

PowerPlus™ Technical Specifications

Description

PowerPlus is a series resonant switchmode power supply for the next generation of high performance electrostatic precipitators. It is a heavy-duty industrial grade design, suitable for use in a power plant and all industrial operating environments.

Electrical Specifications: 4 to 21 kW units

	4.2 kW	8.5 kW	17 kW	21 kW
KVA Rating	4.8	9.7	19.4	24.2
Input Voltage 3Ø, 50/60 Hz	400-480	400-480	400-480	400-480
Rated Input Current – Amps	39	76	94	142
Output Voltage –KVDC	70 83			
Output Current – mADC	60 50	120 100	245 205	300 255
Circuit Breaker Rating - amps	15	20	40	50
Circuit Breaker IAC Rating @ 480VAC (UL & IEC rated)	25K			
Power Factor	.94			
Losses – KW	2.0	3.3	3.6	5.5
% Ripple – KVp-p	3-5			
Output Switching Frequency – KHz	25			
Arc Shutdown Time – µsec	30			

Physical Specifications: 4 to 21 kW units

	4.2 & 8.5 kW			17 & 21 kW		
Weight lbs - (kgs)	1000 (454)			1050 (477)		
Dimensions – in (mm)	W	D	H	W	D	H
	28.46 (723)	50.72 (1288)	70.0 (1778)	45.93 (1167)	46.86 (1190)	57.84 (1469)
Max floor loading - psi (gram/cm)	200 (98)			200 (98)		
Dielectric Vol gal (liter)	41 (154)			41 (154)		
Dielectric type	Cross 206 Mineral Oil or Optional Dow Corning 561 Silicone Fluid					



Electrical Specifications: 28 to 120 kW

	28 KW	35 kW	56 KW	70KW	105KW	120KW
KVA Rating	32.2	39.1	63.2	78.3	118	134
Input Voltage 3Ø, 50/60 Hz	480	480	480	480	480	480
Rated Input Current – Amps	39	48	76	94	142	161
Output Voltage –KVDC	70 83					
Output Current – mADC	400 335	500 420	800 675	1000 840	1500 1265	1700 1445
Circuit Breaker Rating - amps	60	70	100	150	200	250
Circuit Breaker IAC Rating @ 480VAC (UL & IEC rated)	25K					
Power Factor	.94					
Losses – KW	2.0	2.1	3.3	3.6	5.5	6.3
% Ripple – KVp-p	3-5					
Output Switching Frequency – KHz	25					
Arc Shutdown Time – µsec	30					

Physical Specifications: 28 to 120 kW

	28 – 35 kW			56 – 70 kW			105 -120 kW		
Weight lbs - (kgs)	1000 (454)			1100 (499)			2200 (1044)		
Enclosure Dimension – in (mm)	W	D	H	W	D	H	W	D	H
	42.47 (1079)	46.90 (1191)	50.78 (1290)	46.67 (1185)	46.90 (1191)	57.77 (1493)	64.75 (1645)	47.50 (1204)	81.75 (2080)
Max floor Loading – psi (gram/cm)	215 (106)			305 (149)			295 (144)		
Dielectric Vol gal (liter)	29 (110)			29 (110)			100 (379)		
Dielectric type	Cross Grade 206 Mineral Oil (or equivalent) or Dow Corning 561 Silicone Fluid								

International Certifications

These standards apply to every model and size PowerPlus unit.

Directives	
Electromagnetic Compatibility Directive	89/336/EEC
Machinery Directive	2006/42/EC
Low Voltage Directive	2006/95/EC
Emissions	
EN 61000-6-4: 2001 ed.	EN 55011: 2007 ed.
Immunity	
EN 61000-6-2: 2005 ed.	EN 61000-4-4: 2004 ed.
EN 61000-4-2: 1995 ed.	EN 61000-4-5: 1995 ed.
EN 61000-4-3: 2002 ed.	EN 61000-4-6: 1996 ed.

Power Supply Standards	UL 1012, 60079-0, 60079-6, 60079-7
	CSA 107.1, 66, 94, 60079-0, 60079-6, 60079-7
	IEC 60079-0, 60079-6, 60079-7
	EN 60204-1, 12100-2, 14121
	EN 60076-1, 60076-2, 60076-3, 60076-4, 60076-5, 60076-8
	IEC 60076-1, 60076-2, 60076-3, 60076-4, 60076-5, 60076-8

The following IEC standards were used with EN 60204-1 as applicable			
60034-1	60364-4-54	60947-1	61346
60034-5	60364-4-61	60947-2	61557-3
60034-11	60417	60947-3	61558-1
60072-1	60439-1	60947-5-1	61558-2-6
60072-2	60445	60947-7-1	61984
60073	60446	61082-1	62023
60309-1	60447	61082-2	62027
60364-4-41	60529	61082-3	62061
60364-4-43	60617	61082-4	62079
60364-4-52	60621-3	61140	
60364-4-53	60664-1	61310	
Applicable ISO standards			
ISO 13849-2	ISO 13850	ISO 7000	ISO 12100-1
ISO 12100-2	ISO 13849-1		



Operating Conditions

Minimum Ambient Temperature	-20° C
Maximum Avg. Ambient Temperature (24 hr)	40° C
Maximum Ambient Temperature	50° C (for up to 4 hours)
Maximum Oil Temperature Rise	40° C
Maximum Tank Surface Temperature	75° C
Maximum Relative Humidity	100%
Maximum Permissible Altitude	1000 m (3300 ft)

Exterior Specifications

Nameplate Material	Aluminum 0.32" (8 mm) thick, satin finish
Mounting	High voltage duct flange, see outline drawing
Grounding	(see Electrical Ratings, Safety Ground)
Paint (primer)	High solid alkyd primer, VOC compliant, gray, 1-1.5 mils (25-40 µm)
Paint (top coat)	High build acrylic enamel, semi-gloss, 1-1.5 mils (25-40 µm)
Paint (color)	ASA 61 gray (RAL 7042)

Electrical Ratings

Insulation Class	A
Winding Conductor Material (primary)	Copper wire
Winding Conductor Material (secondary)	Copper wire
Oil Level Switch Ratings	20VA contacts
Minimum Ground Wire size	#2 AWG Cu. per NEC, section 250 (35 mm ² Cu.)
Input Connection	Stabs for 5/16" ring lugs (8 mm)
Output Termination	½" NPT Female on HV bushing
External Safety Ground Termination	, ¼-20UNCF, (7 mm)
Internal Neutral Ground Termination	⅜-16 x 1" stud, (10 mm)
Low Voltage feed thru	¼-20UNCF epoxy feed thru, (7 mm)



Oil Tank

Tank Material	14 GA (2.1 mm) 1018 hot rolled steel
Maximum operating internal tank pressure	4 psig (276 mbar)
Maximum internal tank design pressure	7 psig (483 mbar)
Pressure relief valve setting	4 psig (276 mbar)
Fill coupling	½" NPTF, (12 mm)
Drain	½" NPTF, (12 mm)
Lid	Removable, bolted, access to entire tank
Lid removal	Lifting eyes/manual

Electronics and Control Enclosures

Protection Rating	NEMA 4/IP 56
Enclosure Material	14 GA (2.1 mm) 1018 hot rolled steel (minimum)
Lifting Lug Material	10 GA (3.4 mm) ASTM A36 hot rolled steel, 4 or 6 places
Access	(2) Hinged doors

Ratings Nameplate Information (mounted on enclosure door)

NWL name	NWL address
Model number	Serial number
Date of manufacture	KVA rating
Input Voltage	Input Current
Output Voltage (kV average, no load)	Output Current (mADC)
Number of Phases	Input Frequency
Cooling Class (per ANSI C57)	Maximum Ambient Temperature
Maximum Oil Rise Temperature	Weight (lbs, kgs)
Schematic diagram drawing number	Circuit breaker rating

Oil Tag (mounted on the tank)

Volume of oil (gallons/liters)	Type of insulating oil
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