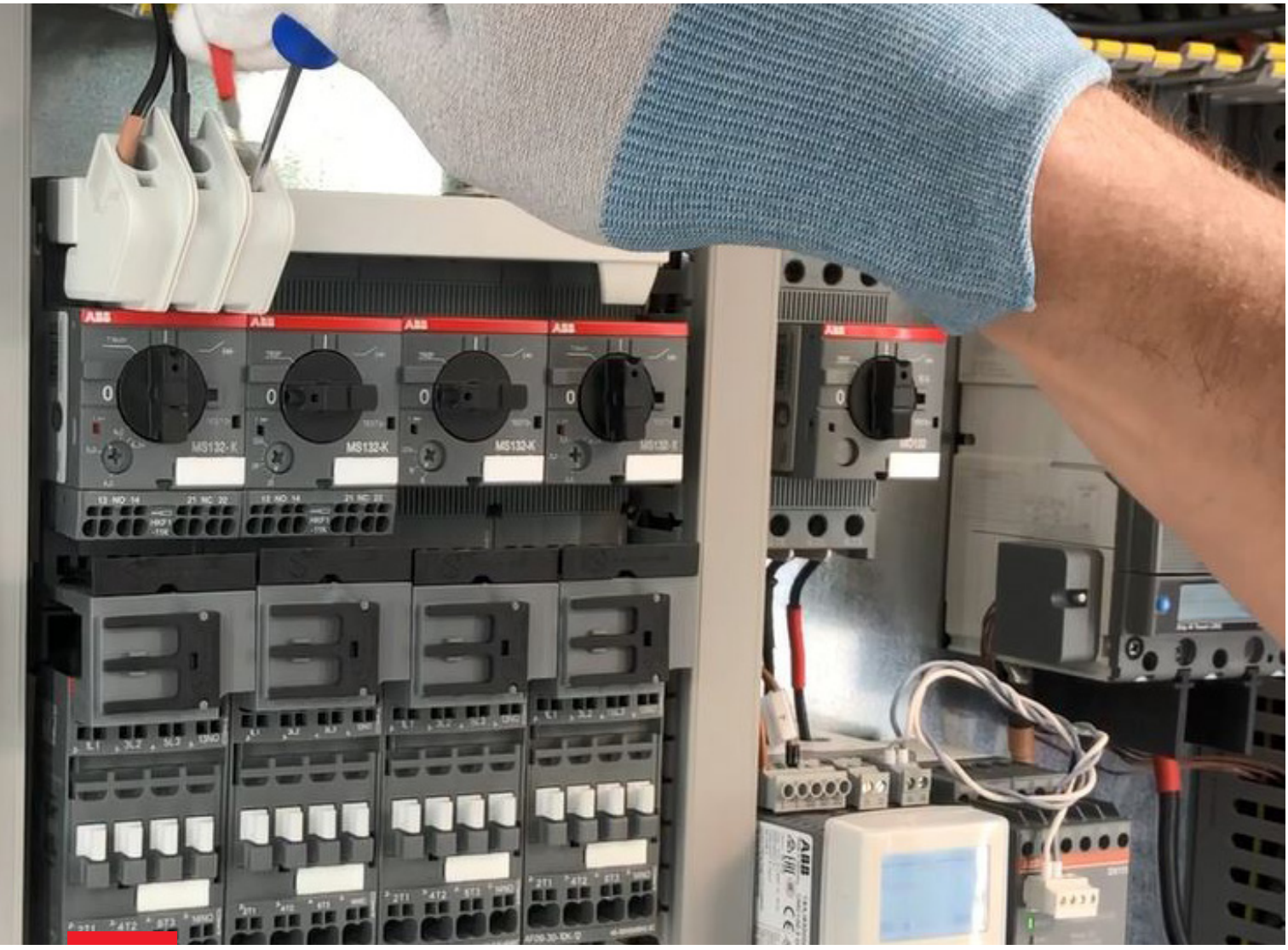


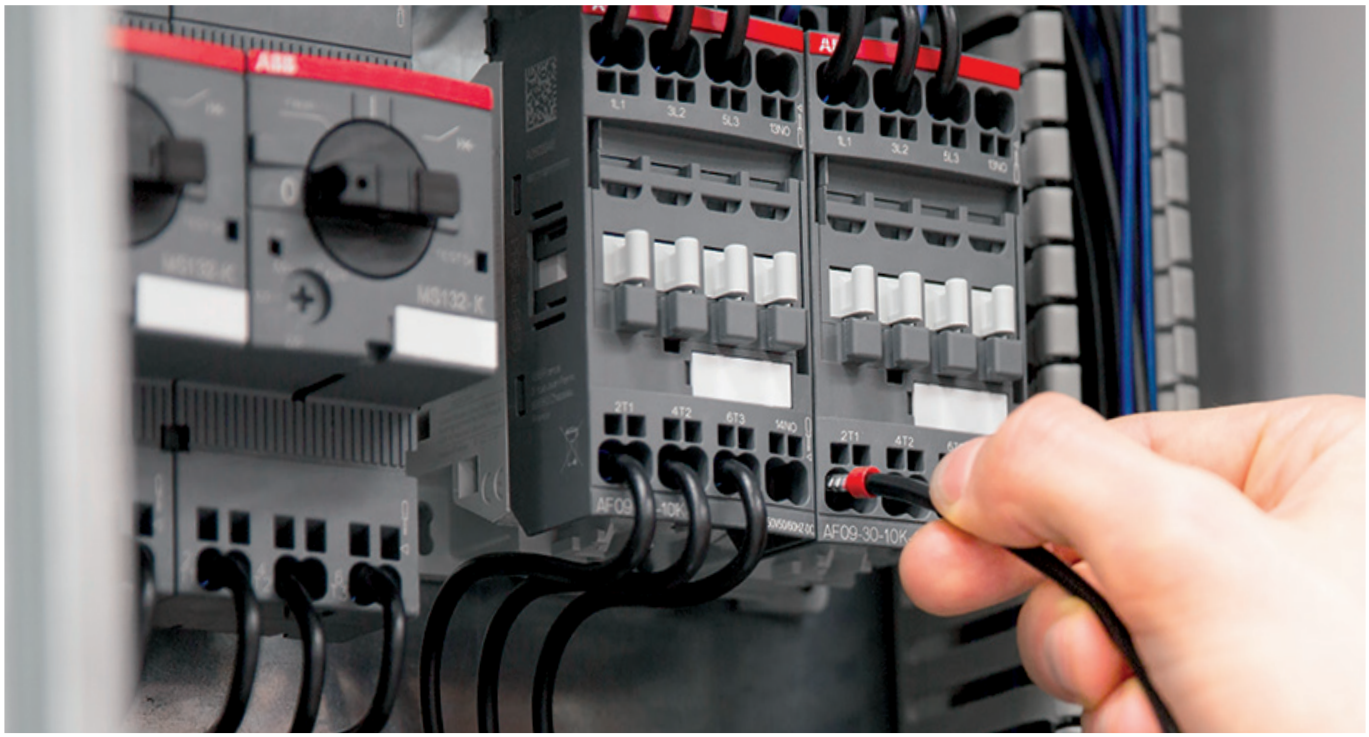
Just push it
Push-in Spring motor starting solution

- Faster than ever installation
- Easier than ever wiring
- Reliable as ever connections

With the new complete Push-in Spring motor starting solution, one push is all you need for extremely fast wiring. No tool is required, so you can save up to 50% wiring time with Push-in Spring compared to conventional spring solutions. And the connections are just as reliable. So for speed, ease and reliability, just push it.

Push-in Spring motor starting solution

Just push it
Push-in Spring motor starting solution



With the new complete Push-in Spring motor starting solution, one push is all you need for extremely fast wiring. No tool is required, so you can save up to 50% wiring time with Push-in Spring compared to conventional spring solutions. And the connections are just as reliable. So for speed, ease and reliability, just push it.

Speed up your projects

Faster than ever installation

Imagine a motor starting solution that's twice as fast to install. With Push-in Spring, you no longer need to imagine – it's a reality. Push-in mode allows you to insert both ferruled and rigid cables without the need to use any tools, boosting your productivity like never before.

Easy to install

Easier than ever wiring

Push-in Spring technology opens up new possibilities. With its unmatched ease of use, wiring becomes far more intuitive. This eliminates the need for special training and reduces the chance of wiring error. What possibilities will it open up for you?

Continuous operation

Reliable as ever connections

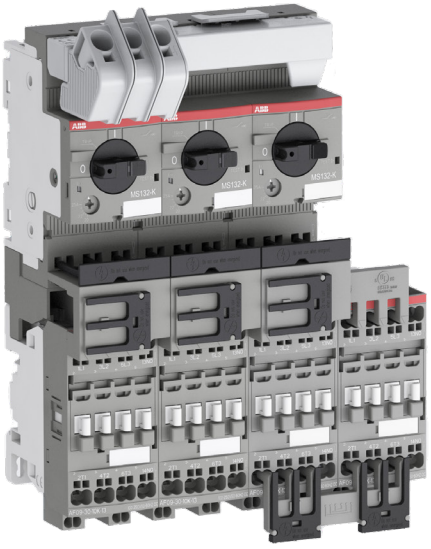
The speed and ease of Push-in Spring comes with the added reassurance of connections that are as reliable as ever. This gives you complete peace of mind when using the Push-in Spring motor starting solution.

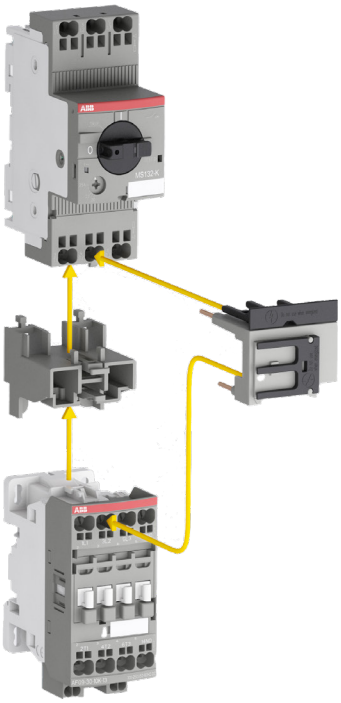
1SBC100212C0203_Push-in Spring catalog_2023

Just push it!

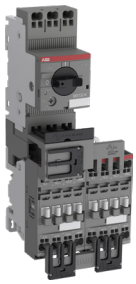
The next evolution in motor starter solutions is here.

So up to 18.5 kW, one push is all you need!

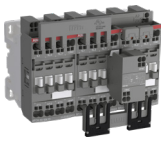




—
Direct on-line Starter



—
Reversing Starter



—
Star-Delta Starter

—
Save up to 50% wiring time with Push-in Spring compared to conventional spring solutions. And the connections are just as reliable. So for speed, ease and reliability, just push it.

Also available with Push-in technology

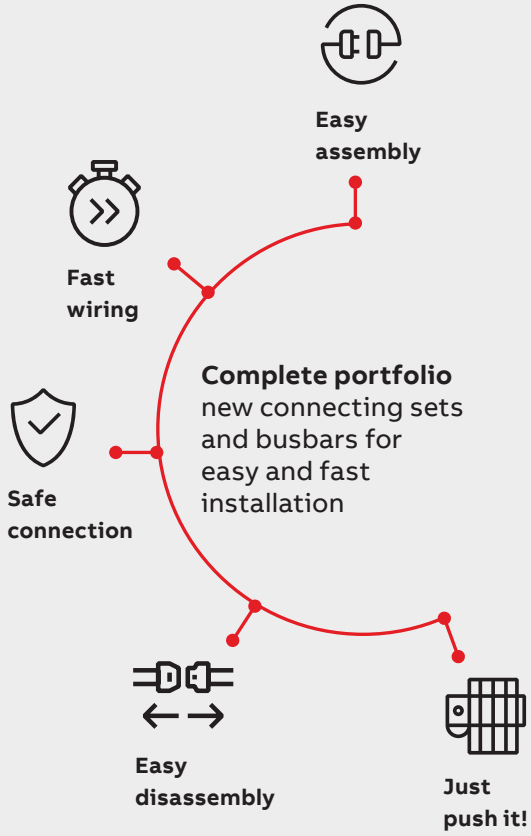
—
Sentry safety relays

—
Monitoring relays

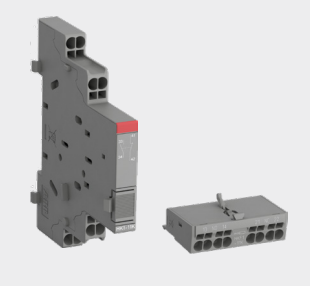
—
Time relays

Benefits / Features

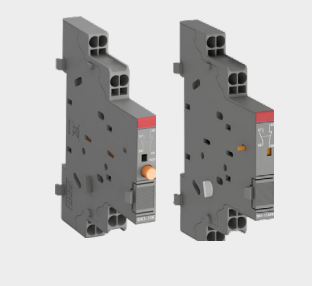
- Fast and intuitive wiring
- Tool-free mounting
- Vibration & shock proof
- Robust design for higher up-time
- Future proof connection technology
- Terminals accessible from the front
- One-hand mounting
- 2-in-1 Push-in / Spring
- Higher connection capacity
- No mounting plate required for starters
- Enabled for automated wiring



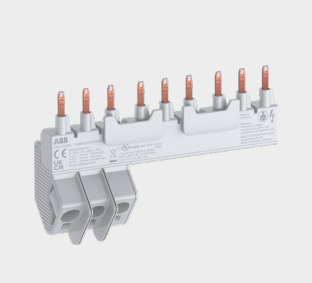
—
CA4..K, CAL4-11K 1, 2 and 4 pole auxiliary contacts



—
HK1-K, HKF1-K auxiliary contacts

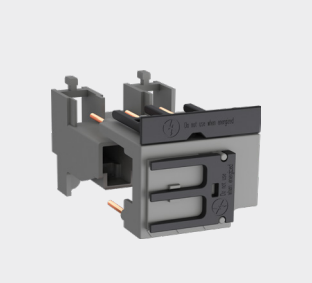


—
SK1-K and SK1-ARK signaling contacts

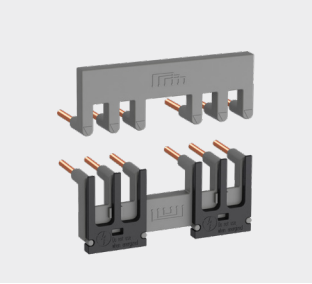


—
PS1-...-65K busbars for 2, 3, 4 or 5 manual motor starters

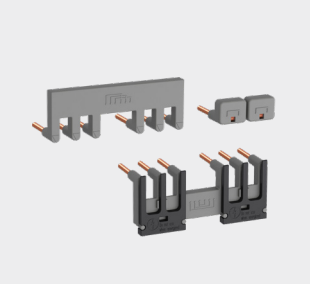
—
TS1-M3-K terminal spacer for UL Type E/F combination motor controllers



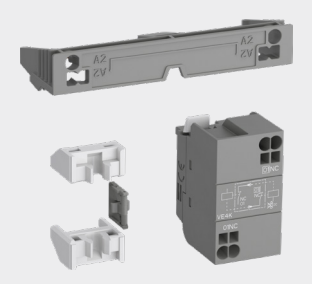
—
BEA16-4KF and BEA38-4KF connecting links with manual motor starters



—
BER16-4KF and BER38-4KF connecting links for reversing starters



—
BEY16-4KF and BEY38-4KF connection sets for Star-Delta starters

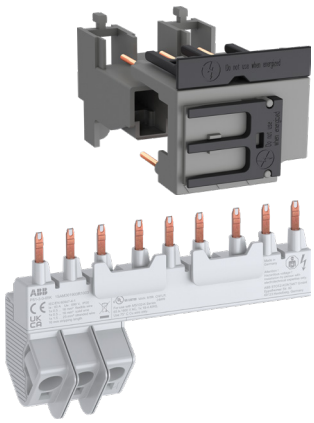


—
VEM4K electrical and mechanical interlock

Faster than ever installation

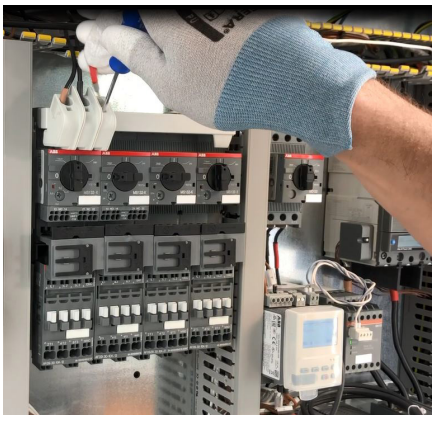
2-in-1 connection

For the very first time, ABB's 2-in-1 connection allows you to use ferruled and rigid cables (Push-in mode) or cables without ferrules (Spring mode) in the same terminal. In Push-in mode, cables can be inserted by just simply pushing them in by hand.



Smart accessories

100% tool-free connecting kits and busbars significantly reduce installation time.



Complete solution

High connection capacities are optimized for motor starting solutions up to 18.5 kW 400 V AC-3 and 50 A AC-1 (25 hp 480 V and 45 A general use). This includes short-circuit fuseless protection up to 100 kA. Push-in Spring accessories can be also mounted on the standard screw range of manual motor starters and contactors.

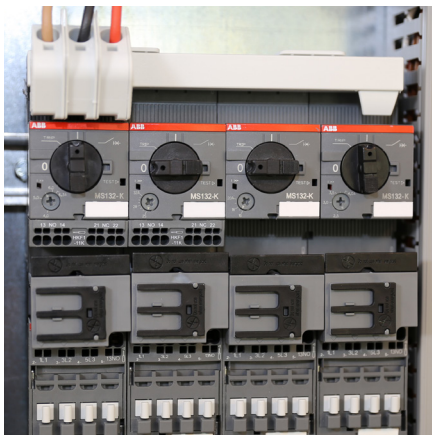
Easier than ever wiring

Intuitive wiring

With Push-in Spring, all cables, busbars and connecting links use the same round shape entry, whilst the square terminals are clearly marked with screwdriver symbols. The result? Wiring and de-wiring that’s intuitive and easily repeatable without cabling error, with little to no training required.

Just one screwdriver required

For de-wiring, only one screwdriver size is needed for the entire range. No twisting or turning is required either, so there's less chance of damage to the terminals and to your installation as a whole.

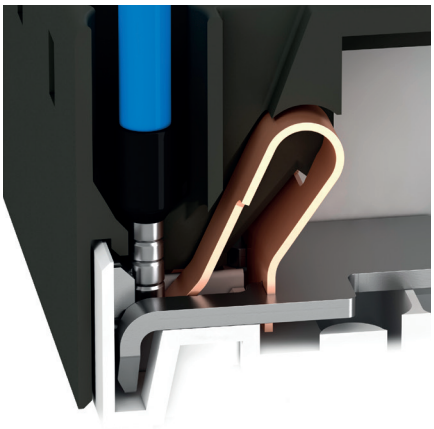


Automated wiring

The Push-in Spring motor starting solution features 90° cable insertion for all terminals. Front access to terminals aids smooth, robust insertion of cables and makes automated robot wiring possible.

1SBC100212C0203_Push-in Spring catalog_2023

Reliable as ever connections



Robust electrical contact

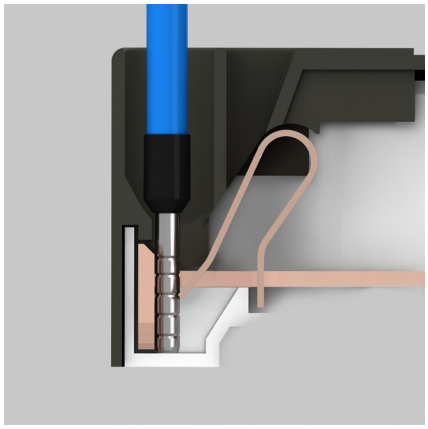
The special spring design guarantees excellent electrical contact. The design provides strict control of contact strength, independent from operator, giving you complete assurance.

Vibration-proof

You can count on Push-in Spring connections, even in harsh environments. Push-in Spring technology has been shock and vibration tested according to IEC 60068-2-27 and IEC 60068-2-6 standards.

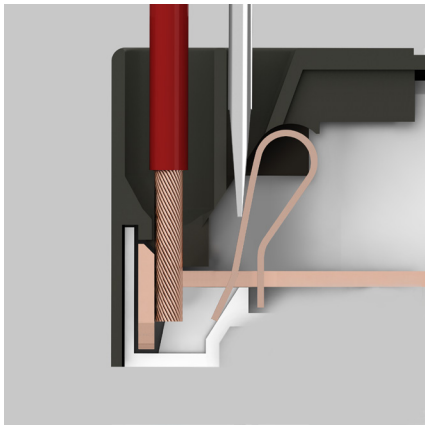
No need to re-tighten

With self-tightening terminals, there's no need to re-tighten after transportation or during the life cycle of the product. High connection strength is guaranteed throughout the whole lifetime of the device.



Push-in mode

Connect rigid cables or ferruled cables simply by pushing them into the cable holes – no need to use any tools. Push-in mode saves up to 50% wiring time compared to conventional spring solutions and makes installation a breeze. Benefit from intuitive wiring, self-tightening terminals and less chance of wiring error.

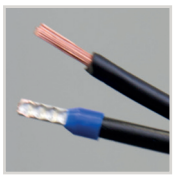


Spring Mode

This mode is used for small cable cross-sections or for cables without ferrules. It is also used for de-wiring the solution. Before inserting the cable, simply push a screwdriver into the clearly marked holes to open the terminal. ABB's Spring mode is easier to use than conventional spring technology, with less chance of damage to terminals as no twisting or turning is required.

Push-in Spring solution
Complete range, complete efficiency

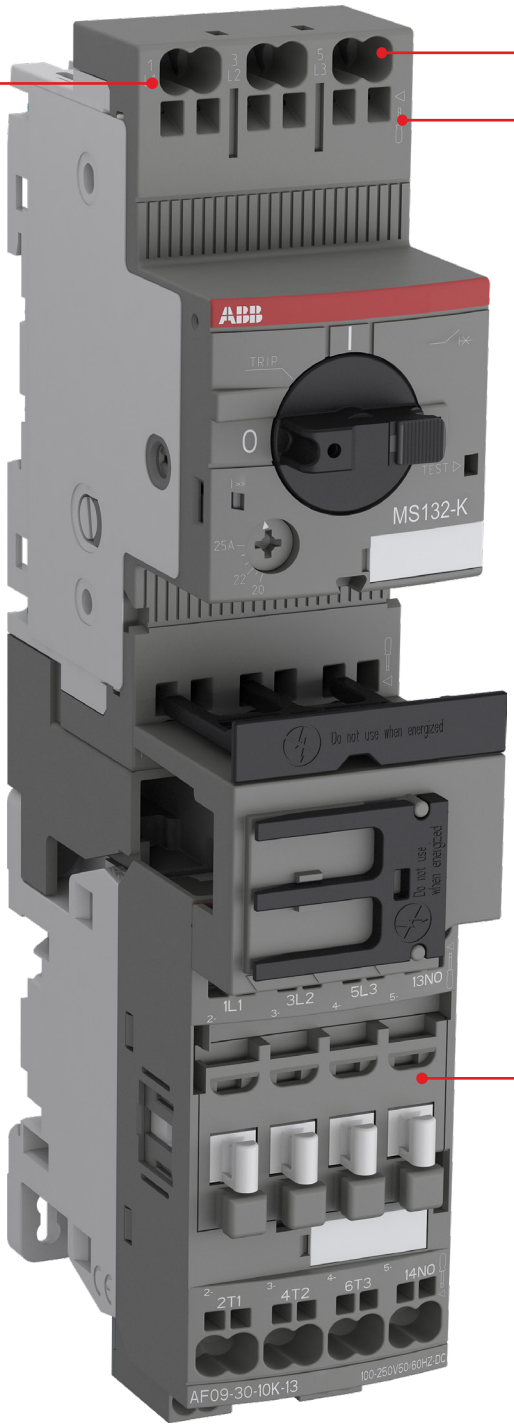
The Push-in Spring motor starting solution products provide you with a range of benefits.

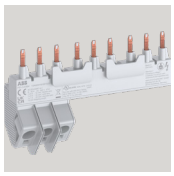


2-in-1
Benefit from both Push-in mode and Spring mode and use ferruled cables or cables without ferrules in the same terminal.

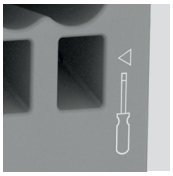
Tool-free connecting links
100% tool-free mounting connecting links.

Compatible with screw range
Mount accessories for control circuits on the screw range up to 45 kW AC-3 400 V on manual motor starters and up to 45 kW AC-3 400 V, 130 A AC-1 on contactors.





Tool-free busbars
Parallel connection of manual motor starters without the need for tools (also certified for UL Type E/ Type F applications)



Just one tool for everything
You only need a 3 mm screwdriver in Spring mode as well as for de-wiring the complete solution.

Higher connecting capacity
The solution ranges up to 18.5 kW 400 V AC-3 and 50 A AC-1 (25 hp 480 V and 45 A 600 V general use).

1SBC100212C0203_Push-in Spring catalog_2023

3-pole contactors and motor protection

AC / DC Control supply				Type	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
IEC	AC-3	Rated operational power	θ ≤ 60 °C, 380 - 400 V	kW	4	5.5	7.5	11	15	18.5
		Rated operational current	380 - 400 V	A	9	12	18	26	32	38
	AC-1	Rated operational current	θ ≤ 40 °C, 690 V	A	25	28	30	45	50	50
UL/CSA	3-phase Motor Rating		440 - 480 V	hp	5	7.5	10	15	20	25
	General Use Rating		600 V	A	25	28	30	42	45	45
NEMA	NEMA size				00	0	–	1	–	–

Main accessories for contactors

Auxiliary contact blocks		Front mounting	CA4-10K (1 N.O.) CA4-01K (1 N.C.)
		Side mounting	CAL4-11K
Interlocking units		Mechanical	VM4
		Mechanical / Electrical	VEM4K
Surge protection			Built-in surge protection

Main accessories for manual motor starters

Connecting link for contactor mounting		BEA16-4KF	BEA38-4KF
Auxiliary contact blocks	Front mounting	HKF1-..K (1 N.O. + 1N.C.) (2 N.O.)	
	Side mounting	HK1-..K (1 N.O. + 1N.C.) (2 N.O.) (2 N.C.)	
Signaling contact	For trip alarm	SK1-..K (1 N.O. + 1N.C.) (2 N.O.) (2 N.C.)	

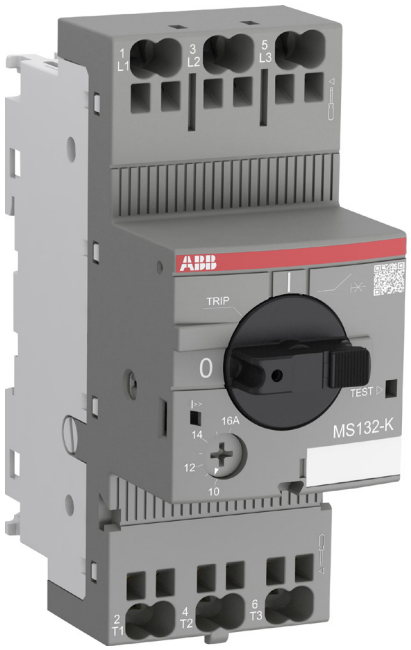
1SBC100212C0203_Push-in Spring catalog_2023

4-pole contactors and motor protection

IEC	AC-1 Rated operational power	θ ≤ 40 °C, 690 V	A	25	30
UL / CSA	General Use Rating	600 V	A	25	30
AC / DC Control supply			Type	**AF09..K**	**AF16..K**
AC Control supply			Type	**AF09..K**	**AF16..K**
DC Control supply			Type	**AF09..K**	**AF16..K**
IEC	AC-1 Rated operational current 690 V	θ ≤ 40 °C	A	25	30
		θ ≤ 60 °C	A	25	30
		θ ≤ 70 °C	A	22	26
	with contactor cross sectional area		mm^2	4	6
	Rated operational voltage Ue max.		V	690	690

Main accessories for contactors

Auxiliary contact blocks	Front mounting	**CA4-10K** (1 N.O.), **CA4-01K** (1 N.C.)
	Side mounting	**CAL4-11K** (1 N.O. + 1 N.C.)
Timers	Electronic	**TEF 4S-ON** **TEF 4S-OFF**
Interlocking units	Mechanical	**VM4**
	Mechanical / Electrical	**VEM4K**
Surge protection	Varistor + RC (AC 7 DC)	Built-in surge protection


1
L1
3
L2
5
L3
ABB
TRIP
0
TEST
16A
14
12
10
MS132-K
2
T1
4
T2
6
T3

Manual motor starters

MS132-K manual motor starters with Push-in Spring terminals

0.10 to 32 A – with thermal and electromagnetic protection

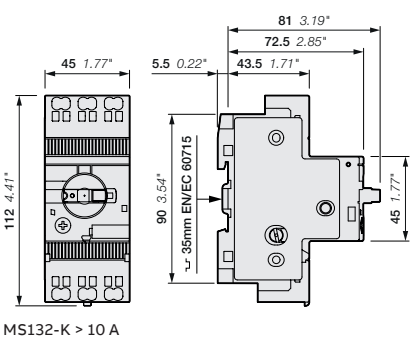
The MS132-K series is a compact and powerful range for motor protection up to 15 kW (400 V) / 32 A with a width of only 45 mm. The innovative Push-in Spring terminals enable tool-free wiring and eliminate the need for routine re-tightening.

The MS132-K also has a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication.

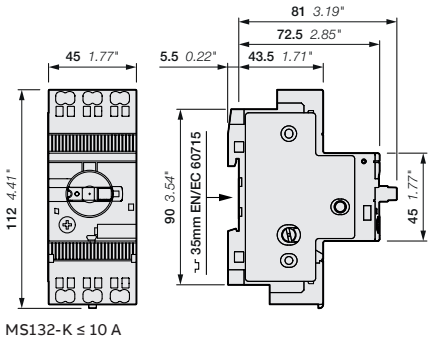
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, terminal spacers and busbars are available as accessory. These are suitable throughout the MS116/MS132/MS165-range.

Rated operational power 400 V AC-3	Setting range	Short-circuit breaking capacity ICS at 400 V AC	Rated instantaneous short-circuit current setting I_i	Type	Order code	Weight (1 pce)
kW	A	kA	A			kg
0.03(1)	0.10 ... 0.16	100	2.00	MS132-0.16K	1SAM350010R1001	0.256
0.06	0.16 ... 0.25	100	3.10	MS132-0.25K	1SAM350010R1002	0.256
0.09	0.25 ... 0.40	100	5.00	MS132-0.4K	1SAM350010R1003	0.256
0.18	0.40 ... 0.63	100	7.90	MS132-0.63K	1SAM350010R1004	0.256
0.25	0.63 ... 1.00	100	12.5	MS132-1.0K	1SAM350010R1005	0.256
0.55	1.00 ... 1.60	100	20.0	MS132-1.6K	1SAM350010R1006	0.298
0.75	1.60 ... 2.50	100	31.3	MS132-2.5K	1SAM350010R1007	0.280
1.50	2.50 ... 4.00	100	50.0	MS132-4.0K	1SAM350010R1008	0.286
2.20	4.00 ... 6.30	100	78.8	MS132-6.3K	1SAM350010R1009	0.289
4.00	6.30 ... 10.0	100	150	MS132-10K	1SAM350010R1010	0.296
5.50	10.0 ... 16.0	100	240	MS132-16K	1SAM350010R1011	0.316
7.50	16.0 ... 20.0	100	300	MS132-20K	1SAM350010R1013	0.317
11.0	20.0 ... 25.0	50	375	MS132-25K	1SAM350010R1014	0.316
15.0	25.0 ... 32.0	25	480	MS132-32K	1SAM350010R1015	0.316

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.
(1) 690 V



MS132-K > 10 A



MS132-K ≤ 10 A

Main dimensions mm, inches

MS132-K manual motor starters with Push-in Spring terminals

Technical data

Main circuit – Utilization characteristics according to IEC/EN

Type	MS132-K
Standards	IEC/EN 60947-1; IEC/EN 60947-2; IEC/EN 60947-4-1
Rated operational voltage U_e	690 V AC; 250 V DC
Rated frequency	DC, 50/60 Hz
Operating frequency	0 ... 400 Hz
Trip class	10
Number of poles	3
Duty time	100 %
Mechanical durability	100000 cycles
Electrical durability	50000 cycles
Rated impulse withstand voltage U_{imp}	6 kV
Rated insulation voltage U_i	690 V
Rated operational current I_e	See ordering details
Rated operational current DC-5 I_e 3 conducting paths in series up to 250 V	See ordering details
Rated instantaneous short-circuit current setting I_i	See ordering details
Rated service short-circuit breaking capacity I_{cs}	See table "Short-circuit breaking capacity and back-up fuses"
Rated ultimate short-circuit breaking capacity I_{cu}	See table "Short-circuit breaking capacity and back-up fuses"
Rated service short-circuit breaking capacity DC I_{cs} 3 conducting paths in series up to 250 V	10 kA

Short-circuit breaking capacity and back-up fuses

I_{cs} Rated service short-circuit breaking capacity
I_{cu} Rated ultimate short-circuit breaking capacity
$I_q(I_{cc})$ Rated conditional short-circuit current

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM	I_{cs}	I_{cu}	gG, aM
	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
MS132-0.16K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-0.25K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-0.4K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-0.63K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-1.0K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-1.6K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-2.5K	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-4.0K	100	100	- (1)	100	100	- (1)	30	30	35 (2)	20	20	35 (2)	3	3	32 (2)
MS132-6.3K	100	100	- (1)	100	100	- (1)	30	30	63 (2)	20	20	63 (2)	3	3	50 (2)
MS132-10K	100	100	- (1)	100	100	- (1)	30	30	100 (2)	20	20	100 (2)	3	3	50 (2)
MS132-16K	100	100	- (1)	100	100	- (1)	30	30	125 (2)	20	20	125 (2)	3	3	63 (2)
MS132-20K	100	100	- (1)	100	100	- (1)	30	30	125 (2)	20	20	125 (2)	3	3	80 (2)
MS132-25K	50	50	125 (2)	50	50	125 (2)	30	30	125 (2)	10	10	125 (2)	3	3	100 (2)
MS132-32K	30	50	125 (2)	30	50	125 (2)	30	30	125 (2)	10	10	125 (2)	3	3	100 (2)

(1) No back-up fuse required, because short-circuit proof up to I_{cu}
(2) Maximum rated current of the back-up fuse for short circuit up to 100 kA if $I_{cc} > I_{cs}$

MS132-K manual motor starters with Push-in Spring terminals

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type		MS132-K
Standards		UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)
Rated operational voltage Ue acc. to UL/CSA		600 V AC
Trip class		10
Motor ratings (1)	Horsepower	See table "Motor ratings, three phase"
	Full Load Amps (FLA)	See table "Motor ratings, three phase"
	Locked Rotor Amps (LRA)	See table "Motor ratings, three phase"

(1) See product data sheets for UL/CSA single phase motor and general use (AC-1) ratings.

UL/CSA ratings overview

Type	MS132-K
Manual Motor Controller	x
Manual Motor Controller, Suitable as Motor Disconnect	x
Manual Motor Controller, Suitable for use in Group Installations	x
Manual Motor Controller, Suitable for Tap Conductor Protection in Group Installations	x
Manual self-protected Combination Motor Controller (Type E)	x
Combination Motor Controller (Type F)	x

UL/CSA Motor ratings, three phase – MS132-K

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS132-0.16K	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS132-0.25K	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS132-0.40K	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS132-0.63K	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS132-1.0K	-	1	6	-	1	6	-	1	6	-	1	6	1/2	1	6
MS132-1.6K	-	1.6	9.6	-	1.6	9.6	-	1.6	9.6	3/4	1.6	9.6	3/4	1.6	9.6
MS132-2.5K	1/2	2.5	15	1/2	2.5	15	1/2	2.5	15	1	2.5	15	1-1/2	2.5	15
MS132-4.0K	3/4	4	24	3/4	4	24	1	4	24	2	4	24	3	3.9	25.6
MS132-6.3K	1	6.3	37.8	1	6.3	37.8	1 1/2	6.3	37.8	3	4.8	32	5	6.1	36.8
MS132-10K	2	7.8	57.5	2	7.5	55	3	9.6	64	5	7.6	46	7 1/2	9	50.8
MS132-16K	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS132-20K	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS132-25K	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS132-32K	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	25	27	146

UL/CSA Maximum short-circuit current ratings – MS132-K

Type	Manual Motor Controllers Branch circuit protection, max. size per NEC/CEC (1)		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Combination Motor Controller (Type E) [1]	
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
MS132-0.16K	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	47	65	47	65	47	65	47
MS132-0.25K			65	47	65	47	65	47	65	47
MS132-0.40K			65	47	65	47	65	47	65	47
MS132-0.63K			65	47	65	47	65	47	65	47
MS132-1.0K			65	47	65	47	65	47	65	47
MS132-1.6K			65	47	65	47	65	47	65	47
MS132-2.5K			65	47	65	47	65	47	65	47
MS132-4.0K			65	47	65	47	65	47	65	47
MS132-6.3K			65	18	65	35	65	18	65	18
MS132-10K			65	18	65	35	65	18	65	18
MS132-16K			30	18	35	35	30	18	30	-
MS132-20K			30	18	35	35	30	18	30	-
MS132-25K			30	18	35	35	30	18	30	-
MS132-32K			30	18	35	35	30	18	30	-

Combination Motor Controller Type F[1]

Type 2 Coordination

Type	480Y / 277 V kA	Contactor	600Y / 347 V kA	Contactor
MS132-0.16K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-0.25K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-0.40K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-0.63K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-1.0K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-1.6K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-2.5K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-4.0K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-6.3K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-10K	65	AF26 ... AF38	47	AF26 ... AF38
MS132-16K	30	AF26 ... AF38	–	–
MS132-20K	30	AF26 ... AF38	–	–
MS132-25K	30	AF26 ... AF38	–	–
MS132-32K	30	AF26 ... AF38	–	–

Combination Motor Controller Type F[1]

Type 1 Coordination

Type	480Y / 277 V kA	Contactor	600Y / 347 V kA	Contactor
MS132-0.16K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-0.25K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-0.40K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-0.63K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-1.0K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-1.6K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-2.5K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-4.0K	100	AF09 ... AF38	50	AF09 ... AF38
MS132-6.3K	100	AF09 ... AF38	47	AF09 ... AF38
MS132-10K	100	AF09 ... AF38	30	AF09 ... AF38
MS132-16K	65	AF26 ... AF38	30	AF26 ... AF38
MS132-20K	65	AF26 ... AF38	–	–
MS132-25K	50	AF26 ... AF38	–	–
MS132-32K	50	AF38	–	–

[1] MS132-K in combination with terminal spacer TS1-M3-K or PS1-xx-65K busbars

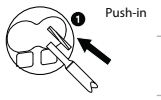
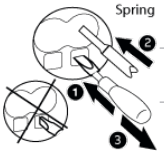
MS132-K manual motor starters with Push-in Spring terminals

Technical data

General technical data

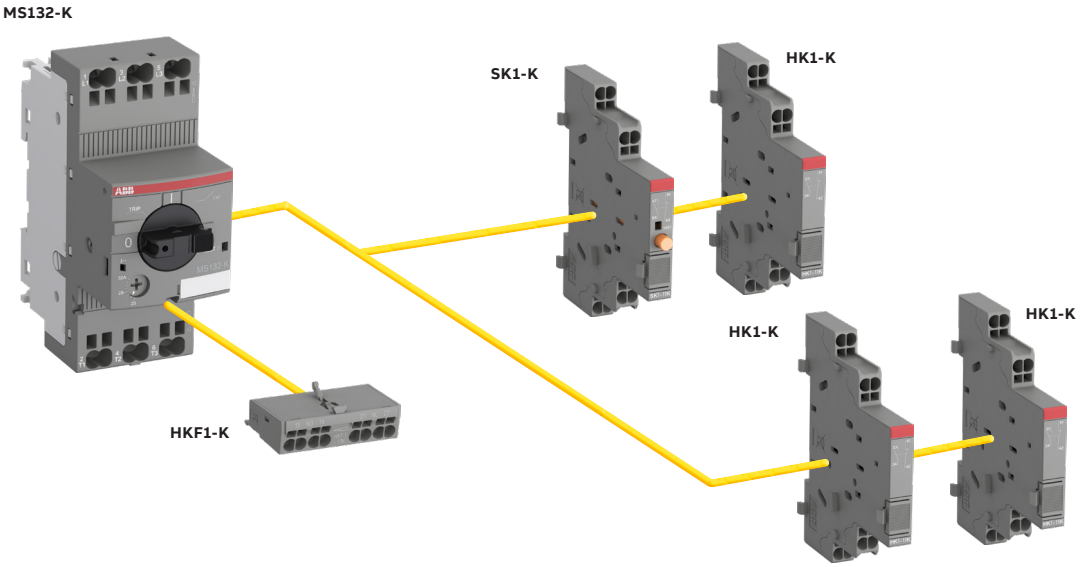
Type		MS132-K
Pollution degree		3
Phase loss sensitive		Yes
Disconnect function acc. to IEC/EN 60947-2		Yes
Ambient air temperature		
Operation	Open - compensated	-25 ... +60 °C
	Open	-25 ... +70 °C
	Enclosed (IB132)	0 ... +40 °C
Storage		-50 ... +80 °C
Ambient air temperature compensation		Acc. to IEC/EN60947-4-1
Maximum operating altitude permissible		2000 m
Resistance to shock acc. to IEC 60068-2-27		25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6		5g / 3 ... 150 Hz
Mounting position		Position 1-6
Mounting on DIN rail		acc. to IEC 60715
Group mounting		On request
Minimum distance to other units same type	Horizontal	0 mm
	Vertical	150 mm
Minimum distance to electrical conductive board	Horizontal, up to 400 V	0 mm
	Horizontal, up to 690 V	> 1.5 mm
	Vertical	75 mm
Degree of protection	Housing	IP20
	Main circuit terminals	IP20

Connecting characteristics - Main circuit

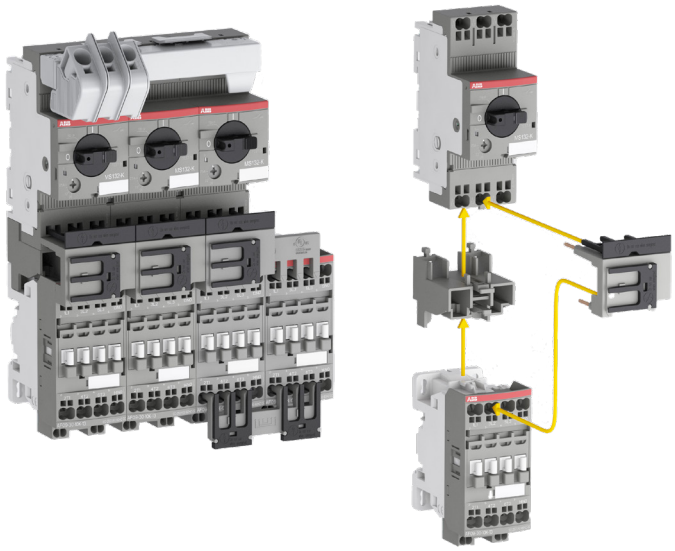
Manual motor starter type			MS132-K/MS132-KT
		1 x 2 x	1 ... 6 mm ²/AWG 10 ... 8
		1 x 2 x	1 ... 2.5 mm ²
		1 x 2 x	1 ... 4 mm ²
		1 x 2 x	1 ... 4 mm ² 1 ... 25 mm ²
		1 x 2 x	-
		1 x 2 x	1 ... 6 mm ²/AWG 18... 8 1 ... 6 mm ²/AWG 18...10
		1 x 2 x	1 ... 2.5 mm ²
		1 x 2 x	0.5 ... 4 mm ²
		1 x 2 x	0.5 ... 4mm ² 0.5 ... 2.5 mm ²
		1 x 2 x	-
		1 x 2 x	Ø 3 mm x 0.5
		1 x 2 x	12 mm

MS132-K

Main accessories



Note: SK1-K, HK1-K and HKF1-K are also suitable for manual motor startes with screw terminals.



MS132-K

Main accessories with Push-in Spring terminals

MS132-K can be equipped with auxiliary contacts for lateral and front mounting as well as signaling contacts for lateral mounting. The accessories are equipped with Push-in Spring terminals that enable tool-free wiring. A variety of combinations is possible as required for the application. The auxiliary contacts change position with the main contacts. The signaling contact SK1 signals tripping regardless if it was caused by short-circuit or overload. These main accessories are suitable throughout the MS116/MS132/MS165-range.

HKF1-11K

HK1-11K

SK1-11K

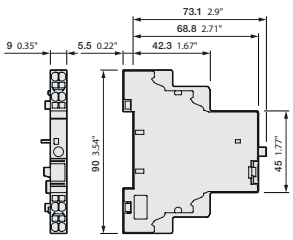
SK1-ARK

Auxiliary contacts

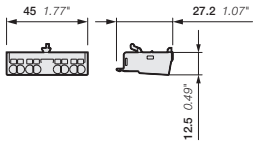
Suitable for	Auxiliary contacts NO	Auxiliary contacts NC	Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Mountable on the front							
MS116, MS132, MS165 MO132, MO165, MS132-T, MS132-K	1	1		HKF1-11K	1SAM201901R1201	10	0.016
	2	0		HKF1-20K	1SAM201901R1202	10	0.016
Mountable on the right							
MS116, MS132, MS165 MO132, MO165, MS132-T, MS132-K	1	1		HK1-11K	1SAM201902R1201	2	0.035
	2	0		HK1-20K	1SAM201902R1202	2	0.035
	0	2		HK1-02K	1SAM201902R1203	2	0.035
	2	0	with 2 leading contacts	HK1-20LK	1SAM201902R1204	2	0.035

Signaling contacts - mountable on the right

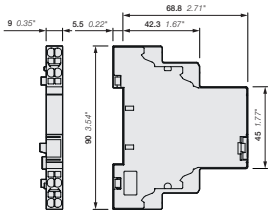
Suitable for	Auxiliary contacts NO	Auxiliary contacts NC	Type	Order code	Pkg qty	Weight (1 pce) kg
MS116, MS132, MS165 MO132, MO165, MS132-T, MS132-K	1	1	SK1-11K	1SAM201903R1201	2	0.035
	2	0	SK1-20K	1SAM201903R1202	2	0.035
	0	2	SK1- 02K	1SAM201903R1203	2	0.035
	1	1	SK1-11ARK	1SAM201903R1204	2	0.035
	2	0	SK1-20ARK	1SAM201903R1205	2	0.035
	0	2	SK1-02ARK	1SAM201903R1206	2	0.035



SK1-K



HKF1-K



HK1-K, SK1-ARK

Main dimensions mm, inches

MS132-K

Technical data

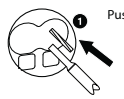
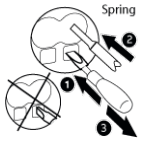
General technical data

Type		HK1-K, SK1-K	HKF1-K
Standards		IEC/EN 60947-1, IEC/EN 60947-5-1	
Rated operational voltage U_e		690 V AC, 600 V DC	250 V AC / 250 V DC
Conventional free-air thermal current I_{th}		6 A	5 A
Rated frequency		DC, 50/60 Hz	
Rated impulse withstand voltage U_{imp}		6 kV	
Rated insulation voltage U_i		690 V AC	250 V AC
Pollution degree		3	
Ambient air temperature	Operation	-25 ... +60 °C	
	Storage	-50 ... +80 °C	
Resistance to shock acc. to IEC 60068-2-27		25 g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6		5 g / 3... 150 Hz	
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category	24 V, 120 V	6 A	3 A
	240 V	4 A	1.5 A
	400 V	3 A	-
	690 V	1 A	-
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category	24 V	2 A	1 A
	125 V	0.55 A	0.27 A
	250 V	0.27 A	0.11 A
	440 V, 600 V	0.15 A	-
Minimum switching capacity		17 V / 5 mA	
Short-circuit protective device	N.C., 95-96	10 A Type gG	
	N.O., 97-98	10 A Type gG	
Duty time		100 %	
Mounting		Right side of Manual Motor Starter/ MS132-K	Front of Manual Motor Starter / MS132-K
Mounting position		1 to 6	
Mechanical durability		100 000 cycles	-
Electrical durability		100 000 cycles	-

Contact utilization characteristics according to UL/CSA

Type	HK1-K, SK1-K	HKF1-K
Standards	UL /CSA 60947-1, UL/CSA 60947-4-1 (UL 508), (CSA C22.2 No. 14)	
Rated operational voltage Ue acc. to UL/CSA	600 V AC / 600 V DC	250 V AC / 250 V DC
Pilot duty	B600, Q600	B300, R300
AC thermal rated current	5 A	5 A
AC maximum volt-ampere making	7200 VA	3600 VA
AC maximum volt-ampere breaking	720 VA	360 VA
DC thermal rated current	2.5 A	2.5 A
DC maximum volt-ampere making-breaking	69 VA	69 VA

Connecting characteristics - Auxiliary circuit

Type		HK1-K, SK1-K, HKF1-K
	1 or 2 x	1 ... 2.5 mm²/AWG 14
	1 or 2 x	1 ... 2.5 mm²
	1 or 2 x	1 ... 2.5 mm²
	1 or 2 x	1 ... 1.5 mm²
	1 or 2 x	-
	1 or 2 x	1 ... 2.5 mm²/AWG 20...14
	1 or 2 x	1 ... 2.5 mm²
	1 or 2 x	0.5 ... 2.5 mm²
	1 or 2 x	0.5 ... 2.5 mm²
	1 or 2 x	0.5 ... 1.5 mm²
	1 or 2 x	Ø 3 mm / x 0.5
	1 or 2 x	12 mm

Accessories with Push-in Spring terminals

MS132-K, MS132-KT

9PAA0000085255

PS1-2-0-65K

9PAA0000085240

PS1-5-0-65K

Three-phase busbars with Push-in Spring terminals

Three-phase busbars ensure a quick and safe connection and are therefore a cost effective solution. Busbars with Push-in Spring terminals enable tool-free wiring and eliminate the need for routine re-tightening. Between 2 and 5 manual motor starters with none or one lateral auxiliary contact can be connected.

Suitable for	Rated operational current A	No. of manual motor starters	No. of lateral auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
MS132-K, MS132-KT	65	2	0	PS1-2-0-65K	1SAM301903R1002	1	0.089 kg
	65	3	0	PS1-3-0-65K	1SAM301903R1003	1	0.093 kg
	65	4	0	PS1-4-0-65K	1SAM301903R1004	1	0.114 kg
	65	5	0	PS1-5-0-65K	1SAM301903R1005	1	0.122 kg
	65	2	1	PS1-2-1-65K	1SAM301903R1012	1	0.139 kg
	65	3	1	PS1-3-1-65K	1SAM301903R1013	1	0.150 kg
	65	4	1	PS1-4-1-65K	1SAM301903R1014	1	0.163 kg
	65	5	1	PS1-5-1-65K	1SAM301903R1015	1	0.177 kg

9PAA0000014929

TS1-M3-K

Terminal spacers, Type E/F

Suitable for	Description	Type	Order Code	Pkg qty	Weight (1 pce)
MS132-K, MS132-KT	UL/CSA Type E/F and IEC	TS1-M3-K	1SAM301913R1001	1	0.012 kg

9PAA0000085267

BS1-K

Additional accesories

Suitable for	Description	Type	Order Code	Pkg qty	Weight (1 pce) kg
MS132-K, MS132-KT	Protection cover for PS1-K busbar	BS1-K	1SAM301904R1D01	1	0.002 kg
	Padlock + two keys	SA2	GJF1101903R0002	1	0.020 kg

2CDC241023F0013

SA2

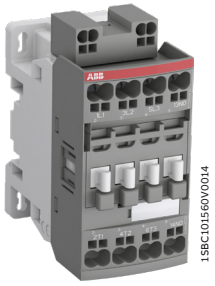

ABB
1L1
3L2
5L3
13NO
2T1
4T2
6T3
14NO
ABB
1 L1
3 L2
5 L3
2 T1
4 T2
6 T3

3-pole contactors

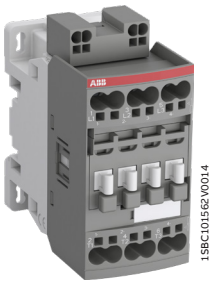
AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

AC / DC operated



AF09-30-10K

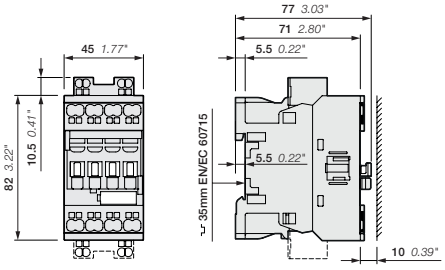


AF26-30-00K

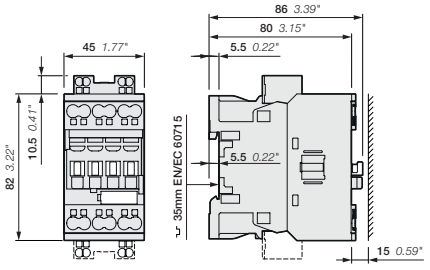
AF09..K ... AF38..K contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power	current θ ≤ 40 °C	3-phase motor rating	General use rating						Pkg (1 pce)
400 V		480 V	600 V AC						
AC-3	AC-1								
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	24 ... 60	20 ... 60	1 0	AF09-30-10K-11	1SBL137005R1110	0.285
						0 1	AF09-30-01K-11	1SBL137005R1101	0.285
				48 ... 130	48 ... 130	1 0	AF09-30-10K-12	1SBL137005R1210	0.285
						0 1	AF09-30-01K-12	1SBL137005R1201	0.285
				100 ... 250	100 ... 250	1 0	AF09-30-10K-13	1SBL137005R1310	0.285
						0 1	AF09-30-01K-13	1SBL137005R1301	0.285
				250 ... 500	250 ... 500	1 0	AF09-30-10K-14	1SBL137005R1410	0.325
						0 1	AF09-30-01K-14	1SBL137005R1401	0.325
5.5	28	7.5	28	24 ... 60	20 ... 60	1 0	AF12-30-10K-11	1SBL157005R1110	0.285
						0 1	AF12-30-01K-11	1SBL157005R1101	0.285
				48 ... 130	48 ... 130	1 0	AF12-30-10K-12	1SBL157005R1210	0.285
						0 1	AF12-30-01K-12	1SBL157005R1201	0.285
				100 ... 250	100 ... 250	1 0	AF12-30-10K-13	1SBL157005R1310	0.285
						0 1	AF12-30-01K-13	1SBL157005R1301	0.285
				250 ... 500	250 ... 500	1 0	AF12-30-10K-14	1SBL157005R1410	0.325
						0 1	AF12-30-01K-14	1SBL157005R1401	0.325
7.5	30	10	30	24 ... 60	20 ... 60	1 0	AF16-30-10K-11	1SBL177005R1110	0.285
						0 1	AF16-30-01K-11	1SBL177005R1101	0.285
				48 ... 130	48 ... 130	1 0	AF16-30-10K-12	1SBL177005R1210	0.285
						0 1	AF16-30-01K-12	1SBL177005R1201	0.285
				100 ... 250	100 ... 250	1 0	AF16-30-10K-13	1SBL177005R1310	0.285
						0 1	AF16-30-01K-13	1SBL177005R1301	0.285
				250 ... 500	250 ... 500	1 0	AF16-30-10K-14	1SBL177005R1410	0.325
						0 1	AF16-30-01K-14	1SBL177005R1401	0.325
11	45	15	42	24 ... 60	20 ... 60	0 0	AF26-30-00K-11	1SBL237005R1100	0.325
				48 ... 130	48 ... 130	0 0	AF26-30-00K-12	1SBL237005R1200	0.325
				100 ... 250	100 ... 250	0 0	AF26-30-00K-13	1SBL237005R1300	0.325
				250 ... 500	250 ... 500	0 0	AF26-30-00K-14	1SBL237005R1400	0.365
15	50	20	45	24 ... 60	20 ... 60	0 0	AF30-30-00K-11	1SBL277005R1100	0.330
				48 ... 130	48 ... 130	0 0	AF30-30-00K-12	1SBL277005R1200	0.330
				100 ... 250	100 ... 250	0 0	AF30-30-00K-13	1SBL277005R1300	0.330
				250 ... 500	250 ... 500	0 0	AF30-30-00K-14	1SBL277005R1400	0.370
18.5	50	25	45	24 ... 60	20 ... 60	0 0	AF38-30-00K-11	1SBL297005R1100	0.330
				48 ... 130	48 ... 130	0 0	AF38-30-00K-12	1SBL297005R1200	0.330
				100 ... 250	100 ... 250	0 0	AF38-30-00K-13	1SBL297005R1300	0.330
				250 ... 500	250 ... 500	0 0	AF38-30-00K-14	1SBL297005R1400	0.370



AF09..K, AF12..K, AF16..K



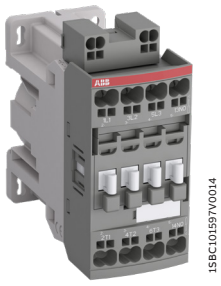
AF26..K, AF30..K, AF38..K

Main dimensions mm, inches

AF09Z..K ... AF38Z..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

24 V DC operated - designed for PLC



AF09Z-30-10K

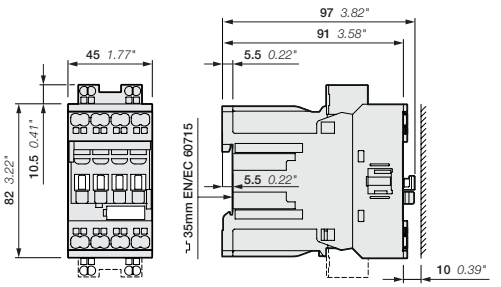
AF26Z-30-00K

AF09Z..K ... AF38Z..K contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

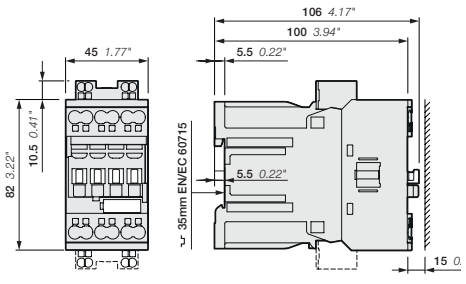
- control circuit: DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current θ ≤ 40 °C	3-phase motor rating	General use rating	Uc min. ... Uc max.				Pkg (1 pce)
400 V		480 V	600 V AC					
AC-3	AC-1							
kW	A	hp	A	V DC				kg
4	25	5	25	24	1 0	AF09Z-30-10K-30	1SBL136005R3010	0.435
					0 1	AF09Z-30-01K-30	1SBL136005R3001	0.435
5.5	28	7.5	28	24	1 0	AF12Z-30-10K-30	1SBL156005R3010	0.435
					0 1	AF12Z-30-01K-30	1SBL156005R3001	0.435
7.5	30	10	30	24	1 0	AF16Z-30-10K-30	1SBL176005R3010	0.435
					0 1	AF16Z-30-01K-30	1SBL176005R3001	0.435

Note: AF..Z contactors with 24V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.
For product availability, please consult your ABB local sales organization.



AF09Z..K, AF12Z..K, AF16Z..K



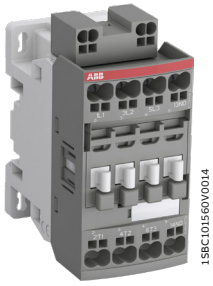
AF26Z..K, AF30Z..K, AF38Z..K

Main dimensions mm, inches

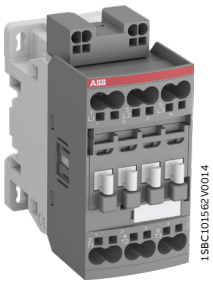
AF09Z..K ... AF38Z..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

AC / DC operated - for specific applications



AF09Z-30-10K



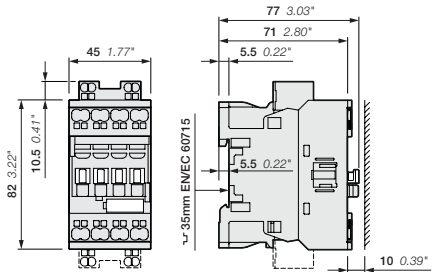
AF26Z-30-00K

AF09Z..K ... AF38Z..K contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

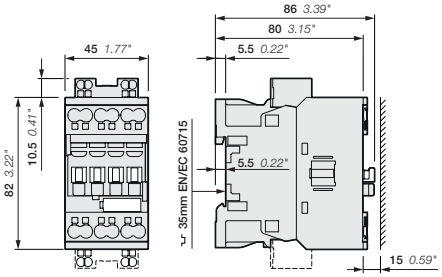
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request)
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current θ ≤ 40 °C	3-phase motor rating	General use rating						Pkg (1 pce)
400 V		480 V	600 V AC						
AC-3	AC-1								
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	–	12 ... 20	1 0	AF09Z-30-10K-20	1SBL136005R2010	0.315
						0 1	AF09Z-30-01K-20	1SBL136005R2001	0.315
				24 ... 60	20 ... 60	1 0	AF09Z-30-10K-21	1SBL136005R2110	0.315
						0 1	AF09Z-30-01K-21	1SBL136005R2101	0.315
				48 ... 130	48 ... 130	1 0	AF09Z-30-10K-22	1SBL136005R2210	0.315
						0 1	AF09Z-30-01K-22	1SBL136005R2201	0.315
				100 ... 250	100 ... 250	1 0	AF09Z-30-10K-23	1SBL136005R2310	0.315
						0 1	AF09Z-30-01K-23	1SBL136005R2301	0.315
5.5	28	7.5	28	–	12 ... 20	1 0	AF12Z-30-10K-20	1SBL156005R2010	0.315
						0 1	AF12Z-30-01K-20	1SBL156005R2001	0.315
				24 ... 60	20 ... 60	1 0	AF12Z-30-10K-21	1SBL156005R2110	0.315
						0 1	AF12Z-30-01K-21	1SBL156005R2101	0.315
				48 ... 130	48 ... 130	1 0	AF12Z-30-10K-22	1SBL156005R2210	0.315
						0 1	AF12Z-30-01K-22	1SBL156005R2201	0.315
				100 ... 250	100 ... 250	1 0	AF12Z-30-10K-23	1SBL156005R2310	0.315
						0 1	AF12Z-30-01K-23	1SBL156005R2301	0.315
7.5	30	10	30	–	12 ... 20	1 0	AF16Z-30-10K-20	1SBL176005R2010	0.315
						0 1	AF16Z-30-01K-20	1SBL176005R2001	0.315
				24 ... 60	20 ... 60	1 0	AF16Z-30-10K-21	1SBL176005R2110	0.315
						0 1	AF16Z-30-01K-21	1SBL176005R2101	0.315
				48 ... 130	48 ... 130	1 0	AF16Z-30-10K-22	1SBL176005R2210	0.315
						0 1	AF16Z-30-01K-22	1SBL176005R2201	0.315
				100 ... 250	100 ... 250	1 0	AF16Z-30-10K-23	1SBL176005R2310	0.315
						0 1	AF16Z-30-01K-23	1SBL176005R2301	0.315
11	45	15	42	–	12 ... 20	0 0	AF26Z-30-00K-20	1SBL236005R2000	0.355
				24 ... 60	20 ... 60	0 0	AF26Z-30-00K-21	1SBL236005R2100	0.355
				48 ... 130	48 ... 130	0 0	AF26Z-30-00K-22	1SBL236005R2200	0.355
				100 ... 250	100 ... 250	0 0	AF26Z-30-00K-23	1SBL236005R2300	0.355
15	50	20	45	–	12 ... 20	0 0	AF30Z-30-00K-20	1SBL276005R2000	0.360
				24 ... 60	20 ... 60	0 0	AF30Z-30-00K-21	1SBL276005R2100	0.360
				48 ... 130	48 ... 130	0 0	AF30Z-30-00K-22	1SBL276005R2200	0.360
				100 ... 250	100 ... 250	0 0	AF30Z-30-00K-23	1SBL276005R2300	0.360
18.5	50	25	45	–	12 ... 20	0 0	AF38Z-30-00K-20	1SBL296005R2000	0.360
				24 ... 60	20 ... 60	0 0	AF38Z-30-00K-21	1SBL296005R2100	0.360
				48 ... 130	48 ... 130	0 0	AF38Z-30-00K-22	1SBL296005R2200	0.360
				100 ... 250	100 ... 250	0 0	AF38Z-30-00K-23	1SBL296005R2300	0.360

Note: Only AF..Z contactors with 12...20 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



AF09Z..K, AF12Z..K, AF16Z..K



AF26Z..K, AF30Z..K, AF38Z..K

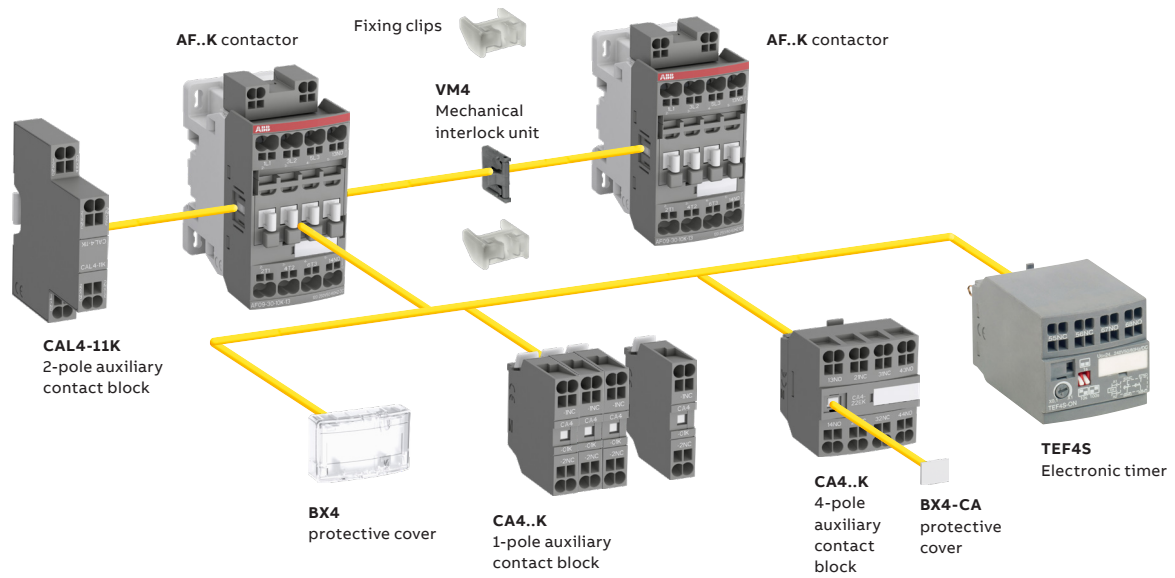
Main dimensions mm, inches

AF09..K ... AF16..K 3-pole contactors - with Push-in Spring terminals

Main accessories

Contactor and main accessories (other accessories available)

AF09..K ... AF38..K



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories					Side-mounted accessories	
			Auxiliary contact blocks		Electronic timer	Mechanical interlock unit		Auxiliary contact blocks	
						(between 2 contactors)		Left side	Right side
			1-pole CA4..K	4-pole CA4..K	TEF4S	VM4		2-pole CAL4-11K	
AF09(Z)..K ... AF38(Z)..K (1)									
AF09..K ... AF16..K	3 0	0 1	4 max.	**or** 1	**or** 1	–	+	1	–
AF09..K ... AF16..K	3 0	1 0	2 max.	–	**or** 1	–	+	1	+ 1
AF26..K ... AF38..K	3 0	0 0	4 max.	**or** 1	**or** 1	+ 1	+	1	**or** 1
AF09Z..K ... AF38Z..K 24 V DC designed for PLC - coil 30 (1)									
AF09Z..K ... AF16Z..K	3 0	0 1	4 max.	**or** 1	**or** 1	+ 1	+	1	+ 1
AF09Z..K ... AF16Z..K	3 0	1 0	2 max.	–	**or** 1	+ 1	+	1	**or** 1
AF26Z..K ... AF38Z..K	3 0	0 0			1	–	+	1	+ 1

(1) Including add-on and built-in contacts: 4 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max. on positions 1 ±30°, 5

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Main accessories

CA4-10K

CAL4-11K

CA4-22EK

VM4

TEF4S-ON

LDC4K

BX4

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks					
AF09..K ... AF38..K	1 0	CA4-10K	1SBN010160R1010	1	0.012
	1 0	CA4-10K-T	1SBN010160T1010	10	0.012
	0 1	CA4-01K	1SBN010160R1001	1	0.012
	0 1	CA4-01K-T	1SBN010160T1001	10	0.012
AF26 ... AF16..-40-00K	2 2	CA4-22MK	1SBN010146R1122	1	0.050
AF26 ... AF38..-40-00K	2 2	CA4-22EK	1SBN010146R1022	1	0.050
Side-mounted instantaneous auxiliary contact blocks					
AF09..K ...AF38..K	1 1	CAL4-11K	1SBN010134R1011	1	0.030
Mechanical interlock unit					
AF09..K ... AF38..K		VM4	1SBN030105T1000	10	0.005

Note: VM4 includes 2 fixing clips (BB4) to maintain together both contactors.

Fixing clips

AF09..K ... AF16..K	BB4	1SBN110120W1000	50	0.002

Electronic timers

For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09..K ... AF38..K	0.1...1 s	ON-delay	1 1	TEF4S-ON	1SBN020113R1000	1	0.065
	1...10 s 10...100 s	OFF-delay	1 1	TEF4S-OFF	1SBN020115R1000	1	0.065

Note: Rated control circuit voltage Uc 24 ... 240 V 50/60 Hz or DC. Terminals with spring mode only.

Additional coil terminal block

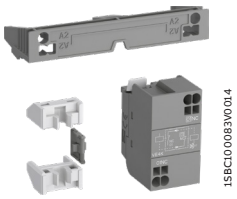
AF09..K ... AF38..K, NF	LDC4K	1SBN070159T1000	10	0.010

Protective covers

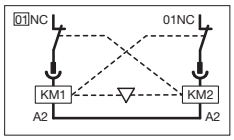
AF09..K ... AF38..K 1-stack contactors and NF contactor relays	BX4	1SBN110108T1000	10	0.006
4-pole CA4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000	50	0.001

Note: CA4..K and CAL4-11K contact blocks can be used on AF09...AF96 contactors.

Connection accessories for starting solutions- with Push-in Spring terminals



VEM4K



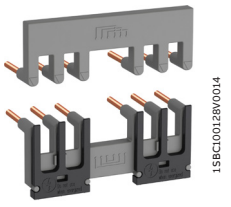
For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
Mechanical and electrical interlock set (1)					
AF09..K ... AF16..K AF26..K ... AF38..K	0 2	VEM4K	1SBN030113R1000	1	0.030

Note: - VEM4K includes a VM4 mechanical interlock unit with 2 fixing clips (BB4), a VE4K electrical interlock block with A2 - A2 connection.
- VE4K block must be used with A2-A2 connection to respect the electrical connection diagram.
- VEM4K not suitable for AF..Z contactors with DC control voltage 12 ... 20 V DC (coil 20 and 24 V DC (coil 30).
For product availability, please consult your ABB local sales organization.

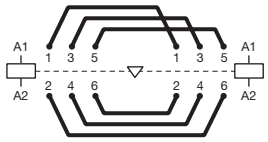
BEA16-4KF

Connecting links with manual motor starters (1)					
AF09..K ... AF16..K	with MS132-0.16K... MS132-25K	BEA16-4KF	1SBN081325T1000	10	0.052
AF26..K ... AF38..K	with MS132-0.16K... MS132-32K	BEA38-4KF	1SBN082325T2000	10	0.057

(1) For product availability, please consult your ABB local sales organization.
Note: BEA not suitable for AF..Z contactors with DC control voltage 24 V DC (coil 30).

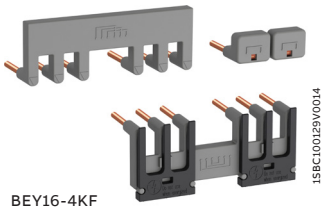


BER16-4KF

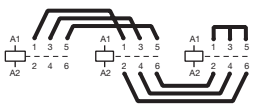


BER
Reversing connections

Connection sets for reversing contactors					
AF09..K ... AF16..K		BER16-4KF	1SBN081322R1000	1	0.050
AF26..K ... AF38..K		BER38-4KF	1SBN082322R1000	1	0.080



BEY16-4KF



BEY
Line-delta-star connection

Connection sets for star-delta starter					
AF09..K ... AF16..K		BEY16-4KF	1SBN081323R2000	1	0.055
AF26..K ... AF38..K		BEY38-4KF	1SBN082323R2000	1	0.090

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1					
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current Ith acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area		6 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-1 Utilization category For air temperature close to contactor Ie / Rated operational current AC-1 Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 40 °C	25 A	28 A	30 A	45 A	50 A	50 A
	θ ≤ 60 °C	25 A	28 A	30 A	40 A	42 A	42 A
	θ ≤ 70 °C	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-3, AC-3e Utilization category For air temperature close to contactor θ ≤ 60 °C Ie / Max. rated operational current AC-3, AC-3e (1)							
3-phase motors	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A
	415 V	9 A	12 A	18 A	26 A	32 A	38 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A	33 A
	690 V	7 A	9 A	10.5 A	17 A	21 A	24 A
	1000 V	–					
Rated operational power AC-3, AC-3e (1)							
1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW	18.5 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW	22 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
	1000 V	–					
Rated making capacity AC-3, AC-3e		10 x Ie AC-3, 12 x Ie AC-3e acc. to IEC 60947-4-1					
Rated breaking capacity AC-3, AC-3e		8 x Ie AC-3, 8.5 x Ie AC-3e acc. to IEC 60947-4-1					
AC-8a Utilization category (without thermal overload relay Ue 400 V 50/60 Hz θ ≤ 40 °C) Ie / Rated operational current AC-8a		12 A	16 A	22 A	30 A	40 A	50 A
Rated operational power AC-8a		5.5 kW	7.5 kW	11 kW	15 kW	20 kW	25 kW
Short-circuit protection device for contactors without thermal overload relay in free air Motor protection excluded (2) Ue ≤ 500 V AC - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current Icw at 40 °C ambient temperature, in free air from a cold state	1 s	300 A	300 A	300 A	700 A	700 A	700 A
	10 s	150 A	150 A	150 A	350 A	350 A	350 A
	30 s	80 A	80 A	80 A	225 A	225 A	225 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A
Maximum breaking capacity cos ϕ = 0.45	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A
Power dissipation per pole	Ie / AC-1	1.14 W	1.43 W	1.64 W	2 W	2.44 W	2.44 W
	Ie / AC-3, AC-3e	0.15 W	0.26 W	0.6 W	0.66 W	1 W	1.41 W
Max. electrical switching frequency	AC-1	600 cycles/h					
	AC-3, AC-3e	1200 cycles/h					
	AC-2, AC-4	300 cycles/h			150 cycles/h		

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Standards		UL 60947-4-1, CSA-C22.2 No. 60947-4-1					
Maximum operational voltage		600 V					
NEMA size		00	0	-	1	-	-
NEMA continuous amp rating	Thermal current	9 A	18 A		27 A		
NEMA maximum horse power ratings 1-phase, 60 Hz	115 V AC	1/3 hp	1 hp		2 hp		
	230 V AC	1 hp	2 hp		3 hp		
NEMA maximum horse power ratings 3-phase, 60 Hz	200 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	230 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	460 V AC	2 hp	5 hp		10 hp		
	575 V AC	2 hp	5 hp		10 hp		
UL / CSA general use rating							
600 V AC		25 A	28 A	30 A	42 A	45 A	45 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8
1 pole	80 V DC	25 A	28 A	30 A	42 A	45 A	45 A
2 poles in serie	160 V DC	25 A	28 A	30 A	42 A	45 A	45 A
3 poles in serie	240 V DC	25 A	28 A	30 A	42 A	45 A	45 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8
UL / CSA maximum 1-phase motor rating							
Full load current	120 V AC	13.8 A	16 A	20 A	24 A	24 A	24 A
	240 V AC	10 A	12 A	17 A	17 A	28 A	28 A
Horse power rating	120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	2 hp
	240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	5 hp
UL / CSA maximum 3-phase motor rating							
Full load current (1)	200-208 V AC	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A
	220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A	28 A
	440-480 V AC	7.6 A	11 A	14 A	21 A	27 A	34 A
	550-600 V AC	9 A	11 A	17 A	22 A	27 A	32 A
Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp
UL / CSA - DC motor starting - 3 poles in series							
Full Load Amps (FLA)	125 V DC	9.5 A	13.2 A	17 A	25 A	25 A	25 A
	250 V DC	8.5 A	12.2 A	12.2 A	20 A	29 A	29 A
Horse power rating	125 V DC	1 hp	1-1/2 hp	2 hp	3 hp	3 hp	3 hp
	250 V DC	2 hp	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
Short-circuit protection device for contactors without thermal overload relay Motor protection excluded							
Fuse rating		30 A		60 A		100 A	
Fuse type, 600 V		RK5					
Maximum electrical switching frequency							
For general use		600 cycles/h					
For motor use		1200 cycles/h					

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

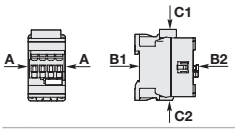
Main pole - Utilization characteristics - 3 N.O. non reversing contactors

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
AC Resistance air heating							
Full Load Amps (FLA)	600 V AC	20 A	25 A	30 A	42 A	45 A	45 A
Elevator control, load switching, 500,000 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1							
1-phase							
Horse power rating	110-120 V AC	1/4 hp	1/3 hp	–	1-1/2 hp	2 hp	2 hp
	220-240 V AC	1/2 hp	3/4 hp	–	3 hp	3 hp	5 hp
3-phase							
Horse power rating	200-208 V AC	1 hp	2 hp	–	5 hp	7-1/2 hp	7-1/2 hp
	220-240 V AC	1 hp	2 hp	–	5 hp	7-1/2 hp	10 hp
	440-480 V AC	3 hp	5 hp	–	15 hp	20 hp	20 hp
	550-600 V AC	3 hp	5 hp	–	15 hp	20 hp	20 hp
Elevator control, 500,000 mechanical operating cycles, 5 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.2							
1-phase							
Horse power rating	110-120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	3 hp
	220-240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	7-1/2 hp
3-phase							
Horse power rating	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp
Lighting application - UL/CSA							
Tungsten lamps							
1-phase per pole	347 V AC	20 A	25 A	30 A	42 A	45 A	45 A
3-phase break all lines	600 V AC	20 A	25 A	30 A	42 A	45 A	45 A
Electrical discharge lamps (ballast)							
1-phase per pole	347 V AC	20 A	25 A	30 A	42 A	45 A	45 A
3-phase break all lines	600 V AC	20 A	25 A	30 A	42 A	45 A	45 A

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

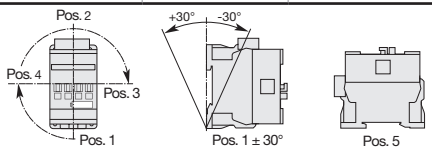
Technical data

General technical data

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)					
Ambient air temperature close to contactor							
Operation Without thermal overload relay		-40 ... +70 °C					
Storage		-60 ... +80 °C					
Climatic withstand		Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)		3000 m					
Mechanical durability							
Number of operating cycles		10 million operating cycles					
Maximum switching frequency		3600 cycles/h					
Shock withstand							
acc. to IEC 60068-2-27 and EN 60068-2-27							
Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position					
	A	30 g					
	B1	25 g closed position / 5 g open position					
	B2	15 g					
	C1	25 g					
	C2	25 g					
Vibration withstand		5 ... 300 Hz					
acc. to IEC 60068-2-6		4 g Closed position / 2 g Open position					

(1) AF09 ... AF38-..-..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only. For environment B: select AF09 ... AF38Z-..-..-22.

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Mounting positions		 Max. N.C. built-in and add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF09 ... AF38					
Mounting distances		The contactors can be assembled side by side					
Fixing							
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm					
By screws (not supplied)		2 x M4 screws placed diagonally					

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Magnet System Characteristics for AF09..K ... AF38..K contactors - AC / DC operated

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
	DC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		24 ... 500 V AC					
Coil consumption	Average pull-in value	50 VA					
	Average holding value	2.2 VA / 2 W					
DC control voltage							
Rated control circuit voltage Uc		20 ... 500 V DC					
Coil consumption	Average pull-in value	50 W					
	Average holding value	2 W					
PLC-output control		Not suitable for direct control by PLC-output					
Drop-out voltage		≤ 60 % Uc min.					
Operating time							
Between coil energization and:							
	N.O. contact closing	40 ... 95 ms					
	N.C. contact opening	38 ... 90 ms					
Between coil de-energization and:							
	N.O. contact opening	11 ... 95 ms					
	N.C. contact closing	13 ... 98 ms					

Magnet System Characteristics for AF09Z..K ... AF38Z..K contactors - for specific applications - coils 20, 21, 22, 23

Contactor types	AC / DC operated	AF09Z..K	AF12Z..K	AF16Z..K	AF26Z..K	AF30Z..K	AF38Z..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max					
	DC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		24 ... 250 V AC					
Coil consumption	Average pull-in value	16 VA					
	Average holding value	1.7 VA / 1.5 W					
DC control voltage							
Rated control circuit voltage Uc		12 ... 250 V DC					
Coil consumption	Average pull-in value	12 ... 16 W					
	Average holding value	1.7 W					
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs - Not suitable for safety PLCs					
Drop-out voltage		≤ 60 % of Uc min.					
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z coil 21, 22, 23) conditions of use on request					
Dips withstand -20 °C ≤ θ ≤ +60°C		(AF..Z coil 21, 22, 23) 20 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC					
Operating time							
Between coil energization and:							
	N.O. contact closing	40 ... 95 ms					
	N.C. contact opening	38 ... 90 ms					
Between coil de-energization and:							
	N.O. contact opening	11 ... 95 ms					
	N.C. contact closing	13 ... 98 ms					

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Main terminals		 Push-in Spring terminals					
Connection capacity (min. ... max.)							
Main conductors (poles)							
Rigid	Solid (≤ 2.5 mm²) 1 x	1 ... 6 mm²			1 ... 10 mm²		
	Stranded (≥ 4 mm²) 2 x	1 ... 6 mm²			1 ... 10 mm²		
Flexible	1 x	1 (push-in) / 0.5 (spring) ... 4 mm²			1 ... 6 mm²		
with non insulated ferrule	2 x	1 (push-in) / 0.5 (spring) ... 4 mm²			1 ... 6 mm²		
Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 4 mm²			1 ... 6 mm²		
	2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²			1 ... 6 mm²		
Flexible without ferrule	1 x	(spring) 0.5 ... 4 mm²			(spring) 1 ... 6 mm²		
	2 x	(spring) 0.5 ... 4 mm²			(spring) 1 ... 6 mm²		
Connection capacity acc. to UL/CSA (Solid ≤ AWG 14)	1 or 2 x	AWG 18 ... 10			AWG 18 ... 8		
Stripping length		12 mm			14 mm		
Auxiliary conductors (built-in auxiliary terminals + coil terminals)							
Rigid solid	1 x	1 ... 2.5 mm²					
	2 x	1 ... 2.5 mm²					
Flexible with	1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²					
non insulated ferrule	2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²					
Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²					
	2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²					
Flexible without ferrule	1 x	(spring) 0.5 ... 2.5 mm²					
	2 x	(spring) 0.5 ... 2.5 mm²					
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18 ... 14					
Stripping length		10 mm					
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529							
Main terminals		IP20					
Coil terminals		IP20					
Built-in auxiliary terminals		IP20					
Screwdriver type	All terminals	Flat Ø 3 mm x 0.5 mm					

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A					
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A					
	220-240 V 50/60 Hz	4 A					
	400-440 V 50/60 Hz	3 A					
	500 V 50/60 Hz	2 A					
	690 V 50/60 Hz	2 A					
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1					
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1					
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W					
	48 V DC	2.8 A / 134 W					
	72 V DC	1 A / 72 W					
	110 V DC	0.55 A / 60 W					
	125 V DC	0.55 A / 69 W					
	220 V DC	0.27 A / 60 W					
	250 V DC	0.27 A / 68 W					
	400 V DC	0.15 A / 60 W					
	500 V DC	0.13 A / 65 W					
	600 V DC	0.1 A / 60 W					
Short-circuit protection device gG type fuse		10 A					
Rated short-time withstand current Icw	for 1.0 s	100 A					
	for 0.1 s	140 A					
Minimum switching capacity		12 V / 3 mA					
with failure rate acc. to IEC 60947-5-4		10^{-7}					
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms					
Power dissipation per pole at 6 A		0.1 W					
Maximum electrical switching frequency	AC-15	1200 cycles/h					
	DC-13	900 cycles/h					
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts.					
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mirror contacts.					

Built-in auxiliary contacts according to UL / CSA

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Maximum operational voltage		600 V AC, 600 V DC					
Pilot duty		A600, Q600					
AC thermal rated current		10 A					
AC maximum volt-ampere making		7200 VA					
AC maximum volt-ampere breaking		720 VA					
DC thermal rated current		2.5 A					
DC maximum volt-ampere making-breaking		69 VA					

AF09..K ... AF38..K 3-pole contactors with Push-in Spring terminals

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.

If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 Ic = Ie
- Category AC-2 Ic = 2.5 x Ie
- Category AC-4 Ic = 6 x Ie

Generally speaking Ic = m x Ie where m is a multiple of the load operational current.

On next pages, the curves corresponding to categories AC-1, AC-3 and AC-4 represent the electrical durability variation of standard contactors in relation to the breaking current Ic. Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

Electrical durability forecast and contactor selection for categories AC-1, AC-2, AC-3 or AC-4

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	Ic = Ie for AC-1 and for AC-3 ; Ic = 2.5 x Ie for AC-2 ; Ic = 6 x Ie for AC-4

- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 (Ic = Ie) type switching off while "motor running" and, occasionally, AC-4 (Ic = 6 x Ie) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn while "motor running"	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current for AC-3	Ic = Ie
Breaking current for AC-4 while "motor accelerating"	Ic = 6 x Ie
Percentage of AC-4 operating cycles	K (on the basis of the total number of operating cycles)

- Define the total number of operating cycles N required.
- Note the smallest contactor rating compatible for AC-3 (Ue / Ie) on Main pole utilization characteristic table (see “Technical data”).
- For the selected contactor make a note of the following in relation to the voltage using diagram AC-3 in next pages:
  - The number of operating cycles A for Ic = Ie (AC-3)
  - The number of operating cycles B for Ic = 6 x Ie (AC-4)
- Calculate the estimated number of cycles N’ (N’ is always below A)

$$N' = \frac{A}{1 + 0.01\,K\,(A/B - 1)}$$

- If N' is too low in relation to the target N, calculate the estimated number of cycles for a higher contactor rating.

Case of uninterrupted duty

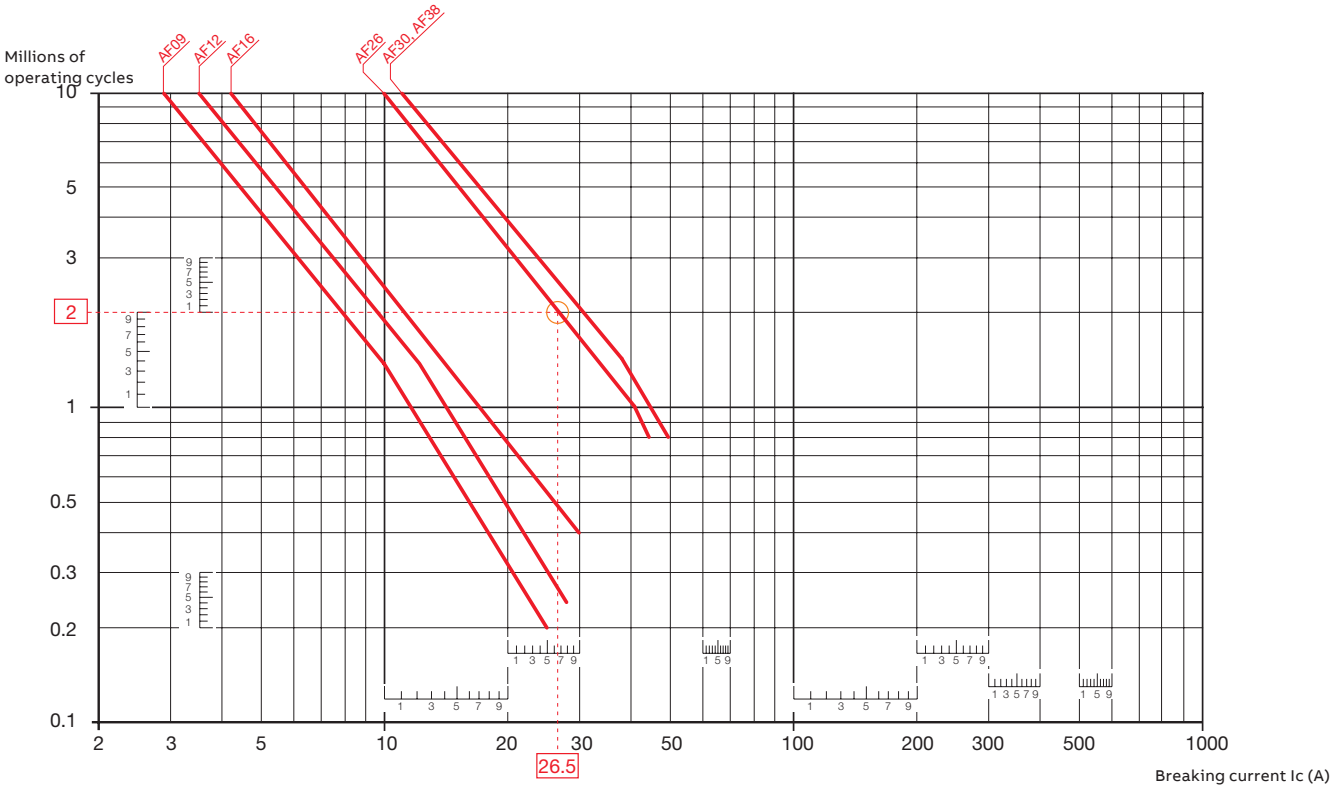
For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).

The combinated effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Electrical durability

Electrical Durability for AC-1 Utilization Category - Ue ≤ 690 V.
Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.
Ambient temperature and maximum electrical switching frequency: see "Technical Data".



Example:

Ic / AC-1 = 26.5 A – Electrical durability required = 2 millions operating cycles.
Using the AC-1 curves above select the AF26 contactor at intersection "○" (26.5 A / 2 millions operating cycles).

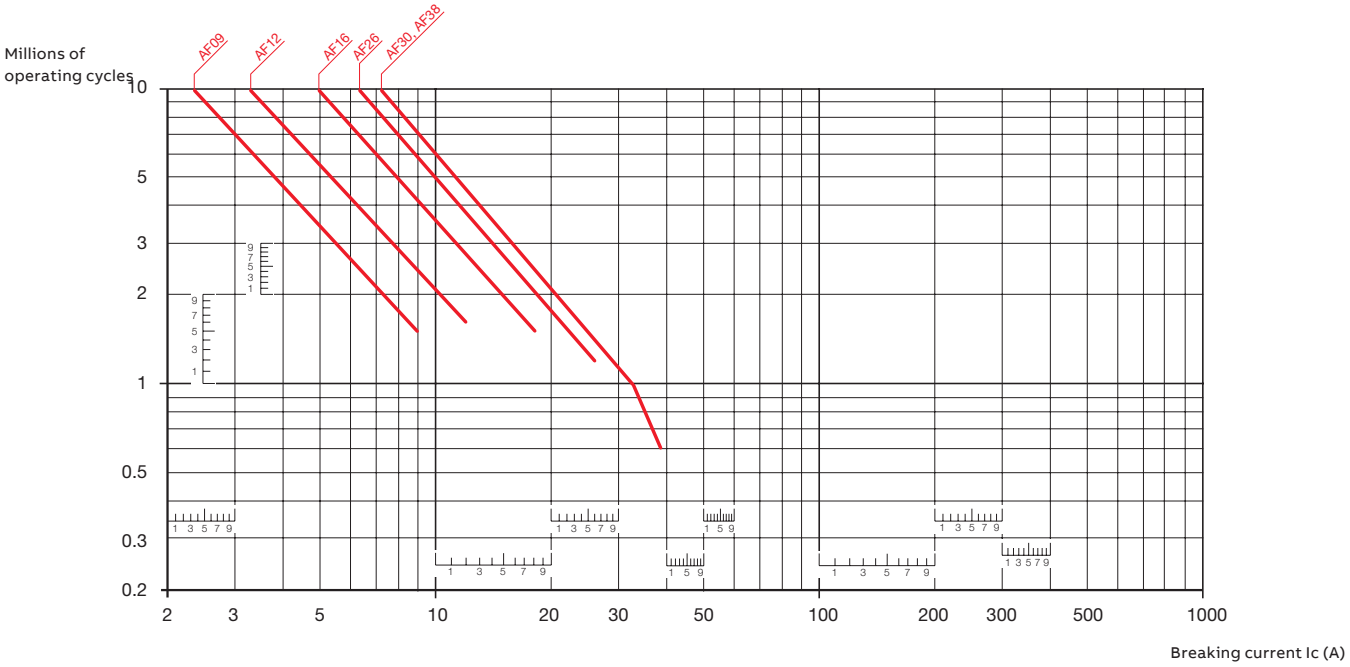
AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Electrical durability

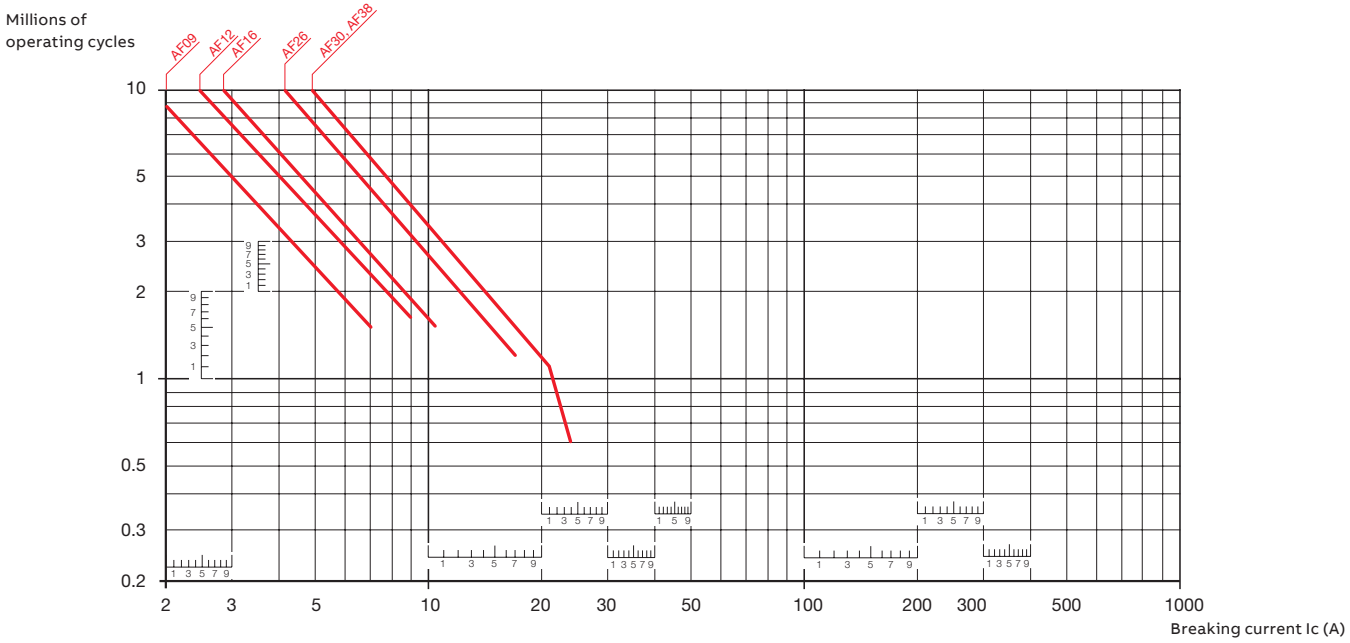
Electrical Durability for AC-3 Utilization Category

Switching cage motors: starting and switching off running motors. The breaking current Ic for AC-3 is equal to the rated operational current Ie (Ie = motor full load current). Ambient temperature and maximum electrical switching frequency: see "Technical Data".

AC-3 - Ue ≤ 440 V



AC-3 - 440 V < Ue ≤ 690 V



AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

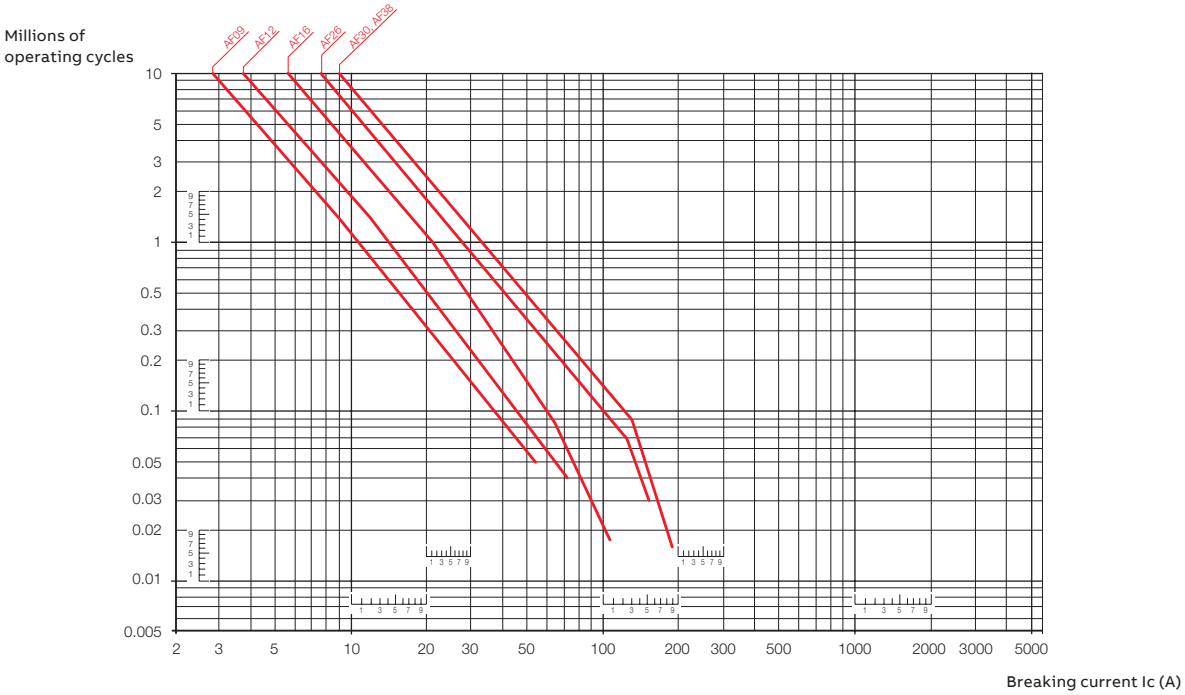
Electrical durability

Electrical Durability for AC-2 or AC-4 Utilization Category

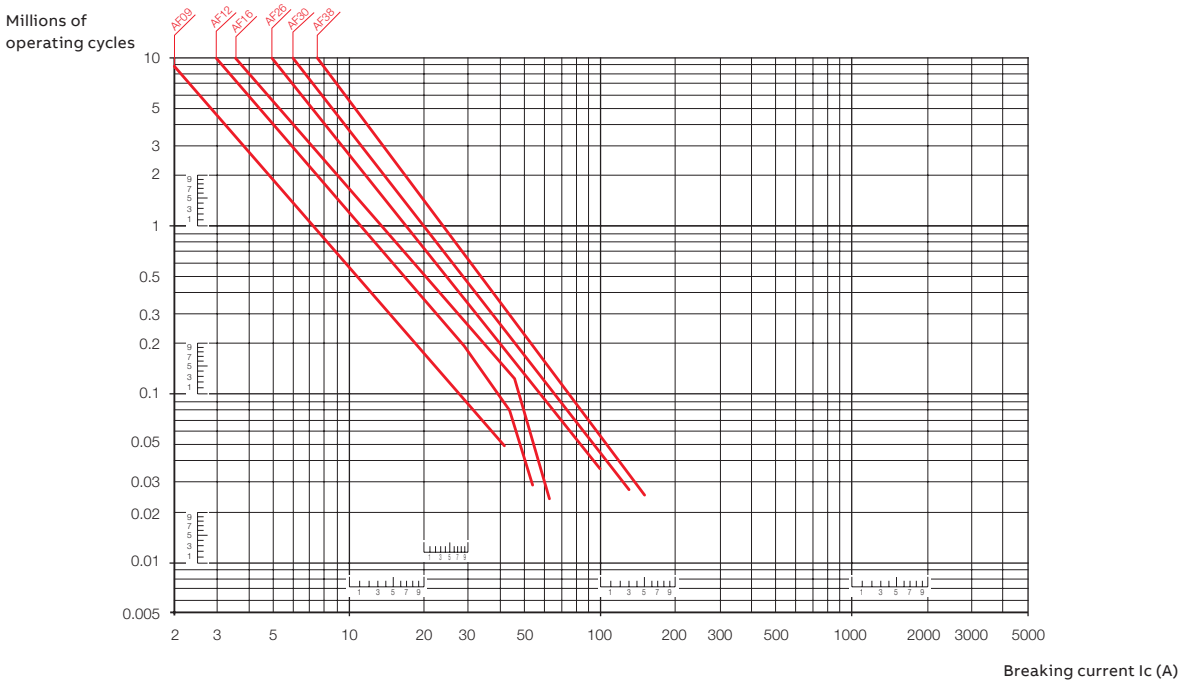
Switching cage motors: starting reverse operation and step-by-step operation. The breaking current Ic is equal to 2.5 x I_e for AC-2 and 6 x I_e for AC-4, keeping in mind that I_e is the motor rated operational current Ie (Ie = motor full load current).

Ambient temperature ≤ 60 °C. Maximum electrical switching frequency: see "Technical Data".

AC-2 or AC-4 - Ue ≤ 440 V



AC-2 or AC-4 - 440 V < Ue ≤ 690 V

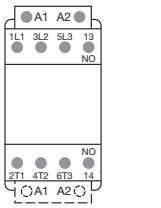


AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

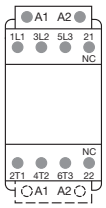
Terminal marking and positioning

AF09..K ... AF38..K contactors - AC / DC operated

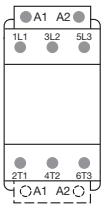
Standard devices without addition of auxiliary contacts



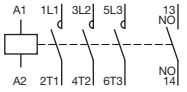
AF09 ... AF16..-30-10K



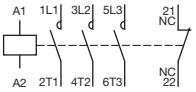
AF09 ... AF16..-30-01K



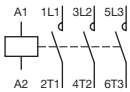
AF26 ... AF38..-30-00K



AF09 ... AF16..-30-10K

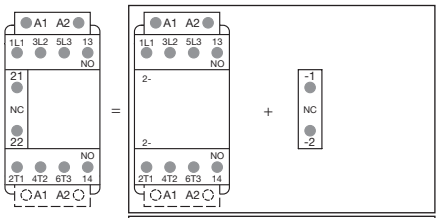


AF09 ... AF16..-30-01K

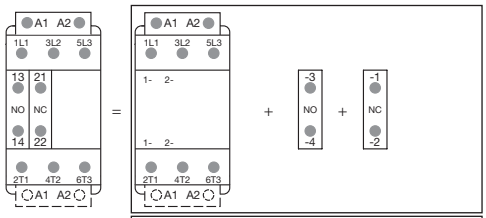


AF26 ... AF38..-30-00K

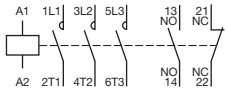
Other possible contact combinations with auxiliary contacts added by the user



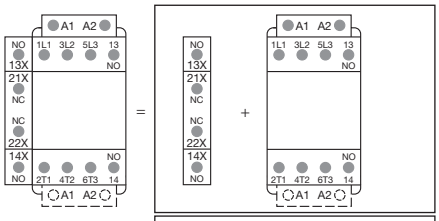
Combination 11 = AF09 ... AF16..-30-10K + CA4-01K



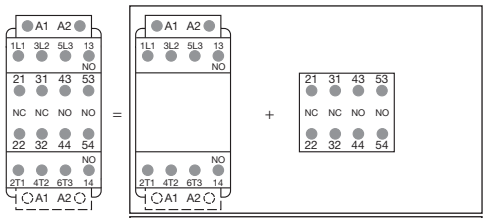
Combination 11 = AF26 ... AF38..-30-00K + CA4-10K + CA4-01K



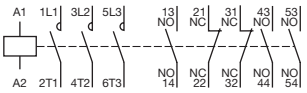
Combination 11



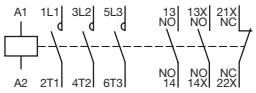
Combination 21 = CAL4-11K + AF09 ... AF16..-30-10K



Combination 32 = AF09 ... AF16..-30-10K + CA4-22MK



Combination 32



Combination 21

Note: Only AF..Z contactor with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole

AF09..K ... AF38..K add-on auxiliary contacts - with Push-in Spring terminals

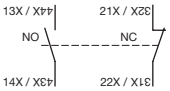
Terminal marking and positioning

1-pole auxiliary contacts

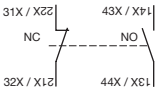
CA4-01K

CA4-10K

2-pole auxiliary contacts

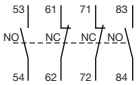


CAL4-11K
(Left side-mounted)

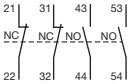


CAL4-11K
(Right side-mounted)

4-pole auxiliary contacts



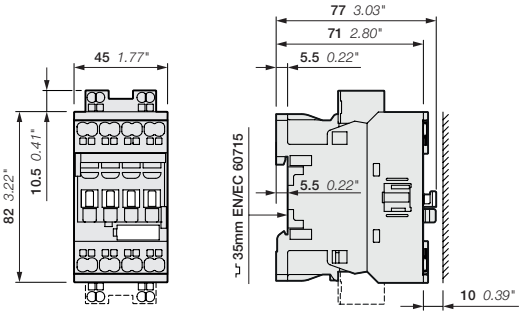
CA4-22EK



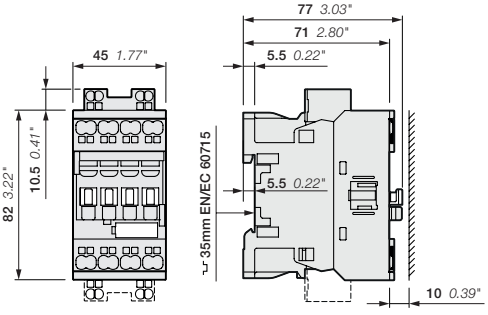
CA4-22MK

AF09..K, AF16..K 3-pole contactors - with Push-in Spring terminals

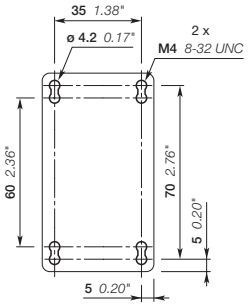
Dimensions



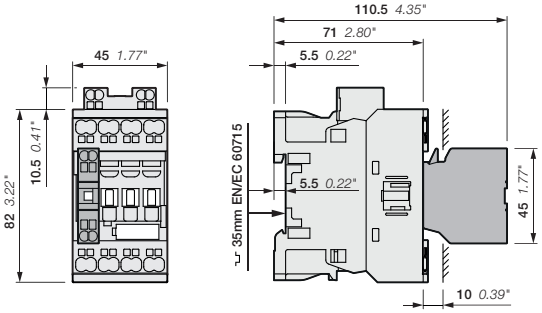
AF09..K, AF12..K, AF16..K



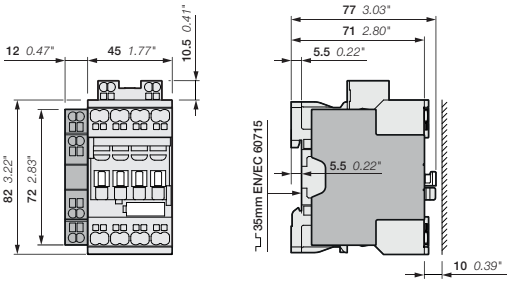
AF09Z..K, AF12Z..K, AF16Z..K



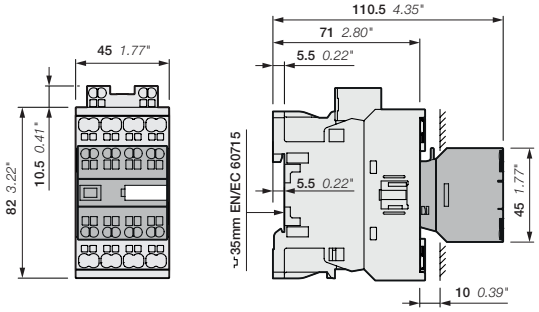
AF09..K, AF12..K, AF16..K



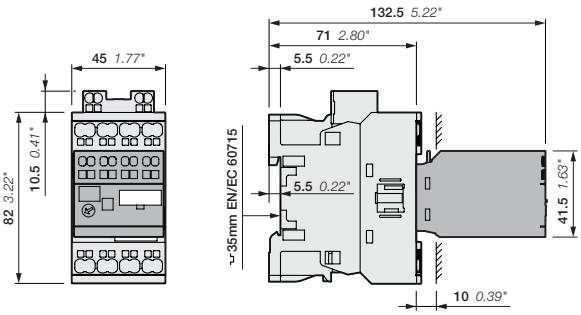
AF09..K, AF12..K, AF16..K
+ CA4..K 1-pole auxiliary contact block



AF09..K, AF12..K, AF16..K+ CAL4-11K
2-pole auxiliary contact block



AF09..K, AF16..K
+ CA4..K 4-pole auxiliary contact block

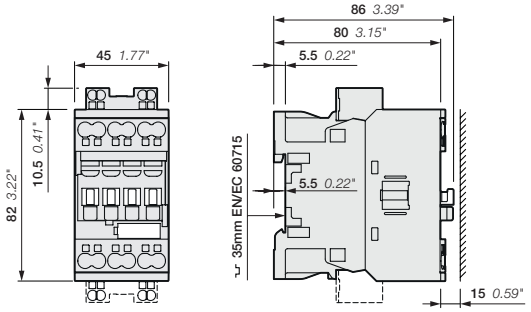


AF09..K, AF16..K
+ TEF4S electronic timer

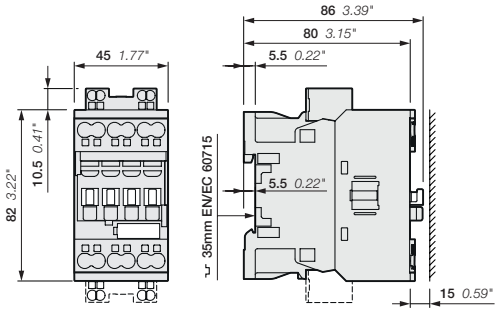
Main dimensions mm, inches

AF26..K, AF30..K, AF38..K 3-pole contactors - with Push-in Spring terminals

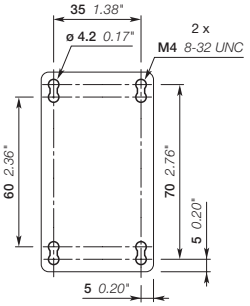
Dimensions



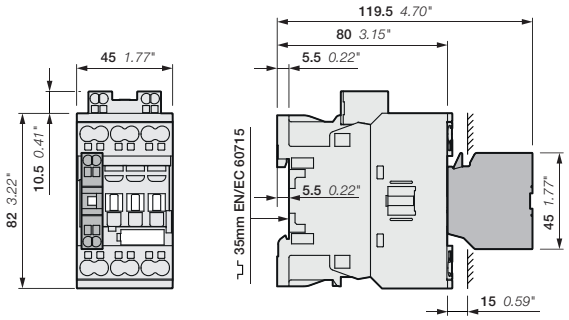
AF26..K, AF30..K, AF38..K



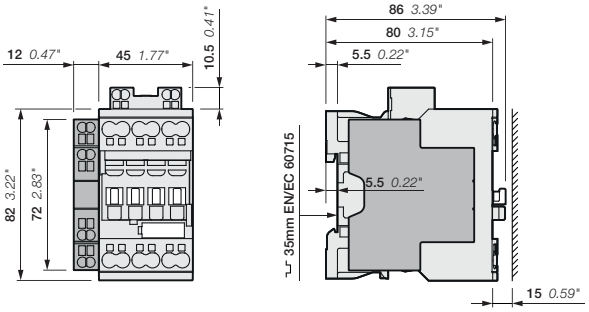
AF26Z..K, AF30Z..K, AF38Z..K



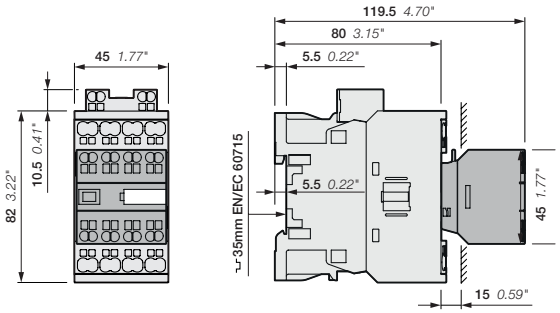
AF26..K, AF30..K, AF38..K



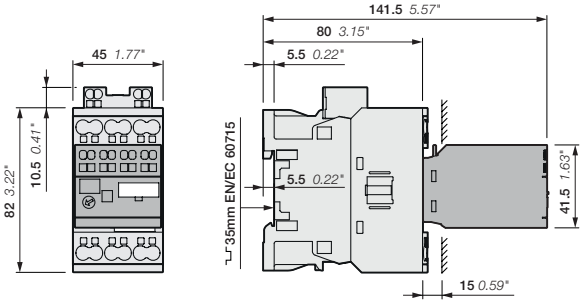
AF26..K, AF30..K, AF38..K
+ CA4..K 1-pole auxiliary contact block



AF26..K, AF30..K, AF38..K
+ CAL4-11K 2-pole auxiliary contact block



AF26..K, AF30..K, AF38..K
+ CA4..K 4-pole auxiliary contact block



AF26..K, AF30..K, AF38..K
+ TEF4S electronic timer

Note: For AF26..K ... AF38..K contactors, lateral distance to grounded component 2 mm 0.08" min
24 V DC operated contactor (coil 30) depth + 20 mm (0.79").

Main dimensions mm, inches


ABB
1L1
3L2
5L3
13NO
2T1
4T2
6T3
14NO
AF09-30-10K-13
100-250V50/60HZ-DC

4-pole contactors

AF09..K ... AF16..K 4-pole contactors with Push-in Spring terminals

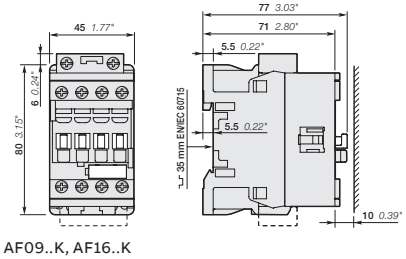
25 to 30 A AC-1

AC / DC operated

AF09..K ... AF16..K 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC	UL/CSA	Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C	General use rating 600 V AC						Pkg (1 pce)
A	A	V 50/60 Hz	V DC				kg
4 N.O. main poles							
25	25	24...60	20...60	0 0	AF09-40-00K-11	1SBL137205R1100	0.285
		48...130	48...130	0 0	AF09-40-00K-12	1SBL137205R1200	0.285
		100...250	100...250	0 0	AF09-40-00K-13	1SBL137205R1300	0.285
		250...500	250...500	0 0	AF09-40-00K-14	1SBL137205R1400	0.285
30	30	24...60	20...60	0 0	AF16-40-00K-11	1SBL177205R1100	0.285
		48...130	48...130	0 0	AF16-40-00K-12	1SBL177205R1200	0.285
		100...250	100...250	0 0	AF16-40-00K-13	1SBL177205R1300	0.285
		250...500	250...500	0 0	AF16-40-00K-14	1SBL177205R1400	0.285
2 N.O. + 2 N.C. main poles							
25	25	24...60	20...60	0 0	AF09-22-00K-11	1SBL137505R1100	0.285
		48...130	48...130	0 0	AF09-22-00K-12	1SBL137505R1200	0.285
		100...250	100...250	0 0	AF09-22-00K-13	1SBL137505R1300	0.285
		250...500	250...500	0 0	AF09-22-00K-14	1SBL137505R1400	0.285
30	30	24...60	20...60	0 0	AF16-22-00K-11	1SBL177505R1100	0.285
		48...130	48...130	0 0	AF16-22-00K-12	1SBL177505R1200	0.285
		100...250	100...250	0 0	AF16-22-00K-13	1SBL177505R1300	0.285
		250...500	250...500	0 0	AF16-22-00K-14	1SBL177505R1400	0.285



AF09..K, AF16..K

Main dimensions mm, inches

AF09Z..K ... AF16Z..K 4-pole contactors with Push-in Spring terminals

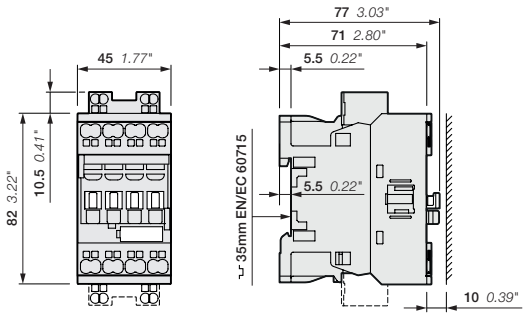
25 to 30 A AC-1

AC / DC operated - low consumption

AF09Z..K ... AF16Z..K 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC	UL/CSA	Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V 50/60 Hz	V DC				kg
4 N.O. main poles							
25	25	-	12...20	2 2	AF09Z-40-00K-20	1SBL136205R2000	0.315
		24...60	20...60	2 2	AF09Z-40-00K-21	1SBL136205R2100	0.315
		48...130	48...130	2 2	AF09Z-40-00K-22	1SBL136205R2200	0.315
		100...250	100...250	2 2	AF09Z-40-00K-23	1SBL136205R2300	0.315
30	30	-	12...20	2 2	AF16Z-40-00K-20	1SBL176205R2000	0.315
		24...60	20...60	2 2	AF16Z-40-00K-21	1SBL176205R2100	0.315
		48...130	48...130	2 2	AF16Z-40-00K-22	1SBL176205R2200	0.315
		100...250	100...250	2 2	AF16Z-40-00K-23	1SBL176205R2300	0.315
2 N.O. + 2 N.C. main poles							
25	25	-	12...20	2 2	AF09Z-22-00K-20	1SBL136505R2000	0.315
		24...60	20...60	2 2	AF09Z-22-00K-21	1SBL136505R2100	0.315
		48...130	48...130	2 2	AF09Z-22-00K-22	1SBL136505R2200	0.315
		100...250	100...250	2 2	AF09Z-22-00K-23	1SBL136505R2300	0.315
30	30	-	12...20	2 2	AF16Z-22-00K-20	1SBL176505R2000	0.315
		24...60	20...60	2 2	AF16Z-22-00K-21	1SBL176505R2100	0.315
		48...130	48...130	2 2	AF16Z-22-00K-22	1SBL176505R2200	0.315
		100...250	100...250	2 2	AF16Z-22-00K-23	1SBL176505R2300	0.315



AF09..K, AF16..K

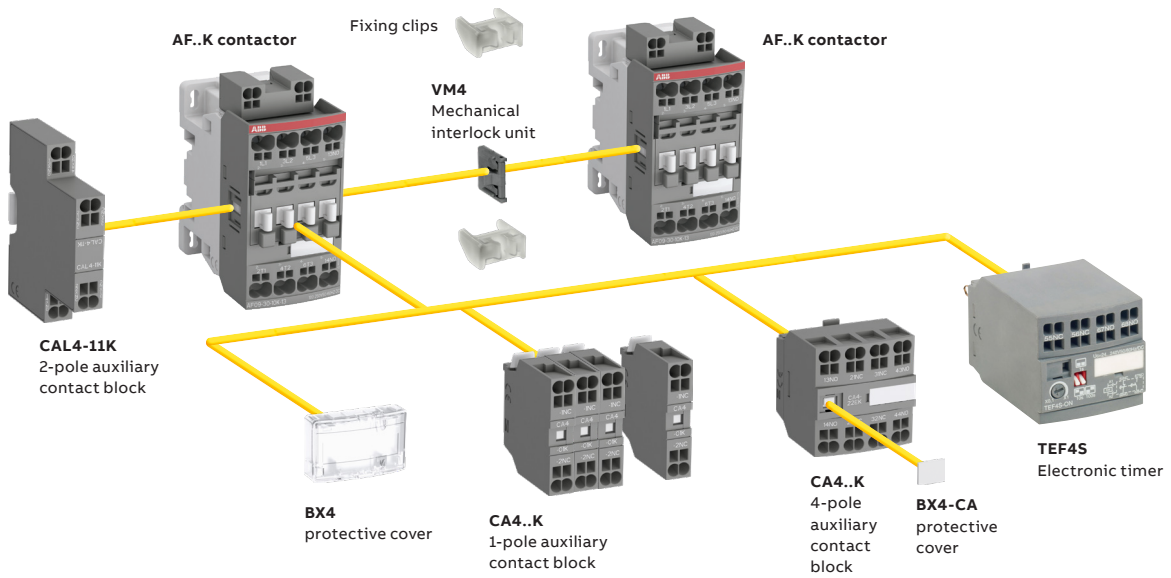
Main dimensions mm, inches

AF09..K ... AF16..K 4-pole contactors - with Push-in Spring terminals

Main accessories

Contactor and main accessories (other accessories available)

AF09..K ... AF16..K



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories						Side-mounted accessories	
			Auxiliary contact blocks		Electronic timer	Mechanical latching unit	Mechanical interlock unit (between 2 contactors)		Auxiliary contact blocks	
									Left side	Right side
			1-pole CA4..K	4-pole CA4..K	TEF4S	WA4(4)	VM4		2-pole CAL4-11K	
AF09(Z)..K ... AF16(Z)..K (1)										
AF09..K ... AF16..K	4 0	0 0 (1)	4 max.	**or 1**	**or 1**	**or 1**	–	+	**1**	–
	4 0	0 0 (2)	2 max.	–	**or 1**	**or 1**	–		**1**	**+ 1**
			3 max.	–	–	–	**+ 1(5)**		**1**	**or 1**
AF09..K... AF16..K	2 2	0 0 (2)	4 max.	**or 1**	**or 1**	**or 1**	–	+	**1**	–
			2 max.	–	**or 1**	**or 1**	–		**1**	**+ 1**

(1) Including add-on and built-in contacts: 4 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max. on positions 1 ±30°, 5

AF09..K ... AF16..K 4-pole contactors - with Push-in Spring terminals

Main accessories

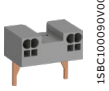
CA4-10K

CAL4-11K

CA4-22MK

VM4

TEF4S-ON



LDC4K

BX4

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks					
AF09..K ... AF16..K	1 0	CA4-10K	1SBN010160R1010	1	0.012
	1 0	CA4-10K-T	1SBN010160T1010	10	0.012
	0 1	CA4-01K	1SBN010160R1001	1	0.012
	0 1	CA4-01K-T	1SBN010160T1001	10	0.012
AF26 ... AF16..-40-00K	2 2	CA4-22EK	1SBN010146R1022	1	0.050
Side-mounted instantaneous auxiliary contact blocks					
AF09..K ...AF16..K	1 1	CAL4-11K	1SBN010134R1011	1	0.030
Mechanical interlock unit					
AF09..K ... AF16..K		VM4	1SBN030105T1000	10	0.005

Note: VM4 includes 2 fixing clips (BB4) to maintain together both contactors.

Fixing clips				
AF09..K ... AF16..K	BB4	1SBN110120W1000	50	0.002

Electronic timers

For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09..K ... AF16..K	0.1...1 s 1...10 s 10...100 s	ON-delay	1 1	TEF4S-ON	1SBN020113R1000	1	0.065
		OFF-delay	1 1	TEF4S-OFF	1SBN020115R1000	1	0.065

Note: Rated control circuit voltage Uc 24 ... 240 V 50/60 Hz or DC. Terminals with spring mode only.

Additional coil terminal block				
AF09..K ... AF16..K	LDC4K	1SBN070159T1000	10	0.010

Protective covers				
AF09..K ... AF16..K 1-stack contactors and NF contactor relays	BX4	1SBN110108T1000	10	0.006
4-pole CA4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000	50	0.001

Note: CA4..K and CAL4-11K contact blocks can be used on AF09...AF96 contactors.

AF09 ..K... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AC / DC operated	AF09..K	AF16..K
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1	
Rated operational voltage Ue max.			1000 V	
Rated frequency (without derating)			50 / 60 Hz	
Conventional free-air thermal current Ith				
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C			35 A	35 A
With conductor cross-sectional area			6 mm²	6 mm²
AC-1 Utilization category				
For air temperature close to contactor				
Ie / Rated operational current AC-1		θ ≤ 40 °C	25 A	30 A
Ue max. ≤ 690 V, 50/60 Hz		θ ≤ 60 °C	25 A	30 A
		θ ≤ 70 °C	22 A	26 A
With conductor cross-sectional area			4 mm²	6 mm²
AC-3 Utilization category				
For air temperature close to contactor θ ≤ 60 °C				
Ie / Max. rated operational current AC-3 (1)				
 3-phase motors		220-230-240 V	9 A	18 A
		380-400 V	9 A	18 A
		415 V	9 A	18 A
		440 V	9 A	18 A
		500 V	9.5 A	15 A
		690 V	7 A	10.5 A
		1000 V		
Rated operational power AC-3 (1)				
 1500 r.p.m. 50 Hz		220-230-240 V	2.2 kW	4 kW
1800 r.p.m. 60 Hz		380-400 V	4 kW	7.5 kW
3-phase motors		415 V	4 kW	9 kW
		440 V	4 kW	9 kW
		500 V	5.5 kW	9 kW
		690 V	5.5 kW	9 kW
		1000 V		
Rated making capacity AC-3			10 x Ie AC-3 acc. to IEC 60947-4-1	
Rated breaking capacity AC-3			8 x Ie AC-3 acc. to IEC 60947-4-1	
Short-circuit protection device for contactors				
Without thermal overload relay - Motor protection excluded				
Ue ≤ 500 V AC - gG type fuse			25 A	32 A
Rated short-time withstand current Icw		1 s	300 A	300 A
At 40 °C ambient temperature,		10 s	150 A	150 A
in free air from a cold state		30 s	80 A	80 A
		1 min	60 A	60 A
		15 min	35 A	35 A
Maximum breaking capacity	N.O. main pole	at 440 V	250 A	250 A
cos ϕ = 0.45		at 690 V	106 A	106 A
	N.C. Main pole	at 440 V	-	-
		at 690 V	-	-
Power dissipation per pole		Ie / AC-1	0.8 W	1.2 W
		Ie / AC-3	0.1 W	0.35 W
Max. electrical switching frequency		AC-1	600 cycles/h	

(1) For the corresponding kW/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor Rated Operational Powers and Currents"
(2) For the protection of motor starters against short circuits, see "Coordination with Short-circuit Protection Devices".
(3) 400 V 3-phase motors only.

AF09 ..K... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to UL/NEMA/CSA

Contactor types	AC / DC operated	AF09..K	AF16..K
Standards		UL 508, CSA C22.2 N°14	
Max. operational voltage		600 V	
UL / CSA general use rating			
	600 V AC	25 A	30 A
With conductor cross-sectional area		AWG 10	AWG 10
1 pole	80 V DC	25 A (1)	30 A (1)
2 poles in serie	160 V DC	25 A (1)	30 A (1)
3 poles in serie	240 V DC	25 A	30 A
4 poles in serie	320 V DC	25 A	30 A
With conductor cross-sectional area		AWG 10	AWG 10
Max. electrical switching frequency			
For general use		600 cycles/h	

Note: 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles, see "General technical data".
(1) 20 A for AF09..-22-00 and AF16..-22-00.

Main pole utilization characteristics - 4 N.O. non-reversing contactors

Contactor types	AC / DC operated	AF09..K	AF16..K
Lighting application - UL / CSA - breaking all lines			
Electrical discharge lamps (ballast)			
1-phase per pole	347 V AC	20 A	30 A
3-phase break all lines	600 V AC	20 A	30 A
Elevator control, load switching, 500 000 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1			
1-phase			
Horse power rating	110-120 V AC	-	1/2 hp
	220-240 V AC	-	1-1/2 hp
3-phase			
Horse power rating	200-208 V AC	-	3 hp
	220-240 V AC	-	3 hp
	440-480 V AC	-	7-1/2 hp
	550-600 V AC	-	10 hp

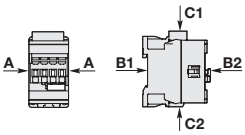
Note: 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles, see "General technical data".

AF09..K... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

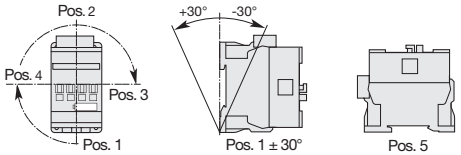
General technical data

Contactor types	AC / DC operated		AF09..K	AF16..K
Rated insulation voltage Ui				
acc. to IEC 60947-4-1			690 V	
acc. to UL / CSA			600 V	
Rated impulse withstand voltage Uimp.			6 kV	
Electromagnetic compatibility			Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)	
Ambient air temperature close to contactor				
Operation			-40...+70 °C	
Storage			-60...+80 °C	
Climatic withstand			Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude (without derating)			3000 m	
Mechanical durability				
Number of operating cycles			10 millions operating cycles	
Max. switching frequency			3600 cycles/h	
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1				
		Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position	
	4 N.O. Main poles	A	30 g	
		B1	25 g Closed position / 5 g Open position	
		B2	15 g	
		C1	25 g	
		C2	25 g	
	2 N.O. + 2 N.C. Main poles	A	30 g	
		B1	25 g Closed position / 5 g Open position	
		B2	15 g	
		C1	25 g	
		C2	25 g	
Vibration withstand acc. to IEC 60068-2-6			5 ... 300 Hz 4 g Closed position / 2 g Open position	

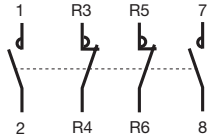


(1) Environment B: all AF09 ... AF38 contactors produced since week 08-2013.
AF09 ... AF38-..-..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only: for environment B select AF09Z ... AF38Z-..-..-22.

Mounting characteristics and conditions for use

Contactor types	AF09..K	AF16..K
Mounting positions	 Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09 ... AF80	
Mounting distances	The contactors can be assembled side by side	
Fixing		
On rail according to IEC 60715, EN 60715	35 x 7.5 mm or 35 x 15 mm	
By screws (not supplied)	2 x M4 screws placed diagonally	

Remark for 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles

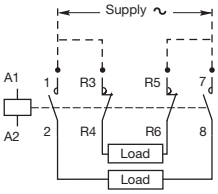


These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams beside). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

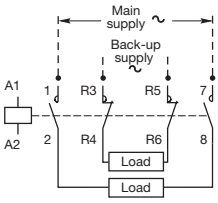
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

- Single supply and 2 separate loads



- 2 separate supplies and 2 separate loads



AF09..K... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

Magnet system characteristics AF09..K ... AF16..K AC / DC operated

Contactor types	AC / DC operated	AF09..K	AF16..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.	
	DC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max	
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc		24...500 V AC	
Coil consumption	Average pull-in value	50 VA	
	Average holding value	2.2 VA / 2 W	
DC control voltage			
Rated control circuit voltage Uc		20...500 V DC	
Coil consumption	Average pull-in value	50 W	
	Average holding value	2 W	
PLC-output control		AF...-11 not suitable for direct control by PLC-output.	
Drop-out voltage		≤ 60 % of Uc min.	
Voltage sag immunity acc. to SEMI F47-0706		–	
Dips withstand -20 °C ≤ θ ≤ +60 °C		–	
Operating time			
Between coil energization and:	N.O. contact closing	40...95 ms	
	N.C. contact opening	38...90 ms	
Between coil de-energization and:	N.O. contact opening	11...95 ms	
	N.C. contact closing	13...98 ms	

Magnet System Characteristics AF09Z..K ... AF16Z..K AC / DC operated for specific applications - coils 20, 21, 22, 23

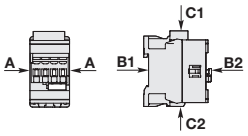
Contactor types	AC / DC operated	AF09Z..K	AF16Z..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.	
	DC supply	at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max	
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc		24...250 V AC	
Coil consumption	Average pull-in value	16 VA	
	Average holding value	1.7 VA / 1.5 W	
DC control voltage			
Rated control circuit voltage Uc		12...250 V DC	
Coil consumption	Average pull-in value	12 ... 16 W	
	Average holding value	1.7 W	
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs - Not suitable for safety PLCs	
Drop-out voltage		≤ 60 % of Uc min.	
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z coil 21, 22, 23) conditions of use on request	
Dips withstand -20 °C ≤ θ ≤ +60 °C		(AF..Z coil 21, 22, 23) 20 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC	
Operating time			
Between coil energization and:	N.O. contact closing	40...95 ms	
	N.C. contact opening	38...90 ms	
Between coil de-energization and:	N.O. contact opening	11...95 ms	
	N.C. contact closing	13...98 ms	

AF09..K ... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

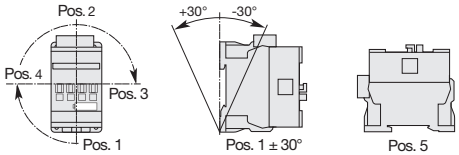
General technical data

Contactor types	AC / DC operated	AF09..K	AF16..K
Rated insulation voltage Ui			
acc. to IEC 60947-4-1		690 V	
acc. to UL / CSA		600 V	
Rated impulse withstand voltage Uimp.		6 kV	
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)	
Ambient air temperature close to contactor			
Operation		-40...+70 °C	
Storage		-60...+80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude (without derating)		3000 m	
Mechanical durability			
Number of operating cycles		10 millions operating cycles	
Max. switching frequency		3600 cycles/h	
Shock withstand			
acc. to IEC 60068-2-27 and EN 60068-2-27			
Mounting position 1			
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position	
4 N.O. Main poles	A	30 g	
	B1	25 g Closed position / 5 g Open position	
	B2	15 g	
	C1	25 g	
	C2	25 g	
2 N.O. + 2 N.C. Main poles	A	30 g	
	B1	25 g Closed position / 5 g Open position	
	B2	15 g	
	C1	25 g	
	C2	25 g	
Vibration withstand		5 ... 300 Hz	
acc. to IEC 60068-2-6		4 g Closed position / 2 g Open position	

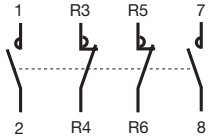


(1) Environment B: all AF09 ... AF38 contactors produced since week 08-2013.
AF09..K ... AF16..K-..-..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only: for environment B select AF09Z..K ... AF16Z..K-..-..-22.

Mounting characteristics and conditions for use

Contactor types	AF09..K	AF16..K
Mounting positions	 Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09 ... AF80	
Mounting distances	The contactors can be assembled side by side	
Fixing		
On rail according to IEC 60715, EN 60715	35 x 7.5 mm or 35 x 15 mm	
By screws (not supplied)	2 x M4 screws placed diagonally	

Remark for 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles

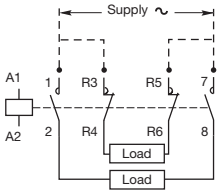


These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams beside). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

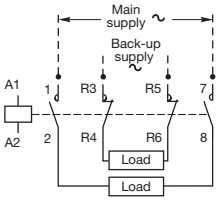
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

- Single supply and 2 separate loads



- 2 separate supplies and 2 separate loads



AF09..K ... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

Magnet system characteristics AF09..K ... AF16..K AC / DC operated

Contactor types	AC / DC operated	AF09..K	AF16..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.	
	DC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.	
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc		24 ... 500 V AC	
Coil consumption	Average pull-in value	50 VA	
	Average holding value	2.2 VA / 2 W	
DC control voltage			
Rated control circuit voltage Uc		20 ... 500 V DC	
Coil consumption	Average pull-in value	50 W	
	Average holding value	2 W	
PLC-output control		Not suitable for direct control by PLC-output	
Drop-out voltage		≤ 60 % Uc min.	
Operating time			
Between coil energization and:			
	N.O. contact closing	40 ... 95 ms	
	N.C. contact opening	38 ... 90 ms	
Between coil de-energization and:			
	N.O. contact opening	11 ... 95 ms	
	N.C. contact closing	13 ... 98 ms	

Magnet System Characteristics for AF09Z..K ... AF16Z..K contactors - for specific applications - coils 20, 21, 22, 23

Contactor types	AC / DC operated	AF09Z..K	AF16Z..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max	
	DC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max	
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc		24 ... 250 V AC	
Coil consumption	Average pull-in value	16 VA	
	Average holding value	1.7 VA / 1.5 W	
DC control voltage			
Rated control circuit voltage Uc		12 ... 250 V DC	
Coil consumption	Average pull-in value	12 ... 16 W	
	Average holding value	1.7 W	
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs - Not suitable for safety PLCs	
Drop-out voltage		≤ 60 % of Uc min.	
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z coil 21, 22, 23) conditions of use on request	
Dips withstand -20 °C ≤ θ ≤ +60°C		(AF..Z coil 21, 22, 23) 20 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC	
Operating time			
Between coil energization and:			
	N.O. contact closing	40 ... 95 ms	
	N.C. contact opening	38 ... 90 ms	
Between coil de-energization and:			
	N.O. contact opening	11 ... 95 ms	
	N.C. contact closing	13 ... 98 ms	

AF09..K ... AF16..K 4-pole contactors - with Push-in Spring terminals

Technical data

Connecting characteristics

Contactor types	AC / DC operated		AF09..K	AF16..K
Main terminals			 Push-in Spring terminals	
Connection capacity (min. ... max.)				
Main conductors (poles)				
Rigid	Solid (≤ 2.5 mm²)	1 x	1 ... 6 mm²	
	Stranded (≥ 4 mm²)	2 x	1 ... 6 mm²	
Flexible		1 x	1 (push-in) / 0.5 (spring) ... 4 mm²	
with non insulated ferrule		2 x	1 (push-in) / 0.5 (spring) ... 4 mm²	
Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 4 mm²	
		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²	
Flexible without ferrule		1 x	(spring) 0.5 ... 4 mm²	
		2 x	(spring) 0.5 ... 4 mm²	
Connection capacity acc. to UL/CSA (Solid ≤ AWG 14)		1 or 2 x	AWG 18 ... 10	
Stripping length			12 mm	
Auxiliary conductors (built-in auxiliary terminals + coil terminals)				
Rigid solid		1 x	1 ... 2.5 mm²	
		2 x	1 ... 2.5 mm²	
Flexible with		1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²	
non insulated ferrule		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²	
Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²	
		2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²	
Flexible without ferrule		1 x	(spring) 0.5 ... 2.5 mm²	
		2 x	(spring) 0.5 ... 2.5 mm²	
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 14	
Stripping length			10 mm	
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529				
Main terminals			IP20	
Coil terminals			IP20	
Built-in auxiliary terminals			IP20	
Screwdriver type	All terminals		Flat Ø 3 mm x 0.5 mm	

4-pole contactors - with Push-in Spring terminals

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.

If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then:

- Categories AC-1: Ic = Ie

Generally speaking Ic = m x Ie where m is a multiple of the load operational current.

On next pages, the curves corresponding to categorie AC-1 represent the electrical durability variation of standard contactors in relation to the breaking current Ic.

Electrical durability curves:

- categories AC-1: the curves represent the electrical durability variation of standard contactors in relation to the breaking current Ic.

Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

Electrical durability forecast and contactor selection for categories AC-1

- Note the characteristics of the load to be controlled:
  - Operational voltage..... Ue
  - Current normally drawn..... Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents").
  - Utilization category..... AC-1
  - Breaking current..... Ic = Ie for AC-1
- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Case of uninterrupted duty

For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).

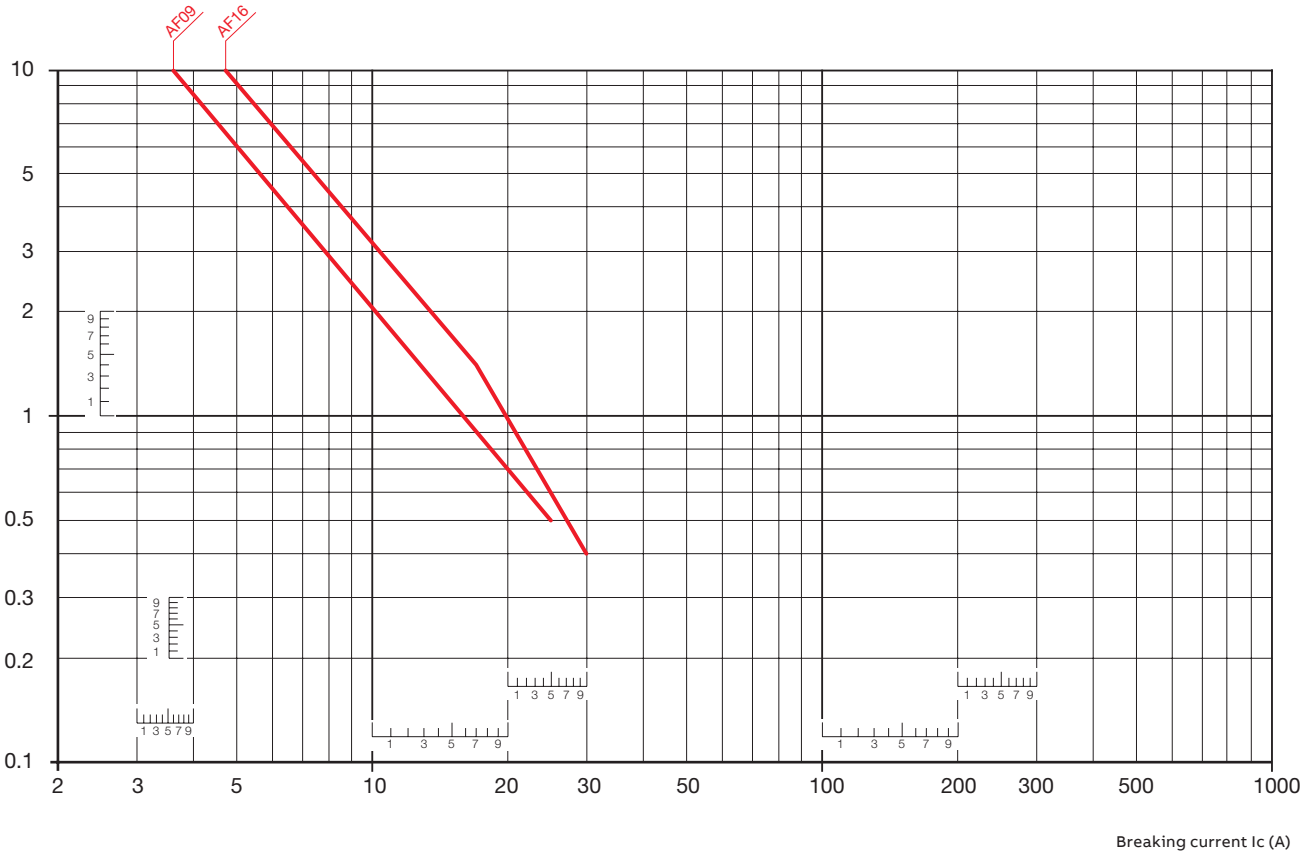
The combined effect of environmental conditions and the proper temperature of the product may require some disposals.

As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

4-pole contactors with Push-in Spring terminals

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 690 V
Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.
Ambient temperature and maximum electrical switching frequency: see "Technical data".

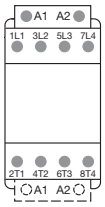


AF09..K ... AF16..K 4-pole contactors

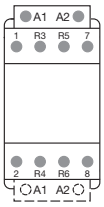
Terminal marking and positioning

AF09..K ... AF16..K contactors - AC / DC operated

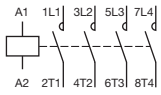
Standard devices without addition of auxiliary contacts



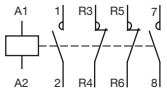
AF09 ... AF16..-40-00K



AF09 ... AF16..-22-00K

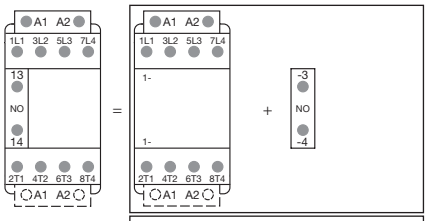


AF09 ... AF16..-40-00K

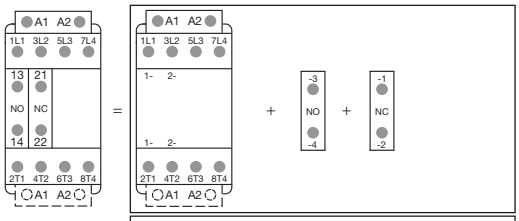


AF09 ... AF16..-22-00K

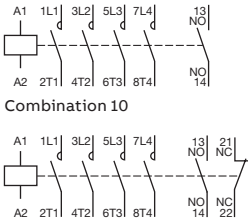
Other possible contact combinations with auxiliary contacts added by the user



Combination 10 = AF09.. AF16..K..-40-00K + CA4-10K

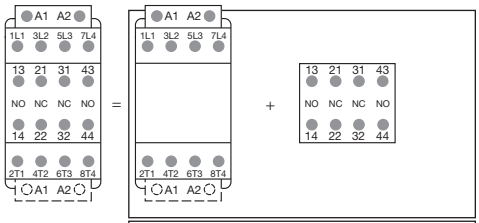


Combination 11 = AF09.. AF16..K..-40-00K + CA4-10K + CA4-01K

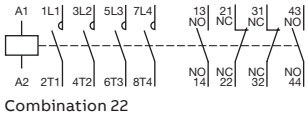


Combination 10

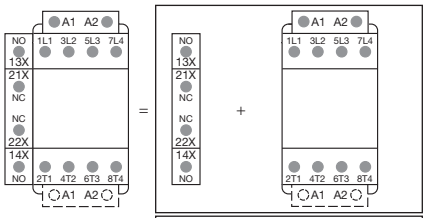
Combination 11



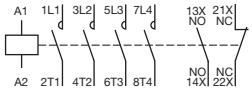
Combination 22 = AF09.. AF16..K..-40-00K + CA4-22EK



Combination 22



Combination 11 = CAL4-11 + AF09 ... AF80..-40-00

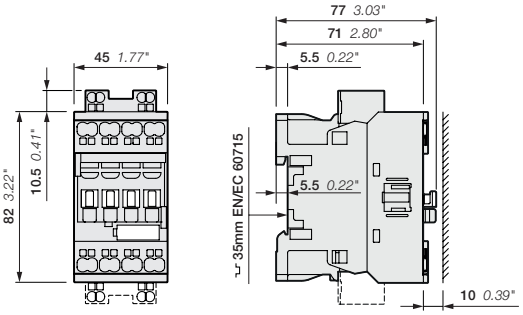


Combination 11

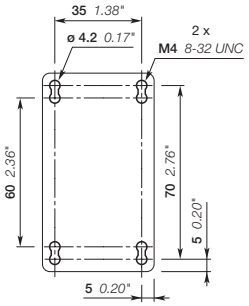
Note: only AF..Z contactor with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30) need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

AF09..K ... AF16..K 4-pole contactors - with Push-in Spring terminals

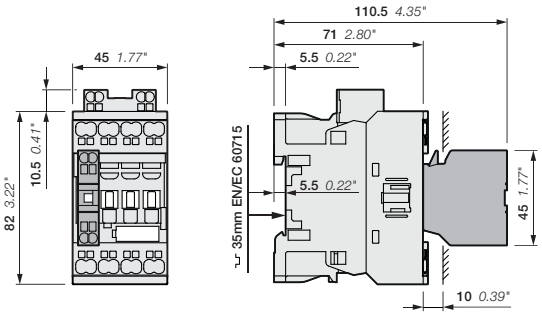
Dimensions



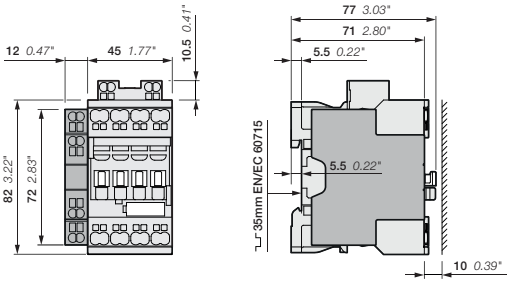
AF09..K ... AF16..K



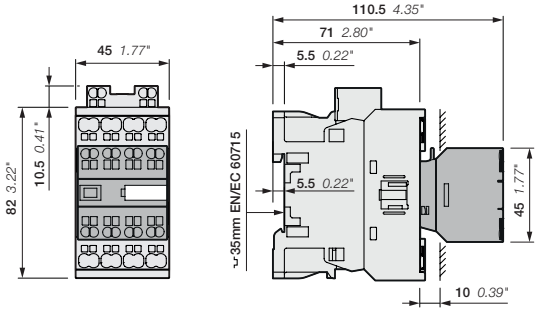
AF09..K ... AF16..K



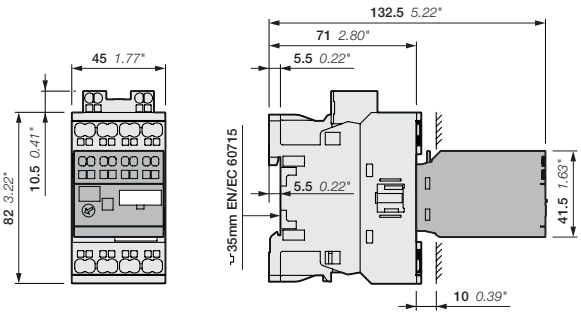
AF09..K ... AF16..K
+ CA4..K 1-pole auxiliary contact block



AF09..K ... AF16..K
+ CAL4-11K 2-pole auxiliary contact block



AF09..K ... AF16..K
+ CA4..K 4-pole auxiliary contact block



AF09..K ... AF16..K
+ TEF4S electronic timer

Main dimensions mm, inches

Add-on auxiliary contacts for AF09..K ... AF16..K contactors

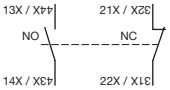
Terminal marking and positioning

1-pole auxiliary contacts

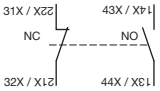
CA4-10K (1)

CA4-10K (1)

2-pole auxiliary contacts

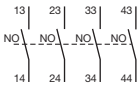


CAL4-11K(1)
(Left-side mounted)

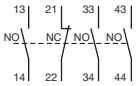


CAL4-11K (1)
(Right-side mounted)

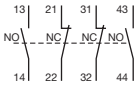
4-pole auxiliary contacts



CA4-40EK (1)



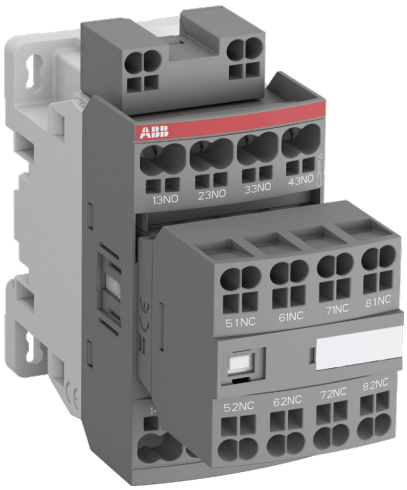
CA4-31EK (1)



CA4-22EK (1)

(1) available with Push-in Spring terminals

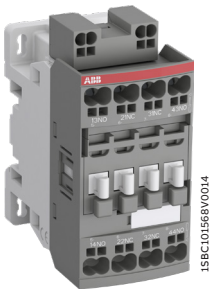

13NO
21NC
31NC
43NO
14NO
22NC
32NC
44NO


13NO
23NO
33NO
43NO
51NC
61NC
71NC
81NC
52NC
62NC
72NC
82NC

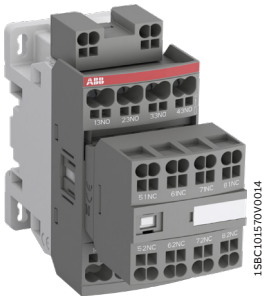
NF..K contactor relays

NF..K contactor relays - with Push-in Spring terminals

AC / DC operated



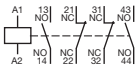
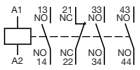
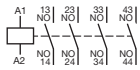
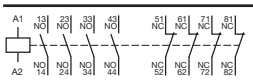
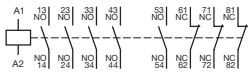
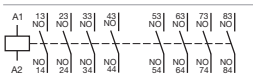
NF22EK



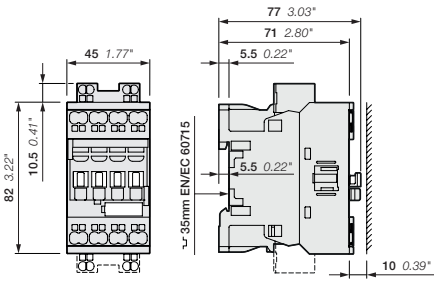
NF44EK

NF..K contactor relays are used for switching auxiliary and control circuits.
These contactor relays are of the block type design with:

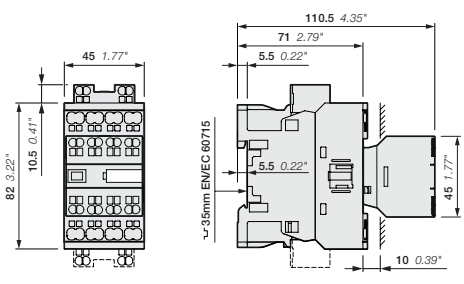
- 4 poles and 8 poles with a permanently fixed 4-pole auxiliary contact block.
  Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - reduced panel energy consumption
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays					
	24 ... 60	20 ... 60 (1)	NF22EK-11	1SBH137005R1122	0.285
	48 ... 130	48 ... 130	NF22EK-12	1SBH137005R1222	0.285
	100 ... 250	100 ... 250	NF22EK-13	1SBH137005R1322	0.285
	250 ... 500	250 ... 500	NF22EK-14	1SBH137005R1422	0.325
	24 ... 60	20 ... 60 (1)	NF31EK-11	1SBH137005R1131	0.285
	48 ... 130	48 ... 130	NF31EK-12	1SBH137005R1231	0.285
	100 ... 250	100 ... 250	NF31EK-13	1SBH137005R1331	0.285
	250 ... 500	250 ... 500	NF31EK-14	1SBH137005R1431	0.325
	24 ... 60	20 ... 60 (1)	NF40EK-11	1SBH137005R1140	0.285
	48 ... 130	48 ... 130	NF40EK-12	1SBH137005R1240	0.285
	100 ... 250	100 ... 250	NF40EK-13	1SBH137005R1340	0.285
	250 ... 500	250 ... 500	NF40EK-14	1SBH137005R1440	0.325
8-pole contactor relays					
	24 ... 60	20 ... 60 (1)	NF44EK-11	1SBH137005R1144	0.330
	48 ... 130	48 ... 130	NF44EK-12	1SBH137005R1244	0.330
	100 ... 250	100 ... 250	NF44EK-13	1SBH137005R1344	0.330
	250 ... 500	250 ... 500	NF44EK-14	1SBH137005R1444	0.370
	24 ... 60	20 ... 60 (1)	NF53EK-11	1SBH137005R1153	0.330
	48 ... 130	48 ... 130	NF53EK-12	1SBH137005R1253	0.330
	100 ... 250	100 ... 250	NF53EK-13	1SBH137005R1353	0.330
	250 ... 500	250 ... 500	NF53EK-14	1SBH137005R1453	0.370
	24 ... 60	20 ... 60 (1)	NF62EK-11	1SBH137005R1162	0.330
	48 ... 130	48 ... 130	NF62EK-12	1SBH137005R1262	0.330
	100 ... 250	100 ... 250	NF62EK-13	1SBH137005R1362	0.330
	250 ... 500	250 ... 500	NF62EK-14	1SBH137005R1462	0.370
	24 ... 60	20 ... 60 (1)	NF71EK-11	1SBH137005R1171	0.330
	48 ... 130	48 ... 130	NF71EK-12	1SBH137005R1271	0.330
	100 ... 250	100 ... 250	NF71EK-13	1SBH137005R1371	0.330
	250 ... 500	250 ... 500	NF71EK-14	1SBH137005R1471	0.370
	24 ... 60	20 ... 60 (1)	NF80EK-11	1SBH137005R1180	0.330
	48 ... 130	48 ... 130	NF80EK-12	1SBH137005R1280	0.330
	100 ... 250	100 ... 250	NF80EK-13	1SBH137005R1380	0.330
	250 ... 500	250 ... 500	NF80EK-14	1SBH137005R1480	0.370

(1) NF..K-11 not suitable for direct control by PLC-output.



NF22EK, NF31EK, NF40EK

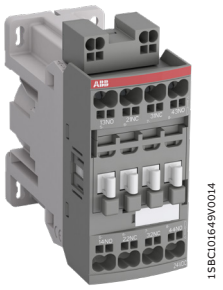


NF44EK, NF53EK, NF62EK, NF71EK, NF80EK

Main dimensions mm, inches

NFZ..K contactor relays - with Push-in Spring terminals

24 V DC operated designed for PLC



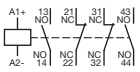
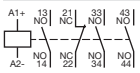
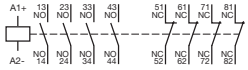
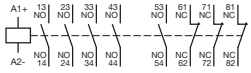
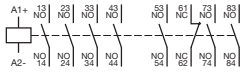
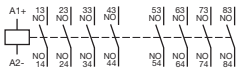
NFZ22EK-30

NFZ44EK-30

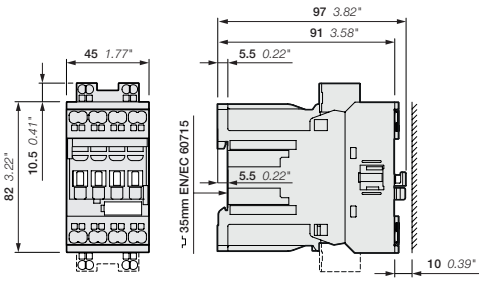
NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with 4 poles or 8 poles (with a permanently fixed 4-pole auxiliary contact block).

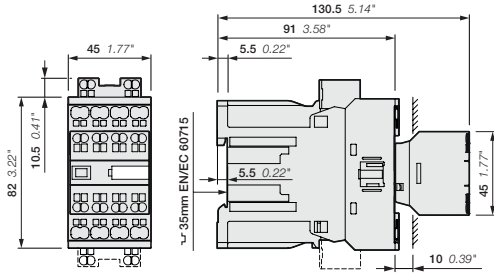
- contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: 24 V DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays				
	24	NFZ22EK-30	1SBH136005R3022	0.435
	24	NFZ31EK-30	1SBH136005R3031	0.435
	24	NFZ40EK-30	1SBH136005R3040	0.435
8-pole contactor relays				
	24	NFZ44EK-30	1SBH136005R3044	0.490
	24	NFZ53EK-30	1SBH136005R3053	0.490
	24	NFZ62EK-30	1SBH136005R3062	0.490
	24	NFZ71EK-30	1SBH136005R3071	0.490
	24	NFZ80EK-30	1SBH136005R3080	0.490

Note: NFZ contactor relays with 24 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.
For product availability, please consult your ABB local sales organization.



NFZ22EK, NFZ31EK, NFZ40EK



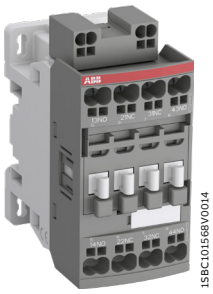
NFZ44EK, NFZ53EK, NFZ62EK, NFZ71EK, NFZ80EK

Main dimensions mm, inches

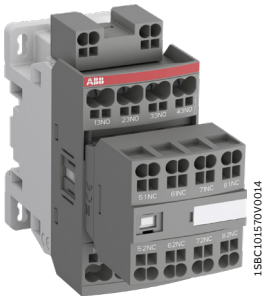
1SBC100212C0203_Push-in Spring catalog_2023

NFZ..K contactor relays - with Push-in Spring terminals

AC / DC operated for specific applications



NFZ22EK



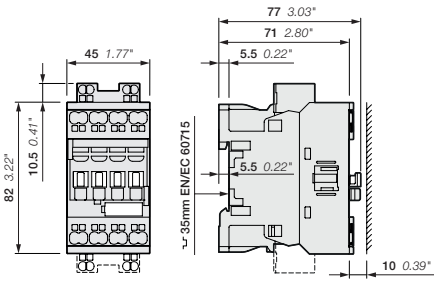
NFZ44EK

NFZ..K contactor relays are used for switching auxiliary and control circuits.
These contactor relays are of the block type design with:

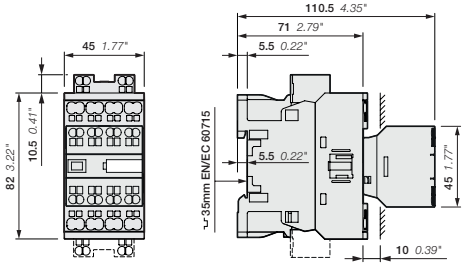
- 4 poles and 8 poles with a permanently fixed 4-pole auxiliary contact block.
  Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays					
	–	12 ... 20	NFZ22EK-20	1SBH136005R2022	0.315
	24 ... 60	20 ... 60	NFZ22EK-21	1SBH136005R2122	0.315
	48 ... 130	48 ... 130	NFZ22EK-22	1SBH136005R2222	0.315
	100 ... 250	100 ... 250	NFZ22EK-23	1SBH136005R2322	0.315
	–	12 ... 20	NFZ31EK-20	1SBH136005R2031	0.315
	24 ... 60	20 ... 60	NFZ31EK-21	1SBH136005R2131	0.315
	48 ... 130	48 ... 130	NFZ31EK-22	1SBH136005R2231	0.315
	100 ... 250	100 ... 250	NFZ31EK-23	1SBH136005R2331	0.315
	–	12 ... 20	NFZ40EK-20	1SBH136005R2040	0.315
	24 ... 60	20 ... 60	NFZ40EK-21	1SBH136005R2140	0.315
	48 ... 130	48 ... 130	NFZ40EK-22	1SBH136005R2240	0.315
	100 ... 250	100 ... 250	NFZ40EK-23	1SBH136005R2340	0.315
8-pole contactor relays					
	–	12 ... 20	NFZ44EK-20	1SBH136005R2044	0.360
	24 ... 60	20 ... 60	NFZ44EK-21	1SBH136005R2144	0.360
	48 ... 130	48 ... 130	NFZ44EK-22	1SBH136005R2244	0.360
	100 ... 250	100 ... 250	NFZ44EK-23	1SBH136005R2344	0.360
	–	12 ... 20	NFZ53EK-20	1SBH136005R2053	0.360
	24 ... 60	20 ... 60	NFZ53EK-21	1SBH136005R2153	0.360
	48 ... 130	48 ... 130	NFZ53EK-22	1SBH136005R2253	0.360
	100 ... 250	100 ... 250	NFZ53EK-23	1SBH136005R2353	0.360
	–	12 ... 20	NFZ62EK-20	1SBH136005R2062	0.360
	24 ... 60	20 ... 60	NFZ62EK-21	1SBH136005R2162	0.360
	48 ... 130	48 ... 130	NFZ62EK-22	1SBH136005R2262	0.360
	100 ... 250	100 ... 250	NFZ62EK-23	1SBH136005R2362	0.360
	–	12 ... 20	NFZ71EK-20	1SBH136005R2071	0.360
	24 ... 60	20 ... 60	NFZ71EK-21	1SBH136005R2171	0.360
	48 ... 130	48 ... 130	NFZ71EK-22	1SBH136005R2271	0.360
	100 ... 250	100 ... 250	NFZ71EK-23	1SBH136005R2371	0.360
	–	12 ... 20	NFZ80EK-20	1SBH136005R2080	0.360
	24 ... 60	20 ... 60	NFZ80EK-21	1SBH136005R2180	0.360
	48 ... 130	48 ... 130	NFZ80EK-22	1SBH136005R2280	0.360
	100 ... 250	100 ... 250	NFZ80EK-23	1SBH136005R2380	0.360

Note: NFZ contactor relays with 12...20 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



NFZ22EK, NFZ31EK, NFZ40EK

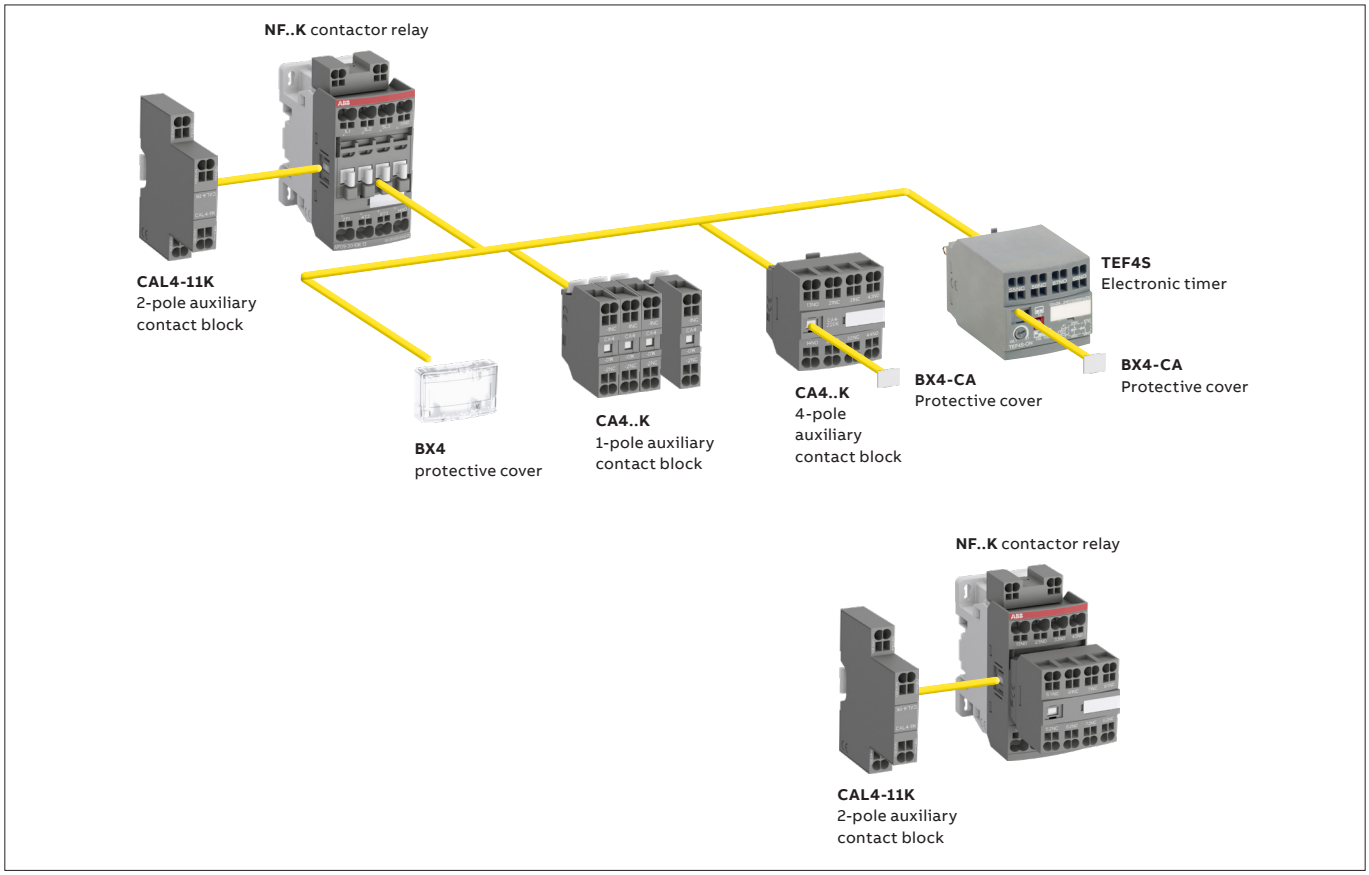


NFZ44EK, NFZ53EK, NFZ62EK, NFZ71EK, NFZ80EK

Main dimensions mm, inches

NF..K contactor relays - with Push-in Spring terminals

Contactor relays and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories
Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles		Front-mounted accessories				Side-mounted accessories	
			Auxiliary contact blocks		Electronic timer		Auxiliary contact blocks 2-pole CAL4-11K	
			1-pole CA4..K	4-pole CA4..K	TEF4S		Left side	Right side
NF(Z)								
NF	2 2	EK (1)	4 max.	or 1	or 1	+	1	-
	3 1	EK (1)	2 max.	-	or 1	+	1	+ 1
	4 0	EK (2)						
NF	4 4	EK	-	-	- -	+	1	-
	5 3	EK						
	6 2	EK						
	7 1	EK						
	8 0	EK						
NFZ 24 V DC designed for PLC - coil 30								
NFZ	2 2	EK (1)	4 max.	**or** 1	**or** 1	**or**	1	+ 1
	3 1	EK (1)	2 max.	-	**or** 1	+	1	
	4 0	EK (2)			1	+	1	+ 1
NFZ	4 4	EK	-	-	-		-	-
	5 3	EK						
	6 2	EK						
	7 1	EK						
	8 0	EK						

(1) Including add-on contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5
(2) Including add-on contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5

NF..K contactor relays - with Push-in Spring terminals

Main accessories

CA4-10K

CAL4-11K

CA4-22NK

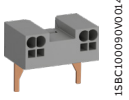
For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks					
4-pole NF..K	1 0	CA4-10K	1SBN010160R1010	1	0.012
	1 0	CA4-10K-T	1SBN010160T1010	10	0.012
	0 1	CA4-01K	1SBN010160R1001	1	0.012
	0 1	CA4-01K-T	1SBN010160T1001	10	0.012
	4 0	CA4-40NK	1SBN010146R1240	1	0.050
	3 1	CA4-31NK	1SBN010146R1231	1	0.050
	2 2	CA4-22NK	1SBN010146R1222	1	0.050
	1 3	CA4-13NK	1SBN010146R1213	1	0.050
NF..40EK	0 4	CA4-04NK	1SBN010146R1204	1	0.050
Side-mounted instantaneous auxiliary contact blocks					
NF..K	1 1	CAL4-11K	1SBN010134R1011	1	0.030

TEF4S-ON

Electronic timers

For contactor relays	Time delay range selected by switch	Delay type	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
4-pole NF..K	0.1...1 s 1...10 s 10...100 s	ON-delay	1 1	TEF4S-ON	1SBN020113R1000	1	0.065
		OFF-delay	1 1	TEF4S-OFF	1SBN020115R1000	1	0.065

Note: Rated control circuit voltage Uc 24 ... 240 V 50/60 Hz or DC. Terminals with spring mode only.



LDC4K

Additional coil terminal block

4-pole NF	LDC4K	1SBN070159T1000	10	0.010

Protective covers

All 1-stack contactor relays	BX4	1SBN110108T1000	10	0.006
4-pole CA4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000	50	0.001

BX4

NF..K contactor relays - with Push-in Spring terminals

Technical data

Contact utilization characteristics according to IEC

Contactor relay types	AC / DC operated	NF..K
Standards		IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1
Rated operational voltage Ue max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Conditional short-circuit current		1 kA
Rated short-time withstand current Icw	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Power dissipation per pole at 6 A		0.1 W
Maximum electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts

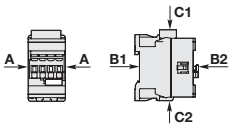
Contact utilization characteristics according to UL / CSA

Contactor relay types	NF..K
Standards	UL 508, CSA C22.2 N°14
Maximum operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

NF..K contactor relays - with Push-in Spring terminals

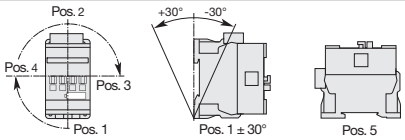
Technical data

General technical data

Contactor relay types	AC / DC operated	NF..K
Rated insulation voltage Ui		
acc. to IEC 60947-5-1		690 V
acc. to UL / CSA		600 V
Rated impulse withstand voltage Uimp.		6 kV
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)
Ambient air temperature close to contactor relay		
Operation in free air		-40 ... +70 °C
Storage		-60 ... +80 °C
Climatic withstand		Category B according to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)		3000 m
Mechanical durability		
Number of operating cycles		20 million operating cycles
Maximum switching frequency		6000 cycles/h
Shock withstand		
acc. to IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	30 g
	B1	25 g closed position / 5 g open position
	B2	15 g
	C1	25 g
	C2	25 g
Vibration withstand		5 ... 300 Hz
acc. to IEC 60068-2-6		4 g closed position / 2 g open position

(1) NF..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only. For environment B: select NFZ..-22.

Mounting characteristics

Contactor relay types	AC / DC operated	NF..K
Mounting positions		 Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF contactor relay
Mounting distances		The contactor relays can be assembled side by side
Fixing		
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)		2 x M4 screws placed diagonally

Connecting characteristics

Contactor relay types	AC / DC operated		NF..K
Main terminals			 Push-in Spring terminals
Connection capacity (min. ... max.)			
Pole and coil terminals			
Rigid		1 x	1 ... 2.5 mm²
		2 x	1 ... 2.5 mm²
Flexible with non insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
		2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
Flexible without ferrule		1 x	(spring) 0.5 ... 2.5 mm²
		2 x	(spring) 0.5 ... 2.5 mm²
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 14
Stripping length			10 mm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			IP20
Screwdriver type	All terminals		Flat Ø 3 mm x 0.5 mm

NF..K contactor relays - with Push-in Spring terminals

Technical data

Magnet System Characteristics for NF..K contactor relays - AC / DC operated

Contactor relay types	AC / DC operated	NF..K
Coil operating limits acc. to IEC 60947-5-1	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
	DC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		24 ... 500 V AC
Coil consumption	Average pull-in value	50 VA
	Average holding value	2.2 VA / 2 W
DC control voltage		
Rated control circuit voltage Uc		20 ... 500 V DC
Coil consumption	Average pull-in value	50 W
	Average holding value	2 W
PLC-output control		Not suitable for direct control by PLC-output
Drop-out voltage		≤ 60 % of Uc min.
Voltage sag immunity according to SEMI F47-0706		–
Dips withstand -20 °C ≤ θ ≤ +60°C		–
Operating time		
Between coil energization and:		
	N.O. contact closing	40 ... 95 ms
	N.C. contact opening	38 ... 90 ms
Between coil de-energization and:		
	N.O. contact opening	11 ... 95 ms
	N.C. contact closing	13 ... 98 ms

Magnet System Characteristics for NFZ..K contactor relays 24V DC operated - designed for PLC - coil 30

Contactor relay types	AC / DC operated	NFZ..K
Coil operating limits acc. to IEC 60947-5-1	DC supply	At θ ≤ 60 °C 0.85 ... 1.1 x Uc At θ ≤ 70 °C Uc
DC control voltage		
Rated control circuit voltage Uc		24 V DC
Coil consumption	Average pull-in value	6 W
	Average holding value	1.7 W
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection
Drop-out voltage		≤ 60 % of Uc min.
Operating time		
Between coil energization and:		
	N.O. contact closing	27 ... 53 ms
	N.C. contact opening	20 ... 35 ms
Between coil de-energization and:		
	N.O. contact opening	17 ... 29 ms
	N.C. contact closing	22 ... 57 ms

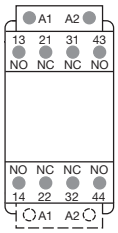
Magnet System Characteristics for NFZ..K contactor relays - for specific applications - coils 20, 21, 22, 23

Contactor relay types	AC / DC operated	NFZ..K
Coil operating limits acc. to IEC 60947-5-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max
	DC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		24 ... 250 V AC
Coil consumption	Average pull-in value	16 VA
	Average holding value	1.7 VA / 1.5 W
DC control voltage		
Rated control circuit voltage Uc		12 ... 250 V DC
Coil consumption	Average pull-in value	12 ... 16 W
	Average holding value	1.7 W
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs - Not suitable for safety PLCs
Drop-out voltage		≤ 60 % of Uc min.
Voltage sag immunity according to SEMI F47-0706		(NFZ coil 21, 22, 23) conditions of use on request
Dips withstand -20 °C ≤ θ ≤ +60°C		(NFZ coil 21, 22, 23) 20 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC
Operating time		
Between coil energization and:		
	N.O. contact closing	40 ... 95 ms
	N.C. contact opening	38 ... 90 ms
Between coil de-energization and:		
	N.O. contact opening	11 ... 95 ms
	N.C. contact closing	13 ... 98 ms

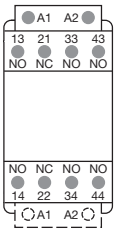
NF..K contactor relays - with Push-in Spring terminals

Terminal marking and positioning

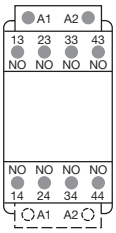
Standard devices without addition of auxiliary contacts



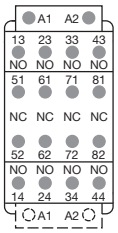
NF22EK



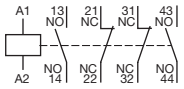
NF31EK



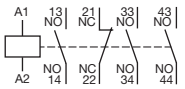
NF40EK



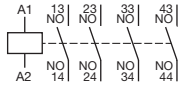
NF44EK



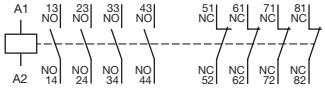
NF22EK



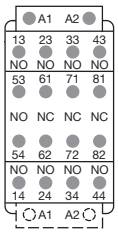
NF31EK



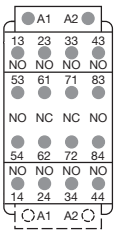
NF40EK



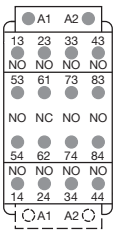
NF44EK



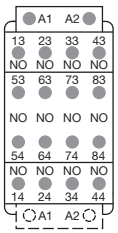
NF53EK



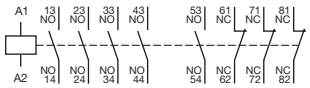
NF62EK



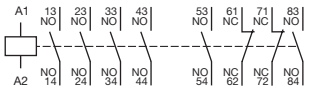
NF71EK



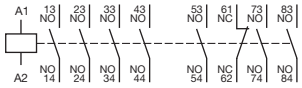
NF80EK



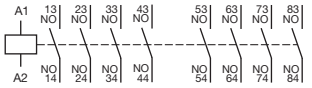
NF53EK



NF62EK

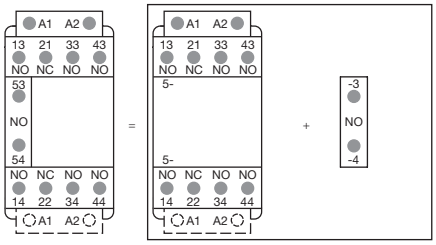


NF71EK

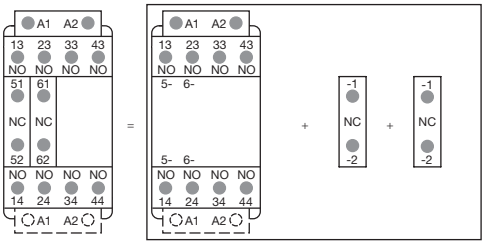


NF80EK

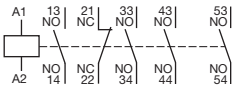
Other possible contact combinations with auxiliary contacts added by the user



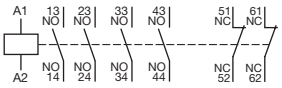
Combination 41 = NF31EK + CA4-10K



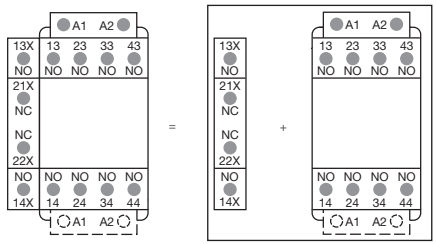
Combination 42 = NF40EK + CA4-01K + CA4-01K



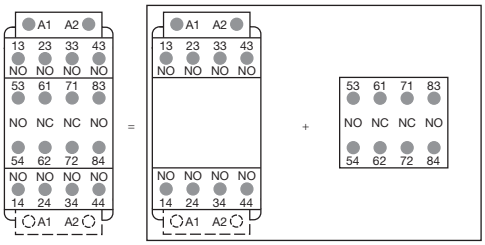
Combination 41 E



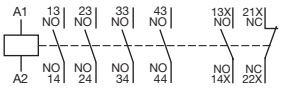
Combination 42 E



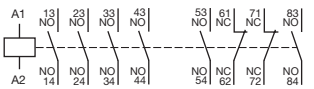
Combination 51 = CAL4-11K + NF40EK



Combination 62 = NF40EK + CA4-22NK



Combination 51 E



Combination 62 E

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

NF..K add-on auxiliary contacts - with Push-in Spring terminals

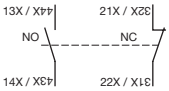
Terminal marking and positioning

1-pole auxiliary contacts

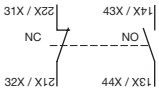
CA4-01K

CA4-10K

2-pole auxiliary contacts

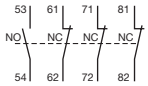


CAL4-11K
(Left side-mounted)

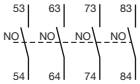


CAL4-11K
(Right side-mounted)

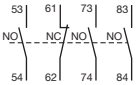
4-pole auxiliary contacts



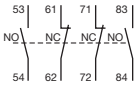
CA4-13NK



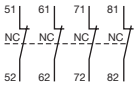
CA4-40NK



CA4-31NK



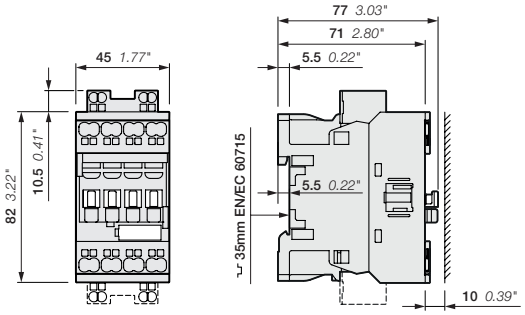
CA4-22NK



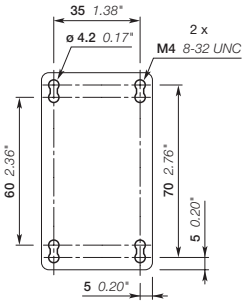
CA4-04NK

NF..K contactor relays - with Push-in Spring terminals

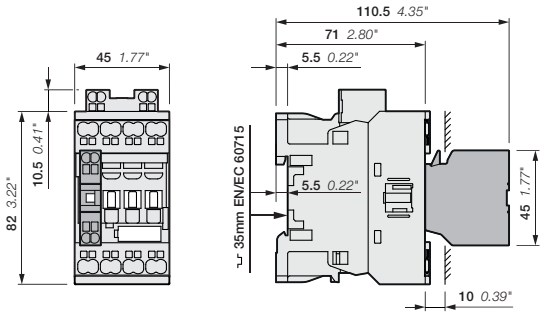
Dimensions



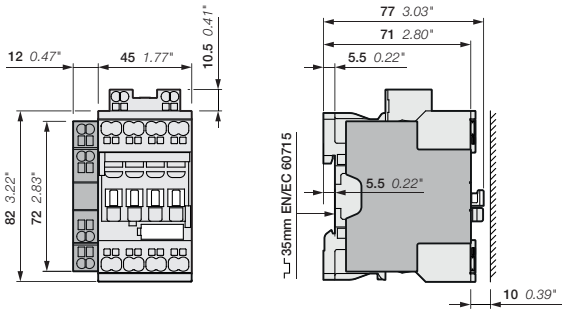
NF22EK, NF31EK, NF40EK



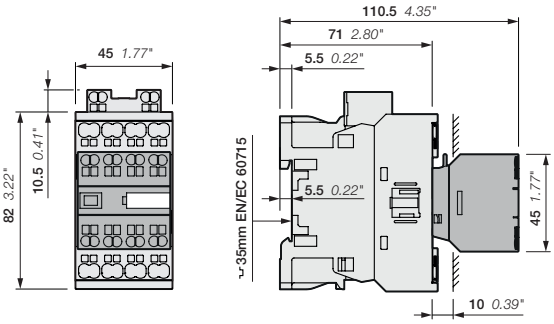
NF22EK, NF31EK, NF40EK



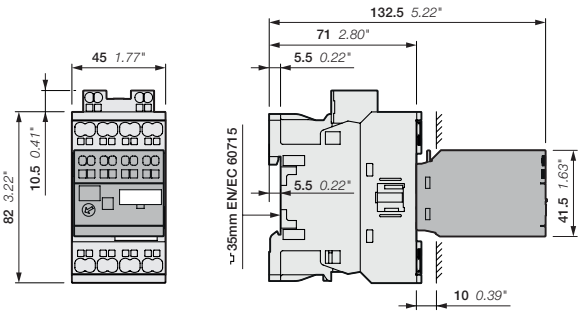
NF22EK, NF31EK, NF40EK
+ CA4..K 1-pole auxiliary contact block



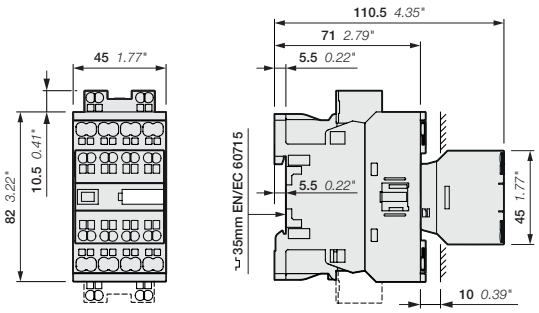
NF22EK, NF31EK, NF40EK
+ CAL4-11K 2-pole auxiliary contact block



NF22EK, NF31EK, NF40EK
+ CA4..K 4-pole auxiliary contact block



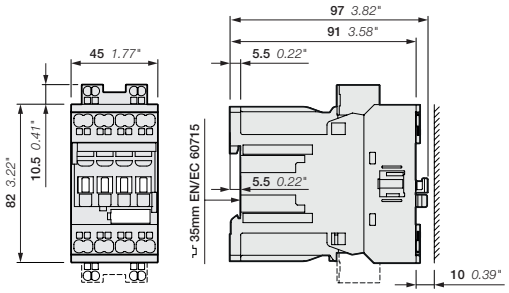
NF22EK, NF31EK, NF40EK
+ TEF4S electronic timer



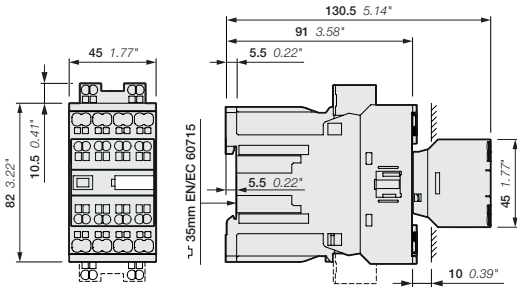
NF44EK, NF53EK, NF62EK, NF71EK, NF80EK

Note: contactor relay lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor (coil 30) depth + 20 mm (0.79").

Main dimensions mm, inches



NFZ22EK, NFZ31EK, NFZ40EK



NFZ44EK, NFZ53EK, NFZ62EK, NFZ71EK, NFZ80EK

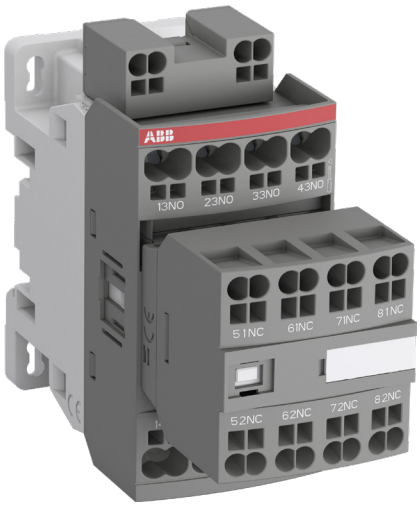


ABB
13NO
23NO
33NO
43NO
51NC
61NC
71NC
81NC
52NC
62NC
72NC
82NC

Accessories

Auxiliary contact blocks with Push-in Spring terminals

CA4-10K

CA4-22EK

CAL4-11K

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for front mounting:

- CA4..K 1 or 4-pole block, with instantaneous N.O., N.C. contacts

Select the 4-pole auxiliary contact blocks CA4-..EK, CA4-..MK or CA4-..NK type, according to the contactor or contactor relay type for compliance with the standard requirements (see "Terminal marking and positioning").

Types of auxiliary contact blocks for side mounting:

- CAL4..K 2-pole block, with instantaneous N.O. + N.C. contacts.

For clipping onto the right- and/or left-hand side of the contactors.

The auxiliary contact blocks are equipped with push-in spring terminals protected against accidental direct contact and bear the corresponding function marking.

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
front-mounted instantaneous auxiliary contact blocks					
AF09..K ... AF38..K NF..K	1 0	CA4-10K	1SBN010160R1010	1	0.012
	1 0	CA4-10K-T	1SBN010160T1010	10	0.012
	0 1	CA4-01K	1SBN010160R1001	1	0.012
	0 1	CA4-01K-T	1SBN010160T1001	10	0.012
AF09 ... AF16..-30-10K	2 2	CA4-22MK	1SBN010146R1122	1	0.050
	3 1	CA4-31MK	1SBN010146R1131	1	0.050
	1 3	CA4-13MK	1SBN010146R1113	1	0.050
	0 4	CA4-04MK	1SBN010146R1104	1	0.050
AF26 ... AF38..-30-00K AF09 ... AF16..-40-00K AF09 ... AF16..-22-00K	2 2	CA4-22EK	1SBN010146R1022	1	0.050
	3 1	CA4-31EK	1SBN010146R1031	1	0.050
	4 0	CA4-40EK	1SBN010146R1040	1	0.050
4-pole NF..K	1 3	CA4-13NK	1SBN010146R1213	1	0.050
	2 2	CA4-22NK	1SBN010146R1222	1	0.050
	3 1	CA4-31NK	1SBN010146R1231	1	0.050
	4 0	CA4-40NK	1SBN010146R1240	1	0.050
NF(Z)40EK	0 4	CA4-04NK	1SBN010146R1204	1	0.050
Side-mounted instantaneous auxiliary contact blocks					
3-pole					
AF09..K ... AF38..K NF...K	1 1	CAL4-11K	1SBN010134R1011	1	0.030

Note: for each contactor or contactor relay type, refer to "Accessory fitting details" table.

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays with Push-in Spring terminals

Technical data

Contact utilization characteristics according to IEC

Contactor relay types			1-pole CA4..K, 4-pole CA4..K, 2-pole CAL4..K
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1
Rated insulation voltage Ui acc. to IEC 60947-5-1			690 V
Rated impulse withstand voltage Uimp.			6 kV
Rated operational voltage Ue max.			690 V
Conventional thermal current Ith - θ ≤ 40 °C			16 A
Rated frequency (without derating)			50 / 60 Hz
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1		24-127 V 50/60 Hz	6 A
		220-240 V 50/60 Hz	4 A
		400-440 V 50/60 Hz	3 A
		500 V 50/60 Hz	2 A
		690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1		24 V DC	6 A / 144 W
		48 V DC	2.8 A / 134 W
		72 V DC	1 A / 72 W
		110 V DC	0.55 A / 60 W
		125 V DC	0.55 A / 69 W
		220 V DC	0.27 A / 60 W
		250 V DC	0.27 A / 68 W
		400 V DC	0.15 A / 60 W
		500 V DC	0.13 A / 65 W
		600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse			10 A
Conditional short-circuit current			1 kA
Rated short-time withstand current Icw		for 1.0 s	100 A
θ = 40 °C		for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4			12 V / 3 mA 10^{-7}
Power dissipation per pole at 6 A			0.1 W
Mechanical durability	Number of operating cycles		10 million operating cycles
	Max. switching frequency		3600 cycles/h
Max. electrical switching frequency		AC-15	1200 cycles/h
		DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1			Additional N.O. or N.C. auxiliary contacts (CA4, CAL4) are mechanically linked contacts.
Mirror contacts acc. to annex F of IEC 60947-4-1			Additional N.C. auxiliary contacts (CA4, CAL4) are mirror contacts.

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22 N°14
Max. operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Connecting characteristics

Connection capacity (min. ... max.)			
Rigid solid		1 x	1 ... 2.5 mm²
		2 x	1 ... 2.5 mm²
Flexible with ferrule		1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
		2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
Flexible without ferrule		1 x	(spring) 0.5 ... 2.5 mm²
		2 x	(spring) 0.5 ... 2.5 mm²
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 14
Stripping length			10 mm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			IP20
Screwdriver type			Flat Ø 3 mm x 0.5 mm

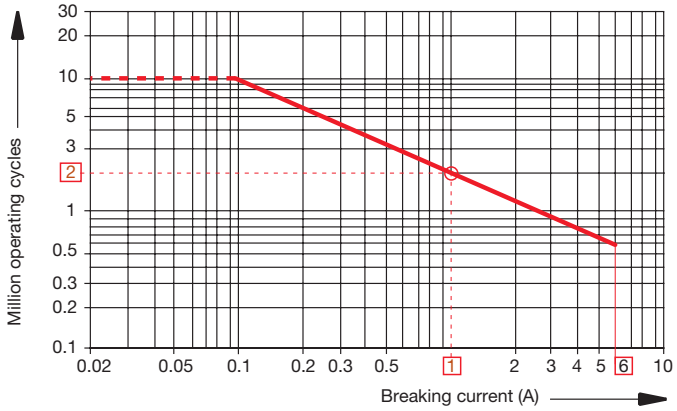
Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays with Push-in Spring terminals
Electrical durability

Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC 60947-5-1 / EN 60947-5-1:

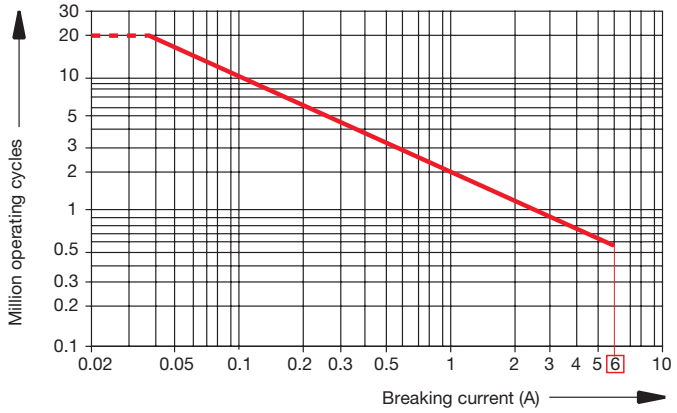
- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

These curves represent the electrical durability of the built-in or add-on auxiliary contacts in relation to the breaking current. The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



- AF09 ... AF38 contactor built-in auxiliary contacts
- 1-pole and 4-pole CA4, 2-pole CAT4,
- 1-pole CC4, 2-pole CAL4 add-on auxiliary contacts.

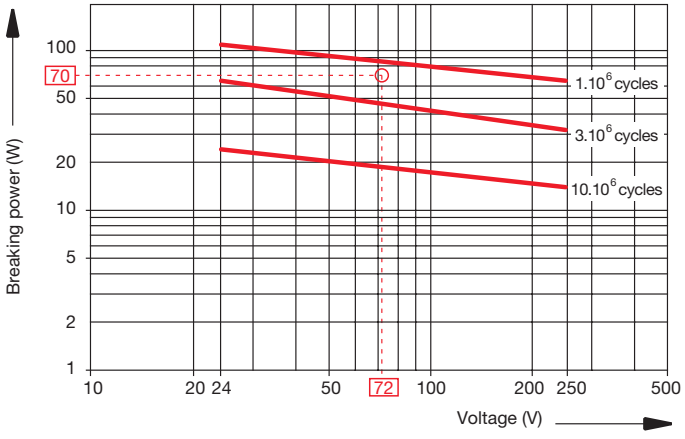
Example:
Breaking current = 1 A
On the opposite curve at intersection "O" 1 A the corresponding value for the electrical durability is approximately 2 millions operating cycles.



NF contactor relays.
(For add on auxiliary contacts see curve above).

Electrical durability for DC-13 utilization category

DC-13 utilization category according to IEC 60947-5-1 / EN 60947-5-1: making and breaking current Ie and Ue.



AF09 ... AF38 contactor built-in auxiliary contacts
1-pole and 4-pole CA4, 2-pole CAT4, 1-pole CC4,

- 2-pole CAL4 add-on auxiliary contacts,
- NF contactor relays.

Example:
Control of DC electro-magnet:
Ue voltage = 72 V DC and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2 millions operating cycles.

Add-on auxiliary contacts - with Push-in Spring terminals

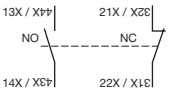
Terminal marking and positioning

1-pole auxiliary contacts

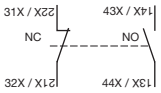
CA4-01K

CA4-10K

2-pole auxiliary contacts

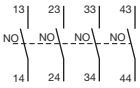


CAL4-11K
(Left-side mounted)

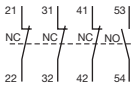


CAL4-11K
(Right-side mounted)

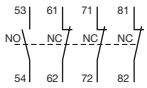
4-pole auxiliary contacts



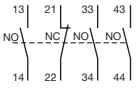
CA4-40EK



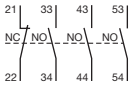
CA4-13MK



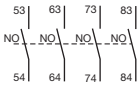
CA4-13NK



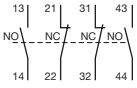
CA4-31EK



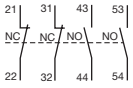
CA4-31MK



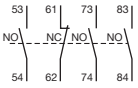
CA4-40NK



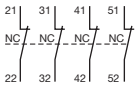
CA4-22EK



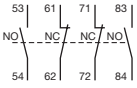
CA4-22MK



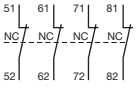
CA4-31NK



CA4-04MK



CA4-22NK



CA4-04NK

Electronic timers - with spring terminals

TEF4S frontal electronic timers are used for realizing timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF4S electronic timers are front-mounted and locked on AF..K..S contactors or NF..K..S contactor relays. A mechanical indicator allows to show the state of the contactor.

Safe and cost-reduced wiring

TEF4S electronic timers are supplied by a direct plug-in parallel connection to the coil terminals A1 - A2 of the contactor or contactor relay. A varistor is integrated on the timer to offer a built-in protection against surges in the contactor coil.

Available for a wide control voltage range 24 ... 240 V AC / DC

TEF4S-ON or TEF4S-OFF allow time-delayed functions up to 100 s in 3 distinct time ranges, independently of the control system. The time delay ranges are selected by a switch and the time delay can be adjusted by means of a rotary switch. The timing function is activated by closing or opening the device on which the timer is mounted. The OFF-delay version operates without additional control supply.


1SBC101394F0014

TEF4S-ON


1SBC101393F0014

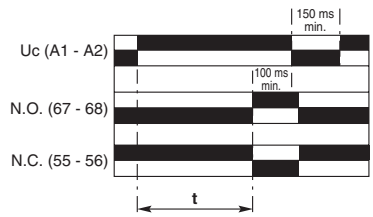
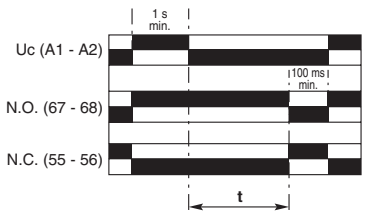
TEF4S-OFF

For contactors, contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage Uc V 50/60 Hz or DC	Auxiliary contacts	Type	Order code	Weight Pkg (1 pce) kg
AF09 ... AF96 NF	0.1...1 s 1...10 s 10...100 s	ON-delay	24...240	1 1	TEF4S-ON	1SBN020113R1000	0.065
		OFF-delay	24...240	1 1	TEF4S-OFF	1SBN020115R1000	0.065

Electronic timers - with spring terminals

Technical data

Contact utilization characteristics according to IEC

Types			TEF4S-ON	TEF4S-OFF
Standards			IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1			400 V	
Rated impulse withstand voltage Uimp			4 kV	
Rated operational voltage Ue max.			240 V	
Rated frequency (without derating)			50 / 60 Hz	
Conventional thermal current Ith - θ ≤ 40 °C			5 A	
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1		24-127 V 50/60 Hz	3 A	
		220-240 V 50/60 Hz	1.5 A	
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15	
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15	
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1		24 V DC	1 A / 24 W	
Short-circuit protection device gG type fuse			6 A	
Rated short-time withstand current Icw		for 1.0 s	8 A	
θ = 40 °C		for 0.1 s	8 A	
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		24 V DC	12 V / 3 mA 10-7	
Power dissipation per pole at 3 A			0.1 W	
Function diagram			ON-delay	OFF-delay
				
			Bistable relay inside. Before use, once apply Uc then switch it off in order to initialize position of the contacts.	
Control circuit voltage				
AC control voltage	Rated control circuit voltage Uc		24...240 V AC	
50/60 Hz	Average consumption		1.5 mA RMS	1 mA RMS
DC control voltage	Rated control circuit voltage Uc		24...240 V DC	
	Average consumption		1.5 mA	1 mA
Rated frequency limits			50 / 60 Hz	
Supply voltage range			0.85...1.1 x Uc (at θ ≤ 70 °C)	
Overvoltage protection			Varistor included	
Time delay range (t) selected by switch		0.1...1 s		
		1...10 s		
		10...100 s		
On-load reiteration accuracy under constant conditions			≤ 1 %	
Minimum ON period			0.1 s	1 s
Recovery time			0.15 s	0.1 s
Ambient air temperature	Operation		-25 °C ... +70 °C	
	Storage		-40 °C ... +80 °C	
Climatic withstand			Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude			2000 m	
Mounting positions			Mounting positions 1, 1 +/- 30°, 2, 3, 4, 5	
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 (Mounting position 1)			1/2 sinusoidal shock for 11 ms: no change in contact position Same as contactor or contactor relay	
Vibration withstand acc. to IEC 60068-2-6			5...300 Hz 3 g closed position / 2 g open position	
Mechanical durability				
	Number of operating cycles		5 millions operating cycles	
	Max. switching frequency		3600 cycles/h	1800 cycles/h
Max. electrical switching frequency				
		AC-15	1200 cycles/h	
		DC-13	900 cycles/h	

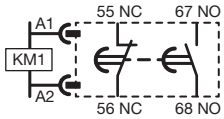
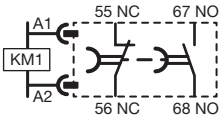
Electronic timers - with spring terminals

Technical data

Contact utilization characteristics according to UL / CSA

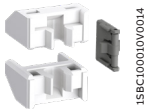
Types	TEF4S-ON	TEF4S-OFF
AC thermal rated current	5 A	
AC maximum volt-ampere making	3600 VA	
AC maximum volt-ampere breaking	360 VA	
DC thermal rated current	1 A	
DC maximum volt-ampere making-breaking	28 VA	

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...2.5 mm²
		2 x	1...2.5 mm²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...1.5 mm²
		2 x	0.75...1.5 mm²
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14
Stripping length			10 mm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			IP20
Screwdriver type			Flat Ø 3.5
Terminal Marking			 

Interlocks

Accessories for AF09..K ... AF38..K 3-pole contactors



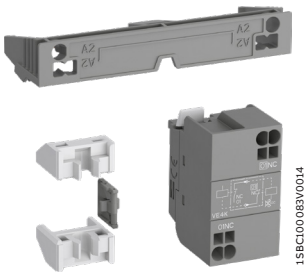
VM4

Mechanical interlock unit

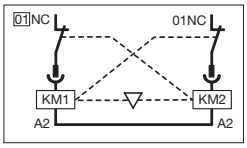
VM4 mechanical interlock unit is designed for the interlocking of two AF contactors.

When mounted between two contactors, the VM4 mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed. The mechanical interlock unit VM4 includes 2 fixing clips (BB4).

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09 ... AF38	VM4	1SBN030105T1000	10	0.005



VEM4K



BB4

Mechanical and electrical interlock set (1)

VEM4K mechanical and electrical interlock set for the interlocking of two AF..K contactors.

VEM4K set includes a mechanical interlock unit VM4 with 2 fixing clips (BB4) and a VE4K electrical interlock block with A2-A2 connection.

Fixing the electrical interlock block to the contactor front face connects the 2 built-in N.C. interlocking contacts with the two coils.

VE4K block must be used with A2-A2 connection to respect the electrical connection

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09..K .. AF16..K AF26..K .. AF38..K	1 1	VEM4K	-		0.030
Fixing clips					
AF09 ... AF96		BB4	1SBN110120W1000	50	0.002

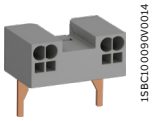
Note: VEM4K not suitable for AFZ contactors with DC control voltage 12...20 V DC.
(1) For more information, please consult your ABB local sales organization

Mechanical interlock unit

Types		VM4
Mechanical durability	Number of operating cycles	5 million operating cycles
	Max. mechanical switching frequency	1800 cycles/h

Other accessories

Accessories for AF09..K ... AF38..K contactors and NF..K contactor relays



LDC4K

Additional coil terminal block

Additional coil terminal block for a bottom access to the coil terminals of contactors or contactor relays.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09 ... AF96, NF	LDC4K	1SBN070159T1000	10	0.010

BX4

BX4-CA

Protective covers

Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.

AF09 ... AF96 1-stack contactors and NF contactor relays	BX4	1SBN110108T1000	10	0.006
4-pole CA4, 2-pole CAT4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000	50	0.001

Note: BX4 produced since 13045 (day 045 - year 2013) are suitable for AF40 ... AF96.

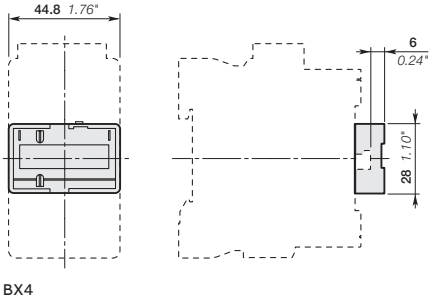
BA4

BA5-50

Function markers AF09..K ... AF38..K

Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters.
Marker dimensions: 7 x 20 mm (.276" x .787").

AF09 ... AF370 contactors, TF thermal overload relays, EF electronic overload relays and MS116, MS132, MS165 manual motor starters	BA4	1SNA235156R2700	16	0.011
AMS 500 support plate for 8 BA4	SPRC 1	1SNA360010R1500	1	0.220
HTP500 support plate	HTP500-BA4	1SNA235712R2400	1	0.290



BX4

Dimensions mm, inches

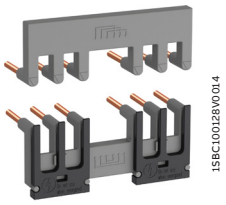
Connection accessories for starting solutions with Push-in Spring terminals

BEA16-4KF

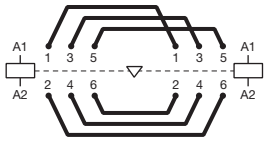
Connecting links with manual motor starters

The BEA..-4KF insulated 3-pole connecting links are used to connect AF09..K ... AF38..K contactors with the MS132-K manual motor starters. The BEA..-4KF insulated 3-pole connecting links ensure the electrical and mechanical connection between the contactor and the associated manual motor starter.

For 3-pole contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09..K ... AF16..K	MS132-0.16 ... MS132-25	BEA16-4KF	1SBN081325T1000	10	0.052
AF26..K ... AF38..K	MS132-0.16 ... MS132-32	BEA38-4KF	1SBN082325T2000	10	0.057



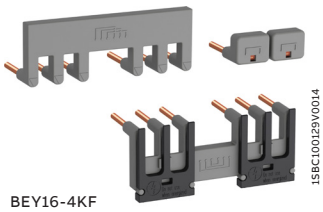
BER16-4KF



BER
Reversing connections

Connection sets for reversing contactors

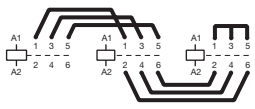
AF09..K ... AF16..K	BER16-4KF	1SBN081322R1000	1	0.050
AF26..K ... AF38..K	BER38-4KF	1SBN082322R1000	1	0.080



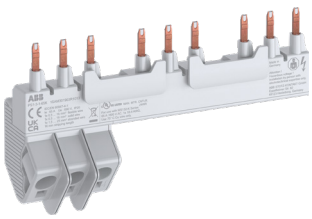
BEY16-4KF

Connection sets for star-delta starter

AF09..K ... AF16..K	BEY16-4KF	1SBN081323R2000	1	0.055
AF26..K ... AF38..K	BEY38-4KF	1SBN082323R2000	1	0.090



BEY
Line-delta-star connection



PS 1-3-1-65K busbar
with Push-in Spring terminals

Busbars with Push-in Spring terminals

Suitable for	Rated operational current A	No. of manual motor starter	Number of lateral auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
MS132K, MS132-KT	65	2	0	PS1-2-0-65K	1SAM301903R1002	1	0.091
	65	3	0	PS1-3-0-65K	1SAM301903R1003	1	0.116
	65	4	0	PS1-4-0-65K	1SAM301903R1004	1	0.140
	65	5	0	PS1-5-0-65K	1SAM301903R1005	1	0.165
	65	2	1	PS1-2-1-65K	1SAM301903R1012	1	0.094
	65	3	1	PS1-3-1-65K	1SAM301903R1013	1	0.123
	65	4	1	PS1-4-1-65K	1SAM301903R1014	1	0.151
	65	5	1	PS1-5-1-65K	1SAM301903R1015	1	0.178

Motor starting solution

DOL starters protected by MS132-K manual motor starters - Push-in Spring terminals

Motor rated operational powers and currents

The currents given below concern standard three-phase four-pole cage motors (1500 r.p.m. at 50 Hz 1800 r.p.m. at 60 Hz). These values are given for guidance and may vary according to the motor manufacturer and depending on the number of poles.

IEC	Motor nominal current: standardized values in grey (according to IEC 60947-4-1 Annex G)									
Motor power	220 V	230 V	240 V	380 V	400 V	415 V	440 V	500 V	660 V	690 V
kW	A	A	A	A	A	A	A	A	A	A
0.06	0.37	0.35	0.34	0.21	0.2	0.19	0.18	0.16	0.13	0.12
0.09	0.54	0.52	0.50	0.32	0.3	0.29	0.26	0.24	0.18	0.17
0.12	0.73	0.7	0.67	0.46	0.44	0.42	0.39	0.32	0.24	0.23
0.18	1	1	1	0.63	0.6	0.58	0.53	0.48	0.37	0.35
0.25	1.6	1.5	1.4	0.9	0.85	0.82	0.74	0.68	0.51	0.49
0.37	2.0	1.9	1.8	1.2	1.1	1.1	1	0.88	0.67	0.64
0.55	2.7	2.6	2.5	1.6	1.5	1.4	1.3	1.2	0.91	0.87
0.75	3.5	3.3	3.2	2.0	1.9	1.8	1.7	1.5	1.15	1.1
1.1	4.9	4.7	4.5	2.8	2.7	2.6	2.4	2.2	1.7	1.6
1.5	6.6	6.3	6	3.8	3.6	3.5	3.2	2.9	2.2	2.1
2.2	8.9	8.5	8.1	5.2	4.9	4.7	4.3	3.9	2.9	2.8
3	11.8	11.3	10.8	6.8	6.5	6.3	5.7	5.2	4	3.8
4	15.7	15	14.4	8.9	8.5	8.2	7.4	6.8	5.1	4.9
5.5	20.9	20	19.2	12.1	11.5	11.1	10.1	9.2	7	6.7
7.5	28.2	27	25.9	16.3	15.5	14.9	13.6	12.4	9.3	8.9
11	39.7	38	36.4	23.2	22	21.2	19.3	17.6	13.4	12.8
15	53.3	51	48.9	30.5	29	28	25.4	23	17.8	17
18.5	63.8	61	58.5	36.8	35	33.7	30.7	28	22	21
22	75.3	72	69	43.2	41	39.5	35.9	33	25.1	24
30	100	96	92	57.9	55	53	48.2	44	33.5	32
37	120	115	110	69	66	64	58	53	40.8	39
45	146	140	134	84	80	77	70	64	49.1	47
55	177	169	162	102	97	93	85	78	59.6	57
75	240	230	220	139	132	127	116	106	81	77
90	291	278	266	168	160	154	140	128	97	93
110	355	340	326	205	195	188	171	156	118	113
132	418	400	383	242	230	222	202	184	140	134
160	509	487	467	295	280	270	245	224	169	162
200	637	609	584	368	350	337	307	280	212	203
250	782	748	717	453	430	414	377	344	261	250
315	983	940	901	568	540	520	473	432	327	313
355	1109	1061	1017	642	610	588	535	488	370	354
400	1255	1200	1150	726	690	665	605	552	418	400
500	1545	1478	1416	895	850	819	745	680	515	493
560	1727	1652	1583	1000	950	916	832	760	576	551
630	1928	1844	1767	1116	1060	1022	929	848	643	615
710	2164	2070	1984	1253	1190	1147	1043	952	721	690
800	2446	2340	2243	1417	1346	1297	1179	1076	815	780
900	2760	2640	2530	1598	1518	1463	1330	1214	920	880
1000	3042	2910	2789	1761	1673	1613	1466	1339	1014	970

UL/CSA	Motor nominal current: single and three phase (according to UL 60947-4-1A)									
Motor power	120 V 1-ph	200 V 1-ph	200 V 3-ph	208 V 1-ph	208 V 3-ph	220-240 V 1-ph	220-240 V 3-ph	380-415 V 3-ph	440-480 V 3-ph	550-600 V 3-ph
hp	A	A	A	A	A	A	A	A	A	A
1/10	3	–	–	–	–	1.5	–	–	–	–
1/8	3.8	–	–	–	–	1.9	–	–	–	–
1/6	4.4	2.5	–	2.4	–	2.2	–	–	–	–
1/4	5.8	3.3	–	3.2	–	2.9	–	–	–	–
1/3	7.2	4.1	–	4	–	3.6	–	–	–	–
1/2	9.8	5.6	2.5	5.4	2.4	4.9	2.2	1.3	1.1	0.9
3/4	13.8	7.9	3.7	7.6	3.5	6.9	3.2	1.8	1.6	1.3
1	16	9.2	4.8	8.8	4.6	8	4.2	2.3	2.1	1.7
1-1/2	20	11.5	6.9	11	6.6	10	6	3.3	3	2.4
2	24	13.8	7.8	13.2	7.5	12	6.8	4.3	3.4	2.7
3	34	19.6	11	18.7	10.6	17	9.6	6.1	4.8	3.9
5	56	32.2	17.5	30.8	16.7	28	15.2	9.7	7.6	6.1
7-1/2	80	46	25.3	44	24.2	40	22	14	11	9
10	100	57.5	32.2	55	30.8	50	28	18	14	11
15	135	–	48.3	–	46.2	68	42	27	21	17
20	–	–	62.1	–	59.4	88	54	34	27	22
25	–	–	78.2	–	74.8	110	68	44	34	27
30	–	–	92	–	88	136	80	51	40	32
40	–	–	120	–	114	176	104	66	52	41
50	–	–	150	–	143	216	130	83	65	52
60	–	–	177	–	169	–	154	103	77	62
75	–	–	221	–	211	–	192	128	96	77
100	–	–	285	–	273	–	248	165	124	99
125	–	–	359	–	343	–	312	208	156	125
150	–	–	414	–	396	–	360	240	180	144
200	–	–	552	–	528	–	480	320	240	192
250	–	–	–	–	–	–	604	403	302	242
300	–	–	–	–	–	–	722	482	361	289
350	–	–	–	–	–	–	828	560	414	336
400	–	–	–	–	–	–	954	636	477	382
450	–	–	–	–	–	–	1030	–	515	412
500	–	–	–	–	–	–	1180	786	590	472

Customer assembled motor starting solutions

ABB Expertise

ABB has acquired years of experience with respect to problems of coordination and is able to make a complete offer based on tests performed in its qualified laboratories. This offer covers 400 V AC, 500 V AC, 690 V AC networks.

A complete database of coordination tables, according to IEC 60947-4-1 (EN 60947-4-1), and UL 60947-4-1 between the branch circuit protective device and the motor starter is available on the ABB Website.

In the coordination tables the following short-circuit protection devices are recommended:

- Case circuit-breakers (MCCBs)
- Miniature circuit-breakers (MCBs)
- Switch-disconnector-fuses (aM, gG and BS)
- Manual motor starters (MMS).

Select Optimized Coordination tool (SOC)

Selected Optimized Coordination is a web tool for the selection of ABB products to be used in the following applications:

- Motor starting and protection
- Selectivity between protection devices
- Back-up protection
- Other devices protection.

In order to guarantee the best performance and the longest lifetime, devices involved into the applications mentioned above (short-circuit protection devices, contactors, overload relays, softstarters, ...) need to be coordinated.

- The coordination among devices cannot be determined directly: tests in power laboratories shall be carried out to qualify the coordination type at low fault and high fault currents, according to IEC or UL standards.
- ABB coordination tables are the results of such tests and represent the ABB offerings in terms of motor starting and protection, selectivity, back-up and switch-disconnector protection.
- In Selected Optimized Coordination all available ABB coordination tables are stored and easily accessible.

Website access:

https://www.lowvoltage-tools.abb.com/soc/Motor

How to combine assemble and wire starter components

The section "customer assembled motor stating solutions" in this catalog gives the components lists and wiring diagrams to assemble the most typical motor starting solutions.

It covers direct-on-line Starters, reversing starters or star-delta starters protected with manual motor starters or with thermal overload relays for Type I or type II coordination for normal starting time.

Note:

In order to confirm your starter combination ratings according to ABB's lattest coordination test results, or to see other coordination of components please refer to the above mentioned SOC tool. SOC tool get constant updates and additions

General remarks applicable to all tables

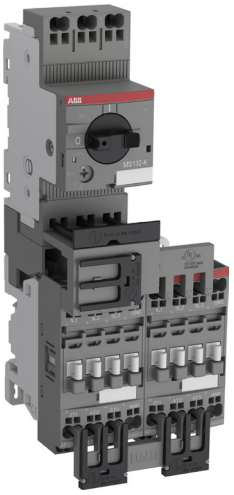
- Each table is defined for a maximum ambient temperature of 40 °C. For higher temperatures, apply a derating factor according to the following rules:
- Fuses: factor of 0.8 applied to In for an ambient temperature of 70 °C
- MCCBs and MCBs: factor of 0.8 applied to In for an ambient temperature of 60 °C
- The starter derating factor depends on the operating conditions of thermal overload relays:
- Factor of 0.9 applied to In for an ambient temperature of 70 °C.
- Each table is defined for motor currents: 3-phase motors, 4-pole
- Normal starting means a starting time < 2 s. - Difficult starting means an accelerating time 10 s < ts < 30 s
- Tripping classes of thermal overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10A and 10
- Tripping classes of electronic overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10E, 20E, 30E selectable
- In the tables with MCCBs, these are fitted with the magnetic relay alone. Setting is always carried out at > 12.3 Ie AC-3 so that the transient current peak occurring during starting does not lead to tripping.

DOL and reversing starters protected by manual motor starters

With AF contactors - open type version in kit form

1SFC101102V0001

DOL starter
MS132-10K + BEA16-4KF
+ AF09-30-10K

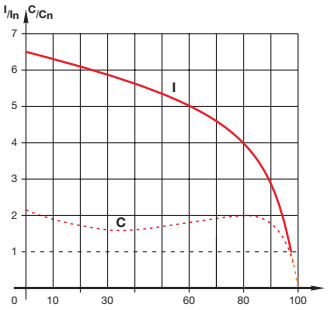


1SFC101105V0001

Reversing starter
MS132-10K + BEA16-4KF
+ BER16-4KF + AF09-30-10K

Application

Full voltage direct-on-line (DOL) starting and reversing starting for controlling three-phase asynchronous motors is a simple and economic solution characterised by a high starting torque (1.9 to 2.1 times full-speed torque) and a starting current 5.5 to 7 times nominal current.



I = current
C = torque
In = nominal current
Cn = nominal torque

Coordination types

The contactor and the manual motor starter control and protect motors against overload and short-circuits according to coordination types 1 and 2 (IEC 60947-4-1 / EN 60947-4-1) defining the anticipated level of service continuity as follow:

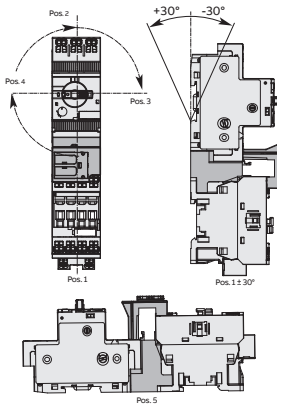
Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.

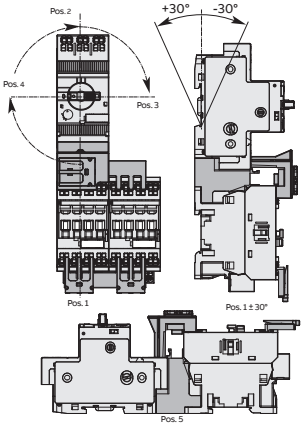
Main Technical Data

Standards		IEC 60947-4-1 / EN 60947-4-1
Rated operational voltage Ue max.		690 V - 50/60 Hz
Rated insulation voltage Ui		
acc. to IEC 60947-4-1		690 V
acc. to UL / CSA		600 V
Switching frequency		≤ 15 starts/hour - 80 % max. load factor - with max. 1.5 s starting time
		≤ 30 starts/hour - 50 % max. load factor - with max. 1.5 s starting time
Ambient air temperature		
Close to the device	use with MS116	≤ 55 °C
	use with MS132, MS165, MS495	≤ 60 °C
Degree of protection		IP20

Mounting positions



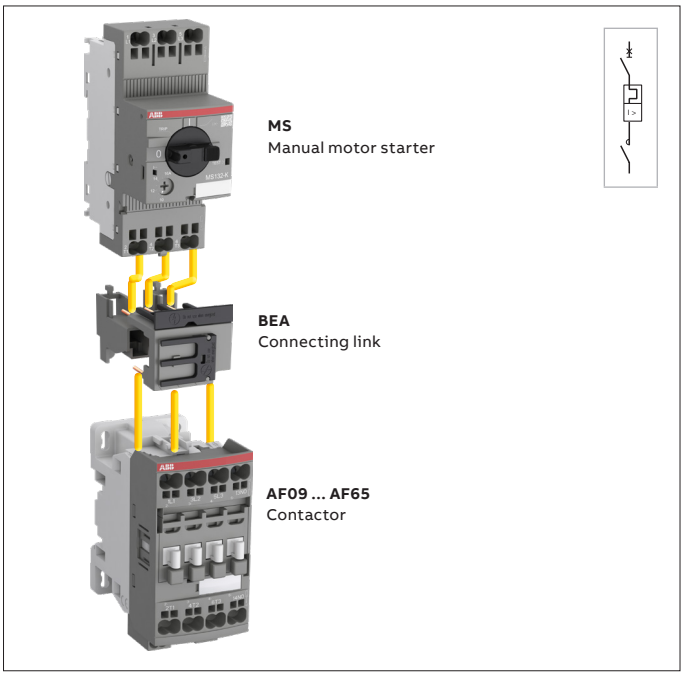
DOL starters



Reversing starters

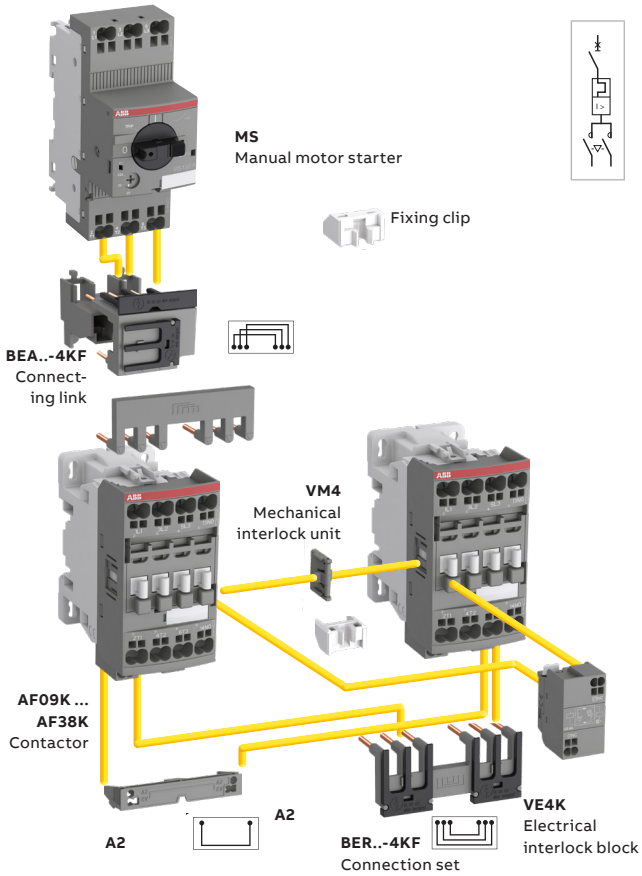
DOL and reversing starters protected by manual motor starters

With AF contactors - open type version in kit form



Direct-on-line starters

You can easily assemble a direct-on-line starter by using the BEA..-4KF connecting link 3-pole insulated. It is used to electrically and mechanically connect MS132-K manual motor starter and AF09 ... AF38..K contactor, AC or DC operated.



Reversing starters

You can easily assemble reversing starter thanks to our complete range of accessories:

- BEA..-4KF connecting link 3-pole insulated: it is used to electrically and mechanically connect MS132 manual motor starter and AF09..K ... AF38..K contactor, AC or DC operated.
- For AF09..K ... AF38..K, use VEM4K mechanical and electrical interlock set for reversing starter in 90 mm width. It includes:
  - VM4 mechanical interlock unit including 2 fixing clips.
  - VE4K electrical interlock block with A2-A2 connection.
- For AF40 ... AF96, use VM96-4 mechanical interlock unit and additional auxiliary contact blocks for electrical interlocking
- BER..-4KF connection set: it assures a safe and simple reversing connection between both contactor main terminals.

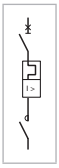
Select now easily and quickly your starter in the following pages for coordination type 1 or 2 at 400 V, 50/60 Hz, Iq = 16 kA up to 18.5 kW and Iq = 50 kA up to 45 kW.

For the full coordination tables, please visit our SOC tool :
https://www.lowvoltage-tools.abb.com/soc/Motor

DOL starters protected by manua lmotor starter

Coordination type 1 and type 2

Coordination type 1, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



Manual motor starters

Contactors

Accessories

BEA..-4KF

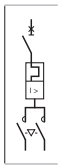
CA4-10K

IEC AC-3, 400 V Rated operational power	current	Manual motor starters Type	Order code	Setting range	Rated instantaneous short-circuit current setting Ii	Contactors Rated control circuit voltage Uc min. ... Uc max. (1)		Type	Order code	Allowed setting current	Accessories Type	Order code
kW	A			A	A	V 50/60 Hz	V DC			A		
Coordination type 1, AC-3, 50 kA, 400 V, 50/60 Hz												
0.06	0.2	MS132-0.25K	1SAM350010R1002	0.16...0.25	3.10	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.25	+ BEA16-4KF	1SBN081325T1000
0.09	0.3	MS132-0.4K	1SAM350010R1003	0.25...0.40	5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.4		
0.12	0.44	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.9	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63		
0.18	0.6	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.9	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63		
0.25	0.85	MS132-1.0K	1SAM350010R1005	0.63...1.00	12.5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1		
0.37	1.1	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.55	1.5	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.75	1.9	MS132-2.5K	1SAM350010R1007	1.60...2.50	31.3	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	2.5		
1.1	2.7	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	4		
1.5	3.6	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	4		
2.2	4.9	MS132-6.3K	1SAM350010R1009	4.00...6.30	78.8	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	6.3		
3	6.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	9		
4	8.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	9		
5.5	11.5	MS132-16K	1SAM350010R1011	10.0...16.0	240	100...250	100...250	AF12-30-10K-13	1SBL157005R1310	12		
7.5	15.5	MS132-16K	1SAM350010R1011	10.0...16.0	240	100...250	100...250	AF16-30-10K-13	1SBL177005R1310	16		
11	22	MS132-25K	1SAM350010R1014	20.0...25.0	375	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	25	+BEA38-4KF	1SBN082325T2000
15	29	MS132-32K	1SAM350010R1015	25.0...32.0	480	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	32	CA4-10K	1SBN010160R1010
Coordination type 2, AC-3,50 kA, 400 V, 50/60 Hz												
0.06	0.2	MS132-0.25K	1SAM350010R1002	0.16...0.25	3.10	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.25	+BEA16-4KF	1SBN081325T1000
0.09	0.3	MS132-0.4K	1SAM350010R1003	0.25...0.40	5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.4		
0.12	0.44	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.9	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63		
0.18	0.6	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.9	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63		
0.25	0.85	MS132-1.0K	1SAM350010R1005	0.63...1.00	12.5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1		
0.37	1.1	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.55	1.5	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.75	1.9	MS132-2.5K	1SAM350010R1007	1.60...2.50	31.3	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	2.5		
1.1	2.7	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	4	+BEA38-4KF	1SBN082325T2000
1.5	3.6	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	4	CA4-10K	1SBN010160R1010
2.2	4.9	MS132-6.3K	1SAM350010R1009	4.00...6.30	78.8	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	6.3		
3	6.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	10		
4	8.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	10		
5.5	11.5	MS132-16K	1SAM350010R1011	10.0...16.0	240	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	12		
7.5 (2)	15.5	MS132-16K	1SAM350010R1011	10.0...16.0	240	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	16		
11	22	MS132-25K	1SAM350010R1014	20.0...25.0	375	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	25		
15	29	MS132-32K	1SAM350010R1015	25.0...32.0	480	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	32		

(1) For other control voltages, see "ordering details pages".

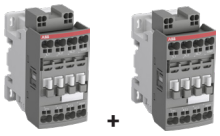
Reversing starters protected by MS manual motor starters

Coordination type 1

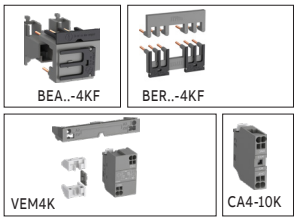


Manual motor starters

Contactors



Accessories



IEC AC-3, 400 V Rated operational power kW	current A	Type (1)	Order code	Setting range A	Rated instantaneous short-circuit current setting Ii A	Rated control circuit voltage Uc min. ... Uc max. (2) V 50/60 Hz	V DC	Type (3)	Order code	Allowed setting current A	Type	Order code
Coordination type 1, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz												
0.06	0.2	MS132-0.25K	1SAM350010R1002	0.16...0.25	3.13	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.25	BEA16-4KF	1SBN081325T1000
0.09	0.3	MS132-0.4K	1SAM350010R1003	0.25...0.40	5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.4	+ BER16-4KF	1SBN081322R1000
0.12	0.44	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.88	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63	+ VEM4K	1SBN030113R1000
0.18	0.6	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.88	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63		
0.25	0.85	MS132-1.0K	1SAM350010R1005	0.63...1.00	12.5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1		
0.37	1.1	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.55	1.5	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.75	1.9	MS132-2.5K	1SAM350010R1007	1.60...2.50	31.25	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	2.5		
1.1	2.7	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	4		
1.5	3.6	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	4		
2.2	4.9	MS132-6.3K	1SAM350010R1009	4.00...6.30	78.75	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	6.3		
3	6.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	9		
4	8.5	MS132-10K	1SAM350000R1010	6.30...10.0	150	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	9		
5.5	11.5	MS132-12K	1SAM350010R1012	8.00...12.0	180	100...250	100...250	AF12-30-10K-13	1SBL157005R1310	12		
7.5	15.5	MS132-16K	1SAM350010R1011	10.0...16.0	240	100...250	100...250	AF16-30-10K-13	1SBL177005R1310	16		
11	22	MS132-25K	1SAM350010R1014	20.0...25.0	375	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	25	BEA38-KF	1SBN082325T2000
15	29	MS132-32K	1SAM350010R1015	25.0...32.0	480	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	32	+ BER38-4KF	1SBN082332R1000
											+ VEM4K	1SBN030113R1000
											-2x CA4-10K	1SBN010160R1010
Coordination type 2, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz												
0.06	0.2	MS132-0.25K	1SAM350010R1002	0.16...0.25	3.13	100...250	100...250	AF09-30-10-13	1SBL137001R1310	0.25	BEA16-4KF	**1SBN081325T1000**
0.09	0.3	MS132-0.4K	1SAM350000R1003	0.25...0.40	5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.4	+ BER16-4KF	**1SBN081322R1000**
0.12	0.44	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.88	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63	+ VEM4K	**1SBN030113R1000**
0.18	0.6	MS132-0.63K	1SAM350010R1004	0.40...0.63	7.88	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	0.63		
0.25	0.85	MS132-1.0K	1SAM350010R1005	0.63...1.00	12.5	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1		
0.37	1.1	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.55	1.5	MS132-1.6K	1SAM350010R1006	1.00...1.60	20	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	1.6		
0.75	1.9	MS132-2.5K	1SAM350010R1007	1.60...2.50	31.25	100...250	100...250	AF09-30-10K-13	1SBL137005R1310	2.5		
1.1	2.7	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	4		
1.5	3.6	MS132-4.0K	1SAM350010R1008	2.50...4.00	50	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	4		
2.2	4.9	MS132-6.3K	1SAM350010R1009	4.00...6.30	78.75	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	6.3		
3	6.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	10	BEA38-KF	**1SBN082306T2000**
4	8.5	MS132-10K	1SAM350010R1010	6.30...10.0	150	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	10	+ BER38-4KF	**1SBN082322R1000**
5.5	11.5	MS132-12K	1SAM350010R1012	8.00...12.0	180	100...250	100...250	AF26-30-00K-13	1SBL237005R1300	12	+ VEM4K	**1SBN030113R1000**
7.5	15.5	MS132-16K	1SAM350010R1011	10.0...16.0	240	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	16	+2x CA4-10K	**1SBN01060R1010**
11	22	MS132-25K	1SAM350010R1014	20.0...25.0	375	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	25		
15	29	MS132-32K	1SAM350010R1015	25.0...32.0	480	100...250	100...250	AF30-30-00K-13	1SBL277005R1300	32		

(1) MS116 manual motor starter can be selected according to the current setting range indicated on the coordination line, up to:
- 15 kW, 400 V - AC-3 at 16 kA
- 4 kW, 400 V - AC-3 at 50 kA.

(2) For other control voltages, see "Voltage code table".
(3) AF38 3-pole contactor can be selected for coordination type 1, 16 kA and 50 kA, 18.5 kW, 400 V - AC-3 (BEA65-4 available for AF40 ... AF65 only).
(4) For direct mounting on 2 rails 35 mm of MS165 with AF40 ... AF65: BEA65-4 must be associated with BPR65-4 fixed on each contactor base. Applicable for MS165 manufactured after week 31, 2016 (date code > 16114).
(5) AF ... -11 not suitable for direct control by PLC-output.

(3) AF26 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.
AF38 3-pole contactor can be selected for coordination type 2, 16 kA and 50 kA, 18.5 kW, 400 V - AC-3 (BEA65-4 available for AF40 ... AF65 only).
(4) BEA26-4 should be selected with MS116-12 ... MS116-16 and AF26 ... AF38.
BEA38-4 can only be selected with MS116-20 ... MS116-32.
(5) For direct mounting on 2 rails 35 mm of MS165 with AF40 ... AF65: BEA65-4 must be associated with BPR65-4 fixed on each contactor base. Applicable for MS165 manufactured after week 31, 2016 (date code > 16114).

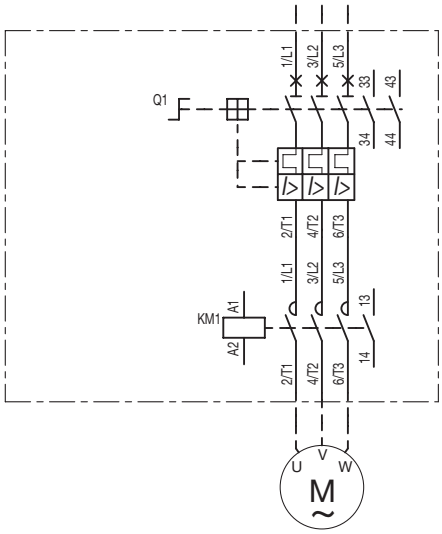
DOL and reversing starters protected by manual motor starters

With AF..K contactors - open type version in kit form

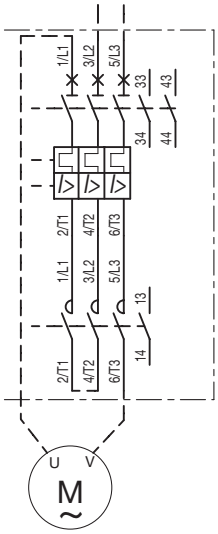
Wiring diagrams

Direct-on-line starters

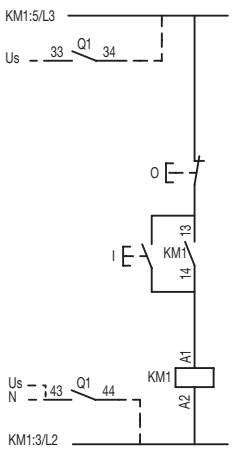
Power circuit



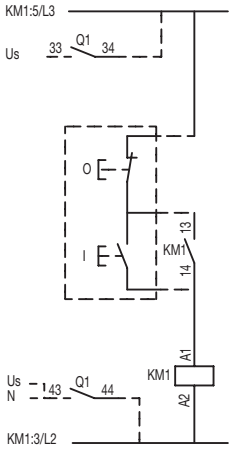
1-phase



AC or DC local control



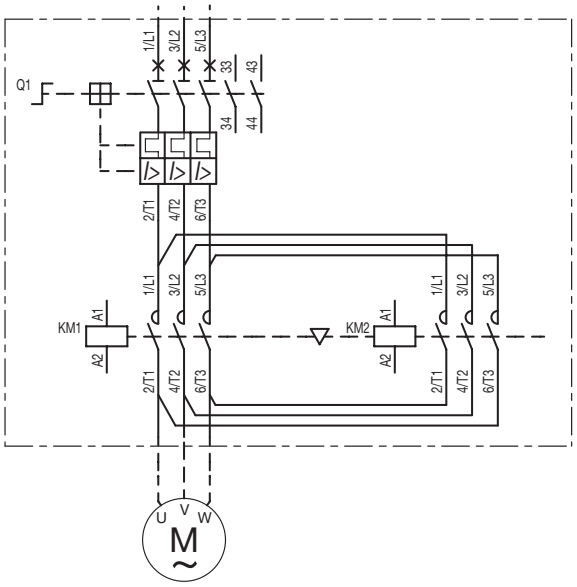
AC or DC remote control



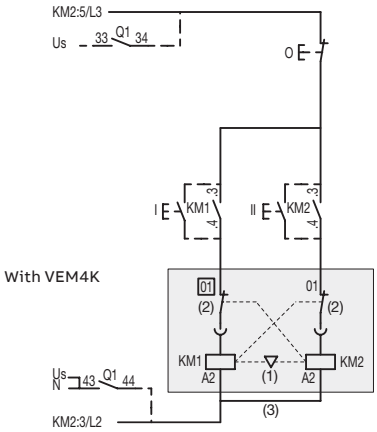
Note: coil Uc 12-20 V DC : A1+, A2-

Reversing starters

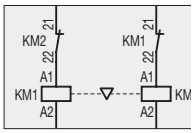
Power circuit



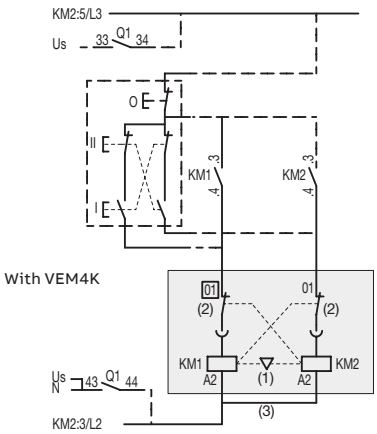
AC or DC local control



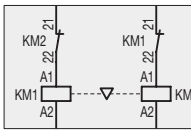
With VM



AC or DC remote control



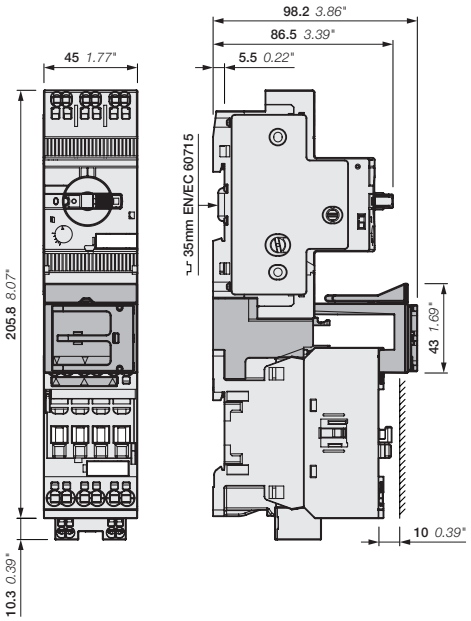
With VM



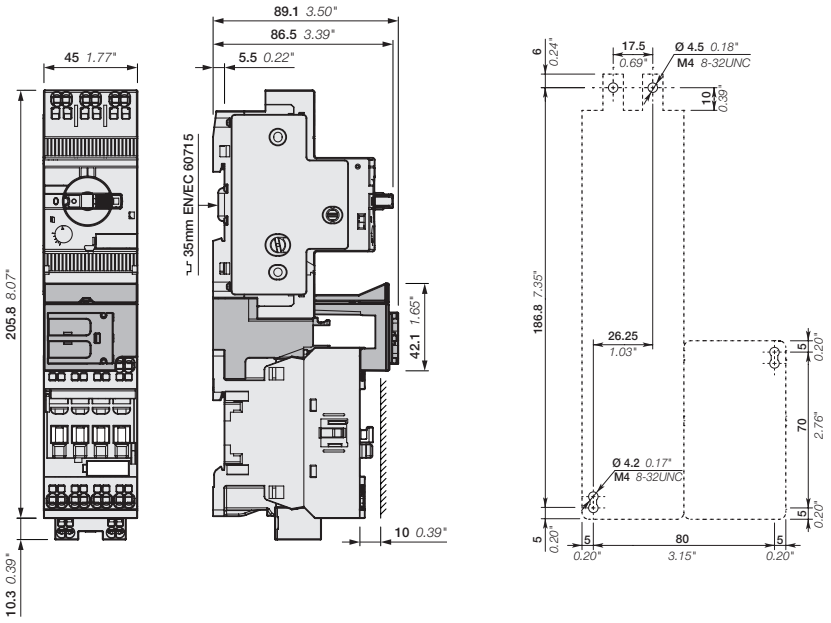
Note: - VEM4K = VM4K (1) + VE4 (2) with A2-A2 (3) connection
(Except for coil Uc 12-20 V DC : use VM4 with CA4K).
- coil Uc 12-20 V DC : A1+, A2-

DOL starters protected by MS132 manual motor starters

With AF contactors - open type version in kit form



MS132-0.16K ... MS132-32K
+ BEA16-4KF
+ AF09..K, AF12..K, AF16..K



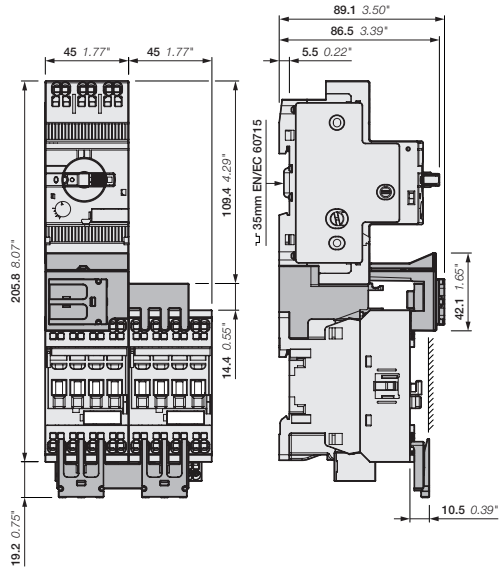
MS132-0.16K ... MS132-32K
+ BEA38-4KF
+ AF26..K, AF30..K, AF38..K

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

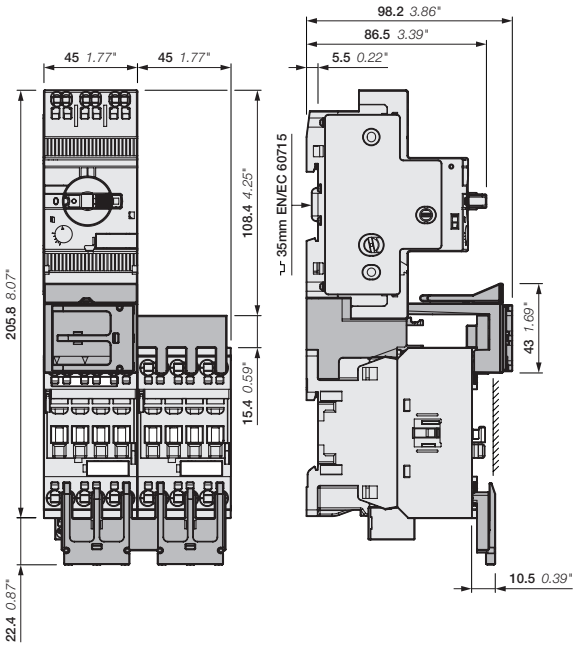
Main dimensions mm, inches

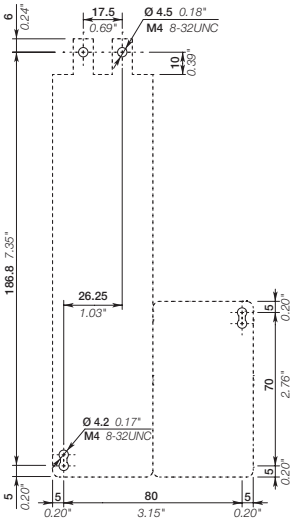
Reversing starters protected by MS132K manual motor starters

With AF contactors - open type version in kit form



MS132-0.16K ... MS132-32K
+ BEA16-4K, BER16-4K, VEM4K
+ AF09..K, AF12..K, AF16..K





MS132-0.16K ... MS132-32K
+ BEA38-4K, BER38-4K, VEM4K, CA4-10K
+ AF26..K, AF30..K, AF38..K

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

Main dimensions mm, inches

—
ABB France
Business Electrification
Low Voltage Products and Systems
11 rue d'Arsonval
F-69687 Chassieu cedex / France

—
ABB STOTZ-KONTAKT GmbH
Business Electrification
Low Voltage Products and Systems
Eppelheimer Straße 82
D-69123 Heidelberg / Germany

You can find the address of your local sales organization on the ABB home page

http://new.abb.com/low-voltage/products/motor-protection

http://www.abb.com/lowvoltage

1SBC100212C0203 - Printed in France (07.2023 PDF)