

Rating @ 0.8 PF		Prime rating	Stand-by rating
Voltage ^{*1}	Freq. ^{*2}	PT30 ^{*3}	PT33S ^{*4}
400 V	50 Hz	30.8 KVA	33.7 KVA
480 V	60 Hz	36.2 KVA	39.7 KVA

The above ratings represent the generating set capability guaranteed within $\pm 3\%$ 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 switchable speed of 1500rpm/1800rpm.
- 3 - PT30 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 - PT33S 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 1103A-33G	
Cylinders	3; vertical in-line	
Aspiration	Naturally aspirated	
Combustion	Direct injection	
Cooling System	Water cooled	
Displacement	3.30 L	
Oil consumption	0.15 % of fuel consumption	
Lube oil capacity	8.30 L Max	
Coolant capacity	10.20 L	
Governor	Mechanical	
Emissions regulations	TA-Luft (1986)	
Speed	1500 rpm	1800 rpm
Fuel Consumption PT30	7.1 L/H	8.6 L/H
Fuel Consumption PT33S	7.9 L/H	9.5 L/H
Radiator Cooling Air Flow	53.0 m ³ /min	70.0 m ³ /min
Max Exhaust Gas Flow	5.7 m ³ /min	6.4 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 42.2 L9	
Regulation	$\pm 0.5\%$	
International protection	IP23	
Insulation class	H	
Terminals	12	
Frequency	50 Hz	60 Hz
Coolant Air Flow	0.15 m ³ /s	0.18 m ³ /s

Shipping Data

Length	Width	Height	Weight
1600 mm	760 mm	1160 mm	772 kg

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





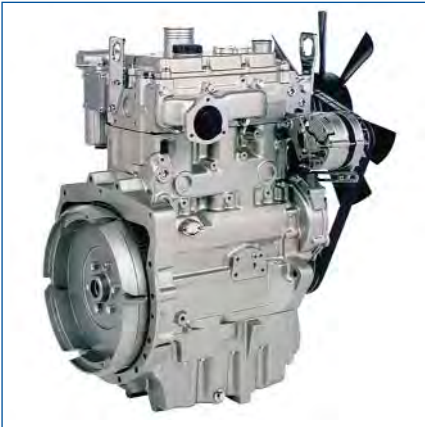
1100 Series

1103A-33G

Diesel Engine - ElectropaK

28 kWm 1500 rev/min

33 kWm 1800 rev/min



Compact, Efficient Power

- 1100 Series is the result of an intensive period of customer research that has guided the development of the range.
- The new 3.3 litre cylinder block bore roundness is maintained under the pressures of operation. It also ensures combustion and mechanical noise is lowered.
- A new cylinder head has re-established Perkins mastery of air control.

Quality by Design

- Product design and Class A manufacturing improvements enhance product reliability while maintaining Perkins legendary reputation for durability.

Cost Effective Power

- Compact size and low noise.
- Lower fuel consumption and oil use.
- 500 hour service intervals.
- Two year warranty.

Product Support

- Total worldwide service is provided through a network of 4,000 distributors and dealers.
- TIPSS - The Integrated Parts and Support System enables customers to specify and order parts electronically as well as service engines with on-line guides and service tools.

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

In the world of power generation success is only gained by providing more for less. With the 1103A-33G 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 units are able to meet TA luft legislation.

Engine speed rev/min	Operation Type	Typical Generator Output (Net)		Engine Power			
				Gross		Net	
		kVA	kWe	kW	bhp	kW	bhp
1500	Prime Power	30.0	24.0	28.2	37.8	27.7	37.1
	Standby (maximum)	33.0	26.4	31.0	41.6	30.4	40.8
1800	Prime Power	34.9	27.9	33.2	44.5	32.2	43.2
	Standby (maximum)	38.2	30.6	36.5	48.9	35.4	62.5

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/1, ISO 3046/1:1986, BS5514/1 Derating may be required for conditions outside these; consult Perkins Engines Company Limited

Generator powers are typical and are based on an average alternator efficiency and a power factor (cos. ϕ) of 0.8
 Fuel specification: BS 2869: Part 2 1998 Class A2 or DIN EN 590
 Lubricating oil: 15W40 to API CG4

Rating Definitions

Prime power: Variable load. Unlimited hours usage with an average load factor of 80% of the published prime power over each 24 hour period. A 10% overload is available for 1 hour in every 12 hours of operation.

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

1100 Series

1103A-33G

Standard Electropak Specification

Air inlet

- Mounted air filter

Fuel system

- Rotary type pump
- Ecoplus fuel filter

Lubrication system

- Wet sump with filler and dipstick
- Spin-on oil filter

Cooling system

- Thermostatically-controlled system with gear-driven circulation pump and belt-driven pusher fan
- Mounted radiator and piping

Electrical equipment

- 12 volt starter motor and 12 volt 65 amp alternator with DC output
- 12 volt shutdown solenoid energised to run

Flywheel and housing

- High inertia flywheel to SAE J620 size 10/11½
- SAE 3 flywheel housing

Mountings

- Front engine mounting bracket

Literature

- User's Handbook

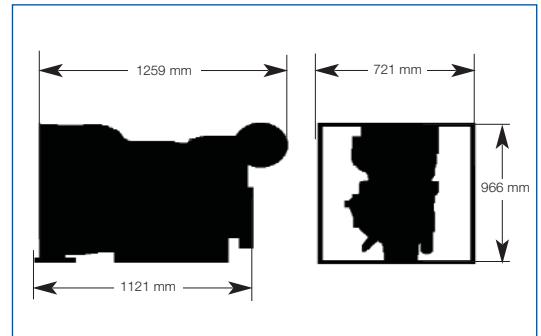
Optional equipment

- Woodward electronic governor (LCG2)
- Workshop manual
- Parts book

General Data

Number of cylinders	3 vertical in-line
Bore and stroke	105 x 127 mm
Displacement	3.3 litres
Aspiration	Naturally aspirated
Cycle	4 stroke
Combustion system	Direct injection
Compression ratio	19.25:1
Rotation	Anti Clockwise (viewed from flywheel)
Cooling system	Water-cooled
Total lubrication system capacity	7.9 litres
Total coolant capacity	10.2 litres
Dimensions	Length 1029 mm Width 629 mm Height 951 mm
Dry Weight (approximately)	412 kg

Final weight and dimensions will depend on completed specification.



Fuel Consumption g/kWh Temperate/Tropical				
Engine speed	1500 rev/min		1800 rev/min	
	g/kWh	l/hr	g/kWh	l/hr
At standby power	214	7.9	222	9.5
At prime power	211	7.1	221	8.6
At 75% of prime power	214	5.4	227	6.6
At 50% of prime power	232	3.9	251	4.9

Option Groups

A selection of optional items is available to enable the customer to prepare a specification precisely matched to the needs.

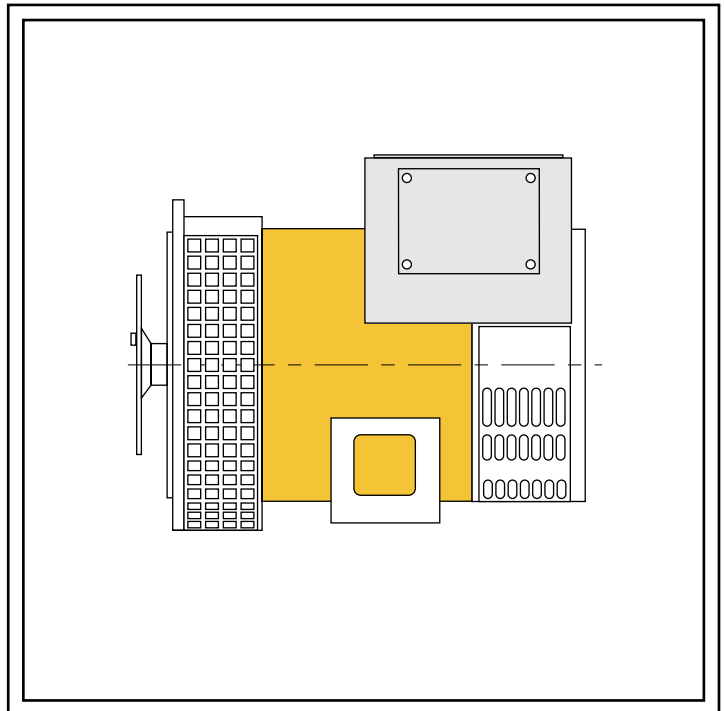
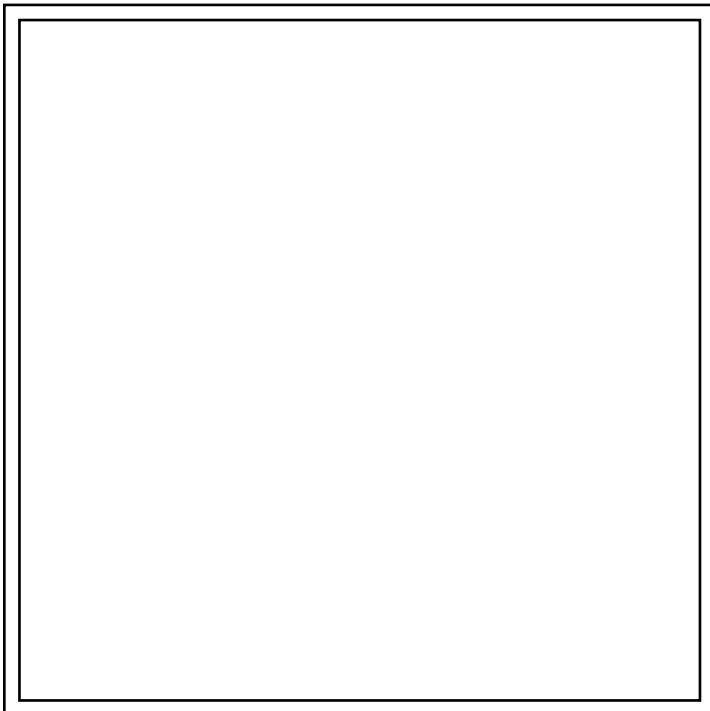
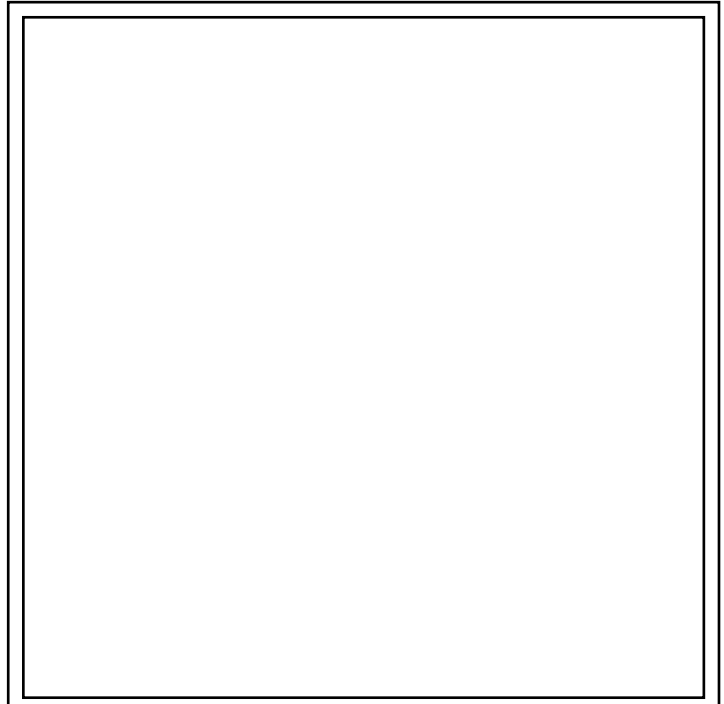
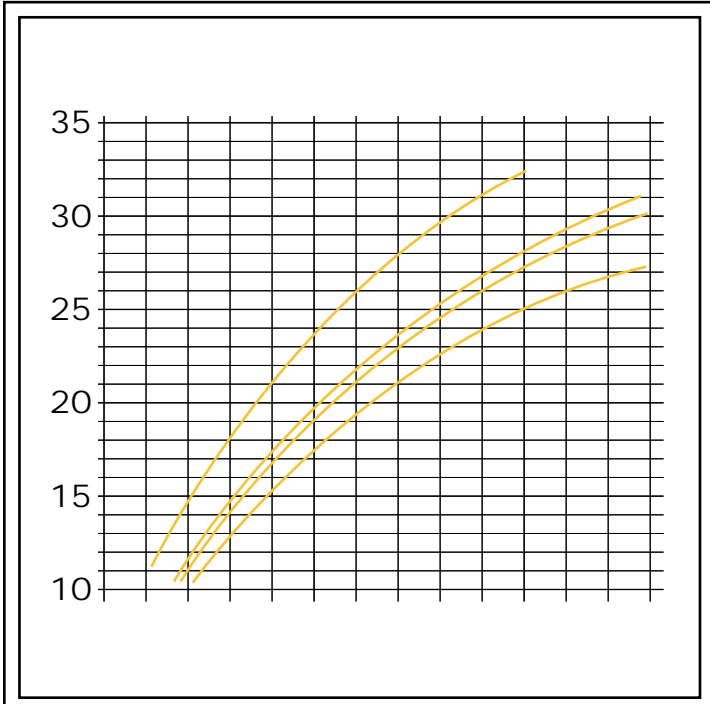


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Distributed by



ALTERNATORS
LSA 42.2 - 4 Pole - Three phase
Electrical and mechanical data

TYPICAL DATA

Insulation class	H	Excitation system	Shunt	A R E P
Winding pitch - Code	2/3 - (N° 6)	A.V.R. model	R 250	R 438
Wires	12	Voltage regulation (steady state)	± 0,5 %	± 0,5 %
Drip proof	IP 23	Sustained short-circuit current	-	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total harmonic (*) TGH / THC	< 4 %	< 4 %
Overspeed	2250 min⁻¹	Wave form : NEMA = TIF - (*)	< 50	< 50
Air flow	0,15 m³/s	Wave form : I.E.C. = THF - (*)	< 2 %	< 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			
	H / 125° K				F / 105° K				H / 150° K				H / 163° K			
Class/T° rise	3 ph.		1 ph.		3 ph.		1 ph.		3 ph.		1 ph.		3 ph.		1 ph.	
Y	380V	400V	415V	Δ Δ	380V	400V	415V	Δ Δ	380V	400V	415V	Δ Δ	380V	400V	415V	Δ Δ
Δ	220V	230V	240V	230V	220V	230V	240V	230V	220V	230V	240V	230V	220V	230V	240V	230V
42.2 S4	kVA	17,5	11		17	10			20	12			21	12,5		
	kW	14	8,8		13,6	8			16	9,6			16,8	10		
42.2 S5	kVA	20	12,5		19,5	11,6			24	13,5			25	14,1		
	kW	16	10		15,6	9,3			19	10,8			19,8	11,3		
42.2 M6	kVA	23	14		21	13			27	15			28	15,5		
	kW	18,4	11,2		16,8	10,4			21,4	12			22,4	12,4		
42.2 M7	kVA	27	16		25	15			30	17,4			31	18,2		
	kW	21,6	12,8		20	11,9			23,8	13,9			24,8	14,6		
42.2 L9	kVA	31,5	18,5		28,5	17,1			33,4	20			35	20,6		
	kW	25,2	14,8		23	13,7			26,7	15,9			27,8	16,5		

EFFICIENCIES (%) : Class H . 40° C

	Three phase : 400 V										Single phase : 230 V									
	P.F. = 0,8					P.F. = 1					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	1/4	2/4	3/4	4/4	St.by	1/4	2/4	3/4	4/4	St.by
42.2 S4	82,9	87,4	88	87,6	87,2	84,9	90,2	91,5	91,6	91,5	75,7	81,6	82,2	81,3	80,6	78	85,2	86,9	87,1	86,9
42.2 S5	84,2	87,8	87,9	87	86,6	86,2	90,8	91,6	91,5	91,2	77,2	82	81,9	80,4	79,6	79,8	86	87,1	86,8	86,5
42.2 M6	85	89,2	89,8	89,4	89,1	86,6	91,5	92,6	92,8	92,7	78	83,9	84,7	84,1	83,7	79,9	86,8	88,5	88,7	88,6
42.2 M7	86,4	89,6	89,7	88,9	88,5	88,1	92,1	92,8	92,6	92,4	79,6	84,3	84,5	83,5	82,9	81,6	87,5	88,7	88,5	88,3
42.2 L9	87,9	90,3	90	89	88,6	89,6	92,8	93,1	92,7	92,5	81,7	85,4	85,1	83,7	83,1	83,7	88,6	89,2	88,7	88,4

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

		42.2 S4	42.2 S5	42.2 M6	42.2 M7	42.2 L9
Kcc	Short-circuit ratio	0,76	0,66	0,71	0,6	0,51
Xd	Direct axis synchronous reactance unsaturated	160	190	170	200	220
Xq	Quadrature axis synchronous reactance unsaturated	80	90	80	100	110
T'do	Open circuit time constant	410	410	450	450	470
X'd	Direct axis transient reactance saturated	10,1	11,5	9,3	10,9	11,8
T'd	Short circuit transient time constant	30	30	30	30	30
X"d	Direct axis subtransient reactance saturated	5,0	5,8	4,6	5,5	5,9
T"d	Subtransient time constant	3	3	3	3	3
X"q	Quadrature axis subtransient reactance saturated	7,1	8,1	6,5	7,7	8,4
Xo	Zero sequence reactance unsaturated	0,8	0,1	0,6	0,2	0,3
X2	Negative sequence reactance saturated	6,0	6,9	5,6	6,6	7,1
Ta	Armature time constant	4	4	4	4	4

OTHER DATA - CLASS : H / 400 V -

		42.2 S4	42.2 S5	42.2 M6	42.2 M7	42.2 L9
io	No load excitation current (A) (SHUNT/AREP)	0,6/0,9	0,6/0,9	0,5/0,8	0,5/0,8	0,5/0,7
ic	Full load excitation current (A) (SHUNT/AREP)	1,4/2,1	1,6/2,3	1,3/2	1,5/2,3	1,5/2,3
uc	Full load excitation voltage (V) (SHUNT/AREP)	36/13	40/14	34/12	39/14	39/14
ms	Recovery time(ΔU =20 % trans.)	500	500	500	500	500
kVA (Shunt)	Motor start. (ΔU = 20% sust.) or (ΔU = 50% Transient)	44	50	54	64	69
kVA (AREP)	Motor start. (ΔU = 20% sust.) or (ΔU = 50% Transient)	51	59	64	75	80
%	Transient dip (rated step load) - PF : 0,8 LAG	13,6	14,7	13,1	14,5	15,6
W	No load losses	590	590	690	690	680
W	Heat rejection	2000	2400	2200	2700	3100

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 (upon request)
 Products and materials shown in this catalogue may, at any time, be modified in order to follow the latest technological developments, improve the design or change conditions of utilization.
 Their description cannot, in any case, engage Leroy-Somer liability. The values indicated are typical values .

COMPACT

This type is specially designed for the most tight spaces where other types fail to be installed. With its modern design that uses the latest technologies in fabrication and paint, this enclosure is considered to be GHADDAR MACHINERY Co.'s best selling type ever.

Charasteristics:

- > Body and components made of steel with heat-treated highly corrosive powder coating.
- > Stainless steel locks and black zinc die-cast hinges.
- > One large door on each side to allow easy access for maintenance purposes.
- > Lube oil pipe can be reached externally to allow easy drainage.
- > Radiator fill access through a special rubber cap on the top of the enclosure.
- > Special viewing window for the control panel in a lockable door.
- > Lifting points on the base frame.
- > Exhaust silencing system in the interior of the enclosure.
- > Fuel fill and battery are secured through lockable doors.
- > Emergency stop push button mounted on the exterior of the enclosure (optional).



**GHADDAR
MACHINERY Co. S.A.L.**

— YOUR POWER PARTNER —

Range

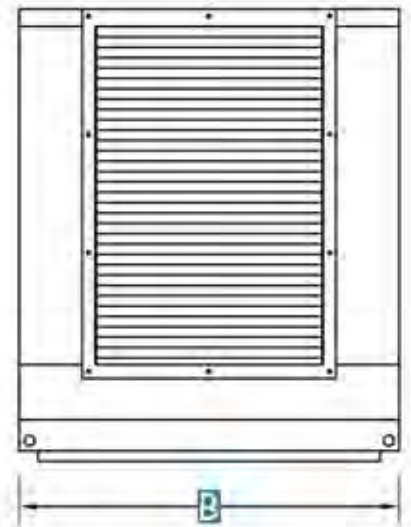
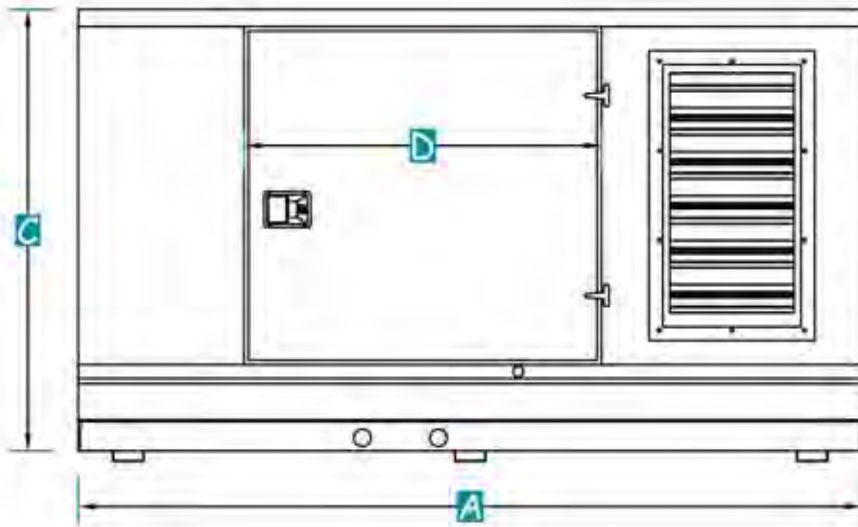
9 - 60 KVA



Certificate Numbers. CC1680-009512. 009912

Sound Pressure Levels (dBA)

Generating Set	Powertech	50 Hz						60 Hz						
		1 m		3 m		7 m		1 m		3 m		7 m		
		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	Load
403C-11G	9	72.5	73.8	69.5	70.8	64.5	65.8	74.2	75.5	71.2	72.5	66.2	67.5	
403C-15G	13	72.5	73.8	69.5	70.8	64.5	65.8	74.2	75.5	71.2	72.5	66.2	67.5	
404C-22G	20	72.5	73.8	69.5	70.8	64.5	65.8	74.2	75.5	71.2	72.5	66.2	67.5	
1103A-33G	30	74.7	76.2	71.2	72.7	66.2	67.7	76.6	78.1	73.1	74.6	68.1	69.6	
1103A-33TG1	45	73.3	74.8	69.8	71.3	64.8	66.3	75.2	76.7	71.7	73.2	66.7	68.2	
1103A-33TG2	60	73.3	74.8	69.8	71.3	64.8	66.3	75.2	76.7	71.7	73.2	66.7	68.2	



Dimensions

Generating Set	Powertech	A: mm	B: mm	C: mm	D: mm
Engine model	KVA				
403C-11G	9	2000	900	1260	876
403C-15G	13	2000	900	1260	876
404C-22G	20	2000	900	1260	876
1103A-33G	30	2270	1100	1310	1020
1103A-33TG1	45	2270	1100	1310	1020
1103A-33TG2	60	2270	1100	1310	1020