Rating @ 0.8 PF	K .	Prime rating	Stand-by rating
Voltage *1	Freq.*2	PT 20 *3	PT 22S*4
400 V	50 Hz	20.0 KVA	22.0 KVA
2	-	2	-

The above ratings represent the generating set capability guarantied within ±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.
- 2 This generating set is of fixed speed of 1500rpm.
- 3 PT20 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 PT22S is a 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.

Model	Perkins 404A-22	2G1
Cylinders	4; vertical in-line	3
Aspiration	Naturally aspirat	ted
Combustion	Indirect injection	1
Cooling System	Water cooled	
Displacement	2.216 L	
Oil consumption	0.1 % of fuel con	nsumption
Lube oil capacity	10.6 L	
Coolant capacity	7.0 L	
Governor	Mechanical	
Emissions regulations	Non-compliant	
Speed	1500 rpm	1800 rpm
Fuel Consumption PT20	5.3 L/H	-
Fuel Consumption PT22S	6.1 L/H	-
Radiator Cooling Air Flow	40.2 m <sup>3</sup> /min	-
Max Exhaust Gas Flow	3.94 m³/min	-

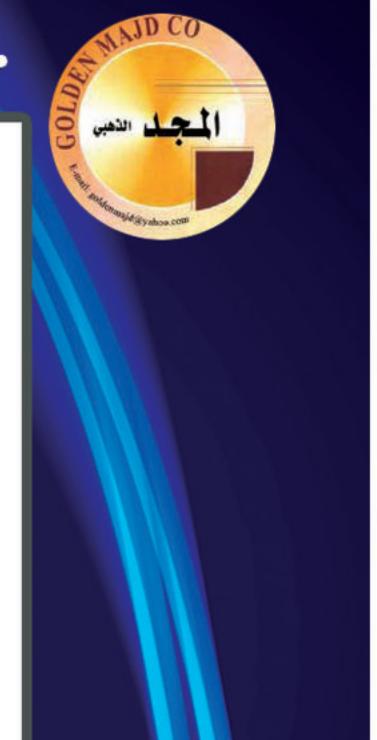
The above performance data are valid as per the following specs:

- Diesel Fuel is according to BS2869 Class A2 or equivalent.
- Lubricating oil is according to API CH4 (15W/40).
- The coolant should be 50% antifreeze and 50% fresh water.

Model	Leroy Somer I	SA 40M5
Regulation	±1%	
International protection	IP23	
Insulation class	Н	
Terminals	12	
Frequency	50 Hz	60 Hz
Coolant Air Flow	0.06 m <sup>3</sup> /s	0.07 m <sup>3</sup> /s

Shipping Dat	a		Shipping Data											
Length	Width	Height	Weight											
1500 mm	610 mm	1000 mm	495 kg											

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







62<sup>nd</sup> St. - Baghdad -Iraq العراق - بغداد - شارع ٦٢

Mobile: 07901150364

07901109589 07801970163 07801970166 www.goldenmajd.com Email: info@goldenmajd.com golden\_majd@yahoo.com

# 400 Series 404A-22G1 Electropak

20.3 kWm @ 1500 rpm

The Perkins® 400 Series engine family continues to set new standards in the compact engine market. Developed alongside customers to fulfill their needs in the generator set, compressor, agricultural and general industrial markets.

These new ElectropaKs provide compact power, from a robust family of 3 and 4 cylinder diesel engines designed to provide economic and durable operation at prime and standby duties, hitting the key power nodes required by the power generation industry.

### Powered by your needs

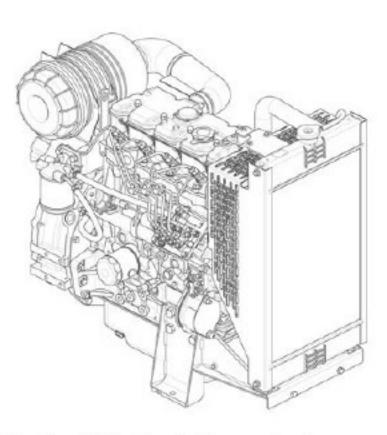
 The 404A-22G1 ElectropaK is a powerful but quiet 2.2 litre naturally aspirated 4-cylinder compact package

### Compact, clean, efficient power

 Design features on the 400D range of ElectropaKs ensures clean rapid starting in all conditions whilst delivering impressive performance with low operating costs in a small, efficient package size

### Lower operating costs

- Approved for operation on biodiesel\* concentrations of up to 20%
- Oil and filter changes are 500 hours, dependent on load factor
- Engine durability and reliability, the warranty offering and ease of installation combine to drive down the cost of ownership



### Product support

 With highly trained Perkins distributors in thousands of communities in over 180 countries, you are never far away from expert product knowledge, genuine parts and a range of advanced diagnostic technology for keeping your engine in peak condition

### 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.com www.tier4air.com www.perkins.com/esc

www.perkins.com/distributor
To find your local distributor

		Typical G	enerator		Engine Power							
Engine speed	Type of Operation	Outpu	it (Net)	Gro	oss	N	Low Idle					
Specu		kVA	kWe	kWm	hp	kWm	hp					
1500	Prime power	20.3	16.2	18.7	25.1	18.4	24.7	n/a				
1500	Standby power	22.3	17.8	20.6	27.6	20.3	27.2	n/a				

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/1, ISO 3046/1:1986, BS 5514/1. Derating may be required for conditions outside these; consult Perkins Engines Company Limited. Generator powers are typical and are based on typical alternator efficiencies and a power factor (cos.) of 0.8.

Fuel specification: BS 2869: Part 2 1998 Class A2 or ASTM D975 D2.

Rating Definitions: Prime Power: Power available at variable load in lieu of a main power network. Overload of 10% is permitted for 1 hour in every 12 hours operation. Standby (maximum): Power available at variable load in the event of a main power network failure. No overload is permitted.

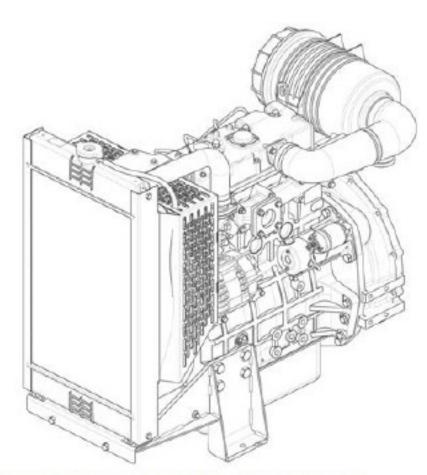


<sup>\*</sup>Subject to conformance with ASTM D6751 and EN14214.

# 400 Series 404A-22G1

ElectropaK

20.3 kWm @ 1500 rpm



### Standard electropaK specification

### Air inlet

Mounted air filter

### Fuel system

- Mechanically governed cassette type fuel injection pump
- Split element fuel filter

### Lubrication system

- Wet steel sump with filler and dipstick
- Spin-on full-flow lub oil filter

### Cooling system

- Thermostatically-controlled system with belt driven coolant pump and pusher fan
- Mounted radiator, piping and guards

### Electrical equipment

- 12 volt starter motor and 12 volt 15 amp alternator with DC output
- Oil pressure and coolant temperature switches
- 12 volt shut-off solenoid energised to run
- Glow plug cold start aid and heater/starter switch

### Flywheel and housing

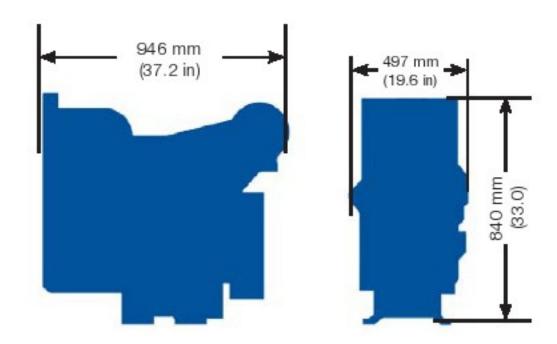
- 1500 rpm
- High inertia flywheel to SAE J620 Size 190.5 mm (7½ in)
- Flywheel housing SAE 4 Long

### Mountings

reflect final specification.

Perkins Engines Company Limited

Front and rear engine mounting bracket



Fuel	Consumption								
	1500 rpm								
Engine Speed	g/kWh	l/hr							
Standby	244	6.1							
Prime power	237	5.3							
75% of prime power	238	4.0							
50% of prime power	258	2.9							

### General Data

Number of cylinders 4
Cylinder arrangementVertical in-line
Cycle4 stroke
Aspiration Naturally aspirated
Combustion systemIndirect injection
Compression ratio
Bore and Stroke
Displacement
Direction of rotationAnti-clockwise viewed on flywheel
Cooling system
Total coolant capacity 7.0 litres (1.8 US gals)
Total lubrication system capacity 10.6 litres (2.8 US gals)
Dimensions
Length946 mm (37.2 in)
Width497 mm (19.6 in)
Height840 mm (33.0 in)
Total weight (dry)242 kg (533 lb)
Final weight and dimensions will depend on completed specification.

### Optional equipment

Parts book

### Option groups

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

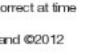


Peterborough PE1 5FQ United Kingdom Telephone +44 (0)1733 583000

Fax +44 (0)1733 582240

Perkins Engines Company Limited

www.perkins.com





















# Low Voltage alternators - 4 pole LSA 40

10 to 23 kVA - 50 Hz / 12.5 to 28 kVA - 60 Hz

Electrical and mechanical data

4250 en - 2013.07 / e

# Low Voltage alternators 4 pole 3-phase PARTINER

**LSA 40** 

10 to 23 kVA - 50 Hz / 12.5 to 28 kVA - 60 Hz

### **General characteristics**

Insulation class	Н	Excitation system	SHUNT	AREP
Winding pitch	2/3 (wdg 6)	AVR type	R 220	R 438
Number of wires	12	Voltage regulation (*)	±1%	±0.5%
Protection	IP 23	Short-circuit current	-	300% (3 IN): 10 s
Altitude	≤ 1000 m	Totale Harmonic distortion THD (*	*) in no-load : < 3%	according to IEC
Overspeed	2250 min <sup>-1</sup>	Totale Harmonic distortion THD (*	*) on linear load : < 5%	according to IEC
Air flow	0.06 m <sup>3</sup> /s, 50 Hz - 0.072 m <sup>3</sup> /s, 60 Hz	Waveform: NEMA = TIF (**)		< 50

<sup>(\*)</sup> Steady state. (\*\*) Total harmonic distortion between phases, in no-load or on linear load.

## Ratings 50 Hz - 1500 R.P.M.

kVA / kW	V - P.I	F. = 0.	8	45		10.000					110000		Section 2								
Duty/T°C		С	ontinu	ous du	uty/40°	°C	С	ontinu	ous di	uty/40°	,C	35.1	Star	nd-by/	40°C		307	Star	nd-by/2	27°C	
Class/T°K			H	1/125°	K			F	7105°	K		H/150°K				H/163°K					
Phase	2	40	3	ph.		1 ph.		3	3 ph. 1 ph.		1 ph.	15	3	ph.		1 ph.		3	ph.	n. 1	
Υ		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	
40 VS1	kVA	10	10	10	9	7	9	9	9	8	6.5	10.5	10.5	10.5	9	7.5	11	11	11	10	8
	kW	8	8	8	7.2	5.6	7.2	7.2	7.2	6.4	5.2	8.4	8.4	8.4	7.2	6	8.8	8.8	8.8	8	6.4
40 VS2	kVA	12.5	12.5	12.5	11	9	11.5	11.5	11.5	10	8	13.5	13.5	13.5	12	9.5	14	14	14	12.5	10
	kW	10	10	10	8.8	7.2	9.2	9.2	9.2	8	6.4	10.8	10.8	10.8	9.6	7.6	11.2	11.2	11.2	10	8
40 S3	kVA	15	15	15	13	10.5	14	14	14	12	10	16	16	16	14	11.5	16.5	16.5	16.5	15	12
	kW	12	12	12	10.4	8.4	11.2	11.2	11.2	9.6	8	12.8	12.8	12.8	11.2	9.2	13.2	13.2	13.2	12	9.6
40 S4	kVA	17.5	17.5	17.5	16	12.5	16	16	16	14	11.5	19	19	19	16.5	13.5	19.5	19.5	19.5	17	14
	kW	14	14	14	12.8	10	12.8	12.8	12.8	11.2	9.2	15.2	15.2	15.2	13.2	10.8	15.6	15.6	15.6	13.6	11.2
40 M5	kVA	20	20	20	18	14	18.5	18.5	18.5	16	13	21.5	21.5	21.5	19	15	22	22	22	20	15.5
	kW	16	16	16	14.4	11.2	14.8	14.8	14.8	12.8	10.4	17.2	17.2	17.2	15.2	12	17.6	17.6	17.6	16	12.4
40 L7	kVA	23	23	23	19	15	20	20	20	16	14	24	24	24	20	16	25	25	25	22	16.5
	kW	18.4	18.4	18.4	15.2	12	16	16	16	12.8	11.2	19.2	19.2	19.2	16	12.8	20	20	20	17.6	13.2

## Ratings 60 Hz - 1800 R.P.M.

Duty/T°C		C	ontinu	ous di	uty/40	°C	C	ontinu	ious d	uty/40	°C		Sta	nd-by/	40°C			Sta	nd-by/	27°C		
Class/T°K			H	1/125°	K			-	F/105°	K		H/150°K					H/163°K					
Phase		(0)	3	h.		1 ph.		3	ph.		1 ph.	3 ph.		1 ph.		3	ph.		1 ph.			
Υ		380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380∨	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			208∨	220V	240V		
40 VS1	kVA	10	11	11.5	12.5	9	9.5	10.5	10.5	11.5	8.5	11	11.5	12.5	13.5	9.5	11.5	12	13	14	10	
	kW	8.0	8.8	9.2	10.0	7.2	7.6	8.4	8.4	9.2	6.8	8.8	9.2	10	10.8	7.6	9.2	9.6	10.4	11.2	8	
40 VS2	kVA	12.5	13.5	14.5	15.5	11.5	11.5	12.5	13.5	14.5	10.5	13.5	14.5	15.5	16.5	12	14	15	16	17	12.5	
	kW	10.0	10.8	11.6	12.4	9.2	9.2	10	10.8	11.6	8.4	10.8	11.6	12.4	13.2	9.6	11.2	12	12.8	13.6	10	
40 S3	kVA	15	16.5	17.5	19	13	14	15.5	16.5	17.5	12	16	18	19	20	13.5	17	18.5	19.5	21	14	
	kW	12	13.2	14.0	15.2	10.4	11.2	12.4	13.2	14	9.6	12.8	14.4	15.2	16	10.8	13.6	14.8	15.6	16.8	11.2	
40 S4	kVA	17.5	19	20	22	14.5	16.5	18	19	20.5	13	19	20.5	21.5	23.5	15	19.5	21	22	24.5	15.5	
	kW	14.0	15.2	16.0	17.6	11.6	13.2	14.4	15.2	16.4	10.4	15.2	16.4	17.2	18.8	12	15.6	16.8	17.6	19.6	12.4	
40 M5	kVA	20	22	23	25	16	18.5	20.5	21.5	23	15	21.5	23.5	25	27	17	22	24.5	26	27.5	17.5	
	kW	16	17.6	18.4	20	12.8	14.8	16.4	17.2	18.4	12.0	17.2	18.8	20	21.6	13.6	17.6	19.6	20.8	22	14	
40 L7	kVA	22	24.5	25.5	28	17.5	20.5	23	24	25	15.5	24	26	27.5	30	18.5	24.5	27	28.5	31	19.5	
	kW	17.6	19.6	20.4	22.4	14	16.4	18.4	19.2	20	12.4	19.2	20.8	22	24	14.8	19.6	21.6	22.8	24.8	15.6	

Ref: 4250 en 3

## Low Voltage alternators 4 pole 3-phase PARTNER

**LSA 40** 

10 to 23 kVA - 50 Hz / 12.5 to 28 kVA - 60 Hz

### SPECIALLY ADAPTED TO APPLICATIONS

The LSA 40 alternator is designed to be suitable for typical generator applications, such as: backup, marine applications, rental, telecommunications, etc.

### COMPLIANT WITH INTERNATIONAL STANDARDS

The LSA 40 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 40 is designed, manufactured and marketed in an ISO 9001 environment.

### 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)
  - 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),
  - 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**

Ex	citation syste	m		Regulation options									
Voltage regulator	SHUNT	AREP	Current transformer for paralleling	Mains paralleling	3-phase sensing	Remote voltage potentiometer							
R220	Std	-	-	-	-	-							
R438		Std	C.T.*	R726*	R731*	1							
D510C*	Option	Option	C.T.*	included	included	1							

AVR voltage accuracy ± 1%

√: Possible mounting

\* External mounting

### PROTECTION SYSTEM SUITED TO THE ENVIRONMENT

- The LSA 40 is IP 23.
- Standard winding protection for clean environments with relative humidity ≤ 95%, including indoor marine environments.
- Options:
  - filters on air inlet: derating 5%,
  - filters on air inlet and air outlet (IP 44): derating 10%,
  - winding protection for harsh environments and relative humidity greater than 95%,
  - space heaters,
  - thermal protection for stator windings,
  - steel terminal box.

### REINFORCED MECHANICAL STRUCTURE USING FINITE ELEMENT MODELLING

- Compact rigid assembly to better withstand generator vibrations.
- Steel frame.
- Aluminium flanges and shields.
- Two-bearing and single-bearing versions designed to be suitable for commercially-available heat engines.
- Half-key balancing.
- Permanently greased bearings.
- Direction of rotation : clockwise and anti-clockwise (without derating).

### **ACCESSIBLE TERMINAL BOX**

- Easy access to the AVR and to the connections.
- 8 way terminal block for reconnecting the voltage.
- · Predrilled holes for cable gland.



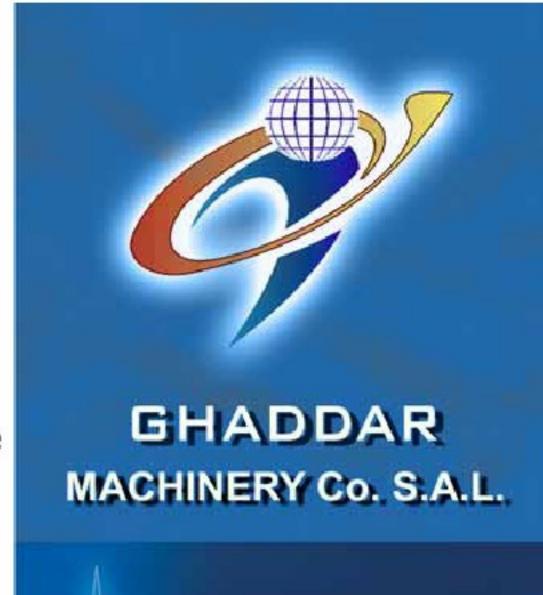
2 Ref: 4250 en

# 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).



Your Power Partner

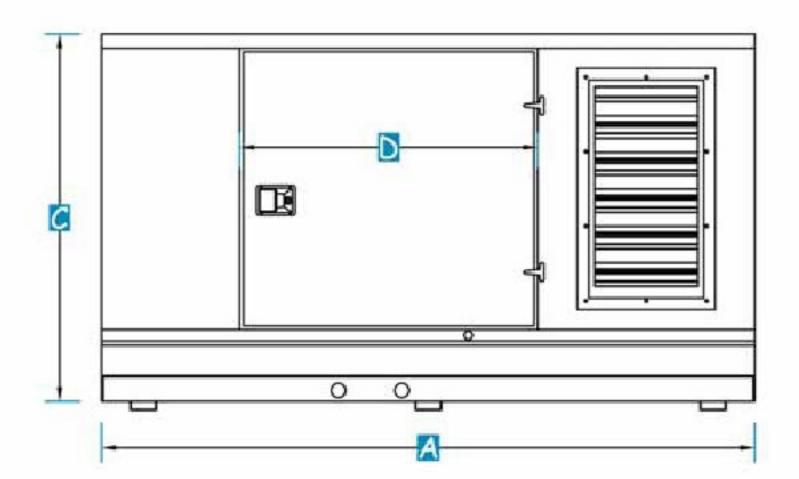


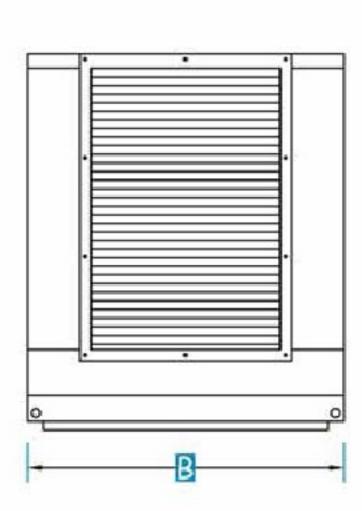
Range 9 - 60 KVA



# Sound Pressure Levels (dBA)

		50 Hz							60 Hz						
		1	m	3	m	7	m	1	1 m		3 m		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	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 Engine model	Powertech KVA	A: mm	B: mm	C: mm	D: mm
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