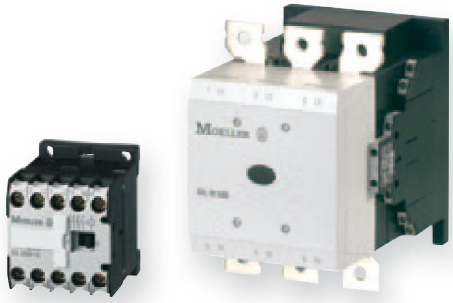


Mini contactor relays, contactor relay, contactors

Continual operation requires high operational reliability in the components used. The DILM contactor achieves the best lifespan values in AC-3 applications and is ideal for heavy AC-4 jogging.

Mini contactor relay DILE…,contactor relays, contactors up to 12 A AC-3 at 400 V
Compact dimensions for the highest packing densities +++ Extended performance range up to 5.5 kW at 400 V

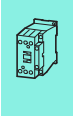
AC and DC contactor system DILM…, contactor relays, 3 pole contactors up to 170 A AC-3 at 400 V, 4 pole contactors up to 200 A AC-1
Easier engineering through identical construction sizes for AC- and DC-operated contactors +++ Energy savings and higher packing density in control panel due to minimized heat dissipation +++ High wiring security through doubled box terminals +++ Less coupler relays: direct actuation from the PLC for contactors up to 32 A +++ Easy engineering through integrated suppressor circuits for DC +++ Uniform accessories for 3- and 4-pole contactors +++ Mechanical interlock double conductor run mountable without additional separation gap +++ Direct fieldbus connection through the communication system SmartWire-Darwin, through plug-in type protective module

High rated contactors - contactors up to 1600 A AC-3 at 400 V, contactors up to 2600 A AC-1
Compact dimensions with high switching power +++ Direct actuation from the PLC saves coupler relays +++ Easy engineering through wide range coils +++ Cost and energy savings for control panel ventilation due to reduced heat dissipation +++ Long lifespan through vacuum technology from 580 A

SmartWire-Darwin
The DIL product range offers contact elements which can be connected to the SmartWire-Darwin communication system. → Protective modules, Page 5/62

Eaton After Sales Service
Testing switching devices in compliance with regulations applicable to this technology
→ Chapter 22

Ordering



AC	DILER-40(...)	DILER-31(...)	DILER-22(...)	DILEEM-10(...)	DILEEM-01(...)
	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]
Standard voltages	See price list	See price list	See price list	See price list	See price list
24V 50Hz	010094	010251	010344	051604	051629
48V 50Hz	010190	010044	010201	051603	051628
240V 50Hz	010478	010300	010138	051602	051627
115V 60Hz	010270	010204	010211	051598	051624
42V 50Hz, 48V 60Hz	–	–	–	051612	051637
110V 50Hz, 120V 60Hz	051756	051765	051774	051611	051636
190V 50Hz, 220V 60Hz	051757	051766	051775	051610	051635
220V 50Hz, 240V 60Hz	051758	051767	051776	051609	051634
230V 50Hz, 240V 60Hz	051759	051768	051777	051608	051633
380V 50Hz, 440V 60Hz	051760	051769	051778	051607	051632
400V 50Hz, 440V 60Hz	051761	051770	051779	051606	051631
415V 50Hz, 480V 60Hz	051762	051771	051780	051605	051630
24V 50/60Hz	021924	021594	021704	051596	051621
42V 50/60Hz	033459	029869	029433	051595	051620
110V 50/60Hz	021961	021624	021871	051592	051618
230V 50/60Hz	052725	052509	052508	056674	058771
DC	**DILER-40-G(...)**	**DILER-31-G(...)**	**DILER-22-G(...)**	**DILEEM-10-G(...)**	**DILEEM-01-G(...)**
	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]
Standard voltages	See price list	See price list	See price list	See price list	See price list
12V DC	079711	079761	080728	051644	051649
24V DC	010223	010157	010042	051643	051650
48V DC	010255	010205	010346	051642	051648
110V DC	010287	010253	010043	051640	051646
220V DC	010303	010269	010091	051639	051645

Notes [1] To obtain the article number for ordering, read under selected part number and actuating voltage from the table. Devices with dual-voltage coils are to be ordered under a single article number.

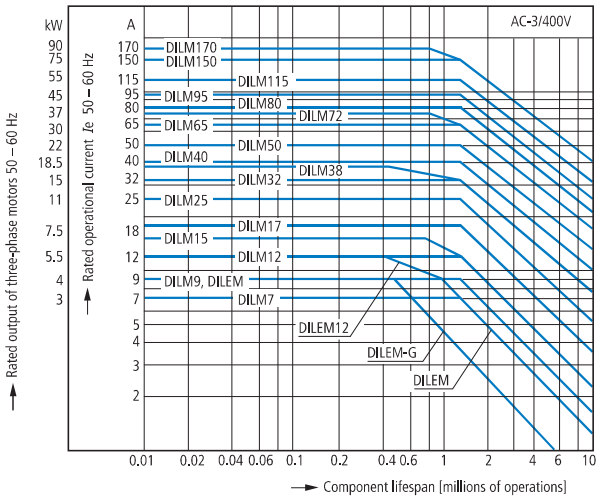
AC	DILEM-10(...)	DILEM-01(...)	DILEM12-10(...)	DILEM12-01(...)	DILEM4(...)
	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]
Standard voltages	See price list	See price list	See price list	See price list	See price list
24V 50Hz	010005	010086	127067	127083	014754
48V 50Hz	010020	010294	–	–	–
240V 50Hz	010032	010151	–	–	014305
115V 60Hz	010024	010470	–	–	–
42V 50Hz, 48V 60Hz	051782	051791	–	–	–
110V 50Hz, 120V 60Hz	051783	051792	127072	127088	051801
190V 50Hz, 220V 60Hz	051784	051793	–	–	–
220V 50Hz, 240V 60Hz	051785	051794	–	–	051803
230V 50Hz, 240V 60Hz	051786	051795	–	–	051804
380V 50Hz, 440V 60Hz	051787	051796	–	–	–
400V 50Hz, 440V 60Hz	051788	051797	–	–	051806
415V 50Hz, 480V 60Hz	051789	–	–	–	–
24V 50/60Hz	021417	020402	127079	127095	022044
42V 50/60Hz	032174	033233	–	–	–
110V 50/60Hz	021455	020436	127081	127097	–
230V 50/60Hz	052302	051114	127082	127098	052506

DC	DILEM-10-G(...)	DILEM-01-G(...)	DILEM12-10-G(...)	DILEEM12-01-G(...)	DILEM4-G(...)
	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]	Article no.[1]
Standard voltages	See price list	See price list	See price list	See price list	See price list
12V DC	079594	079642	–	–	079680
24V DC	010213	010343	127132	127137	012701
48V DC	010245	010496	–	–	–
110V DC	010309	010136	–	–	–
220V DC	010325	010168	–	–	–

Notes

[1] To obtain the article number for ordering, read under selected part number and actuating voltage from the table. Devices with **dual-voltage coils** are to be ordered under a **single** article number.

Normal switching duty



Normal AC induction motor

Operating characteristics

Make: from stop

Break: during run

Electrical characteristics:

Make: up to 6 X rated motor current

Break: 1 X rated motor current

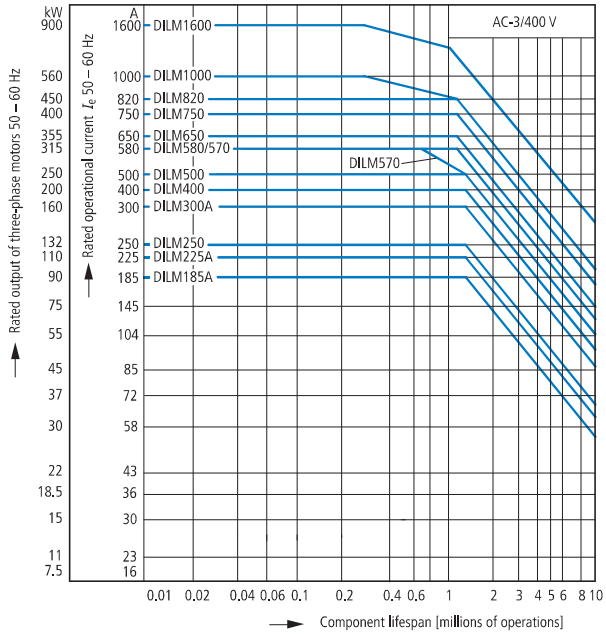
Utilization category

100 % AC-3

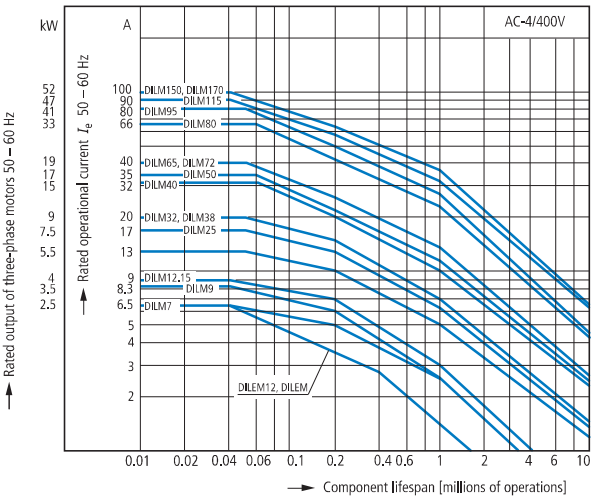
Typical applications:

Compressors	Lifts	Mixers
Pumps	Escalators	Agitators
Fan	Conveyor belts	Centrifuges
Hinged flaps	Bucket-elevator	Air conditioning sys-

General drives for manufacturing and processing machines



Extreme switching duty



Normal AC induction motor

Operating characteristics

Inching, plugging, reversing

Electrical characteristics:

Make: up to 6 X rated motor current

Break: 6 X rated motor current

Utilization category

100 % AC-4

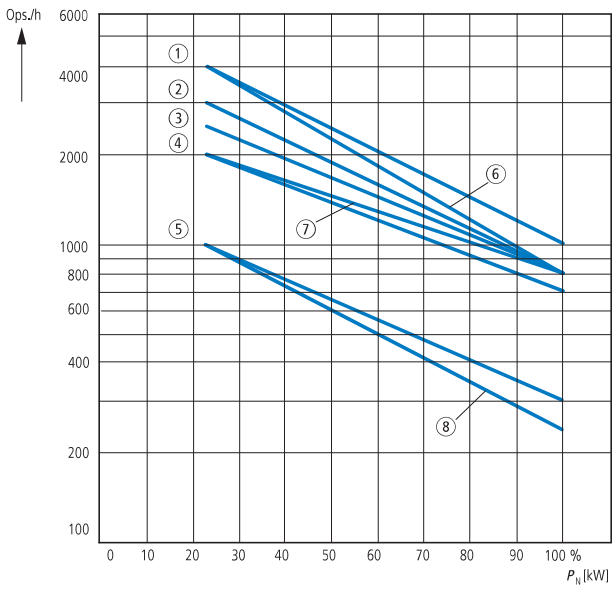
Typical applications:

Printing machines	Wire-drawing	Centrifuges

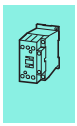
Special drives on manufacturing and processing machines

Determination of the maximum operating frequency dependent on the rating and utilization category (recommended values) for 400 V

P_N = max. rated motor output (kW) of respective contactor according to → Page 5/18 and → Page 5/4
S/h = max. operation per hour

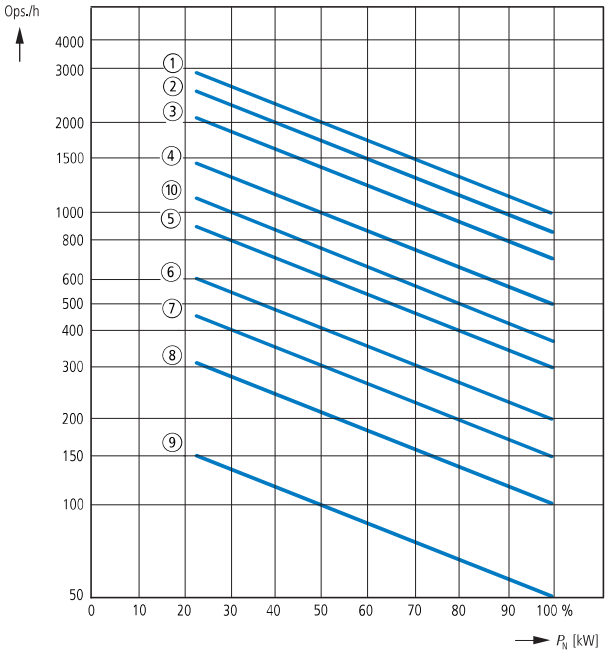


Part no.	Characteristic AC-1	AC-3	AC-2 AC-4
DILE(E)M(-12)	7	6	8
DILM7, 9, 12, 15	3	1	5
DILM17, 25, 32, 38	3	2	5
DILM40, 50, 65, 72	3	2	5
DILM80, 95, 115, 150, 170	3	4	5



Determination of the maximum operating frequency dependent on the rating and utilization category (recommended values)

P_N = max. rated motor output (kW) of respective contactor according to → Page 5/30 and → Page 5/34
S/h = max. operation per hour

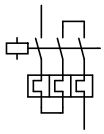
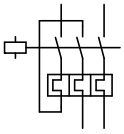


Part no.	Characteristic AC-1	AC-3	AC-4
DILM185A	2	1	8
DILM225A	2	1	8
DILM250	2	1	8
DILM300A	3	2	9
DILM400	3	2	9
DILM500	3	2	9
DILM580	3	4	7
DILM650	3	4	7
DILM750	3	4	7
DILM820	3	4	7
DILM1000	3	4	7
DILM1600	10	10	7
DILH1400	10	–	–
DILH2000	10	–	–
DILH2200	10	–	–
DILH2600	10	–	–

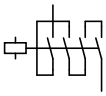
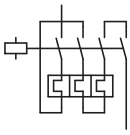
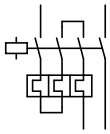
DC current switching

– – – – – when necessary conductor to be supplied by customer

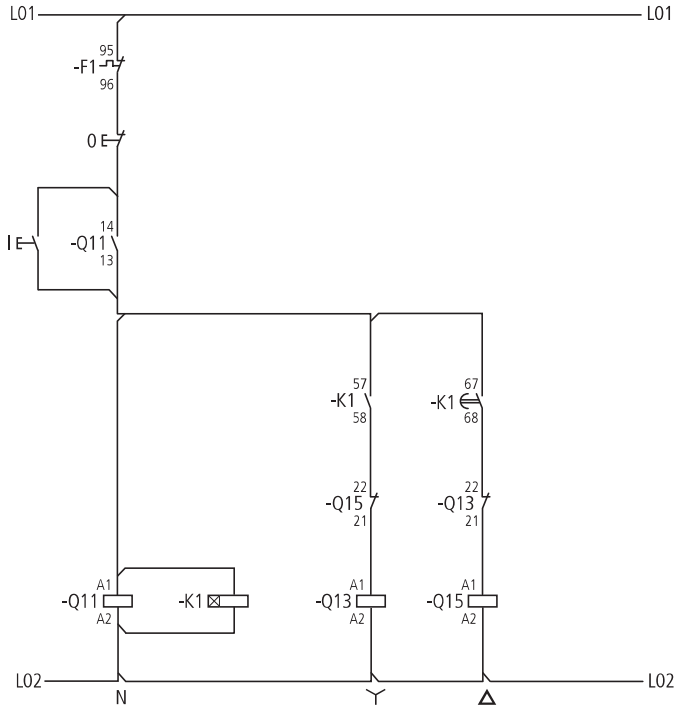
DILEEM ... DILM700

	Without overload relay ≤ 60 V DC	> 60 V DC	With overload relay > 60 V DC
1 pole			
2 pole			

DILEM4
DILMP...

		> 60 V DC	With overload relay > 60 V DC
1 pole			
2 pole			

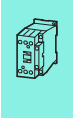
Wiring, star-delta combination with DILM32-XTEY20



DILEEM, DILEM

			DILEEM DILEM DILEM12	DILEEM-G DILEM-G DILEM12-G	DILEM4	DILEM4-G
General						
Standards			IEC/EN 60947, VDE 0660, CSA, UL			
Lifespan, mechanical; Coil 50/60 Hz	at 50 Hz		7	–	7	–
Lifespan, mechanical	c (contacts)	x 10^6	10	20	20	–
Maximum operating frequency						
Mechanical		Ops/h	9000			
Electrical (Contactor without overload relay)			→ Characteristic curves Page 5/95			
Climatic proofing			Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30			
Ambient temperature						
Open		°C	-25 - 50			
Enclosed		°C	-25 - 40			
Mounting position			Any, except for vertically with terminals A1/A2 below			
Mechanical shock resistance (IEC/EN 60068-2-27)						
Half-sinusoidal shock 10 ms						
Basic device without auxiliary contact module						
Main circuit normally open contact		g	10			
Auxiliary contacts NC/Normally open contact		g	10/8	10/8	–	–
Basic devices with auxiliary contact module						
Main circuit normally open contact		g	10			
Auxiliary contacts Normally open contact/NC		g	20/20			
Protection type			IP20			
Protection against direct contact when actuated from front (EN 50274)			Finger- and back-of-hand proof			
Weight		kg	0.2	0.17	0.2	0.17
Terminal capacity: main and auxiliary contacts						
Solid		mm^2	1 x (0.75 - 2.5) 2 x (0.75 - 2.5)			
Flexible with ferrule		mm^2	1 x (0.75 - 1.5) 2 x (0.75 - 1.5)			
Solid or stranded		AWG	18 - 14			
Terminal screw			M3.5			
Pozidriv screwdriver		Size	2			
Flat-blade screwdriver		mm	0.8 x 5.5 1 x 6			
Max. tightening torque		Nm	1.2			
Terminal capacity springloaded terminals main and control circuits						
Solid		mm^2	1 x (1 - 2.5) 2 x (1 - 2.5)			
Flexible with ferrule		mm^2	1 x (1 - 2.5) 2 x (1 - 2.5)			
Flat-blade screwdriver		mm	0.6 x 3.5			

DILEEM, DILEM

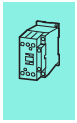


				DILEEM DILEEM-G	DILEM DILEM-G	DILEM4	DILEM4-G	DILEM12 DILEM12-G
Main contacts								
Rated impulse withstand voltage		U_{imp}	V AC	6000	6000	6000	6000	6000
Overvoltage category/pollution degree				III/3	III/3	III/3	III/3	III/3
Rated insulation voltage		U_i	V AC	690	690	690	690	690
Rated operating voltage		U_e	V AC	690	690	690	690	690
Safe isolation according to EN 61140								
Between coil and contacts			V AC	300	300	300	300	300
Between the contacts			V AC	300	300	300	300	300
Making capacity of up to 440 V (cos φ as specified in IEC/EN 60947)			A	110	110	110	110	120
Breaking capacity	220/230 V		A	90	90	90	90	96
	380/400 V		A	90	90	90	90	96
	500 V		A	64	64	64	64	72
	660/690 V		A	42	42	42	42	42
Devices lifespan	AC-1			→ Engineering Page 5/92				
	AC-3			→ Engineering Page 5/91				
	AC-4			→ Engineering Page 5/91				
Short-circuit protection rating maximum fuse								
	Type "2" coordination 500 V	gL/gG	A	10	10	10	10	20
	Type "1" coordination 500 V	gL/gG	A	20	20	20	20	35
AC voltage								
AC-1 operation								
Conventional thermal current 3 pole 50 - 60 Hz								
Open	at 40 °C	I_{th}	A	22	22	22	22	22
	at 50 °C	I_{th}	A	20	20	20	20	20
	at 55 °C	I_{th}	A	19	19	19	19	19
Enclosed[1)]		I_{th}	A	16	16	16	16	16
Conventional thermal current, 1-pole								
Open[1)]		I_{th}	A	50	50	60	60	50
Enclosed[1)]		I_{th}	A	40	40	50	50	40
AC-3 operation								
Rated operational current AC-3 open, 50 - 60 Hz, 3-pole1)	220/230 V	I_e	A	6.6	9	9	9	12
	240 V	I_e	A	6.6	9	9	9	12
	380/400 V	I_e	A	6.6	9	9	9	12
	415 V	I_e	A	6.6	9	9	9	12
	440 V	I_e	A	6.6	9	9	9	10.5
	500 V	I_e	A	5	6.4	6.4	6.4	9
	660/690 V	I_e	A	3.5	4.8	4.8	4.8	5.2
Motor rating	220/230 V	P	kW	1.5	2.2	2.2	2.2	3.5
	240 V	P	kW	1.8	2.5	2.5	2.5	3
	380/400 V	P	kW	3	4	4	4	5.5
	415 V	P	kW	3.1	4.3	4.3	4.3	5.5
	440 V	P	kW	3.3	4.6	4.6	4.6	5.5
	500 V	P	kW	3	4	4	4	5.5
	660/690 V	P	kW	3	4	4	4	4
AC-4 operation								
Rated operational current AC-4 open, 50 - 60 Hz, 3-pole1)	220/230 V	I_e	A	5	6.6	6.6	6.6	6.6
	240 V	I_e	A	5	6.6	6.6	6.6	6.6
	380/400 V	I_e	A	5	6.6	6.6	6.6	6.6
	415 V	I_e	A	5	6.6	6.6	6.6	6.6
	440 V	I_e	A	5	6.6	6.6	6.6	6.6
	500 V	I_e	A	3.7	5	5	5	5
	660/690 V	I_e	A	2.9	3.4	3.4	3.4	3.4
Rated operational power	220/230 V	P	kW	1.1	1.5	1.5	1.5	1.5
	240 V	P	kW	1.3	1.8	1.8	1.8	1.8
	380/400 V	P	kW	2.2	3	3	3	3
	415 V	P	kW	2.3	3.1	3.1	3.1	3.1
	440 V	P	kW	2.4	3.3	3.3	3.3	3.3
	500 V	P	kW	2.2	3	3	3	2.2
	660/690 V	P	kW	2.2	3	3	3	2.2

Notes

[1)] At maximum permissible ambient air temperature

DILEEM, DILEM



				DILEEM	DILEEM-G	DILEM	DILEM-G	DILEM4	DILEM4-G	DILEM12	DILEM12-G
DC voltage											
Operations				→ Engineering Page 5/96							
Rated operational current open											
DC-1	12 V	I_e	A	20	20	20	20	20	20	20	20
	24 V	I_e	A	20	20	20	20	20	20	20	20
	60 V	I_e	A	20	20	20	20	20	20	20	20
	110 V	I_e	A	20	20	20	20	20	20	20	20
	220 V	I_e	A	20	20	20	20	20	20	20	20
DC-3	12 V	I_e	A	6	6	8	8	8	8	8	8
	24 V	I_e	A	6	6	8	8	8	8	6	8
	60 V	I_e	A	3	3	4	4	4	4	4	4
	110 V	I_e	A	2	2	3	3	3	3	3	3
	220 V	I_e	A	–	–	–	–	1	1	–	–
DC-5	12 V	I_e	A	1.8	1.8	2.5	2.5	2.5	2.5	2.5	2.5
	24 V	I_e	A	1.8	1.8	2.5	2.5	2.5	2.5	2.5	2.5
	60 V	I_e	A	1.8	1.8	2.5	2.5	2.5	2.5	2.5	2.5
	110 V	I_e	A	1.8	1.8	1.5	1.5	2.5	2.5	1.5	1.5
	220 V	I_e	A	0.2	0.2	0.3	0.3	1	1	0.3	0.3
Current heat loss (3-pole or 4-pole)											
At I_{th}			W	2	3.5	2	3.5	2.7	4.7	2	3.5
At I_e to AC-3/400 V			W	0.5	0.7	0.5	0.7	–	–	0.5	0.7
Magnet systems											
Voltage tolerance											
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz		Pick-up	x U_c	0.8 - 1.1	–	0.8 - 1.1	–	0.8 - 1.1	–	0.8 - 1.1	–
Dual-frequency coil 50/60 Hz		Pick-up	x U_c	0.8 - 1.1	–	0.85 - 1.1	–	0.85 - 1.1	–	0.8 - 1.1	–
DC operated		Pick-up	x U_c	–	0.8 - 1.1	–	0.8 - 1.1	–	0.85 - 1.1	–	0.8 - 1.1
Power consumption											
AC operation	Single-voltage coil, 50 Hz, and dual-voltage coil, 50 Hz, 60 Hz	Pick-up	VA	25	–	25	–	25	–	25	–
		Pick-up	W	22	–	22	–	22	–	22	–
		Sealing	VA	4.6	–	4.6	–	4.6	–	4.6	–
		Sealing	W	1.3	–	1.3	–	1.3	–	1.3	–
	Dual-frequency coil 50/60 Hz at 50 Hz	Pick-up	VA	30	–	30	–	30	–	30	–
		Pick-up	W	26	–	26	–	26	–	26	–
		Sealing	VA	5.4	–	5.4	–	5.4	–	5.4	–
		Sealing	W	1.6	–	1.6	–	1.6	–	1.6	–
	Dual-frequency coil 50/60 Hz at 60 Hz	Pick-up	VA	29	–	29	–	29	–	29	–
		Pick-up	W	24	–	24	–	24	–	24	–
		Sealing	VA	3.9	–	3.9	–	3.9	–	3.9	–
		Sealing	W	1.1	–	1.1	–	1.1	–	1.1	–
	Single-voltage coil, 50 Hz, and dual-voltage coil, 50 Hz, 60 Hz	Pick-up	VA	25	–	25	–	25	–	25	–
	Dual-frequency coil 50/60 Hz at 50 Hz	Pick-up	VA	30	–	30	–	30	–	30	–
	Dual-frequency coil 50/60 Hz at 60 Hz	Pick-up	VA	29	–	29	–	29	–	29	–
DC operation[1)]	Power consumption pick-up = sealing		VA/W	–	2.6	–	2.6	–	2.6	–	2.6
Duty factor			% DF	100	100	100	100	100	100	100	100
Switching times at 100 % U_c											
N/O	Closing delay min.		ms	14	26	14	26	14	26	14	26
	Closing delay max.		ms	21	35	21	35	21	35	21	35
	Opening delay min.		ms	8	15	8	15	8	15	8	15
	Opening delay max.		ms	18	25	18	25	18	25	18	25
	Closing delay with top mounting auxiliary contact		ms	Max. 45	Max. 70	Max. 45	Max. 70	Max. 45	Max. 70	Max. 45	Max. 70
Reversing contactors	Changeover time at 110 % U_c										
	Changeover time min.		ms	16	40	16	40	16	40	16	40
	Changeover time max.		ms	21	50	21	50	21	50	21	50
	Arcing time at 690 V AC		ms	Max. 12	Max. 12	Max. 12	Max. 12	Max. 12	Max. 12	Max. 12	Max. 12
Coil	Lifespan, mechanical; Coil 50/60 Hz	c (contacts)	x 10^6	7	–	7	–	7	–	7	–

Notes

[1)] Smoothed DC or three-phase bridge rectifier

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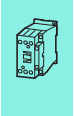

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Auxiliary contact				
Interlocked opposing contacts to EN 60947-5-1 Annex L, including auxiliary contact module			Yes	Yes
Rated impulse withstand voltage	U_{imp}	V AC	6000	6000
Overvoltage category/pollution degree			III/3	III/3
Rated insulation voltage	U_i	V AC	690	690
Rated operating voltage	U_e	V AC	600	600
Safe isolation according to EN 61140				
Between coil and auxiliary contacts		V AC	300	300
Between the auxiliary contacts		V AC	300	300
Rated operational current				
AC-15				
220/240 V	I_e	A	6	4
380/415 V	I_e	A	3	2
500 V	I_e	A	1.5	1.5
DC L/R ≦ 15 ms				
Contacts in series:				
1	24 V	A	2.5	2.5
2	60 V	A	2.5	2.5
3	100 V	A	1.5	1.5
3	220 V	A	0.5	0.5
Conventional thermal current	I_{th}	A	10	10
Control circuit reliability (at U_e = 24 V DC, U_{min} = 17 V, I_{min} = 5.4 mA)	Fault probability	λ	$<10^{-8}$, < one failure in 100 million operations	
Component lifespan at U_e = 240 V				
AC-15	c (contacts)	x 10^6	0.2	0.2
DC[1)]				
L/R = 50 ms: 2 contacts in series at I_e = 0.5 A	c (contacts)	x 10^6	0.15	0.15
Short-circuit rating without welding				
Maximum overcurrent protective device			PKZM0-4	PKZM0-4
Short-circuit protection rating maximum fuse				
500 V		A gG/gL	6	6
500 V		A fast	10	10
Current heat loss at load of I_{th}				
Per contact		W	0.2	0.2

Notes

[1)] Switch-on and switch-off conditions based on DC-13, time constant as specified