

**Energy Control  
DIL Contactors**

239460 585-970  
239471  
221-326 / 221-338

				DIL EEM	DIL EEM-G	DIL EM	DIL EM-G	DIL EM-GI	
<b>General</b>				<b>585-932</b>					
Standards				IEC 947, (BS) EN 60 947, DIN VDE 0660, CSA, UL, SEV, LRS, GL, BV, DNV, CIS, RINA, PRS					
Mechanical lifespan	Operations	x 10 <sup>6</sup>		10	20	10	20		
Maximum operating frequency	Maximum	Ops./h		9000					
Electrical	See table, Page 32/090								
Climatic proofing	Damp heat, constant, to IEC 68 Part 2-3								
	Damp heat, cyclic, to IEC 68 Teil 2-30								
Ambient temperature	Open	Max./min.	°C	+50/-25	+50/-20	+50/-25	+50/-20		
	Enclosed <sup>1)</sup>	Max./min.	°C	+40/-25	+40/-20	+40/-25	+40/-20		
Mounting position				As required, except vertical with terminal A1/A2 at the bottom					
Mechanical shock resistance (sinusoidal shock 20 ms)									
<i>Basic unit</i>									
Main contacts		g		8	20	8	20		
Make contacts		g		8/5.5	20/20	8/5.5	20/20		
<i>Basic unit with auxiliary contact module</i>									
Main contacts		g		7.5	20	7.5	20		
Make contacts		g		7.5/4.5	20/20	7.5/4.5	20/20		
Auxiliary contacts		g		7.5/4.5	20/20	7.5/4.5	20/20		
Make/break contacts		g		7.5/4.5	20/20	7.5/4.5	20/20		
Degree of protection				IP 20					
Protection against direct contact when actuated from the front by a perpendicular test finger (DIN VDE 0106, Part 100)				Finger- and back-of-hand proof <sup>2)</sup>					
Dimensions				Page 32/114					
Weights				kg					
				0.17	0.2	0.17	0.2		
Terminal capacities									
Auxiliary and main contacts									
Solid				Min.	mm <sup>2</sup>	2 x 0.75			
				Max.	mm <sup>2</sup>	2 x 2.5			
Flexible									
With ferrule to DIN 46 228				Max.	mm <sup>2</sup>	2 x 1.5			
With Klockner-Mosler ferrule				Max.	mm <sup>2</sup>	2 x 2.5			
Solid or stranded				Min.	AWG	18			
				Max.	AWG	14			
Terminal screw				M 3.5					
PoziDrive screwdriver				Size	mm	2			
Standard screwdriver					mm	0.8 x 5.5			
					mm	1 x 6			
Tightening torque				Max.	Nm	1.2			
<b>Main contacts</b>									
Rated impulse withstand voltage				U <sub>imp</sub>	V	6000			
Overvoltage category/pollution degree				III/3					
Rated insulation voltage				U <sub>i</sub>	V~	690			
Rated operational voltage				U <sub>s</sub>	V~	690			
"Safe isolation" to DIN VDE 0106 Part 101 and Part 101 A									
between coil and contacts, and between contacts					V~	300			

DIL EEM

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<sup>1)</sup> For suitable enclosure, see Pages 32/086, 087  
<sup>2)</sup> DIL EM-...F: only finger-proof when 6.3 x 0.8 mm blade terminals with ferrules are used

# Command System Control Circuit Devices

				Contact elements	Foot and palm switches	Lamp socket elements	Lamp transformers	
					Emergency-stop switches	Front fixing		
<b>General</b>				IEC 947, EN 60 947, DIN VDE 0660				
Standards				10	0.5	-	-	
Mechanical lifespan	Operations × 10 <sup>3</sup> Operations × 10 <sup>6</sup>			-	-	-	-	
Maximum operating frequency	Ops./h			6000	6000	-	-	
Operating force	N			≤ 5	≤ 25	-	-	
	N			IEC 11: ≤ 7.3	-	-	-	
	N			IEC 20: ≤ 9	-	-	-	
	N			IEC 02: ≤ 5.5	-	-	-	
Operating torque	Nm			-	-	-	-	
Degree of protection to IEC 529				IP 20	IP 65	IP 20	-	
Climatic proofing				Damp heat, constant, to IEC 68 Part 2-3				
				Damp heat, cyclic, to IEC 68 Part 2-30				
Ambient temperature	Open	Max./min. °C		+60/-25				
	Enclosed	Max./min. °C		+40/-25				
Mounting position				As required				
Mechanical shock resistance (shock duration 20 ms)	g			> 30				
Terminal capacity	Solid	Max./min. mm <sup>2</sup>		2.5/0.75				
	Stranded	Max./min. mm <sup>2</sup>		1.5/0.5				
Dimensions	Page			21/092-095				
<b>Contacts</b>								
Rated impulse withstand voltage	U <sub>imp</sub>	kV		6	4	4 <sup>1)</sup>	6	
Rated insulation voltage	U <sub>i</sub>	V		500	250	250	630	
Pollution degree				3				
Overvoltage category				III				
Max. short-circuit protective device	Fuseless	Type		PKZM 1-6/ FAZN B10	PKZM 1-6/ FAZN B10	-	Short-circuit-proof	
	Fuse, gL	A		10	10	-	Short-circuit-proof	
<b>Switching capacity</b>								
Rated operational current I <sub>n</sub> , AC-15	500 V		A	2	-	-	-	
	400 V		A	4	-	-	-	
	230 V		A	6	6	-	-	
Rated operational current I <sub>n</sub> , DC-13	220 V		A	0.5	0.5	-	-	
	110 V		A	1.1	1.1	-	-	
Electrical lifespan	230 V	1.2 A	Operations × 10 <sup>4</sup>	0.6	-	-	-	
		3.6 A	Operations × 10 <sup>3</sup>	0.3	-	-	-	
		2.8 A	Operations × 10 <sup>6</sup>	1.2	-	-	-	
DC-13	12 V							

<sup>1)</sup> EF 1 (C) : 2.5 kV, EF 0 (C) : 0.8 kV

# RMQ 22 Technical Data

RMQ 16

Push-button actuators Mushroom actuators	Emergency-stop actuators	Double actuators <sup>2)</sup>	Selector switches Illuminated selector switches	Toggle switches	Key-operated actuators	Key-release mushroom actuators	Illuminated push-button actuators - stay-put <sup>3)</sup>	Indicator lights
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IEC 947, EN 60 947, DIN VDE 0660

5	0.1	0.2	0.1	0.1	0.1	0.1	3 R(M)LTR: 0.3	-
6000	10	6000	2000	2500	100	100	6000	-
≤ 5	≤ 30	≤ 5	-	≤ 2	-	≤ 7	≤ 5	-
-	-	-	-	-	-	-	-	-
-	-	-	≤ 0.2	-	≤ 0.4	-	-	-



IP 65

Damp heat, constant, to IEC 68 Part 2-3  
Damp heat, cyclic, to IEC 68 Part 2-30

+60/-25  
+40/-25

As required

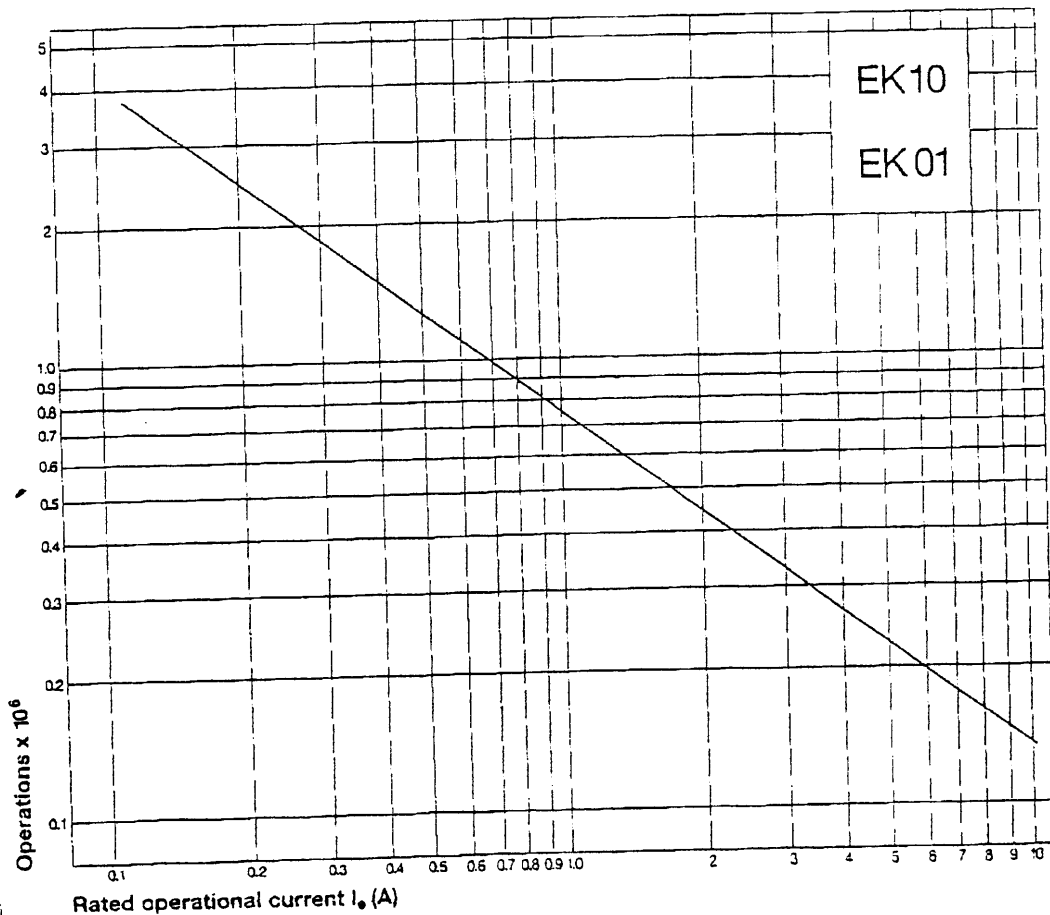
> 30	> 50	> 30	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-



21/090, 091  
21/092-095
















RMQ 22

## Electrical lifespan AC-15 to EN 60 947-5-1



<sup>2)</sup> Only for ⊗ up to 2 W    <sup>3)</sup> Only for ⊗ up to 1.2 W

# DIL EM Mini Contactors Technical Data

		DIL EEM	DIL EEM-G	DIL EM	DIL EM4	DIL EM-G	DIL EM-GI	
Making capacity cos φ to IEC 947		A	110	90	200	110	110	 32/006
Breaking capacity cos φ to IEC 947	220/230 V	A	70					 32/022
	380/400 V	A	70					
	500 V	A	52					
	660/690 V	A	40					
Component lifespan AC-1, AC-3, AC-4	Operations		Pages 32/088, 089					 32/028
Short-circuit rating Maximum fuse <sup>1)</sup> Type "2" co-ordination	gL	A	10					 32/038
	Type "1" co-ordination	A	20					
<b>A.C.</b>								
<b>AC-1 duty</b> Conventional free air thermal current $I_{th}$ rated operational current $I_n$ , 50-60 Hz								
3-pole	Open at 40 °C	A	22		(19.8) <sup>2)</sup>			 32/048
	at 50 °C	A	20		(18) <sup>2)</sup>			
	at 55 °C	A	19		(17) <sup>2)</sup>			 32/056
	Enclosed <sup>3)</sup>	A	16					
1-pole Three/four main contacts in parallel	Open <sup>3)</sup>	A	50		60	50		 32/008
	Enclosed <sup>3)</sup>	A	40		50	40		
<b>AC-3 duty</b> Rated operational current $I_n$ Open <sup>3)</sup> 50-60 Hz								
	220 V	A	6		8.7			 32/022
	230 V	A	6		8.7			
	380 V	A	6.6		8.5			 32/028
	400 V	A	6.6		8.5			
	500 V	A	5		6.4			 32/058
	660 V	A	3.5		4.9			
	690 V	A	3.5		4.8			
<b>AC-4 duty</b> Rated operational current $I_n$ Open <sup>3)</sup> 50-60 Hz								
	220 V	A	4.5		6			 32/022
	230 V	A	4.5		6			
	380 V	A	5		6.6			 32/068
	400 V	A	5		6.6			
	500 V	A	3.7		5			 32/088
	660 V	A	2.9		3.5			
	690 V	A	2.9		3.4			
<b>D.C.</b>								
Circuitry Rated operational current $I_n$ Open <sup>3)</sup>								
DC-1 duty	12 V-	A	20				20	 32/114
	24 V-	A	20				20	
	60 V-	A	20				20	
	110 V-	A	20				20	
	220 V-	A	20				20	
DC-3 duty	12 V-	A	6		8		8	
	24 V-	A	6		8		8	
	60 V-	A	3		4		4	
	110 V-	A	2		3		3	
	220 V-	A	-		-	1	-	
DC-5 duty	12 V-	A	1.8		2.5		2.5	
	24 V-	A	1.8		2.5		2.5	
	60 V-	A	1.8		2.5		2.5	
	110 V-	A	1.1		1.5	2.5	1.5	
	220 V-	A	0.2		0.3	1	0.3	
Current heat loss (3- or 4-pole) at conventional free air thermal current $I_{th}$ at $I_n$ AC-3/400 V		W	2	3.5	2	2.7	3.5	 32/093
		W	0.3	0.4	0.5	-	0.7	














<sup>1)</sup> See overlay "Fuses" for time/current characteristics  
<sup>2)</sup> At maximum permissible ambient temperature

<sup>3)</sup> DIL EM-...F

# Energy Control DIL Contactors

				DIL EEM	DIL EEM-G	DIL EM	DIL EM-G	DIL EM-GI
<b>Magnet system</b>								
Pick-up and drop-out values	A.C. operated							
	Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	Pick-up	$\times U_c$	0.8-1.1	-	0.8-1.1	-	-
	Dual-frequency coil ... V, 50/60 Hz	Pick-up	$\times U_c$	0.85-1.1	-	0.85-1.1	-	-
	D.C. operated		Pick-up	$\times U_c$	-	0.85-1.1	-	0.85-1.1 0.7-1.3
Power consumption of the coil	A.C. operated							
	Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	Pick-up	VA/W	25/22	-	25/22	-	-
		Sealing	VA/W	4.6/1.3	-	4.6/1.3	-	-
	Dual-frequency coil ... V, 50/60 Hz at 50 Hz	Pick-up	VA/W	30/26	-	30/26	-	-
		Sealing	VA/W	5.4/1.6	-	5.4/1.6	-	-
... V, 50/60 Hz at 60 Hz	Pick-up	VA/W	29/24	-	29/24	-	-	
	Sealing	VA/W	3.9/1.1	-	3.9/1.1	-	-	
	D.C. operated		Pick-up = W	-	2.6	-	2.6	1.5
			Sealing					
Duty factor			% DF	100 .....				
Switching times at 100 % $U_c$ (approximate values) Make contacts	Closing delay		ms	14-21	26-35	14-21	26-35	.....
	Opening delay		ms	8-18	15-17	8-18	15-17	14-20
<b>Reversing contactors</b>								
Changeover time at 110 % $U_c$			ms	16-21	30-40	16-21	30-40	.....
Arcing time when a.c. operated 690 V			ms	12 .....				
Coil 50/60 Hz				Mechanical lifespan at 50 Hz approximately 30 % less than listed under "General", (Page 32/092)				

# DIL EM Mini Contactors Technical Data

				DIL EEM	DIL EEM-G	DIL EM	DIL EM-G	DIL EM-GI		
<b>Contacts</b>										
Interlocked opposing contacts to German specification ZH 1/457, including auxiliary contact modules				+	+	+	+	+		
Rated impulse withstand voltage	$U_{imp}$	V		6000						
Overvoltage category/pollution degree				III/3						
Rated insulation voltage	$U_i$	V~		690						
Rated operational voltage	$U_o$	V~		600						
"Safe isolation" to DIN VDE 0106 Part 101 and Part 101 A1 between coil and auxiliary contacts, and between auxiliary contacts										
		V~		300						
Rated operational current $I_n$ AC-15										
		220/240 V	A	6						
		380/415 V	A	3						
		500 V	A	1.5						
DC-13 <sup>1)</sup>	Contacts in series									
Above 110 V and at L/R > 15 ms it is essential that means of arc suppression be used in parallel with the contacts: Required capacitor C-1 $\mu$ F R-0.5 $\Omega$ in series	L/R $\leq$ 15 ms e. g. contactor coils solenoid valves d.c. motors									
		1	24 V- A	2.5						
		2	60 V- A	2.5						
		3	110 V- A	1.5						
		3	220 V- A	0.5						
Control circuit reliability at $U_c = 24$ V DC Voltage, current and tolerances to DIN 19 240, 17 V, 5.4 mA	Error rate	$H_f$		< $10^{-8}$ , < 1 fault operation in 100 million operations						
Conventional free air thermal current $I_n$			A	10						
Component lifespan $U_c = 240$ V AC-15	Operations $\times 10^6$			Page 32/088						
$U_c = 240$ V DC-13 <sup>1)</sup>	At $I_n = 0.5$ A, L/R = 50 ms 2 contacts in series	Operations $\times 10^6$		0.15						
Short-circuit rating With direct connection to mains or transformer > 1000 VA	Without welding Max. overcurrent protective device	220/240 V PKZM 1		4						
		380/415 V PKZM 1		4						
	Without welding Maximum fuse <sup>2)</sup>	500 V	A gL	6						
		500 V	A fast	10						
Current heat loss at conventional free air thermal current $I_n$	Per contact	Max.	W	0.2	0.3	0.2	0.3			
										
										

1) Making and breaking currents to DC-13, time constant as stated  
2) See overlay "Fuses" for time/current characteristics

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