Westinghouse

WCMC - CONTACTORS FOR SWITCHING OF CAPACITORS

Full solution for switching of capacitor for power factor correction

CE

Contactors for Switching of WCMC Capacitors

Switching of Power Factor Correction Capacitors

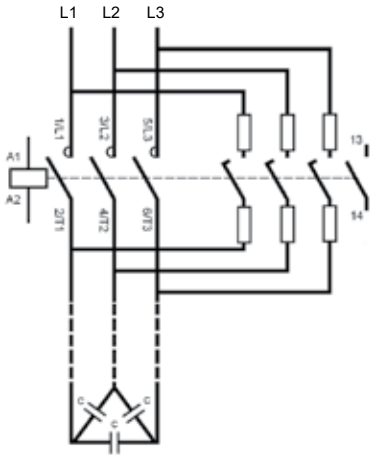
WESTINGHOUSE's special WCMC contactors series for switching of capacitors is designed according to IEC 60947-1 and UL, and provides the best solution for the switching of power factor correction capacitors.

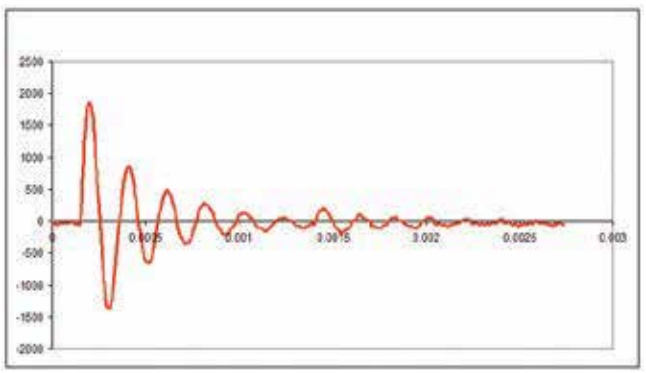
In-Rush Currents

When capacitor banks are switched, the voltage associated with a low line impedance may produce high currents on the capacitors.

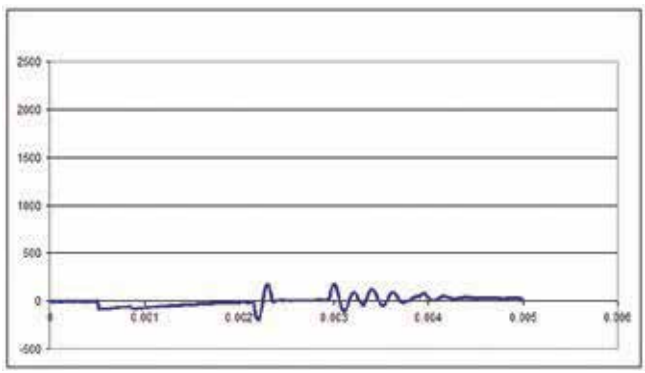
This current may reach 100 x In, being one of the main causes of reduction in the capacitor useful life.

The WCMC contactors feature pre-charge resistors that limit the "in-rush current" when the capacitors are switched. The resistors, mounted in series with the advanced contact blocks, are connected before the main contacts. After the main contacts close, they are disconnected, and only the capacitors in parallel with their inductive load remain for the proper power factor correction.





I_n (A) with standard contactors



I_n (A) with WESTINGHOUSE WCMC contactor

Modular Design

For 35 mm DIN rail
or screw fixing

Damping Resistors

Avoids high in-rush current

Auxiliary Contact

WCMC allows use of standard contact blocks, the same used in CWM line, being either NO or NC

Early Make Contact Block

They connect the pre-charge resistors and then disconnect them after a few moments

Contactors for Switching of WCMC Capacitors




Three-pole from 16 A up to 92 A (θ = 55 ºC)

I_e AC-6b ($T_{amb.}$ = 55 °C) A	Reactive power for capacitors banks AC-6b ($T_{amb.}$ = 55 °C) 220 V 230 V kvar	380 V 415 V kvar	440 V kvar	480 V kvar	660 V kvar	Integrated auxiliary contacts per contator •3 \ •4 NA	•1 / •2 NF	Reference to complete with voltage code	Ref.No.	Weight [2] kg
16	6	10	13	14	14	1	-	WCMC9-10-30 ♦	W606105	0.395
						-	1	WCMC9-01-30 ♦	W606106	
22	8	15	16	17	20	1	-	WCMC18-10-30 ♦	W606107	0.395
						-	1	WCMC18-01-30 ♦	W606108	
30	11	20	23	25	30	1	-	WCMC25-10-30 ♦	W606109	0.440
						-	1	WCMC25-01-30 ♦	W606110	
40	15	26	30	33	40	1	-	WCMC32-10-30 ♦	W606111	0.670
						-	1	WCMC32-01-30 ♦	W606112	
60	25	40	45	50	65	1	-	WCMC50-10-30 ♦	W606113	1.370
						-	1	WCMC50-01-30 ♦	W606114	
77	30	50	60	65	70	1	-	WCMC65-10-30 ♦	W606115	1.370
						-	1	WCMC65-01-30 ♦	W606116	
93	35	61	71	77	87	1	-	WCMC80-10-30 ♦	W606117	1.595
						-	1	WCMC80-01-30 ♦	W606118	

Replace "♦" with the appropriate coil voltage code.[1)]

Alternate Current

Code	X04	X15	X18	X26	X32	X37	X41	X42	X47
V (50 Hz)	20	95	110	190	220	240	325	380	415
V (60 Hz)	24	110	120	220	255	277	380	440	480

Direct Current

Code (WCMC32...65)	C34	C37	C40	C44
V Ac	24...28	42...50	110...130	208...240

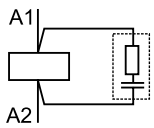
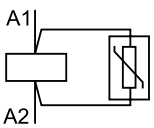
Notes: 1) Other voltages on request;
2) Weights for contactors with alternating current control circuit. For direct current control circuit, add 0.020 kg to the WCMC32 models, and 0.050 kg to the WCMC50/65 models;
3) For WCMC9...32, auxiliary blocks cannot be included in addition to those that are already built-in.

Accessories

Front Mounted Auxiliary Contact Block

Illustrative picture	For use with	Max. number of contacts / contactor	Auxiliary contacts NO	Auxiliary contacts NC	Reference	Ref.No	Weight kg
	WCMC50…80	1 / WCMC50…80	1	0	WCMF10	W606119	0.016
			0	1	WCMF01	W606120	

Surge Suppressors - Connect Directly to Coil Terminals A1-A2 [2)]

Illustrative picture	For use with	Voltage	Circuit diagram	Reference	Code	Weight kg
	WCMC9...32	24 ..48V50/60 Hz		WAMR4 D53	W606121	0.014
		50 ...127V50/60 Hz		WAMR5 D55	W606122	
		130..250V50/60 Hz		WAMR6 D63	W606123	
	WCMC50...80	24..48V50/60 Hz		WAMR7 D53	W606124	
		50..127V50/60 Hz		WAMR8 D55	W606125	
		130..250V50/60 Hz		WAMR9 D63	W606126	
	WCMC9...80	270..380V50/60 Hz		AMAV D68	W606127	
		400..510V50/60 Hz		AMAV D73	W606128	

Spare Coils

Illustrative picture	Control type	For use with	Reference to complete with voltage code	Code	Weigh kg
	AC	WCMC9...25	BCA4-25♦	On request	0.065
		WCMC32	BCA4-40♦	On request	0.110
		WCMC50...80	BCA-105♦	On request	0.140
	DC	WCMC32	BECC4-40♦	On request	0.240
		WCMC50...65	BECC-105♦	On request	0.300

Replace "♦" with the appropriate coil voltage code.[1)]

Alternate Current (0.75 x U_e)

Code	X04	X06	X10	X11	X15	X18	X26	X30	X32	X37	X41	X42	X45	X46	X47	X50
V (50 Hz)	20	24	42	48	95	110	190	208	220	240	325	380	-	400	415	440
V (60 Hz)	24	28	48	56	110	120	220	240	255	277	380	440	400	460	480	510

Direct Current

Code (WCMC32...65)	C34	C37	C40	C44
Vdc	24...28	42...50	110...130	208...240

Notes: 1) Other voltages on request ;
2) WCMC32...65 contactors with DC coil do not require surge suppression blocks, as they have a suppressor built in the coil;
3) For WCMC9...32, auxiliary blocks cannot be included in addition to those that are already built-in.

Technical Data

Basic Data

Models			WCMC9/18	WCMC25	WCMC32	WCMC50/65	WCMC80
Compliance with the standards			IEC 60947-1, IEC 60947-4, DIN VDE 0660(102)				
Rated insulation voltage U_i (pollution degree 3)	IEC 60947-4-1, VDE 0660	(V)	1,000				
	UL, CSA	(V)	600				
Rated impulse withstand voltage U_{imp} (IEC 60947-1)		(kV)	6			8	
Frequency limits		(Hz)	25...400				
Mechanical life	AC coil	(million operations)	1				
	DC coil	(million operations)	1				
Electrical life	I_e (AC-6b)	(million operations)	0.1				
Maximum frequency of operation cycles		(operations/h)	120 (1 operation every 30 seconds)				
Protection rating (IEC 60529)	Main terminals		IP10				
	Coil and auxiliary contacts		IP20			IP10 (coil) and IP20 (auxiliary contacts)	
Mounting			Screws or DIN rail 35 mm (EN 50022)				
Coil connection points	Contactors with AC coil		4		4	3	
	Contactors with DC coil		3		4	3	
Vibration resistance (IEC 60068-2-6)	Open contactor	(g)	3	4.5	7	4.5	5
	Closed contactor	(g)	6	5	9		
Resistance to mechanical shocks (½ sine wave = 11ms - IEC 60068-2-27)	Open contactor	(g)	8		7	6	
	Closed contactor	(g)	12			10	
Ambient temperature	Operation		-25 °C...+55 °C				
	Storage		-55 °C...+80 °C				
Maximum operation altitude without modification in the rated values[1)]			3,000 m				

Control Circuit - Alternate Current (AC)

Models			WCMC9...25	WCMC32	WCMC50...80
Rated insulation voltage U (pollution degree 3)	IEC 60947-4-1, VDE 0660	(V)	1,000	1,000	1,000
	UL, CSA	(V)	600	600	600
Standard voltages at 50 Hz		(V)	10...550	10...550	10...550
Standard voltages at 60 Hz		(V)	12...660	12...660	12...660
Standard voltages at 50/60 Hz		(V)	12...660	12...660	12...660
Control voltage limits					
Coil operation limits		(xUs)	0.85...1.1		
50 Hz and 60 Hz coil	Pick up	(xUs)	0.4...0.76	0.5...0.76	0.5...0.76
	Drop out	(xUs)	0.25...0.65	0.3...0.65	0.25...0.6
Average consumption			1.0 x Us and cold coil		
Coil 0.75 x U_e (50 Hz e 60 Hz)	Closed magnetic circuit	(VA)	6.1...10.2	11.4...15.0	16.8...26
	Power factor	($\cos\varphi$)	0.28	0.34	0.32
	Thermal power dissipation	(W)	2.6	4.3	8
	Closing of the magnetic circuit	(VA)	120.36	177	307
	Power factor	($\cos\varphi$)	0.85	0.69	0.54
Operation average time	Closing of the NO contacts	(ms)	8...20	10...19	15...30
	Opening of the NO contacts	(ms)	6...13	5...25	9...15

Note: 1) For 3,000...4,000 m altitudes (0.90xI_e and 0.80xU_i) and 4,000...5,000 m (0.80xI_e 0.75xU_i).

Control Circuit - Direct Current (DC)

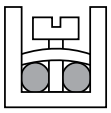
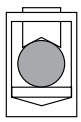
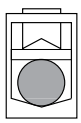
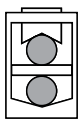
Models			WCMC32	WCMC50...65
Rated insulation voltage U_i (pollution degree 3)	IEC 60947-4-1, VDE 0660	(V)	1,000	1,000
	UL, CSA	(V)	600	600
Standard voltages		(V)	24...240	24...240
Control voltage limits				
Coil operation limits		(xUs)	0.85...1.1	
	Pick up	(xUs)	0.7...0.8	0.7...0.8
	Drop out	(xUs)	0.4...0.6	0.4...0.6
Average consumption			1.0 x Us	
	Closed magnetic circuit	(W)	6	6.5
	Closing of the magnetic circuit	(W)	240	340
Operation average time	Closing of the NO contacts	(ms)	50...60	50...60
	Opening of the NO contacts	(ms)	55...60	55...60

Auxiliary Contact Block

Models			WCMF10 and WCMF01
Compliance with the standards			IEC 60947-5-1, IEC 60947-4-1
Rated insulation voltage U_i (pollution degree 3)	IEC, VDE 0660	(V)	1,000
	UL, CSA	(V)	600
Rated operational voltage U_e	IEC, VDE 0660	(V)	690
	UL, CSA	(V)	600
Conventional thermal current I_{th} (θ ≤55 °C)		(A)	10
Rated operational current I_e			
AC-15 (IEC 60947-5-1)	110-120 V	(A)	10
	220-230 V	(A)	10
	380-400 V	(A)	6
	415-440 V	(A)	5
	500 V	(A)	4
	660-690 V	(A)	2
UL, CSA			A600
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
UL, CSA			Q600
Making capacity	U_e ≤400 V 50/60 Hz - AC-15	(A)	90
Breaking capacity	U_e ≤400 V 50/60 Hz - AC-15	(A)	60
Short circuit protection with fuse (gL/gG)		(A)	10
Control circuit reliability		(V / mA)	17 / 5
Electrical life		(million operations)	1
Mechanical life		(million operations)	10
Non-overlapping time between NO and NC contacts		(ms)	>1.5
Impedance of the contacts		(mΩ)	1.28

Technical Data

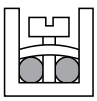
Terminal Capacity and Tightening Torque - Power Circuit

Models			WCMC9/18	WCMC25	WCMC32	WCMC50/65	WCMC80
Mounting system screw type			M3.5 Slot / Phillips	M4 Slot / Phillips	M4 Slot / Phillips	M8 Hexagon socket	M10 Hexagon socket
Conductor cross-section							
Flexible conductor without terminal	(mm²)		1x 1...6 2x 1...2.5 2x 2.5...6	1x 2.5...10 2x 2.5...10	-	-	-
Flexible conductor with terminal	(mm²)		1x 0.5...4 2x 0.5...2.5	1x 1...6.0 2x 1...2.5 2x 2.5...4	-	-	-
Solid wire	(mm²)		1x 0.5...6 2x 0.5...2.5 2x 2.5...6	x 1...10 2x 1...2.5 2x 2.5...10			
Torque	(Nm)		1...1.5	1.6...2.5	-	-	-
Connection of the conductors on top - bottom not used							
Flexible conductor without terminal	(mm²)		-	-	1...16	1.5...35	2.5...50
Flexible conductor with terminal	(mm²)		-	-	0.75...16	1...35	1.5...50
Solid wire	(mm²)		-	-	0.75...16	1...35	1.5...50
Torque	(Nm)		-	-	2...2.5	4...6	5...6.5
Connection of the conductors at the bottom - top not used							
Flexible conductor without terminal	(mm²)		-	-	1.5...16	6...35	6...35
Flexible conductor with terminal	(mm²)		-	-	1...16	2.5...35	4...35
Solid wire	(mm²)		-	-	1...16	2.5...35	4...35
Torque	(Nm)		-	-	2...2.5	4...6	5...6.5
2-conductor connection							
First conductor/top							
Flexible conductor without terminal	(mm²)		-	-	1...16	1.5...35	2.5...50
Flexible conductor with terminal	(mm²)		-	-	0.75...16	1...35	1.5...50
Solid wire	(mm²)		-	-	0.75...16	1...25	1.5...50
Second conductor/bottom							
Flexible conductor without terminal	(mm²)		-	-	1.5...16	6...35	6...35
Flexible conductor with terminal	(mm²)		-	-	1...16	2.5...25	4...35
Solid wire	(mm²)		-	-	1...16	2.5...35	4...35
Torque	(Nm)		-	-	2...2.5	4...6	5...6.5

Terminal Capacity and Tightening Torque - Control Circuit

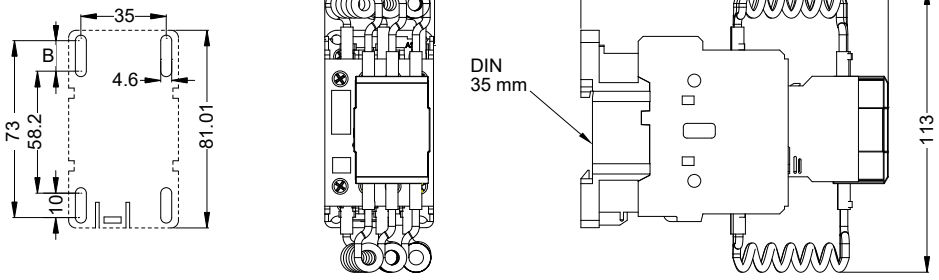
Models			WCMC9...25	WCMC32...80
Mounting system screw type			M3.5 Slot / Phillips	
Conductor cross-section				
Flexible conductor without terminal	(mm²)		1x 1...4 or 2x 1...2.5	
Flexible conductor with terminal / solid wire	(mm²)		1x 0.5...4 or 2x 0.5...1.5 or 2x 1...2.5	
Torque	(Nm)		0.8...1.1	0.8...1.5

Terminal Capacity and Tightening Torque - Auxiliary Contacts

Models			WCMF10 and WCMF01
Mounting system screw type			M3.5 Slot / Phillips
Conductor cross-section			
Conductor with or without terminal	(mm²)		0.75...2.5 or 2x 0.75...2.5
Flexible conductor with terminal / solid wire	(mm²)		1x 0.5...4 or 2x 0.5...2.5
Torque	(Nm)		0.8...1.5

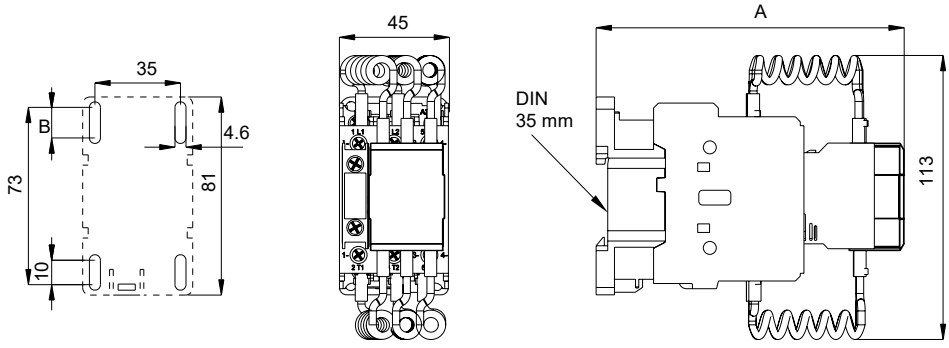
Dimensions (mm)

WCMC9/18



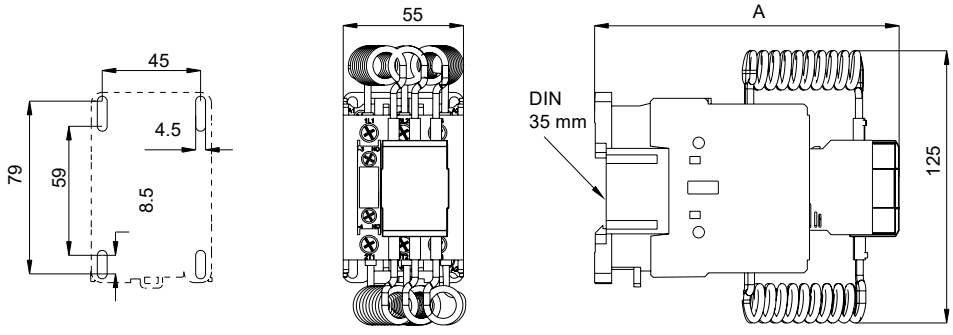
Coil	
AC	DC
A = 126.4	A = 156.7
B = 4.8	B = 12.5

WCMC25



Coil	
AC	DC
A = 129	A = 159
B = 4.8	B = 12.5

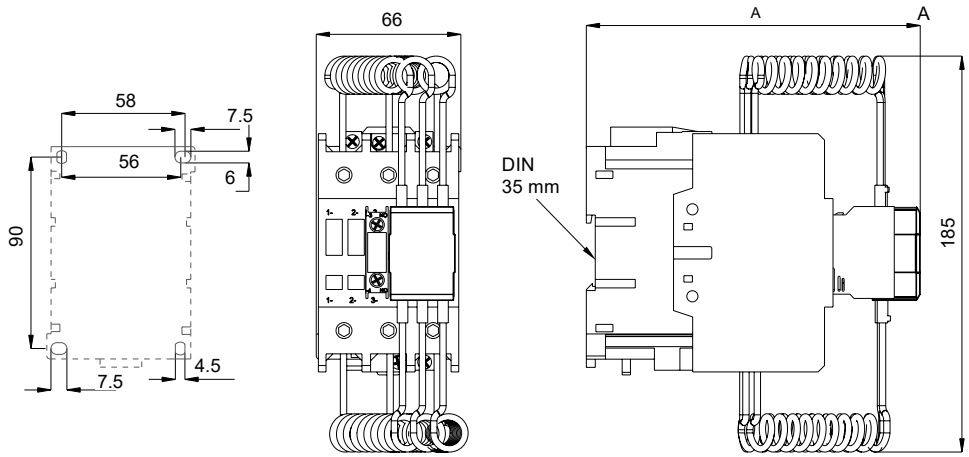
WCMC32



Coil	
AC	DC
A = 140	A = 160

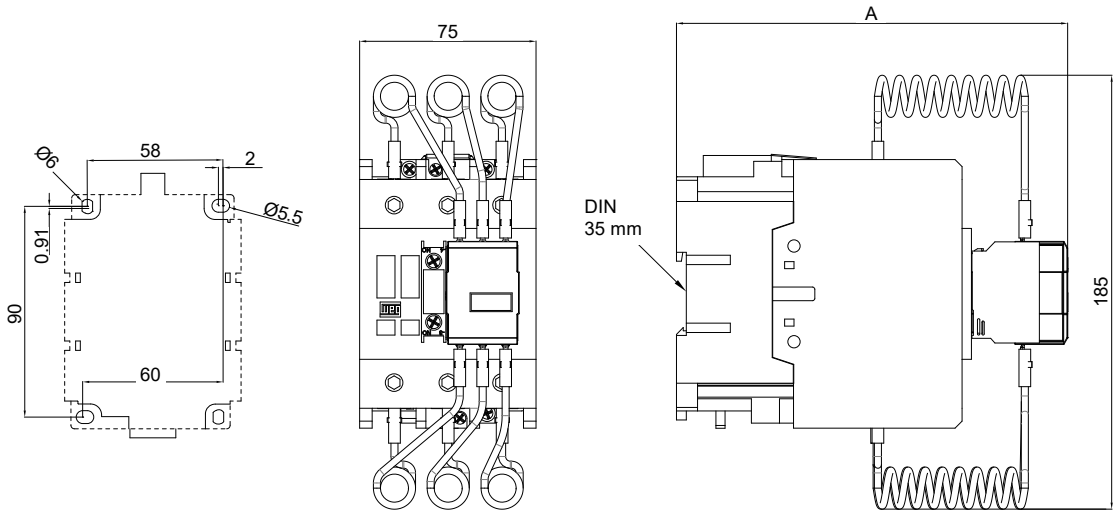
Dimensions (mm)

WCMC50 and WCMC65



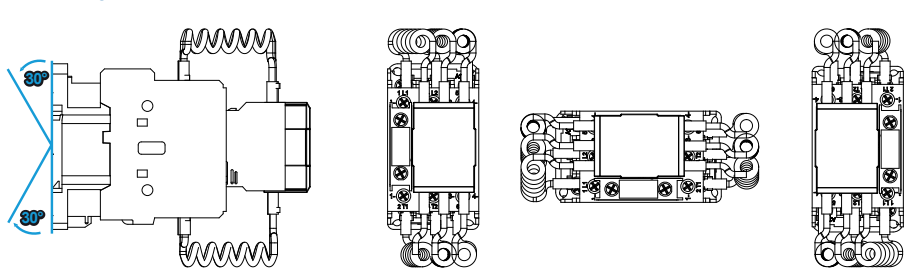
Coil	
AC	DC
A = 158	A = 158

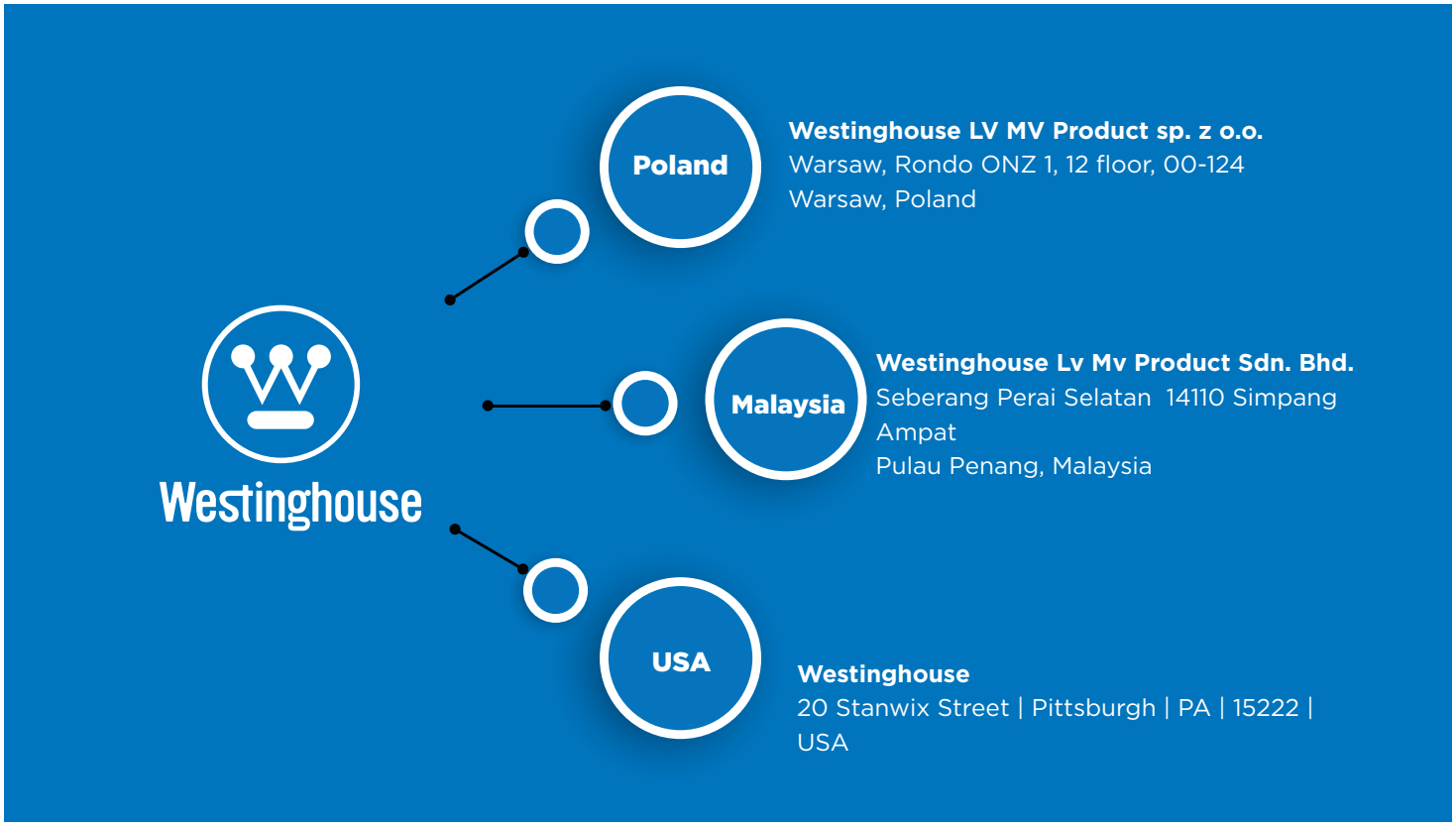
WCMC80



Coil	
AC	DC
A = 167	A = 167

Mounting Position





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