

# AF09-40-00-.. / AF09Z-40-00-.. 4-pole Contactors AC / DC Operated - with Screw Terminals

AF09(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.



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

### Ordering Details

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

### 4-pole Contactors 4 N.O. Main Poles

Rated current	UL/CSA rating	Uc min.	Uc max.	Auxiliary contacts	Type	Order code	EAN	Weight
25	25	24...60	20...60	0 0	AF09-40-00-11	1SBL 137 201 R1100	3471523115019	0.270
		48...130	48...130	0 0	AF09-40-00-12	1SBL 137 201 R1200	3471523115026	0.270
		100...250	100...250	0 0	AF09-40-00-13	1SBL 137 201 R1300	3471523115033	0.270
		250...500	250...500	0 0	AF09-40-00-14	1SBL 137 201 R1400	3471523115040	0.310

Note: AF09-40-00-11 not suitable for a direct control by PLC-output. AF09-40-00-11 available in some countries: please consult your ABB representative.

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

Rated current	UL/CSA rating	Uc min.	Uc max.	Auxiliary contacts	Type	Order code	EAN	Weight
25	25	-	12...20	0 0	AF09Z-40-00-20	1SBL 136 201 R2000	3471523115804	0.310
		24...60	20...60	0 0	AF09Z-40-00-21	1SBL 136 201 R2100	3471523115811	0.310
		48...130	48...130	0 0	AF09Z-40-00-22	1SBL 136 201 R2200	3471523115828	0.310
		100...250	100...250	0 0	AF09Z-40-00-23	1SBL 136 201 R2300	3471523115835	0.310

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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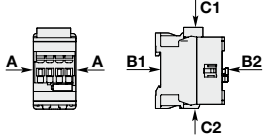
## Main Pole - Utilization Characteristics according to IEC

<b>Standards</b>	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1	
<b>Rated operational voltage U<sub>e</sub> max.</b>	690 V	
<b>Rated frequency limits</b>	25 ... 400 Hz	
<b>Conventional free-air thermal current I<sub>th</sub></b>	35 A	
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40\text{ °C}$		
with conductor cross-sectional area	6 mm <sup>2</sup>	
<b>AC-1 Utilization category</b>		
for air temperature close to contactor		
<b>I<sub>e</sub> / AC-1 rated operational current</b>	$\theta \leq 40\text{ °C}$	25 A
<b>U<sub>e</sub> max. <math>\leq 690\text{ V}</math>, 50/60 Hz</b>	$\theta \leq 60\text{ °C}$	25 A
	$\theta \leq 70\text{ °C}$	22 A
with conductor cross-sectional area	4 mm <sup>2</sup>	
<b>Short-circuit protection</b>		
for contactors without thermal O/L relay - Motor protection excluded		
U <sub>e</sub> $\leq 500\text{ V AC}$ - gG type fuse	25 A	
<b>Rated short-time withstand current I<sub>cw</sub></b>	<b>1 s</b>	300 A
at 40 °C ambient temperature, in free air from a cold state	<b>10 s</b>	150 A
	<b>30 s</b>	80 A
	<b>1 min</b>	60 A
	<b>15 min</b>	35 A
<b>Heat dissipation per pole</b>	<b>I<sub>e</sub> / AC-1</b>	0.8 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 U<sub>e</sub> max.</b>	600 V	
<b>UL General use rating</b>		
600 V AC	25 A	
With conductor cross-sectional area	AWG 10	
80 V DC - 1-pole for 4 N.O. main poles	25 A	
With conductor cross-sectional area	AWG 10	
80 V DC - 1-pole for 2 N.O. / 2 N.C. main poles		
With conductor cross-sectional area		
<b>Max. electrical switching frequency</b>		
for general use	600 cycles/h	

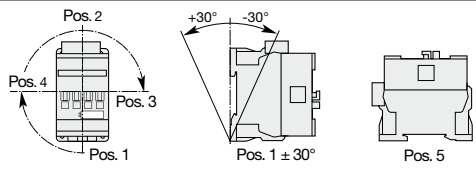
## General Technical Data

<b>Rated insulation voltage <math>U_i</math></b> acc. to IEC 60947-4-1 acc. to UL	690 V 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
	<b>B1</b> 25 g Closed position / 5 g Open position
	<b>B2</b> 15 g
	<b>C1</b> 25 g
<b>C2</b> 25 g	
<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> acc. to IEC 60947-4-1	<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
	<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> 50/60 Hz	Rated control circuit voltage $U_c$ Coil consumption	24 ... 500 V AC Average pull-in value (AF) 50 VA - (AF..Z) 16 VA Average holding value (AF) 2.2 VA / 2 W - (AF..Z) 1.7 VA / 1.5 W
<b>DC control voltage</b>	Rated control circuit voltage $U_c$ Coil consumption	12 ... 500 V DC Average pull-in value (AF) 50 W - (AF..Z) 12 ... 16 W Average holding value (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) -20 °C ≤ $\theta$ ≤ +60 °C		(AF..Z) 22 ms average for $U_c = 24$ ... 250 V 50/60Hz
<b>Operating time</b>	between coil energization and: between coil de-energization and:	<b>N.O. contact closing</b> 40 ... 95 ms <b>N.C. contact opening</b> 38 ... 90 ms <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 by screws (not supplied)
	35 x 7.5 mm or 35 x 15 mm 2 x M4 screws placed diagonally















## Connecting Characteristics

### Main terminals



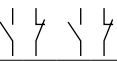

Screw terminals with cable clamp

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

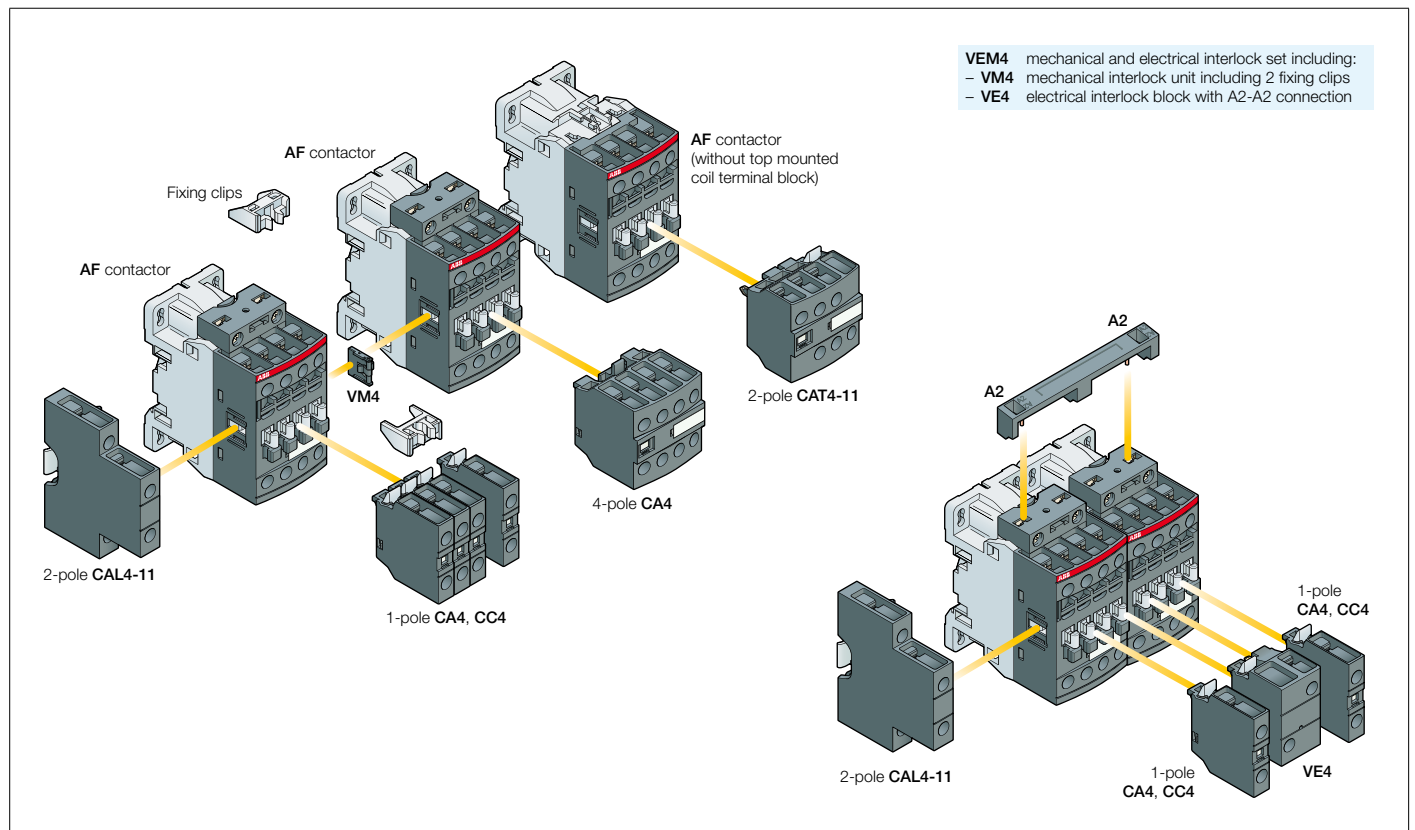
<b>Main conductors (poles)</b>			
	Rigid	solid ( $\leq 4 \text{ mm}^2$ )	1 x 1 ... 6 mm <sup>2</sup>
		stranded ( $\geq 6 \text{ mm}^2$ )	2 x 1 ... 6 mm <sup>2</sup>
	Flexible with non insulated ferrule		1 x 0.75 ... 6 mm <sup>2</sup>
			2 x 0.75 ... 6 mm <sup>2</sup>
	Flexible with insulated ferrule		1 x 0.75 ... 4 mm <sup>2</sup>
			2 x 0.75 ... 2.5 mm <sup>2</sup>
	Bars or lugs		L < 9.6 mm
Capacity according to UL/CSA			1 or 2 x AWG 16 ... 10
Stripping length			10 mm
<b>Auxiliary conductors</b>			
	Rigid solid		1 x 1 ... 2.5 mm <sup>2</sup>
			2 x 1 ... 2.5 mm <sup>2</sup>
	Flexible with non insulated ferrule		1 x 0.75 ... 2.5 mm <sup>2</sup>
			2 x 0.75 ... 2.5 mm <sup>2</sup>
	Flexible with insulated ferrule		1 x 0.75 ... 2.5 mm <sup>2</sup>
			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			M3.5
Coil terminals			M3.5
<b>Screwdriver type</b>			Flat Ø 5.5 / Pozidriv 2
<b>Tightening torque</b>			
Main pole terminals			1.5 Nm / 13 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			Electrical and mechanical interlock set (between 2 contactors)	Side-mounted accessories			
		Auxiliary contact blocks				Auxiliary contact blocks			
		1-pole CA4			VEM4	Left side	Right side		
		1-pole CC4	2-pole CAT4-11	4-pole CA4		2-pole CAL4-11			
Max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5									
4 0 0 0		4 max.	or 1	or 1	-	+	1	-	
		2 max.	or 1	-	-	-	+	1	+ 1
		3 max.	-	-	-	+ 1	+	1	or 1

## Overview of main accessories (other accessories available)



## Main Accessories

### Ordering Details

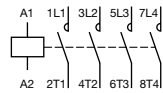
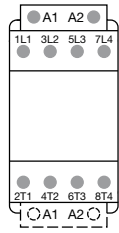
Description	Auxiliary contacts 	Type	Order code	EAN	Pack <sup>(ing)</sup> piece	Weight	
						kg (1 pce)	
<b>Additional auxiliary contact blocks</b>	Front-mounted instantaneous auxiliary contact blocks	0 1 - -	CA4-01	1SBN 010 110 R1001	3471523130029	1	0.014
		1 0 - -	CA4-10	1SBN 010 110 R1010	3471523130005	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	0 4 - -	CA4-04E	1SBN 010 140 R1004	3471523130159	1	0.055
		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
	1 1 - -	CAT4-11E	1SBN 010 151 R1011	3471523130067	1	0.040	
<b>Interlocks</b>	Mechanical interlock unit		VM4	1SBN 030 105 T1000	3471523130609	10	0.005
	Mechanical and electrical interlock set	1 1 - -	VEM4	1SBN 030 111 R1000	3471523130616	1	0.035
	Fixing clips		BB4	1SBN 110 120 W1000	3471523130722	50	0.002
<b>Additional coil terminal block</b>	Additional coil terminal block		LDC4	1SBN 070 156 T1000	3471523130678	10	0.010
<b>Protective covers</b>	Protective covers		BX4	1SBN 110 108 T1000	3471523130708	10	0.006
			BX4-CA	1SBN 110 109 W1000	3471523130715	50	0.001
<b>Function markers</b>	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.
- VM4: includes 2 fixing clips (BB4) to maintain together both contactors.
- VEM4: includes a VM4 mechanical interlock unit with 2 fixing clips (BB4), a VE4 electrical interlock block and A2-A2 connection. VE4 block must be used with its A2-A2 connection to respect the electrical connection diagram.
- VEM4 not fittable on AF..Z contactors with DC control voltage 12...20 V DC.

## Terminal Marking and Positioning

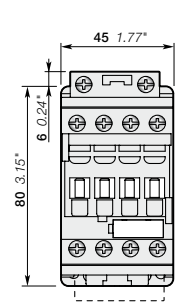
Standard devices without addition of auxiliary contacts



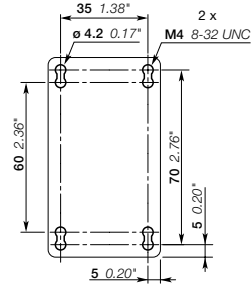
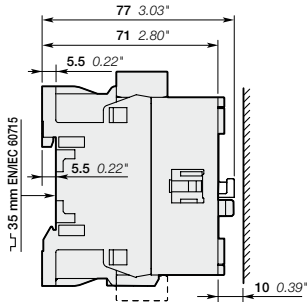
AF09-40-00-.. / AF09Z-40-00-..

AF09-40-00-.. / AF09Z-40-00-..

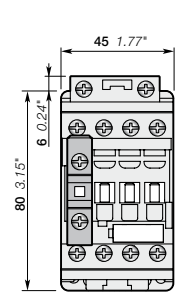
## Dimensions mm, inches



AF09

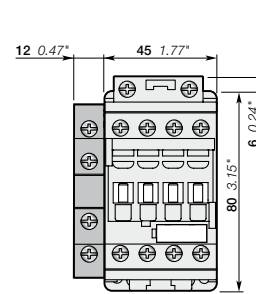
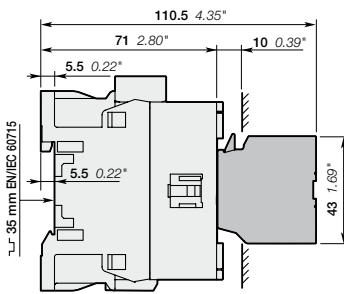


AF09



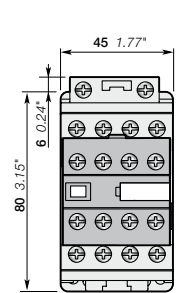
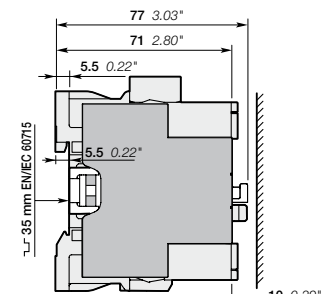
AF09

+ CA4, CC4 1-pole auxiliary contact block



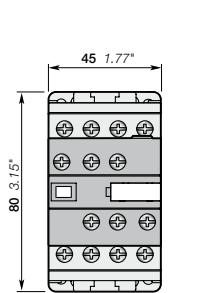
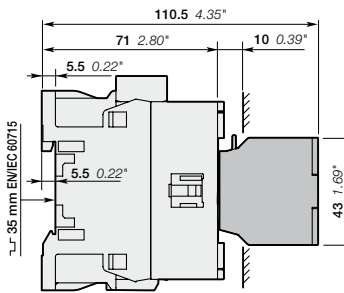
AF09

+ CAL4-11 2-pole auxiliary contact block



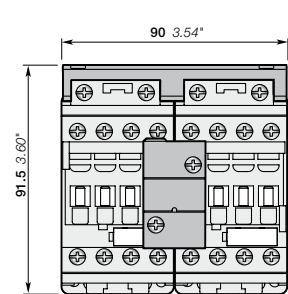
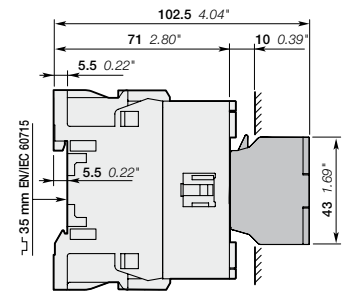
AF09

+ CA4 4-pole auxiliary contact block



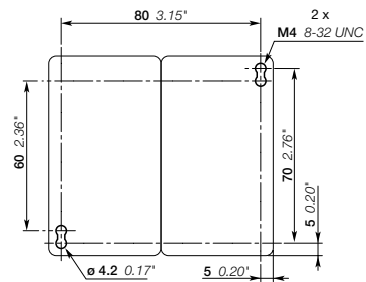
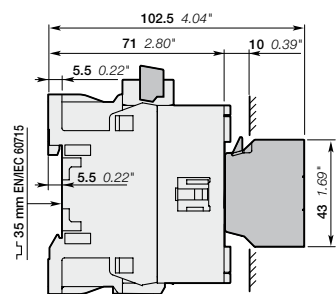
AF09

+ CAT4 2-pole auxiliary contact and coil terminal block



AF09

+ VEM4 mechanical and electrical interlock set



AF09

+ VEM4 mechanical and electrical interlock set

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

# Contact us

## **ABB France**

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You can find the address of your local sales organisation  
on the ABB home page  
<http://www.abb.com/contacts> -> Low Voltage products

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