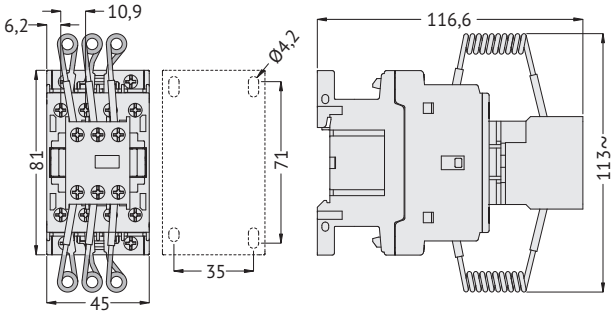
Minimum distance required for coil replacement



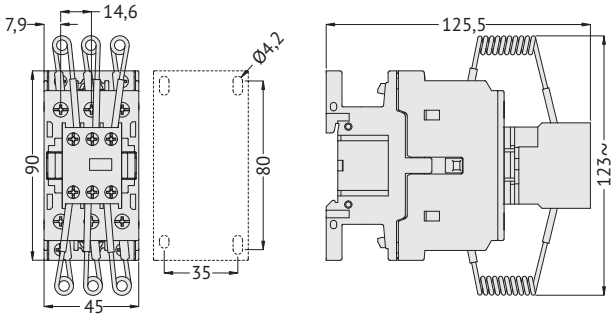
	F-250…F400	F-500…F1000
A	145	170
B	110	160

Capacitor switching contactors

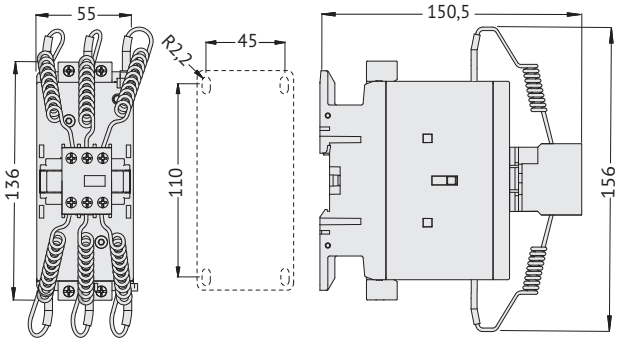
Contactors FK-09…FK-18 with AC coil



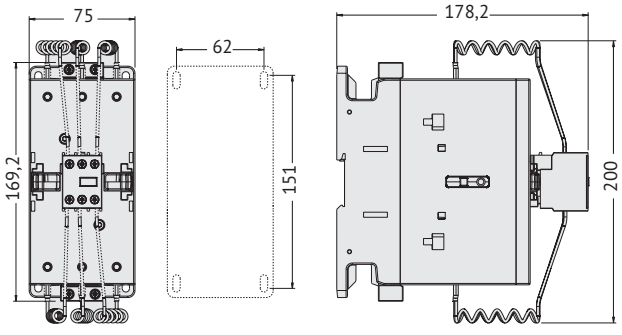
Contactors FK-26…FK-38 with AC coil



Contactors FK-50…FK-94 with AC coil



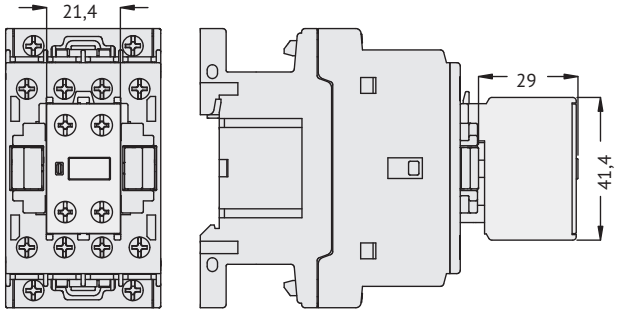
Contactors FK-95…FK-150 with AC coil



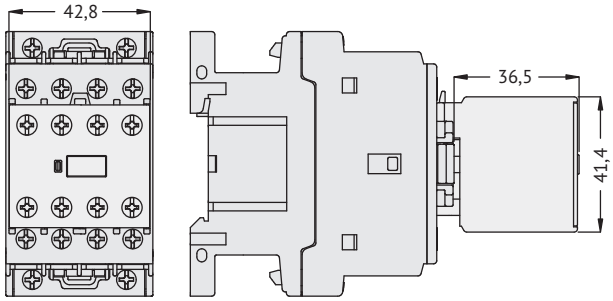
Overall dimensions of accessories (mm)

For contactors F-09...(A)F-150 and contactor relays FR

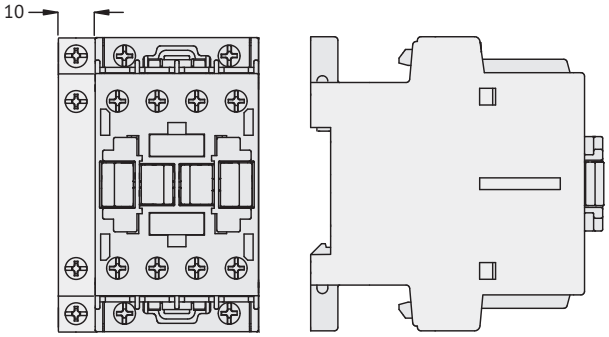
Auxiliary contacts
FX-10... with 2 contacts



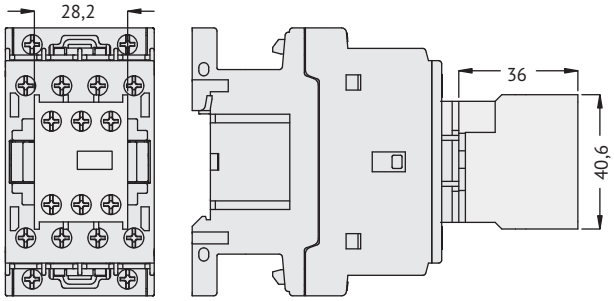
FX-10... with 4 contacts



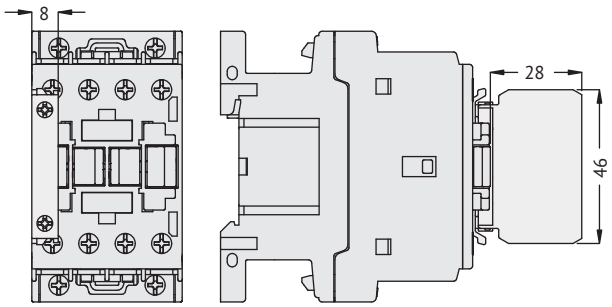
FX-12...



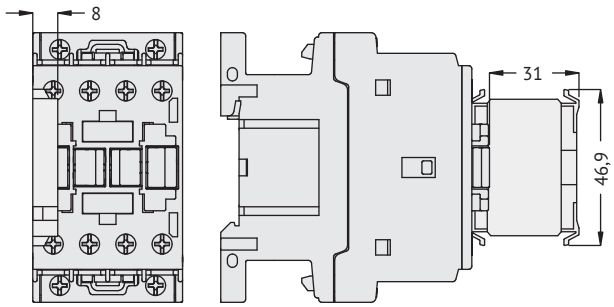
FX-484...



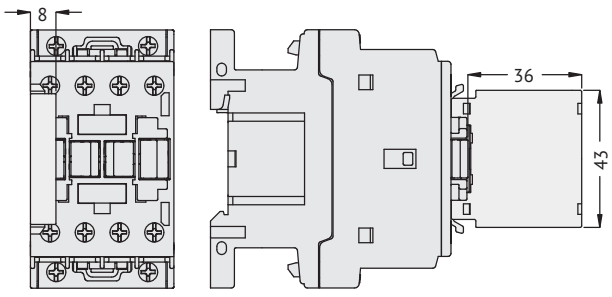
FX-418...



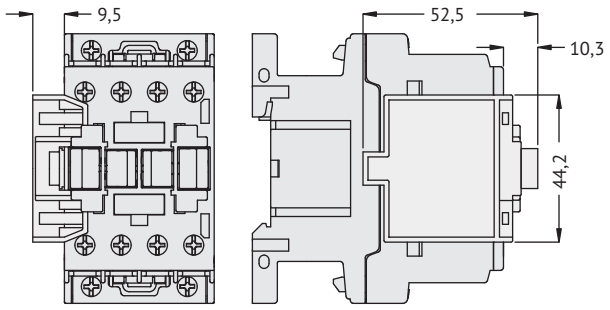
FX-218



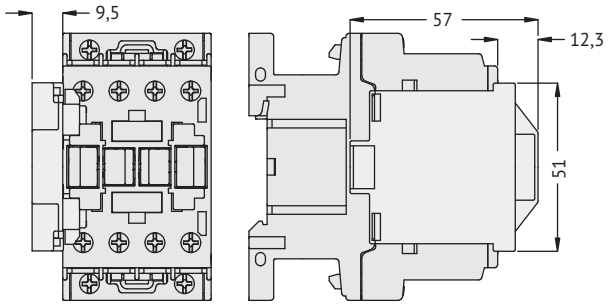
FX-481..., FX-482



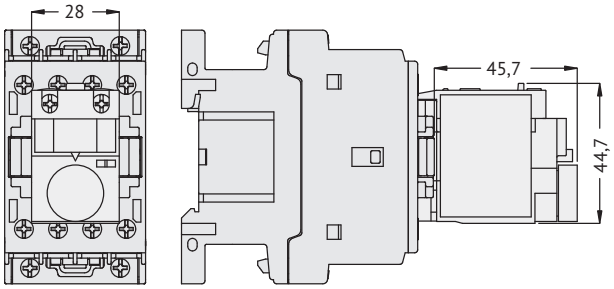
FX-280 c FX-218



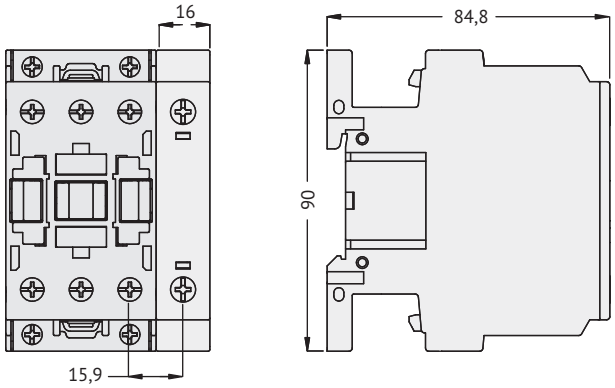
FX-419 with FX-418, FX-428..., FX-483 with FX-481 or FX-482



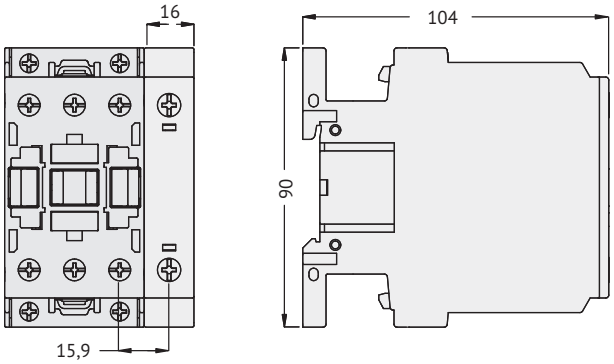
Pneumatic time delay attachments FX-485..., FX-486..., FX-487



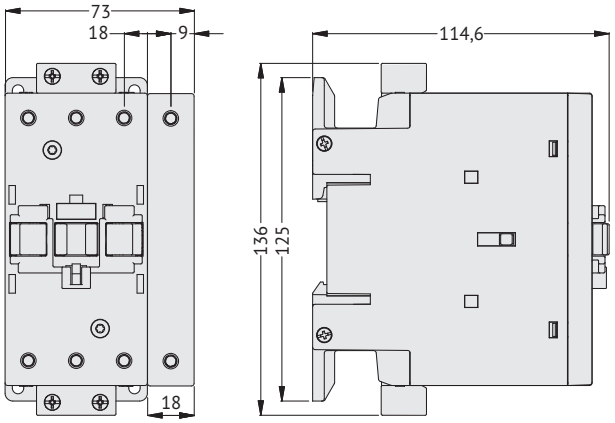
Fourth pole FX-42



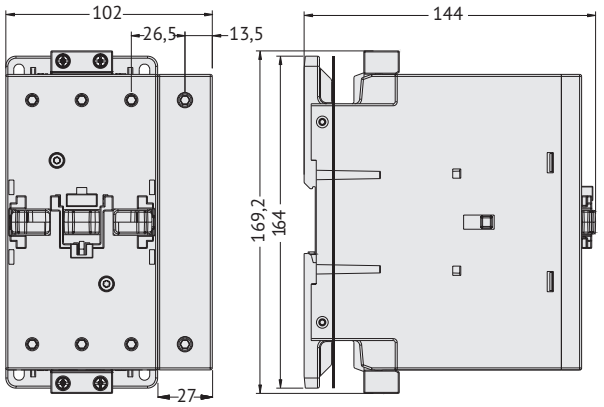
FX-D42



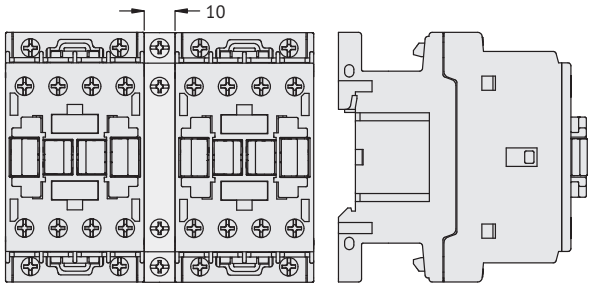
FX-43



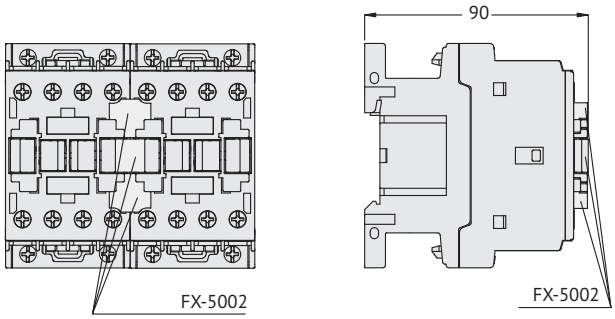
FX-D44



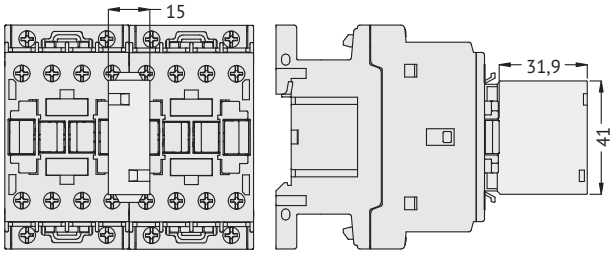
Interlocks FX-5000, FX-5001, FX-5300, FX-5301, FX-5400, FX-5401



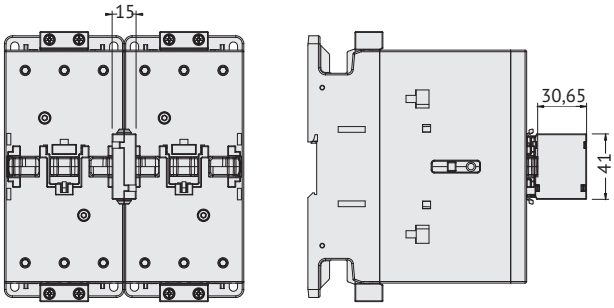
FX-5002



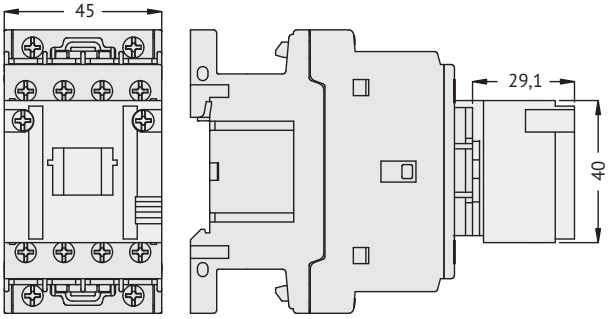
FX-5003, FX-5303, FX-5403



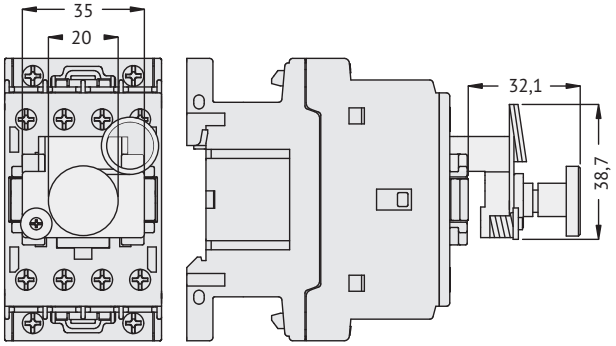
FX-5303, FX-5403



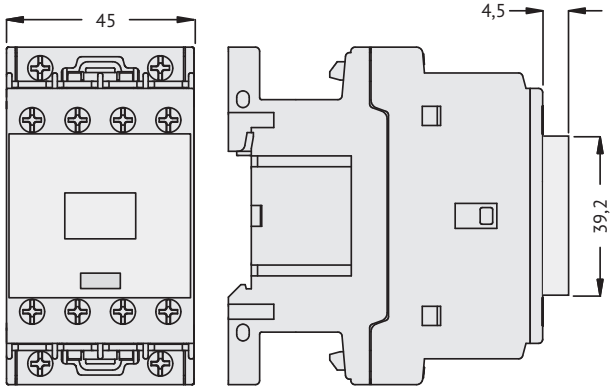
Mechanical lock
FX-222, FX-272, FX-641



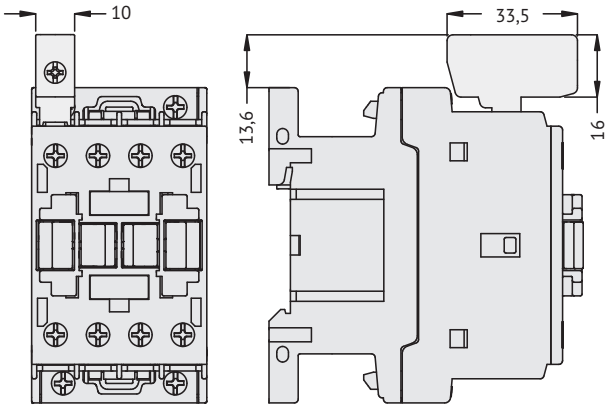
Manual interlocking module
FX-454, FX-455, FX-642



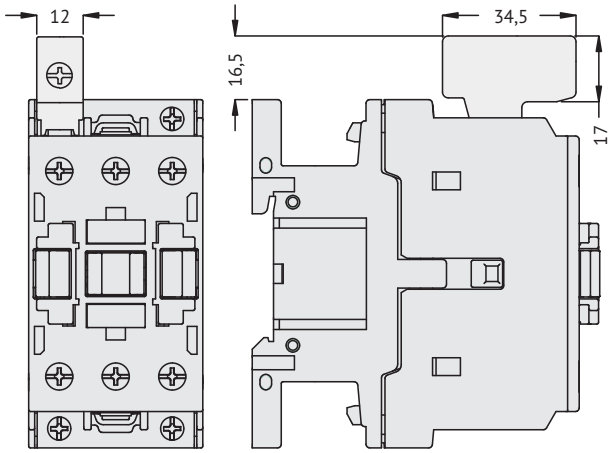
Cover
FX-80



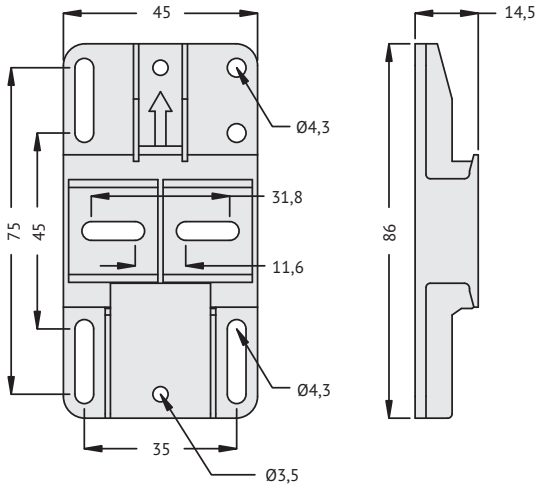
Adapter for increasing FX-231 terminal cross-section



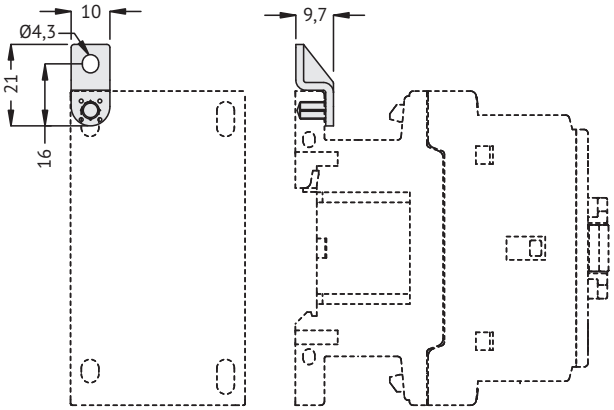
Adapter for increasing FX-232 terminal cross-section



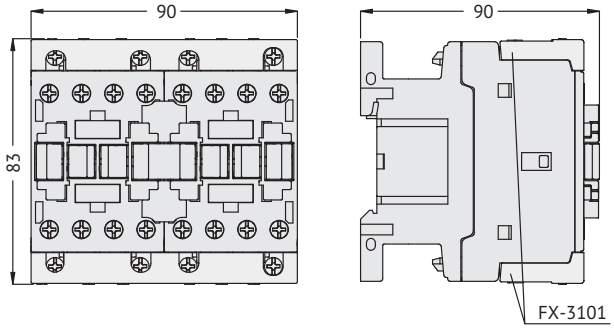
Bracket for screw mounting
FX-8901



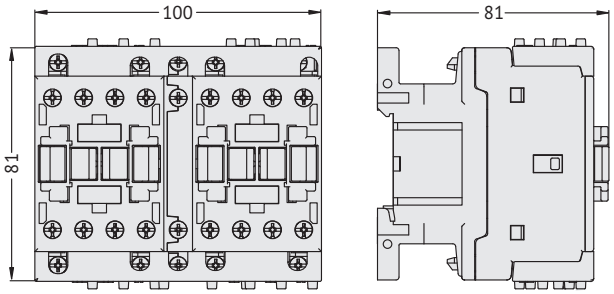
Bracket for screw mounting
FX-8902



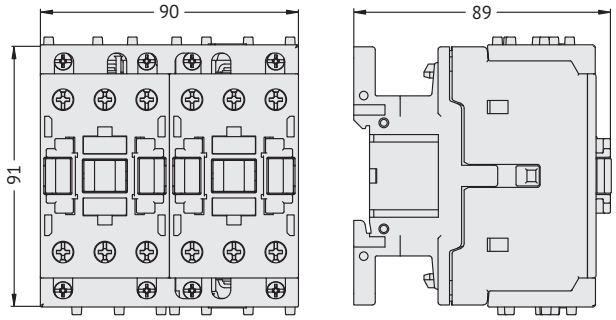
Connection adapter
FX-3101



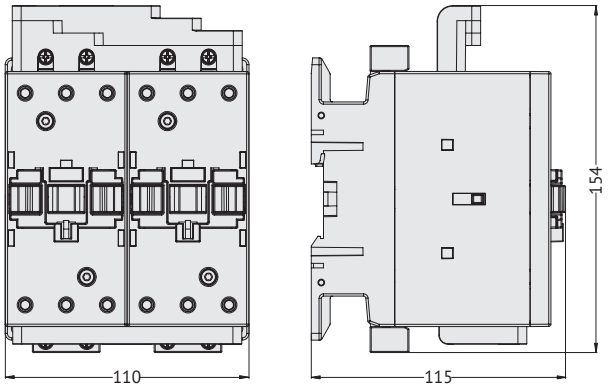
FX-3102



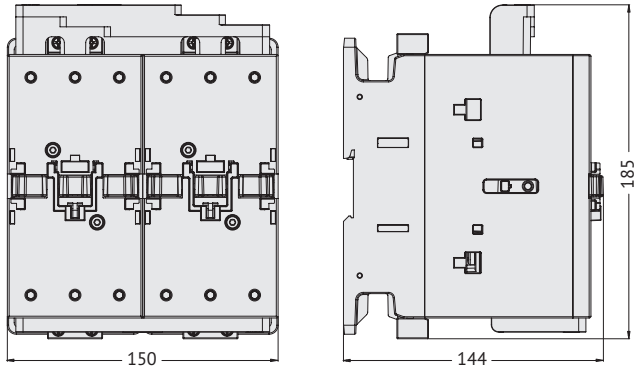
FX-3201



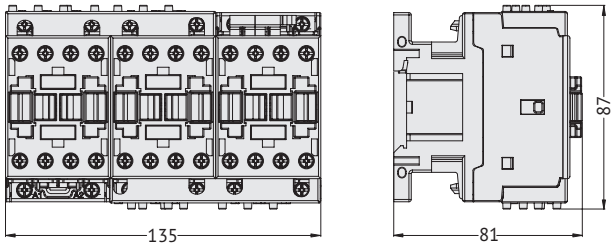
FX-3301



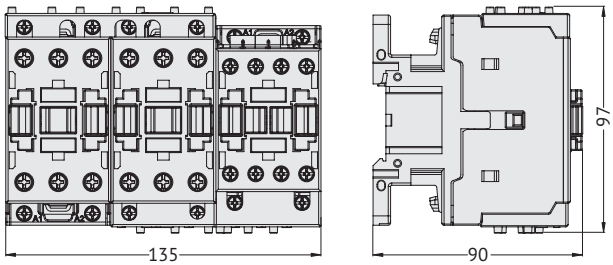
FX-3401



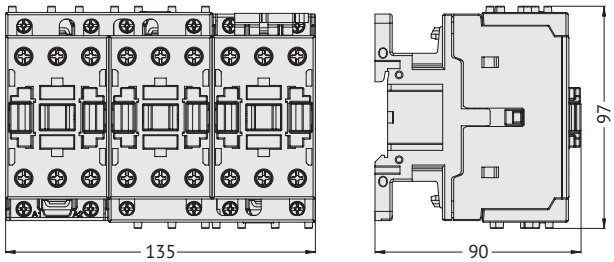
FX-3131



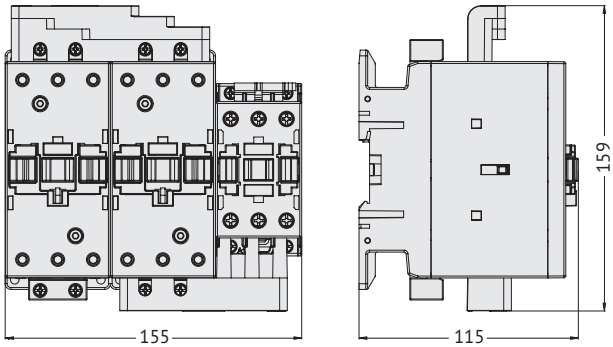
FX-3232



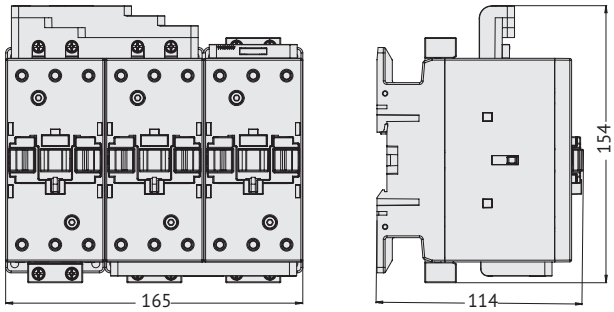
FX-3231



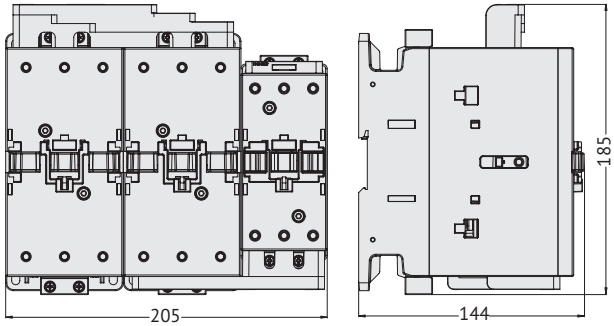
FX-3332



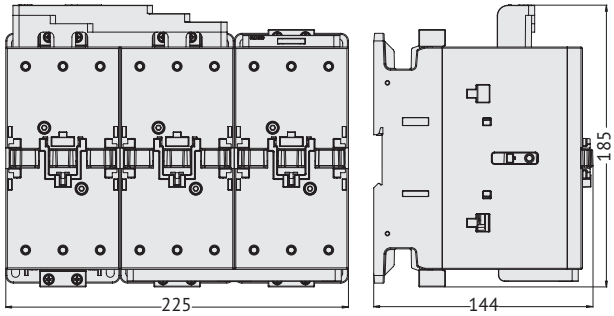
FX-3331



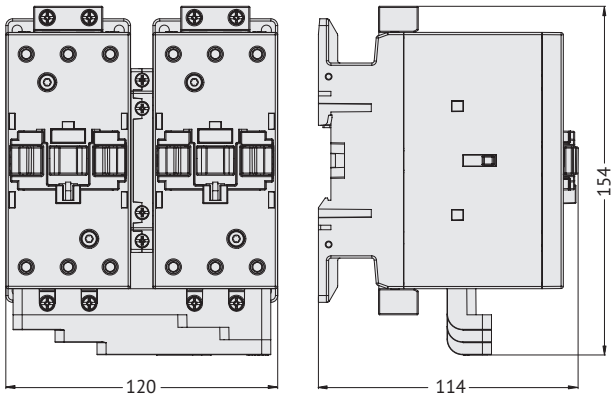
FX-3432



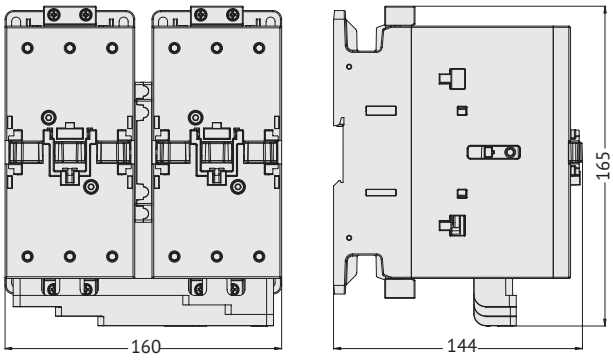
FX-3431



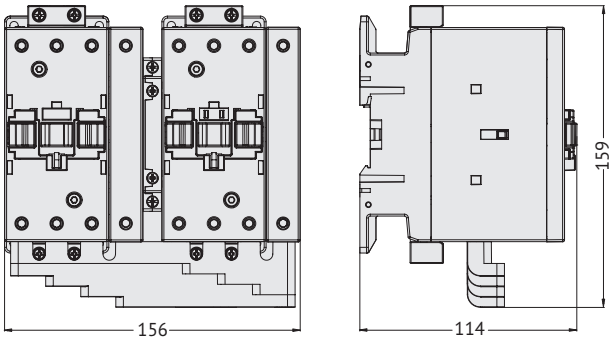
FX-3361



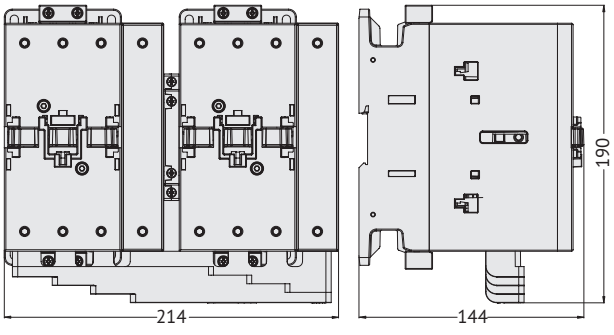
FX-3461



FX-3371

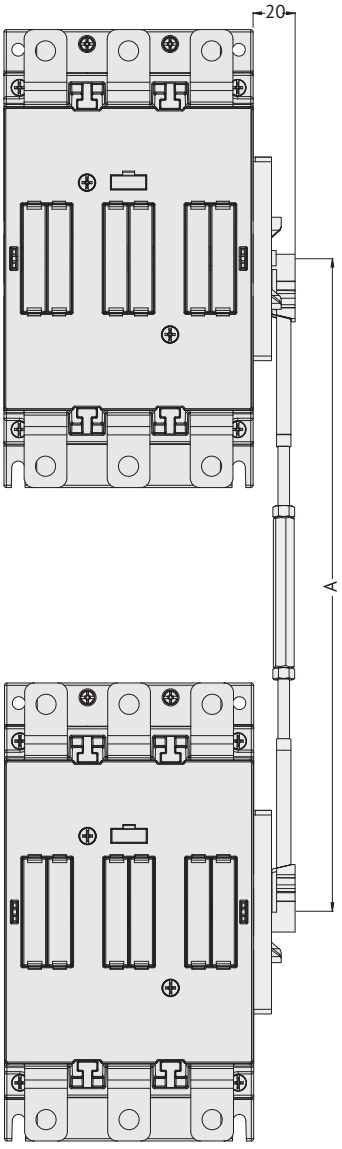


FX-3471

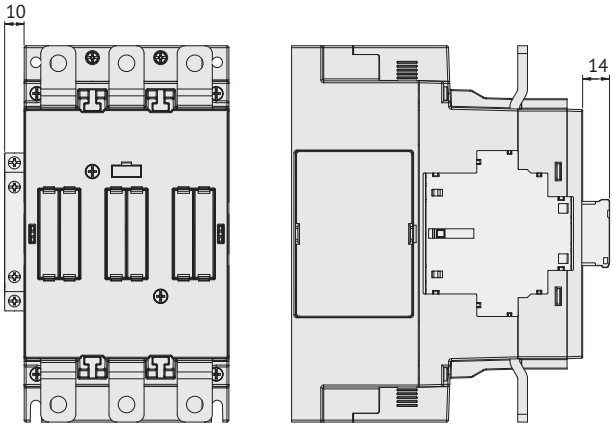


For AF-160...AF-230 contactors

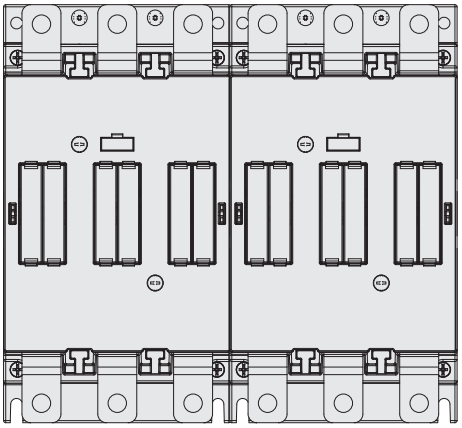
Mechanical interlock
FX-5503, FX-5504



Auxiliary contacts
FX-10C..., FX-12C...

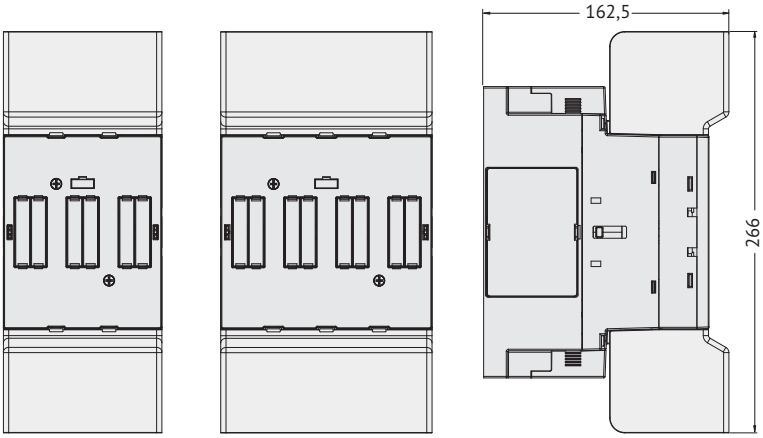


Mechanical interlock
FX-5500

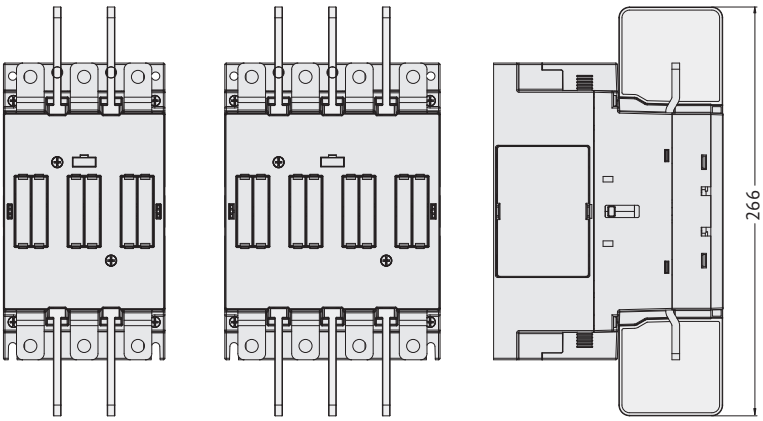


(1) Interlock module FX-5500 is installed between contactors and does not increase the overall dimensions of the assembly

Protective casing
FX-835, FX-845

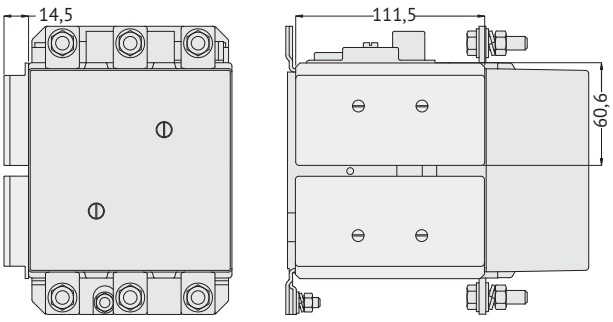


Interphase partition
FX-805

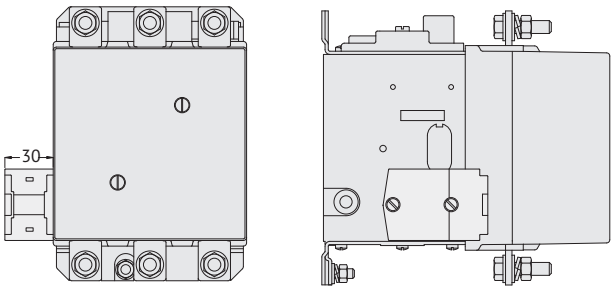


For F-250...F-1000 contactors

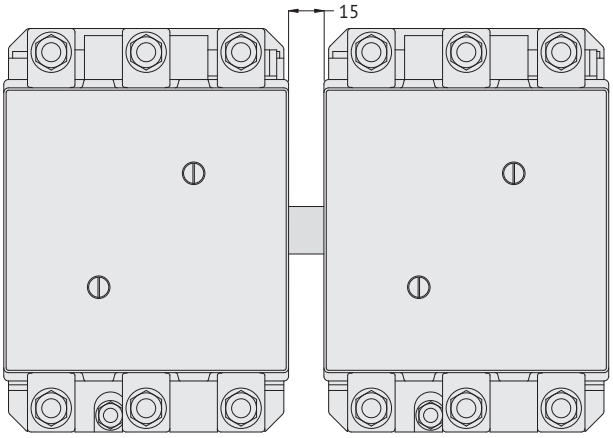
Auxiliary contacts
FX-350, FX-354



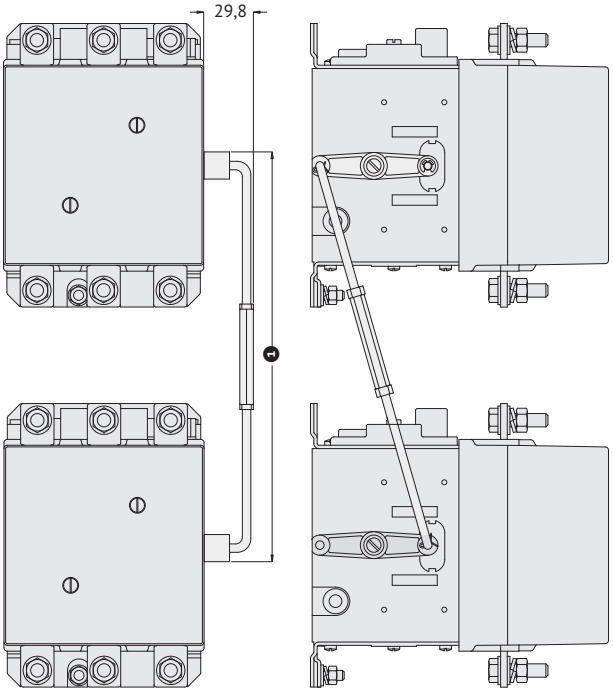
FX-358



Mechanical interlock
FX-355

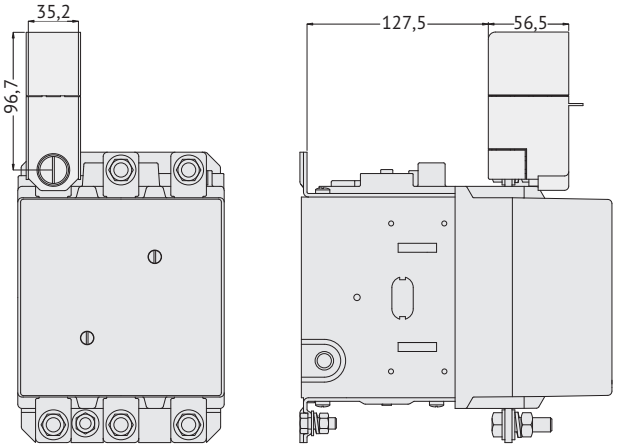


FX-356...

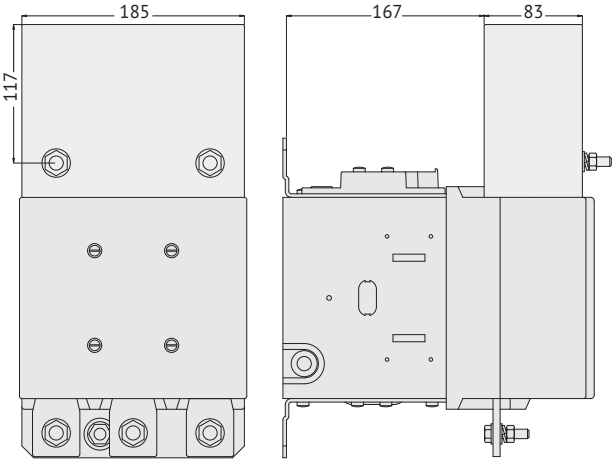


(1) The overall dimensions are presented in the «Technical specifications» section

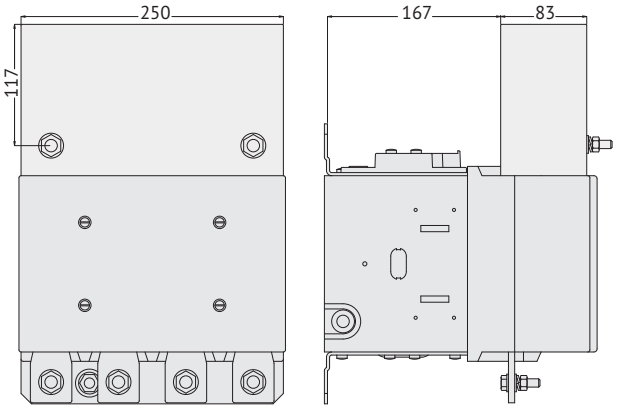
Protective cover
FX-363



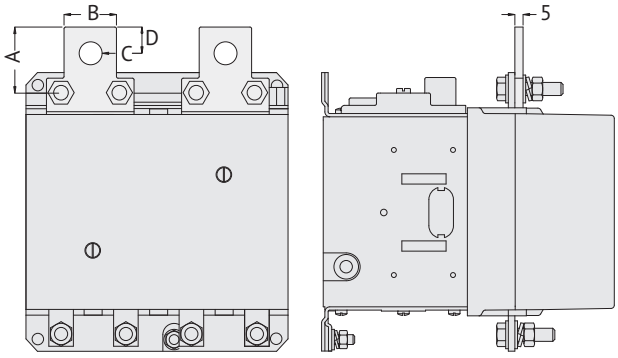
FX-527, FX-529



FX-528, FX-530

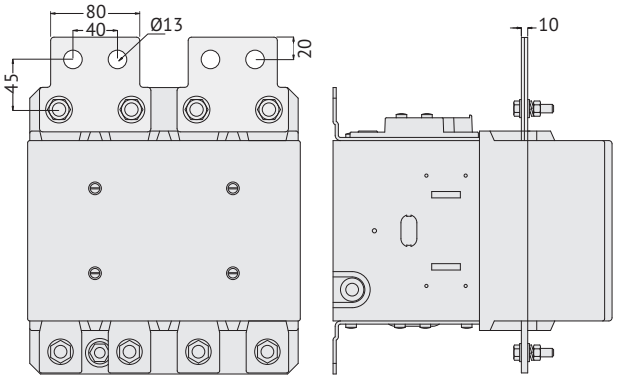


Jumpers for parallel connection of 2 poles
FX-A1720

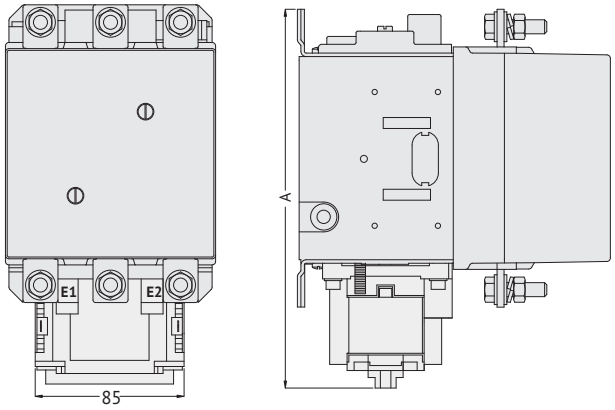


	A	B	C	D
FX-A1720	53	50	Ø18	20

FX-A1845



Contactors OptiStart K-FLA and OptiStart K-FLD with mechanical latch installed

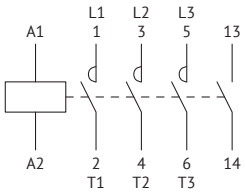


Contactor type	A
F-250, F-400	255
F-500, F-630	300

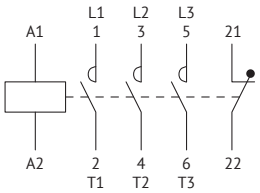
Electric schematics

Three-pole contactors with AC coil

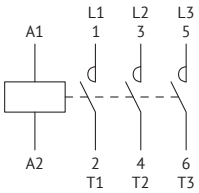
F-09-30-10…F-25-30-10



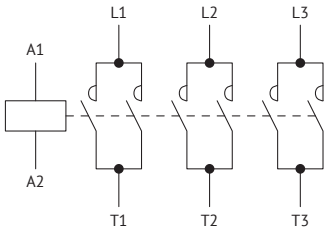
F-09-30-01…F-25-30-01



F-26…F-1000

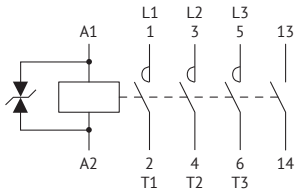


F-1250; F-1600

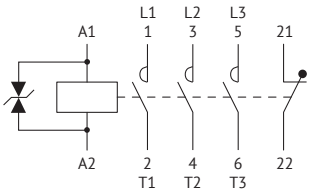


Three-pole contactors with DC or AC/DC coil

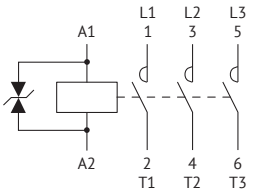
F-09-30-10…F-25-30-10



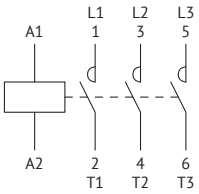
F-09-30-01…F-25-30-01



F-26…F-38

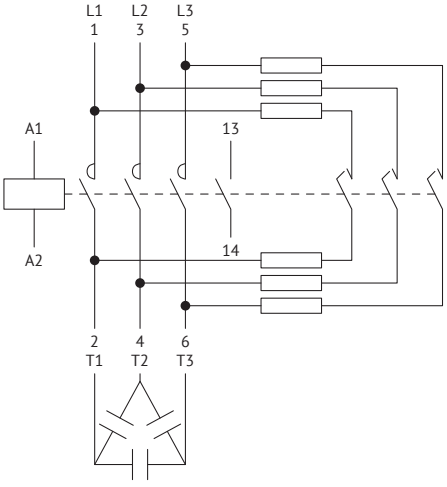


AF-40…AF-400



Contactors for capacitor switching

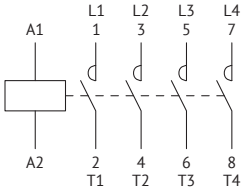
FK-09…FK-150



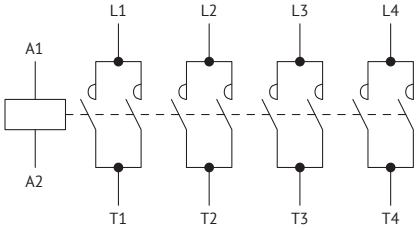
Auxiliary contact 13-14 is installed on FK-09…FK-18 contactors only

Four-pole contactors with AC coil

F-09-40 … F-1000-40; FD-80-40

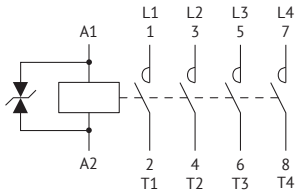


F-1250-40; F-1600-40

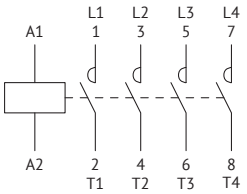


Four-pole contactors with DC or AC/DC coil

F-09-40 … F-38-40

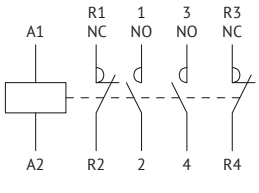


(A)F-65-40…AF-400-40; FD-150-40



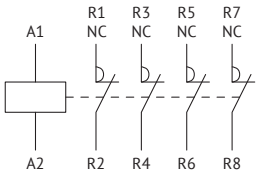
Four-pole contactors with AC coil with 2NO+2NC poles

F-09-22 … F-80-22



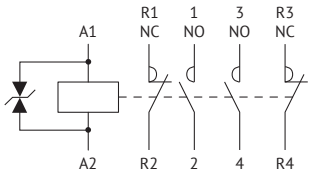
Four-pole contactors with DC with 4NC poles

F-18-04...F-26-04

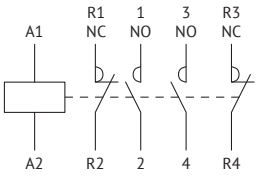


Four-pole contactors with DC or AC/DC coil with 2NO+2NC poles

F-18-22 ... F-38-22

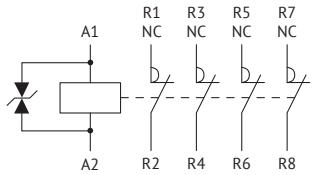


AF-80-22



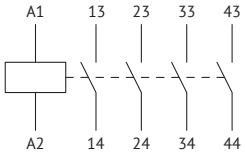
Four-pole contactors with AC with 4NC poles

F-18-04...F-26-04

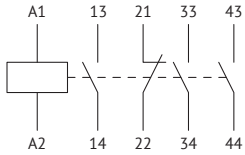


Contactor relays with AC coil

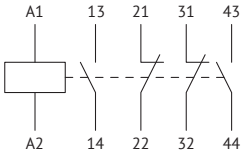
FR-40



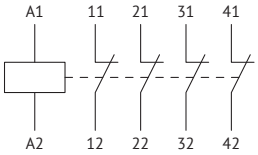
FR-31



FR-22

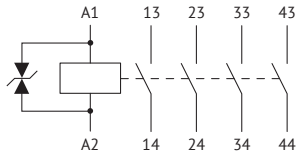


FR-04

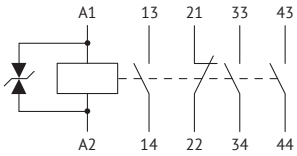


Contactor relays with DC coil

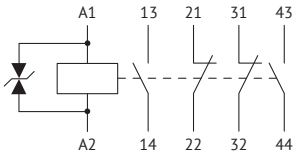
FR-40



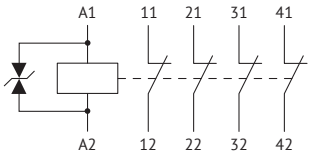
FR-31



FR-22



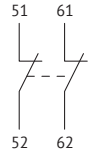
FR-04



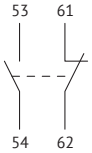
Accessories for contactors F-09...F-150; AF-40...AF-400 and contactor relays FR

Auxiliary contacts

FX-1002

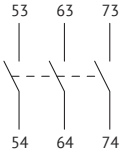


FX-1011

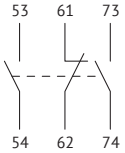


FX-1020

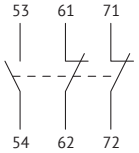
FX-48430



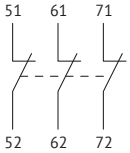
FX-48421



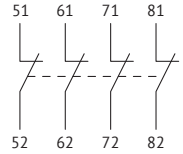
FX-48412



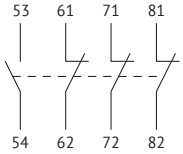
FX-48403



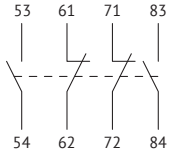
FX-1004



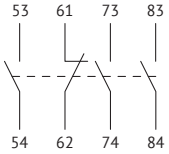
FX-1013



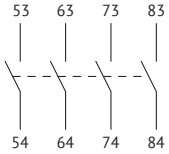
FX-1022



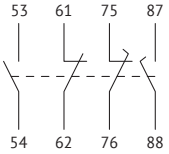
FX-1031



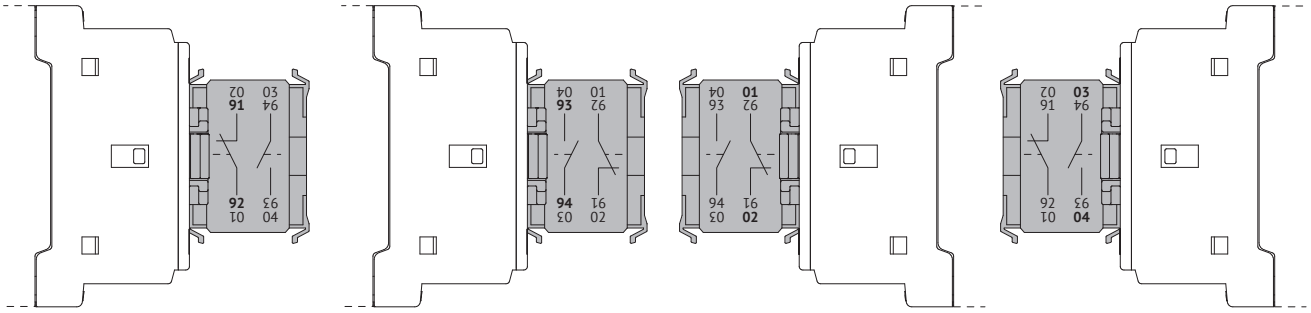
FX-1040



FX-101111

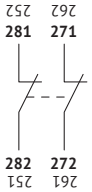


FX-218

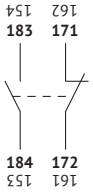


Auxiliary contacts FX-218 have different numbers, which depend on the installation position.
For correct interpretation, use the numbers applied in bold.

FX-1202
FX-12C02



FX-1211
FX-12C11



FX-1220
FX-12C20

FX-10C10

FX-10C01

FX-41810
FX-42810

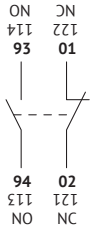
FX-41810A
FX-42810A

FX-41801
FX-42801

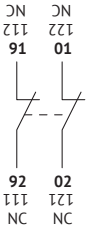
FX-41801D
FX-42801D

FX-48120

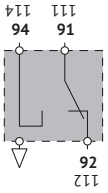
FX-48111



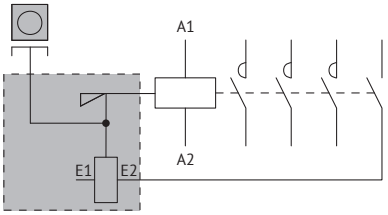
FX-48102



FX-482



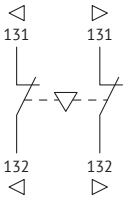
Mechanical latch
FX-222...; FX-272...; FX-641...



Auxiliary contacts FX-12.../ FX-418.../ FX-481.../ FX-482 have different numbers, which depend on the installation position.
For correct interpretation in case of the contact unit installation on the left side, use the numbers applied in bold.

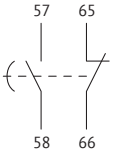
Fourth pole
FX-42; FX-43;
FX-44; FX-D42

Electromechanical interlock
FX-5001; FX-5301; FX-5401

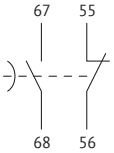


Pneumatic time delay attachments

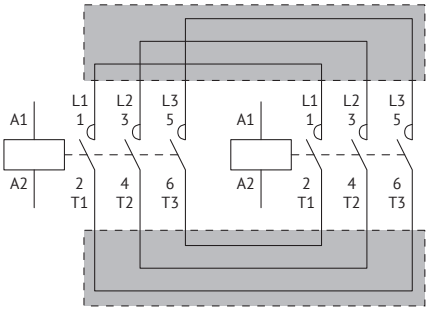
FX-485...



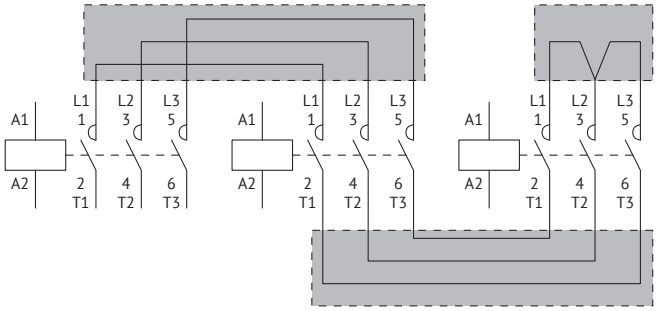
FX-486...; FX-487



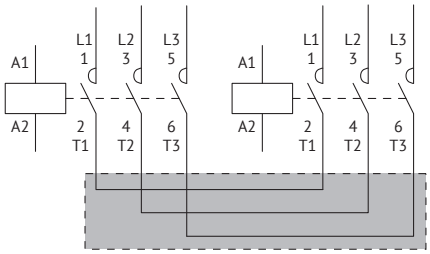
Connection adapters
FX-3101; FX-3102; FX-3201; FX-3301; FX-3401



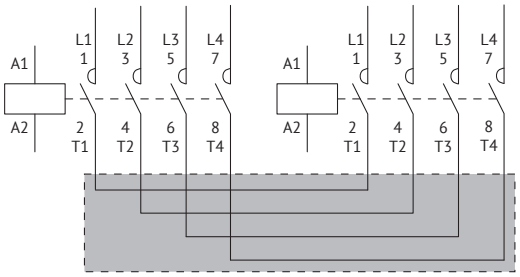
FX-3131; FX-3231; FX-3232; FX-3331; FX-3332; FX-3431; FX-3432



FX-3361; FX-3461

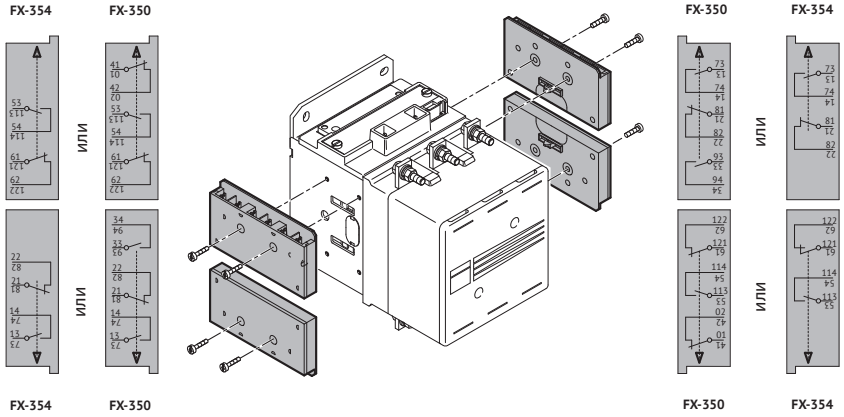


FX-3371; FX-3471



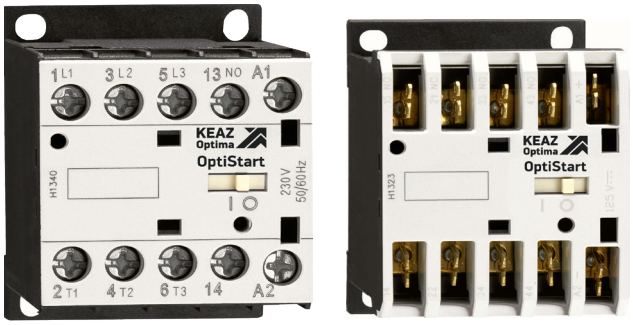
Accessories for F-500...F-1000 contactors

Auxiliary contacts
FX-350; FX-354



OptiStart K-M

Mini-contactors



Designation

Series OptiStart K-M mini-contactors

OptiStart K - M - 09 - 30 - 01 - A 400 - F

1	Group	OptiStart — Motor control and protection equipment		
2	Series	K — Contactors		
3	Version	**M** — Mini-contactors		
4	Rated current (AC-3), A	The rated current is specified for utilization category AC-3 at a rated voltage of 400 V		
5	Number of power poles	The first digit stands for the number of NO power contacts. The second digit stands for the number of NC power contacts.		
6	Number of built-in auxiliary contacts	The first digit stands for the number of NO auxiliary contacts. The second digit stands for the number of NC auxiliary contacts.		
7	Control coil type and current type	A — AC control coil	D — DC control coil	Z — DC control coil with reduced power consumption and ability of direct connection to the PLC
8	Control coil voltage	Rated supply voltage is specified. Information on the operating voltage range and permissible deviations is provided in the «Technical Specifications» section.		
9	Connection method	No symbol — Terminal screws	F — Faston terminals	P — Solder pins

Series MR mini-contactor relays

OptiStart K - MR - 22 - D 220 - F

(1) (2) (3) (4) (5) (6) (7)

1	Group	OptiStart — Motor control and protection equipment		
2	Series	K — Contactors		
3	Version	MR — contactor relay		
4	Quantity and type of contacts	The first digit stands for the number of NO contacts. The second digit stands for the number of NC contacts.		
5	Control coil type and current type	A — AC control coil	D — DC control coil	Z — DC control coil with reduced power consumption and ability of direct connection to the PLC
6	Control coil voltage	Rated supply voltage is specified. Information on the operating voltage range and permissible deviations is provided in the «Technical specifications» section.		
7	Connection method	No symbol — Terminal screws	F — Faston terminals	P — Solder pins

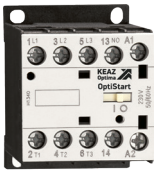
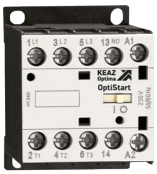
Items

Series M mini-contactors

Three-pole series M mini-contactors with AC control coil with screw terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	06	2,4	0	1	24	OptiStart K-M-06-30-01-A024	335518
	06	2,4	0	1	48	OptiStart K-M-06-30-01-A048	335519
	06	2,4	0	1	110	OptiStart K-M-06-30-01-A110	335520
	06	2,4	0	1	230	OptiStart K-M-06-30-01-A230	335521
	06	2,4	0	1	400	OptiStart K-M-06-30-01-A400	335522
	06	2,4	1	0	24	OptiStart K-M-06-30-10-A024	335530
	06	2,4	1	0	48	OptiStart K-M-06-30-10-A048	335531
	06	2,4	1	0	110	OptiStart K-M-06-30-10-A110	335532
	06	2,4	1	0	230	OptiStart K-M-06-30-10-A230	335533
	06	2,4	1	0	400	OptiStart K-M-06-30-10-A400	335534
	09	4,3	0	1	24	OptiStart K-M-09-30-01-A024	335542
	09	4,3	0	1	48	OptiStart K-M-09-30-01-A048	335543
	09	4,3	0	1	110	OptiStart K-M-09-30-01-A110	335544
	09	4,3	0	1	230	OptiStart K-M-09-30-01-A230	335545
	09	4,3	0	1	400	OptiStart K-M-09-30-01-A400	335546
	09	4,3	1	0	24	OptiStart K-M-09-30-10-A024	335556
	09	4,3	1	0	48	OptiStart K-M-09-30-10-A048	335557
	09	4,3	1	0	110	OptiStart K-M-09-30-10-A110	335558
	09	4,3	1	0	230	OptiStart K-M-09-30-10-A230	335559
	09	4,3	1	0	400	OptiStart K-M-09-30-10-A400	335560
	12	6,2	0	1	24	OptiStart K-M-12-30-01-A024	335594
	12	6,2	0	1	48	OptiStart K-M-12-30-01-A048	335595
	12	6,2	0	1	110	OptiStart K-M-12-30-01-A110	335596
	12	6,2	0	1	230	OptiStart K-M-12-30-01-A230	335597
	12	6,2	0	1	400	OptiStart K-M-12-30-01-A400	335598
	12	6,2	1	0	24	OptiStart K-M-12-30-10-A024	335606
	12	6,2	1	0	48	OptiStart K-M-12-30-10-A048	335607
	12	6,2	1	0	110	OptiStart K-M-12-30-10-A110	335608
	12	6,2	1	0	230	OptiStart K-M-12-30-10-A230	335609
	12	6,2	1	0	400	OptiStart K-M-12-30-10-A400	335610

Three-pole series M mini-contactors with DC control coil with screw terminals

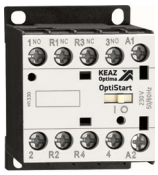
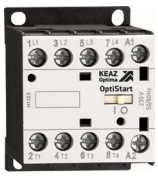
Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	06	2,4	0	1	12	OptiStart K-M-06-30-01-D012	335523
	06	2,4	0	1	24	OptiStart K-M-06-30-01-D024	335524
	06	2,4	0	1	48	OptiStart K-M-06-30-01-D048	335525
	06	2,4	0	1	60	OptiStart K-M-06-30-01-D060	335526
	06	2,4	0	1	110	OptiStart K-M-06-30-01-D110	335527
	06	2,4	0	1	125	OptiStart K-M-06-30-01-D125	335528
	06	2,4	0	1	220	OptiStart K-M-06-30-01-D220	335529
	06	2,4	1	0	12	OptiStart K-M-06-30-10-D012	335535
	06	2,4	1	0	24	OptiStart K-M-06-30-10-D024	335536
	06	2,4	1	0	48	OptiStart K-M-06-30-10-D048	335537
	06	2,4	1	0	60	OptiStart K-M-06-30-10-D060	335538
	06	2,4	1	0	110	OptiStart K-M-06-30-10-D110	335539
	06	2,4	1	0	125	OptiStart K-M-06-30-10-D125	335540
	06	2,4	1	0	220	OptiStart K-M-06-30-10-D220	335541
	09	4,3	0	1	12	OptiStart K-M-09-30-01-D012	335547
	09	4,3	0	1	24	OptiStart K-M-09-30-01-D024	335548
	09	4,3	0	1	48	OptiStart K-M-09-30-01-D048	335549
	09	4,3	0	1	60	OptiStart K-M-09-30-01-D060	335550
	09	4,3	0	1	110	OptiStart K-M-09-30-01-D110	335551
	09	4,3	0	1	125	OptiStart K-M-09-30-01-D125	335552
	09	4,3	0	1	220	OptiStart K-M-09-30-01-D220	335553
	09	4,3	1	0	12	OptiStart K-M-09-30-10-D012	335561
	09	4,3	1	0	24	OptiStart K-M-09-30-10-D024	335562
	09	4,3	1	0	48	OptiStart K-M-09-30-10-D048	335563
	09	4,3	1	0	60	OptiStart K-M-09-30-10-D060	335564
	09	4,3	1	0	110	OptiStart K-M-09-30-10-D110	335565
	09	4,3	1	0	125	OptiStart K-M-09-30-10-D125	335566
	09	4,3	1	0	220	OptiStart K-M-09-30-10-D220	335567
	12	6,2	0	1	12	OptiStart K-M-12-30-01-D012	335599
	12	6,2	0	1	24	OptiStart K-M-12-30-01-D024	335600
	12	6,2	0	1	48	OptiStart K-M-12-30-01-D048	335601
	12	6,2	0	1	60	OptiStart K-M-12-30-01-D060	335602
	12	6,2	0	1	110	OptiStart K-M-12-30-01-D110	335603
	12	6,2	0	1	125	OptiStart K-M-12-30-01-D125	335604
	12	6,2	0	1	220	OptiStart K-M-12-30-01-D220	335605
	12	6,2	1	0	12	OptiStart K-M-12-30-10-D012	335611
	12	6,2	1	0	24	OptiStart K-M-12-30-10-D024	335612
	12	6,2	1	0	48	OptiStart K-M-12-30-10-D048	335613
	12	6,2	1	0	60	OptiStart K-M-12-30-10-D060	335614
	12	6,2	1	0	110	OptiStart K-M-12-30-10-D110	335615
	12	6,2	1	0	125	OptiStart K-M-12-30-10-D125	335616
	12	6,2	1	0	220	OptiStart K-M-12-30-10-D220	335617

Three-pole series M mini-contactors with DC control coil with reduced power consumption (-Z) with screw terminals

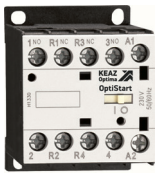
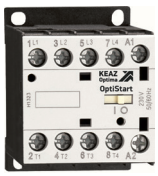
Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	0	1	24	OptiStart K-M-09-30-01-Z024	335554
	09	4,3	0	1	48	OptiStart K-M-09-30-01-Z048	335555
	09	4,3	1	0	24	OptiStart K-M-09-30-10-Z024	335568
	09	4,3	1	0	48	OptiStart K-M-09-30-10-Z048	335569

Note: The list of possible accessories is limited. For more detailed information, see the «Maximum combination of auxiliary accessories» section.

Four-pole series M mini-contactors with AC control coil with screw terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Main contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,3	2	2	24	OptiStart K-M-09-22-00-A024	335570
	09	4,3	2	2	48	OptiStart K-M-09-22-00-A048	335571
	09	4,3	2	2	110	OptiStart K-M-09-22-00-A110	335572
	09	4,3	2	2	230	OptiStart K-M-09-22-00-A230	335573
	09	4,3	2	2	400	OptiStart K-M-09-22-00-A400	335574
	09	4,3	4	0	24	OptiStart K-M-09-40-00-A024	335582
	09	4,3	4	0	48	OptiStart K-M-09-40-00-A048	335583
	09	4,3	4	0	110	OptiStart K-M-09-40-00-A110	335584
	09	4,3	4	0	230	OptiStart K-M-09-40-00-A230	335585
	09	4,3	4	0	400	OptiStart K-M-09-40-00-A400	335586

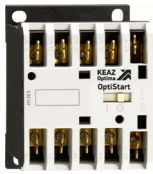
Four-pole series M mini-contactors with DC control coil with screw terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Main contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	2	2	12	OptiStart K-M-09-22-00-D012	335575
	09	4,3	2	2	24	OptiStart K-M-09-22-00-D024	335576
	09	4,3	2	2	48	OptiStart K-M-09-22-00-D048	335577
	09	4,3	2	2	60	OptiStart K-M-09-22-00-D060	335578
	09	4,3	2	2	110	OptiStart K-M-09-22-00-D110	335579
	09	4,3	2	2	125	OptiStart K-M-09-22-00-D125	335580
	09	4,3	2	2	220	OptiStart K-M-09-22-00-D220	335581
	09	4,3	4	0	12	OptiStart K-M-09-40-00-D012	335587
	09	4,3	4	0	24	OptiStart K-M-09-40-00-D024	335588
	09	4,3	4	0	48	OptiStart K-M-09-40-00-D048	335589
	09	4,3	4	0	60	OptiStart K-M-09-40-00-D060	335590
	09	4,3	4	0	110	OptiStart K-M-09-40-00-D110	335591
	09	4,3	4	0	125	OptiStart K-M-09-40-00-D125	335592
	09	4,3	4	0	220	OptiStart K-M-09-40-00-D220	335593

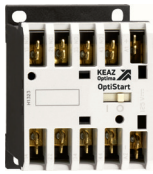
Three-pole series M mini-contactors with AC control coil with faston terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,3	0	1	24	OptiStart K-M-09-30-01-A024-F	335618
	09	4,3	0	1	48	OptiStart K-M-09-30-01-A048-F	335619
	09	4,3	0	1	110	OptiStart K-M-09-30-01-A110-F	335620
	09	4,3	0	1	230	OptiStart K-M-09-30-01-A230-F	335621
	09	4,3	0	1	400	OptiStart K-M-09-30-01-A400-F	335622
	09	4,3	1	0	24	OptiStart K-M-09-30-10-A024-F	335632
	09	4,3	1	0	48	OptiStart K-M-09-30-10-A048-F	335633
	09	4,3	1	0	110	OptiStart K-M-09-30-10-A110-F	335634
	09	4,3	1	0	230	OptiStart K-M-09-30-10-A230-F	335635
	09	4,3	1	0	400	OptiStart K-M-09-30-10-A400-F	335636

Three-pole series M mini-contactors with DC control coil with faston terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	0	1	12	OptiStart K-M-09-30-01-D012-F	335623
	09	4,3	0	1	24	OptiStart K-M-09-30-01-D024-F	335624
	09	4,3	0	1	48	OptiStart K-M-09-30-01-D048-F	335625
	09	4,3	0	1	60	OptiStart K-M-09-30-01-D060-F	335626
	09	4,3	0	1	110	OptiStart K-M-09-30-01-D110-F	335627
	09	4,3	0	1	125	OptiStart K-M-09-30-01-D125-F	335628
	09	4,3	0	1	220	OptiStart K-M-09-30-01-D220-F	335629
	09	4,3	1	0	12	OptiStart K-M-09-30-10-D012-F	335637
	09	4,3	1	0	24	OptiStart K-M-09-30-10-D024-F	335638
	09	4,3	1	0	48	OptiStart K-M-09-30-10-D048-F	335639
	09	4,3	1	0	60	OptiStart K-M-09-30-10-D060-F	335640
	09	4,3	1	0	110	OptiStart K-M-09-30-10-D110-F	335641
	09	4,3	1	0	125	OptiStart K-M-09-30-10-D125-F	335642
	09	4,3	1	0	220	OptiStart K-M-09-30-10-D220-F	335643

Three-pole series M mini-contactors with DC control coil with reduced power consumption (-Z) with faston terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	0	1	24	OptiStart K-M-09-30-01-Z024-F	335630
	09	4,3	0	1	48	OptiStart K-M-09-30-01-Z048-F	335631
	09	4,3	1	0	24	OptiStart K-M-09-30-10-Z024-F	335644
	09	4,3	1	0	48	OptiStart K-M-09-30-10-Z048-F	335645

Note: The list of possible accessories is limited. For more detailed information, see the «Maximum combination of auxiliary accessories» section.

Four-pole series M mini-contactors with AC control coil with faston terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Main contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,3	4	0	24	OptiStart K-M-09-40-00-A024-F	335646
	09	4,3	4	0	48	OptiStart K-M-09-40-00-A048-F	335647
	09	4,3	4	0	110	OptiStart K-M-09-40-00-A110-F	335648
	09	4,3	4	0	230	OptiStart K-M-09-40-00-A230-F	335649
	09	4,3	4	0	400	OptiStart K-M-09-40-00-A400-F	335650

Four-pole series M mini-contactors with DC control coil with faston terminals

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Main contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	4	0	12	OptiStart K-M-09-40-00-D012-F	335651
	09	4,3	4	0	24	OptiStart K-M-09-40-00-D024-F	335652
	09	4,3	4	0	48	OptiStart K-M-09-40-00-D048-F	335653
	09	4,3	4	0	60	OptiStart K-M-09-40-00-D060-F	335654
	09	4,3	4	0	110	OptiStart K-M-09-40-00-D110-F	335655
	09	4,3	4	0	125	OptiStart K-M-09-40-00-D125-F	335656
	09	4,3	4	0	220	OptiStart K-M-09-40-00-D220-F	335657

Three-pole series M mini-contactors with AC control coil with solder pins

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,3	0	1	24	OptiStart K-M-09-30-01-A024-P	335658
	09	4,3	0	1	48	OptiStart K-M-09-30-01-A048-P	335659
	09	4,3	0	1	110	OptiStart K-M-09-30-01-A110-P	335660
	09	4,3	0	1	230	OptiStart K-M-09-30-01-A230-P	335661
	09	4,3	0	1	400	OptiStart K-M-09-30-01-A400-P	335662
	09	4,3	1	0	24	OptiStart K-M-09-30-10-A024-P	335670
	09	4,3	1	0	48	OptiStart K-M-09-30-10-A048-P	335671
	09	4,3	1	0	110	OptiStart K-M-09-30-10-A110-P	335672
	09	4,3	1	0	230	OptiStart K-M-09-30-10-A230-P	335673
	09	4,3	1	0	400	OptiStart K-M-09-30-10-A400-P	335674

Three-pole series M mini-contactors with DC control coil with solder pins

Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated power (AC-3, 400 V, ≤55 °C), kW	Auxiliary contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	0	1	12	OptiStart K-M-09-30-01-D012-P	335663
	09	4,3	0	1	24	OptiStart K-M-09-30-01-D024-P	335664
	09	4,3	0	1	48	OptiStart K-M-09-30-01-D048-P	335665
	09	4,3	0	1	60	OptiStart K-M-09-30-01-D060-P	335666
	09	4,3	0	1	110	OptiStart K-M-09-30-01-D110-P	335667
	09	4,3	0	1	125	OptiStart K-M-09-30-01-D125-P	335668
	09	4,3	0	1	220	OptiStart K-M-09-30-01-D220-P	335669
	09	4,3	1	0	12	OptiStart K-M-09-30-10-D012-P	335675
	09	4,3	1	0	24	OptiStart K-M-09-30-10-D024-P	335676
	09	4,3	1	0	48	OptiStart K-M-09-30-10-D048-P	335677
	09	4,3	1	0	60	OptiStart K-M-09-30-10-D060-P	335678
	09	4,3	1	0	110	OptiStart K-M-09-30-10-D110-P	335679
	09	4,3	1	0	125	OptiStart K-M-09-30-10-D125-P	335680
	09	4,3	1	0	220	OptiStart K-M-09-30-10-D220-P	335681

Four-pole series M mini-contactors with AC control coil with solder pins

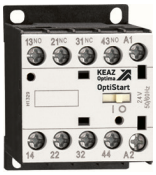
Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Main contacts		Control coil rated voltage, V AC	Product name	Code
			NO	NC			
	09	4,3	4	0	24	OptiStart K-M-09-40-00-A024-P	335682
	09	4,3	4	0	48	OptiStart K-M-09-40-00-A048-P	335683
	09	4,3	4	0	110	OptiStart K-M-09-40-00-A110-P	335684
	09	4,3	4	0	230	OptiStart K-M-09-40-00-A230-P	335685
	09	4,3	4	0	400	OptiStart K-M-09-40-00-A400-P	335686

Four-pole series M mini-contactors with DC control coil with solder pins

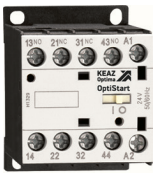
Appearance	Rated current (AC-3, 400 V, ≤55 °C), A	Rated current (AC-1, 400 V, ≤40 °C), A	Main contacts		Control coil rated voltage, V DC	Product name	Code
			NO	NC			
	09	4,3	4	0	12	OptiStart K-M-09-40-00-D012-P	335687
	09	4,3	4	0	24	OptiStart K-M-09-40-00-D024-P	335688
	09	4,3	4	0	48	OptiStart K-M-09-40-00-D048-P	335689
	09	4,3	4	0	60	OptiStart K-M-09-40-00-D060-P	335690
	09	4,3	4	0	110	OptiStart K-M-09-40-00-D110-P	335691
	09	4,3	4	0	125	OptiStart K-M-09-40-00-D125-P	335692
	09	4,3	4	0	220	OptiStart K-M-09-40-00-D220-P	335693

Series MR mini-contactor relays

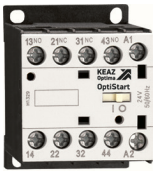
Series MR mini-contactor relays with AC control coil with screw terminals

Appearance	Main contacts		Control coil rated voltage, V AC	Product name	Code
	NO	NC			
	2	2	24	OptiStart K-MR-22-A024	335791
	2	2	48	OptiStart K-MR-22-A048	335792
	2	2	110	OptiStart K-MR-22-A110	335793
	2	2	230	OptiStart K-MR-22-A230	335794
	2	2	400	OptiStart K-MR-22-A400	335795
	3	1	24	OptiStart K-MR-31-A024	335796
	3	1	48	OptiStart K-MR-31-A048	335797
	3	1	110	OptiStart K-MR-31-A110	335798
	3	1	230	OptiStart K-MR-31-A230	335799
	3	1	400	OptiStart K-MR-31-A400	335800
	4	0	24	OptiStart K-MR-40-A024	335802
	4	0	48	OptiStart K-MR-40-A048	335803
	4	0	110	OptiStart K-MR-40-A110	335804
	4	0	230	OptiStart K-MR-40-A230	335805
	4	0	400	OptiStart K-MR-40-A400	335806

Series MR mini-contactor relays with DC control coil with screw terminals

Appearance	Main contacts		Control coil rated voltage, V DC	Product name	Code
	NO	NC			
	2	2	12	OptiStart K-MR-22-D012	335766
	2	2	24	OptiStart K-MR-22-D024	335767
	2	2	48	OptiStart K-MR-22-D048	335768
	2	2	60	OptiStart K-MR-22-D060	335769
	2	2	110	OptiStart K-MR-22-D110	335770
	2	2	125	OptiStart K-MR-22-D125	335771
	2	2	220	OptiStart K-MR-22-D220	335772
	3	1	12	OptiStart K-MR-31-D012	335775
	3	1	24	OptiStart K-MR-31-D024	335776
	3	1	60	OptiStart K-MR-31-D060	335777
	3	1	110	OptiStart K-MR-31-D110	335778
	3	1	125	OptiStart K-MR-31-D125	335779
	3	1	220	OptiStart K-MR-31-D220	335780
	4	0	12	OptiStart K-MR-40-D012	335783
	4	0	24	OptiStart K-MR-40-D024	335784
	4	0	60	OptiStart K-MR-40-D060	335785
	4	0	110	OptiStart K-MR-40-D110	335786
	4	0	125	OptiStart K-MR-40-D125	335787
	4	0	220	OptiStart K-MR-40-D220	335788
	3	1	48	OptiStart K-MR-31-D048	335801
	4	0	48	OptiStart K-MR-40-D048	335807

Series MR mini-contactor relays with DC control coil with reduced power consumption (-Z) with screw terminals

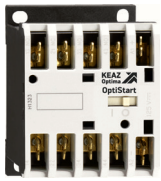
Appearance	Main contacts		Control coil rated voltage, V DC	Product name	Code
	NO	NC			
	2	2	24	OptiStart K-MR-22-Z024	335773
	2	2	48	OptiStart K-MR-22-Z048	335774
	3	1	24	OptiStart K-MR-31-Z024	335781
	3	1	48	OptiStart K-MR-31-Z048	335782
	4	0	24	OptiStart K-MR-40-Z024	335789
	4	0	48	OptiStart K-MR-40-Z048	335790

Note: The list of possible accessories is limited. For more detailed information, see the "Maximum combination of auxiliary accessories» section.

Series MR mini-contactor relays with AC control coil with faston terminals

Appearance	Main contacts		Control coil rated voltage, V AC	Product name	Code
	NO	NC			
	2	2	24	OptiStart K-MR-22-A024-F	335808
	2	2	48	OptiStart K-MR-22-A048-F	335809
	2	2	110	OptiStart K-MR-22-A110-F	335810
	2	2	230	OptiStart K-MR-22-A230-F	335811
	2	2	400	OptiStart K-MR-22-A400-F	335812
	3	1	24	OptiStart K-MR-31-A024-F	335822
	3	1	48	OptiStart K-MR-31-A048-F	335823
	3	1	110	OptiStart K-MR-31-A110-F	335824
	3	1	230	OptiStart K-MR-31-A230-F	335825
	3	1	400	OptiStart K-MR-31-A400-F	335826
	4	0	24	OptiStart K-MR-40-A024-F	335836
	4	0	48	OptiStart K-MR-40-A048-F	335837
	4	0	110	OptiStart K-MR-40-A110-F	335838
	4	0	230	OptiStart K-MR-40-A230-F	335839
	4	0	400	OptiStart K-MR-40-A400-F	335840

Series MR mini-contactor relays with DC control coil with faston terminals

Appearance	Main contacts		Control coil rated voltage, V DC	Product name	Code
	NO	NC			
	2	2	12	OptiStart K-MR-22-D012-F	335813
	2	2	24	OptiStart K-MR-22-D024-F	335814
	2	2	48	OptiStart K-MR-22-D048-F	335815
	2	2	60	OptiStart K-MR-22-D060-F	335816
	2	2	110	OptiStart K-MR-22-D110-F	335817
	2	2	125	OptiStart K-MR-22-D125-F	335818
	2	2	220	OptiStart K-MR-22-D220-F	335819
	3	1	12	OptiStart K-MR-31-D012-F	335827
	3	1	24	OptiStart K-MR-31-D024-F	335828
	3	1	48	OptiStart K-MR-31-D048-F	335829
	3	1	60	OptiStart K-MR-31-D060-F	335830
	3	1	110	OptiStart K-MR-31-D110-F	335831
	3	1	125	OptiStart K-MR-31-D125-F	335832
	3	1	220	OptiStart K-MR-31-D220-F	335833
	4	0	12	OptiStart K-MR-40-D012-F	335841
	4	0	24	OptiStart K-MR-40-D024-F	335842
	4	0	48	OptiStart K-MR-40-D048-F	335843
	4	0	60	OptiStart K-MR-40-D060-F	335844
	4	0	110	OptiStart K-MR-40-D110-F	335845
	4	0	125	OptiStart K-MR-40-D125-F	335846
	4	0	220	OptiStart K-MR-40-D220-F	335847

Series MR mini-contactor relays with DC control coil with reduced power consumption (-Z) with faston terminals

Appearance	Main contacts		Control coil rated voltage, V DC	Product name	Code
	NO	NC			
	2	2	24	OptiStart K-MR-22-Z024-F	335820
	2	2	48	OptiStart K-MR-22-Z048-F	335821
	3	1	24	OptiStart K-MR-31-Z024-F	335834
	3	1	48	OptiStart K-MR-31-Z048-F	335835
	4	0	24	OptiStart K-MR-40-Z024-F	335848
	4	0	48	OptiStart K-MR-40-Z048-F	335849

Note: The list of possible accessories is limited. For more detailed information, see the «Maximum combination of auxiliary accessories» section.

Technical specification

Series M mini-contactors and series MR mini-contactor relays

Type				MR	M-06	M-09	M-12
Specifications of power poles							
Number of power poles, pcs.				4	3	3-4	3
Rated insulation voltage U_i, V				690 (1)			
Rated pulse withstand voltage U_{imp}, kV				–	6		
Operating frequency, Hz				25...400 (2)			
Operating current, A	Outdoor thermal stability current Ith (AC-1) at		≤40 °C	see data in table below	16	20	20
	AC-3 (≤440 V ≤55 °C)			–	6	9	12
	AC-4 (400 V) (3)			–	3,3	4	4,8
Rated short-time withstand current I_{cw} 10 s (IEC/EN/BS 60947-1), A				–	96	96	96
Rated fuse current for short-circuit protection at 400V — 50 kA, A			gG	–	16	20	20
			aM	–	6	10	16
Rated making capacity (effective value), A				–	92	92	120
Rated breaking capacity, A			≤440 V	–	72	72	96
			500 V	–	72	72	72
			690 V	–	72	72	72
Resistance and heat dissipation per pole		R	mOhm	–	10	10	10
		I_{th}	W	–	2,6	4	4
		AC-3	W	–	0,36	0,81	1,44
Specifications of connections			Type	Screw with washer 			
			A	7,5	7,5	7,5	7,5
			B	4	4	4	4
			Screw	M3	M3	M3	M3
			Screwdriver type	PH 2	PH 2	PH 2	PH 2
			Type	–	–	Faston terminals 1x6,35 — 2x2,8	–
			Type	–	–	Soldered terminals on PCB (4)	–
Min - max tightening torque of power pole terminals, Nm				0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0
Min - max tightening torque of coil terminals, Nm				0,8–1,0	0,8–1,0	0,8–1,0	0,8–1,0
			Screwdriver type	PH 2	PH 2	PH 2	PH 2
Cross-section of conductors (1 or 2 conductors), min ... max, mm²	flexible conductors without lugs			0,75...2,5			
	flexible conductors with lugs			2x1,5 или 1x2,5			
	flexible conductors with fork-type lugs			2x1,5 или 1x2,5			
Power terminals protection degree as per IEC/EN/BS 60529				IP20 (5)	IP20 (5)	IP20 (5)	IP20 (5)
Specifications of built-in auxiliary contacts							
Contactor types, pcs.				Depending on configuration	1 NO or 1 NC depending on configuration (6)		
Conditional thermal current I_{th}, A				10			
Specifications as per IEC/EN/BS 60947-5-1			AC	A600			
			DC	Q600	P600		
Operating conditions							
Ambient temperature, °C		during operation		-50...+70			
		during storage		-60...+80			
Maximum height above sea level, m				3000			
Installation position		rated		In a vertical plane			
		permissible		± 30°			
Mounting method				Screw or on 35 mm din-rail			

(1) For mini-contactors MCP..., rated voltage Ui is 500 V
(1) At frequencies above 60 Hz with derating.
(3) For utilization category AC-4, the switching life is reduced down to 50 thous. cycles.
(4) The sizes and installation dimensions are presented in the "Overall and Installation Dimensions" section.
(4) Protection degree IP20 is provided for devices connected by conductors with a cross-section of at least 0.75 mm²
(6) Mechanical characteristics correspond to the data for power poles

Type				MR	M-06	M-09	M-12
Specifications of magnetic system							
AC control coil							
Rated voltage at 50/60 Hz, V				12...575			
Rated control coil voltage ranges							
Coil with 50/60 Hz supply frequency, % U_s		50 Hz	closure	75...115			
			opening	20...55			
		60 Hz	closure	80...115			
			opening	20...55			
Average power consumption at 20 °C							
Coil with 50/60 Hz supply frequency, VA		50 Hz	switching	30			
			retention	4			
		60 Hz	switching	25			
			retention	3			
Heat dissipation at ≤20 °C 50 Hz, W				0,95			
DC control coil							
Rated voltage, V				6...250			
Control coil rated voltage ranges, % U_s							
Closure		three-pole version		75...115			
Opening		all versions		10...20	10...25		
Average power consumption at 20 °C (switching / retention), W		DC coil		3,2			
		Version – Z		2,3			
Trip time, ms							
Average time at rated voltage control U_s	AC control coil	closure NO		12...21			
		opening NO		9...18			
		closure NC		17...26			
		opening NC		7...17			
	DC control coil	closure NO		18...25			
		opening NO		2...3			
		closure NC		3...5			
		opening NC		11...17			
Wear resistance, mln cycles							
Mechanical				20			
Electrical (I_e at 400 V AC-3)				0,5			
Maximum switching frequency, cycle/h				3600			

Electrical characteristics of built-in auxiliary contacts and series FR contactor relays as per IEC/EN/BS 60947-5-1

Designation	Utilization category as per IEC/EN	Enclosed thermal current I_{the}	Rated operating current, A at rated operating voltage U_e										Rated power	
			120 V AC		240 V AC		380 V AC		480 V AC		600 V AC		VA, max	
Alternating current		[A]	Closure	Opening	Closure	Opening	Closure	Opening	Closure	Opening	Closure	Opening	Closure	Opening
A600	AC-15	10	60	6	30	3	19	1,9	15	1,5	12	1,2	7200	720
Direct current			Maximum direct current upon closure and opening										W max	
			125 V DC	250 V DC	301 V DC	400 V DC	500 V DC	600 V DC					300 V or less	
Q600	DC-13	2,5	0,55	0,27	0,1	0,15	0,13	0,1					69	69

Specifications of power poles

Utilization category AC-3: squirrel-cage motor, tripping at a rated current

Maximum operating power at ambient temperature ≤55 °C.
Information is provided in the summary table in the «Technical specifications» section, «Contactors OptiStart K-F» chapter.

Electrical endurance at AC3 ≤ 440 V

Information is provided in the summary table in the «Technical specifications» section, «Contactors OptiStart K-F» chapter.

DC switching

Maximum operating power at ambient temperature ≤55 °C.
Information is provided in the summary table in the «Technical specifications» section, «Contactors OptiStart K-F» chapter.

Switching of lighting circuits

Information is provided in the summary table in the «Technical specifications» section, «Contactors OptiStart K-F» chapter.

Performance characteristics of accessories

Type			Auxiliary contact unit	
			MX-10.. MX-11..	MX-F10..
Conditional thermal current I_{th}, A			10	10
Rated insulation voltage U_i, B			690	690
Type of connection	Screw	Type	M3	–
		Width, mm	6,9	
	Faston	Dimensions	–	1x6,3 mm 2x2,8 mm
Tightening torque, Nm			0,8...1	–
Maximum cross-section (1 or 2 conductors), mm^2	Flexible without lug		2,5	2,5
	Flexible with lug		2,5	2,5
Ingress protection degree			IP20 (1)	IP20
Type as per IEC/EN/BS 60947-5-1		AC	A600	A600
		DC	Q600	Q600
Mechanical wear resistance, mln cycles			20	20

Accessories

Auxiliary contact units

Front mounted auxiliary contact units with screw terminals

Appearance	Compatible devices	Auxiliary contacts		Product name	Code
		NO	NC		
	M...; MC...; MR...	0	2	OptiStart K-MX-1002 (1)	335850
	M...; MC...; MR...	1	1	OptiStart K-MX-1011 (1)	335852
	M...; MC...; MR...	2	0	OptiStart K-MX-1020 (1)	335854
	M...; MC...; MR...	0	4	OptiStart K-MX-1004 (2)	335851
	M...; MC...; MR...	1	3	OptiStart K-MX-1013 (2)	335853
	M...; MC...; MR...	2	2	OptiStart K-MX-1022 (1)	335855
	M...; MC...; MR...	3	1	OptiStart K-MX-1031 (1)	335856
	M...; MC...; MR...	4	0	OptiStart K-MX-1040 (1)	335857
	MC...	1	1	OptiStart K-MX-1111 (3)	335858
	MC...	2	2	OptiStart K-MX-1122 (3)	335859

Note: For possible combinations and configurations, see the «Maximum combination of auxiliary accessories» section.
(1) Installation on mini-contactors with reduced power consumption coil (...Z) is not permitted
(2) Installation on mini-contactors with DC coil (...D; ...Z) is not permitted
(3) Installation is only allowed on the left side of the left contactor as part of the reversing assembly MC...

Front mounted auxiliary contact units with faston terminals

Appearance	Compatible devices	Auxiliary contacts		Product name	Code
		NO	NC		
	M...; MC...; MR...	0	2	OptiStart K-MX-F1002 (1)	335870
	M...; MC...; MR...	0	4	OptiStart K-MX-F1004 (2)	335871
	M...; MC...; MR...	1	1	OptiStart K-MX-F1011 (1)	335872
	M...; MC...; MR...	1	3	OptiStart K-MX-F1013 (2)	335873
	M...; MC...; MR...	2	0	OptiStart K-MX-F1020 (1)	335874
	M...; MC...; MR...	2	2	OptiStart K-MX-F1022 (1)	335875
	M...; MC...; MR...	3	1	OptiStart K-MX-F1031 (1)	335876
	M...; MC...; MR...	4	0	OptiStart K-MX-F1040 (1)	335877

Note: For possible combinations and configurations, see the «Maximum combination of auxiliary accessories» section.
(1) Installation on mini-contactors with reduced power consumption coil (...Z) is not permitted
(2) Installation on mini-contactors with DC coil (...D; ...Z) is not permitted

Interlock modules for contactors

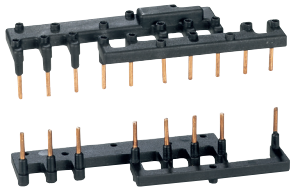
Appearance	Compatible devices	Type	Mounting method	Product name	Code
	M...; MC...; MR...	Mechanical	Front	OptiStart K-FX-5000	335361

Note: Installation on mini-contactors with reduced power consumption coil (...Z) is not permitted

Surge arresters

Appearance	Compatible devices	Type	Rated voltage	Product name	Code
	M...; MC...; MR...	Variable resistor	up to 48 V AC/DC	OptiStart K-MX-77048	335861
	M...; MC...; MR...	Variable resistor	48–125 V AC/DC	OptiStart K-MX-77125	335862
	M...; MC...; MR...	Variable resistor	125–240 V AC/DC	OptiStart K-MX-77240	335863
	M...; MC...; MR...	RC	up to 48 V DC	OptiStart K-MX-79048	335865
	M...; MC...; MR...	RC	48–125 V DC	OptiStart K-MX-79125	335866
	M...; MC...; MR...	RC	125–240 V DC	OptiStart K-MX-79240	335867
	M...; MC...; MR...	RC	240–415 V DC	OptiStart K-MX-79415	335868
	M...; MC...; MR...	Diode	up to 225 V DC	OptiStart K-MX-78225	335864

Busbar connection adapters

Appearance	Compatible devices	Type	Product name	Code
	M...; MC...; MR...	For star-delta connection of reversing series MC mini-contactors	OptiStart K-MX-9021	337847
	M...; MC...; MR...	For reversing series MR mini-contactors	OptiStart K-MX-9022	337850

Protective cover

Appearance	Compatible devices	Ingress protection degree	Product name	Code
	M...; MC...; MR...	IP40	OptiStart K-MX-8000	335869

Note: Installation is only permitted on mini-contactors and mini-contactor relays with screw terminals, without auxiliary contacts, without surge arrester and interlock. Increases the protection degree on the front side.

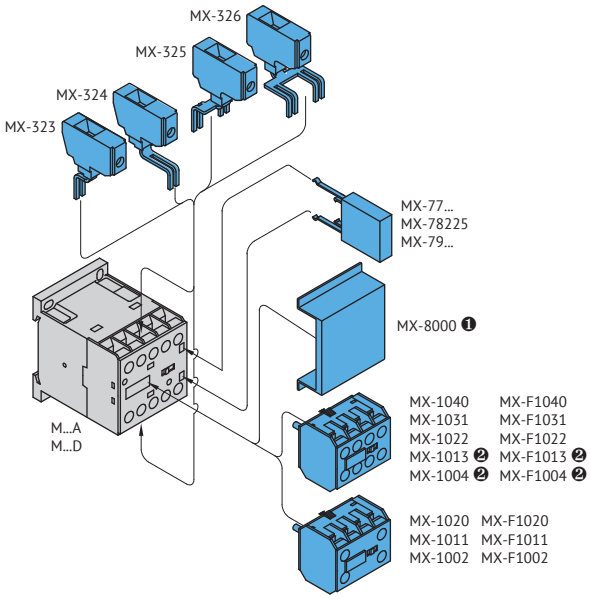
Jumpers for parallel pole connection

Appearance	Compatible devices	Number of poles	Availability of insulation	Product name	Code
	M...; MC...; MR...	2	+	OptiStart K-MX-323 (1)	335878
	M...; MC...; MR...	2	+	OptiStart K-MX-324	335879
	M...; MC...; MR...	4	+	OptiStart K-MX-325 (1)	335880
	M...; MC...; MR...	4	+	OptiStart K-MX-326	335881

Note: Installation simultaneously with a protective casing is unacceptable

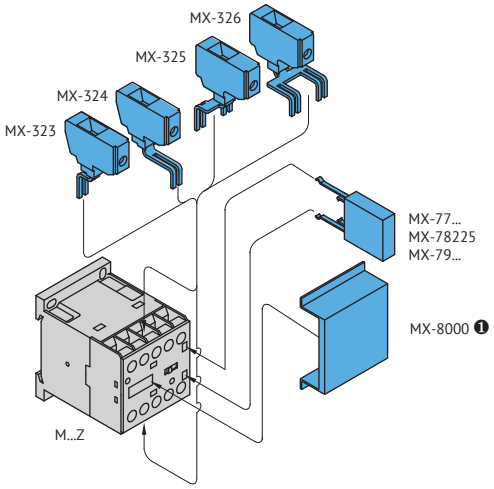
Maximum combination of optional accessories

Series M mini-contactors with AC and DC coil

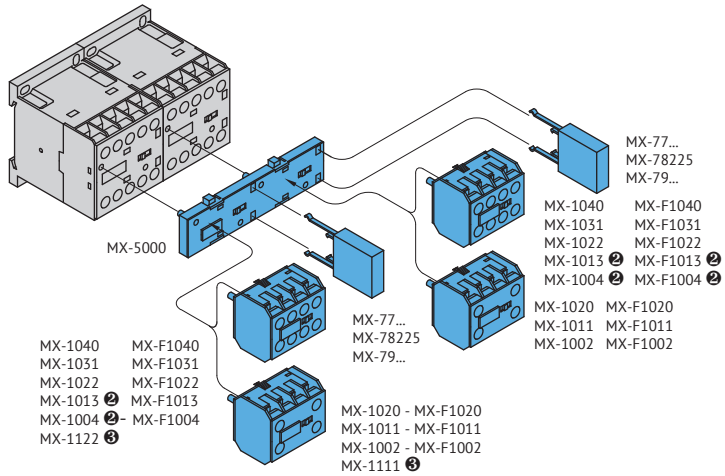


(1) Installation is only permitted on mini-contactors and mini-contactor relays with screw terminals, without auxiliary contacts, without surge arrester and interlock.
(2) Installation on mini-contactors with DC coil is not permitted

Series M mini-contactors with reduced power consumption (-Z)

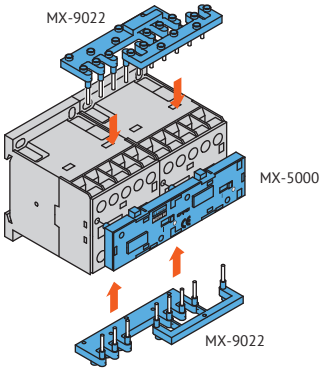


Reversing mini-contactors

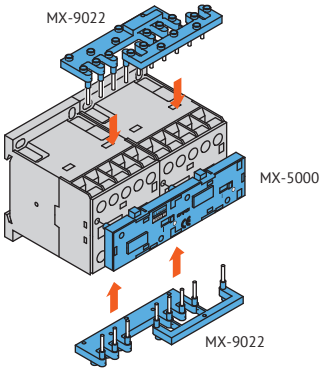


(2) Installation on mini-contactors with DC coil (...D) is not permitted
(3) Installation is only allowed on the left side of the left contactor as part of the reversing assembly

Busbar adapters for reversing starters



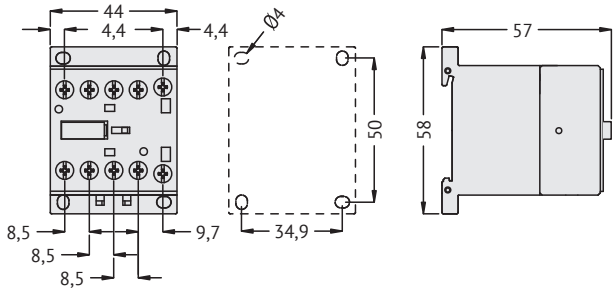
Busbar adapters for star-delta starters



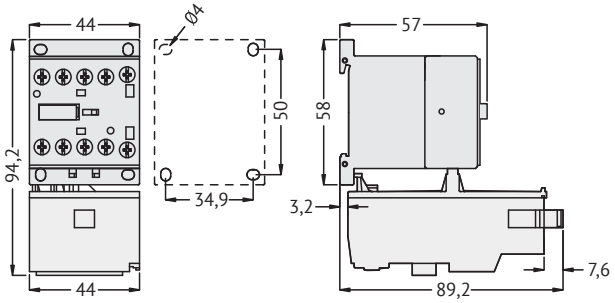
Overall dimensions (mm)

Series M mini-contactors and series MR mini-contactor relays with AC and DC coil

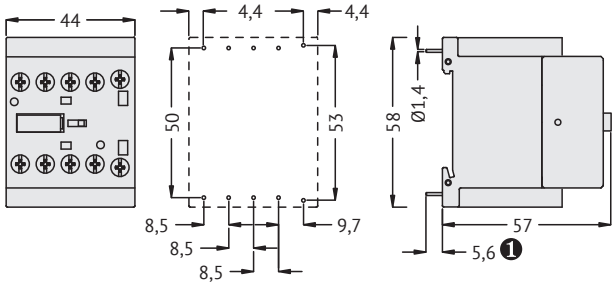
Series M mini-contactors and series MR mini-contactor relays with screw terminals



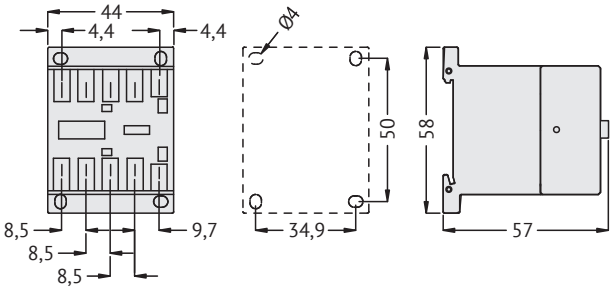
Three-pole series mmini-contactors with screw terminals with thermal relay TF-M...



Series M mini-contactors and series MR mini-contactor relays with solderable terminals



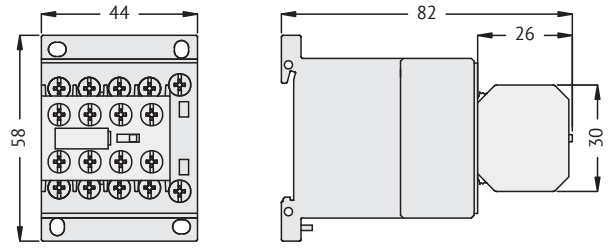
Series M mini-contactors and series MR mini-contactor relays with faston terminals



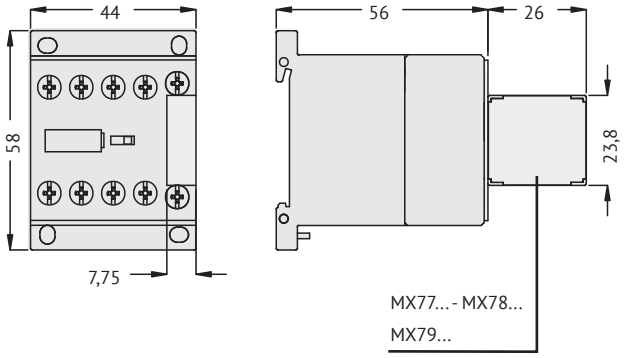
(1) Recommended PCB hole diameter: 1.7...2 mm

Accessories for series M mini-contactors and series MR mini-contactor relays

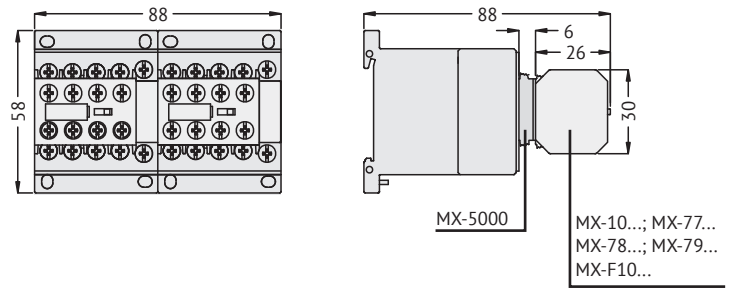
Auxiliary contacts MX-10... MX-F10 (1)



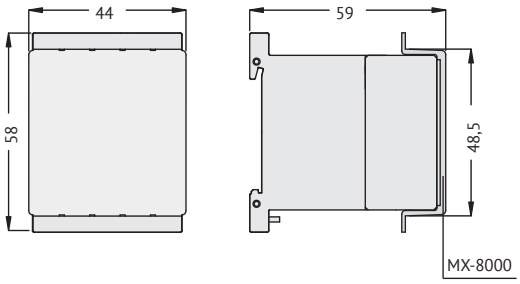
Surge arresters MX-77...; MX-78...; MX-79...



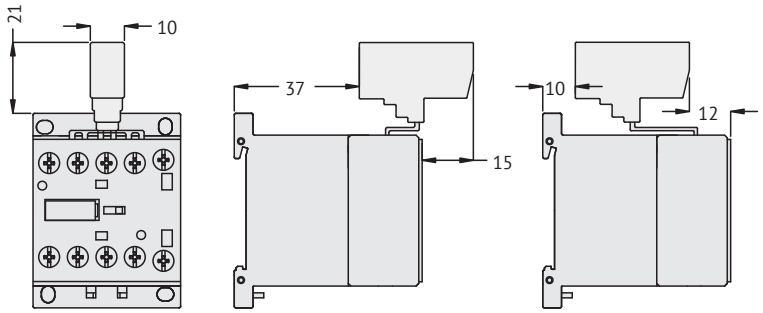
Interlock module MX-5000 with contacts FX-10... and surge arresters FX-7..



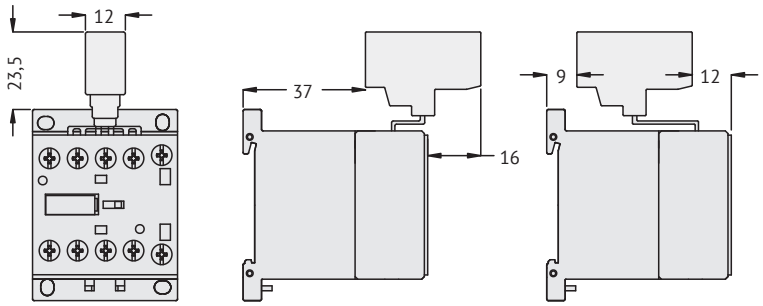
Protective casing MX-8000



Buses for parallel connection
MX-323; MX-324



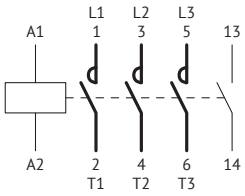
MX-325; MX-326



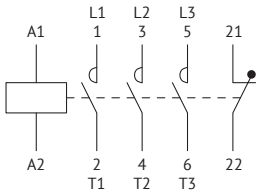
Electric schematics

Three-pole mini-contactors

M-06-30-10...M-12-30-10

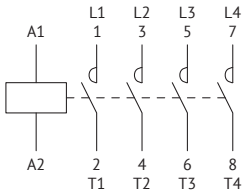


M-06-30-01...M-12-30-01



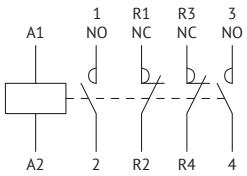
Four-pole mini-contactors with 4 NO contacts

M-06-40...M-12-40



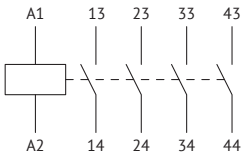
Four-pole mini-contactors with 2 NO + 2 NC contacts

M-06-40...M-12-40

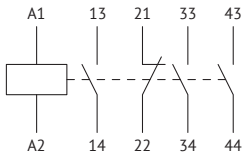


Mini-contactor relays

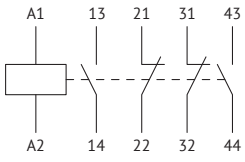
MR-40



MR-31



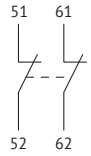
MR-22



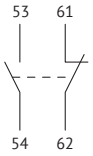
Accessories for series M mini-contactors and series MR mini-contactor relays

Auxiliary contacts

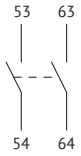
MX-1002
MX-F1002



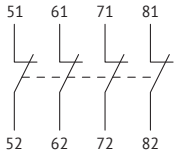
MX-1011
MX-F1011



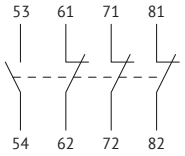
MX-1020
MX-F1020



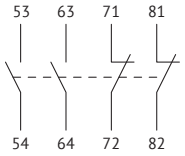
MX-1004
MX-F1004



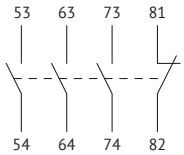
MX-1013
MX-F1013



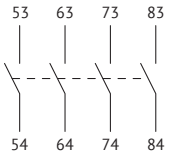
MX-1022
MX-F1022



MX-1031
MX-F1031

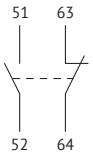


MX-1040
MX-F1040

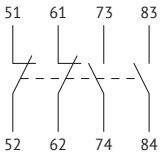


Special auxiliary contacts

MX-1111

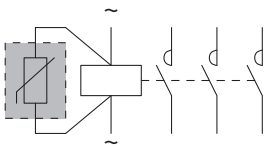


MX-1122

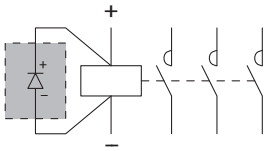


Surge arresters

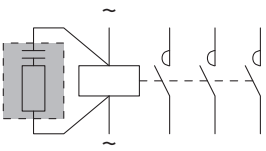
MX-77...



MX-78...

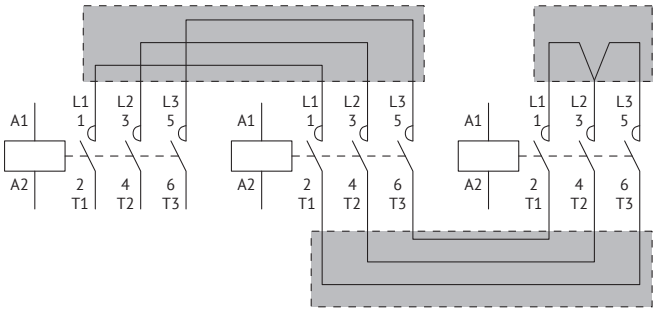


MX-79...

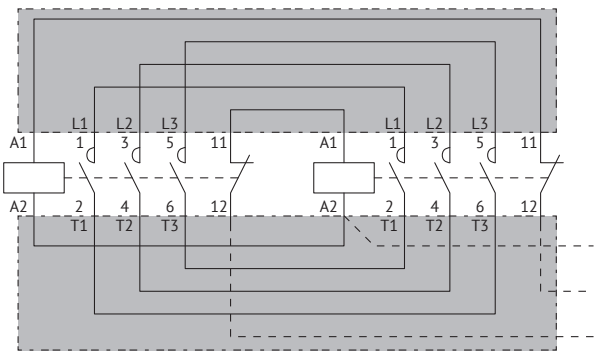


Connection adapters

MX-9021

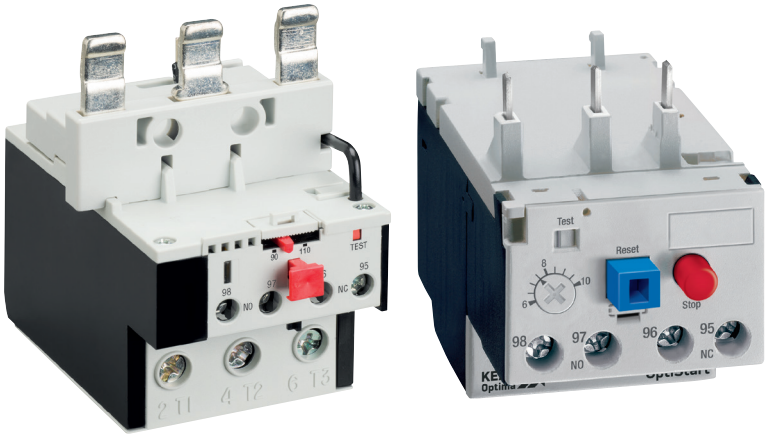


MX-9021



OptiStart TF

↗ Overload relay



Designation

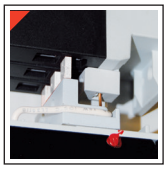
OptiStart TF - U A P 150 - 82

1 2 3 4 5 6 7

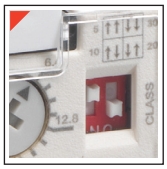
1	Group	OptiStart — Motor control and protection equipment		
2	Series	OptiStart TF — Overload relays		
3	Version	**U** — Thermal overload relay for series (A)F contactors	**E** — Electronic overload relay for series (A)F contactors	**M** — Thermal overload relay for series M mini-contactor
4	Reset method	A — Automatic reset after emergency * * The reset method of models TF-...38, TF-...400 and TF-...420 can be configured		
5	Phase interruption sensitivity	P — Relay sensitive to phase interruption		
6	Maximum compatible contactor size	For information on the overload relay and contactor relay compatibility, see the «Selection guide» section. Series TF-M... thermal relays or mini-contactors do not contain information on this item in their name.		
7	Maximum rated current setpoint	For information on the rated current setpoint ranges, see the «Selection guide» section.		

Series advantages

Possibility of selecting a reset method and precise identification of the selected solution
The reset method of series TF-...38, TF-...400, TF-...420 thermal relays can be configured after an emergency shutdown to enable configuring the relay based on customer requirements. The retractable switching button facilitates visual identification of the selected method.



Easy relay installation
The output contact of the overload relay is connected to the contactor coil terminal via a rigid electrical connection to make the installation easy and enable connection in one action without the need for other external connections.



Electronic relays with trip class adjustment
The range of overload relays includes electronic overload relays, whose distinctive features include a possibility to select a trip class to enable the relay fine-tuning depending on the load type and startup conditions.

Mounting adapter for separate relay installation
Overload relays can be mounted on a din-rail using a separate mounting adapter and connected using conductors to any equipment, which ensures high flexibility of their application.

Protective casing
When protective casing is used, protection is provided against unauthorized setting changes and accidental pressing of the «Reset» and «Stop» buttons.

Thermal relay sealing device
Using a sealing accessory prevents unauthorized changes to the rated current setting of the overload relay.

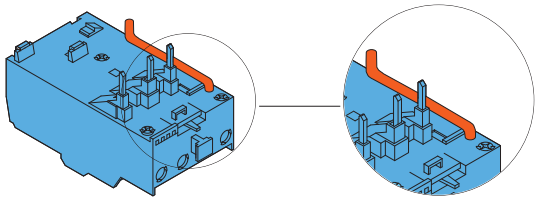
Items

Thermal overload relays

For direct installation on mini-contactors M

Appearance	Rated current, A	Reset method	Phase interruption sensitivity	Product name	Code
	0,09...0,15	Automatic	Yes	OptiStart TF-MAP-0,15	336015
	0,14...0,23	Automatic	Yes	OptiStart TF-MAP-0,23	336016
	0,2...0,33	Automatic	Yes	OptiStart TF-MAP-0,33	336017
	0,3...0,5	Automatic	Yes	OptiStart TF-MAP-0,5	336018
	0,45...0,75	Automatic	Yes	OptiStart TF-MAP-0,75	336019
	0,6...1,0	Automatic	Yes	OptiStart TF-MAP-1,0	336020
	0,9...1,5	Automatic	Yes	OptiStart TF-MAP-1,5	336023
	1,4...2,3	Automatic	Yes	OptiStart TF-MAP-2,3	336024
	2,0...3,3	Automatic	Yes	OptiStart TF-MAP-3,3	336025
	3,0...5,0	Automatic	Yes	OptiStart TF-MAP-5,0	336026
	4,5...7,5	Automatic	Yes	OptiStart TF-MAP-7,5	336027
	6,0...10	Automatic	Yes	OptiStart TF-MAP-10	336021
	9...15	Automatic	Yes	OptiStart TF-MAP-15	336022

Note: to facilitate connection between auxiliary contact H3 of thermal relay TF-M... and terminal A2 of the contactor, insert a conductor into the corresponding technological hole as shown below.



For direct installation on contactors F-09...F-38

Appearance	Rated current, A	Reset method	Phase interruption sensitivity	Product name	Code
	0,1...0,16	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-0,16	336061
	0,16...0,25	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-0,25	336062
	0,25...0,4	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-0,4	336063
	0,4...0,63	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-0,63	336064
	0,63...1,0	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-1,0	336065
	1,0...1,6	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-1,6	336066
	1,6...2,5	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-2,5	336067
	2,5...4,0	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-4,0	336068
	4,0...6,5	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-6,5	336069
	6,3...10	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-10	336070
	9,0...14	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-14	336071
	13...18	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-18	336072
	17...23	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-23	336073
	20...25	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-25	336074
	24...32	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-32	336075
	32...38	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP38-38	336076

Note: Din-rail installation is possible when FX-3804 mounting adapter is used

For direct installation on contactors (A)F-40...(A)F-94

Appearance	Rated current, A	Reset method	Phase interruption sensitivity	Product name	Code
	20...33	Автоматический	Да	OptiStart TF-UAP94-33	336089
	28...42	Автоматический	Да	OptiStart TF-UAP94-42	336090
	35...50	Автоматический	Да	OptiStart TF-UAP94-50	336091
	46...65	Автоматический	Да	OptiStart TF-UAP94-65	336092
	60...82	Автоматический	Да	OptiStart TF-UAP94-82	336093
	70...95	Автоматический	Да	OptiStart TF-UAP94-95	336094

Note: Din-rail installation is possible when FX-270 mounting adapter is used

For direct installation on contactors (A)F-95...(A)F-150.

Appearance	Rated current, A	Reset method	Phase interruption sensitivity	Product name	Code
	60...82	Automatic	Yes	OptiStart TF-UAP150-82	336086
	70...95	Automatic	Yes	OptiStart TF-UAP150-95	336087
	90...110	Automatic	Yes	OptiStart TF-UAP150-110	336088

Note: Din-rail installation is possible when FX-270 mounting adapter is used

For separate installation jointly with contactors AF-160...AF-400

Appearance	Rated current, A	Reset method	Phase interruption sensitivity	Product name	Code
	60...100	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP400-100	336057
	75...125	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP400-125	336058
	90...150	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP400-150	336059
	120...200	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP400-200	336060
	150...250	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP420-250	336077
	180...300	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP420-300	336078
	250...420	Manual or automatic (adjustable)	Yes	OptiStart TF-UAP420-420	336079

Electronic overload relays

General information

The electronic overload relays TF-EAP38 feature a wide current range and high tripping accuracy. The relays are suitable for all motor starting conditions due to the possibility of adjusting the trip class. The front panel contains a switch for selecting manual or automatic reset and an element for controlling forced stop (STOP). The equipment does not require a separate power supply, since it is powered from the protected circuit.

Performance characteristics

– rated insulation voltage of the main circuit U_i: 1000 V;
– rated insulation voltage of output circuit U_i: 690 V;
– rated pulse withstand voltage: 8 kV;
– rated frequency: 50/60 Hz;
– power dissipation per phase: <1 W;
– selectable trip classes: 5-10-20-30;
– phase interruption sensitivity;
– installation position: any;
– possibility of sealing the adjustment element and trip class switch;
– protection degree: IP20.

For direct installation on contactors F-09...F-38

Appearance	Rated current, A	Reset method	Phase interruption sensitivity	Product name	Code
	0,4...2,0	Manual or automatic (adjustable)	Yes	OptiStart TF-EAP38-2,0	336095
	1,6...8,0	Manual or automatic (adjustable)	Yes	OptiStart TF-EAP38-8,0	336096
	6,4...32	Manual or automatic (adjustable)	Yes	OptiStart TF-EAP38-32	336097
	9,0...45	Manual or automatic (adjustable)	Yes	OptiStart TF-EAP38-42	336098

Note: Din-rail installation is possible when FX-3804 mounting adapter is used

Technical specification

		TF-M..	TF-U..38	TF-U..94	TF-U..400	TF-U..420	TF-E..38
Power circuit specifications							
Rated insulation voltage U_i, B		690	690	690	1000	1000	1000
Rated pulse withstand voltage U_{imp}, kV		8 (1)	6	8 (1)	6	6	6
Operating frequency, Hz		0...400	0...400	0...400	50...60	50...60	50...60
Trip type		10A			10A		5-10-20-30
Special features		Test button - Trip indicator					
Connection diagram		Direct			With current transformers		
Connection terminals	type	Screw with washer		Wire clamp	Screw with flat washer		Screw with washer
	screw	M4	M4	M5	M8	M10	M4
	width, mm	9,8	12,6	9	20	25	12
	screwdriver type	PH 2	PH 2	PH 2	13 мм	13 мм	PH 2
Tightening torque of power terminals, Nm		2,3	2...2,5	3,9	18	35	3,1
Maximum cross-section of conductors, mm^2 and busbar size, mm	flexible without lug	6	10	35	–	–	16
	flexible with lug	10	6	–	150	2 x 150	10
	busbar	–	–	–	25 x 3	30 x 5	–
Power dissipation per phase, W		0,7...2,4	0,7...2,4	2,0...4,2	0,7...2,4	0,7...2,4	<1
Output circuit specifications							
Number of contacts, pcs.	NO	1					
	NC	1					
Rated insulation voltage, V		690					
Conditional outdoor thermal current I_{th}, A		10			10		5
Connection terminals	screw with washer	M3,5					
	width, mm	8					7
	screwdriver type	PH 1	PH 2	PH 1	PH 2	–	PH 2
Maximum conductor cross-section, $мм^2$	flexible without lug	2,5					
	flexible with lug	2,5					
Tightening torque of output circuit terminals, Nm		1	0,8...1	1	0,8...1	0,8...1	0,8
Type as per IEC/EN/BS 60947-5-1		B600-P600 (2)	B600-R300	B600-P600 (2)	B600-R300	B600-R300	B600-R300
Operating conditions							
Operating temperature, °C		-20...+55	-25...+60	-20...+55	-25...+60	-25...+60	-25...+70
Storage temperature, °C		-55...+70	-50...+70	-55...+70	-50...+70	-50...+70	-55...+80
Compensation temperature, °C		-15...+55	-20...+60	-15...+55	-20...+60	-20...+60	-25...+70
Maximum height above sea level, m		3000					
Installation position	rated	In a vertical plane					
	permissible	±30°					
Installation		Per contactor or separately					

(1) 6 kV for auxiliary circuit.
(2) C600-R300 in case of automatic reset

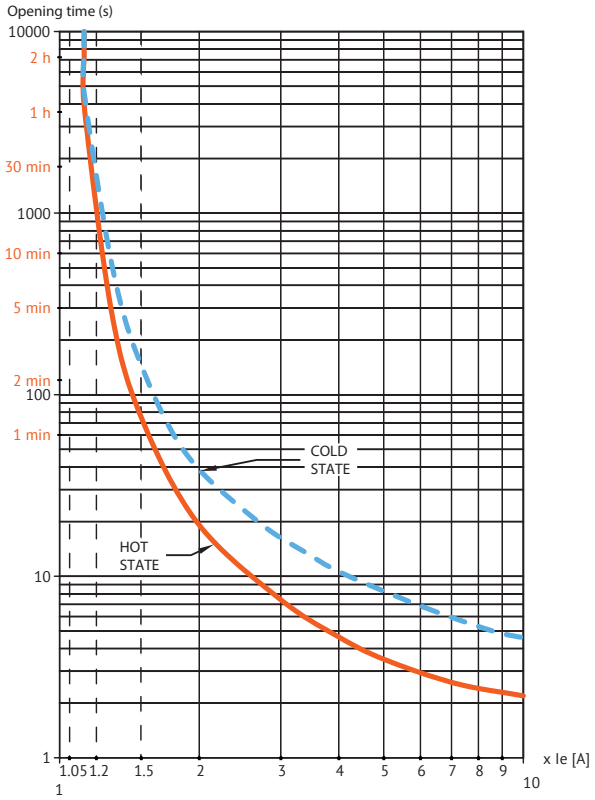
Type	Weight, kg	Rated current range, A	Fuse, A		Three-phase motor power (1), kW			
			aM	gG	240 V	400 V	500 V	690 V
TF-M..-0,15	0,12	0,09...0,15	0,25	–	(2)	(2)	(2)	0,06
TF-M..-0,23	0,12	0,14...0,23	0,5	–	(2)	0,06	0,06	0,09
TF-M..-0,33	0,12	0,2...0,33	0,5	1	(2)	0,09	0,09	0,12
TF-M..-0,5	0,12	0,3...0,5	1	2	0,06	0,12	0,12	0,18
TF-M..-0,75	0,12	0,45...0,75	1	2	0,09–0,12	0,18	0,18	0,25–0,37
TF-M..-1,0	0,12	0,6...1	2	4	0,12	0,25	0,25–0,37	0,55
TF-M..-1,5	0,12	0,9...1,5	2	4	0,18	0,37	0,55	0,75
TF-M..-2,3	0,12	1,4...2,3	4	6	0,25–0,37	0,55–0,75	0,75	1,1–1,5
TF-M..-3,3	0,12	2...3,3	4	10	0,55	1,1	1,1–1,5	1,5–2,2
TF-M..-5,0	0,12	3...5	6	16	0,75	1,5	2,2	3
TF-M..-7,5	0,12	4,5...7,5	8	20	1,1–1,5	2,2-3	3–4	4–5,5
TF-M..-10	0,12	6...10	10	32	2,2	4	4–5,5	7,5
TF-M..-15	0,12	9...15	16	40	3	5,5	7,5	11
TF-U..38-0,16	0,16	0,1...0,16	0,25	–	(2)	(2)	(2)	0,06
TF-U..38-0,25	0,16	0,16...0,25	0,5	–	(2)	0,06	0,06–0,09	0,09–0,12
TF-U..38-0,4	0,16	0,25...0,4	0,5	1	0,06	0,09	0,12	0,18
TF-U..38-0,63	0,16	0,4...0,63	1	2	0,09	0,12–0,18	0,18	0,25
TF-U..38-1,0	0,16	0,63...1	2	4	0,12	0,25	0,25–0,37	0,37–0,55
TF-U..38-1,6	0,16	1...1,6	2	4	0,18–0,25	0,37–0,55	0,55–0,75	0,75
TF-U..38-2,5	0,16	1,6...2,5	4	6	0,37	0,75	1,1	1,1-1,5
TF-U..38-4,0	0,16	2,5...4	4	6	0,55–0,75	1,1–1,5	1,5–2,2	2,2–3
TF-U..38-6,5	0,16	4...6,5	8	16	1,1–1,5	2,2	3	4
TF-U..38-10	0,16	6,3...10	10	20	1,5–2,2	3–4	4–5,5	5,5–7,5
TF-U..38-14	0,16	9...14	16	32	3	5,5	5,5–7,5	11
TF-U..38-18	0,16	13...18	25	40	4	7,5	11	15
TF-U..38-23	0,16	17...23	25	50	5,5	11	11	18,5
TF-U..38-25	0,16	20...25	32	50	5,5	11	15	22
TF-U..38-32	0,16	24...32	40	63	7,5	15	18,5	30
TF-U..38-38	0,16	32...38	40	63	11	18,5	22	30
TF-U..94-33	0,365	20...33	40	63	5,5–7,5	11–15	15–18,5	18,5–22
TF-U..94-42	0,365	28...42	50	80	11	15–18,5	18,5–22	30–37
TF-U..94-50	0,365	35...50	50	100	11	22	30	37–45
TF-U..94-65	0,365	46...65	80	125	15–18,5	22–30	37–45	45–55
TF-U..94-82	0,365	60...82	100	200	18,5–22	37–45	45–55	75
TF-U..94-95	0,365	70...95	100	200	22	45	55	75-90
TF-U..150-82	0,365	60...82	100	200	18,5–22	37–45	45–55	75
TF-U..150-95	0,365	70...95	100	200	22	45	55	75–90
TF-U..150-110	0,365	90...110	125	200	30	55	75	90
TF-U..400-100	2,15	60...100	100	160	18,5–25	33–51	45–63	59–92
TF-U..400-125	2,15	75...125	125	200	22–37	40–63	55–80	75–110
TF-U..400-150	2,15	90...150	160	250	25–45	51–80	63–100	92–140
TF-U..400-200	2,15	120...200	200	315	37–59	75–100	92–140	129–184
TF-U..420-250	2,46	150...250	250	400	45–75	92–132	110–162	140–220
TF-U..420-300	2,46	180...300	315	500	55–92	100–162	129–198	180–280
TF-U..420-420	2,46	250...420	500	630	75–110	129–198	180–280	250–368
TF-E..38-8,0	0,195	0,4...2	4	6	0,09...0,37	0,12...0,75	0,18...0,75	0,25...1,1
TF-E..38-32	0,195	1,6...8	10	20	0,37...0,55	0,75...3	1,1...4	1,1...5,5
TF-E..38-42	0,195	6,4...32	40	63	1,5...7,5	3...15	6,8...28	5,5...30
TF-E..38-2,0	0,195	9...45	50	63	3...11	4...22	5,5...30	7,5...45

(1) The specified power values are valid for 4-pole motors: it is always recommended to check that the rated motor current is within the relay adjustment range.
(2) No standardized power values are available; select the relay according to the current consumption.

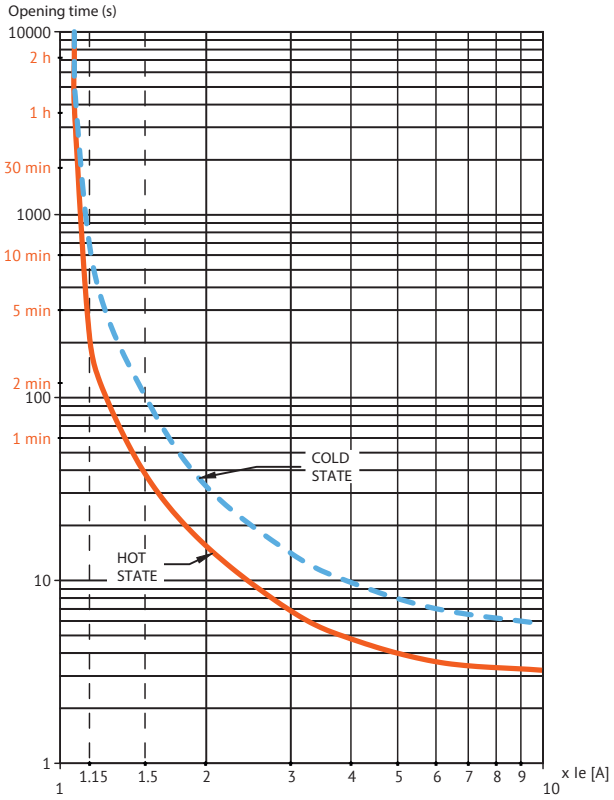
Current and time characteristics

TF-M..; TF-U..38; TF-U..94; TF-U..150

Three-phase mode

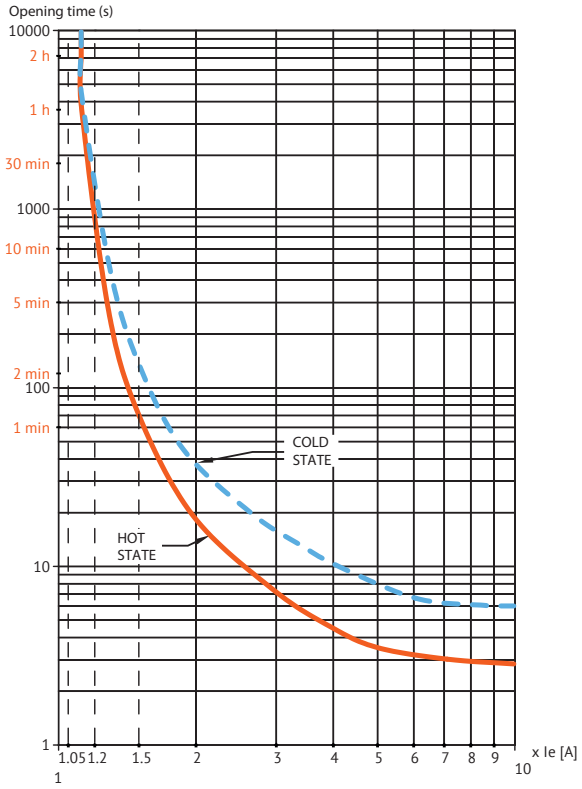


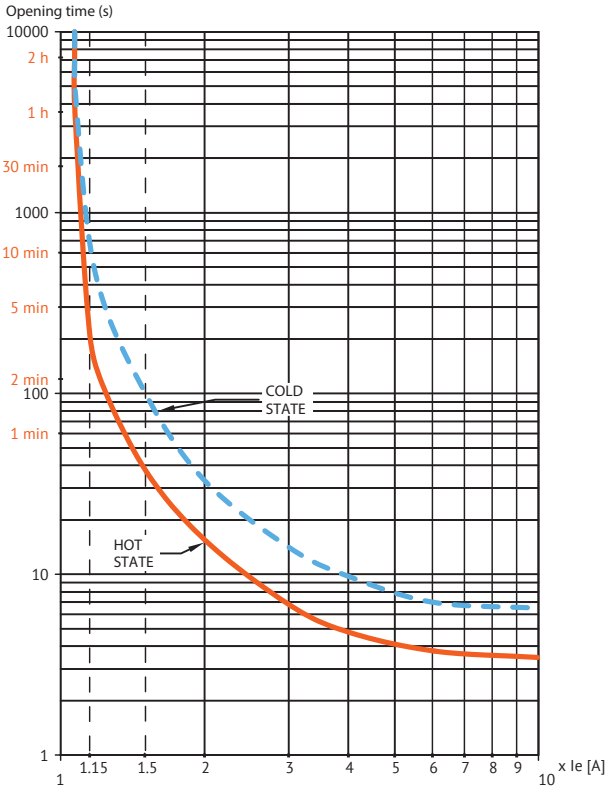
Two-phase mode (phase interruption)



TF-U..400; TF-U..420

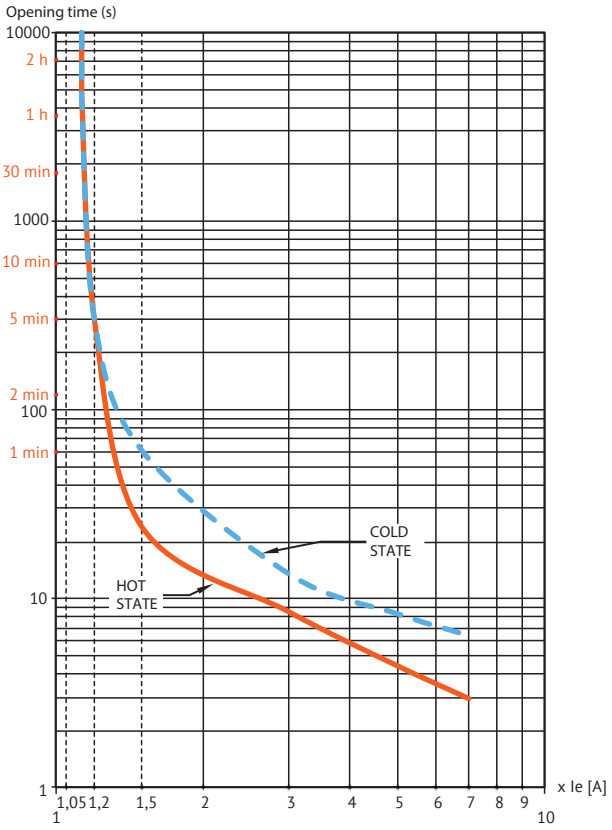
Three-phase mode



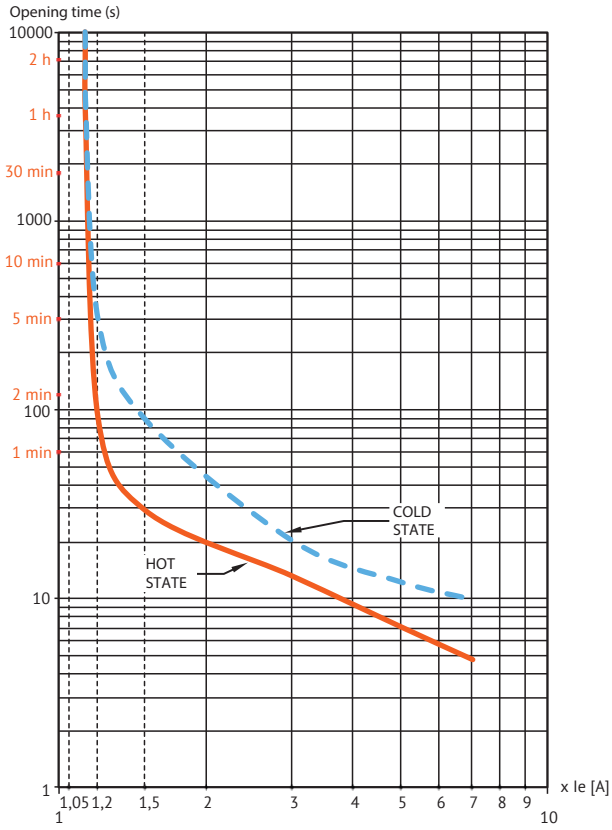


TF-E..38

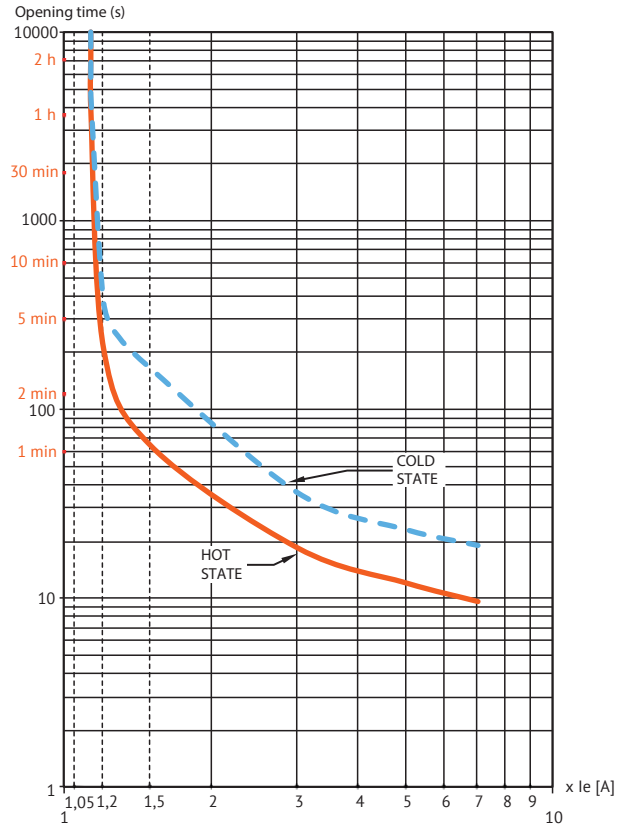
Three-phase mode, trip class 5



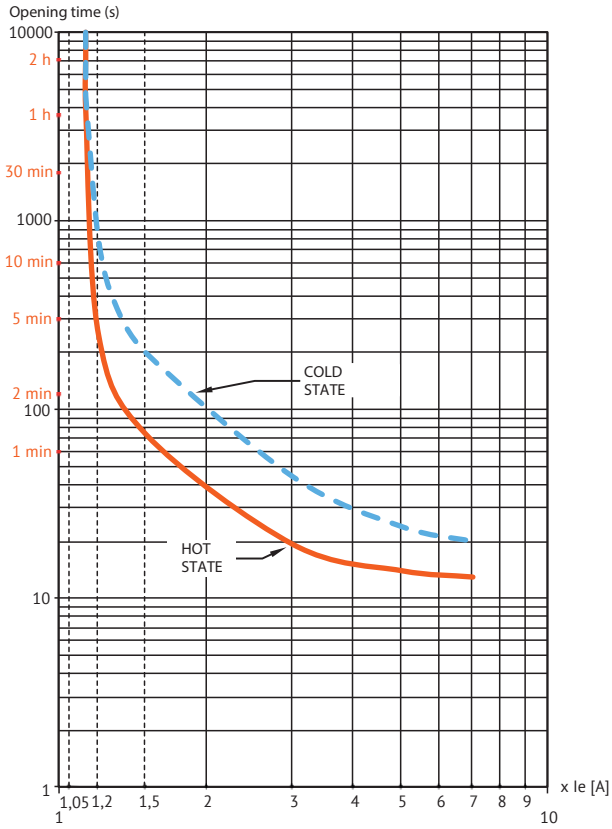
Three-phase mode, trip class 10



Three-phase mode, trip class 20

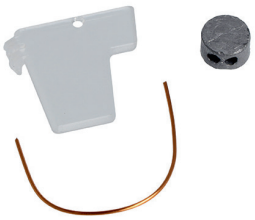


Three-phase mode, trip class 30

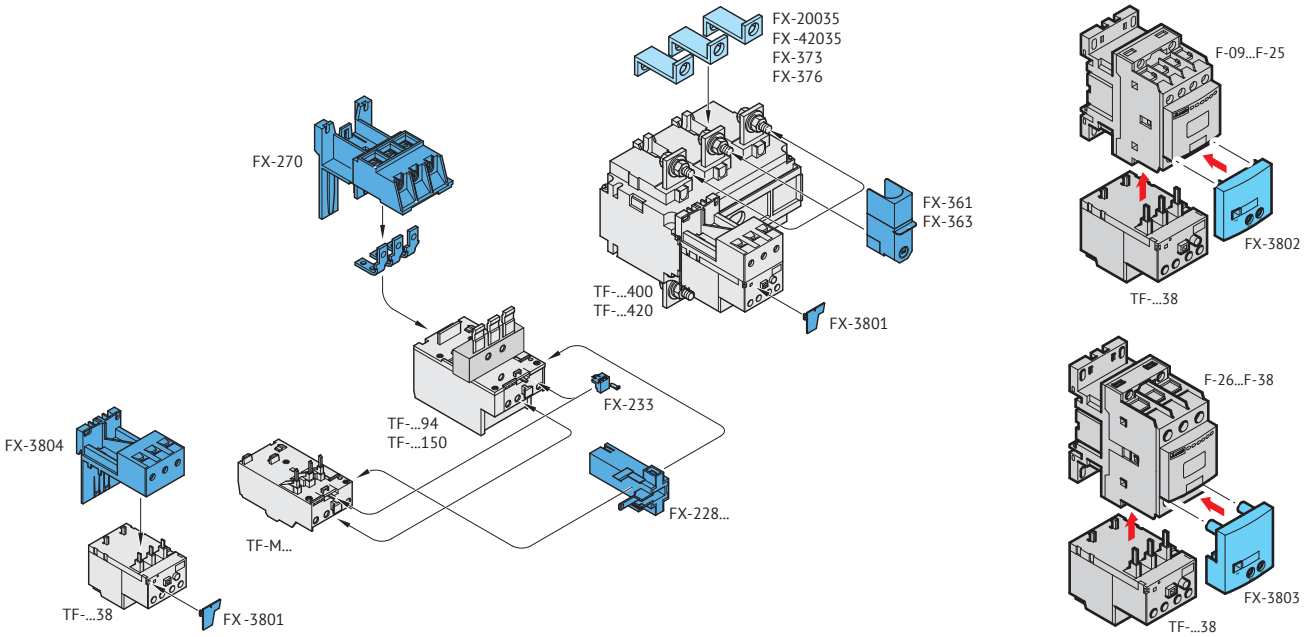


Note: for phase asymmetry >40%, the maximum trip time is 3 s.

Accessories

Appearance	Type	Rated voltage	Compatible devices	Product name	Code
	Mounting adapter		TF-...38	OptiStart TF-FX-3804	336155
			TF-...94, TF-...150	OptiStart TF-FX-270	336144
	Busbar kit		TF-...400 и AF-160...AF-230	OptiStart TF-FX-20035	336151
			TF-...420 и AF-160...AF-230	OptiStart TF-FX-42035	336156
	Sealing device		TF-M..., TF-...94, TF-...150	OptiStart TF-FX-233	336143
			TF-...38, TF-...400, TF-...420	OptiStart TF-FX-3801	336152
	Protective cover		TF-...400	OptiStart TF-FX-361	336145
	Protective cover		TF-...38 и F-09...F-25	OptiStart TF-FX-3802	336153
			TF-...38 и F-26...F-38	OptiStart TF-FX-3803	336154
	Remote reset module	24 В AC	TF-M..., TF-...94, TF-...150	OptiStart TF-FX-22824	336140
		48 В AC	TF-M..., TF-...94, TF-...150	OptiStart TF-FX-22848	336142
		110 В AC	TF-M..., TF-...94, TF-...150	OptiStart TF-FX-228110	336138
		220 В AC	TF-M..., TF-...94, TF-...150	OptiStart TF-FX-228220	336139
		380 В AC	TF-M..., TF-...94, TF-...150	OptiStart TF-FX-228380	336141

Available combination of optional accessories

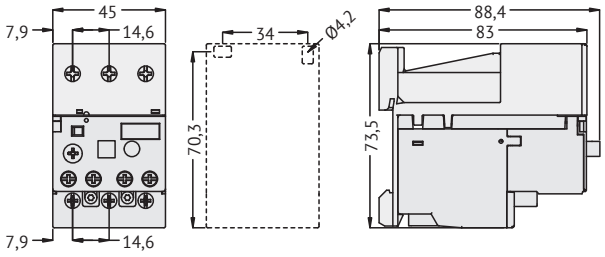


Overall dimensions (mm)

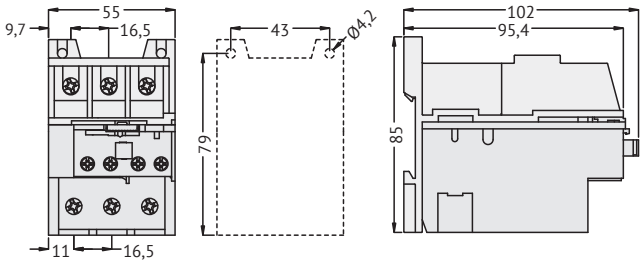
The overall dimensions of the overload relay assembled with contactors are presented in the summary table of the «Overall dimensions» section, «Contactors OptiStart K-F» chapter.

Overload relay accessories

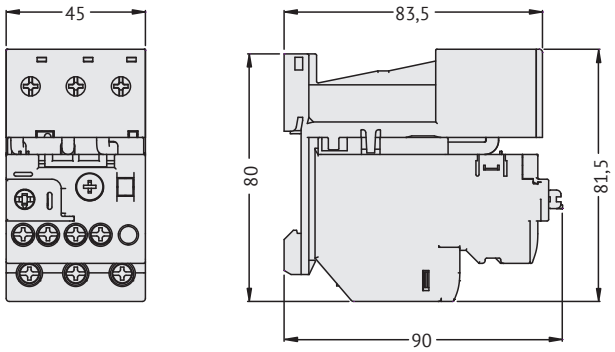
OptiStart TF-FX-3804 mounting adapter with separately installed TF-U..38 relay



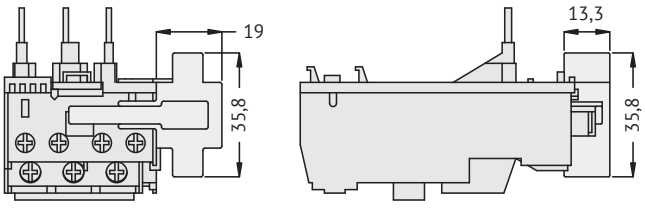
OptiStart TF-FX-270 mounting adapter with separately installed TF-U..94, TF-U..150 relay



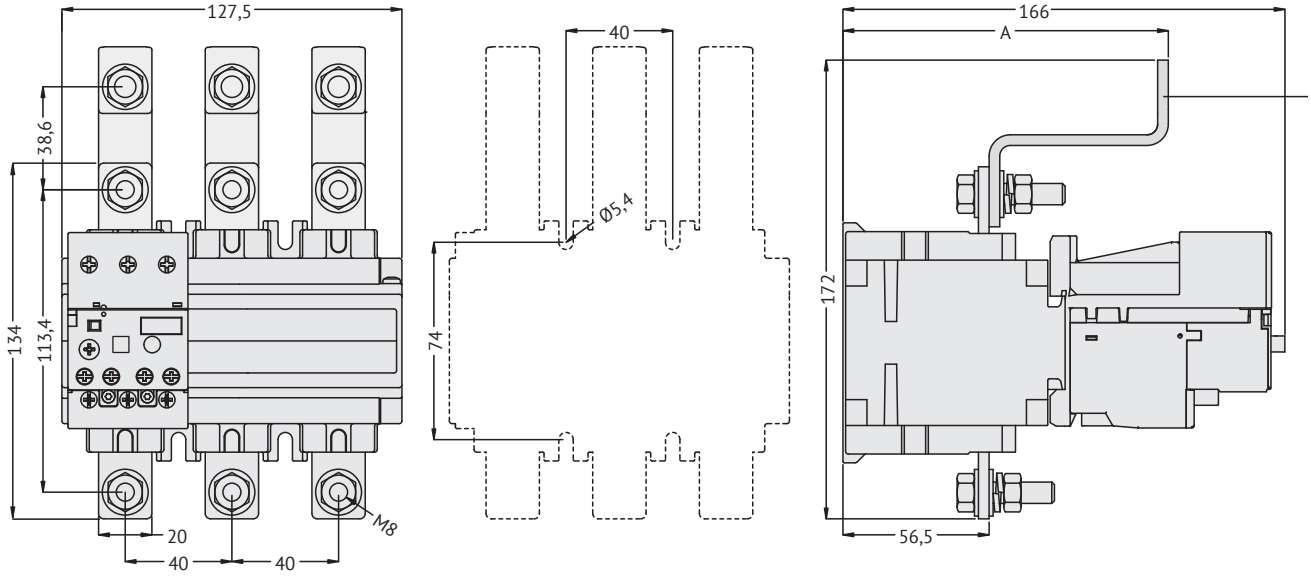
OptiStart TF-FX-3804 mounting adapter with separately installed TF-E..38 relay



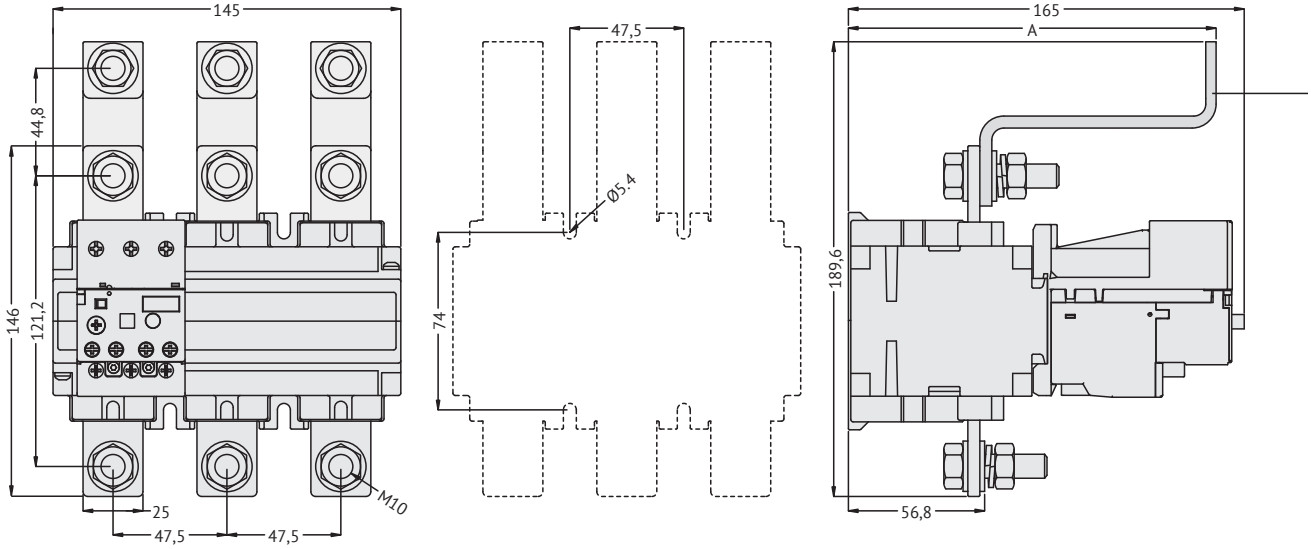
Remote reset module OptiStart TF-FX-228...



Overload relay TF-...400 with busbar kit FX-20035 or FX-373



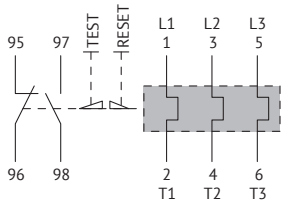
Overload relay TF-...420 with busbar kit FX-42035 or FX-376



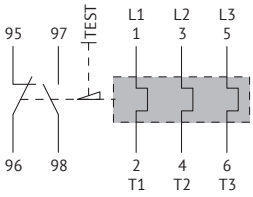
Electric schematics

Thermal and electronic relays for (A)F contactors and M mini-contactors

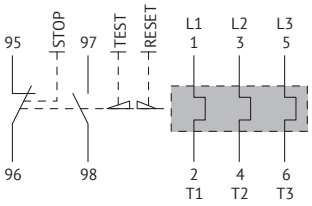
TF-MH...; TF-UH..94; TF-UH..150



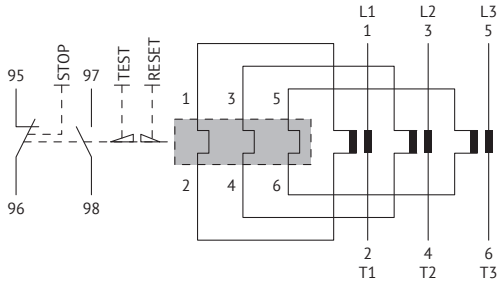
TF-MA...; TF-UA..94; TF-UA..150



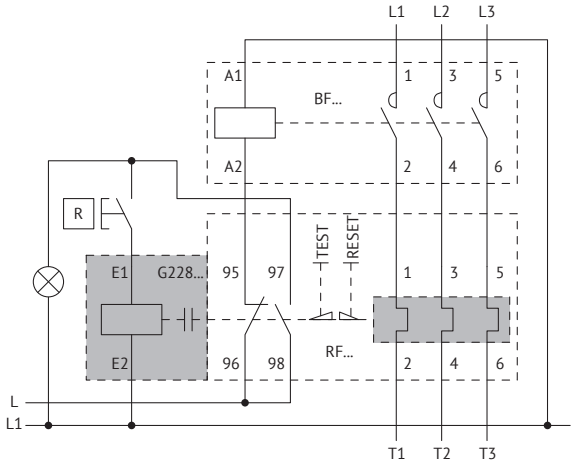
TF-...380



TF-U..400; TF-U..420



Remote reset module FX-228...



OptiStart E LC1E

Electromagnetic contactors

Electromagnetic contactors series OptiStart E LC1E (hereinafter – «contactors») are intended for use as switching devices in electric drive control circuits, mainly in stationary installations for remote starting by direct connection to the mans, stopping and reversing three-phase asynchronous electric motors with a squirrel-cage rotor in electrical installations with voltage up to 660 V AC and frequency of 50 and 60 Hz. Series LC1E contactors can be used together with series LRE thermal relays to provide protection of controlled electric motors against long-term overload currents of unacceptable duration and against currents arising from interruption of one of the phases.

Designation

OptiStart E LC1E 18 10 F5 - 18A - 1NO - 110AC

1 2 3 4 5 6 7 8

1	Series	OptiStart E			
2	Device identification	LC1E — electromagnetic contactors			
3	Rated operating current AC-3 380 V, A	09, 12, 18, 25, 32, 40, 50, 65, 80, 95, 120, 160, 200, 250, 300, 400, 500, 630 A			
4	Number of auxiliary contacts	10 — one closing «1NO»	01 — one opening «1NC»	no designation — one normally open and one normally closed «1NO»+«1NC»	
5	Code designation of control circuit rated voltage with a frequency of 50 Hz NF3	B5 — 24 V	F5 — 110 V	M5 — 220 V	Q5 — 380 V
6	Rated operating current AC-3 380 V, A	09, 12, 18, 25, 32, 40, 50, 65, 80, 95, 120, 160, 200, 250, 300, 400, 500, 630 A			
7	Number of auxiliary contacts	10 — one closing «1NO»	01 — one opening «1NC»	no designation — one normally open and one normally closed «1NO»+«1NC»	
8	Rated voltage of control circuit, V, and current type	24, 110, 220, 380 AC — alternating current			

Series advantages

SELF-EXTINGUISHING PLASTIC HOUSING

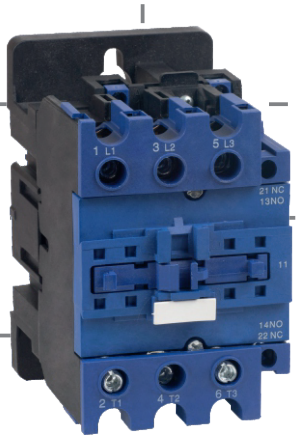
Made of flame-retardant materials.

IMPLEMENTATION OF ANY ENGINEERING SOLUTIONS

A wide range of contactors for 9 to 630 A currents

RESISTANCE TO RUSSIAN CLIMATIC CONDITIONS

The operating temperature range is from minus 20 to plus 40°C.



AVAILABILITY OF BUILT-IN AUXILIARY CONTACTS

Contactors up to 32 A are equipped with one built-in auxiliary contact: 1NO or 1NC. Contactors 40-95 A are equipped with two auxiliary contacts: 1NO + 1NC.

WIDE RANGE OF ACCESSORIES

Convenient to connect and easy to use. This series includes all the most necessary accessories for contactors.

PROTECTION DEGREE IP-20

Protection of terminals against direct contact with current-carrying elements.

EFFECTIVE STOCK FORMATION

The most popular items are always available in stock.

Items

Appearance	Rated current Ie in AC-3 380 V, A	Suitable for AC-3 motors, 380-400 V, kW	Switching wear resistance, mln cycles	Auxiliary contacts		Product name	Coil voltage	Code	Weight, kg
				NO	NC				
three-pole non-reversing									
	9	4	1,2	–	1	Contactor OptiStart E LC1E0901B5-9A-1NC-24AC	24AC	330249	0,33
	9			–	1	Contactor OptiStart E LC1E0901F5-9A-1NC-110AC	110AC	330250	
	9			–	1	Contactor OptiStart E LC1E0901M5-9A-1NC-220AC	220AC	330251	
	9			–	1	Contactor OptiStart E LC1E0901Q5-9A-1NC-380AC	380AC	330252	
	9			1	–	Contactor OptiStart E LC1E0910B5-9A-1NO-24AC	24AC	330253	
	9			1	–	Contactor OptiStart E LC1E0910F5-9A-1NO-110AC	110AC	330254	
	9			1	–	Contactor OptiStart E LC1E0910M5-9A-1NO-220AC	220AC	330255	
	9			1	–	Contactor OptiStart E LC1E0910Q5-9A-1NO-380AC	380AC	330256	
	12	5,5		–	1	Contactor OptiStart E LC1E1201B5-12A-1NC-24AC	24AC	330257	
	12			–	1	Contactor OptiStart E LC1E1201F5-12A-1NC-110AC	110AC	330258	
	12			–	1	Contactor OptiStart E LC1E1201M5-12A-1NC-220AC	220AC	330259	
	12			–	1	Contactor OptiStart E LC1E1201Q5-12A-1NC-380AC	380AC	330260	
	12			1	–	Contactor OptiStart E LC1E1210B5-12A-1NO-24AC	24AC	330262	
	12			1	–	Contactor OptiStart E LC1E1210F5-12A-1NO-110AC	110AC	330263	
	12			1	–	Contactor OptiStart E LC1E1210M5-12A-1NO-220AC	220AC	330264	
	12			1	–	Contactor OptiStart E LC1E1210Q5-12A-1NO-380AC	380AC	330265	
	18	7,5		–	1	Contactor OptiStart E LC1E1801B5-18A-1NC-24AC	24AC	330267	0,37
	18			–	1	Contactor OptiStart E LC1E1801F5-18A-1NC-110AC	110AC	330268	
	18			–	1	Contactor OptiStart E LC1E1801M5-18A-1NC-220AC	220AC	330269	
	18			–	1	Contactor OptiStart E LC1E1801Q5-18A-1NC-380AC	380AC	330274	
	18			1	–	Contactor OptiStart E LC1E1810B5-18A-1NO-24AC	24AC	330270	
	18			1	–	Contactor OptiStart E LC1E1810F5-18A-1NO-110AC	110AC	330271	
	18			1	–	Contactor OptiStart E LC1E1810M5-18A-1NO-220AC	220AC	330272	
	18			1	–	Contactor OptiStart E LC1E1810Q5-18A-1NO-380AC	380AC	330273	

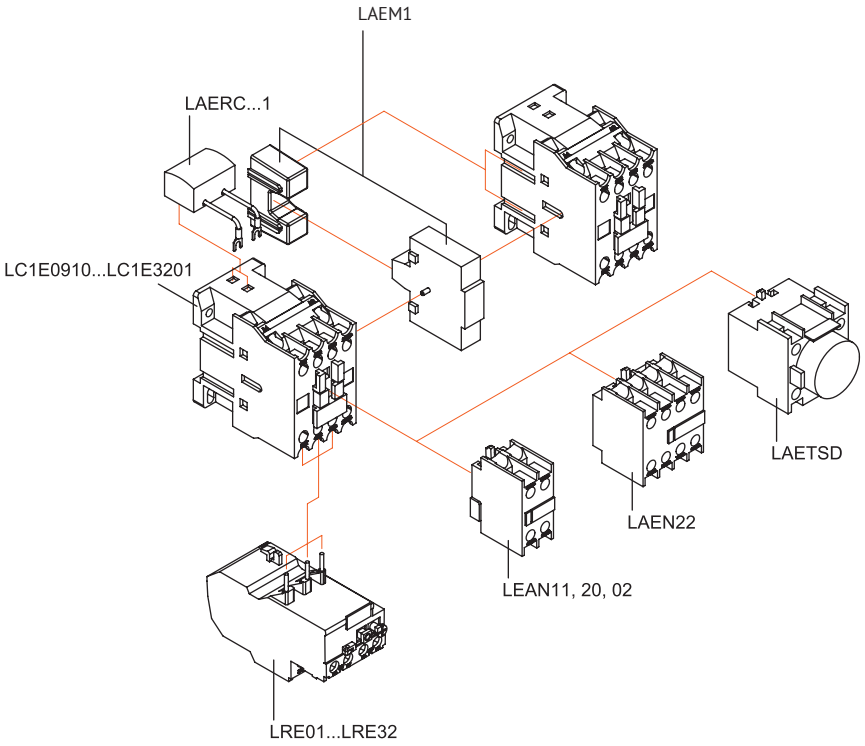
Appearance	Rated current Ie in AC-3 380 V, A	Suitable for AC-3 motors, 380–400 V, kW	Switching wear resistance, mln cycles	Auxiliary contacts		Product name	Coil voltage	Code	Weight, kg
				NO	NC				
	25	11	1,2	–	1	Contactor OptiStart E LC1E2501B5-25A-1NC-24AC	24AC	330275	0,53
	25			–	1	Contactor OptiStart E LC1E2501F5-25A-1NC-110AC	110AC	330276	
	25			–	1	Contactor OptiStart E LC1E2501M5-25A-1NC-220AC	220AC	330277	
	25			–	1	Contactor OptiStart E LC1E2501Q5-25A-1NC-380AC	380AC	330278	
	25			1	–	Contactor OptiStart E LC1E2510B5-25A-1NO-24AC	24AC	330280	
	25			1	–	Contactor OptiStart E LC1E2510F5-25A-1NO-110AC	110AC	330281	
	25			1	–	Contactor OptiStart E LC1E2510M5-25A-1NO-220AC	220AC	330282	
	25			1	–	Contactor OptiStart E LC1E2510Q5-25A-1NO-380AC	380AC	330283	
	32	15	1	–	1	Contactor OptiStart E LC1E3201B5-32A-1NC-24AC	24AC	330284	0,6
	32			–	1	Contactor OptiStart E LC1E3201F5-32A-1NC-110AC	110AC	330285	
	32			–	1	Contactor OptiStart E LC1E3201M5-32A-1NC-220AC	220AC	330286	
	32			–	1	Contactor OptiStart E LC1E3201Q5-32A-1NC-380AC	380AC	330287	
	32			1	–	Contactor OptiStart E LC1E3210B5-32A-1NO-24AC	24AC	330288	
	32			1	–	Contactor OptiStart E LC1E3210F5-32A-1NO-110AC	110AC	330289	
	32			1	–	Contactor OptiStart E LC1E3210M5-32A-1NO-220AC	220AC	330290	
	32			1	–	Contactor OptiStart E LC1E3210Q5-32A-1NO-380AC	380AC	330291	
	40	18,5	0,9	1	1	Contactor OptiStart E LC1E40B5-40A-1NO+1NC-24AC	24AC	330293	1,1
	40			1	1	Contactor OptiStart E LC1E40F5-40A-1NO+1NC-110AC	110AC	330294	
	40			1	1	Contactor OptiStart E LC1E40M5-40A-1NO+1NC-220AC	220AC	330295	
	40			1	1	Contactor OptiStart E LC1E40Q5-40A-1NO+1NC-380AC	380AC	330296	
	50	24		1	1	Contactor OptiStart E LC1E50B5-50A-1NO+1NC-24AC	24AC	330297	
	50			1	1	Contactor OptiStart E LC1E50F5-50A-1NO+1NC-110AC	110AC	330298	
	50			1	1	Contactor OptiStart E LC1E50M5-50A-1NO+1NC-220AC	220AC	330299	
	50			1	1	Contactor OptiStart E LC1E50Q5-50A-1NO+1NC-380AC	380AC	330300	
	65	28		1	1	Contactor OptiStart E LC1E65B5-65A-1NO+1NC-24AC	24AC	330301	
	65			1	1	Contactor OptiStart E LC1E65F5-65A-1NO+1NC-110AC	110AC	330302	
	65			1	1	Contactor OptiStart E LC1E65M5-65A-1NO+1NC-220AC	220AC	330303	
	65			1	1	Contactor OptiStart E LC1E65Q5-65A-1NO+1NC-380AC	380AC	330304	
	80	37		1	1	Contactor OptiStart E LC1E80B5-80A-1NO+1NC-24AC	24AC	330305	1,4
	80			1	1	Contactor OptiStart E LC1E80F5-80A-1NO+1NC-110AC	110AC	330306	
	80			1	1	Contactor OptiStart E LC1E80M5-80A-1NO+1NC-220AC	220AC	330307	
	80			1	1	Contactor OptiStart E LC1E80Q5-80A-1NO+1NC-380AC	380AC	330308	
	95	44		1	1	Contactor OptiStart E LC1E95B5-95A-1NO+1NC-24AC	24AC	330309	
	95			1	1	Contactor OptiStart E LC1E95F5-95A-1NO+1NC-110AC	110AC	330310	
	95			1	1	Contactor OptiStart E LC1E95M5-95A-1NO+1NC-220AC	220AC	330311	
	95			1	1	Contactor OptiStart E LC1E95Q5-95A-1NO+1NC-380AC	380AC	330312	
	120	55	0,8	1	1	Contactor OptiStart E LC1E120M5-120A-1NO+1NC-220AC	220AC	330261	4,6
	160	75		1	1	Contactor OptiStart E LC1E160M5-160A-1NO+1NC-220AC	220AC	330266	4,7
	250	132	0,5	1	1	Contactor OptiStart E LC1E250M5-250A-1NO+1NC-220AC	220AC	330279	6,6
	400	200		1	1	Contactor OptiStart E LC1E400M7-400A-1NO+1NC-220AC	220AC	330292	7,2

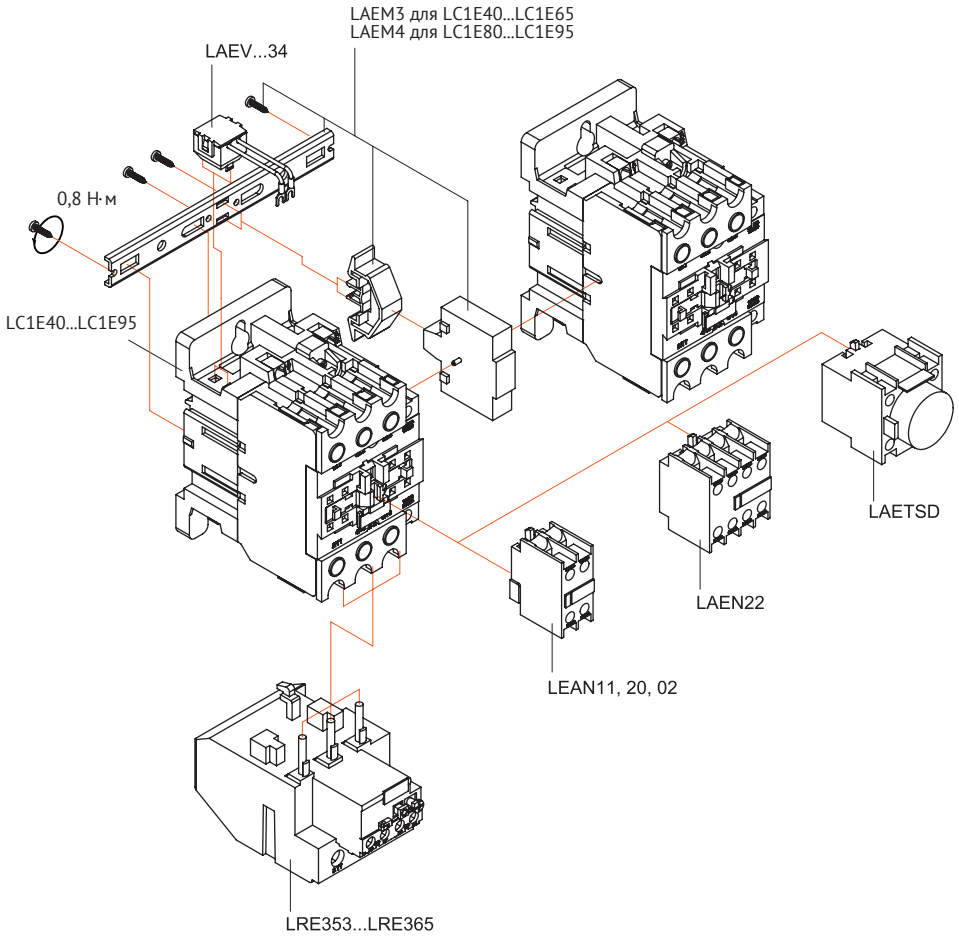
Technical specification

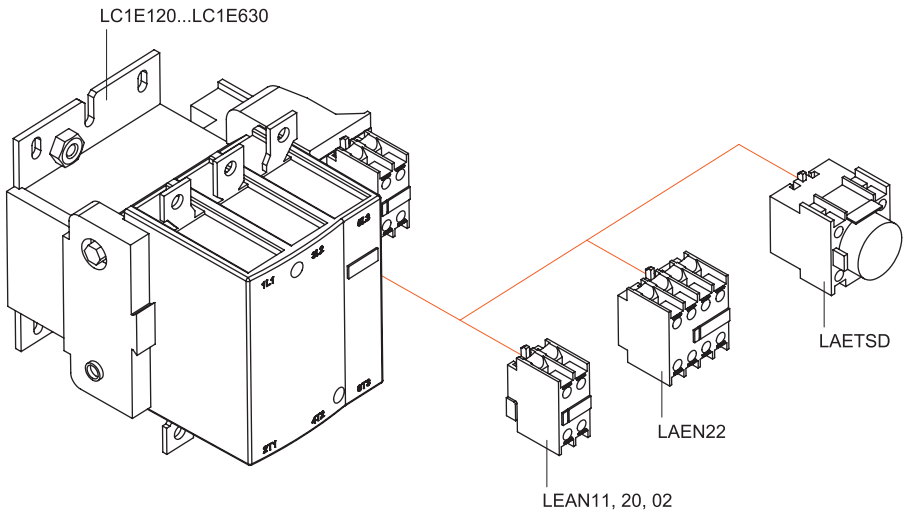
Contactor type		LC1E0910	LC1E0901	LC1E1210	LC1E1201	LC1E1810	LC1E1801	LC1E2510	LC1E2501	LC1E3210	LC1E3201
Rated insulation voltage Ui, V		690									
Utilization category AC-2 and AC-3 — Start-up, shut-down of three-phase motors											
Rated operating current in utilization category Ie, A	AC-3 ≤ 400 V	9		12		18		25		32	
	AC-3 660/690 V	6,6		8,9		12		18		21	
	AC-4 ≤ 400 V	3,5		5		7,7		8,5		12	
	AC-4 660/690 V	1,5		2		3,8		4,4		7,5	
Rated power of controlled motor, kW, in utilization category AC-3	220/230 V	2,2		3		4		5,5		7,5	
	380/400 V	4		5,5		7,5		11		15	
	660/690 V	5,5		7,5		10		15		18,5	
Auxiliary contacts											
«1NO» — closing contact		1NO	–	1NO	–	1NO	–	1NO	–	1NO	–
«1NC» — opening contact		–	1NC	–	1NC	–	1NC	–	1NC	–	1NC
Switching and mechanical wear resistance, mln cycles											
Switching wear resistance	AC-1	0,3									
	AC-3	1,2								1	0,9
	AC-4	0,2									
Mechanical wear resistance		10								8	
Short-circuit protection											
Coordination type 1: welding of contacts, safe for personnel	gG, A	20		25		35		40		63	
Frequency of operations, q-ty per hour											
No load		3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
In utilization category AC-3		1200	1200	1200	1200	1200	1200	1200	1200	600	600
Conductor connection											
Flexible cable with lug, mm²	1 conductor	1...4	1...4	1...4	1...4	1...4	1...4	1...6	1...6	1...10	1...10
	2 conductor	1...2,5	1...2,5	1...2,5	1...2,5			1...4	1...4	2,5...6	2,5...6
Flexible cable without lug, mm²	1 conductor	1...4	1...4	1...4	1...4	1,5...6	1,5...6	1,5...10	1,5...10	2,5...6	2,5...6
	2 conductor					1,5...6	1,5...6	1,5...6	1,5...6		
Rigid cable, mm²	1 conductor	1...4	1...4	1...4	1...4	1,5...6	1,5...6	1,5...6	1,5...6	1,5...10	1,5...10
	2 conductor									2,5...10	2,5...10
Stripped insulation length, mm²		8				9		12			
Lug cable, mm²		–									
Bus	2 pcs. x										
Bolt diameter											
Tightening torque, N·m		1,2									
AC control circuit coil specifications											
Tripping range	Tripping	0,85...1,1Uc									
	Release	0,2...0,6Uc									
Power consumption, VA	Tripping cosφ 0.75	70						110			
	Retention cosφ 0.3	8						11			
Trip time	Closing	12..25						20..25			
	Opening	5...20						20..35			
Power dissipation, W		3						3,5			
Contactor weight, max, kg		0,33				0,37		0,53		0,6	

Contactor type		LC1E40	LC1E50	LC1E65	LC1E80	LC1E95	LC1E120	LC1E160	LC1E200	LC1E250	LC1E300	LC1E400	LC1E500	LC1E630
Rated insulation voltage Ui, V		690												
Utilization category AC-2 and AC-3 — Start-up, shut-down of three-phase motors														
Rated operating current in utilization category Ie, A	AC-3 ≤ 400 V	40	50	65	80	95	120	160	200	250	300	400	500	630
	AC-3 660/690 V	25	32	42	49	49	87,5	112	142	160	213	303	335	462
	AC-4 ≤ 400 V	18,5	24	28	37	44	53	64	76	88	120	138	147	188
	AC-4 660/690 V	9	12	14	17,3	21,3	30,5	37	45	50,8	69	79,7	84,9	108
Rated power of controlled motor, kW, in utilization category AC-3	220/230 V	11	15	18,5	22	25	37	45	55	75	90	110	147	185
	380/400 V	18,5	22	30	37	45	55	75	90	132	185	200	250	335
	660/690 V	30	33	37	45	45	75	100	110	132	200	280	335	450
Auxiliary contacts														
«1NO» — closing contact		1NO	1NO	1NO	1NO	1NO	1NO	1NO	1NO	1NO	1NO	1NO	1NO	1NO
«1NC» — opening contact		1NC	1NC	1NC	1NC	1NC	1NC	1NC	1NC	1NC	1NC	1NC	1NC	1NC
Switching and mechanical wear resistance, mln cycles														
Switching wear resistance	AC-1	0,3					0,2							
	AC-3	0,9					0,8		0,5					
	AC-4	0,15			0,1		0,1							
Mechanical wear resistance		8			6		3							
Short-circuit protection														
Coordination type 1: welding of contacts, safe for personnel	gG, A	80		125	160		250	315			500	630	800	800
Frequency of operations, q-ty per hour														
No load		3600	3600	3600	3600	3600	2400	2400	2400	2400	2400	2400	2400	2400
In utilization category AC-3		600	600	600	600	600	600	600	600	600	600	600	600	600
Conductor connection														
Flexible cable with lug, mm²	1 conductor	2,5...25	2,5...25	2,5...25	4...50	4...50	–							
	2 conductor	2,5...10	2,5...10	2,5...10	4...16	4...16								
Flexible cable without lug, mm²	1 conductor	2,5...25	2,5...25	2,5...25	4...50	4...50								
	2 conductor	2,5...16	2,5...16	2,5...16	4...25	4...25								
Rigid cable, mm²	1 conductor	2,5...25	2,5...25	2,5...25	4...50	4...50								
	2 conductor	2,5...16	2,5...16	2,5...16	4...25	4...25								
Stripped insulation length, mm²		15			17									
Lug cable, mm²		–					1x95	1x150		1x185	1x240	2x150	2x185	2x240
Bus	2 pcs. x						20x3	25x3		32x4	30x5	30x4	40x5	60x5
Bolt diameter							M8	M10						M12
Tightening torque, N·m		3,5			4		18	35						58
AC control circuit coil specifications														
Tripping range	Tripping	0,85...1,1Uc					0,85...1,1Uc							
	Release	0,2...0,6Uc					0,2...0,55Uc							
Power consumption, VA	Tripping cosφ 0,75	200					550	805		650		1075	1000	1650
	Retention cosφ 0,3	20					55	64		15		22	24	27
Trip time	Closing	20..25			8..15		23..35	20..35		40...65	40..65	40..75		40-80
	Opening	20..25			8...20		5...15	7...15		100...170				100-200
Power dissipation, W		10					12...16	18..24		8		14	18	20
Contactor weight, max, kg		1,1			1,4		4,6	4,7	4,9	6,6	6,8	7,2	9,7	18

Configuration

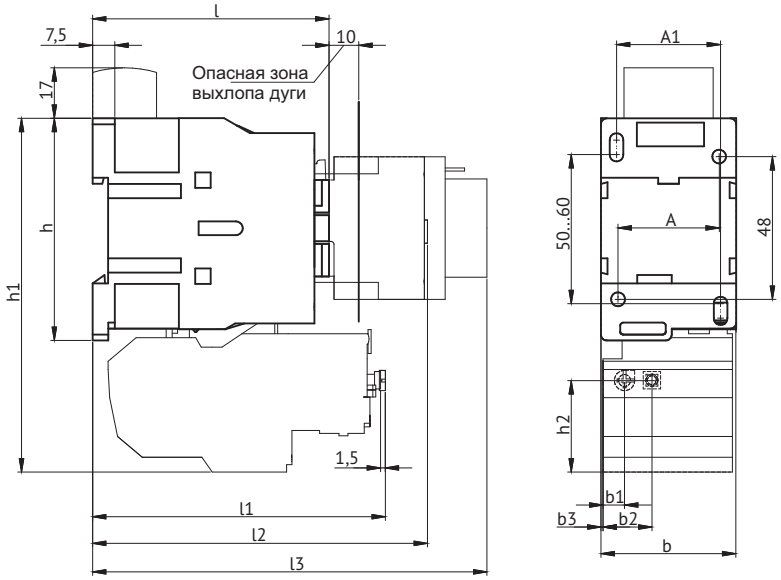


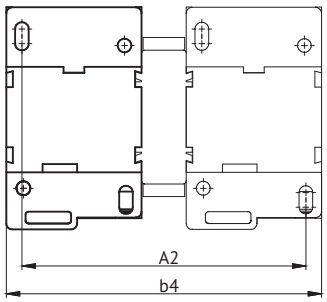




Overall dimensions (mm)

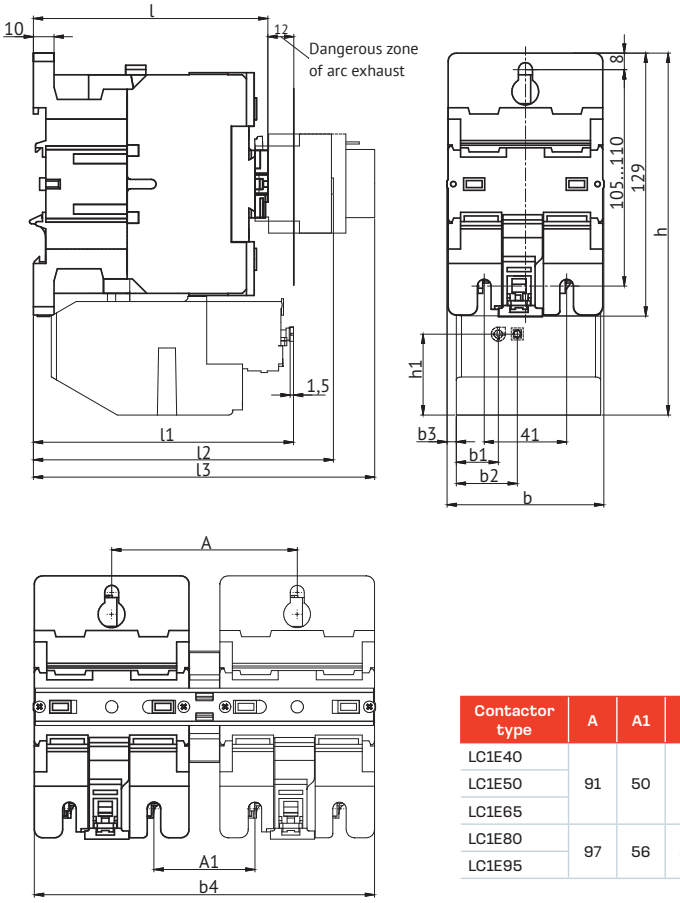
Contactors LC1E 9-32 A





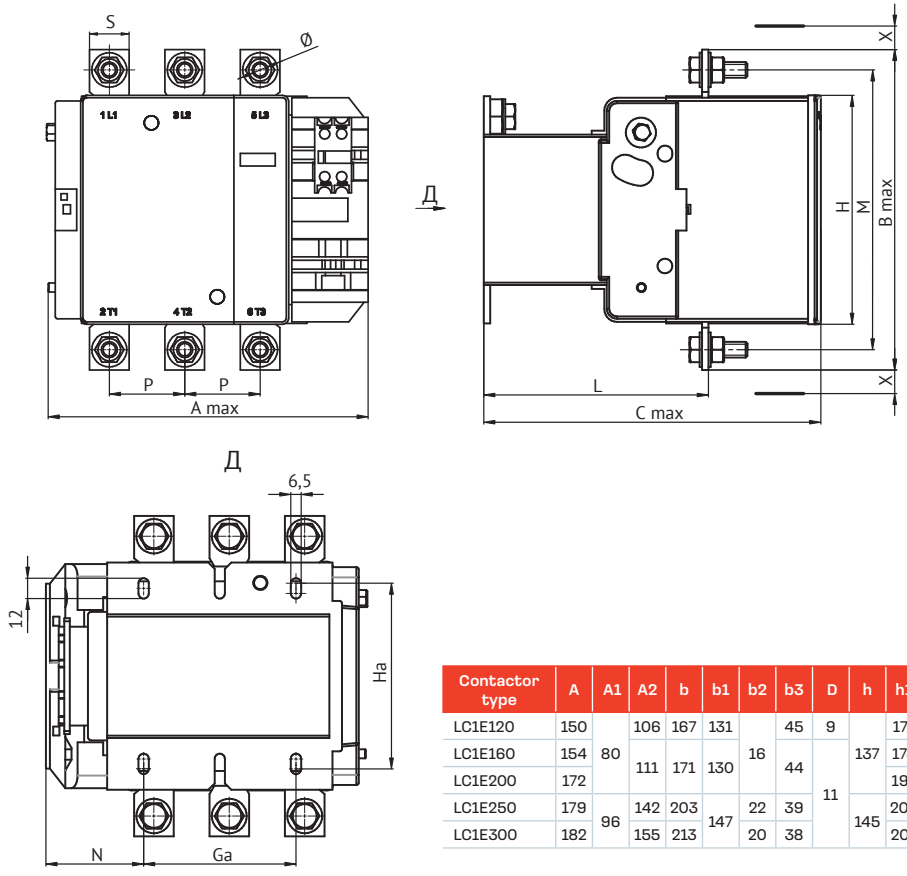
Contactor type	A	A1	A2	b	b1	b2	b3	b4	h	h1	h2	l	l1	l2	l3	Panel mounting screws
LC1E09	34	35	96	46	7,6	16,8	0,5	107	75	120	31	81	98,5	114	136	M4 2 pcs.
LC1E12																
LC1E18							0					86	99	119	140	
LC1E25	40	40	112	57			10,5	129	84	129		94	108,5	127	147	
LC1E32							8,5					100	110,5	132	154	

Contactors LC1E 40-95 A



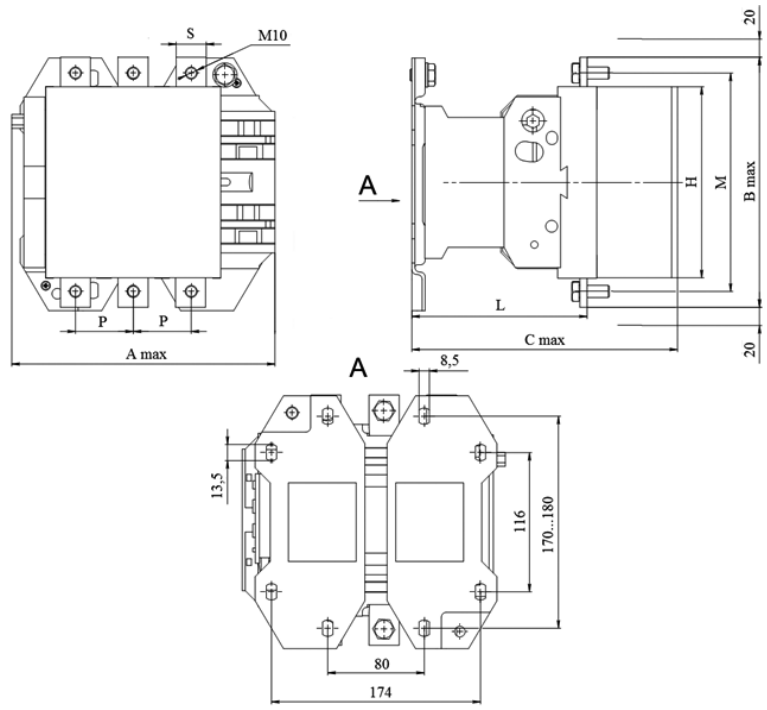
Contactor type	A	A1	b	b1	b2	b3	b4	h	h1	l	l1	l2	l3	Panel mounting screws
LC1E40	91	50	77	20,4	29,6	5	167	176	39,2	115	126	147	169	M6 3 pcs.
LC1E50														
LC1E65														
LC1E80	97	56	86			8,5	182	180		123	131,5	155	177	
LC1E95														

Contactors LC1E 120-300 A



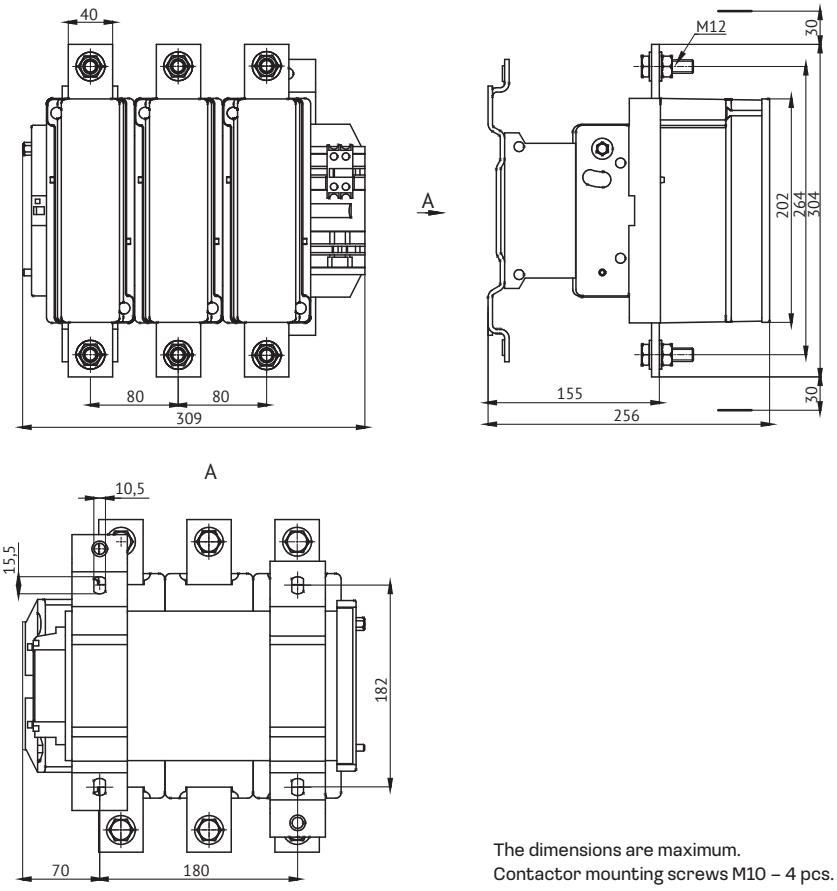
Contactor type	A	A1	A2	b	b1	b2	b3	D	h	h1	h2	l	l1	P	Q	Q1	S	Panel mounting screws
LC1E120	150	80	106	167	131	16	45	11	137	171	124	171	107	40	29	58	20	M6 4 pcs.
LC1E160	154		111	171	130		44			174	127	181	113,5		31	60		
LC1E200	172									197				48	22	53	25	
LC1E250	179	96	142	203	147	22	39		145	205	147	213	142		39	68		
LC1E300	182		155	213		20	38			207	158	219	146		43	74		

Contactors LC1E 400-500 A



Contactor type	A	b	b1	b2	h	h1	l	l1	P	Q	Q1	S	Panel mounting screws
LC1E400	181	213	151	19,5	206	158	220	145	48	43	74	25	M8 4 pcs.
LC1E500	208	233	169	39,5	238	172	233	146	55	46	77	30	

Contactors LC1E 630, 800 A



The dimensions are maximum.
Contactor mounting screws M10 – 4 pcs.

Accessories

Designation

OptiStart E LAEN 2 2

1 2 3 4

1	Series	OptiStart E
2	Product type name	LAEN — Optional contact unit
3	Number of closing contacts (NO)	0; 1; 2
4	Number of opening contacts (NC)	0; 1; 2

OptiStart E LAET S D

1 2 3 4

1	Series	OptiStart E
2	Product type name	LAET — Optional contact unit with time delay
3	Time delay upon activation	S
4	Time delay range: 0.1-30 s	D

Items

Appearance	Contact unit type	Contacts		Rated operating current in utilization category Ie, A					Code
		NO	NC	DC-13			AC-15		
				110 V	220 V	440 V	400 V	690 V	
	LAEN11	1	1	0,34	0,15	0,06	0,74	0,28	333076
	LAEN20	2	-						333077
	LAEN02	-	2						333078
	LAEN22	2	2						333079
	LAETSD	1	1						333080

Contactor coils OptiStart E LC1E

Appearance	For contactors	Product name	Coil voltage, V	Code
	LC1E9...18	OptiStart E LAEX1B5	24	333090
		OptiStart E LAEX1F5-110B	110	333091
		OptiStart E LAEX1M5	220	333092
		OptiStart E LAEX1Q5-380B	380	333093
	LC1E25...32	OptiStart E LAEX2B5	24	333094
		OptiStart E LAEX2F5	110	333095
		OptiStart E LAEX2M5	220	333096
		OptiStart E LAEX2Q5	380	333097
	LC1E40...65	OptiStart ELAEX3F5	110	333099
		OptiStart ELAEX3M5	220	333100
		OptiStart ELAEX3Q5	380	333101
	LC1E80...95	OptiStart E LAEX4B5	24	333102
		OptiStart E LAEX4F5	110	333103
		OptiStart E LAEX4M5	220	333104
		OptiStart E LAEX4Q5	380	333105
	LC1E120	OptiStart E LAEX5M5	220	333106
	LC1E160...200	OptiStart E LAEX51M5	220	333107
	LC1E250...300	OptiStart E LAEX6M5	220	333108
	LC1E500	OptiStart E LAEX8M5	220	333110
	LC1E630	OptiStart E LAEX9M5	220	333111

Mechanical interlock OptiStart E LAEM

Appearance	Contactor types	Installation	Product name	Code
	LC1E9...32	Horizontal	LAEM1	333087
	LC1E40...65	Horizontal	LAEM3	333088
	LC1E80...95	Horizontal	LAEM4	333089

OptiStart E switching overvoltage limitation module

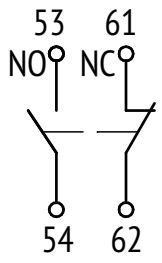
Appearance	For contactor	Voltage range, V	Hardware components	Product name	Code
	LC1E9...32	24-48	R-C	OptiStart E LAERCE1	333081
	LC1E9...32	100-250	R-C	OptiStart E LAERCU1	333082
	LC1E9...32	380-400	R-C	OptiStart E LAERCN1	333083
	LC1E40...95	24-48	Variable resistor	OptiStart E LAEVE34	333084
	LC1E40...95	100-250	Variable resistor	OptiStart E LAEVU34	333085
	LC1E40...95	380-400	Variable resistor	OptiStart E LAEVN34	333086

Technical specification

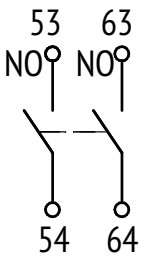
Type		LAEN11	LAEN20	LAEN02	LAEN22	LAETSD
Rated insulation voltage Ui, V		690	690	690	690	690
Operation frequency, q-ty per hour		3600	3600	3600	3600	3600
Switching wear resistance, mln cycles		1	1	1	1	1
Mechanical wear resistance, mln cycles		10	10	10	10	5
Utilization category AC-15						
Rated operating current	400 V	0,74	0,74	0,74	0,74	0,74
	690 V	0,28	0,28	0,28	0,28	0,28
Short-circuit protection, A						
Short-circuit current 1 kA, contact welding is unacceptable	gG	10	10	10	10	10
Number of contacts						
Closing (NO)		1	2	0	2	1
Opening (NC)		1	0	2	2	1
Conductor connection						
Flexible cable with lug, mm²	2 conductors	1–2,5	1–2,5	1–2,5	1–2,5	1–2,5
Flexible cable without lug, mm²		1–2,5	1–2,5	1–2,5	1–2,5	1–2,5
Rigid cable, mm²		1–2,5	1–2,5	1–2,5	1–2,5	1–2,5
Weight, max, kg		0,3	0,3	0,3	0,6	0,8

Electric schematics

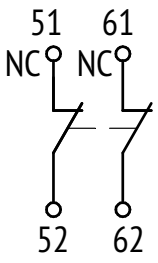
LAEN11



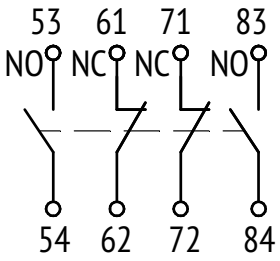
LAEN20



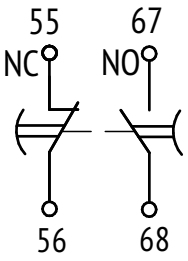
LAEN02



LAEN22

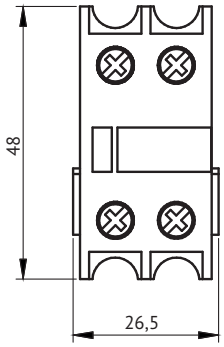


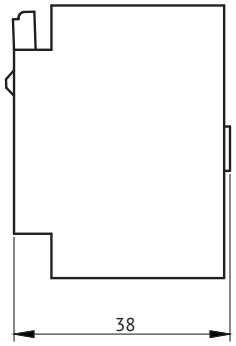
LAETSD



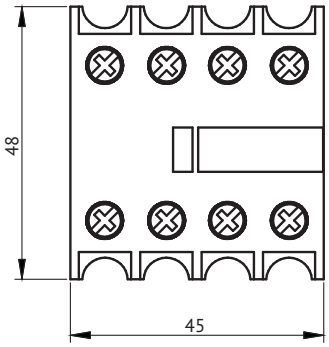
Overall dimensions (mm)

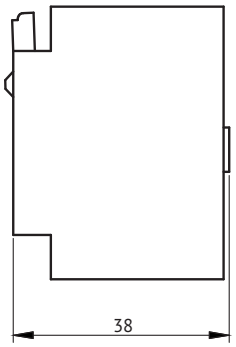
Optional contact units
LAEN11, LAEN02, LAEN20



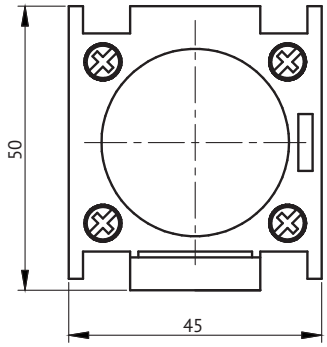


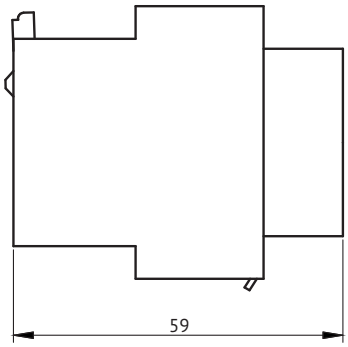
LAEN22





Contact units with time delay
LAETSD





OptiStart E LRE

↗ Thermal relays

Relays are designed to protect three-phase asynchronous electric motors with a squirrel-cage rotor from overcurrent of unacceptable duration, including those occurring when one of the phases fails. The relays are used as components in control circuits of electric drives in circuits up to 690 V AC and 50/60 Hz. This series is intended for use together with series OptiStart E LC1E contactors as per TU 3420-091-05758109-2016. They are used in control systems of lifting gear (elevators, cranes, etc.), fans, pumps, thermal curtains, furnaces, machines, lighting systems, in automatic traNCer switch (ATS) systems. Thermal relays OptiStart E LRE are Russian devices replacing those manufactured by Western vendors withdrawn from the market.

Selection table

Relay type	Relay current set-point range, A	Electric motor power, kW, at a voltage, V, 50/60 Hz			Fuse Coordination type 1		Compatibility with contactor									
		220/230	380/400	660/690	aM (A)	gG (A)	LC1E09	LC1E12	LC1E18	LC1E25	LC1E32	LC1E40	LC1E50	LC1E65	LC1E80	LC1E95
LRE01	0,1–0,16	–	–	–	0,25	2	•	•	•	•	•					
LRE02	0,16–0,25	–	0,06	–	0,5		•	•	•	•	•					
LRE03	0,25–0,4	–	0,09	–	1		•	•	•	•	•					
LRE04	0,4–0,63	–	0,18	0,25			•	•	•	•	•					
LRE05	0,63–1	–	0,25	0,55	2	4	•	•	•	•	•					
LRE06	1–1,6	–	0,55	0,75			•	•	•	•	•					
LRE07	1,6–2,5	0,37	0,75	1,5	4	6	•	•	•	•	•					
LRE08	2,5–4	0,75	1,5	3	6	10	•	•	•	•	•	–	–	–	–	–
LRE10	4,0–6	1,1	2,2	4	8	16	•	•	•	•	•					
LRE12	5,5–8	1,8	3	5,5	12	20	•	•	•	•	•					
LRE14	7–10	2,2	4	7,5			•	•	•	•	•					
LRE16	9–13	3	5,5	10	16	25		•	•	•	•					
LRE21	12–18	4	7,5	15	20	35			•	•	•					
LRE22	17–25	5,5	11	18,5	25	50				•	•					
LRE32	23–32	7,5	15	22	40	63					•					
LRE353	23–32	7,5	15	22								•	•	•	•	•
LRE355	30–40	11	18,5	30		100	–	–	–	–	–	•	•	•	•	•
LRE357	37–50	11	22	45	63								•	•	•	•
LRE359	48–65	18,5	30	55										•	•	•
LRE361	55–70	18,5	37	55	80	125						–	–		•	•
LRE363	63–80	22	37	55											•	•
LRE365	80–93	25	45	75		160									–	•

• Jointly
– Not jointly

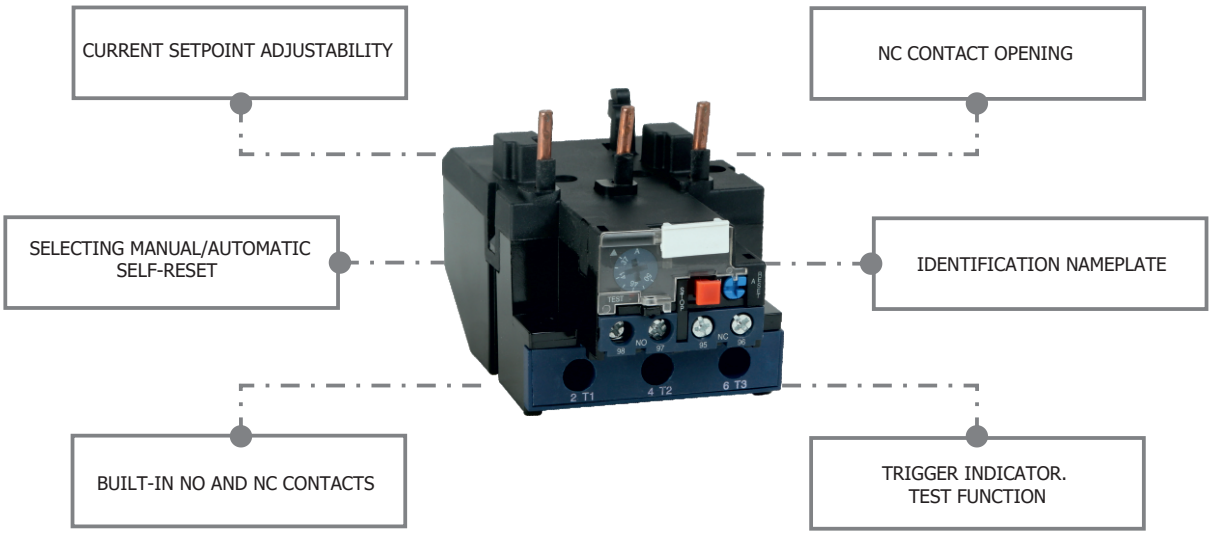
Designation

OptiStart E LRE 07 - 32A - (4-6A)

1 2 3 4 5

1	Series	OptiStart E	
2	Product type name	LRE — Thermal relay	
3	Designation of current setpoint	01, 02, 03, 04, 05, 06, 07, 08, 10, 12, 14, 16, 21, 22, 32	353, 355, 357, 359, 361, 363, 365
4	Relay rated current, A	32	93
5	Motor current setpoint range, A	0,1 to 32	23 to 93

Series advantages



Items

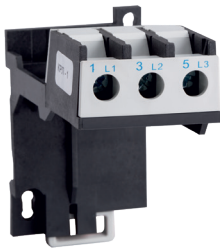
Appearance	Product type	Thermal release current setpoint range, A	Product name	Code	Weight, kg
	OptiStart E LRE01	0,1–0,16	Thermal relay OptiStart E LRE01-32A-(0,1-0,16A)	330313	0,17
	OptiStart E LRE02	0,16–0,32	Thermal relay OptiStart E LRE02-32A-(0,16-0,32A)	330314	
	OptiStart E LRE03	0,25–0,4	Thermal relay OptiStart E LRE03-32A-(0,25-0,4A)	330315	
	OptiStart E LRE04	0,4–0,63	Thermal relay OptiStart E LRE04-32A-(0,4-0,63A)	330316	
	OptiStart E LRE05	0,63–1	Thermal relay OptiStart E LRE05-32A-(0,63-1A)	330317	
	OptiStart E LRE06	1–1,6	Thermal relay OptiStart E LRE06-32A-(1-1,6A)	330318	
	OptiStart E LRE07	1,6–2,5	Thermal relay OptiStart E LRE07-32A-(1,6-2,5A)	330319	
	OptiStart E LRE08	2,5–4	Thermal relay OptiStart E LRE08-32A-(2,5-4A)	330320	
	OptiStart E LRE10	4–6	Thermal relay OptiStart E LRE10-32A-(4-6A)	330321	
	OptiStart E LRE12	5,5–8	Thermal relay OptiStart E LRE12-32A-(5,5-8A)	330322	
	OptiStart E LRE14	7–10	Thermal relay OptiStart E LRE14-32A-(7-10A)	330323	
	OptiStart E LRE16	9–13	Thermal relay OptiStart E LRE16-32A-(9-13A)	330324	
	OptiStart E LRE21	12–18	Thermal relay OptiStart E LRE21-32A-(12-18A)	330325	
	OptiStart E LRE22	17–25	Thermal relay OptiStart E LRE22-32A-(17-25A)	330326	
	OptiStart E LRE32	23–32	Thermal relay OptiStart E LRE32-32A-(23-32A)	330327	
	OptiStart E LRE353	23–32	Thermal relay OptiStart E LRE353-93A-(23-32A)	330328	0,25
	OptiStart E LRE355	30–40	Thermal relay OptiStart E LRE355-93A-(30-40A)	330329	
	OptiStart E LRE357	37–50	Thermal relay OptiStart E LRE357-93A-(37-50A)	330330	
	OptiStart E LRE359	48–65	Thermal relay OptiStart E LRE359-93A-(48-65A)	330331	
	OptiStart E LRE361	55–70	Thermal relay OptiStart E LRE361-93A-(55-70A)	330332	
	OptiStart E LRE363	63–80	Thermal relay OptiStart E LRE363-93A-(63-80A)	330333	
	OptiStart E LRE365	80–93	Thermal relay OptiStart E LRE365-93A-(80-93A)	330334	

Technical specification

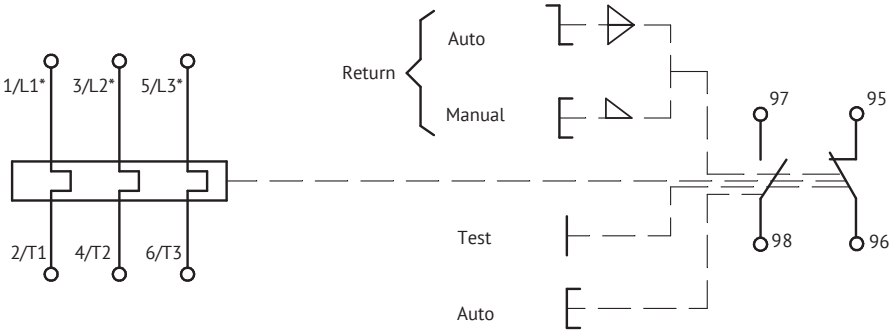
Type	LRE01	LRE02	LRE03	LRE04	LRE05	LRE06	LRE07	LRE10	LRE12	LRE14	LRE16	LRE21	LRE22	LRE32	LRE353	LRE355	LRE357	LRE359	LRE361	LRE363	LRE365
Trip time as per GOST IEC 60947-4-1 at an ambient temperature of 20 °C																					
Setpoint ratio																					
1,05																					
1,2																					
1,5																					
7,2																					
Trip time in case of phase interruption as per GOST IEC 60947-4-1 at an ambient temperature of 20 °C																					
Setpoint ratio																					
Any two phases																					
Three phases																					
1																					
0,9																					
1,15																					
0																					
Initial condition																					
Cold																					
Hot																					
Cold																					
—																					
> 2 h																					
< 2 h																					
< 4 min																					
2 s < Tp ≤ 10 s																					
Self-return to the initial position after tripping, min																					
1,5																					
Main circuit specifications																					
Rated insulation voltage Ui, V																					
690																					
Protection degree in accordance with GOST 14254																					
IP20																					
Rated operating voltage Ue, V																					
690																					
Trip class as per GOST IEC 60947-4-1																					
10 A																					
Temperature compensation, °C																					
-20 ÷ + 40																					
Conductor connection																					
Flexible cable with lug, mm²																					
1 conductor																					
1...4																					
4...35																					
Flexible cable without lug, mm²																					
1...6																					
Rigid cable, mm²																					
Auxiliary circuit specifications																					
Rated insulation voltage Ui, V																					
690																					
Insulation resistance, min, MOhm																					
10																					
Rated operating AC voltage, V																					
380																					
Rated operating voltage Ue, V																					
690																					
Conditional outdoor thermal current Ith, A																					
5																					
Rated operating current																					
AC-15																					
380 V																					
1,58																					
Short circuit protection, type gG fuse, A																					
5																					
Conductor connection																					
Flexible cable with lug, mm²																					
2 conductors																					
1...2,5																					
Flexible cable without lug, mm²																					
Rigid cable, mm²																					
Weight, max, kg																					
0,17																					
0,25																					

Accessories

Terminal blocks OptiStart E LAEB

Appearance	For thermal relay	Product name	Code
	LRE01-LRE32	Terminal block OptiStart E LAEB1 for relay LRE01-35	334525
	LRE353-LRE365	Terminal block OptiStart E LAEB3 for relay LRE322-365	334526

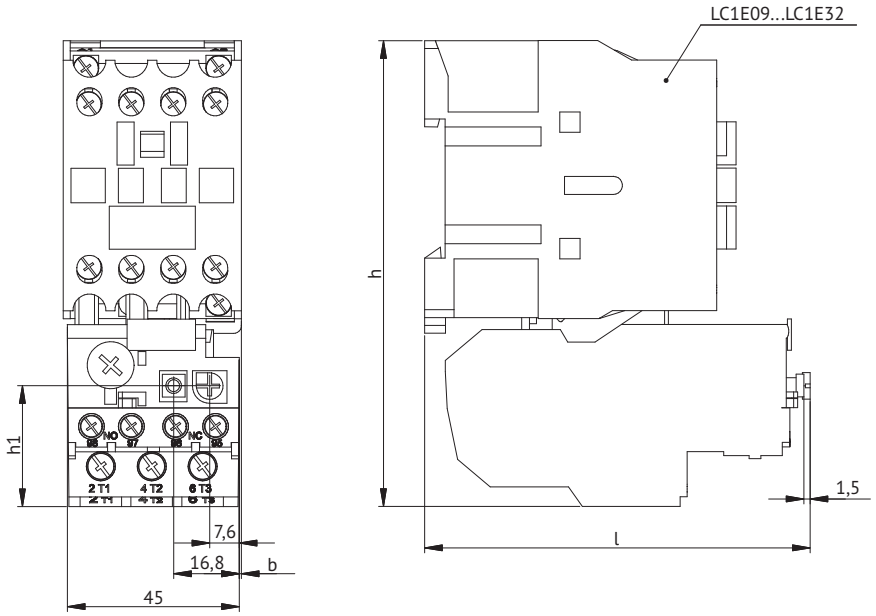
Electric schematic



*Designation

Overall dimensions (mm)

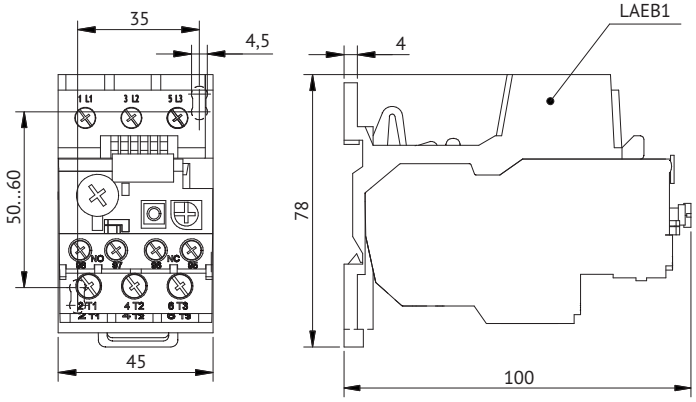
Relay LRE01 - LRE35



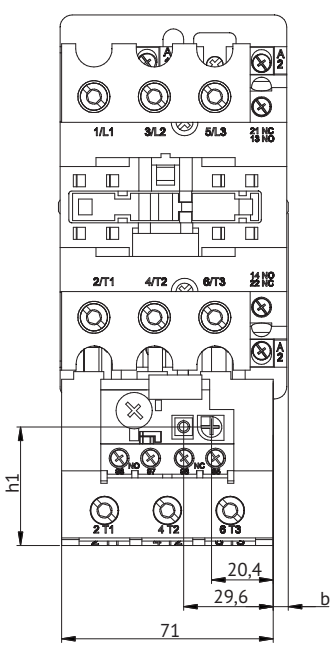
Installation directly under contactors LC1E06...35, connection using screw terminals.

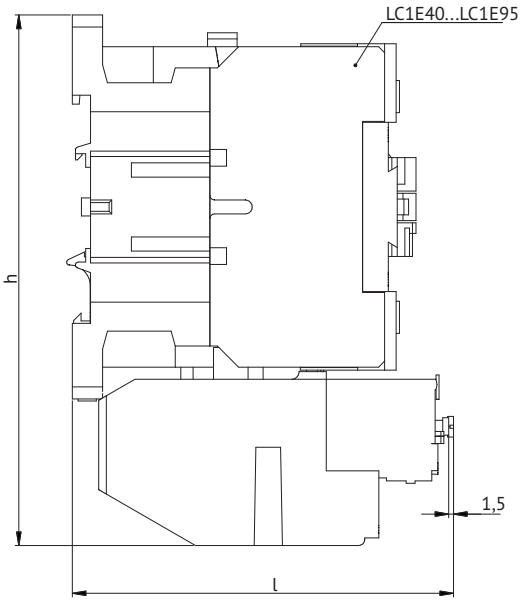
LRE01...LRE32				
With contactors	LC1E0910-LC1E1201	LC1E1810, LC1E1801	LC1E2510, LC1E2501	LC1E3210, LC1E3201
b	0,5	0	10,5	
h	120		129	
h1	31			
I	99,81		108,5	110,5

Relay LRE01 - LRE35, used with terminal block LAEB1



Relay LRE3**





Installation directly under contactors LC1E40...95, connection using screw terminals.

LRE353...LRE365		
With contactors	LC1E40...LC1E63	LC1E80...LC1E95
b	5	8,5
h	176	180
h1	39,2	
I	126	131,5

Relay LRE3***, used with terminal block LAEB3