

GOLDEN MAJD Co.



Rating @ 0.8 PF		Prime rating	Stand-by rating
Voltage ^{*1}	Freq. ^{*2}	PT 200 ^{*3}	PT 220S ^{*4}
400 V	50 Hz	200.0 KVA	223.0 KVA
480 V	60 Hz	232.9 KVA	254.1 KVA

The above ratings represent the generating set capability guaranteed within $\pm 3\%$ at the reference conditions equivalent to those specified in ISO 8528/1, ISO 3046/1 and BS 5514/1

NOTES

- 1 - The applicable voltage range is 380V to 415V for 50Hz applications and 380V to 480V for 60Hz applications.
- 2 - This generating set is of switchable speed of 1500rpm/1800rpm.
- 3 - PT200 is the prime power rating of the generating set, where a variable load and unlimited hours usage are applied on the generating set with an average load factor of 80% of the prime rating over each 24 hour period. Noting that a 10% overload is available for 1 hour in every 12 hours operation.
- 4 - PT220S is the standby power rating of the generating set, where a variable load limited to an annual usage up to 500 hours is applied, with 300 hours of which may be continuous running. Noting that no overload is permitted.

Engine Technical Data

Model	Perkins 1306A-E87TAG3	
Cylinders	6; vertical in-line	
Aspiration	Turbocharged, & A / A charge cooled	
Combustion	Direct injection	
Cooling System	Water cooled	
Displacement	8.7 L	
Oil consumption	0.1 % of fuel consumption	
Lube oil capacity	28.3 L	
Coolant capacity	24.2 L	
Governor	Electronic	
Emissions regulations	EU stage 2 & EPA tier 2	
Speed	1500 rpm	1800 rpm
Fuel Consumption PT200	45.2 L/H	51.5 L/H
Fuel Consumption PT220S	49.1 L/H	56.9 L/H
Radiator Cooling Air Flow	439 m ³ /min	495 m ³ /min
Max Exhaust Gas Flow	36.5 m ³ /min	48.1 m ³ /min

The above performance data are valid as per the following specs:

- Diesel Fuel is according to BS2869 Class A2 or equivalent.
- Lubricating oil is according to API CI 4 (15W/40).
- The coolant should be 50% antifreeze and 50% fresh water.

Alternator Technical Data

Model	Leroy Somer LSA 46.2 M5	
Regulation	$\pm 0.5\%$	
International protection	IP23	
Insulation class	H	
Terminals	12	
Frequency	50 Hz	60 Hz
Coolant Air Flow	0.43 m ³ /s	0.51 m ³ /s

Shipping Data

Length	Width	Height	Weight
2850 mm	990 mm	1750 mm	2100 kg

Information given in this leaflet is correct at the time of printing but it may be changed subsequently by the company



200 - 220S

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1300 Series 1306A-E87TAG3 Diesel Engine – Electropak

173-210 kWm Gross Power 1500 rev/min
202-240 kWm Gross Power 1800 rev/min

The Perkins 1300 Series family of Electropak engines has become renowned throughout the power generation industry for the engines' superior performance and reliability.

The 1306A-E87TAG3 engine is a turbocharged and air-to-air charge cooled unit, featuring hydraulically-actuated electronically controlled unit injectors (HEUI) with 'full authority' electronic engine management providing reliable, quiet, economic operation supported by the quick starting, fast response and close control demanded by the electrical power generation market.



High performance productive power

- Hydraulically actuated Electronically controlled Unit Injectors – high-pressure fuel injection gives consistent, reliable high performance.
- Constant electronic engine management and monitoring enable precise fuel metering and injection timing to ensure reliable low temperature starting, superb economy with performance and very close governing.

Quiet, clean power

- A rigid structure minimises noise transmission and helically cut gears provide quiet power transfer to auxiliaries.
- Forced induction and electronic fuel injection control combine to reduce combustion noise while electronically optimised fuel/air mixing ensures complete combustion resulting in virtually smoke free operation with emissions capability matching current and future emissions legislation.

Durable power

- A fully balanced induction-hardened steel crankshaft gives smooth performance with minimised bearing loads.

- Oil cooled pistons with keystone top and second rings give longer life while positive rotational valves and roller cam followers reduce wear on valve seats, tappets and cam lobes.

Reliable power

- Cylinder head coolant is directed to valve bridges and injectors and lubricating oil is cooled in a high efficiency oil cooler, both features enhancing engine reliability.
- Electronic safety shutdown option protects the engine while event and fault warning codes protect operations.

Easy maintenance

- Electronic diagnostics help to keep the engine at its productive best while enabling the operator to plan maintenance. Oil and filter changes at 450 hours reduce down time.
- All engines are supported by the Perkins worldwide network of distributors and dealers.

Engine Speed (rev/min)	Type of Operation	Typical Generator Output (Net)		Engine Power			
				Gross		Net	
		kVA	kWe	kWm	bhp	kWm	bhp
1500	Prime Power	200	160	191	256	180	241
	Standby (maximum)	225	180	210	281	199	267
1800	Prime Power	231	185	221	296	201	269
	Standby (maximum)	253	200	240	322	220	296

1500/1800 rev/min switchable ratings are offered for stand-alone non-load sharing gen set applications.

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/1, ISO 3046/1:1988, BS5514/1, DIN 6271. Derating may be required for conditions outside these; consult Perkins Engines Company Limited.

Generator powers are typical and are based on an alternator efficiency of 92% and a power factor of 0.8. Performance tolerance is $\pm 5\%$. Fuel specification: BS 2869: Part 2 1998 Class A2 or ASTM D975 D2. Lubricating oil: 15W40 to ACEA E3 or API CG4.

Rating Definitions

Prime Power: Variable load. Unlimited hours usage with an average load factor of 70% of the published prime power rating. A 10% overload is available for 1 hour in every 12 hour of operation.

Standby (maximum): Variable load. Limited to 500 hours annual usage up to 300 hours of which may be continuous running. No overload is permitted.

Photographs are for illustrative purposes only and may not reflect final specification.

All information in this document is substantially correct at time of printing and may be altered subsequently.

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Perkins®

THE HEART OF EVERY GREAT MACHINE

1300 Series 1306A-E87TAG3 Diesel Engine – Electropak

173-210 kWm 1500 rev/min
202-240 kWm 1800 rev/min

Standard Electropak specification

Air inlet

- Mounted air filter and turbocharger

Fuel system

- Hydraulically actuated electronically controlled unit fuel injectors with full authority electronic control
- Electronic governing to ISO 3046-4 with stand-alone isochronous or load-sharing capabilities
- Spin-on fuel filter with pre-filter and hand primer pump

Lubrication system

- Wet rear well steel sump with filler and dipstick
- Full flow spin-on filters
- Tube-type oil cooler thermostatically controlled

Cooling system

- Thermostatically controlled with belt driven circulating pump and 28 inch belt-driven fan
- Radiator mounted with all guards and pipes
- Air/air charge cooler incorporated in radiator
- Coolant filter/conditioner

Electrical equipment

- 24V starter motor and 24V 45 amp alternator with DC output
- Electronic Control Module mounted on engine with wiring looms and sensors
- 3 level engine protection system

Flywheel and housing

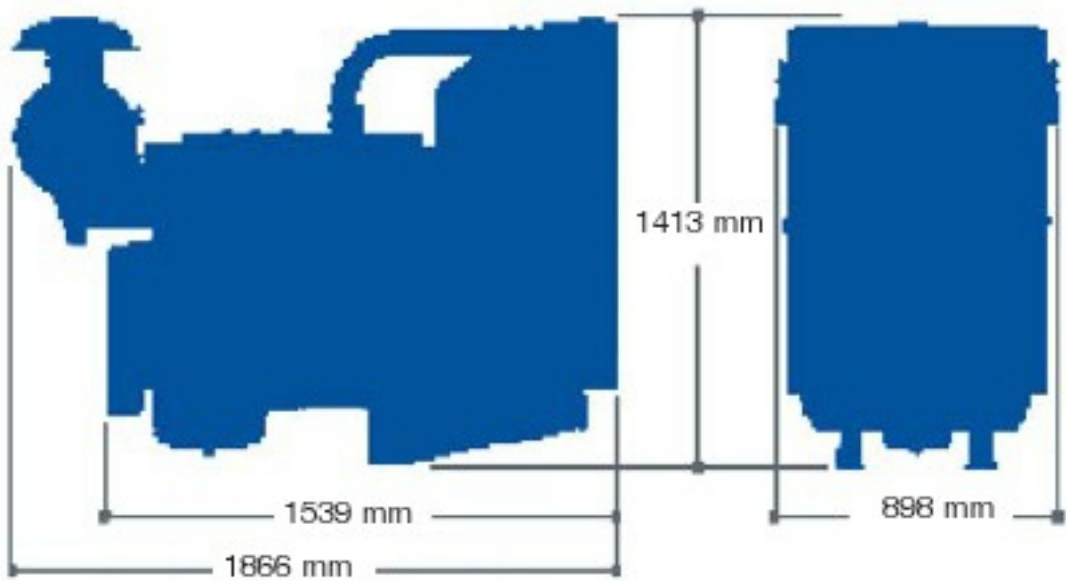
- High inertia flywheel to SAE 3 J620 Size 11½
- Cast iron SAE 2 flywheel housing

Mountings

- Front engine mounting bracket

Optional equipment

- 12V starter and alternator
- 12V ECM
- Sensor positions for:
 - oil pressure
 - oil temperature
 - coolant temperature
- SAE 1 flywheel housing and flywheel
- Turbocharger exhaust outlet
- Parts manual
- Workshop manual



Fuel Consumption				
Engine Speed	1500 rev/min		1800 rev/min	
	g/kWh	l/hr	g/kWh	l/hr
Standby	206	43	211	50
Prime Power	208	46	218	54
75% of Prime Power	216	37	234	44
50% of Prime Power	231	27	248	32

General data

Number of cylinders	6
Cylinder arrangement	Vertical in-line
Cycle	4 stroke
Induction system	Turbocharged, air-to-air chargecooled
Combustion system.....	Direct injection
Cooling system.....	Water-cooled
Bore and stroke.....	116.6 mm x 135.9 mm (4.6 in x 5.4 in)
Displacement	8.7 litres (531 cubic in)
Compression ratio	16.9:1
Direction of rotation	Anti-clockwise, viewed on flywheel
Total lubrication system capacity.....	26.5 litres (7 US gal)
Coolant capacity.....	24.2 litres (6.4 US gal)
Dimensions – Length	1866 mm (73.5 in)
Width.....	898 mm (35.4 in)
Height	1413 mm (55.6 in)
Dry weight (engine).....	889 kg (1960 lbs)

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 **Perkins®**
THE HEART OF EVERY GREAT MACHINE



Low Voltage alternators - 4 pole
LSA 46.2

180 to 315 kVA - 50 Hz / 228 to 381 kVA - 60 Hz

Electrical and mechanical data

Low Voltage alternators 4 pole 3-phase **PARTNER**

LSA 46.2

180 to 315 kVA - 50 Hz / 228 to 381 kVA - 60 Hz

SPECIALLY ADAPTED TO APPLICATIONS

The LSA 46.2 alternator is designed to be suitable for typical generator applications, such as: backup, marine applications, rental, telecommunications, etc.

COMPLIANT WITH INTERNATIONAL STANDARDS

The LSA 46.2 alternator conforms to the main international standards and regulations:

- IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA / UL 1446 (UL 1004 on request), marine regulations, etc.

It can be integrated into a CE marked generator.

The LSA 46.2 is designed, manufactured and marketed in an ISO 9001 environment and ISO 14001.

TOP OF THE RANGE ELECTRICAL PERFORMANCE

- Class H insulation.
- Standard 12-wire re-connectable winding, 2/3 pitch, type no. 6.
- Voltage range 50 Hz: 220 V - 240 V and 380 V - 415 V (440 V).
- Voltage range 60 Hz: 208 V - 240 V and 380 V - 480 V.
- High efficiency and motor starting capacity.
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440 V (no. 7), 500 V (no. 9), 550 V (no. 22), 600 V (no. 23), 690 V (no. 10 or 52).
 - 60 Hz: 380 V and 416 V (no. 8), 600 V (no. 9).
- R 791 interference suppression conforming to standard EN 55011 group 1 class B standard for European zone (CE marking).

EXCITATION AND REGULATION SYSTEM SUITED TO THE APPLICATION

Excitation system				Regulation options				
Volage regulator	SHUNT	AREP	PMG	Current transformer for paralleling	Mains paralleling	3-phase sensing	3-phase sensing for mains paralleling unbalanced	Remote voltage potentiometer
R250	Std	-	-	-	-	-	-	√
R450	Option	Std	Std	C.T.	R726	R731	R734	√
D510C	Option	Option	Option	C.T.	included	included	contact factory	√

Voltage regulator accuracy $\pm 0.5\%$

√ : possible mounting

PROTECTION SYSTEM SUITED TO THE ENVIRONMENT

- The LSA 46.2 is IP 23.
 - Standard winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments.
- Options :
- Filters on air inlet : derating 5%.
 - Filters on air inlet and air outlet (IP 44) : derating 10%.
 - Winding protections for harsh environments and relative humidity greater than 95%.
 - Space heaters.
 - Thermal protection for winding and shields.

REINFORCED MECHANICAL STRUCTURE USING FINITE ELEMENT MODELLING

- Compact and rigid assembly to better withstand generator vibrations.
- Steel frame.
- Cast iron flanges and shields.
- Twin-bearing and single-bearing versions designed to be suitable for engines on the market.
- Half-key balancing.
- Sealed for life ball bearings, regreasable bearings (optional).

ACCESSIBLE TERMINAL BOX PROPORTIONED FOR OPTIONAL EQUIPMENT

- Easy access to the voltage regulator and to the connections.
- Possible inclusion of accessories for paralleling, protection and measurement.
- 12-way terminal block for voltage reconnection.

Low Voltage alternators 4 pole 3-phase **PARTNER**

LSA 46.2

180 to 315 kVA - 50 Hz / 228 to 381 kVA - 60 Hz

General characteristics

Insulation class	H	Excitation system	SHUNT	AREP or PMG
Winding pitch	2/3 (N° 6)	AVR type	R 250	R 450
Number of wires	12	Voltage regulation (*)	± 0.5 %	± 0.5 %
Protection	IP 23	Short-circuit current	-	300% (3 IN) : 10s
Altitude	≤ 1000 m	Totale Harmonic distortion THD (**)	no load < 2.5% - on load < 2.5%	
Overspeed	2250 min ⁻¹	Waveform: NEMA = TIF (**)	< 50	
Air flow	0.43 m³/s (50Hz) / 0.51 (60Hz)			

(*) Steady state. (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																					
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C				
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K				
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.	
Y		380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ
Δ		220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V
YY					220V					220V					220V					220V	
46.2 M3	kVA	180	180	180	160	104	168	168	168	146	97	195	195	195	175	110	203	203	203	180	114
	kW	144	144	144	128	83	134	134	134	116	78	156	156	156	140	88	162	162	162	144	91
46.2 M5	kVA	200	200	200	175	116	184	184	184	160	108	214	214	214	190	123	223	223	223	200	127
	kW	160	160	160	140	93	147	147	147	128	86	171	171	171	152	98	178	178	178	160	102
46.2 L6	kVA	250	250	240	205	141	217	217	217	190	131	254	260	254	225	150	266	275	266	237	156
	kW	200	200	192	164	113	174	174	174	152	105	203	208	203	180	120	213	220	213	190	125
46.2 L9	kVA	280	280	280	215	154	250	250	250	195	142	290	290	290	240	165	300	300	300	250	170
	kW	224	224	224	172	123	200	200	200	156	114	232	232	232	192	132	240	240	240	200	136
46.2 VL12	kVA	315	315	300	260	187	276	276	260	230	170	327	327	310	285	200	341	341	325	300	208
	kW	252	252	240	208	150	221	221	208	184	136	262	262	248	228	160	273	273	260	240	166

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																					
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C				
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K				
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.	
Y		380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ
Δ		220V	240V		240V		220V	240V		240V		220V	240V		240V		220V	240V		240V	
YY			208V	220V	240V			208V	220V	240V			208V	220V	240V			208V	220V	240V	
46.2 M3	kVA	192	205	220	228	128	177	189	198	210	119	203	219	228	244	136	211	225	237	255	141
	kW	154	164	176	182	102	142	151	158	168	95	162	175	182	195	109	169	180	190	204	113
46.2 M5	kVA	205	219	230	250	136	190	203	211	225	126	219	235	245	262	145	227	242	252	273	151
	kW	164	175	184	200	109	152	162	169	180	101	175	188	196	210	116	182	194	202	218	121
46.2 L6	kVA	257	276	289	300	173	239	255	265	278	160	276	295	308	324	184	285	304	317	337	192
	kW	206	221	231	240	138	191	204	212	222	128	221	236	246	259	147	228	243	254	270	154
46.2 L9	kVA	296	316	328	344	197	273	291	302	302	182	313	338	351	357	209	326	348	366	375	220
	kW	237	253	262	275	158	218	233	242	242	146	250	270	281	286	167	261	278	293	300	176
46.2 VL12	kVA	333	357	372	381	220	309	329	341	347	200	359	383	397	412	235	370	399	415	429	243
	kW	266	286	298	305	176	247	263	273	278	160	287	306	318	330	188	296	319	332	343	194

PLENUM

This type of enclosures has gained a well known reputation through its relatively medium size and good capabilities for noise reduction. It has a very unique inlet and outlet system and the front and rear attenuators makes it easily accessible for maintenance purposes.

Charasteristics:

- > Body and components made of steel painted with highly corrosive synthetic gloss.
- > Stainless steel locks and hinges.
- > Easy access for the radiator and the control panel throgh the outlet and inlet attenuators.
- > Lube oil pipe can be reached externally to allow easy drainage.
- > Fuel fill and battery are secured throgh lockable doors.
- > Control panel viewing window in the inlet attenuator.
- > Lifting points on the top of the enclosure.
- > Exhaust silencing system in the interior of the enclosure.
- > Large doors for easy maintenance access. (two or four depending on the size).
- > Emergency stop push button mounted on the exterior of the enclosure (optional).



GHADDAR
MACHINERY Co. S.A.L.



Range

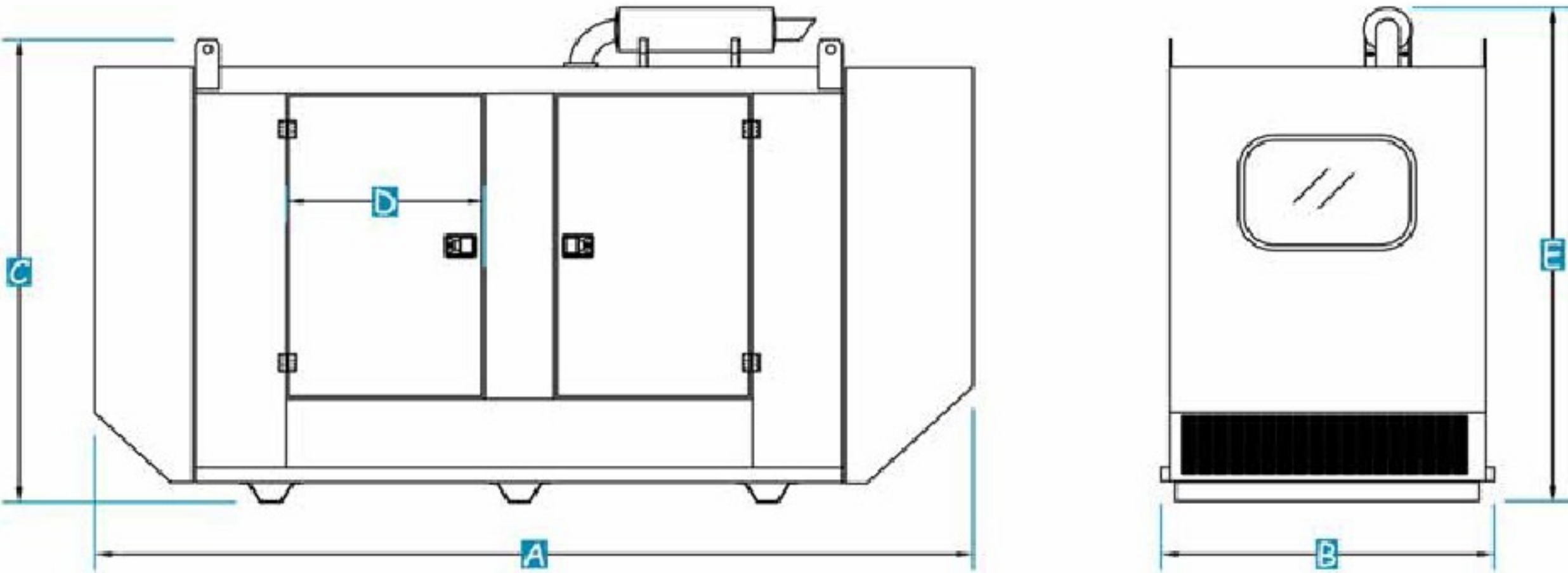
9 - 250 KVA



Certificate Numbers, CC1680-009512, 009912

Sound Pressure Levels (dBA)

		50 Hz						60 Hz					
		1 m		3 m		7 m		1 m		3 m		7 m	
Generating Set	Powertech	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
Engine model	KVA	Load	Load	Load	Load	Load	Load	Load	Load	Load	Load	Load	Load
403C-11G	9	69.7	71	66.7	68	61.7	63	71.4	72.7	68.4	69.7	63.4	64.7
403C-15G	13	69.7	71	66.7	68	61.7	63	71.4	72.7	68.4	69.7	63.4	64.7
404C-22G	20	69.7	71	66.7	68	61.7	63	71.4	72.7	68.4	69.7	63.4	64.7
1103A-33G	30	71.9	73.4	68.4	69.9	63.4	64.9	73.8	75.3	70.3	71.8	65.3	66.8
1103A-33TG1	45	70.5	72	67	68.5	62	63.5	72.4	73.9	68.9	70.4	63.9	65.4
1103A-33TG2	60	70.5	72	67	68.5	62	63.5	72.4	73.9	68.9	70.4	63.9	65.4
1104A-44TG1	65	70.5	72	67	68.5	62	63.5	72.4	73.9	68.9	70.4	63.9	65.4
1104A-44TG2	80	71.7	73.2	68.2	69.7	63.2	64.4	73.5	75	70	71.5	65	66.2
1006TG1A	95	73.5	75	70	71.5	65	66.2	76	77.5	72.5	74	67.5	68.7
1104C-44TAG2	100	73.5	75	70	71.5	65	66.2	76	77.5	72.5	74	67.5	68.7
1006TG2	105	73.5	75	70	71.5	65	66.2	76	77.5	72.5	74	67.5	68.7
1006TAG1	135	74.7	76.2	71.2	72.7	66.2	67.4	77.2	78.7	73.7	75.2	68.7	69.9
1006TAG2	150	74.7	76.2	71.2	72.7	66.2	67.4	77.2	78.7	73.7	75.2	68.7	69.9
1306C-E87TAG3	200	76.9	79.6	73.4	75.5	68.4	70.8	79.8	82.5	76.3	78.4	71.3	73.7
1306C-E87TAG6	250	76.9	79.6	73.4	75.5	68.4	70.8	79.8	82.5	76.3	78.4	71.3	73.7



Dimensions

Generating Set	Powertech	A: mm	B: mm	C: mm	D: mm	E: mm
Engine model	KVA					
403C-11G	9	2230	1100	1450	834	
403C-15G	13	2230	1100	1450	834	
404C-22G	20	2230	1100	1450	834	
1103A-33G	30	2630	1150	1660	985	
1103A-33TG1	45	2630	1150	1660	985	
1103A-33TG2	60	2630	1150	1660	985	
1104A-44TG1	65	2630	1150	1660	985	
1104A-44TG2	80	2920	1150	1660	640	
1006TG1A	95	3620	1260	1860	872	
1104C-44TAG2	100	3620	1260	1860	872	
1006TG2	105	3620	1260	1860	872	
1006TAG1	135	3620	1260	1860	872	
1006TAG2	150	3620	1260	1860	872	
1306C-E87TAG3	200	4360	1650	2160	860	2480
1306C-E87TAG6	250	4360	1650	2160	860	2480