

CWBC - Contactors for Capacitor Switching

Switching **efficiency.**
Correction **reliability.**

Industrial Motors

Commercial &
Appliance Motors

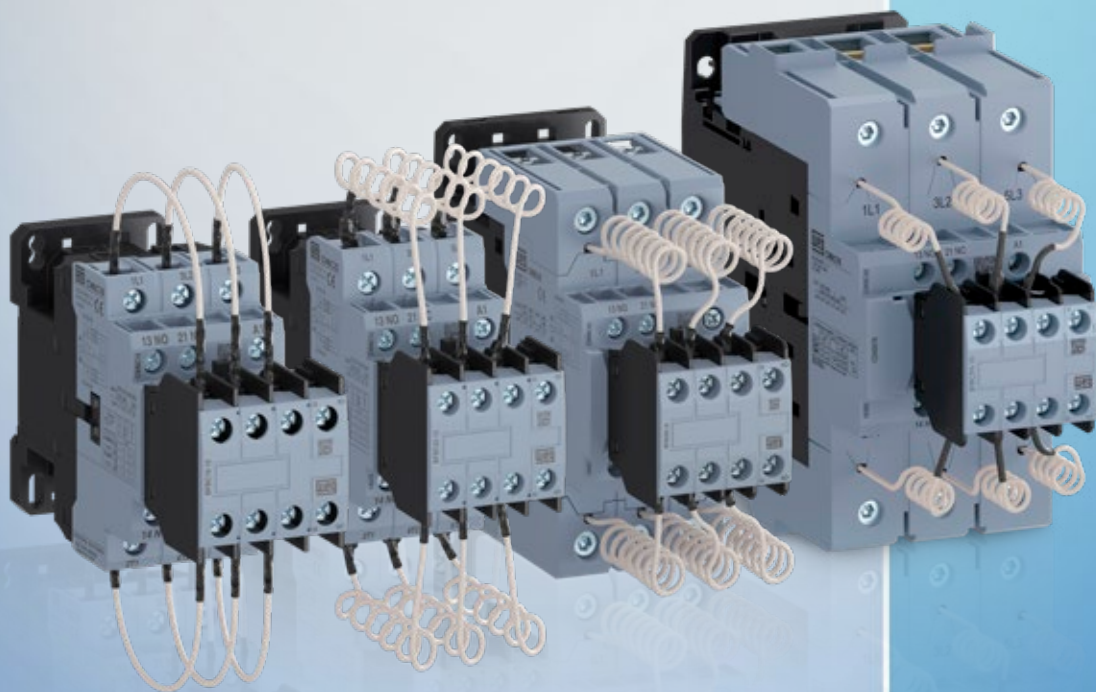
Automation

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Driving efficiency and sustainability





Capacitor switching for **power factor correction**

The special line of CWBC contactors was designed according to IEC 60947-1 and UL 60947-1 standards and provides the best solution for switching your capacitors for power factor correction.

Main characteristics

- Currents from 17 to 152 A (AC-6b)
- Compact products
- Power supply from 24 to 600 V
- Low consumption coils
- Enclosure for surge suppressors



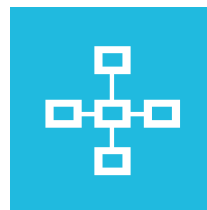
Advantages



Modular design:
DIN rail 35 mm mounting
or with screws



Pre-charge resistors:
reduce high in-rush
currents



Early make contact block:
connect the pre-charge
resistors and then
disconnect them after
a few moments



Auxiliary contacts:
3 built-in auxiliary contacts
2 NO + 1 NC or 1 NO + 2 NC

Certifications

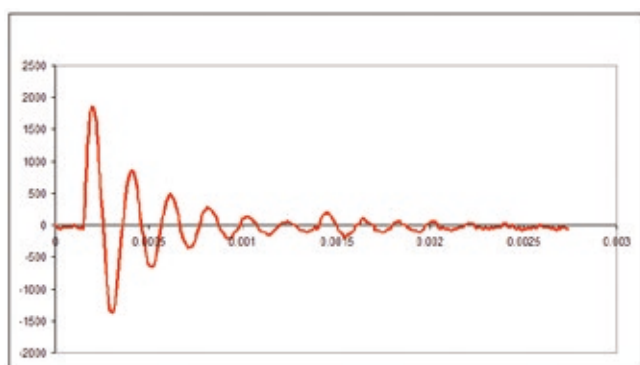
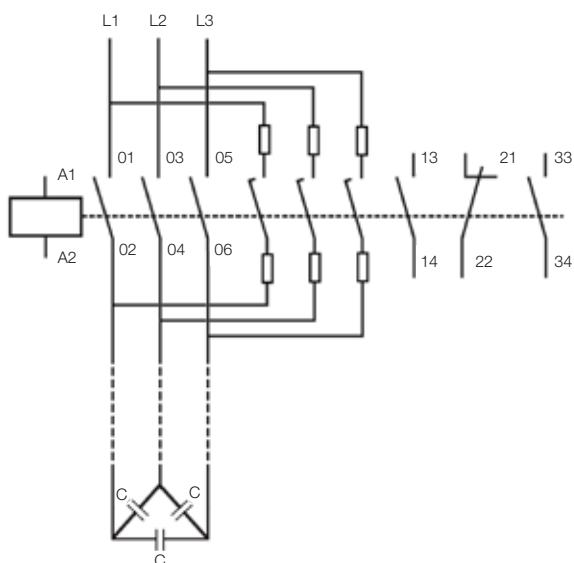


CWBC contactors for switching capacitors

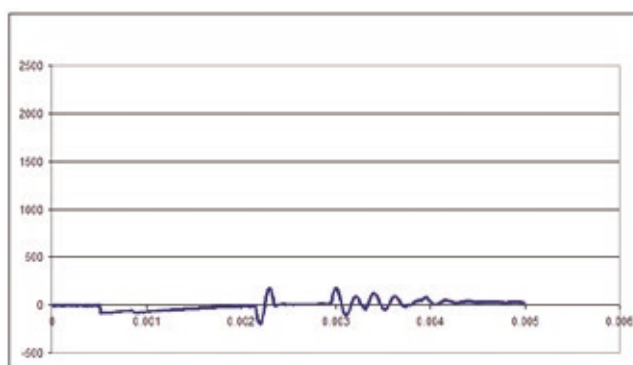
In-rush currents

When capacitors banks are switched, the voltage associated with a low line impedance may produce high currents on the capacitors. This current may reach $100 \times I_n$ (A), being one of the main causes of reduction in the capacitor lifespan.

The CWBC contactors have pre-charge resistors that limit the in-rush currents when the capacitors are switched. The resistors, assembled in series with the early make contact blocks, are connected before the main contacts. After the main contacts close, the early make contacts are disconnected, and only the capacitors in parallel remain with their inductive load for the proper power factor correction.



I_n (A) with standard contactors



I_n (A) with CWBC contactors

Calculation of the capacitor rated current

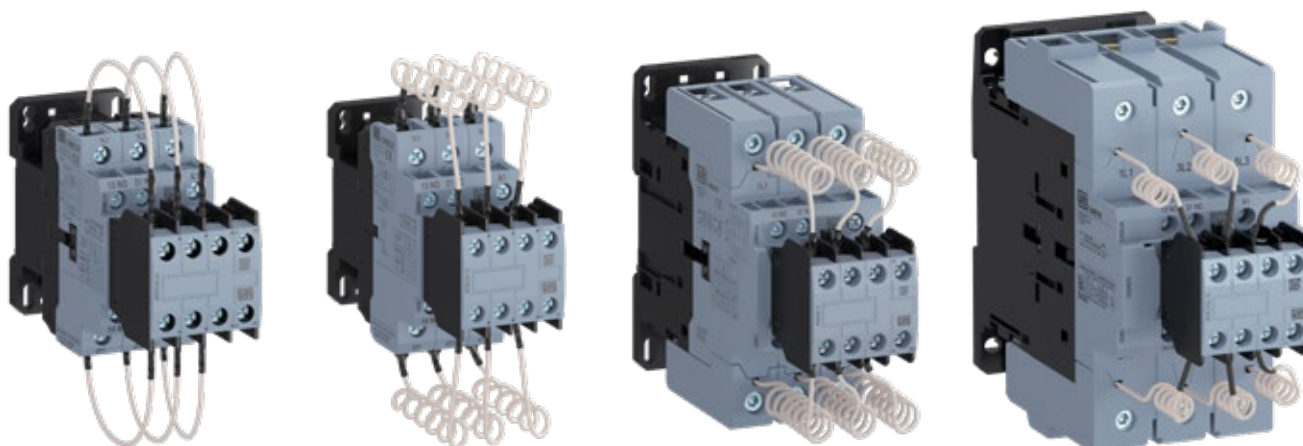
$$I_c = \frac{\text{React.pow. (KVAr)} \times 1000}{\sqrt{3} \times V_{FF}} \text{ (A)}$$

Where:



I_c = Capacitor bank current

V_{FF} = Voltage between phases

CWBC contactors for switching capacitors



Three-pole from 17 A to 152 A ($\theta = 55^\circ\text{C}$)

I_e AC-6b $(T_{amb.} = 55^\circ\text{C})$ $U_e < 480\text{ V}$ A	Reactive power for AC-6b capacitor banks ($T_{amb.} = 55^\circ\text{C}$)					Integrated auxiliary contacts per contactor		Code to fill in with the control voltage	Weight ²⁾ kg
	220 V 230 V KVar	380 V 415 V KVar	440 V KVar	480 V KVar	660 V KVar	 3 NO	 1 NC		
17	6	10	13	14	14	2	1	CWBC9-21-30 ♦	0.40
						1	2	CWBC9-12-30 ♦	
22	8	15	16	17	20	2	1	CWBC18-21-30 ♦	0.45
						1	2	CWBC18-12-30 ♦	
28	11	20	23	25	30	2	1	CWBC25-21-30 ♦	0.45
						1	2	CWBC25-12-30 ♦	
40	15	25	30	33	40	2	1	CWBC32-21-30 ♦	0.92
						1	2	CWBC32-12-30 ♦	
63	25	40	45	50	65	2	1	CWBC50-21-30 ♦	0.92
						1	2	CWBC50-12-30 ♦	
77	30	50	60	65	70	2	1	CWBC65-21-30 ♦	1.66
						1	2	CWBC65-12-30 ♦	
115	40	75	80	85	85	2	1	CWBC95-21-30 ♦	1.66
						1	2	CWBC95-12-30 ♦	
152	50	100	115	120	105	2	1	CWBC125-21-30 ♦	1.66
						1	2	CWBC125-12-30 ♦	

Replace “♦” with the control voltage code¹⁾.

Alternating current (CWBC9...95)

Code	D02	D07	D13	D15	D17	D23	D24	D25	D33	D34	D35	D36	D39
V (50/60 Hz)	24	48	110	120	127	220	230	240	380	400	415	440	480

Direct current (CWBC9...65)

Code	C03	C07	C09	C12	C13	C15
V _{DC}	24	48	60	110	125	220

Alternating current/direct current with electronic module (CWBC95/125)


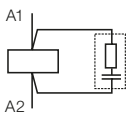
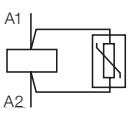
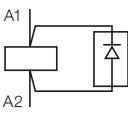
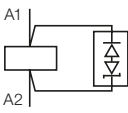
Code	E04	E64	E65	E66
V _{AC} (50/60 Hz) and V _{DC}	24...60 V	48...130 V	110...255 V	250...500 V

Notes: 1) Other voltages on request.

2) Weights for contactors with control circuit in alternating current. For DC control circuit, add 0.110 kg to the CWBC9/18 models and 0.120 kg to the CWBC25/32 models; add 0.060 kg to the CWBC50/65 AC models. For CWBC95 with electronic coil add 0.010kg.

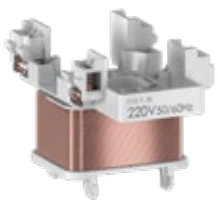
Accessories

Surge suppressors - plug-in type

Illustrative picture	Use with	Voltages	Diagram	Code	Part number	Weight kg
	CWBC9...95	24...48 V 50/60 Hz		RCBD53	12242511	0.008
		50...127 V 50/60 Hz		RCBD55	12242512	
		130...250 V 50/60 Hz		RCBD63	12242513	
		12...48 V 50/60 Hz / 12...60 Vdc		VRBE49	12242514	
		50...127 V 50/60 Hz / 60...180 Vdc		VRBE34	12242515	
		130...250 V 50/60 Hz / 180...300 Vdc		VRBE50	12242516	
		277...380 V 50/60 Hz / 300...510 Vdc		VRBE41	12242517	
		400...510 V 50/60 Hz		VRBD73	12242558	
		12...600 Vdc		DIBC33 ¹⁾	12242560	
		12...250 Vdc		DIZBC26 ²⁾	12242561	

Note: contactors with an electronic coil already have an internal surge protector (varistor).

Spare coils

Illustrative picture	Use with	Control type	Code to complete with the control voltage ³⁾	Part number	Weight kg
	CWC9...32	AC	BRB-38 ♦	On request	0.08
	CWBC50/65	AC	BRB-80 ♦	On request	0.09
		DC	BRB-80 ♦	On request	0.40
	CWBC95/125	AC	BRB-110 ♦	On request	0.15
		AC/DC	BRB-125 ♦	On request	0.15

Replace "♦" with the control voltage code³⁾.

Alternating current (CWBC9...95)

Code	D02	D07	D13	D15	D17	D23	D24	D25	D33	D34	D35	D36	D39
V (50/60 Hz)	24	48	110	120	127	220	230	240	380	400	415	440	480

Direct current (CWBC9...65)

Code	C03	C07	C09	C12	C13	C15
Vdc	24	48	60	110	125	220

Alternating current/direct current with electronic module (CWBC95/125)

Code	E04	E64	E65	E66
V _{AC} (50/60 Hz) and V _{DC}	24...60 V	48...130 V	110...255 V	250...500 V

Notes: 1) Contactors with control in direct current assembled with DIB surge suppressor blocks increases the opening time by six times.

Do not use with BFBC auxiliary contact blocks that contain NC contact (CWBCx-12-30 contactors).

2) Contactors with control in direct current assembled with DIZB surge suppressor blocks increases the opening time by four times.

3) Other voltages on request.

Technical data

Basic data

Models			CWBC9/18	CWBC25/32	CWBC50/65	CWBC95/125
Compliance with the standards			IEC/EN 60947-1 IEC/EN 60947-4-1 IEC/EN 60947-5-1			
Rated insulation voltage U_i (pollution degree 3)	IEC 60947-4-1	(V)	690			
	UL, CSA	(V)	600			
Rated impulse withstand voltage U_{imp} (IEC/EN 60947-1)		(kV)	6			
Frequency limits		(Hz)	25...400			
Mechanical life	AC coil	(millions of operations)	1			
	DC coil	(millions of operations)	1			
Electrical life	I_e (AC-6b)	(millions of operations)	0.1			
Maximum frequency of operation cycles		(ops./h)	120 (1 operation every 30 seconds)			
Protection rating (IEC 60529)	Main terminals		IP10 (front)			
	Coil and auxiliary contacts		IP20 (front)			
Mounting			Screws or DIN rail 35 mm (EN 50022)			
Coil connection points	Contactors with AC coil		2			
	Contactors with DC coil		2			
Vibration resistance (IEC 60068-2-6)	Open contactor	(g)	4			
	Closed contactor	(g)	4			
Resistance to mechanical shocks (½ sine wave = 11ms - IEC 60068-2-27)	Open contactor	(g)	10			
	Closed contactor	(g)	15			
Ambient air temperature	Operation		-25 °C...+55 °C			
	Storage		-55 °C...+80 °C			
Maximum operation altitude without modification in the rated values ¹⁾			3,000 m			

Notes: 1) Check the time between activations of the capacitor used, as this time is normally greater than that of the contactor and must be observed (the longer time between activations shall prevail) to avoid damage to the set.

2) For altitudes of 3,000...4,000 m, consider $0.90 \times I_e$ and $0.80 \times U_i$; for altitudes of 4,000...5,000 m, consider $0.80 \times I_e$ and $0.75 \times U_i$.

Auxiliary contacts

Model			CWBC9...125
Compliance with the standards			IEC/EN 60947-5-1
Rated insulation voltage U_i (pollution degree 3)	IEC/EN 60947-4-1, VDE 0660	(V)	690
	UL, CSA	(V)	600
Rated operational voltage U_e	IEC/EN 60947-4-1, VDE 0660	(V)	690
	UL, CSA	(V)	600
Conventional thermal current I_{th} ($\theta \leq 55$ °C)		(A)	10
Rated operational current I_e			
AC-15 (IEC 60947-5-1)	220/230 V	(A)	10
	380/440 V	(A)	4
	500 V	(A)	2.5
	660/690 V	(A)	1.5
DC-13(IEC 60947-5-1)	24 V	(A)	4
	48 V	(A)	2
	110 V	(A)	0.7
	220 V	(A)	0.3
	440 V	(A)	0.15
Making capacity	$U_e \leq 690$ V 50/60 Hz - AC-15	(A)	$10 \times I_e$
Breaking capacity	$U_e \leq 400$ V 50/60 Hz - AC-15	(A)	$1 \times I_e$
Short circuit protection with fuse (gL/gG)		(A)	10
Control circuit reliability		(V / mA)	17 / 5
Electrical life		(millions of operations)	1
Mechanical life		(millions of operations)	10
Non-overlapping time between NO and NC contacts		(ms)	1.5
Impedance of the contacts		(mΩ)	2.5

Technical data

Control circuit - alternate current (AC)

Models			CWBC9...32	CWBC50/65	CWBC95/125
Rated insulation voltage U_i (pollution degree 3)	IEC/EN 60947-4-1	(V)	690	690	690
	UL, CSA	(V)	600	600	600
Standard voltages at 50/60 Hz			12...500	24...500	24...500
Coil operation limits	At 50 Hz	(xUs)	0.8...1.1	0.8...1.1	0.8...1.1
	At 60 Hz	(xUs)	0.8...1.1	0.8...1.1	0.8...1.1
Average coil consumption 50/60 Hz (operation at 60 Hz)	Closed magnetic circuit	(VA)	7.5	17.5	25
	Power factor switched on	(cos φ)	0.27	0.28	0.4
	Thermal power dissipation	(W)	1.5...2.5	4...5.5	9...11
	Closing of the magnetic circuit	(VA)	75	185	410
	Power factor switching on	(cos φ)	0.7	0.55	0.48
Average coil consumption 50/60 Hz (operation at 50 Hz)	Closed magnetic circuit	(VA)	9	27	27
	Power factor switched on	(cos φ)	0.24	0.25	0.4
	Thermal power dissipation	(W)	1.5...2.5	5.5...7.8	11...13.4
	Closing of the magnetic circuit	(VA)	90	202	426
	Power factor switching on	(cos φ)	0.8	0.56	0.5
Average operating time	Closing of the NO contacts	(ms)	15...25	10...15	8...12.5
	Opening of the NO contacts	(ms)	8...12	8...12	4...8

Control circuit - direct current (DC)

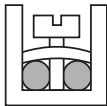
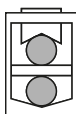
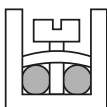
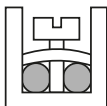
Models			CWBC9...32	CWBC50/65	CWBC95/125
Rated insulation voltage U_i (pollution degree 3)	IEC/EN 60947-4-1	(V)	690	690	-
	UL, CSA	(V)	600	600	-
Standard voltages			12...500	12...500	-
Coil operation limits			0.8...1.1	0.8...1.1	-
Average DC coil consumption	Closed magnetic circuit	(W)	5.8	10.6	-
	Closing of the magnetic circuit	(W)	5.8	54	-
Average operating time	Closing of the NO contacts	(ms)	35...45	20...30	-
	Opening of the NO contacts	(ms)	8...12	4...8	-

Control circuit - alternating current/direct current with electronic module (AC/DC)

Models			CWBC9/32	CWBC50/65	CWBC95/125
Rated insulation voltage U_i (pollution degree 3)	IEC/EN 60947-4-1, VDE 0660	(V)	-	-	690
	UL, CSA	(V)	-	-	600
Standard voltages			-	-	24...500
Coil operation limits	in V_{oc}	(xUs)	-	-	0.8...1.1
	at 50 Hz	(xUs)	-	-	0.8...1.1
	at 60 Hz	(xUs)	-	-	0.8...1.1
Average consumption			-	-	1.0 x U_s and cold coil
AC power supply (60 Hz)	Closed magnetic circuit	(VA)	-	-	10.8
	Power factor	(cos φ)	-	-	0.47
	Power factor switched on	(W)	-	-	5.1
	Closing of the magnetic circuit	(VA)	-	-	217
	Power factor switching on	(cos φ)	-	-	0.88
DC power supply	Closed magnetic circuit	(W)	-	-	2...5
	Closing of the magnetic circuit	(W)	-	-	180...220
Average operating time	Closing of the NO contacts	(ms)	-	-	32...48
	Opening of the NO contacts	(ms)	-	-	30...55

Technical data

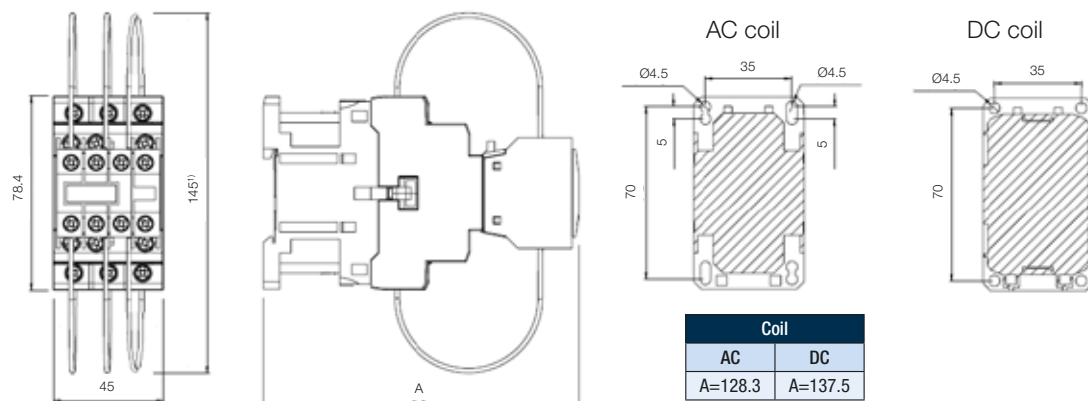
Terminal capacity and tightening torque

Models			CWBC9/18	CWBC25/32	CWBC50/65	CWBC95/125
Power circuit						
Mounting system screw type			Phillips number 2	Phillips number 2	ALLEN 4 mm	ALLEN 4 mm
Flexible conductor without wire ferrule	(mm²)		1 x 1...6 2 x 1...6	1 x 2.5...10 2 x 2.5...10	-	-
Flexible conductor with wire ferrule	(mm²)		1 x 1...6 2 x 1...4	1 x 1.5...10 2 x 1.5...6	-	-
Solid wire	(mm²)		1 x 1...6 2 x 1...6	1 x 2.5...10 2 x 2.5...10	-	-
Tightening torque	(mm²)		1.7	2.5	-	-
Flexible conductor without wire ferrule	(mm²)		-	-	1 x 2.5...35 2 x 2.5...35	1 x 2.5...70 2 x 2.5...70
Flexible conductor with wire ferrule	(Nm)		-	-	1 x 2.5...35 2 x 2.5...35	1 x 2.5...70 2 x 2.5...70
Solid wire	(mm²)		-	-	1 x 2.5...35 2 x 2.5...35	1 x 2.5...25 2 x 2.5...25
Tightening torque	(Nm)		-	-	5.0	6.0
Control circuit and auxiliary contacts						
Mounting system screw type			Phillips number 2			
Flexible conductor without wire ferrule	(mm²)		1 x 1...4 2 x 1...4			
Flexible conductor with wire ferrule	(mm²)		1 x 1...4 2 x 1...2.5			
Solid wire	(mm²)		1 x 1...4 2 x 1...4			
Tightening torque	(Nm)		1.0			
Front Mounted Block (BFBC)						
Mounting system screw type			Phillips number 2			
Flexible conductor without wire ferrule	(mm²)		1 x 1...2.5 2 x 1...2.5			
Flexible conductor with wire ferrule	(mm²)		1 x 1...2.5 2 x 1...2.5			
Solid wire	(mm²)		1 x 1...2.5 2 x 1...2.5			
Tightening torque	(Nm)		1.0			

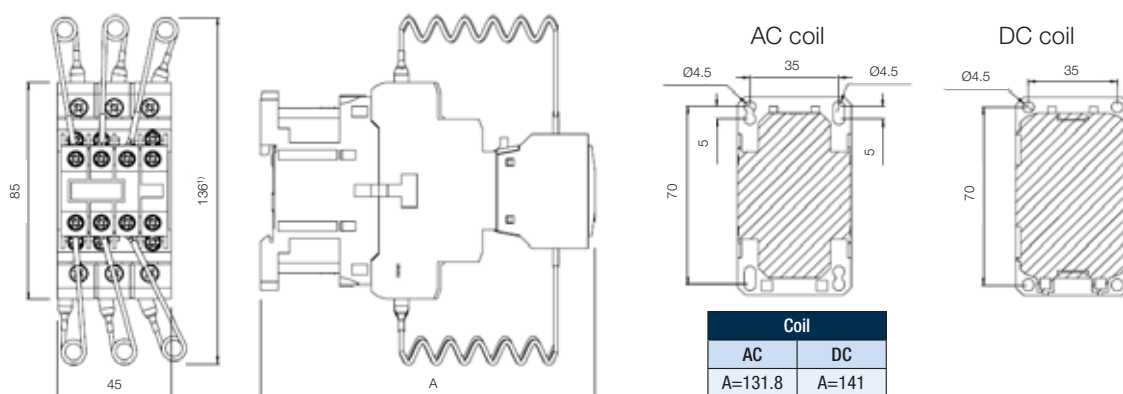
Note: for the utilization of CWBC32 at its maximum power capacity it is recommended to use 10 mm²/90 °C cables or another for higher temperature.

Dimensions (mm)

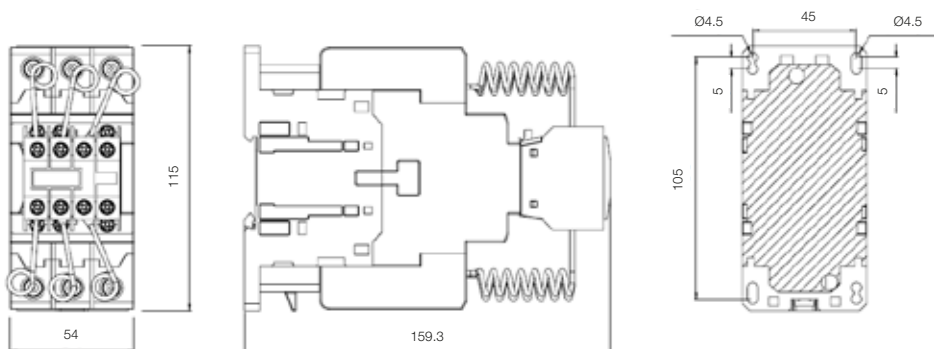
CWBC9/18



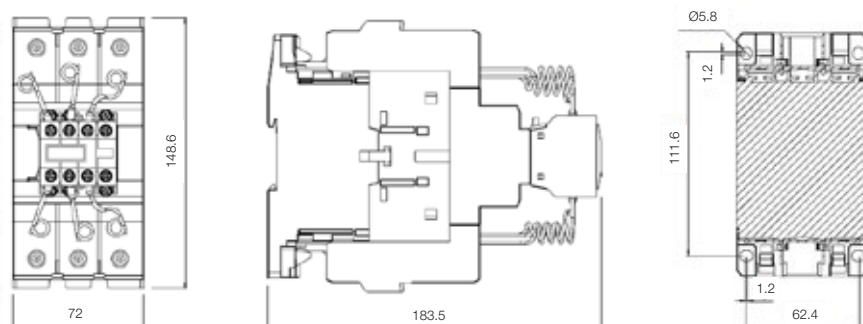
CWBC25/32



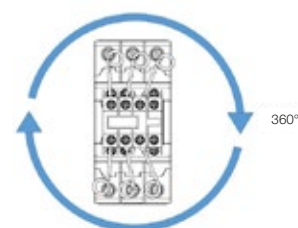
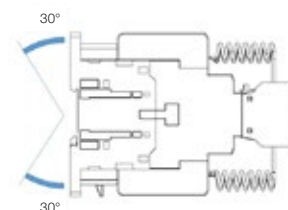
CWBC50/65



CWBC95/125



Mounting position



Note: 1) Approximate size.

Global presence is essential, as much as understanding your needs.

Global Presence

With more than 40,000 employees worldwide, WEG is one of the largest electric motors, electronic equipments and systems manufacturers. We are constantly expanding our portfolio of products and services with expertise and market knowledge. We create integrated and customized solutions ranging from innovative products to complete after-sales service.

WEG's know-how guarantees our **CWBC - Contactors for Capacitor Switching** are the right choice for your application and business, assuring safety, efficiency and reliability.



Availability is to have a global support network



Partnership is to create solutions that suits your needs



Competitive edge is to unite technology and innovation

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The information contained is reference values.