Technical Submission

Job	73-75 Avenue Road	Ref	C1082 – TSE007
Date	18th March 2020		

Item	Generator Set
Description	Standby Generator Set to be installed in dedicated generator room adjacent to mains intake. Please note the dimensions of the unit and related access requirements detailed on page 24 of this document. Prime Rating 200kVA / 160kW Standby Rating 200kBA / 176kW The Genset has a fuel tank capacity of 1075litres which will offer 23.5 hours of runtime at 100% load and 30.9 hours at 70% load
Manufacturer / Specialist	Power Technique / PTDGPS220
Specification Reference	Please refer to below data sheets and Generator Drawing

DELIVERY SCHEDULE

We estimate the following lead times from acceptance of order (all ex-works, to be confirmed at time of order and may be subject to amendment during production):

- generator – 8-10 working weeks (excluding arrangements for factory witness testing)
- ventilation system – 8-10 working weeks from drawing approval
- flue – 4-6 working weeks from drawing approval.

EXCLUSIONS AND ASSUMPTIONS

Assumes easy access to site and normal working hours
Signal to start the generator will be from switchgear provided by others
Our price includes provision of a Project Manager to provide a main point of contact between the site appointed contacts, our engineers and subcontractors, and external contacts following receipt of order. The project manager will also be responsible for preparation of RAMS and OEM manuals
The discharge height of all exhaust systems must be approved by the relevant Local Authority planning office as required under the Clean Air Act. Power Tecnique Ltd are not responsible for obtaining this approval
Excludes all builders works
Excludes all electrical installation
Excludes all plinths
Excludes all earthing
Excludes any item not specifically detailed in this quotation
All prices subject to confirmation following site survey
Powertecnique is not responsible for the testing, handling or removal of asbestos if discovered during project implementation

GENERATOR GENERAL SPECIFICATION

Prime output is suitable for supplying continuous electrical power at variable load. A 10% overload is permitted.

Standby output is available a variable load in the event of a main power network failure. No overload is permitted.

All outputs stated are based at 35 deg C of ambient temperature and 1000 mt of altitude in accordance with ISO 8528 with 400v / 230V, 3 phases, 50 Hz @ 1500 rpm.

DIESEL ENGINE:

The prime mover will be a diesel ignition, direct injection, industrial pattern, turbo-charged and after-cooled engine and will be supplied with full flow fuel and lubricating oil filters together with a medium duty, dry type air filter with paper replacement element. The coolant and oil drains will be extended to base edge to assist with general servicing.

DC ELECTRICS:

The engine control system comprises 24 Volt D.C. electrics, c/w a heavy-duty lead acid battery pack. These will be suitable to permit at least six consecutive starts. The set will be complete with a battery condition meter and mains charger unit, with trickle / boost selector switching.

COOLING:

Water cooled through a 35 Deg C pusher type radiator suitable for continuous or intermittent stand-by operations in temperate conditions. Cooling Water Pre-heaters, fan guard and stone guard will be fitted as standard.

ALTERNATOR:

Directly coupled to the engine by means of an SAE flange to minimise torsional vibration and to provide smooth running of the set. Alternator is of brushless design; Class H insulated for optimum performance in tropical environment, single bearing, self-excited, self regulating and drip-proof and includes underspeed protection. BS4900 / BS5000 standards are applicable. Voltage regulation accuracy is maintained to within +/-1% with load from 0 to 100%, speed from 2% to 5% and power factor range from 0.8 to 1 and balanced load. The rotor system is dynamically balanced to minimize vibration. Ample ventilation is provided by a shaft mounting centrifugal fan.

GOVERNOR:

Electronic governor is provided as standard to provide rapid response to load changes - this is suitable for applications where the generator regulation is to be kept with tight parameters.

SEPARATELY-EXCITED AVR WITH PERMANENT MAGNET GENERATOR

These components are included in order to improve the initial load acceptance of the generator, as well as improving regulation in response to fluctuating loads.

GENERATOR CONTROL MODULE:

Synch controls includes upgrade to DSE8620 generator controller, and will require switchgear to be fitted with 2 x motorised ACB's (one for mains, one for generator) and G59 relay.
Please refer to additional page for further details.

EXPANSION MODULES:

DSE2157 output module to configure with generator control module in order to provide 8no. programmable VFC alarms per unit.

MOUNTING ARRANGEMENT:

The engine and alternator will be mounted as a whole on a heavy duty fabricated steel base frame, complete with anti-vibration mounting pads for fixing between base frames.

SAFETY AND PROTECTION:

The generator is fitted with engine manifold guard, alternator screen protection, and protection circuits for low oil pressure, high engine temperature, low coolant level, over-current and over-speed conditions, battery condition indicator and emergency stop button. Internal circuits (including terminals, relays, fittings and cables) are clearly identified by numbers or named plates.

FUEL TANK:

Base frame mounted fuel tank is provided with the generator set and is complete with all essential accessories comprising: filler, breather, feed and return lines, dial type contents gauge.

EXTERNAL TERMINATION PANEL:

External cable link box c/w pre-installed cabling and conduits allowing for easy connection of SWA cabling

OUTPUT MCCB:

Consisting of a suitably rated 4-pole moulded case circuit breaker with thermal and magnetic trips.

CANOPY:

Please refer to additional page for further details

GENERATOR PARTICULAR SPECIFICATIONS – 200kVA ENCLOSED, PERKINS ENGINE, 23.5HR TANK

GENERATOR

Model	PTDGPS220
Prime rating	200kVA / 160kW
Standby rating	220kVA / 176kW

ENGINE

Manufacturer	Perkins
Model	1106A-70TAG3
Governor	Electronic
Speed	1500rpm
No. of cylinders	6L
Compression ratio	16 : 1

FUEL AND OIL

100% load - runtime (consumption)	23.5 hours (45.8lph)
75% load - runtime (consumption)	30.9 hours (34.7lph)
Fuel tank capacity	1075litres (we provide an option to upgrade to 1700L)
Oil Sump	16.5 litres

ALTERNATOR

Manufacturer	Stamford
Model	UCDI 274H

PHYSICAL DATA

Configuration	Enclosed
Noise level (dBA @ 7m)	69
Dimensions	3667L x 1162W x 2157H mm
Weight	2800kg (dry) / 3875kg (wet)

1100 Series 1106A-70TAG2 Diesel Engine – ElectropaK

144.1 kWm net power @ 1500 rpm

Building upon Perkins proven reputation within the power generation industry, the 1100 Series range of ElectropaK engines now fit even closer to customers needs.

In the world of power generation success is only gained by providing more for less. With the 1106A-70TAG Perkins has engineered even higher levels of reliability, yet lowered the cost of ownership.

1100A units are designed for territories that do not require compliance to EPA or EU emissions legislation. These engines are assembled around optimal, efficient manufactuing processes with state-of-the-art technology. They are built to provide the exact power solution for customers who sell their applications into lesser regulated countries.

Focusing on our common platform theme, changes to engine envelope dimensions and connection points have been kept to a minimum.

Specification		
Number of cylinders	6 vertical in-line	
Bore and stroke	105 x 135 mm	4.13 x 5.31 in
Displacement	7.01 litres	428 in^3
Aspiration	Turbocharged aftercooled	
Cycle	4 stroke	
Combustion system	Direct injection	
Compression ratio	16:1	
Rotation	Anti-clockwise, viewed on flywheel	
Total lubricating capacity	16.5 litres	4.36 US gal
Cooling system	Liquid	
Total coolant capacity	21 litres	5.5 US gal

www.perkins.com

Publication No. PN3054A/12/14 Produced in England

Perkins®

THE HEART OF EVERY GREAT MACHINE

1100 Series 1106A-70TAG2 Diesel Engine – ElectropaK

144.1 kWm net power @ 1500 rpm

Features and benefits

Dependable power

- The Perkins® 1106A-70TAG2 delivers up to 165 kVA standby at 50 Hz and 150 kWe standby at 60 Hz, providing greater productivity through an improved power to weight ratio
- This world-class power density has been achieved in a 7 litre engine, using a mechanical fuel injection system; making this engine robust for all markets, with the ability to cope with the variation of fuel qualities around the world

  The 1106A has been designed for excellent load acceptance to ensure your facility is powered quickly at all conditions

Low operating costs

- Service intervals are set at 500 hours as standard
- Warranties and Service Contracts

  We provide one-year warranties for constant speed engines and two-year warranties for variable speed models, as standard. These are supported by multilevel Extended Service Contracts that can be bought additionally
  Discover more: **www.perkins.esc**
- Low usage warranty package is also available

World class product support

- Through an experienced global network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. They have a comprehensive suite of web based tools at their finger tips, covering technical information, parts identification and ordering systems, all dedicated to maximising the productivity of your engine
- Perkins actively pursues product support excellence by insisting our distribution network invest in their territory to provide you with a consistent quality of support across the globe
- Throughout the entire life of a Perkins engine, we provide access to genuine OE specification parts giving 100% reassurance that you receive the very best in terms of quality for lowest possible cost… wherever your Perkins powered machine is operating in the world
- To find your local distributor: **www.perkins.com/distributor**

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THE HEART OF EVERY GREAT MACHINE

1100 Series 1106A-70TAG2 Diesel Engine – ElectropaK

144.1 kWm net power @ 1500 rpm

Technical information

- Tropical radiator pipes and guards
- Flywheel housing
- Flywheel and starter ring
- Oil filters
- Starter motor
- Air cleaners and brackets
- Lubricating oil sump
- Alternator
- Induction manifolds
- Exhaust manifolds
- Fuel filter
- Cold start aid
- Engine mountings

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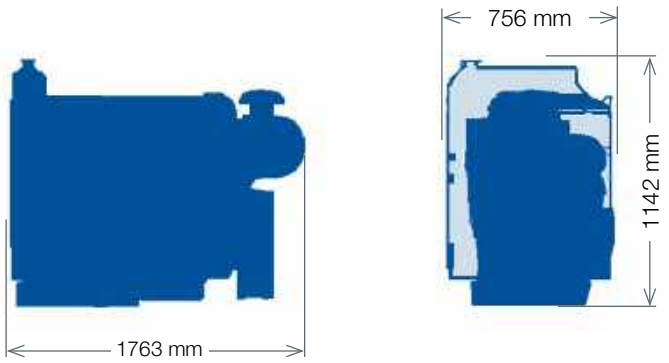
THE HEART OF EVERY GREAT MACHINE

1100 Series 1106A-70TAG2 Diesel Engine – ElectropaK

144.1 kWm net power @ 1500 rpm



Engine package weights and dimensions		
Length with air cleaner	1763 mm	69.4 in
Width	756 mm	29.8 in
Height	1142 mm	145 in
Weight (dry)	788 kg	1737 lb

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THE HEART OF EVERY GREAT MACHINE

1100 Series 1106A-70TAG2 Diesel Engine – ElectropaK

144.1 kWm net power @ 1500 rpm

Speed rpm	Type of operation	Typical generator output (Net)		Engine power			
				Gross		Net	
		kVA	kWe	kWm	hp	kWm	hp
1500	Prime power	150	120	136.0	182.4	131.0	175.7
	Standby (maximum)	165	132	153.6	206.0	144.1	193.2

Percent of prime power	Fuel consumption at 1500 rpm g/kWh	Fuel consumption at 1500 rpm l/hr
110%	201.1	36.1
Prime power	203.3	33.4
75%	199.7	24.7
50%	197.9	16.4
25%	221.1	9.1

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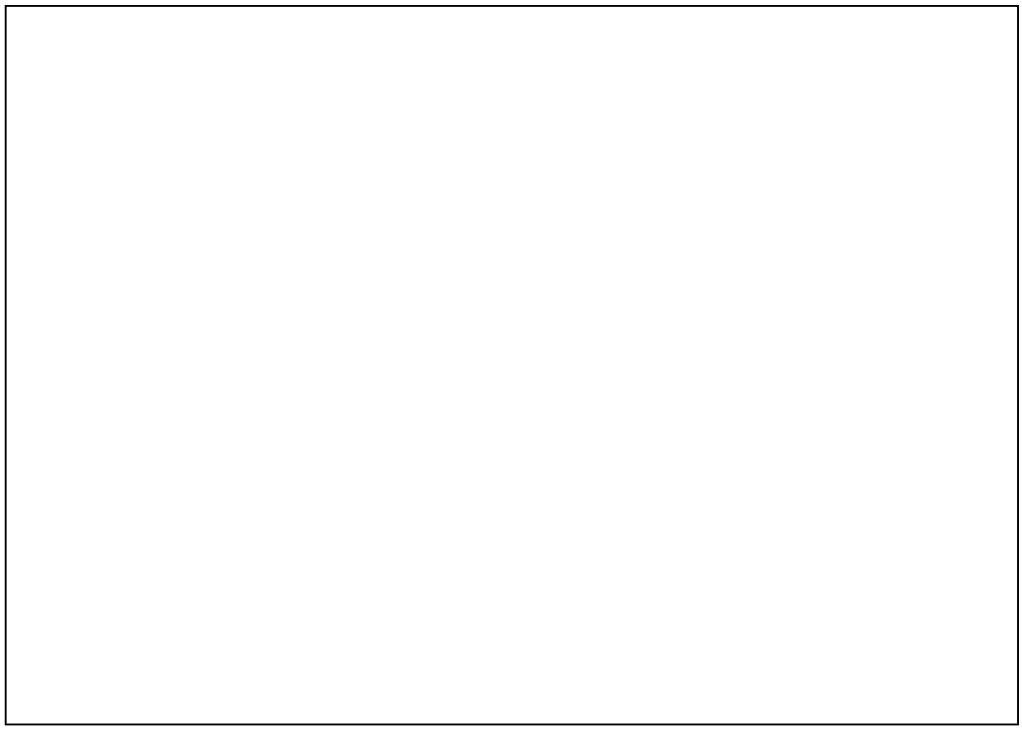
THE HEART OF EVERY GREAT MACHINE

STAMFORD
power generation

UCI274H - Technical Data Sheet



UCI274H

SPECIFICATIONS & OPTIONS

STANDARDS
Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

SX460 AVR - STANDARD
With this self excited control system the main stator supplies power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.
The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

SX440 AVR
With this self-excited system the main stator provides power via the AVR to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.
The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.
The SX440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.
If 3-phase sensing is required with the self-excited system, the SX421 AVR must be used.

SX421AVR
This AVR also operates in a self-excited system. It combines all the features of the SX440 with, additionally, three-phase rms sensing for improved regulation and performance. Over voltage protection is provided via a separate circuit breaker. An engine relief load acceptance feature is built in as standard.

MX341 AVR
This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.
The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.
An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.
If three-phase sensing is required with the PMG system the MX321 AVR must be used.
We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

MX321 AVR
The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.
Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE
All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th ...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX
Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS
All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION
The insulation system is class 'H'.
All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE
Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

STAMFORD
power generation

UCI274H

WINDING 311

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.		
A.V.R.	MX321	MX341	
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)		

CONTROL SYSTEM	SELF EXCITED			
A.V.R.	SX460	SX440	SX421	
VOLTAGE REGULATION	± 1.5 %	± 1.0 %	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT			

INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER CONCENTRIC							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	12							
STATOR WDG. RESISTANCE	0.0155 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	1.82 Ohms at 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4,VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6315-2RS (ISO)							
BEARING NON-DRIVE END	BALL. 6310-2RS (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	626 kg				641 kg			
WEIGHT WOUND STATOR	253 kg				253 kg			
WEIGHT WOUND ROTOR	227.53 kg				216.57 kg			
WR² INERTIA	1.9349 kgm^2				1.8843 kgm^2			
SHIPPING WEIGHTS in a crate	659 kg				673 kg			
PACKING CRATE SIZE	123 x 67 x 103 (cm)				123 x 67 x 103 (cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	0.514 m³/sec 1090 cfm				0.617 m³/sec 1308 cfm			
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
kVA BASE RATING FOR REACTANCE VALUES	200	200	200	n/a	237.5	245	245	255
Xd DIR. AXIS SYNCHRONOUS	2.11	1.91	1.77	-	2.50	2.31	2.11	2.02
X'd DIR. AXIS TRANSIENT	0.18	0.16	0.15	-	0.21	0.19	0.18	0.17
X"d DIR. AXIS SUBTRANSIENT	0.12	0.11	0.10	-	0.14	0.13	0.12	0.11
Xq QUAD. AXIS REACTANCE	1.28	1.15	1.07	-	1.53	1.41	1.29	1.23
X"q QUAD. AXIS SUBTRANSIENT	0.17	0.15	0.14	-	0.20	0.18	0.17	0.16
X_L LEAKAGE REACTANCE	0.08	0.08	0.07	-	0.10	0.09	0.08	0.08
X_2 NEGATIVE SEQUENCE	0.13	0.12	0.11	-	0.16	0.15	0.13	0.13
X_0 ZERO SEQUENCE	0.08	0.08	0.07	-	0.10	0.09	0.08	0.08
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							
T'd TRANSIENT TIME CONST.	0.042 s							
T"d SUB-TRANSTIME CONST.	0.012 s							
T'do O.C. FIELD TIME CONST.	1.1 s							
Ta ARMATURE TIME CONST.	0.012 s							
SHORT CIRCUIT RATIO	1/Xd							

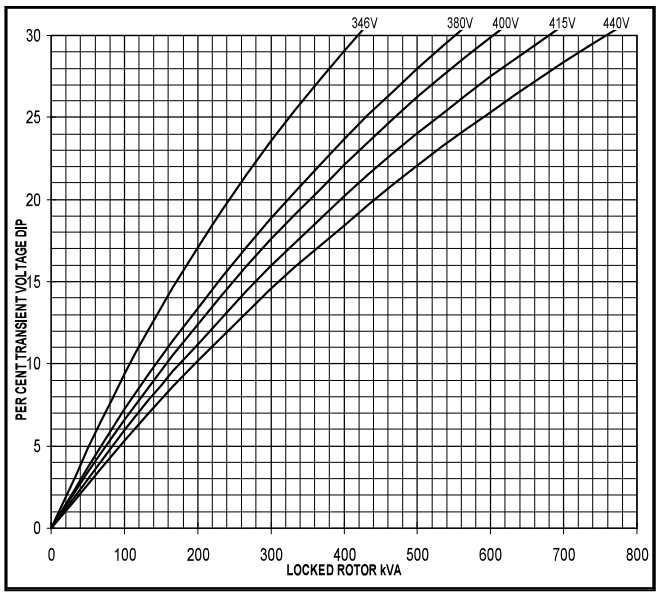
UCI274H

Winding 311

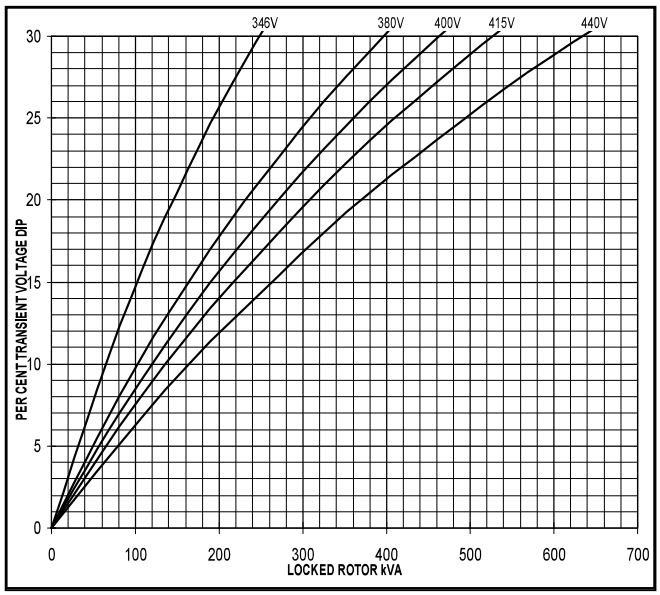
Locked Rotor Motor Starting Curve

50 Hz

MX

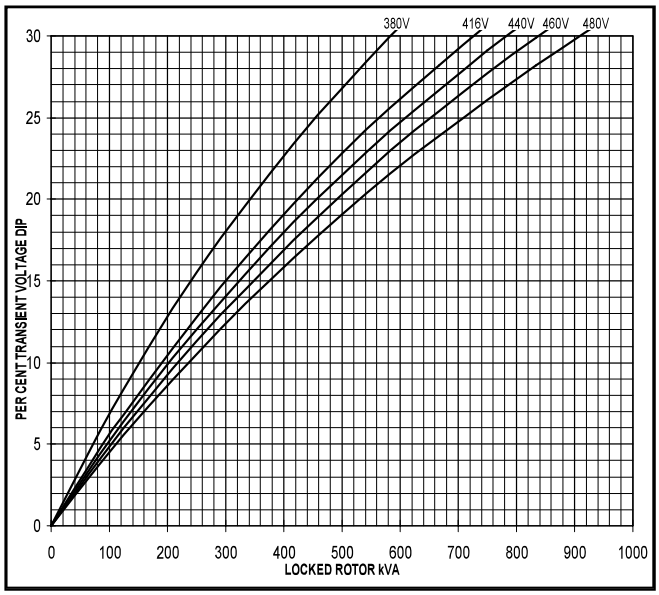


SX

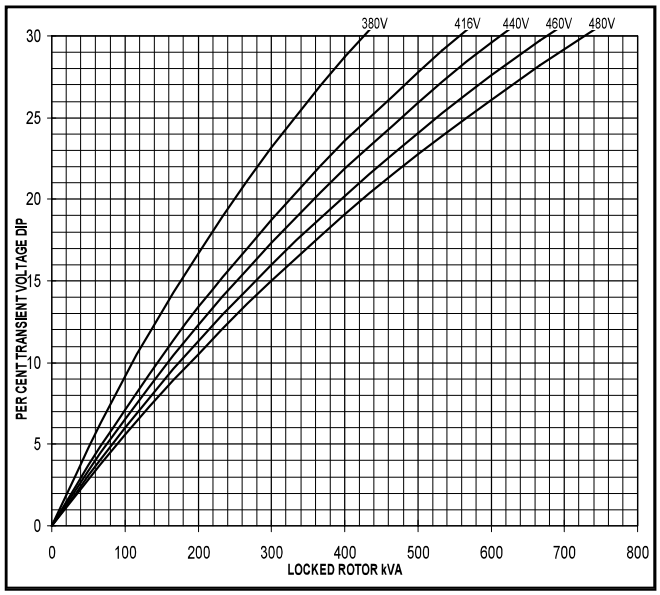


60 Hz

MX

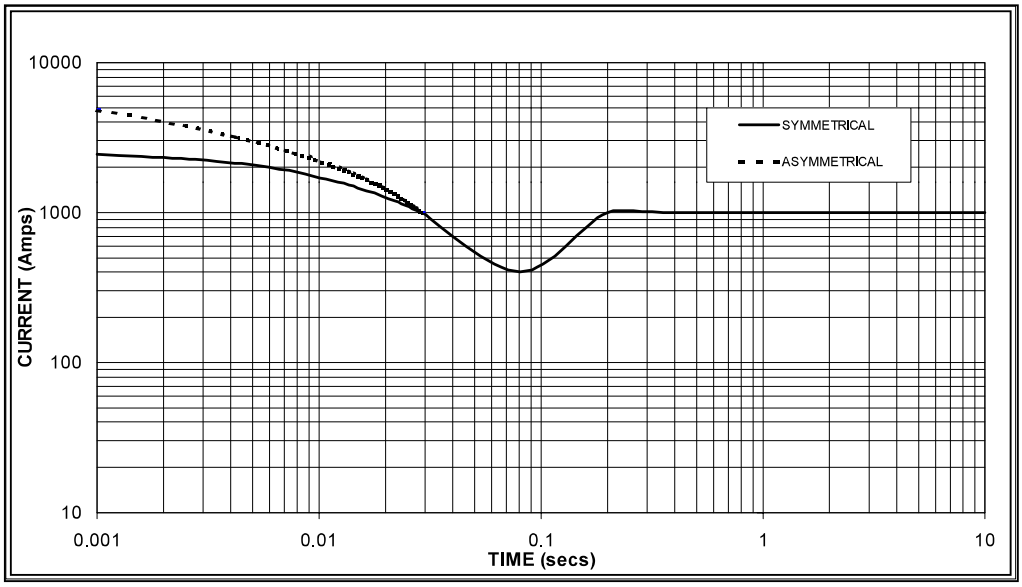


SX



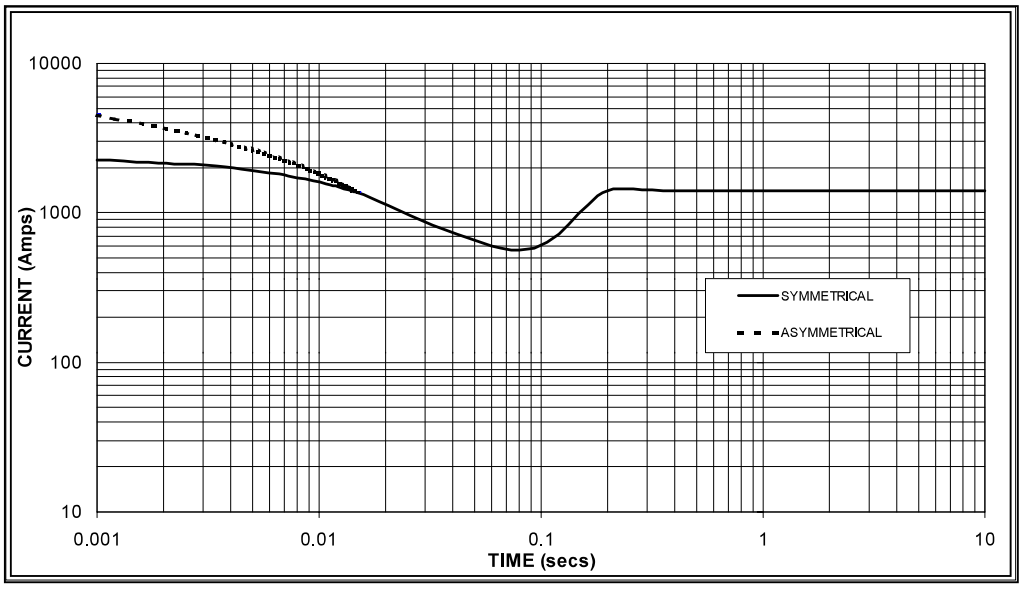
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 1,000 Amps

60 Hz



Sustained Short Circuit = 1,400 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.07	440v	X 1.06
415v	X 1.12	460v	X 1.12
440v	X 1.18	480v	X 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

UCI274H

Winding 311 / 0.8 Power Factor

RATINGS

	Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50 Hz	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	182.0	182.0	182.0	n/a	200.0	200.0	200.0	n/a	212.0	212.0	212.0	n/a	220.0	220.0	220.0	n/a
	kW	145.6	145.6	145.6	n/a	160.0	160.0	160.0	n/a	169.6	169.6	169.6	n/a	176.0	176.0	176.0	n/a
	Efficiency (%)	93.3	93.5	93.6	n/a	93.0	93.3	93.4	n/a	92.8	93.1	93.3	n/a	92.7	93.0	93.2	n/a
	kW Input	156.1	155.7	155.6	n/a	172.0	171.5	171.3	n/a	182.8	182.2	181.8	n/a	189.9	189.2	188.8	n/a
60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	218.8	225.0	225.0	235.0	237.5	245.0	245.0	255.0	250.0	258.8	258.8	275.0	256.3	265.0	265.0	280.0
	kW	175.0	180.0	180.0	188.0	190.0	196.0	196.0	204.0	200.0	207.0	207.0	220.0	205.0	212.0	212.0	224.0
	Efficiency (%)	93.2	93.4	93.6	93.7	93.0	93.2	93.5	93.6	92.8	93.1	93.3	93.4	92.7	93.0	93.3	93.3
	kW Input	187.8	192.7	192.3	200.6	204.3	210.3	209.6	217.9	215.5	222.4	221.9	235.5	221.2	228.0	227.2	240.1

DIMENSIONS

PO Box 17 • Barnack Road • Stamford • Lincolnshire • PE9 2NB
Tel: 00 44 (0)1780 484000 • Fax: 00 44 (0)1780 484100
Website: www.newage-avkseg.com

STAMFORD®

MX341 Automatic Voltage Regulator (AVR)

SPECIFICATION, CONTROLS AND ACCESSORIES

English
Original Instructions

A043Y699 (Issue 2)

1 Description

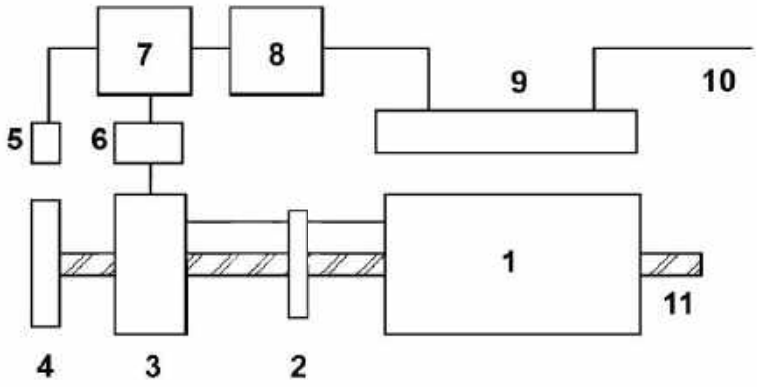
1.1 Separately-Excited AVR Controlled Alternators

1.1.1 Permanent Magnet Generator (PMG) excited - AVR controlled alternators

⚠ WARNING

Strong Magnetic Field
The strong magnetic field from a permanent magnet generator (PMG) can cause serious injury or death by interference with implanted medical devices.
To prevent injury, do not work near a PMG if you have an implanted medical device.

The AVR provides closed loop control by sensing the alternator output voltage at the main stator windings and adjusting the exciter stator field strength. Voltage induced in the exciter rotor, rectified by the rotating diodes, magnetises the rotating main field which induces voltage in the main stator windings. A separately-excited AVR is independently powered from a separate permanent magnet generator (PMG), mounted on the main alternator rotor shaft. Voltage is induced in the stator of the PMG by a rotor of permanent magnets.



No.	Description	No.	Description	No.	Description
1	Main field (rotor)	5	PMG armature (stator)	9	Main armature (stator)
2	Rotating diodes	6	Exciter field (stator)	10	Output
3	Exciter armature (rotor)	7	AVR	11	Rotor shaft
4	PMG field (rotor)	8	Isolating transformer (if fitted)		

2 Specification

2.1 MX341 Technical Specification

- **Sensing Input**
  - Voltage: 190 VAC to 264 VAC 1 phase, 2 wire
  - Frequency: 50 Hz to 60 Hz nominal
- **Power Input**
  - Voltage: 140 VAC to 220 VAC 3 phase, 3 wire
  - Current: 3 A per phase
  - Frequency: 100 Hz to 120 Hz nominal
- **Power Output**
  - Voltage: maximum 120 VDC
  - Current
    - continuous 2.7 A
    - transient 6 A for 10 seconds
  - Resistance: 15 Ω minimum
- **Regulation**
  - +/- 1.0% RMS[1]
- **Thermal Drift**
  - 0.03% per 1 °C change in AVR ambient temperature[2]
- **Typical Response**
  - AVR response in 10 ms
  - Field current to 90% in 80 ms
  - Machine Volts to 97% in 300 ms
- **External Voltage Adjustment**
  - +/-10% with 1 kΩ, 1 W trimmer[3]
- **Under-Frequency Protection**
  - Set point 95% Hz [4]
  - Slope 170% down to 30 Hz
- **Unit Power Dissipation**
  - 12 W maximum
- **Analogue Input**
  - Maximum input: +/- 5 VDC[5]
  - Sensitivity: 1V for 5% Alternator Volts (adjustable)

[1] With 4% engine governing
[2] After 10 minutes
[3] Applies to Mod status D onwards. Alternator de-rate may apply. Check with factory
[4] Factory set, semi-sealed, jumper selectable.
[5] Any device connected to the analogue input must be fully floating (galvanically isolated from ground), with an insulation strength of 500 VAC

-

- Input resistance 1 kΩ
- **Quadrature Droop Input**
  - 10 Ω burden
  - Maximum sensitivity: 0.07 A for 5% droop, zero power factor
  - Maximum input: 0.33 A
- **Over-Voltage Detection**
  - Set point: 75 VDC
  - Time delay: 10 s (fixed)
- **Environmental**
  - Vibration
    - 20 Hz to 100 Hz: 50 mm/sec
    - 100 Hz to 2 kHz: 3.3 g
  - Operating temperature: -40 °C to +70 °C
  - Relative Humidity 0 °C to 70 °C: 95%[6]
  - Storage temperature: -55 °C to +80 °C

[6] Non condensing.

DSEGenset

DSE8620

SYNCHRONISING AUTO MAINS FAILURE CONTROL MODULE

FEATURES

The DSE8620 is an Auto Mains (Utility) Failure Control Module suitable for paralleling single gensets (diesel or gas) with the mains (utility) supply. Designed to synchronise a single genset with a single mains (utility) supply, the DSE8620 will automatically control the change over from mains (utility) to generator supply or run the generator in synchronisation with the mains (utility) to provide no-break, peak lopping and peak shaving power solutions.

The module can indicate operational status and fault conditions on the LCD screen (multiple languages available), by illuminated LED, audible sounder and SMS messaging.

Comprehensive communications are also available via RS232, RS485 & Ethernet for remote PC control and monitoring, and integration into building management systems.
The comprehensive event log will record up to 250 events to facilitate maintenance.

An extensive number of fixed and flexible monitoring and protection features are included. Easy alteration of the sequences, timers and alarms can be made using the DSE PC Configuration Suite Software. Selected configuration is also available via the module's front panel.

With all communication ports capable of being active at the same time, the DSE8xxx Series is ideal for a wide variety of demanding load share applications.

KEY LOAD SHARE FEATURES:

- Peak lopping/sharing
- Manual voltage/frequency adjustment
- R.O.C.O.F. and vector shift protection
- Generator load demand
- Mains (Utility) de-coupling
- Mains (Utility) de-coupling test mode
- Direct governor & AVR control.
- Volts and frequency matching.
- kW & kV Ar load sharing

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY
BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY
BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE
BS EN 60068-2-1
Ab/Ae Cold Test -30 °C
BS EN 60068-2-2
Bb/Be Dry Heat +70 °C

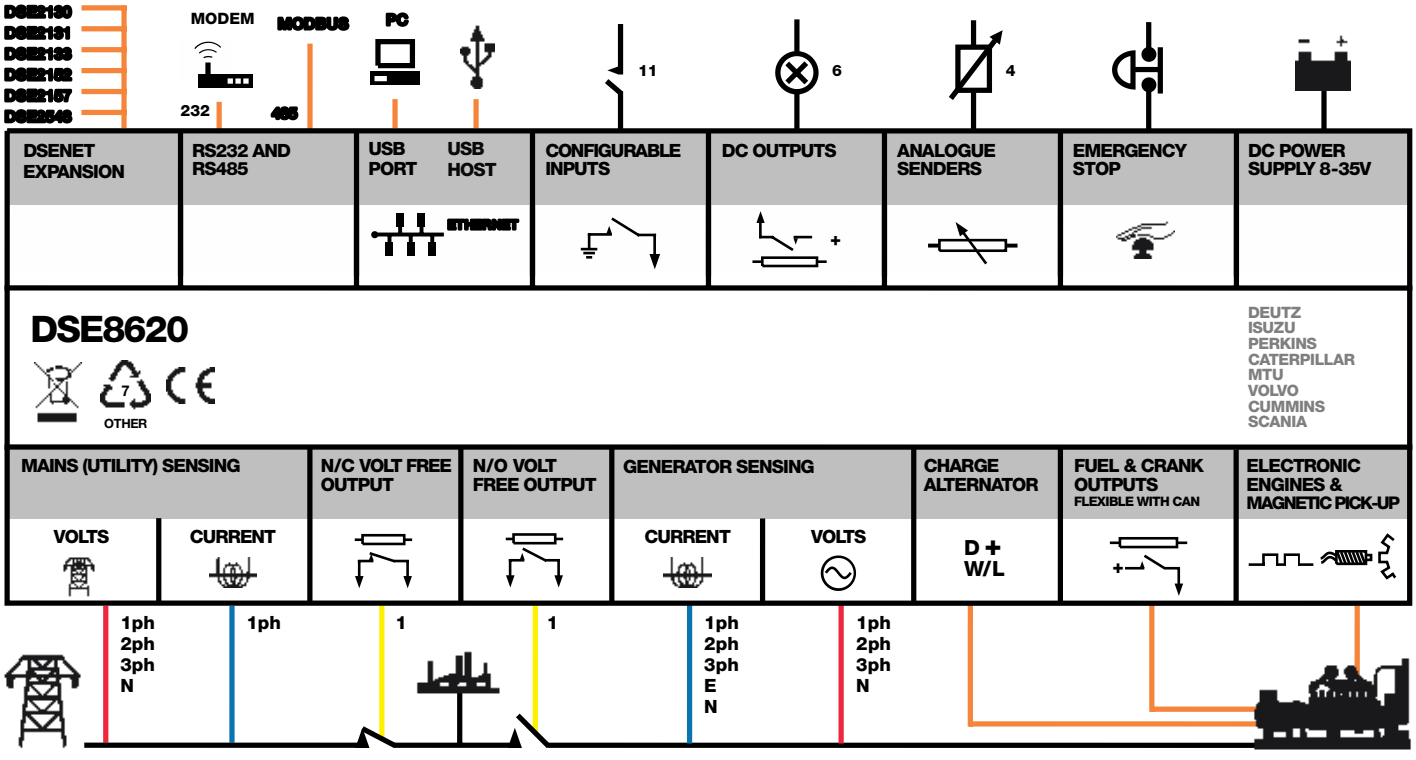
VIBRATION
BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm,
8 Hz to 500 Hz @ 2 gn

HUMIDITY
BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C
@ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C
@ 93% RH 48 Hours

SHOCK
BS EN 60068-2-27
Three shocks in each of three major axes
15 gn in 11 mS

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES
BS EN 60529
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

COMPREHENSIVE FEATURE LIST FOR SINGLE GEN-SET PARALLELING WITH MAINS (UTILITY)



ISSUE 1

DSEGenset

DSE8620

SYNCHRONISING AUTO MAINS FAILURE CONTROL MODULE

FEATURES

KEY FEATURES

- Mains (utility) failure detection
- Comprehensive synchronising & loadsharing capabilities
- Built-in governor and AVR control
- Base load (kW export) functionality
- Positive & negative kVAr export control
- Peak lopping & shaving functionality
- Mains (utility) power (kW, kV Ar, kV A & pf) monitoring
- Mains (utility) de-coupling protection
- Generator power (kW, kV Ar, kV A & pf) monitoring
- Overload (kW & kV Ar) protection
- Reverse power (kW & kV Ar) protection
- Mains (utility) kW export protection
- Unbalanced load protection
- Independent earth fault protection
- Advanced integral PLC editor
- 11 Configurable inputs
- 8 Configurable outputs
- Configurable flexible sensor inputs
- DSENet® expansion compatibility
- User configurable RS232, RS485 and Ethernet communications
- Remote SCADA monitoring via various DSE software applications
- MODBUS RTU & TCP support
- User configurable MODBUS pages
- Advanced SMS control and fault messaging (additional GSM modem required)
- Easy access diagnostic pages including modem diagnostic pages
- Data logging and trending
- CAN, MPU and Frequency speed sensing
- Tier 4 CAN engine support
- “Protections disabled” feature
- Front panel editing with PIN protection
- Fully configurable using DSE Configuration Suite PC software via USB
- 4 Line back-lit LCD text display
- LED and LCD alarm indication
- Configurable display languages
- USB connectivity
- Customisable status screens
- Five key menu navigation
- 3 Configurable maintenance alarms
- Multiple date and time run scheduler
- Manual fuel pump control
- Fuel usage monitor and low fuel level protection
- Charge alternator failure protection
- Load switching (load shedding and dummy load control)
- Configurable event log (250)
- Backed up real time clock

KEY BENEFITS

- Compatible with DSE8003
- 132 x 64 pixel ratio display for clarity
- Real-time clock provides accurate event logging
- Ethernet communication, provides builit in advanced remote monitoring.
- Can be integrated into building management systems (BMS) and programmable logic control (PLC)
- Increased input and output expansion capability via DSENet®
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- Advanced Internal PLC editor allows user configurable functions to meet specific application requirements.

EXPANSION DEVICES

- DSE124 CAN/MSC Extender
- DSE2130 Input Expansion Module
- DSE2131 Ratio-metric Input Expansion Module
- DSE2133 RTD & Thermo-couple Expansion Module
- DSE2152 Ratio-metric Output Expansion Module
- DSE2157 Output Expansion Module
- DSE2548 LED Expansion Module

RELATED MATERIALS

TITLE	PART NO’S
DSE8620 Installation Instructions	053-129
DSE8620 Operator Manual	057-142
DSE8600 PC Configuration Suite Manual	057-119

SPECIFICATION

DC SUPPLY

CONTINUOUS VOLTAGE RATING
8 V to 35 V continuous

CRANKING DROPOUTS
Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and
supply recovers to 5 V. This is achieved without the need for internal batteries

MAXIMUM OPERATING CURRENT
460 mA at 12 V, 245 mA at 24 V

MAXIMUM STANDBY CURRENT
375 mA at 12 V, 200 mA at 24 V

CHARGE FAIL/EXCITATION RANGE
0 V to 35 V

OUTPUTS

OUTPUT A (FUEL)
15 A DC at supply voltage

OUTPUT B (START)
15 A DC at supply voltage

OUTPUTS C & D
8 A AC at 250 V AC (Volt free)

AUXILIARY OUTPUTS E,F,G,H,I & J
2 A DC at supply voltage

GENERATOR & MAINS

VOLTAGE RANGE
15 V to 333 V AC (L-N)

FREQUENCY RANGE
3.5 Hz to 75 Hz

MAGNETIC PICK-UP

VOLTAGE RANGE
+/- 0.5 V to 70 V

FREQUENCY RANGE
10,000 Hz (max)

BUILT-IN GOVERNOR CONTROL

MINIMUM LOAD IMPEDANCE
1000Ω
Fully isolated

GAIN VOLTAGE
0 V to 10 V DC
Fully isolated

OFFSET VOLTAGE
+/- 10 V DC
Fully isolated

BUILT-IN AVR CONTROL

MINIMUM LOAD IMPEDANCE
1000Ω
Fully isolated

GAIN VOLTAGE
0 V to 10 V DC
Fully isolated

OFFSET VOLTAGE
+/- 10 V DC
Fully isolated

DIMENSIONS

OVERALL
240 mm x 181 mm x 42 mm
9.4” x 6.8” x 1.6”

PANEL CUTOUT
220 mm x 160 mm
8.7” x 6.3”

MAXIMUM PANEL THICKNESS
8 mm
0.3”

OPERATING TEMPERATURE RANGE
-30 °C to +70 °C

STORAGE TEMPERATURE RANGE
-40 °C to +85 °C

DEEP SEA ELECTRONICS PLC UK
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EMAIL sales@deepseaplc.com **WEBSITE** www.deepseaplc.com

DEEP SEA ELECTRONICS INC USA
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TELEPHONE +1 (815) 316 8706 **FACSIMILE** +1 (815) 316 8708
EMAIL sales@deepseausa.com **WEBSITE** www.deepseausa.com

ACOUSTIC ENCLOSURE SPECIFICATION

ACOUSTIC PERFORMANCE:

Acoustic pressure **69dba @ 7m** in open field conditions with non contributory background noise.

APPROXIMATE DIMENSIONS:

3410L x 1162W x 2157H mm (+252L mm for the cable termination panel)
Please note we require space around the set for access during maintenance, operation and refuelling – please refer to the generator general arrangement for details.

CONSTRUCTION:

Metal soundproofed canopy with IP45 protection made using 2.5mm phosphate sheet steel, primer and polyurethane powder paint in RAL9016 (traffic white – other RAL colours available for additional cost) and oven dried at 200° C with a thickness of 100 microns

Side water inlet / side water outlet grating 25 x 25 mm

Collar and rain flap to prevent water access into exhaust

Withholds 700 hours in saline mist chamber according to saline mist test

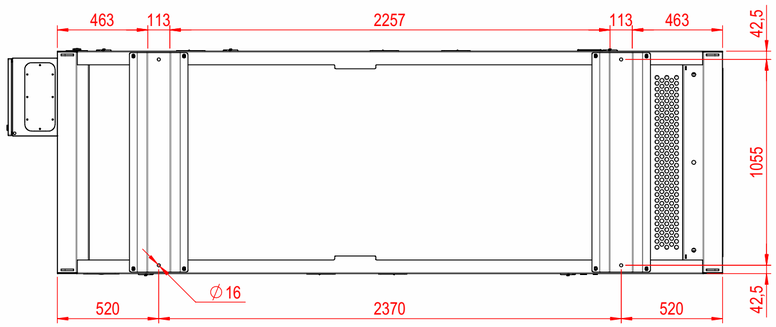
Glass fibre sound insulation, 50mm in thickness and 80mm in density, protected by waterproof coating and fixed to the metal edges on all top, sides and doors.

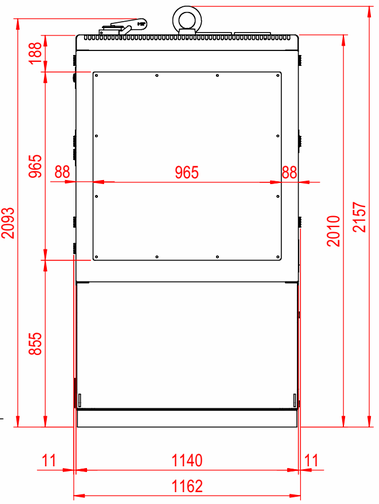
Stainless steel internal exhaust pipe, 30 dB attenuation and condensation tank which can be emptied into the base frame.

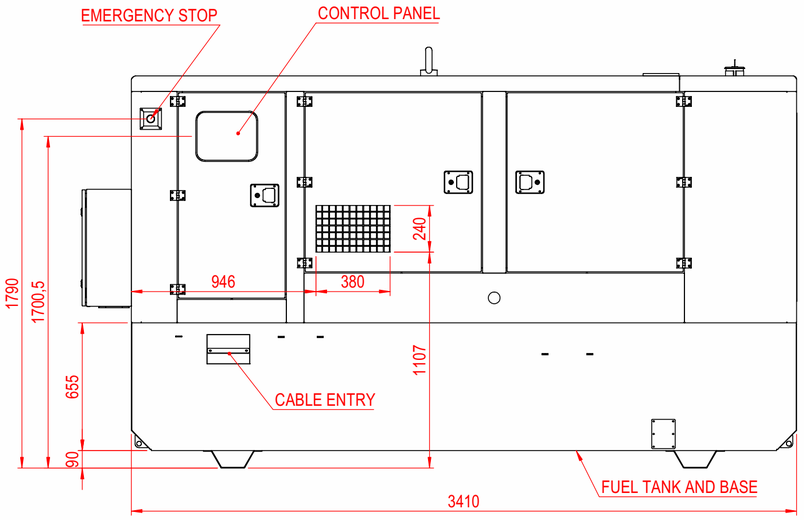
Emergency stop button accessible from the outside.

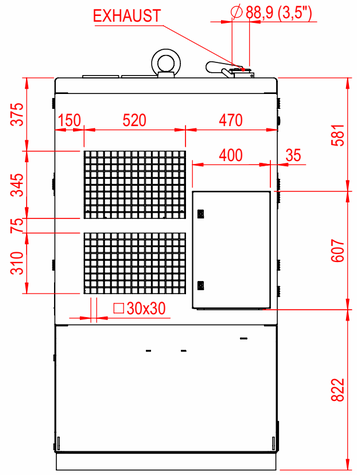
Electric control panel with see-through window protecting measuring and control devices.

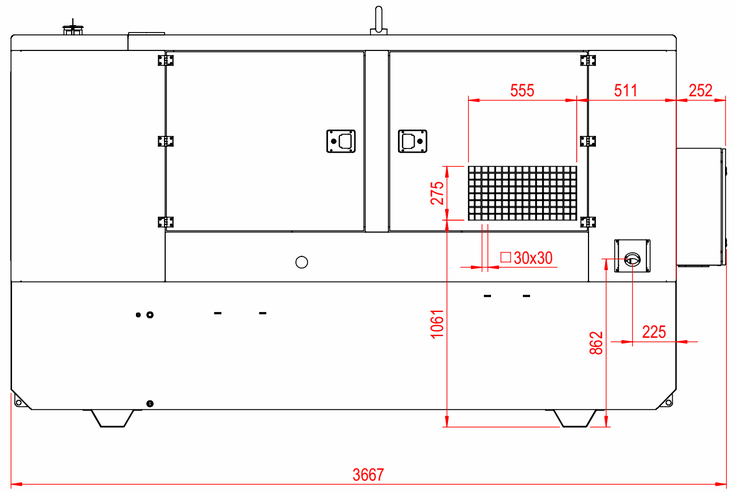
MODIFICACIÓN:
Modification:

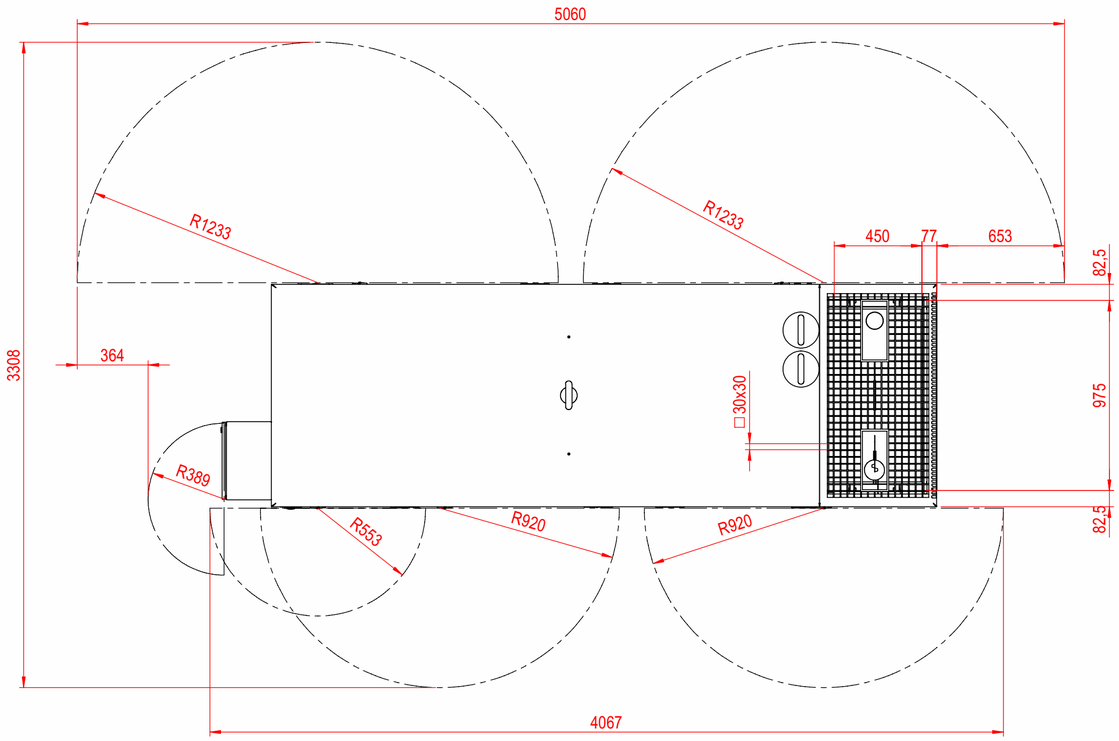


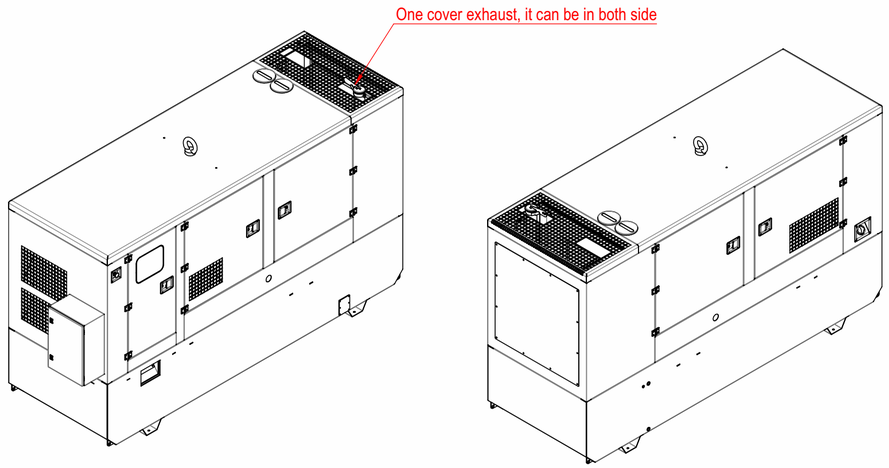












Measures in mm

Dagartech reserves the right to change

DIBUJADO POR: Drawn by:	DMOROS	FECHA: Date:	06/04/2018
APROBADO POR: Approved by:	DMOROS	FECHA: Date:	09/04/2018
MODIFICADO POR: Modified by:		FECHA: Date:	

Dagartech

NORMAS ISO 2768-c

A2

DESCRIPCIÓN: Description:

GENSET DK24 (PE) UK

PLANO: Drawing:

DGPS 165-200-220

ESPESOR: Thickness:	MATERIAL: Material:	VERSIÓN: Version: 01	ESCALA: Scale:
TRATAMIENTO/COLOR: Treatment/Color:		PESO: Weight:	HOJA: Sheet: 1/1

VENTILATION SYSTEM SPECIFICATION

To include supply, delivery and installation of the equipment outlined below:

DISCHARGE DUCT

Comprising 1 x straight duct, nominal 1m length, connecting against the discharge louvre.

DISCHARGE LOUVRE

On air discharge system

Our understanding is that the generator is sharing the plantroom with other services which require air supply, and that this is provided via louvred doors supplied and installed by others.

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Reg No: 2643516 Registered: 9 Donnington Park, 85 Birdham Road, Chichester, West Sussex, PO20 7AJ, UK Vat No: 582 8674 90

FLUE:

SUMMARY

1 No 150 mm I/D, 225mm O/D Generator Exhaust System to run from the exit of the exhaust canopy for 2m vertically and 2m horizontally terminating with an open terminal.

Horizontal sections will be supported to the underside of the ceiling slab or steelwork with Unistrut and studding using standard brackets. We have allowed for an aluminium scaffold tower to install these sections.

PRODUCT INCLUSIONS

Flanged adaptors, lengths, elbows, tees, terminal, standard brackets, flashing (roof upstands by others) and storm collars.

PRODUCT EXCLUSIONS

Leakage test to DW143 Class C 1500pa (unless requested).
Spring hangers.
Steelwork other than Unistrut type channel.

STANDARD INCLUSIONS

Installation in one continuous operation.
Normal low level access equipment below 3 metres in height.
Standard Unistrut type channel.

STANDARD EXCLUSIONS

Scaffold Equipment and / or high level access equipment above 3 metres.
All builders work and making good.
Pipework from exhaust to drain.
Lightning Protection.
Holes through roof and weathering.

PLEASE NOTE:

The discharge height of all exhaust systems must be approved by the relevant Local Authority planning office as required under the Clean Air Act. Power Tecnique is not responsible for obtaining this approval.

DSEGenset

DSE2548
DSENET® OUTPUT EXPANSION MODULE

The DSE2548 is an LED expansion module that can be used with all DSENet® compatible control modules. The module has been designed to display a maximum of eight individual LED indications up to a maximum distance of 1 KM (0.6miles).

The DSE2548 is presented in a vertical enclosure. It includes an alarm sounder that is triggered when the host controller detects an alarm condition. The alarm can be muted directly from the DSE2548 using the front push button.

The DSE2548 includes individual LEDs for each channel and a 'Power On' LED that flashes when the link with the host controller is lost.

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY
BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY
BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE
BS EN 60068-2-1
Ab/Ae Cold Test -30 °C
BS EN 60068-2-2
Bb/Be Dry Heat +70 °C

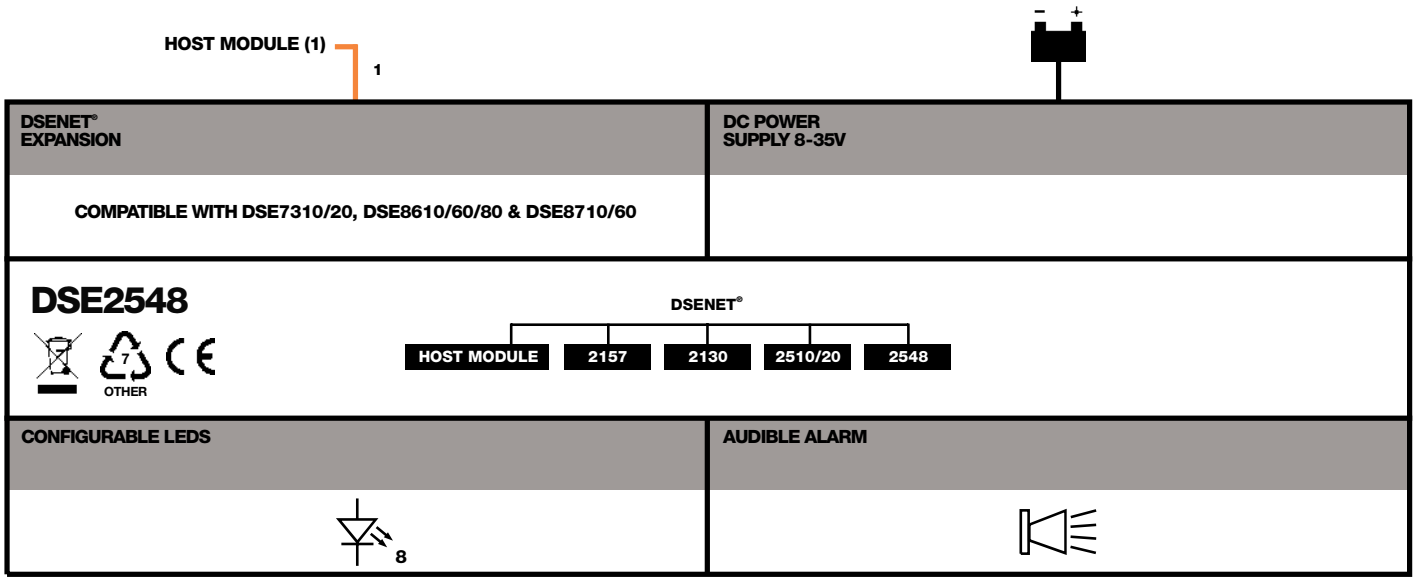
VIBRATION
BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm,
8 Hz to 500 Hz @ 2 gn

HUMIDITY
BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C
@ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C
@ 93% RH 48 Hours

SHOCK
BS EN 60068-2-27
Three shocks in each of three major axes
15 gn in 11 mS

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES
BS EN 60529
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS



ISSUE 3

DSEGenset

DSE2548
DSENET® OUTPUT EXPANSION MODULE

KEY FEATURES
- Eight configurable LEDs
- Works up to 1 KM (0.6 miles) from the host controller
- 10 modules can be linked together to one host controller

ID SWITCH
The rotary ID switch is used to select the address of the DSE2548 expansion module, as the host control module is capable of giving instructions to a number of DSE2548 expansion modules at the same time.

SPECIFICATION

DC SUPPLY

CONTINUOUS VOLTAGE RATING
8 V to 35 V Continuous

CRANKING DROPOUTS
Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT
112 mA at 12 V, 53 mA at 24 V

MAXIMUM STANDBY CURRENT
74 mA at 12 V, 35 mA at 24 V

DIMENSIONS

OVERALL
180 mm x 116 mm x 42.7 mm
7.07” x 4.57” x 1.68”

PANEL CUT-OUT
154 mm x 98 mm
6.06” x 3.86”

MAXIMUM PANEL THICKNESS
8 mm
0.3”

RELATED MATERIALS

TITLE	PART NO’S
DSE2548 Installation Instructions	053-032
DSE2548 Operator Manual	057-084

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EMAIL sales@deepseausa.com **WEBSITE** www.deepseausa.com

Registered in England & Wales No.01319649
VAT No.316923457

055-062/10/10 (3)

Generator Warranty Statement

Our Commitment to Quality

Customer care and satisfaction is paramount to Powertecnique. Our standard warranty periods and terms are amongst the best in the industry. However standard warranty has some limitations if your power back-up is critical and response times essential. A specific Maintenance Contract will provide you with total peace of mind and documented response times.

Generator Standard Warranty

Warranty terms for all standby operation generators are one calendar year from the commissioning date or up to 500 hours run time, whichever is sooner. All Volvo and MTU engines are covered by 2 years or 1000 hours of operation, whichever is sooner.

Powertecnique undertakes to remedy any operating fault resulting from a defect in design, materials or workmanship (including assembly if this operation is entrusted to them) within the limit of the provisions below.

In order to be covered by the warranty, the end user must ensure that the equipment is operated and maintained according to the manufacturer's guidelines. The equipment must be properly maintained by Powertecnique or a Powertecnique approved/ accredited service partner. The user must keep up-to-date a maintenance book in which he enters the date, content and results of tests, visual inspections, routine maintenance work and maintenance work together with any comments and findings concerning any operating anomalies.

Faults must be reported in writing to Powertecnique in a timely manner and repairs can only be carried out by Powertecnique or a company approved by Powertecnique.

The decision to accept or deny a warranty belongs to Powertecnique. In the event of a breakdown of the engine or alternator the warranty will be granted by the supplier of the said component according to the warranty terms of this component. Powertecnique reserves the right to recover the failed element. In this event all expenses derived from this recovery will be payable by the customer.

The warranty of a repair made during the warranty period will end at the time that the warranty for the generator unit expires.

Generator Warranty Validation

In order for the equipment warranty to be valid the equipment must have been commissioned by a Powertecnique approved Commissioning Engineer (for relevant equipment only) and the equipment must be registered with Powertecnique within 30 days of delivery/commissioning. Failure to register your equipment in this timeframe may invalidate your warranty.

Conditions of Warranty

The warranty covers only the initial user and cannot be transferred to a third party without the prior agreement of Powertecnique.

The warranty does not cover breakdowns due to the coupling of the electric generator unit to other devices not installed or supplied by Powertecnique. Breakdowns and damage caused by prolonged or incorrect storage are also excluded. Please refer to the Users Manual with respect to this clause.

Any warranty is also excluded for incidents due to unforeseeable circumstances or cases of force majeure as well as for any replacements or repairs which may result from normal wear and tear of the material, from damage or from accidents arising out of negligence, lack of supervision or of maintenance and from defective use of this material.

The warranty of the generator set will only cover the necessary replacement parts and labour for repairing the unit by personnel authorised by Powertecnique. All travel, mileage and other expenses derived from a repair to the unit under warranty are excluded from warranty coverage, therefore in no event will Powertecnique pay for the same and such items must be reimbursed to Powertecnique.

Should no fault be found or damage to the generator be from misuse or operator error then all repair and recovery costs will be charged to the user.

Powertecnique reserves the right to exchange your generator for a suitable replacement should your equipment be deemed to be beyond economical repair.

Service & Maintenance Contracts

Powertecnique's annual Service and Maintenance contracts are tailored to suit your specific requirements. Offering you a guaranteed response time from fully qualified engineers, 24 hours a day, seven days a week, every day of the year.

PowerVue

PowerVue is a complete UPS and generator remote monitoring system. This service is an add on feature that can be included with any service plan offered by Powertecnique. Please contact your customer service representative for more information and a product demonstration.

Please contact your Service Sales Representative for detailed pricing of the above.

Powertecnique's liability is strictly limited to the obligations defined above and it is an express agreement that Powertecnique shall not be liable for any compensation for any direct or indirect damage, even in the event of a claim whose initial cause is damage covered under the terms of this warranty.