

## TECHNICAL SPECIFICATION SHEET

3 Phase Standard ZORC™							
Parameter	Unit	3.3kV	4.16kV	6.6kV	7.2kV	11kV	12.5/13.8kV
Rated Voltage (L-L)	kV	3.3	4.16	6.6	7.2	11	13.8
Voltage Range	kV	2.2-3.3	3.3-4.2	4.2-6.6	6.6-7.2	7.9-11	12.0-13.8
Rated Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60
Rated Capacitance per phase	µF	0.2	0.2	0.2	0.2	0.2	0.2
Capacitance Tolerance	%	-5 / +10	-5 / +10	-5 / +10	-5 / +10	-5 / +10	-5 / +10
Resistance per phase	Ω	30	30	30	30	30	30
Insulator BIL (Terminal to casing)	kV	95	95	95	95	95	95
Insulator to Insulator BIL	mm	63.5	63.5	63.5	63.5	121	121
Working Temperature (Ambient)	°C	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)
	°F	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)
THD (V)	%	8	8	8	8	8	8
Dielectric type		All-film	All-film	All-film	All-film	All-film	All-film
Bushing type		Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
Bushing quantity		3	3	3	3	3	3
Bushing specifications		Bushing to enclosure	Bushing to enclosure	Bushing to enclosure	Bushing to enclosure	Bushing to enclosure	Bushing to enclosure
Impulse Voltage BIL rating	kV	95	95	95	95	95	95
AC withstand wet	kV	38 (1min)	38 (1min)	38 (1min)	38 (1min)	38 (1min)	38 (1min)
AC withstand dry	kV	70 (1min)	70 (1min)	70 (1min)	70 (1min)	70 (1min)	70 (1min)
Impulse voltage (1.2uS/50uS)	kV	(+)96	(+)96	(+)96	(+)96	(+)96	(+)96
Impulse voltage (1.2uS/50uS)	kV	(-)96	(-)96	(-)96	(-)96	(-)96	(-)96
Arc distance	mm	160	160	160	160	160	160
	inch	6.3	6.3	6.3	6.3	6.3	6.3
Creepage to earth/ground	mm	380	380	380	380	380	380
	inch	15	15	15	15	15	15
Bushing Connection(s):	Nm	20	20	20	20	20	20
(Max torque)	ft lb	14.75	14.75	14.75	14.75	14.75	14.75
Installation		Panel / Machine	Panel / Machine	Panel / Machine	Panel / Machine	Panel / Machine	Panel / Machine
Mass	kg	19	19	19	19	24	27
	lb	41.88	41.88	41.88	41.88	52.91	59.52
Overall dimensions (W x H x D)	mm	428 x 444 x 138	428 x 444 x 138	428 x 444 x 138	428 x 444 x 138	535 x 489 x 105	535 x 489 x 120
	inch	16.85 x 17.48 x 5.43	16.85 x 17.48 x 5.43	16.85 x 17.48 x 5.43	16.85 x 17.48 x 5.43	21.06 x 19.25 x 4.13	21.06 x 19.25 x 4.72
Earthing / Grounding	Min 16mm <sup>2</sup> to 25mm <sup>2</sup> (to machine earth) / 0.0248 in <sup>2</sup> to 0.0387 in <sup>2</sup> (to machine ground)						
Oil impregnate	Faradol 810 / Jarylec 101						
Enclosure material	Stainless steel (SS409) with thickness of 1.6mm / 0.063 inches						
Paint primer	Aerofin Epoxy Primer Beige (180-0039) Thickness: 40µm						
Paint finish	Thanacryl Polyurethane Enamel (RAL 7038) Thickness: 80 µm						
Product codes		M3-3kV P3-3kV	M3-4.16kV P3-4.16kV	M3-6kV P3-6kV	M3-7.2kV P3-7.2kV	M3-11kV P3-11kV	P3-12kV / 13kV-U20 M3-12kV / 13kV-U20

Specification –3 Phase compact ZORC™					3 Phase low voltage ZORC™			
Parameter	Unit	3.3kV	4.16kV	6.6kV	LVZ400	LVZ550	LVZ690	LVZ1000
Rated Voltage (L-L)	kV	3.3	4.16	6.6	0.4	0.55	0.69	1
Voltage Range	kV	2.2-3.3	3.3-4.2	6.6	0.38-0.4	0.46-0.55	0.58-0.69	0.8-1
Rated Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated Capacitance per phase	µF	0.1	0.1	0.1	0.5	0.5	0.5	0.5
Capacitance Tolerance	%	-5 / +10	-5 / +10	-5 / +10	-5 / +10	-5 / +10	-5 / +10	-5 / +10
Resistance per phase	Ω	30	30	30	22	22	22	22
Working Temperature (Ambient)	°C	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)
	°F	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)
THD (V)	%	5	5	5	5	5	5	5
Dielectric type		All-film	All-film	All-film	All-film	All-film	All-film	All-film
Insulator BIL	kV	45	45	45	NA	NA	NA	NA
Insulator to Insulator BIL	mm	53	53	53	NA	NA	NA	NA
Bushing type		Ceramic			Terminal housing			
Bushing quantity		Three			NA	NA	NA	NA
Bushing specifications		Bushing to enclosure	Bushing to enclosure	Bushing to enclosure	NA	NA	NA	NA
Impulse Voltage BIL rating	kV	45	45	45				
AC withstand wet	kV	13 (1min)	13 (1min)	13 (1min)				
AC withstand dry	kV	21 (1min)	21 (1min)	21 (1min)				
Impulse voltage (1.2uS/50uS)	kV	(+)45	(+)45	(+)45				
Impulse voltage (1.2uS/50uS)	kV	(-)45	(-)45	(-)45				
Arc distance	mm	45	45	45				
	inch	1.77	1.77	1.77				
Creepage to earth/ground	mm	60	60	60				
	inch	2.36	2.36	2.36				
Bushing Connection(s):	Nm	20			NA	NA	NA	NA
(Max torque)	ft lb	14.75			NA	NA	NA	NA
Installation		Machine	Machine	Machine	Panel/ Machine	Panel/ Machine	Panel/ Machine	Panel/ Machine
Mass	kg	6	6	6	3.2	3.2	3.2	3.2
	lb	13.22	13.22	13.22	7.05	7.05	7.05	7.05
Overall dimensions (W x H x D)	mm	280 x 242 x 116	280 x 242 x 116	280 x 242 x 116	182 x 255 x 90	182 x 255 x 90	182 x 255 x 90	182 x 255 x 90
	inch	11.02 x 9.53 x 4.57	11.02 x 9.53 x 4.57	11.02 x 9.53 x 4.57	7.16 x 10.04 x 3.54	7.16 x 10.04 x 3.54	7.16 x 10.04 x 3.54	7.16 x 10.04 x 3.54
Earthing / Grounding		Min 16mm <sup>2</sup> to 25mm <sup>2</sup> (to machine earth) / 0.0248 in <sup>2</sup> to 0.0387 in <sup>2</sup> (to machine ground)			Min 4mm <sup>2</sup> to 16mm <sup>2</sup> (to machine earth) / 0.0062 in <sup>2</sup> to 0.025 in <sup>2</sup> (to machine ground)			
Oil impregnate		Faradol 810 / Jarylec 101			None			
Enclosure material		Stainless steel (SS409) with thickness of 1.6mm / 0.063 inches			Mild Steel (Commercial quality)			
Paint primer		Aerofin Epoxy Primer Beige (180-0039) Thickness: 40µm			Powder Coated			
Paint finish		Thanacryl Polyurethane Enamel (RAL 7038) Thickness: 80 µm			Grey631			
Connection		YN			YN			
Product codes		M3C-3kV	M3C-4.16kV	M3C-6kV	LVZ400	LVZ550	LVZ690	LVZ1000

Single Phase ZORC™ RC Suppressor						
Parameter	Unit	22kV	25kV	33kV	36kV	40kV
Rated Voltage (L-L)	kV	22	25	33	36	40
Voltage Range	kV	18 - 22	22.5 - 25	25.5 - 33	33.5 - 36	36.5 - 40
Rated Frequency	Hz	50/60	50/60	50/60	50/60	50/60
Rated Capacitance per phase	µF	0.2	0.2	0.2	0.2	0.2
Capacitance Tolerance	%	-5 / +10	-5 / +10	-5 / +10	-5 / +10	-5 / +10
Resistance per phase	Ω	30	30	30	30	30
Working Temperature	°C	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)	-25 / D (Max 55)
IEC60871-1-4.1 (Table 1)	°F	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)	-13 / D (Max 131)
THD (V)	%	8	8	8	8	8
Dielectric type		All-film	All-film	All-film	All-film	All-film
Insulator BIL	mm	n/a	325.5	325.5	325.5	325.5
Bushing type		Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
Bushing quantity		1	2	2	2	2
Bushing specifications		Bushing to enclosure	2 Bushings in series	2 Bushings in series	2 Bushings in series	2 Bushings in series
Impulse Voltage BIL rating	kV	170	170 +170	170 +170	170 +170	170 +170
AC withstand wet	kV	70 (1min)	70+70 (1min)	70+70 (1min)	70+70 (1min)	70+70 (1min)
AC withstand dry	kV	100 (1min)	100+100 (1min)	100+100 (1min)	100+100 (1min)	100+100 (1min)
Impulse voltage (1.2uS/50uS)	kV	(+)200	(+)(200+200)	(+)(200+200)	(+)(200+200)	(+)(200+200)
Impulse voltage (1.2uS/50uS)	kV	(-)180	(-)(180+180)	(-)(180+180)	(-)(180+180)	(-)(180+180)
Arc distance	mm	300	300	300	300	300
	inch	11.8	11.8	11.8	11.8	11.8
Creepage to earth/ground	mm	820	820 + 820	820 + 820	820 + 820	820 + 820
	inch	32.3	32.3 + 32.3	32.3 + 32.3	32.3 + 32.3	32.3 + 32.3
Bushing Connection(s):	Nm	20	20	20	20	20
(Max torque)	ft lb	14.75	14.75	14.75	14.75	14.75
Station Post Insulator Quantity		None	1	1	1	1
Impulse Voltage BIL rating	kV	--	250	250	250	250
AC withstand wet	kV	--	125	125	125	125
AC withstand dry	kV	--	170	170	170	170
Impulse voltage (1.2uS/50uS)	kV	--	(+)275 & (-)350	(+)275 & (-)350	(+)275 & (-)350	(+)275 & (-)350
Arc distance	mm	--	450	450	450	450
	inch	--	17.7	17.7	17.7	17.7
Creepage to earth/ground	mm	--	1300	1300	1300	1300
	inch	--	51.2	51.2	51.2	51.2
Installation		Machine	Machine	Machine	Machine	Machine
Mass	kg	30	112 (30 + 30 + 52)	112 (30 + 30 + 52)	112 (30 + 30 + 52)	112 (30 + 30 + 52)
	lb	66	247 (66 + 66 + 115)	247 (66 + 66 + 115)	247 (66 + 66 + 115)	247 (66 + 66 + 115)
Overall dimensions (W x H x D)	mm	343 x 655 x 117	433 x 1516 x 414	433 x 1310 x 433	433 x 1310 x 433	433 x 1310 x 433
	inch	13.5 x 25.8 x 4.6	17.04 x 51.6 x 17.04	17.04 x 51.6 x 17.04	17.04 x 51.6 x 17.04	17.04 x 51.6 x 17.04
Earthing / Grounding		Min 16mm <sup>2</sup> to 25mm <sup>2</sup> (to machine earth) / 0.0248 in <sup>2</sup> to 0.0387 in <sup>2</sup> (to machine ground)				
Oil impregnate		Faradol 810 / Jarylec 101				
Enclosure material		Stainless steel (SS409) with thickness of 1.6mm / 0.063 inches				
Paint primer		Aerofin Epoxy Primer Beige (180-0039) Thickness: 40µm				
Paint finish		Thanacryl Polyurethane Enamel (RAL 7038) Thickness: 80 µm				
Configuration		One unit	Two units per phase – values above are consolidated for 2 cans			
Product codes		M1-22kV	M1-25kV	M1-33kV	M1-36kV	M1-40kV

<b>Standards</b>	
Quality Management System	ISO 9001: 2015
Overall manufacturing compliance	IEC 60871-1: 2005 / ANSI, IEEE 18 / NEMA CP-1 / VDE 0560 part 410 / CIGRÉ 13.02

<b>Testing</b>	
Manufacturing tests	Each ZORC™ surge suppressor is routine tested prior to dispatch. Test certificates are available.
Field tests	<p>Check for obvious physical damage (broken bushing, leaking impregnate, bulging tank, etc.)</p> <p>Measure the capacitance from each phase to earth and check that it is within 10% of nominal as stamped on the ZORC™ rating plate.</p> <p>Use a hand-held capacitance meter or apply a known low voltage (e.g. 230V ac) between each phase and earth, measure the phase currents, and calculate the capacitance.</p> <p>With the ZORC™ line connections bonded together, and using a DC cable test set, test between line and earth for 10 seconds. Confirm there are no dielectric breakdowns or audible discharges.</p>

<b>Additional Considerations</b>	
Maintenance	<p>A ZORC™ is maintenance-free, requiring only periodic cleaning of bushings in contaminated areas.</p> <p>Equipment should be inspected periodically for failure or leaks. This check can be made after de-energising and following "Safety Instruction, Shock Hazard" detailed elsewhere in this document.</p> <p>The use of hoses in the vicinity of an 'open' ZORC™ installation must be avoided.</p> <p>Testing can be carried out once a year.</p>
Inspection	<p>Inspect the ZORC™ for dirty, broken or chipped bushings.</p> <p>Physical damage to the casing.</p> <p>Earth &amp; the leads. The casing earth and leads should not be corroded.</p> <p>Inspect casing for any bulging. (Needs to be removed from service immediately).</p> <p>Inspect very carefully for oil leaks. (Needs to be removed from service immediately).</p>

<b>General</b>	
Hazardous location certification	Class 1 Div 2 Certification of ExN (Non Sparking) available on <b>3.3/6.6/11kV</b> Units, Temp Classes T1-T5, SABS 970-1971
Life expectancy	20 years on all models
Warranty	12 month factory warranty
Further documentation available	ZORC™ Operating Manual
	ZORC™ Instructions for Safe Use
	Faradol 810 MSDS