

# AF38-22-00-.. / AF38Z-22-00-.. 4-pole Contactors AC / DC Operated - with Screw Terminals

AF38(Z) contactors are used for controlling power circuits up to 690 V AC and 440 V DC. They are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...).

- AF..(Z) contactors include an electronic coil interface providing reduced pull-in and holding consumption, particularly for AC control circuits
- Only four coils are needed to cover control voltages between 24...500 V 50/60 Hz or 20...500 V DC.
- AF..(Z) offer extended operating limits and are suitable worldwide for different control voltages. e.g.: the coil 100...250 V 50/60 Hz - DC is suitable for Europe (230 V 50 Hz) and for North America (120 V 60 Hz and 208 V 60 Hz).
- AF..(Z) contactors can manage large control voltage variations.
- AF.Z contactors equipped with a 24...60 V 50/60 Hz - 20...60 V DC coil allow direct control by 24 V DC 500 mA PLC-output
- AF.Z contactors withstand short voltage dips and voltage sags (SEMI F47-0706 compliance)
- AF..(Z) contactors have built-in surge protection and do not require additional surge suppressors.



		55 A	
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3D CAD outline drawings available on «Control Product 3D» portal

### Ordering Details

IEC	UL/CSA	Control voltage	Auxiliary contacts	Type	Order code	EAN	Weight
AC-1 Rated current	General use rating	Uc min. ... Uc max.	fitted				
$\theta \leq 40\text{ }^{\circ}\text{C}$ A	600 V AC A	V 50/60 Hz ; V DC					Pack <sup>(ing)</sup> 1 piece kg

### 4-pole Contactors 2 N.O. + 2 N.C. Main Poles

IEC	UL/CSA	Control voltage	Auxiliary contacts	Type	Order code	EAN	Weight
55	55	24...60	0 0	AF38-22-00-11	1SBL 297 501 R1100	3471523116511	0.360
		48...130	0 0	AF38-22-00-12	1SBL 297 501 R1200	3471523116528	0.360
		100...250	0 0	AF38-22-00-13	1SBL 297 501 R1300	3471523116535	0.360
		250...500	0 0	AF38-22-00-14	1SBL 297 501 R1400	3471523116542	0.400

Note: AF38-22-00-11 not suitable for a direct control by PLC-output. AF38-22-00-11 available in some countries: please consult your ABB representative.

### 4-pole Contactors 2 N.O. + 2 N.C. Main Poles - Low Consumption

IEC	UL/CSA	Control voltage	Auxiliary contacts	Type	Order code	EAN	Weight
55	55	-	0 0	AF38Z-22-00-20	1SBL 296 501 R2000	3471523116900	0.400
		24...60	0 0	AF38Z-22-00-21	1SBL 296 501 R2100	3471523116917	0.400
		48...130	0 0	AF38Z-22-00-22	1SBL 296 501 R2200	3471523116924	0.400
		100...250	0 0	AF38Z-22-00-23	1SBL 296 501 R2300	3471523116931	0.400

Note: Only AF..Z contactors 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

### Certifications and Approvals

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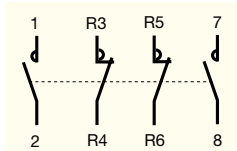
## Main Pole - Utilization Characteristics according to IEC

<b>Standards</b>	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1	
<b>Rated operational voltage Ue max.</b>	690 V	
<b>Rated frequency limits</b>	25 ... 400 Hz	
<b>Conventional free-air thermal current Ith</b>	55 A	
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		
with conductor cross-sectional area	16 mm <sup>2</sup>	
<b>AC-1 Utilization category</b>		
for air temperature close to contactor		
<b>Ie / AC-1 rated operational current</b>	$\theta \leq 40^\circ\text{C}$	55 A
<b>Ue max. <math>\leq 690\text{ V}</math>, 50/60 Hz</b>	$\theta \leq 60^\circ\text{C}$	45 A
	$\theta \leq 70^\circ\text{C}$	37 A
with conductor cross-sectional area	16 mm <sup>2</sup>	
<b>Short-circuit protection</b>		
for contactors without thermal O/L relay - Motor protection excluded		
Ue $\leq 500\text{ V AC}$ - gG type fuse	63 A	
<b>Rated short-time withstand current Icw</b>	<b>1 s</b>	450 A
at 40 °C ambient temperature, in free air from a cold state	<b>10 s</b>	300 A
	<b>30 s</b>	225 A
	<b>1 min</b>	150 A
	<b>15 min</b>	55 A
<b>Heat dissipation per pole</b>	<b>Ie / AC-1</b>	2.3 W
<b>Max. electrical switching frequency</b>	<b>AC-1</b>	600 cycles/h

## Main Pole - Utilization Characteristics according to UL / CSA

<b>Standards</b>	UL 508, CSA C22.2 N°14	
<b>Rated operational voltage Ue max.</b>	600 V	
<b>UL General use rating</b>		
600 V AC	55 A	
With conductor cross-sectional area	AWG 6	
80 V DC - 1-pole for 4 N.O. main poles		
With conductor cross-sectional area		
80 V DC - 1-pole for 2 N.O. / 2 N.C. main poles	55 A	
With conductor cross-sectional area	AWG 6	
<b>Max. electrical switching frequency</b>		
for general use	600 cycles/h	

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



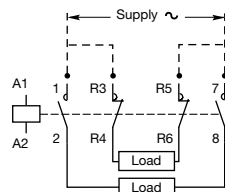
These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK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



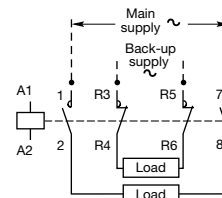
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

### Block diagrams

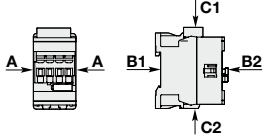
- Single supply and 2 separate loads



- 2 separate supplies and 2 separate loads



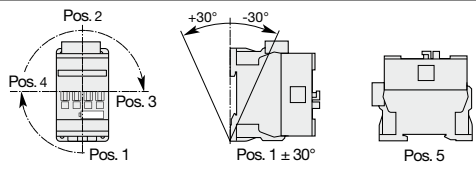
## General Technical Data

<b>Rated insulation voltage <math>U_i</math></b>	acc. to IEC 60947-4-1	690 V
	acc. to UL	600 V
<b>Rated impulse withstand voltage <math>U_{imp}</math></b>		6 kV
<b>Electromagnetic compatibility</b>		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A
<b>Ambient air temperature</b> close to contactor		
Operation in free air		-40 ... +70 °C
Storage		-60 ... +80 °C
<b>Climatic withstand</b>		Category B according to IEC 60947-1 Annex Q
<b>Operating altitude</b>		≤ 3000 m
<b>Mechanical durability</b>		
Number of operating cycles		10 millions operating cycles
Max. switching frequency		3600 cycles/h
<b>Shock withstand</b> acc. IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1		
	<b>Shock direction</b>	1/2 sinusoidal shock for 11 ms: no change in contact position
	<b>A</b>	30 g Closed position / 25 g Open position
	<b>B1</b>	25 g Closed position / 5 g Open position
	<b>B2</b>	15 g Closed position / 10 g Open position
	<b>C1</b>	25 g Closed position / 20 g Open position
	<b>C2</b>	25 g Closed position / 20 g Open position
<b>Vibration withstand</b>		
acc. to IEC 60068-2-6		5 ... 300 Hz 4 g Closed position / 2 g Open position

## Magnet System Characteristics

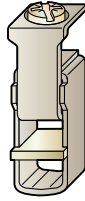
<b>Coil operating limits</b>		<b>AC supply</b>	at $\theta \leq 60$ °C 0.85 x $U_c$ min ... 1.1 x $U_c$ max at $\theta \leq 70$ °C 0.85 x $U_c$ min ... $U_c$ max
acc. to IEC 60947-4-1		<b>DC supply</b>	at $\theta \leq 60$ °C 0.85 x $U_c$ min ... 1.1 x $U_c$ max at $\theta \leq 70$ °C (AF) 0.85 x $U_c$ min ... $U_c$ max - (AF..Z) 0.85 x $U_c$ min ... 1.1 x $U_c$ max
<b>AC control voltage</b>	Rated control circuit voltage $U_c$		24 ... 500 V AC
50/60 Hz	Coil consumption	<b>Average pull-in value</b>	(AF) 50 VA - (AF..Z) 16 VA
		<b>Average holding value</b>	(AF) 2.2 VA / 2 W - (AF..Z) 1.7 VA / 1.5 W
<b>DC control voltage</b>	Rated control circuit voltage $U_c$		12 ... 500 V DC
	Coil consumption	<b>Average pull-in value</b>	(AF) 50 W - (AF..Z) 12 ... 16 W
		<b>Average holding value</b>	(AF) 2 W - (AF..Z) 1.7 W
<b>PLC-Output control</b>			(AF..Z) ≥ 500 mA 24 V DC
<b>Drop-out voltage in % of <math>U_c</math> min.</b>			≤ 60 % $U_c$ min
<b>Voltage sag immunity</b> according to SEMI F47-0706			(AF..Z) conditions of use on request
<b>Dips withstand</b> (level 0% according to IEC 61000-4-11)			(AF..Z) 22 ms average for $U_c = 24$ ... 250 V 50/60Hz
-20 °C ≤ $\theta$ ≤ +60 °C			
<b>Operating time</b>	between coil energization and:	<b>N.O. contact closing</b>	40 ... 95 ms
		<b>N.C. contact opening</b>	38 ... 90 ms
	between coil de-energization and:	<b>N.O. contact opening</b>	11 ... 95 ms
		<b>N.C. contact closing</b>	13 ... 98 ms

## Mounting Characteristics

<b>Mounting positions</b>		
		Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09 ... AF38
<b>Mounting distances</b>		The contactors can be assembled side by side.
<b>Fixing</b>	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

### Main terminals



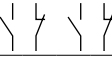

Screw terminals with double connector  
2 x (5.5 width x 6.8 depth)

### Connecting capacity (min. ... max.)

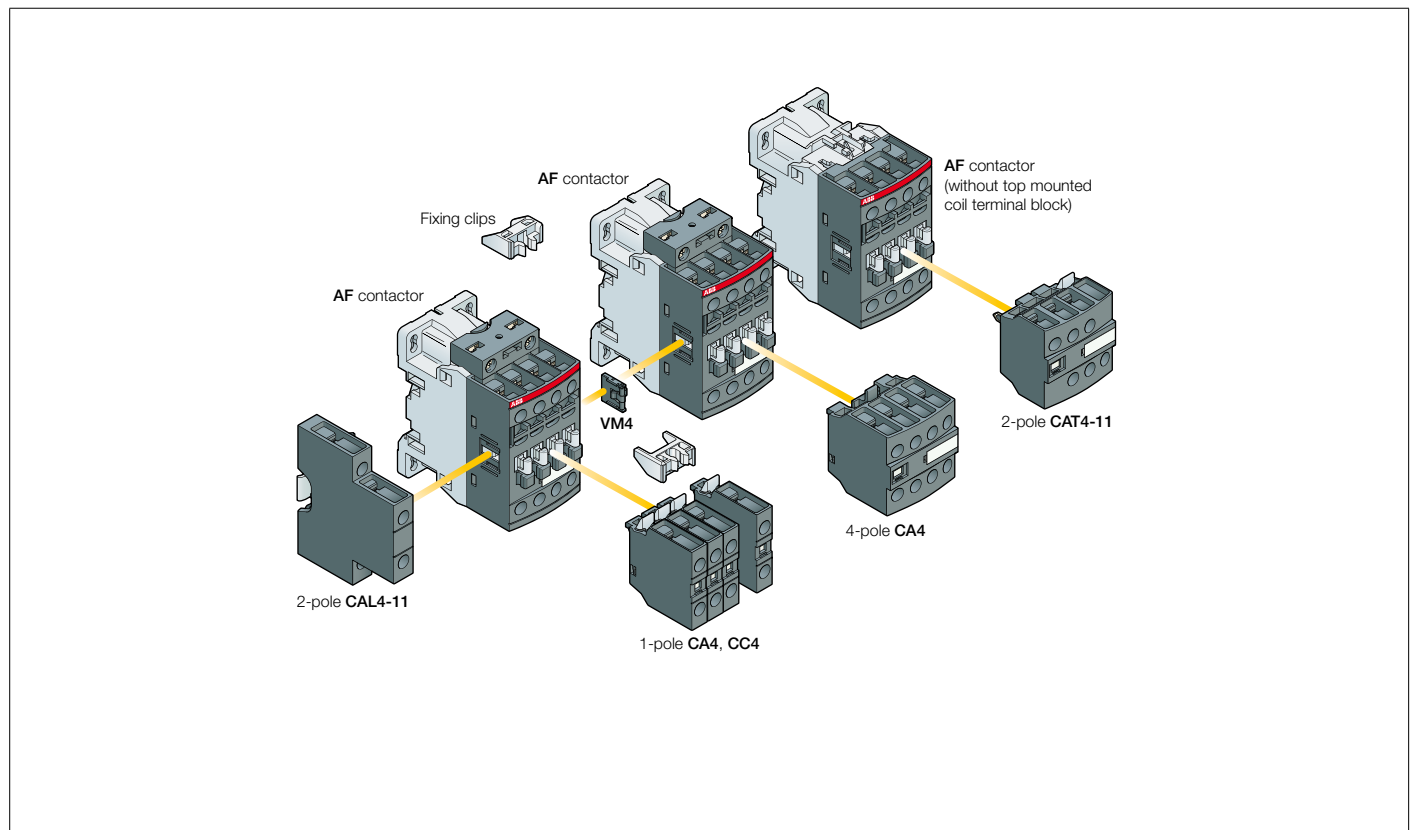
<b>Main conductors (poles)</b>		
 Rigid	solid ( $\leq 4 \text{ mm}^2$ )	1 x : 1.5 ... 16 mm <sup>2</sup>
 Rigid	stranded ( $\geq 6 \text{ mm}^2$ )	2 x : 1.5 ... 16 mm <sup>2</sup>
 Flexible with non insulated ferrule		1 x : 1.5 ... 16 mm <sup>2</sup>
 Flexible with non insulated ferrule		2 x : 1.5 ... 16 mm <sup>2</sup>
 Flexible with insulated ferrule		1 x : 1.5 ... 16 mm <sup>2</sup>
 Flexible with insulated ferrule		2 x : 1.5 ... 16 mm <sup>2</sup>
 Bars or lugs		L < -
Capacity according to UL/CSA		1 or 2 x : AWG 16 ... 6
Stripping length		12 mm
<b>Auxiliary conductors</b>		
 Rigid solid		1 x : 1 ... 2.5 mm <sup>2</sup>
 Rigid solid		2 x : 1 ... 2.5 mm <sup>2</sup>
 Flexible with non insulated ferrule		1 x : 0.75 ... 2.5 mm <sup>2</sup>
 Flexible with non insulated ferrule		2 x : 0.75 ... 2.5 mm <sup>2</sup>
 Flexible with insulated ferrule		1 x : 0.75 ... 2.5 mm <sup>2</sup>
 Flexible with insulated ferrule		2 x : 0.75 ... 1.5 mm <sup>2</sup>
 Bars or lugs		L < 8 mm
Capacity according to UL/CSA		1 or 2 x : AWG 18 ... 14
Stripping length		10 mm
<b>Degree of protection</b>		
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
Main terminals		IP20
Coil terminals		IP20
<b>Screw terminals</b>		(delivered in open position, screws of unused terminals must be tightened)
Main terminals		M4.5
Coil terminals		M3.5
<b>Screwdriver type</b>		Flat Ø 5.5 / Pozidriv 2
<b>Tightening torque</b>		
Main pole terminals		2.5 Nm / 22 lb.in
Coil terminals		1.2 Nm / 11 lb.in

## Accessory Fitting Details for a 4-pole Contactor

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

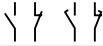
Main poles	Built-in auxiliary contacts	Front-mounted accessories				Side-mounted accessories		
		Auxiliary contact blocks			Electrical and mechanical interlock set (between 2 contactors)	Auxiliary contact blocks		
		1-pole CA4						
		1-pole CC4	2-pole CAT4-11	4-pole CA4	VEM4	Left side 2-pole CAL4-11	Right side	
Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5								
2	2	0	0					
		4 max.	or 1	or 1	–	+	1	–
		2 max.	or 1	–	–	+	1	+ 1

## Overview of main accessories (other accessories available)



## Main Accessories

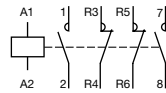
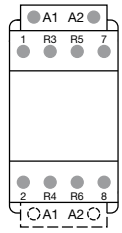
### Ordering Details

Description	Auxiliary contacts 	Type	Order code	EAN	Pack <sup>(ing)</sup> piece	Weight	
						kg <small>(1 pce)</small>	
Additional auxiliary contact blocks	Front-mounted instantaneous auxiliary contact blocks	0 1 - -	CA4-01	1SBN 010 110 R1001	3471523130029	1	0.014
		1 0 - -	CA4-10	1SBN 010 110 R1010	3471523130005	1	0.014
		0 1 - -	CA4-01-T	1SBN 010 110 T1001	3471523130395	10	0.014
		1 0 - -	CA4-10-T	1SBN 010 110 T1010	3471523130371	10	0.014
	Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact	- - 0 1	CC4-01	1SBN 010 111 R1001	3471523130432	1	0.014
		- - 1 0	CC4-10	1SBN 010 111 R1010	3471523130425	1	0.014
	Side-mounted instantaneous auxiliary contact blocks	1 1 - -	CAL4-11	1SBN 010 120 R1011	3471523130043	1	0.040
		1 1 - -	CAL4-11-T	1SBN 010 120 T1011	3471523130418	10	0.040
	Front-mounted instantaneous auxiliary contact blocks	2 2 - -	CA4-22E	1SBN 010 140 R1022	3471523130128	1	0.055
		3 1 - -	CA4-31E	1SBN 010 140 R1031	3471523130135	1	0.055
	4 0 - -	CA4-40E	1SBN 010 140 R1040	3471523130142	1	0.055	
Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks	1 1 - -	CAT4-11E	1SBN 010 151 R1011	3471523130067	1	0.040	
Additional coil terminal block		LDC4	1SBN 070 156 T1000	3471523130678	10	0.010	
Protective covers	Protective covers		BX4	1SBN 110 108 T1000	3471523130708	10	0.006
			BX4-CA	1SBN 110 109 W1000	3471523130715	50	0.001
Function markers	Function markers		BA4	1SNA 235 156 R2700	3472592351568	16	0.011
			HTP500-BA4	1SNA 235 712 R2400	3472592357126	1	0.220
			SPRC 1	1SNA 360 010 R1500	3472593600108	1	0.290

Note: CAT4 not fittable on AF..Z contactors with DC control voltage 12...20VDC.

## Terminal Marking and Positioning

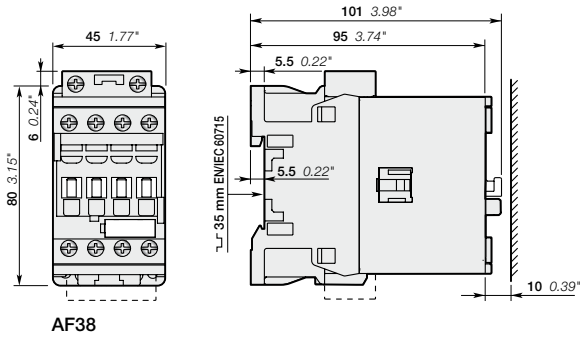
Standard devices without addition of auxiliary contacts



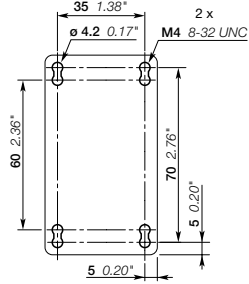
AF38-22-00-.. / AF38Z-22-00-..

AF38-22-00-.. / AF38Z-22-00-..

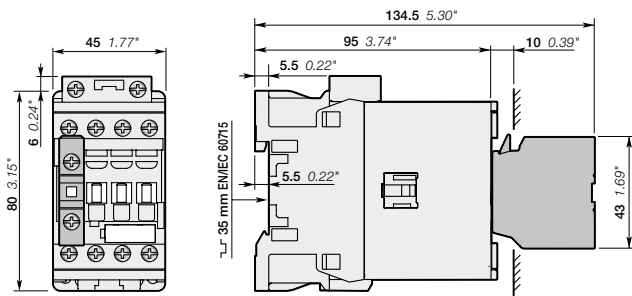
## Dimensions mm, inches



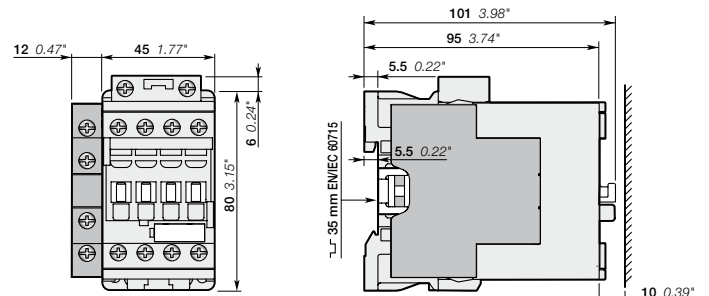
AF38



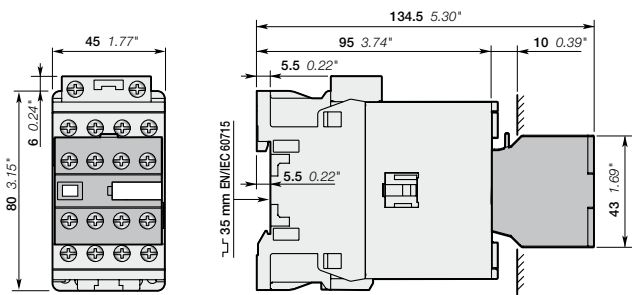
AF38



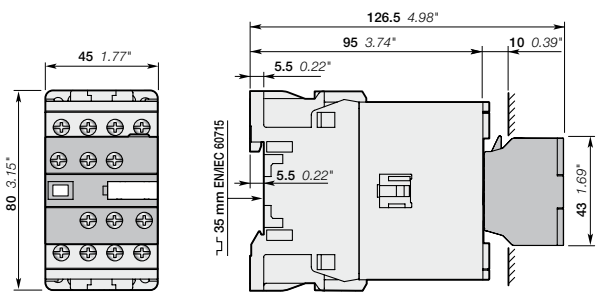
AF38  
+ CA4, CC4 1-pole auxiliary contact block



AF38  
+ CAL4-11 2-pole auxiliary contact block



AF38  
+ CA4 4-pole auxiliary contact block



AF38  
+ CAT4 2-pole auxiliary contact and coil terminal block

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

# Contact us

## **ABB France**

### **Low Voltage Products Division**

10, rue Ampère Z.I. - B.P. 114  
F-69685 Chassieu cedex / France

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<http://www.abb.com/contacts> -> Low Voltage products

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