



CONTACTORS
FROM 2,2 kW TO 132 kW



TYPES



HL-K...



DL-K4-10
-01



DL-K5-10
-01



DL-K7-10
-01



DL-K11-10
-01



DL-K15



DL-K18



DLK-7/c-10



DLK-30/c-11
DLK-37/c-11



DL- K22-11



DL- K30-11



DL- K37-11



DL- K45-22
DL- K55-22



DL- K75-22
DL- K90-22



DL- K110-22
DL- K132-22



MK 2-..



MK 4-..



IK 40



H6



H0-2K



T63I



MH



IK 21



IK 63



S..



BB



PKB11



PK22E



YD-..



Hi-., Li-..



KS-..



KS-..



RC-K, V-K, D-K



MV-e

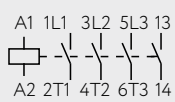
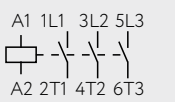
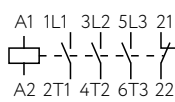
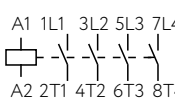
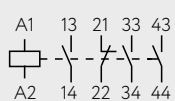
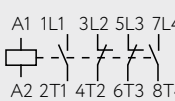
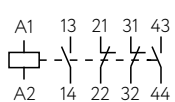
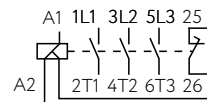
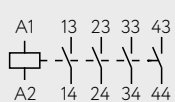
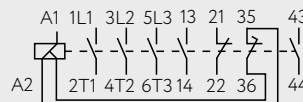
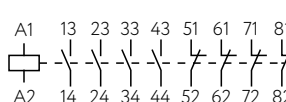
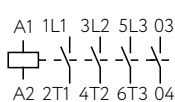
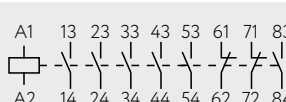
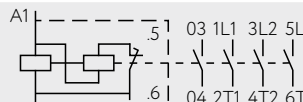
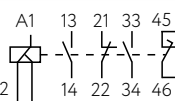
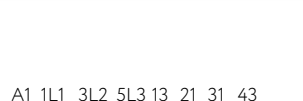
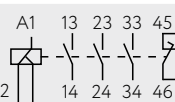
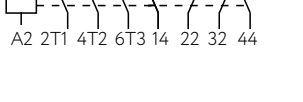
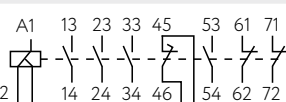
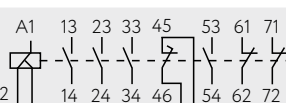
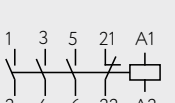
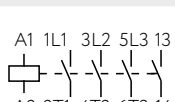
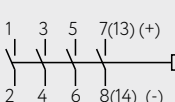
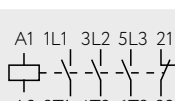
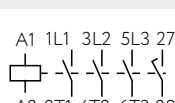
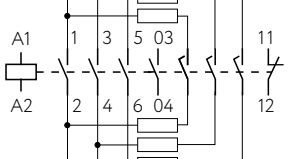
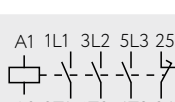


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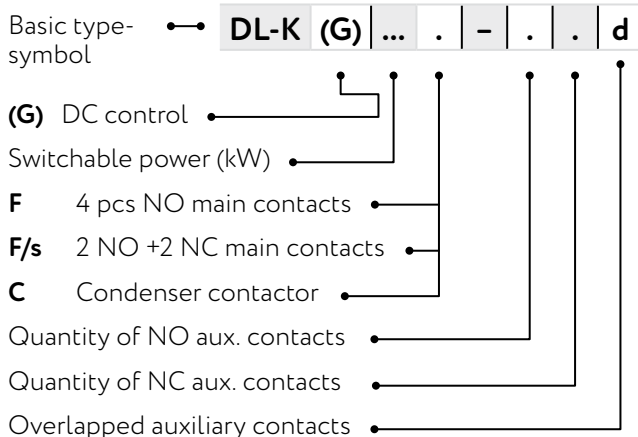
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1. TYPES

MK 2-10 MK 4-10 MK(G)4-10		DL-K15 DL-K18	
MK 2-01 MK 4-01 MK(G)4-01		DL-K4F DL-K5F DL-K7F DL-K11F	
HL-K-31		DL-K4F/s DL-K5F/s DL-K7F/s DL-K11F/s	
HL-K-22		DL-K(G)4 DL-K(G)5 DL-K(G)7 DL-K(G)1	
HL-K-40		DL-K(G)15-21 DL-K(G)18-21	
HL-K-44		DL-K22-11 DL-K30-11 DL-K37-11	
HL-K-62		DL-K(G)22-10 DL-K(G)30-10 DL-K(G)37-10	
HL-K(G)-21		DL-K45-22 DL-K55-22 DL-K75-22 DL-K90-22 DL-K110-22 DL-K132-22	
HL-K(G)-30			
HL-K(G)-43		IK 21-10	
HL-K(G)-52		IK 21-01	
DL-K4-10 DL-K5-10 DL-K7-10 DL-K11-10		IK 40-10 IK 63-10	
DL-K4-01 DL-K5-01 DL-K7-01 DL-K11-01			
DL-K4-10d DL-K5-10d DL-K7-10d DL-K11-10d		DLK-7/c-10 DLK-15/c-11 DLK-30/c-11 DLK-37/c-11	
DL-K4-01d DL-K5-01d DL-K7-01d DL-K11-01d			

1.1 Type-symbols system



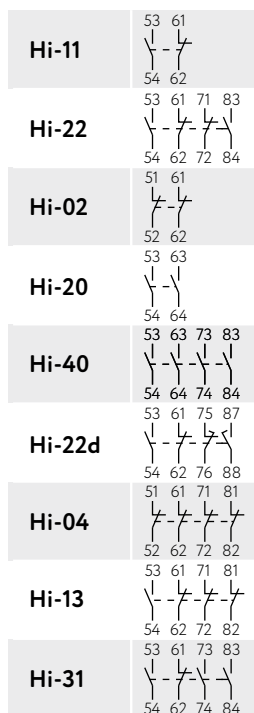
The basic type-symbol of minicontactors is **MK-...**, the auxiliary contactors is: **HL-K**

The marking system is according to the EN 60947-4-1 standard.

1.2 Auxiliary contact blocks

1.2.1 On the forefront of contactors

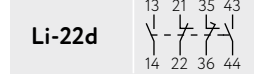
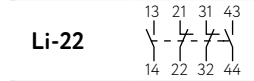
to DL-K4...DL-K11
and to HL-K



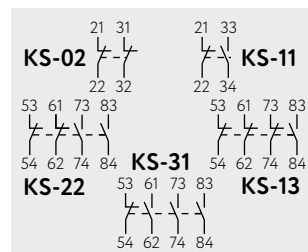
to DL-K22...DL-K37



to DL-K15 and DL-K18

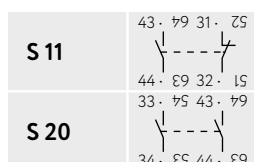


to MK2...MK4

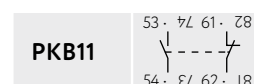


1.2.2 Side mounted aux. contact blocks

to HL-K and to DL-K4...DL-K18



to DL-K22...DL-K37



1.3 AC-control

The coil of contactors DL-K4...DL-K37 have three outputs, above A1 and A2, at the bottom: A2.

The contactors DL-K45...DL-K132 have two outputs.

The range of control voltages can be found in the table of technical data.

1.4 DC-control of contactors

For DC-operation of contactors DL-K4...DL-K37 the energization (need to keep the magnet in) is generated by the detached winding (as a resistor) built in the coil. These are made short by the delayed opening (break) auxiliary contact during operation up to about 80 % of magnet-move. Connecting is made by the manufacturer so this contact is not free.

Operation by AC-voltage is not changeable into operation by DC-voltage.

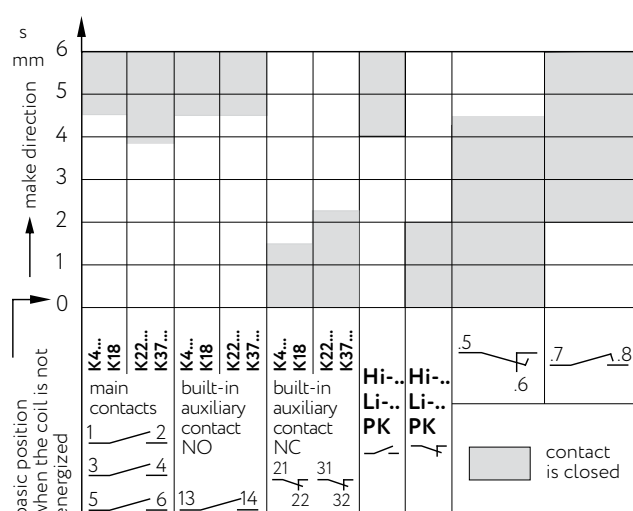
The contactors DL-K45...DL-K132 can be controlled by AC-voltages (50 Hz) only.

1.5 DC main current paths

Main contacts can switch AC and DC power as well exact values indicated at technical data.

Connection on series the 2- 3 or the 4 - 5 contact points must be made by the user when mounting the device.

1.6 Contact operation and characteristic (up to 37 kW)



2. GENERAL TECHNICAL DATA

Characteristics		MK 2, MK 4		HL-K	DL-K4, DL-K5, DL-K7, DL-K11	DL-K15, DL-K18
Mounting position		any		vertical ± 22,5°		
Mounting		2 pcs M4×15 screws or TS 35 rail				
Terminal screw	size	M3		M3,5		caged, M5
	tightening torque [Nm]			1,2...1,8		3
Ambient temperature [°C]	operating	- 20... + 60		-25...+55		
	storage	- 20... + 60		-30...+80		
Relativ humidity						
Climatic conditions		by IEC 68 - 2 - 3		by IEC 68-2-3; -2-30		
Maximum altitude [m]		2000		2000		
Masse [kg]		0,17 ; 0,21		0,41		0,62
Cross-section of connecting wires [mm²]	rigid	0,75... 2,5		1×(1...6) or 2 × (1,5...6)		1×(2,5...25) or 2×(4...10)
	flexible	0,5... 2,5		1×(1...6) or 2×(1...6)		1×(2,5...25) or 2×(2,5...10)
	with ferrule			1×(0,75...6)		1×(0,75...16)
	built-in aux. conts. and coil-terminals	rigid: 0,75... 2,5 flex.: 0,5... 2,5		rigid and flexible: 1×(1...6) or 2×(1...6) with ferrule: 1 x (0,75...6)		-
Degree of protection		IP 20		IP 20		
Pollution degree normal industrial environment		3		3		
Main dimensions [mm]		35x63x49	45x57x49	45×78×85		45×78×97
Mounting dimensions [mm]		25,5x50	35x50	35×70		35×70
Relevant standard				EN 60947-4-1		

* Degree of protection IP 10 can be understood from parallel direction of the covered main terminals with mounting plane of the contactor, degree of protection IP 20 can be understood in case of access from perpendicular direction.

DL-K22, DL-K30, DL-K37		DL-K45, DL-K55		DL-K75, DL-K90		DL-K110, DL-K132	
vertical ± 10°							
2 pcs M5 screws or 35 mm rail		3 pcs M5 screws		3 pcs M6 screws			
M6 lug terminal				M10 lug terminal			
2,5							
-25...+55							
-25...+55							
at 98 % 35 °C							
by IEC 68--2-1; -2-2; -2-5; -2-10; -2-30							
2000							
0,9		1,4		3,7		5,7	
2,5...25		16...50		35...150		70...150	
2,5...25		16...50		35...150		70...150	
-							
rigid: 1...2,5 flexible: 0,75...1,5							
IP 20		IP 10 / IP 20					
3							
70 × 107 × 116		108 × 124 × 140		148 × 179 × 178,5		154 × 204 × 191,5	
60 × 75 (90)		78 × 88		105 × 125		106 × 150	
EN 60947-4-1							

3. ELECTRIC TECHNICAL DATA

Characteristic			MK 2	MK 4	DL-K4	DL-K5	DL-K7	DL-K11	DL-K15
Rated insulation voltage U _i [V]			690		690				690
Impulse withstand voltage U _{imp} [kV]									
Conditional thermal current [A]		free air* I _{th}	20		22	25	32	32	54
		enclosed I _{the}	16		16	20	25	30	45
Motor power P _e [kW]	AC-2; AC-3	230 V	1,5	2,2	2,2	3	4	5,5	9
		400 V	2,2	4	4	5,5	7,5	11	15
		500 V	3	5	5,5	7,5	11	15	18,5
		690 V	4	5,5	4	5,5	7,5	11	15
	AC-4	400 V			3	4	5,5	7,5	12,5
Rated operational current ^{**} I _e [A] 300 c/h ≤ 40 °C	AC-1	400 V	20	20	22	25	32	32	54
	AC-1	3 contacts paralell			55	62	80	80	135
	AC-3	400 V	6,5	8,5	9	12	16	23	30
	DC-1	24 V	20		22	25	32	32	54
		110 V	20		22	25	32	32	54
		220 V	12		22	25	32	32	54
	DC-3	24 V	20		22	25	32	32	54
		110 V	12		22	25	32	32	54
		220 V	1,8		6	6	8	8	10
	DC-5	24 V			22	25	32	32	54
		110 V	12		22	25	32	32	54
		220 V	1,8		6	6	8	8	10
	Short time withstand current I _{cw} [A]		1s / 5s			180/120 80/70		400/280 80/70	
1m / 3m									
Rated control supply voltage U _c		AC (0,8...1,1) U _c	6...415 V	6...690 V	12...600 V 50 / 60Hz				
		DC (0,8...1,25) U _c	-	6...230 V	12...250 V				
Switching frequency [c/h] AC-1 / AC-3 / AC-4					1000 / 1000 / 250		1000 / 750 / 250		
Power consumption of coil	AC	inrush	37 VA		95 VA				
		hold	1,5 W		10 VA				
	DC	inrush	-	3 W	105 W				
		hold	-	3 W	1 W				
Built-in auxiliary contacts I _e [A]		versions	1 NO or 1 NC		1 NO or 1 NC				-
		I _{th} [A]	20		16				-
	AC-15	230 V	6		6				-
		400 V	4		4				-
Mechanical durability [c]			10 ⁷		10 ⁷				
Electrical durability [c]			AC-3: 10 ⁶		AC-3: 10 ⁶ ; AC-4: 0,05 × 10 ⁶				
Recommended fuse ^{***} aM [A]			20	25	20	25	35		63
Type of co-ordination with SCPD			2		2				
Overvoltage category by EN 61010			III. Pollution degree: 3						

* HL-K : 16 A

**HL-K : 230 V : 6 A ; 400 V : 4 A (AC-15)

*** HL-K : gL 20 A

**** * $I_{th} = 95 \text{ A}$, if the Cu-wire 25 mm^2 and $T \leq 35 \text{ }^\circ\text{C}$

DL-K18	DL-K22	DL-K30	DL-K37	DL-K45	DL-K55	DL-K75	DL-K90	DL-K110	DL-K132
690	690			690		690		690	
	8			8			8		
54	85	85	85(95) ^{***}	140	140	225	225	350	350
50									
11	15	18,5	22	25	30	45	55	65	75
18,5	25	30	37	45	55	75	90	110	132
20	30	37	45	45	55	75	90	110	132
18,5	30	37	45	37	45	55	75	90	110
15	7,5	9	10	15	18,5	22	25	30	37
54	60	75	85	105	140	160	200	300	350
135									
37	50	65	80	85	105	140	170	205	250
54									
54									
54	85	85	85	105	105	170	170	300	
54									
54									
16	44	44	44	63	63	100	100	100	
54									
54									
16	32	32	32	40	40	63	63	80	
700/450 260/120	800/500 210/145	880/550 230/145	960/620 270/185	1200/1000 420/250	1270/1060 440/250	1700/1250 600/420	2000/1450 650/420	2500/1800 950/620	3000/2150 1000/620
12...600 V 50 / 60Hz	24 V, 110 V, 220/230 V, 380/400 V 50 Hz					110 V, 220/230 V, 380/400 V 50 Hz			
12...250 V	12...220 V			-					
1000/750/250	300/1200/600			300/600/600					
95 VA	140 VA			208 VA		365 VA		700 VA	
10 VA	23 / 5,7 VA / W			37 / 6,9 VA / W		61 / 14,5 VA / W		75 / 23 VA / W	
105 W	150 W			72 W		110 W		117 W	
1 W	16,5 W			12 W		12 W		9 W	
-	1 NO + 1 NC			2 NO + 2 NC					
-	12			10					
-	4			4					
-	2			2					
10 ⁷	10 ⁷							5 × 10 ⁶	
AC-3: 10 ⁶ ; AC-4: 0,05 × 10 ⁶	AC-1: 0,5 × 10 ⁶ ; AC-3: 10 ⁶					AC-1: 0,5 × 10 ⁶ ; AC-3: 0,5 × 10 ⁶			
63	50	63	80	100		160		250	
2	2	1		2					
III. Pollution degree: 3									

3.1 Version for switching of capacitor bank

		DLK-7/c-10	DLK-15/c-11	DLK-30/c-11	DLK-37/c-11
Switchable capacitive load of capacitor banks [kVAr]	230 V	10	15	30	35
(Electric durability max. 10 ⁵ c)	400 V	12,5	25	50	60
	500 V	15	30	60	70

3.2 Auxiliary contacts

Characteristics		KS-...	Hi-, Li-, S	PK22E	PKB11
Rated insulation voltage [V]		690			
Conditional thermal current (free air) [A]		20	10	12	12
Rated operational current (free air) [A] AC-15	230 V	6	6	4	4
	400 V	4	4	2	2
Mechanical durability [c]		10 ⁷	3 × 10 ⁷	10 ⁷	5×10 ⁶
Electrical durability [c]	230 V	10 ⁶	10 ⁶	0,8×10 ⁶	0,8×10 ⁶
	400 V			10 ⁶	10 ⁶
Cross-section of connecting wires [mm ²]	rigid	0,75...2,5	2×(1...6)	1...2,5	1...2,5
	flexible	0,6...2,5	2×(1...6)	0,75...1,5	0,75...1,5
	with ferrule	-	1×(0,5...6)	-	-
Size and tightening torque of terminal screws		M 3 / 1,2 Nm	M 3,5 / 1,2 Nm		
Degree of protection		IP 00	IP 20		
Recommended fuse				Dol II. 16 A	

4. THERMAL RELAYS

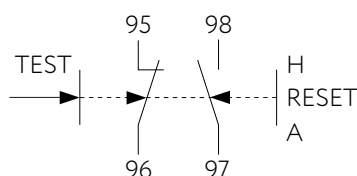
The compensating bimetallic unit ensures the operation irrespectively the actual ambient temperature (within the given wide ambient temperature-range).

The resetting mode (manual or automatic) can be chosen. The thermal relays have a double side-system which operates the switch-off mechanism, in case of phase failure. It releases faster: within 2 hours at 15 % overload. The contacting mechanism contains two electrically independent NO and NC contacts.

Time-values of release

Multiples of current setting		Time of release [T _p]	Working condition
1,05 × I _e		after 2 hours	cold
1,2 × I _e		within 2 hours	warm
1,5 × I _e		within 2 min	warm
Trip class: 10 A	7,2 × I _e	2 < T _p < 10 s	cold
10		4 < T _p < 10 s	
20		6 < T _p < 20 s	

Contacts



4.1 MH type mini thermal relay

The mini thermal relays are produced in the current-range of 0,11 A...14 A. They can be plugged directly to the lower terminals of the MK 2- and MK 4- type minicontactors, they cannot mounted independently to a plate or rail.

4.2 H0-2K type thermal relays

The current-range are available from 0,2 A to 32 A covered by 13 differently set devices. Mounting is possible to 35 mm rail (snap-on) or fixed with three M4 screws to a mounting plate. The device can be plugged directly to lower terminals (2T1, 4T2, 6 T3) of DL-K4, DL-K5, DL-K7, DL-K11, DL-K15, and DL-K18 contactors after removing the fixing and connecting elements.

The right-side terminal (L3) of the relay should be put to the correct position before connecting to the contactor.

4.3 H6 type thermal relay with reeveable current-transformer

The reeveable current-transformer is available between 25 and 250 A, covered by 6 ranges. It can be used for motor-starter, reversing and star-delta starter combinations with DL-K15, DL-K18, DL-K22...DL-K132 contactors. Cross-section of the reeveable wires across the current transformer:

25...51 A	25 mm ²	(Ø 11,5 mm)
51...250 A	120 mm ²	(Ø 21,5 mm)

Note: Detailed description of thermal relays can be found in the catalogue „THERMAL RELAYS, MOTORSTARTERS“

Degree of protection: IP10/IP20

9

5. ACCESSORIES

5.1 NP-K low-signal module

The module can be plugged in A1 and A2 coil terminals of DL-K4...DL-K18 contactors. The built-in Reed-relay has a NO contact and it is suitable for switching of low voltages and low currents. its outputs are 11;14 terminals, they can give an information about input of a PLC, for example: voltage exists or not on the coil of a contactor.

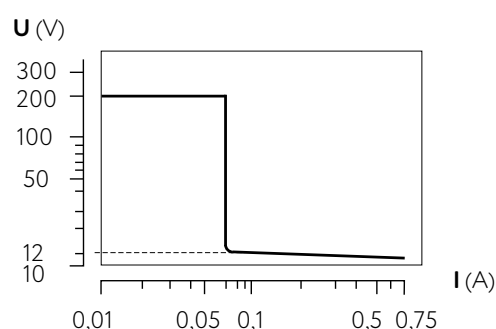
The switching-on position is indicated by illumination of a red LED.

The module consists a RC supressor element.

Technical data:

Input		
Rated voltage and power	24 V UC	0,072 W
	230 V UC	0,800 W
Output		
Contact resistance of the relay	200 mΩ	(start value)
Switchable max. voltage	200 V UC	(pick value)

The switchable max. current at ohmic loads:



5.2 Overvoltage protecting and supressor units

Overvoltage protecting and supressor units can be plugged in A1 and A2 coil terminals. The units allow free control voltage wiring due to their design.

5.2.1 RC-K unit

Built-in R-C damping elements lessen both switching and aerial over-voltages. In-line R-C elements make an oscillating circuit with the L inductivity of the network and limit the overcurrent to a maximum of 1,5 ... 2 times of the network voltage. The units can reduces the steep of the voltage-impulse and the frequency as well.

Variants to DL-K4...DL-K18 contactors	RC-K 02	110...240 V	AC
	RC-K 03	220...400 V	AC
Variants to DL-K22...DL-K37 contactors	BO 60	24...60 V	AC
	BO 230	110...230 V	AC

5.2.2 V-K unit (to DL-K4...DL-K18 contactors only)

The varistor absorbs the energy that could be harmful to elements in the network due to high voltage impulses. The steep and frequency of the impulses are not reduced, but their peak value is lessend considerably. This unit can not be used in systems that are sensitive to the steep of the voltage impulses.

Variants V-K 02	60...130 V	AC
	70...145 V	DC
Variants V-K 03	120...260 V	AC
	140...320 V	DC

5.2.3 D-K 01 unit (to DL-K4...DL-K18 contactors only)

This module can be plugged in DC-operated (12...220 V) contactors only. Its function is to cut overvoltage peaks when switching off the coil voltage. The unit delays the contactor release by 10 ms.

5.3 MV-e type mechanical interlock

Using the mechanical interlock two contactors can be attached. The interlock's main function is to avoid the simultaneous operation of the two contactor. The interlock can be used (without electrical interlock) in reversing and star-delta combinations and in a safety circuit containing auxiliary contactors.

Variants DL-K4...18 contactors	MV-e
Variants DL-K22...37 contactors	BB
Variants MK 2, MK 4 minicontactactors	MB 7

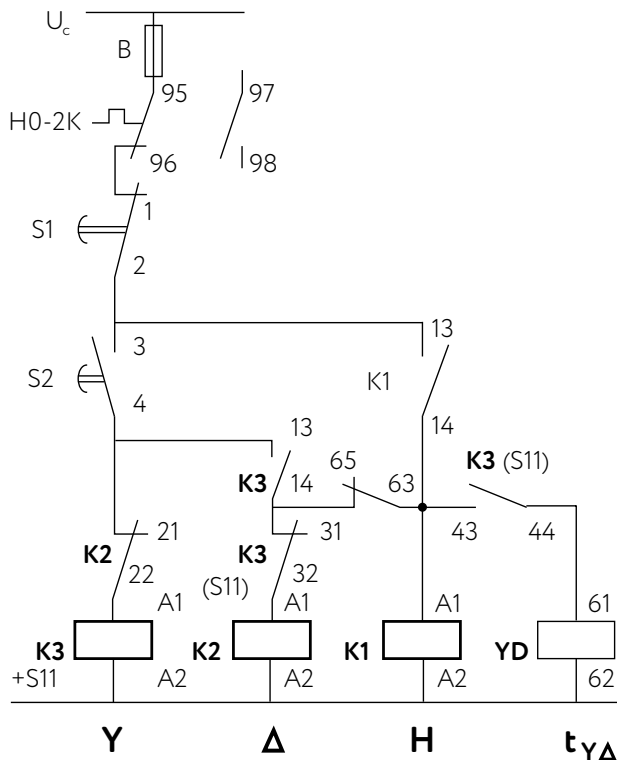
5.4 YD star-delta timer

It is a special timer module with the function of change-over switching of the DL-K4...DL-K18 contactors for star-delta motorstarter combinations. There are two versions: 1...12s ± 40 % and 2...24 s ± 40 %. The circuit of timer is built-in the house of Hi.. auxiliary contact block. It should be snapped on any contactor.

The control voltage connected on the terminals marked 61; 62 aparates the timing and after the adjusted **T** time the contacts connected to terminals marked 63; 65 shall be opened. Time needed to restart: min. 300 ms.

Rated control voltage	24, 42, 110, 230, 400 V AC	
Power consumption	2 VA	
Ambient temperature	-5... +50 °C	
Rated thermal current	8 A	
Rated operational current (AC-15)	0,6 A	(400 V)
	1 A	(230 V)
	1,6 A	(24 V)
Electrical endurance	10 ⁵ c	
Switching frequency	120 c/h	

Star-delta control:



5.5 Compatibility

There are some restrictions concerning the use of forefront-mounted additional units and the side-mounted auxiliary contacts together, in order to ensure the safe bounce and noise-free (AC or DC) operation of the contactors.

Forefront mounted unit		Side mounting aux. cont.		
				
DL-K4...	with 2 contacts Hi-	+	+	+
DL-K11	with 4 contacts Hi-	+	-	-
DL-K15,	with 2 contacts Li-	+	+	+
DL-K18	with 4 contacts Li-	+	-	-
DL-K22...	PK22E	+	+	+
DL-K37				

6. IK INSTALLATION CONTACTORS

IK type contactors - installation contactors - are suitable for switching single-phase or three-phase loads (e.g. heat storage ovens, lamps, heat pumps, air-conditioning equipment, ventilators, electrical motors, etc.). Their control is available by push buttons, timers, programming switches, by signal of a voice frequency control-system, or any suitable impulse.

The characteristic feature of **IK** installation contactors is the silent operation, because the technical solution of the IK 21 contactor is that the contact system and the magnetic system are moving parallel with mounting surface, and IK 40 and IK 63 have a built-in rectifier in case to use for DC operation.

In this way they are particularly suitable for automatic control of electric devices in the fields of installations at dwellings, office-buildings, shops, hospitals, etc.

Recommended for use in energy-supplying systems, especially at two-tariff system and for switching of staircase lighting as executive device.

Features

- IK contactors can be snapped on a 35 mm rail, or they can be fixed by 2 pcs M4 screws,
- they are lead-sealable,
- degree of protection IP 20,
- they can be mounted into the 45 mm wide cut out of distribution boxes,
- LED indicates position of the contacts (in case of IK 40 and IK 63).

Technical data

Type	IK 21	IK 40	IK 63
General data			
Relevant standards	EN 60947-4-1; EN 61095		
Mounting vertical surface ± 30°	TS 35 rail 2 pcs M4		
Ambient temperature [°C]	operating	- 5...+ 55	- 5...+ 40
	storage	- 30...+ 80	
Climatic conditions	by standard IEC 68		
Mechanical durability [c]	3×10 ⁶		
Degree of protection	IP 20		
Width [mm]	35	53,5	
Masse [kg]	0,17	0,40	
Cross section of connecting wires [mm ²] solid/stranded	1 ... 4 / 2,5	1 ... 25 / 16	
Terminal screws	M 3,5	M 5	
Tightening torque [Nm]	1,2	2	

Control system

Rated ins. voltage Ui [V]	415	500
Rated control circuit voltage (0,8...1,1) Uc	24, 110, 230 V AC	24, 110, 220, 230, 240 V AC, DC
Power consumption of coil [VA/W]	inrush	37 / 32
	hold	5,5 / 1,5
Switching times [ms]	on	7 ... 20
	off	10 ... 20
Switching frequency max. [c/h]	360	120

Type			IK 21	IK 40	IK 63	
Auxiliary contact system (4th contact paths)						
Rated ins. voltage U_i [V]			415	500		
Rated operational current I_e [A] AC-15		230 V	6			
		400 V	4			
Main contact system						
Rated ins. voltage U_i [V]			415	500		
Rated impulse withstand [kV]			4			
Rated thermal current I_{th} [A]			20	40	63	
Rated operational current I_e [A]	AC-1, AC-7a		20	40	63	
	AC-3		5	20	30	
	DC-1 1 pole	24 V	20	40	63	
	1 pole	110 V	2	4	4	
		220 V	0,5	0,8	0,8	
	2 poles connect- ed in series	24 V	20	40	63	
		110 V	4	10	10	
	220 V	1,5	6	6		
		24 V	20	40	63	
	3 poles connect- ed in series	110 V	6	30	35	
		220 V	2,5	20	30	
	Rated switch- able power [kW]	AC-7a	230 V	7,5	16	24
			400 V	13	26	40
AC-3; AC-7b		230 V	1,1	5,5	8,5	
		400 V	2,2	11	15	
Electrical endurance at 400 V AC [10^5 c]		AC-1	2	1	1	
		AC-3	3	1,5	1,5	
		AC-5a	1/36 μ F	1/220 μ F	1/300 μ F	
		AC-5b	0,5/1,5 kW	1/4 kW	1/6 kW	
		AC-7a	2	1	1	
		AC-7b	3	1,5	1,5	
Power loss/current path [W]			2	4	8	
Back-up fuse gL. max. rating			25 A	63 A	80 A	

AC-5a Switching of electric discharge lamp control

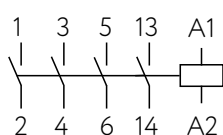
AC-5b Switching of incandescents lamps

AC-7a Slightly inductive loads in household appliances and similar applications

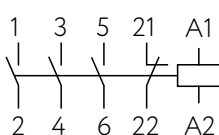
AC-7b Motor-loads for household applications (EN 60947-1)

Contact-versions:

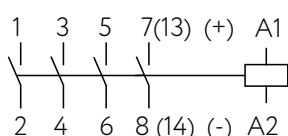
IK 21-10



IK 21-01



IK 40-10, IK 63-10

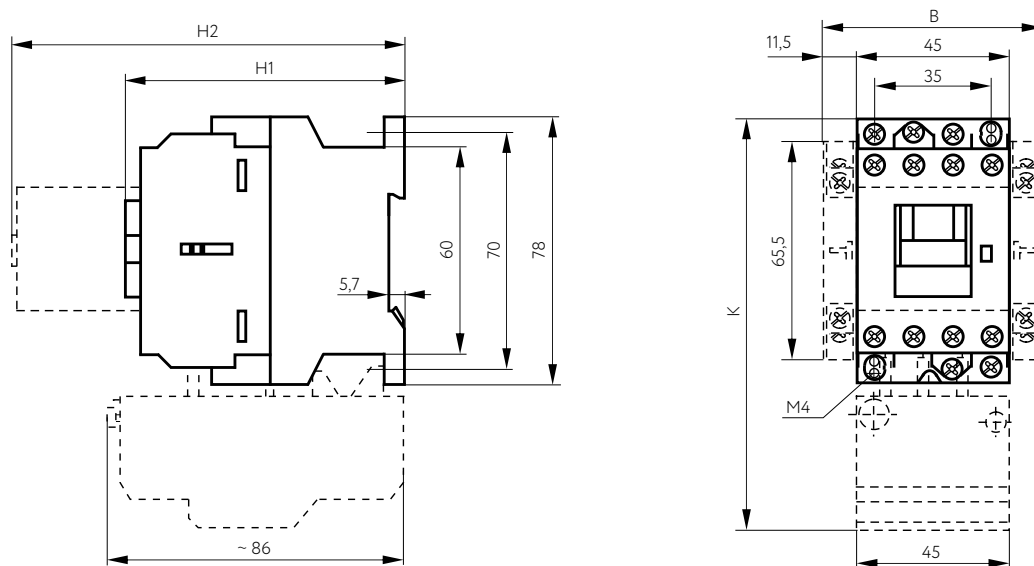


Maximum number of lamps per phase

Types		IK 21	IK 40	IK 63
Fluorescent lamps (uncompensated)	18 W	24	90	140
	36 W	20	65	95
	58 W	13	40	60
Fluorescent lamps (compensated)	18 W	8	45	70
	36 W	8	45	70
	58 W	5	25	43
Fluorescent lamps (dual fitted)	18 W	2 x 48	2 x 100	2 x 150
	36 W	2 x 24	2 x 65	2 x 95
	58 W	2 x 15	2 x 40	2 x 60
Low pressure sodium-vapour lamps (compensated)	35 W	1	10	16
	55 W	1	10	16
	90 W	1	8	12
	135 W	-	4	7
High pressure sodium-vapour lamps (compensated)	180 W	-	4	7
	50 W	3	22	33
	70 W	3	18	27
	110 W	2	18	27
High pressure sodium-vapour lamps (uncompensated)	150 W	1	10	16
	250 W	1	6	9
	400 W	-	4	7
	1000 W	-	2	3
Fluorescent lamps with electronic starting device AC-operation	1 x 18 W	30	60	80
	1 x 36 W	16	30	42
	1 x 58 W	12	22	30
	2 x 18 W	32	40	48
Incandescent lamps	2 x 36 W	16	20	26
	2 x 58 W	10	10	18
	60 W	25	65	85
	100 W	15	40	50
Energy saving lamps	200 W	7	20	25
	500 W	3	8	10
	1000 W	1	4	5
Halogen lamps	7 W	15	100	150
	11 W	15	100	150
	15 W	15	100	150
	20 W	10	70	70
Low pressure sodium-vapour lamps (uncompensated)	200 W	5	15	20
	300 W	3	10	13
	500 W	2	6	8
	1000 W	1	3	4
High pressure sodium-vapour lamps (uncompensated)	35 W	6	13	20
	55 W	6	13	20
	90 W	4	9	14
	135 W	3	6	9
High pressure sodium-vapour lamps (compensated)	180 W	3	6	9
	50 W	12	24	38
	70 W	10	20	30
	110 W	7	16	25
Low pressure sodium-vapour lamps (uncompensated)	150 W	5	10	16
	250 W	3	6	10
	400 W	2	4	6
	1000 W	-	2	3

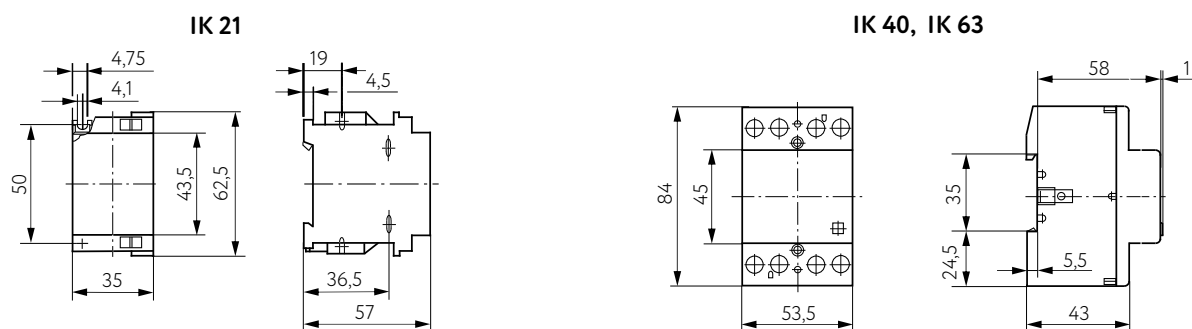
7. DIMENSIONS

7.1 DL-K4...DL-K18 contactors and accessories

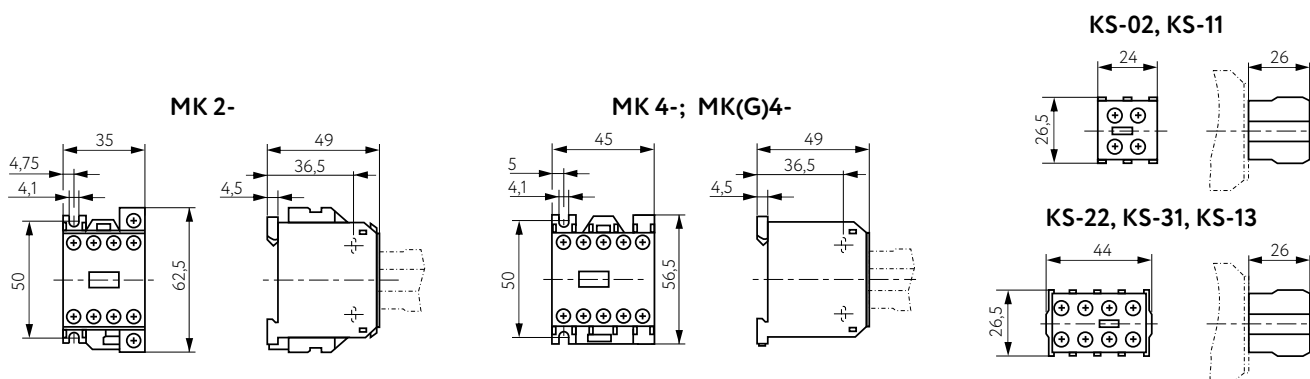


Dimension	Symbol	HL-K..., DL-K4 ..., DL-K11...	DL-K15, DL-K18
Height	H1	85	97
Contactor + Hi- or Li- Contactor + LA...	H2	120 138	132 150
Contactor + 2 pcs S ... aux. contact block	B	69	69
Contactor + H0-2K	K	132	132

7.2 Installation contactors

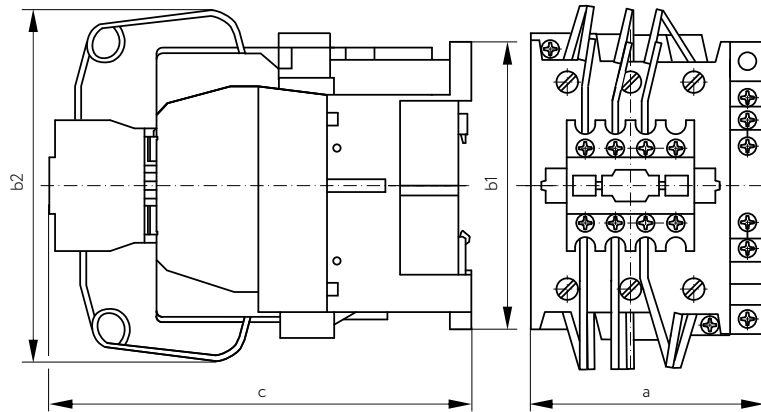


7.3 Minicontactors

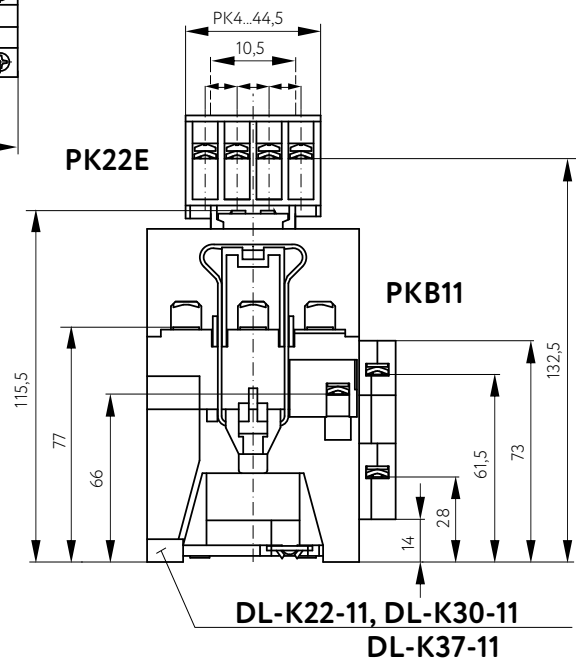
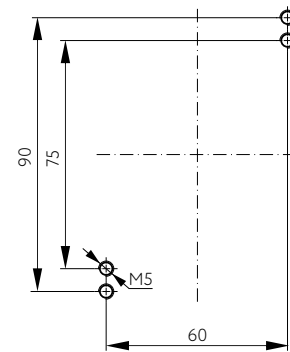


7.4 DL-K22...DL-K37 contactors and accessories

Condenser-contactors

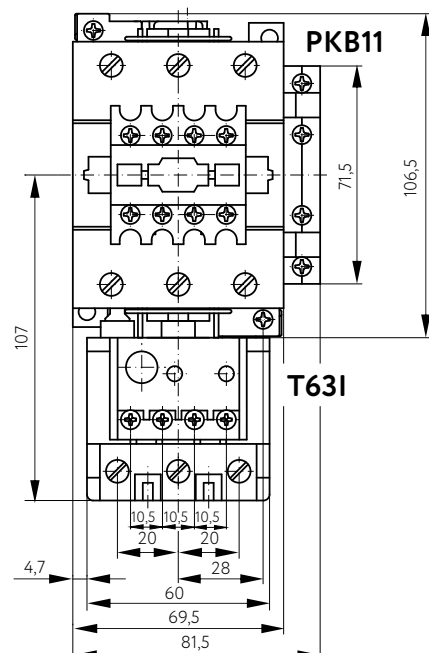
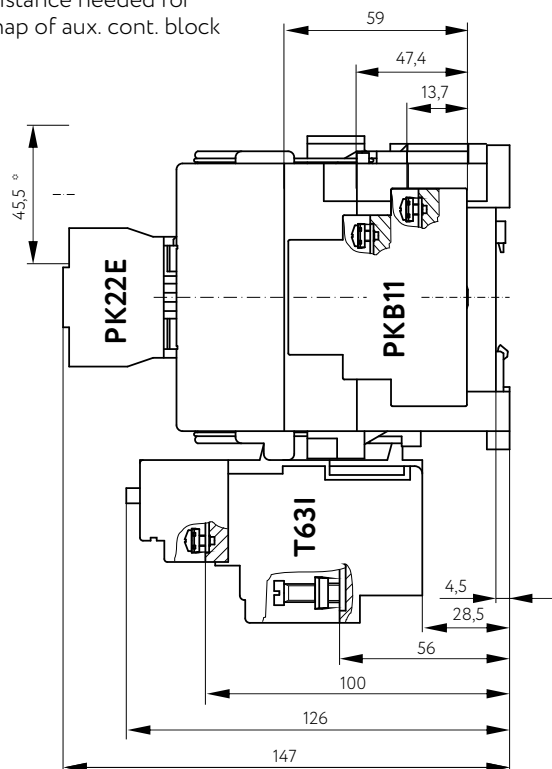


	a	b1	b2	c
DLK-7/c-10	45	69,5	~95	105
DLK-15/c-11	56	82,5	~120	122
DLK-30/c-11	69,5	106,5	~123	147
DLK-37/c-11	69,5	106,5	~123	147

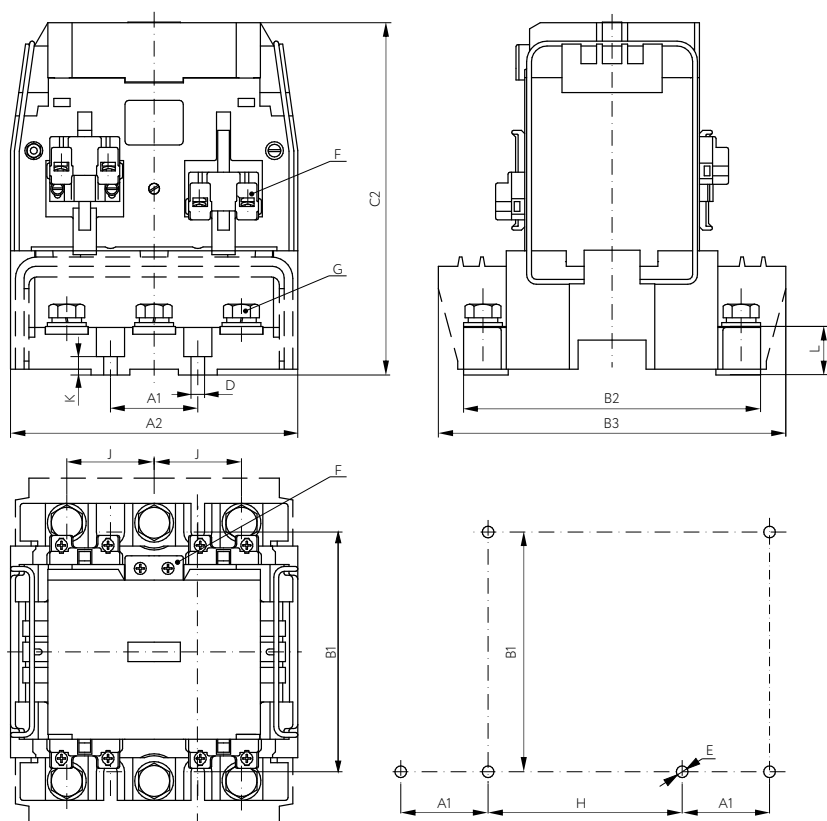


Basic contactors

* Distance needed for snap of aux. cont. block



7.5 DL-K45...DL-K132 contactors and accessories



Dimensions	DL-K45-22 DL-K55-22	DL-K75-22 DL-K90-22	DL-K110-22 DL-K132-22
A1	32,5	45	50
B1	87,5	125	150
A2	108	148	154
B2	100	153	176
B3	124	179	204
C2	140	178,5	191,5
D	6	7	7
E	3 × M5	3 × M6	3 × M6
F	10 × M3,5	10 × M3,5	10 × M3,5
G	6 × M6	6 × M10	6 × M10
H	> 77,5	> 105	> 106
J	32	45	50
K	4	9,5	9,5
L	17	24,5	27

8. SELECTION CHARACTERISTICS

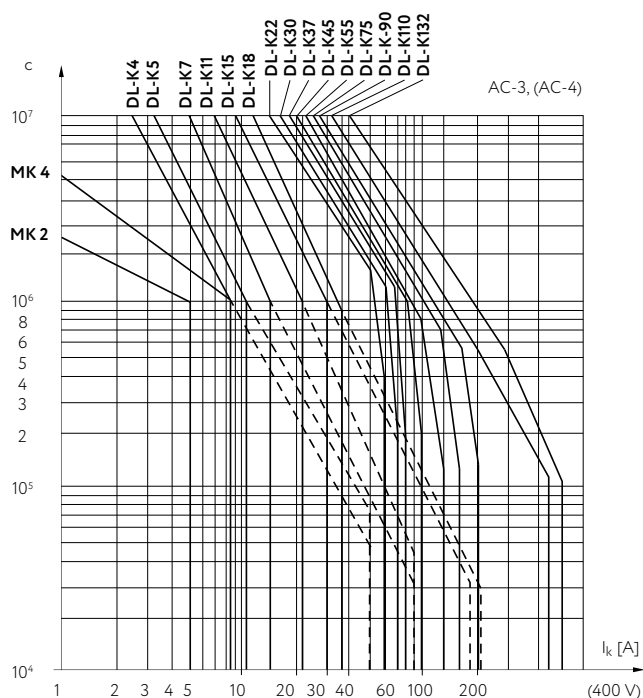
Electrical durability (endurance) of the contactors primarily depend on break (switch-off) current of the appliance. The accessible number of switching cycles are shown by set of curves plotted against switching frequency in most frequent utilization category (AC-3, 400 V).

Selecting of a contactor it should be considered the required life time of the machine or equipment operated by selected contactor. For example in case of $I_k = 63$ A break current the DL-K22-11 contactor is suitable for operation up to 40000 cycles, but in case of required 4×10^6 cycles endurance and $I_k = 63$ A it should be selected DL-K110-22 contactor.

AC-2 and **AC-3** utilization categories the break current is equal to rated operational current belonging to rated motor power.

At **AC-4** utilization category the break current is sixfold of the rated operational current.

In case of **DL-K4...DL-K18** contactors the cycles marked by --- lines are suitable for determination of operating cycles in AC-4 utilization category.



APPENDIX

Rated operational currents of a.c. motors:

The undermentioned value of the rated operational currents are related to electric motors (AC, inner and surface cooling, 1500 r.p.m.).

Direct starting: 6 x the running up time: ≤ 5 s

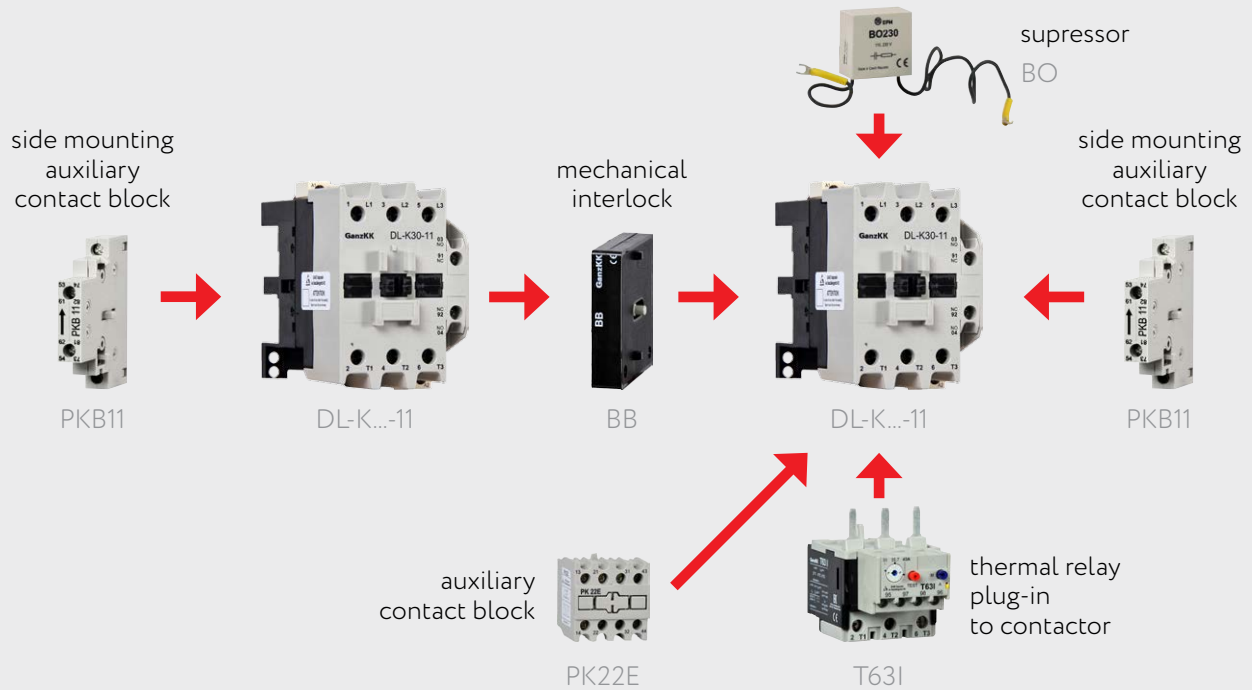
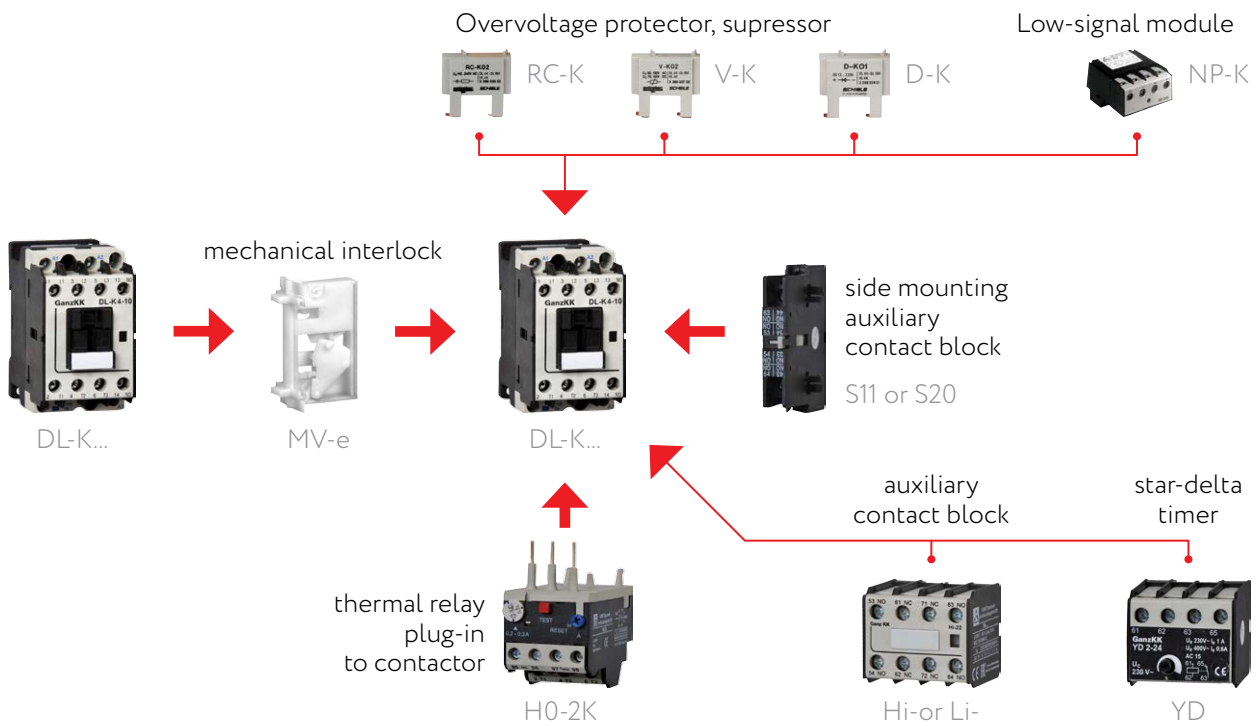
Star-delta starting: 2 x the running up time: ≤ 15 s

The range of currents for star-delta starting are legible on the surface of the thermal relay as well. The value of the motor's rated current should be adjusted by the turn knob.

The current-values of fuses are valide for Y/ Δ starting of slip-ring motors. In case of bigger rated and starting currents, or/and running up times it should be used bigger fuses (characteristic gG). Rated current of NH-fuses of characteristic aM should be chosen to equal value of the motors' rated current.

Motor			230 V			400 V			500 V			690 V		
Rated power	Power factor	Efficiency	Motor I_e	Fuse I_n		Motor I_e	Fuse I_n		Motor I_e	Fuse I_n		Motor I_e	Fuse I_n	
[kW]	$\cos \varphi$	η %		direct	Y/D		direct	Y/D		direct	Y/D		direct	Y/D
[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]	[A]
0,06	0,7	59	0,38	1	1	0,22	1	1	0,16	1	1	-	-	-
0,09	0,7	60	0,55	2	2	0,33	1	1	0,24	1	1	-	-	-
0,12	0,7	61	0,76	2	2	0,42	2	2	0,33	1	1	-	-	-
0,18	0,7	61	1,1	2	2	0,64	2	2	0,46	1	1	-	-	-
0,25	0,7	62	1,4	4	2	0,88	2	2	0,59	2	2	-	-	-
0,37	0,72	64	2,1	4	4	1,22	4	2	0,85	2	2	0,7	2	2
0,55	0,75	69	2,7	4	4	1,5	4	2	1,2	4	2	0,9	2	2
0,75	0,8	74	3,3	6	4	2	4	4	1,48	4	2	1,1	2	2
0,8	0,8	74	3,6	6	4	2,1	4	4	1,57	4	2	-	-	-
1,1	0,83	77	4,9	10	6	2,6	4	4	2,1	4	4	1,5	4	2
1,5	0,83	78	6,2	10	10	3,5	6	4	2,6	4	4	2	4	4
2,2	0,83	81	8,7	16	10	5	10	6	3,8	6	6	2,9	6	4
2,5	0,83	81	9,8	16	16	5,7	10	10	4,3	6	6	-	-	-
3	0,84	81	11,6	20	16	6,6	16	10	5,1	10	10	3,5	6	4
3,7	0,84	82	14,2	25	20	8,2	16	10	6,2	16	10	-	-	-
4	0,84	82	15,3	25	20	8,5	16	10	6,5	16	10	4,9	10	6
5	0,84	83	18,9	35	25	10,5	20	16	8,1	16	10	-	-	-
5,5	0,85	83	20,6	35	25	11,5	20	16	8,9	16	10	6,7	16	10
6,5	0,86	84	23,7	35	25	13,8	25	16	10,4	20	16	-	-	-
7,5	0,86	85	27,4	35	35	15,5	25	20	11,9	20	16	9	16	10
8	0,86	85	28,8	50	35	16,7	25	20	12,7	20	16	-	-	-
11	0,86	87	39,2	63	50	22	35	25	16,7	25	20	13	25	16
12,5	0,86	87	43,8	63	50	25	35	35	19	35	25	-	-	-
15	0,86	87	52,6	80	63	30	50	35	22,5	35	25	17,5	25	20
18,5	0,86	88	64,9	100	80	37	63	50	28,5	50	35	21	35	25
20	0,86	88	69,3	100	80	40	63	50	30,6	50	35	-	-	-
22	0,87	89	75,2	100	80	44	63	50	33	50	50	25	35	35
25	0,87	89	84,4	125	100	50	80	63	38	63	50	-	-	-
30	0,87	90	101	125	125	60	80	63	44	63	50	33	50	35
37	0,87	90	124	160	160	72	100	80	54	80	63	42	63	50
40	0,87	90	134	160	160	79	100	100	60	80	63	-	-	-
45	0,88	91	150	200	160	85	125	100	64,5	100	80	49	63	63
51	0,88	91	168	200	200	97	125	100	73,7	100	80	-	-	-
55	0,88	91	181	250	200	105	160	125	79	125	100	60	80	63
63	0,88	91	207	250	200	119	160	125	90,5	125	100	-	-	-
75	0,88	91	245	315	250	140	200	160	106	160	125	82	125	100
80	0,88	91	260	315	315	147	200	160	112	160	125	-	-	-
90	0,88	92	292	400	315	170	250	200	128	160	160	98	125	125
100	0,88	92	325	400	400	188	250	250	143	200	160	-	-	-
110	0,88	92	358	500	400	205	250	250	156	200	200	118	160	125
129	0,88	92	420	500	500	242	315	250	184	250	200	-	-	-
132	0,88	92	425	500	500	245	315	250	186	250	200	140	200	160
140	0,88	92	449	630	500	260	315	315	200	250	250	-	-	-
147	0,88	93	472	630	630	273	315	315	207	250	250	-	-	-
160	0,88	93	502	630	630	295	400	315	220	315	250	170	200	200

ACCESSORIES FOR CONTACTORS





GANZ Switchgear and Appliance Manufacturing Ltd.

Address: H-1101 Budapest, Kőbányai út 41/c

Phone.: +36 (1) 261 1115 · Fax: +36 (1) 261-7670

Web: www.ganzkk.hu

E-mail: ganzkk@ganzkk.hu