GOLDEN MAJD Co.

1250 - 1375S

Rating @ 0.8 PF		Prime rating	Stand-by rating
Voltage *1	Freq. *2	PT1250 *3	PT1375S *4
400 V	50 Hz	1250 KVA	1375 KVA
480 V	60 Hz	1250 KVA	1375 KVA

The above ratings represent the generating set capability guarantied within ±3% at the references 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 fixed speed of 1500rpm or 1800rpm.
3 - **PT1250** 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 - **PT1375S** 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 4012TWG2	
Cylinders	12; 60° Vee Form	
Aspiration	Turbocharged & A/W charge-cooled	
Combustion	Direct injection	
Cooling System	Water cooled	
Displacement	45.842 L	
Oil consumption	0.51 g / KWhr	
Lube oil capacity	159.0 L	
Coolant capacity	205 L	
Governor	Electronic	
Emissions regulations	TA-Luft (1986)	
Speed	1500 rpm	1800 rpm
Fuel Consumption PT1250	265.0 L/H	272.0 L/H
Fuel Consumption PT1375S	294.0 L/H	305.0 L/H
Radiator Cooling Air Flow	1146 m^3/min	1146 m^3/min
Max Exhaust Gas Flow	245 m^3/min	254 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 CG4 (15W/40).
- The coolant should be 50% antifreeze and 50% fresh water.

Alternator Technical Data		
Model	Leroy Somer LSA 50.1 M6	
Regulation	± 0.5 %	
International protection	IP21	
Insulation class	H	
Terminals	6	
Frequency	50 Hz	60 Hz
Coolant Air Flow	1.6 m^3/s	1.6 m^3/s

Shipping Data			
Length	Width	Height	Weight
4940 mm	2000 mm	2300 mm	9000 kg

All information given in this leaflet is correct at the time of printing but it may be changed subsequently by the Company

ISO 9001 : 2000
Certificate Number: CC1680-009512,009912

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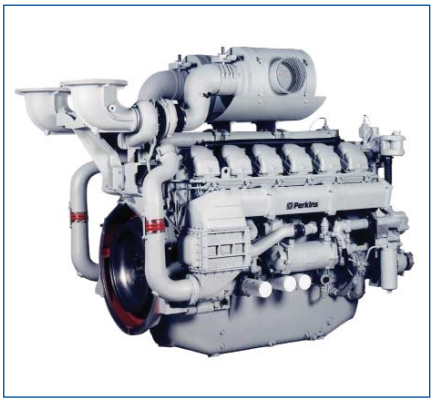


The Perkins 4000 Series family of 8, 12 and 16 cylinder diesel engines was designed in advance of today's uncompromising demands within the power generation industry and includes superior performance and reliability.

The 4012TWG2 is a turbocharged air to water charge cooled, 12 cylinder vee form diesel engine. Its premium design and specification features provide economic and durable operation as well as exceptional power to weight ratio, improved serviceability, low gaseous emissions, overall performance and reliability essential to the power generation market.

4000 Series

4012TWG2

Diesel Engine – Electro Unit

1154 kWm 1500 rev/min
1154 kWm 1800 rev/min

Economic power

Individual 4 valve cylinder heads give optimised gas flows, while unit fuel injectors ensure ultra fine fuel atomisation and hence controlled rapid combustion for efficiency and economy.
Commonality of components with other engines in 4000 Series family allows reduced parts stocking levels.

Reliable power

Developed and tested using latest engineering techniques.
Piston temperatures are controlled by an advanced gallery jet cooling system.
All engines are tolerant of a wide range of temperatures without derate.
Service is provided through the extensive Perkins network of over 4000 distributors and dealers worldwide.

Clean, efficient power

Exceptional power to weight ratio and compact size for easier transportation and installation.
Designed to provide excellent service access for ease of maintenance.
Engines designed to comply with major international standards.
Low gaseous emissions for cleaner operation.

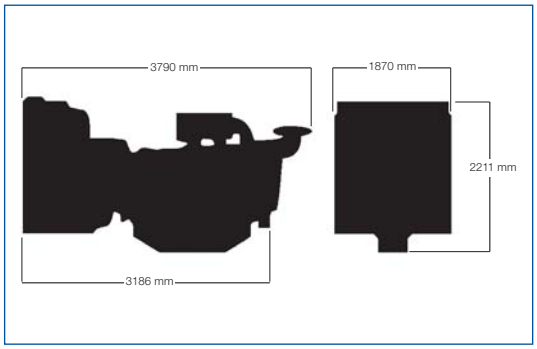
Engine Speed (rev/min)	Type of Operation	Typical Generator Output (Net)		Engine Power			
				Gross		Net	
		kVA	kWe	kWm	bhp	kWm	bhp
1500	Baseload Power	989	792	878	1177	825	1106
	Prime Power	1258	1002	1097	1471	1044	1400
	Standby (maximum)	1385	1108	1207	1619	1154	1547
1800	Baseload Power	989	792	878	1177	825	1106
	Prime Power	1258	1002	1097	1471	1044	1400
	Standby (maximum)	1385	1108	1207	1619	1154	1547

The above ratings represent the engine performance capabilities within plus or minus 3% at the reference conditions equivalent to those specified in ISO 8528/1, ISO 3046/1, BS 5514/1.

Ratings conditions: 25°C air inlet temperature, barometer pressure 100 kPa, relative humidity 30%. Please consult your distributor or the factory for ratings in ambient conditions.
Note: For full ratings please refer to Perkins Engines Company Limited. All electrical ratings are based on an average alternator efficiency and a power factor of 0.8.
Fuel specification: BS 2869 Class A1 + A2 or ASTM D975 No 2D.

Rating Definitions
Baseload Power: Power available for continuous full load operation. No overload is permitted.
Prime Power: Power available for variable load with an average load factor not exceeding 80% of the prime power rating in any 24 hour period. Overload of 10% permitted for 1 hour in every 12 hours operation at 1500 rev/min. No overload is permitted at 1800 rev/min.
Standby (maximum): Power available at variable load in the event of a main power network failure for a maximum of 500 hours per year. No overload is permitted.

4000 Series
4012TWG2



Standard Electro Unit Specification

Air inlet
- Mounted air filters and turbochargers – integral charge coolers

Fuel system
- Unit fuel injectors with lift pump and hand stop control
- Electronic governor to ISO 3046 Part 4 class A1
- Full-flow spin-on fuel oil filters

Lubrication system
- Wet sump with filler and dipstick
- Full-flow spin-on oil filters
- Engine jacket water/lub oil temperature stabiliser

Cooling system
- Twin gear driven circulating pumps
- Two twin thermostats
- Crankshaft pulley for fan drive

Electrical equipment
- 24 volt starter motor and 24 volt/40 amp alternator with integral regulator and DC output
- 24 volt combined high coolant temperature/low oil pressure switch
- Overspeed switch and magnetic pickup
- Turbine inlet temperature shutdown switch
- 24 volt stop solenoid (energised to run)

Flywheel and housing
- Flywheel to SAE J620 size 18
- SAE 00 flywheel housing

General Data

Number of cylinders	12	
Cylinder arrangement	60° Vee form	
Cycle	4 stroke	
Induction system	Turbocharged Air to water charge cooled	
Combustion system	Direct injection	
Cooling system	Water-cooled	
Displacement	45.842 litres	
Bore and stroke	160 x 190 mm	
Compression ratio	13.6:1	
Direction of rotation	Anti-clockwise, viewed from flywheel end	
Firing order	1A, 6B, 5A, 2B, 3A, 4B, 6A, 1B, 2A, 5B, 4A, 3B	
Total lubrication system capacity	177.6 litres	
	Electro Unit	ElectropaK
Total coolant capacity	73 litres	185 litres
Length	2731 mm	3790 mm
Width	1547 mm	1870 mm
Height	2118 mm	2211 mm
Total weight (dry)	4400 kg	5280 kg

Final weight and dimensions will depend on completed specification

Optional Equipment

The following optional equipment is available to make up the specifications to Perkins ElectropaK specification:
Tropical radiator including: Water pipes, clips and hoses
Fan, fan guards and belts
Other optional extra equipment available
Twin heavy duty air cleaner – paper element with pre-cleaner
Changeover lubricating oil filters
Changeover fuel oil filters
Immersion heater with thermostat
Water pipes, clips and hoses for radiator
Air starters
Instrument panel
NB This list is not exhaustive, further options may be available to meet to particular applications on enquiry to Perkins Sales Department

Fuel Consumption (g/kWh)		
Engine Speed	1500 rev/min	1800 rev/min
At Standby Maximum Rating	207	215
At Prime Power Rating	205	211
At Baseload Power Rating	204	212
At 75% of Prime Power Rating	204	213
At 50% of Prime Power Rating	210	223
At 25% of Prime Power Rating	238	264

Perkins®

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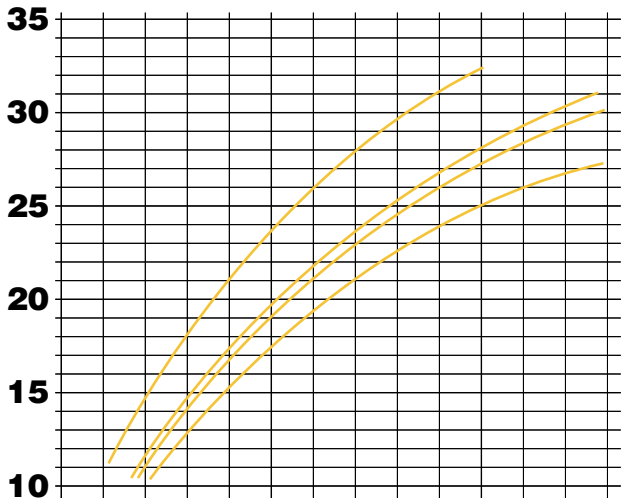
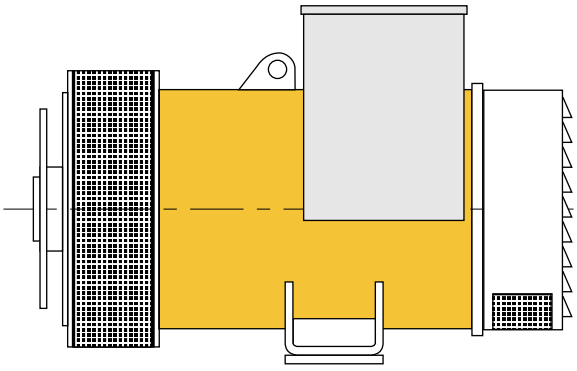




ALTERNATORS

LSA 50.1 - 4 Pole

Electrical and mechanical data

PARTNER®

ALTERNATORS

LSA 50.1 - 4P

50 Hz - 1500 r.p.m.

ELECTRICAL DATA

Insulation class	**H**	Excitation system	**A R E P + PMI**
Winding pitch - Code	**2/3 - (N° 6)**	A.V.R. model	**R 449**
Leads	**6**	Voltage regulation (steady state)	**± 0,5 %**
Drip proof	**IP 23**	Sustained short-circuit current	**300% (3 IN) : 10s**
Altitude	**≤ 1000 m**	Total harmonic (*) TGH / THC	**< 4 %**
Overspeed	**2250 min $^{-1}$**	Waveform : NEMA = TIF - (*)	**< 50**
Air flow	**1,6 m^3/s**	Waveform : I.E.C. = THF - (*)	**< 2 %**

(*) Total harmonic content line to line, at no load or full rated linear and balanced load

RATINGS : kVA / *kW* - Power factor = 0,8

Duty/Ambiant T°		Continuous / 40°C						Stand-by / 40°C			Stand-by / 27°C		
Class/T° rise		H / 125° K			F / 105° K			H / 150° K			H / 163° K		
Phase		**3 ph.**			**3 ph.**			**3 ph.**			**3 ph.**		
Y		380V	400V	415V	380V	400V	415V	380V	400V	415V	380V	400V	415V
Δ		220V	230V	240V	220V	230V	240V	220V	230V	240V	220V	230V	240V
50.1 S2	kVA	**910**			820			960			**1000**		
	kW	*728*			*656*			*768*			*800*		
50.1 S4	kVA	**1025**			925			1075			**1130**		
	kW	*820*			*740*			*860*			*904*		
50.1 M6	kVA	**1225**			1100			1290			**1350**		
	kW	*980*			*880*			*1032*			*1080*		
50.1 M7	kVA	**1325**			1190			1390			**1460**		
	kW	*1060*			*952*			*1112*			*1168*		
50.1 L8	kVA	**1425**			1280			1500			**1570**		
	kW	*1140*			*1024*			*1200*			*1256*		
50.1 VL10	kVA	**1580**			1420			1660			**1740**		
	kW	*1264*			*1136*			*1328*			*1392*		

EFFICIENCIES (%) - Class H / 40° C

	Three phase : 400 V									
	P.F. = 0,8					P.F. = 1				
	1/4	2/4	3/4	4/4	St.by	1/4	2/4	3/4	4/4	St.by
50.1 S2	92,6	94,6	94,6	94,1	93,8	93,2	95,6	96	96	95,9
50.1 S4	93	94,9	95	94,5	94,3	93,6	95,9	96,3	96,2	96,1
50.1 M6	93,6	95,3	95,4	94,9	94,7	94,2	96,2	96,6	96,5	96,5
50.1 M7	93,8	95,5	95,5	95,1	94,9	94,4	96,4	96,7	96,7	96,6
50.1 L8	94	95,7	95,8	95,5	95,3	94,5	96,5	96,9	96,9	96,8
50.1 VL10	94,2	95,9	96	95,7	95,5	94,7	96,6	97	97	96,9

REACTANCES (%) - TIME CONSTANTS (ms) - CLASS H / 400 V

		50.1 S2	50.1 S4	50.1 M6	50.1 M7	50.1 L8	50.1 VL10
Kcc	Short-circuit ratio	0,331	0,343	0,352	0,349	0,371	0,382
Xd	Direct axis synchronous reactance unsaturated	395	381	377	375	353	342
Xq	Quadrature axis synchronous reactance unsaturated	237	229	226	225	212	205
T'do	Open circuit time constant	2210	2350	2520	2600	2720	2830
X'd	Direct axis transient reactance saturated	29,7	28,2	27,3	26,7	24,6	23,1
T'd	Short circuit transient time constant	196	205	214	218	222	225
X"d	Direct axis subtransient reactance saturated	16,4	15,5	15	14,8	13,5	12,7
T"d	Subtransient time constant	16	17	18	19	20	21
X"q	Quadrature axis subtransient reactance saturated	20,5	19,5	18,8	18,5	16,9	16
Xo	Zero sequence reactance unsaturated	3,9	3,7	3,5	3,5	3,2	3,0
X2	Negative sequence reactance saturated	18,5	17,5	16,9	16,5	15,2	14,3
Ta	Armature time constant	33	36	39	41	41	42

OTHER DATA - CLASS H / 400 V

io (A)	No load excitation current	1,05	1,05	1,1	1,1	1,3	1,3
ic (A)	Full load excitation current	5	4,85	4,9	4,9	5	5
uc (V)	Full load excitation voltage	63	61	62	62	63	63
ms	Recovery time (ΔU = 20 % transient)	< 500	< 500	< 500	< 500	< 500	< 500
kVA	Motor start. (ΔU = 20% sust.) or (ΔU = 50% Transient)	1820	2000	2500	2650	2850	3150
%	Transient dip (rated step load) - PF : 0,8 LAG	15	14	13,5	13	12,5	12
W	No load losses	12050	12722	13705	14199	15091	16100
W	Heat rejection	45645	47725	52665	54616	53717	56794

According to : I.E.C. 34.1/34.2 - U.T.E. : NF C 51.111 - V.D.E. 0530 - B.S. 4999 & 5000 - NEMA : MG 1.22 - ISO 8528 . 3 - CSA (C 22.2 + UL 2200).

Attenuator-Attenuator

This type of enclosures is distinguished from all of our other types with its excellent capability of noise reduction, this is mainly because of the presense of attenuators on each of the air inlet and outlet sides.
It is fully weather proofed and the exhaust muffler is mounted on the top to ensure proper cooling and ventilation.

Charasteristics:

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

GHADDAR
MACHINERY Co. S.A.L.

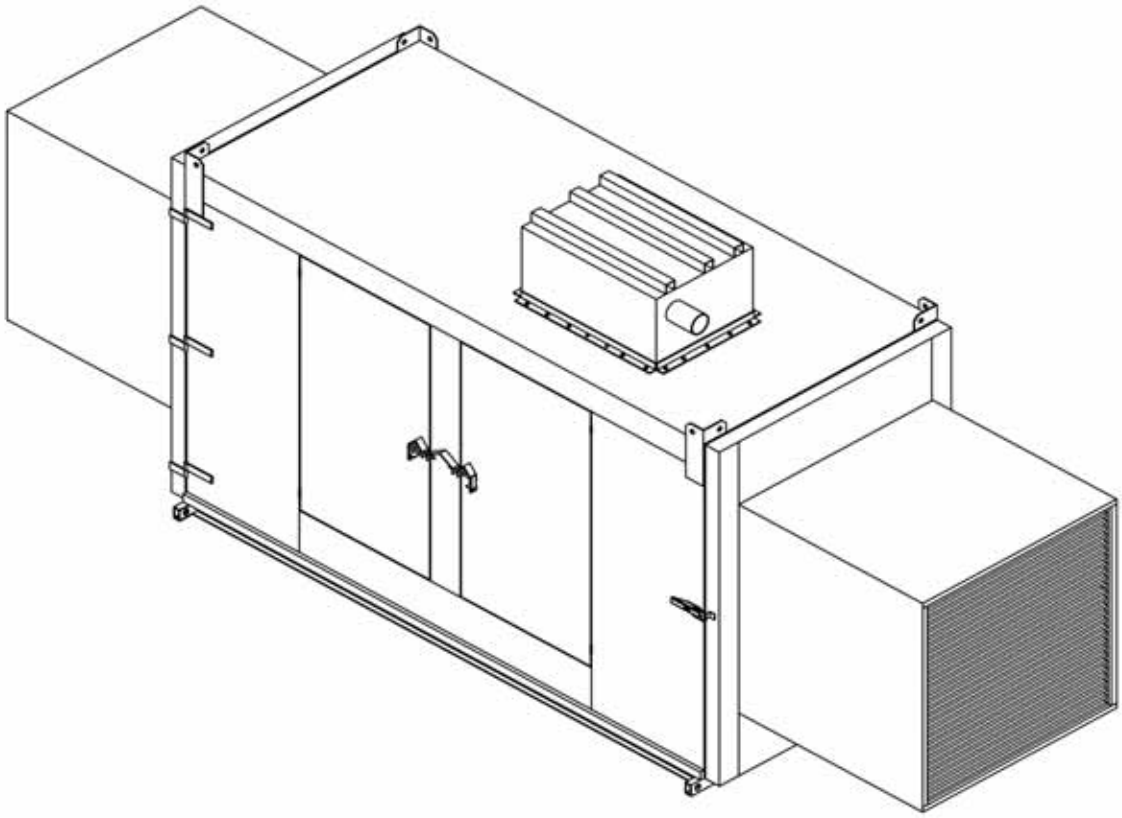
YOUR POWER PARTNER

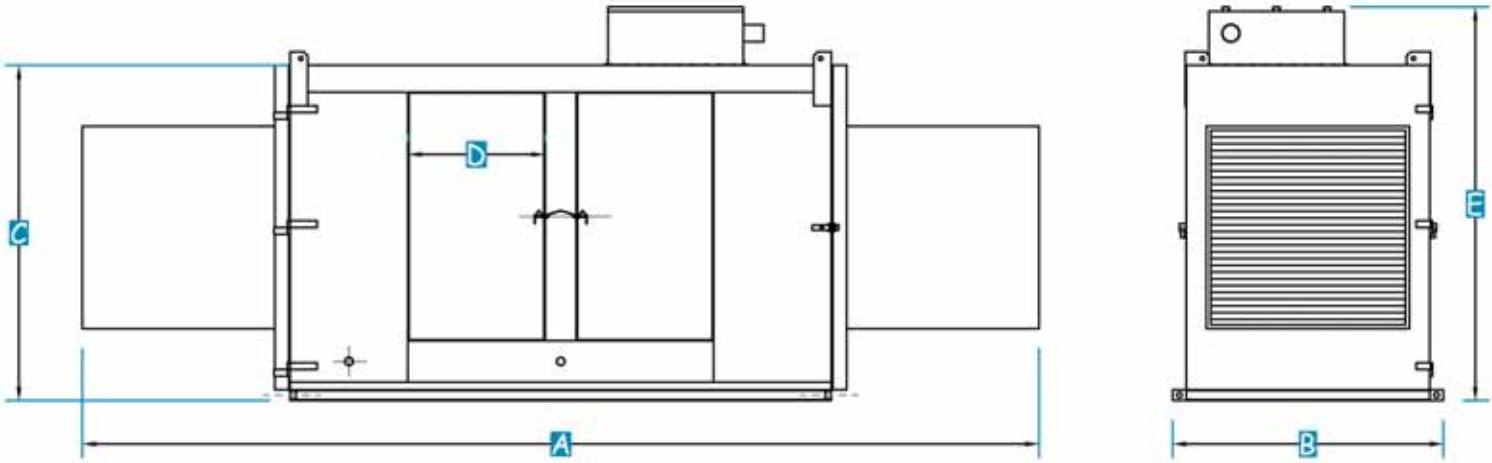
Range
9 - 1500 KVA

ISO 9001 :2000
QMI REGISTERED
IQNet CERTIFIED MANAGEMENT SYSTEM
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	66.5	67.8	63.5	64.8	58.5	59.8	68.2	69.5	65.2	66.5	60.2	61.5
403C-15G	13	66.5	67.8	63.5	64.8	58.5	59.8	68.2	69.5	65.2	66.5	60.2	61.5
404C-22G	20	66.5	67.8	63.5	64.8	58.5	59.8	68.2	69.5	65.2	66.5	60.2	61.5
1103A-33G	30	68.7	70.2	65.2	66.7	60.2	61.7	70.6	72.1	67.1	68.6	62.1	63.6
1103A-33TG1	45	67.3	68.8	63.8	65.3	58.8	60.3	69.2	70.7	65.7	67.2	60.7	62.2
1103A-33TG2	60	67.3	68.8	63.8	65.3	58.8	60.3	69.2	70.7	65.7	67.2	60.7	62.2
1104A-44TG1	65	67.3	68.8	63.8	65.3	58.8	60.3	69.2	70.7	65.7	67.2	60.7	62.2
1104A-44TG2	80	68.5	70	65	66.5	60	61.2	70.3	71.8	66.8	68.3	61.8	63
1006TG1A	95	70.3	71.8	66.8	68.3	61.8	63	72.8	74.3	69.3	70.8	64.3	65.5
1104C-44TAG2	100	70.3	71.8	66.8	68.3	61.8	63	72.8	74.3	69.3	70.8	64.3	65.5
1006TG2	105	70.3	71.8	66.8	68.3	61.8	63	72.8	74.3	69.3	70.8	64.3	65.5
1006TAG1	135	71.5	73	68	69.5	63	64.2	74	75.5	70.5	72	65.5	66.7
1006TAG2	150	71.5	73	68	69.5	63	64.2	74	75.5	70.5	72	65.5	66.7
1306C-E87TAG3	200	73.7	76.4	70.2	72.3	65.2	67.6	76.6	79.3	73.1	75.2	68.1	70.5
1306C-E87TAG6	250	73.7	76.4	70.2	72.3	65.2	67.6	76.6	79.3	73.1	75.2	68.1	70.5
2306C-E14TAG2	350	75.2	77.9	71.7	73.8	66.7	69.1	78.1	80.8	74.6	76.7	69.6	72
2306C-E14TAG3	400	75.2	77.9	71.7	73.8	66.7	69.1	78.1	80.8	74.6	76.7	69.6	72
2806C-E16TAG1	450	75.9	78.6	72.4	74.5	67.4	69.8	79	81.7	75.5	77.6	70.5	72.9
2806C-E16TAG2	500	75.9	78.6	72.4	74.5	67.4	69.8	79	81.7	75.5	77.6	70.5	72.9
2806C-E18TAG1	550	77.1	80	73.6	76.9	68.6	71.2	80.3	83.2	76.8	80.1	71.8	74.4
2806C-E18TAG2	625	77.1	80	73.6	76.9	68.6	71.2	80.3	83.2	76.8	80.1	71.8	74.4
4006C-23TAG2A	725	77.8	80.7	74.3	77.6	69.3	71.9	81.3	84.2	77.8	81.1	72.8	75.4
4006C-23TAG3A	800	78.1	81.6	74.6	78.5	69.6	72.8	81.5	85	78	81.9	73	76.2
4008TAG2	1000	78.1	81.6	74.6	78.5	69.6	72.8	81.5	85	78	81.9	73	76.2
4012TWG2	1250	78.9	82.4	75.4	79.3	70.4	73.6	82.9	86.4	79.4	83.3	74.4	77.6
4012TAG2	1500	80.5	84	77	80.9	72	75.2	85	88.5	81.5	85.3	76.5	79.7





Dimensions

Generating Set	Powertech	A: mm	B: mm	C: mm	D: mm	E: mm
Engine model	**KVA**					
403C-11G	9	2920	1100	1300	834	1650
403C-15G	13	2920	1100	1300	834	1650
404C-22G	20	2920	1100	1300	834	1650
1103A-33G	30	4580	1200	1700	980	2050
1103A-33TG1	45	4580	1200	1700	980	2050
1103A-33TG2	60	4580	1200	1700	980	2050
1104A-44TG1	65	4580	1200	1700	980	2050
1104A-44TG2	80	4580	1200	1700	980	2050
1006TG1A	95	5120	1360	1970	634	2320
1104C-44TAG2	100	5120	1360	1970	634	2320
1006TG2	105	5120	1360	1970	634	2320
1006TAG1	135	5120	1360	1970	634	2320
1006TAG2	150	5120	1360	1970	634	2320
1306C-E87TAG3	200	5570	1800	2410	784	2760
1306C-E87TAG6	250	5570	1800	2410	784	2760
2306C-E14TAG2	350	6370	2000	2410	1000	2760
2306C-E14TAG3	400	6370	2000	2410	1000	2760
2806C-E16TAG1	450	7070	2000	2580	1000	2930
2806C-E16TAG2	500	7070	2000	2580	1000	2930
2806C-E18TAG1	550	7070	2000	2580	1000	2930
2806C-E18TAG2	625	7070	2000	2580	1000	2930
4006C-23TAG2A	725	8620	2552	2850	986	3200
4006C-23TAG3A	800	8620	2552	2850	986	3200
4008TAG2	1000	8620	2552	2850	986	3200
4012TWG2	1250	9120	2552	3200	985	3550
4012TAG2	1500	10700	2750	3450	982	3800