

# 1103A-33G

# 1100

31.0 kWm (Gross) @ 1500 rpm  
36.5 kWm (Gross) @ 1800 rpm

## Genset

## Series

### Basic technical data

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	Four stroke
Induction system	Naturally Aspirated
Compression ratio	19.25 : 1
Bore	105 mm (4.13 in)
Stroke	127 mm (4.99 in)
Cubic capacity	3.3 litres
Direction of rotation	Clockwise view from front
Firing order	1,2,3

### Weight of Genset (engine only)

Dry	412 kg
Wet	430 kg

### Overall dimensions of ElectropaK

Height	951 mm (37.44 inches)
Length	1000 mm (39.37 inches)
Width (including mounting brackets)	629 mm (24.76 inches)

### Moment of inertia

Engine:	
- longitudinal	23.3 kgm <sup>2</sup>
- horizontal	38.1 kgm <sup>2</sup>
- axial	24.4 kgm <sup>2</sup>
Flywheel (polar)	1.14 kgm <sup>2</sup>

### Centre of gravity (wet)

Forward from rear of block	210 mm (8.26 inches)
Above centre line of block	120 mm (4.72 inches)
Offset of RHS of centre line	40 mm (1.57 inches)

### Ratings

Steady state speed stability at constant load  $\pm 0.75\%$   
Electrical ratings are based on average alternator efficiency and are for guidance only (0.8 power factor being used).

### Performance

Overall sound pressure level (cooling pack and air cleaner fitted):  
@1500 rpm 88.1dB(A)  
@1800 rpm 90.7dB(A)

**Note:** Sound pressure level from the mean of 4 microphones at the front, left, right and above the engine. Exhaust was piped away out of the test cell.

**Note:** All data based on operation to ISO 3046/1, BS 5514 and DIN 6271 standard reference conditions.

**Note:** For engines operating in ambient conditions other than the standard reference conditions stated below, a suitable derate must be applied.

**Note:** Derate tables for increased ambient temperature and/or altitude are available, please contact Perkins Applications Department.

### Test conditions

Air temperature 25°C  
Barometric pressure 100 kPa  
Relative humidity 30%

**Note:** For test conditions relevant to data on load acceptance, refer to Perkins Applications Department.

## General installation

### 1103A-33G

Designation	Units	Type of operation and application			
		Prime power 50 Hz	Standby power 50 Hz	Prime power 60 Hz	Standby power 60 Hz
Gross engine power	kWb	28.2	31	33.2	36.5
Gross BMEP	kPa (lbf/in <sup>2</sup> )	684 (99.2)	752 (109.0)	669 (97.0)	736 (106.7)
Mean piston speed	m/s (ft/s)	6.35 (20.8)		7.62 (25.0)	
ElectropaK nett engine power	kWm	27.7	30.4	32.2	35.4
Engine coolant flow 35 kPa restriction	litres/min (UK gal/min)	125.5 (27.6)		151 (33.2)	
Combustion air flow	m <sup>3</sup> /min (ft <sup>3</sup> /min)	2.16 (76.2)	2.15 (75.9)	2.6 (91.8)	2.57 (90.7)
Exhaust gas flow (maximum)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	5.7 (201.2)	5.8 (204.8)	6.4 (226.0)	6.6 (233.0)
Exhaust gas temperature (maximum) in manifold	°C (°F)	500 (932)	520 (968)	520 (968)	530 (986)
Cooling fan air flow	m <sup>3</sup> /min (ft <sup>3</sup> /min)	53 (1871.6)		70 (2472)	
Overall thermal efficiency (nett)	%	39.2	39.2	40	37.3
Typical Genset electrical output 0.8pf 25°C	kWe	24	26.4	27.9	30.6
	kVA	30	33	34.9	38.2
Assumed alternator efficiency	%	87			

**Note:** The above data is based on 42940 MJ/kg calorific value for diesel conforming to specification BS2869 Class A2.

## Rating definitions

### Prime power

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

### Standby power

Limited to 500 hours annual usage with an average load factor of 80% of the published Standby power rating over each 24 hour period. Up to 300 hours of annual usage may be run continuously. No overload is permitted on Standby power.

## Energy balance

Designation	Units	Prime power 50 Hz	Standby power 50 Hz	Prime power 60 Hz	Standby power 60 Hz
Energy in fuel	kW (Btu/min)	72 (4098.2)	79 (4496.6)	83 (4724.3)	98 (5578.1)
Energy in power output (gross)	kW (Btu/min)	28.2 (1605.1)	31 (1764.5)	33.2 (1889.7)	36.5 (2077.5)
Energy to cooling fan	kW (Btu/min)	0.5 (28.4)	0.6 (34.1)	1 (56.9)	1.1 (62.6)
Energy in power output (nett)	kW (Btu/min)	27.7 (1576.6)	30.4 (1730.3)	32.2 (1832.8)	35.4 (2014.9)
Energy to coolant and oil	kW (Btu/min)	16 (910.7)	18 (1024.5)	18 (1024.5)	22 (1252.2)
Energy to exhaust	kW (Btu/min)	22 (1252.2)	25 (1422.9)	27 (1536.8)	34 (1935.2)
Energy to radiation	kW (Btu/min)	5 (284.5)	6 (341.5)	5 (284.5)	6 (341.5)

**Note:** The airflows shown in this table will provide acceptable cooling for an open power unit operating in ambient temperatures of up to 53 °C (127 °F) or 46 °C (114.8 °F) if a canopy is fitted. If the power unit is to be enclosed totally, a cooling test should be done to check that the engine cooling is acceptable. If there is insufficient cooling, contact Perkins Technical Service Department.

**Note:** Not to be used for CHP design purposes (indicative figures only). Consult Perkins Engines Company Limited.

## Cooling system

### Radiator

Face area	0.276 m <sup>2</sup> (2.97 ft <sup>2</sup> )
Rows and materials	Single row aluminium
Matrix density and material	Aluminium 12,5 fins/inch
Width of matrix	526 mm (20.7 inches)
Height of matrix	524 mm (20.6 inches)
Pressure cap setting	107 kPa

### Fan

Diameter	457mm (18 in)
Drive ratio	0.85:1
Number of blades	7
Material	Composite
Type	Pusher

### Coolant

Recommended coolant: 50 % ethylene glycol with a corrosion inhibitor (BS 658 : 1992 or MOD AL39) and 50% clean fresh water.

Total system capacity:

With radiator	10.2 l (21.5 pt)
Without radiator	4.4 l (9.2 pt)
Maximum top tank temperature	110 °C (230 °F)
Thermostat operating range	82 - 93 °C (180 - 199 °F)

## Lubrication system

### Lubricating oil capacity

Total system	8.3 litres (17.5 pt)
Sump minimum	6.2 litres (13.1 pt)
Sump maximum	7.8 litres (16.4 pt)
Maximum engine operating angles:	
Front up, front down, right side or left side	25°

### Lubricating oil pressure

Relief valve opens	415 - 470 kPa
- at maximum no-load speed	276 - 414 kPa
Maximum continuous oil temperature (in rail)	125 °C (257 °F)
Oil consumption at full load as a % of fuel consumption	0.15%

## Exhaust system

Maximum back pressure

1500 rpm	8 kPa
1800 rpm	10 kPa
Exhaust outlet size	56 mm (2.2 inches)

## Fuel System

Type of injection	Direct
Fuel injection pump	Rotary
Fuel atomiser	Multi-hole
Nozzle opening pressure	29 MPa (290 bar)

### Fuel lift pump

Type	Mechanical
Flow/hour	120 - 150 litres/h (211 - 264 pt/m)
Pressure	30 - 75 kPa (4.4 - 10.9 psi)
Maximum suction head:	
1500 rpm	17 kPa

### Governor type

Mechanical and electronic governor speed control to ... ISO 8528, G2

### Fuel specification

Fuel Specification	European RF75-T-96 / DIN EN590 / BS2869 class A2
Density (kg/l @ 15 °C)	0.835 - 0.845
Viscosity (mm <sup>2</sup> /s @ 40 °C)	2.5 - 3.5
Sulphur content (%)	0.1 - 0.2
Cetane number	45 - 50

### Fuel consumption litres/hour (UK gals/hr)

		Power rating				
Speed	Unit	110%	100%	75%	50%	25%
1500	Litres	8.01	7.33	5.59	4.07	2.62
	Gallons	1.76	1.61	1.23	0.90	0.58
	SFC (g/kwh)	211.7	210.6	215.8	230.7	298.8

## Electrical system

Type .....	Negative ground
Alternator voltage .....	12 volts
Alternator output .....	65 amps
Starter motor voltage .....	12 volts
Starter motor power .....	3 kW
Number of teeth on flywheel .....	126
Pull in current of starter motor solenoid .....	60 amps
Hold in current of starter motor solenoid .....	15 amps
Engine stop solenoid .....	12 volts
Stop solenoid (minimum):	
Pull in current .....	10 amps
Hold in current .....	10 amps

### Cold start recommendations

Minimum cranking speed ..... 120 rpm

### Starter specification

Starter motor type	Min. starting temp. °C (°F)	Lubricating oil viscosity SAE / battery type - values in CCA				
		15W/40	15W/40	10W/40	5W/40	5W/30
12 volt 3.0 kW	-7 (19.4)	1 x 770				
	-10 (14)*		1 x 770			
	-15 (5)*			1 x 770		
	-20 (-4)*				1 x 900	
	-25 (-13)*					2 x 570

\* Start aid fitted

**Note:** CCA - Cold Cracking Amps to SAEJ537.

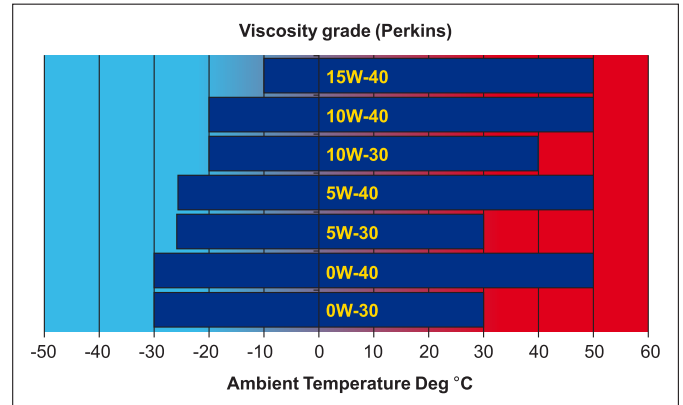
**Note:** Battery capacity is defined by the 20 hour rate.

**Note:** If a change to a low viscosity oil is made, the cranking torque necessary at lower ambient temperatures is much reduced. The starting equipment has been selected to take advantage of this. It is important to change the appropriate multigrade oil in anticipation of operating in low ambient temperatures.

**Note:** Breakaway current is dependent on battery capacity available. Cables should be capable of handling the transient current which may be up to double the steady cranking current.

## Recommended SAE viscosity

A single or multigrade oil conforming to API-CH-4 or ACEA E5 must be used.



## Engine mounting

Maximum static bending moment at rear face of block 791 Nm (583 lb/ft)

## Load acceptance

The figures below comply with requirements of Classification 3 and 4 of ISO 8528 - 12 and G2 operating limits stated in ISO 8528 - 5.

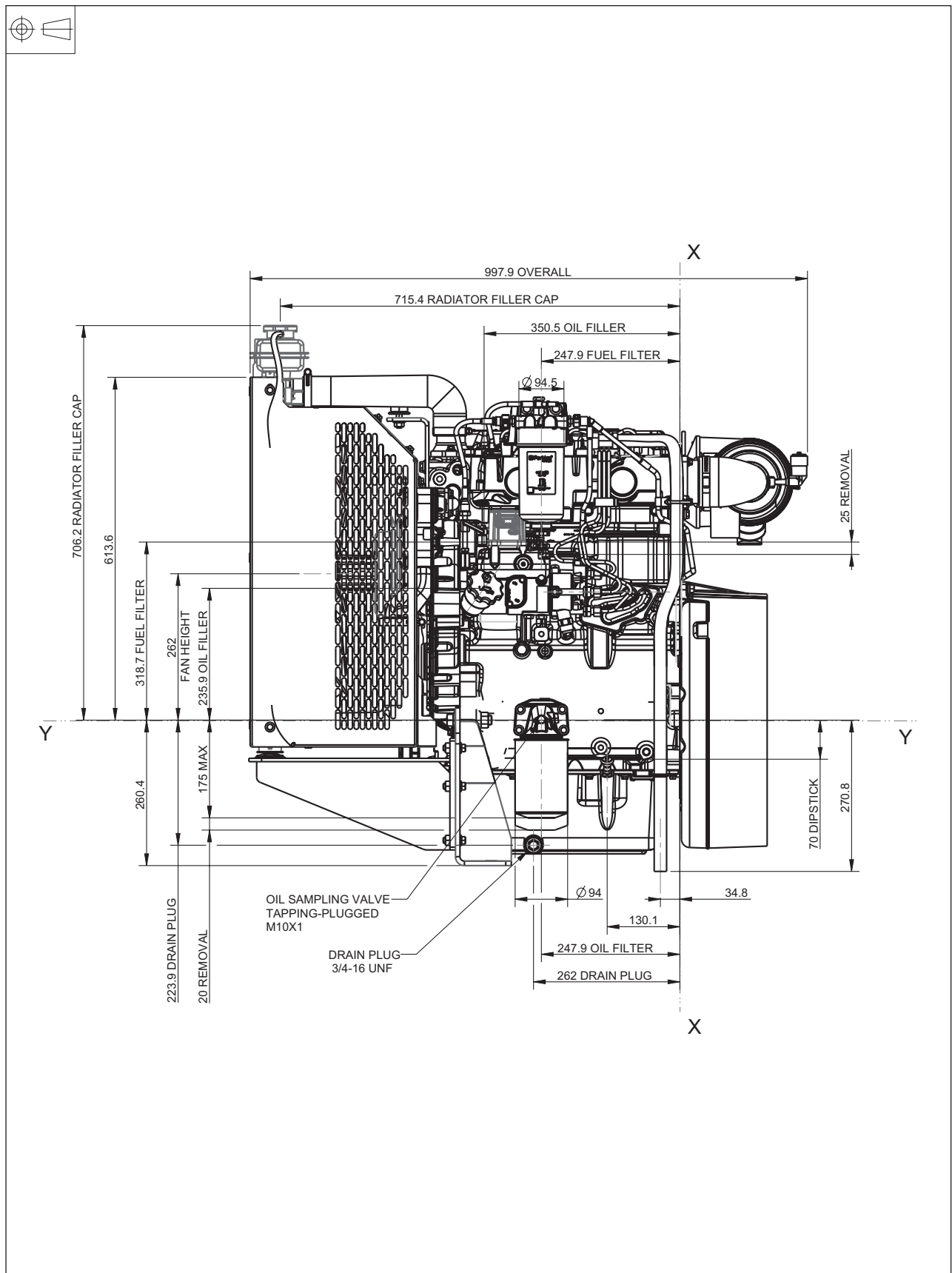
Initial load application: When engine reaches rated speed (15 seconds maximum after engine starts to crank)			
Descriptor	Units	1500 rpm	1800 rpm
Prime power	%	90	90
Load	kWm (kWe)	25.7 (21.8)	29.4 (24.7)
Transient frequency deviation	%	< -10	< -10
Frequency recovery	Second	< 1	< 1

The figures shown in the table above were obtained under the following test conditions:

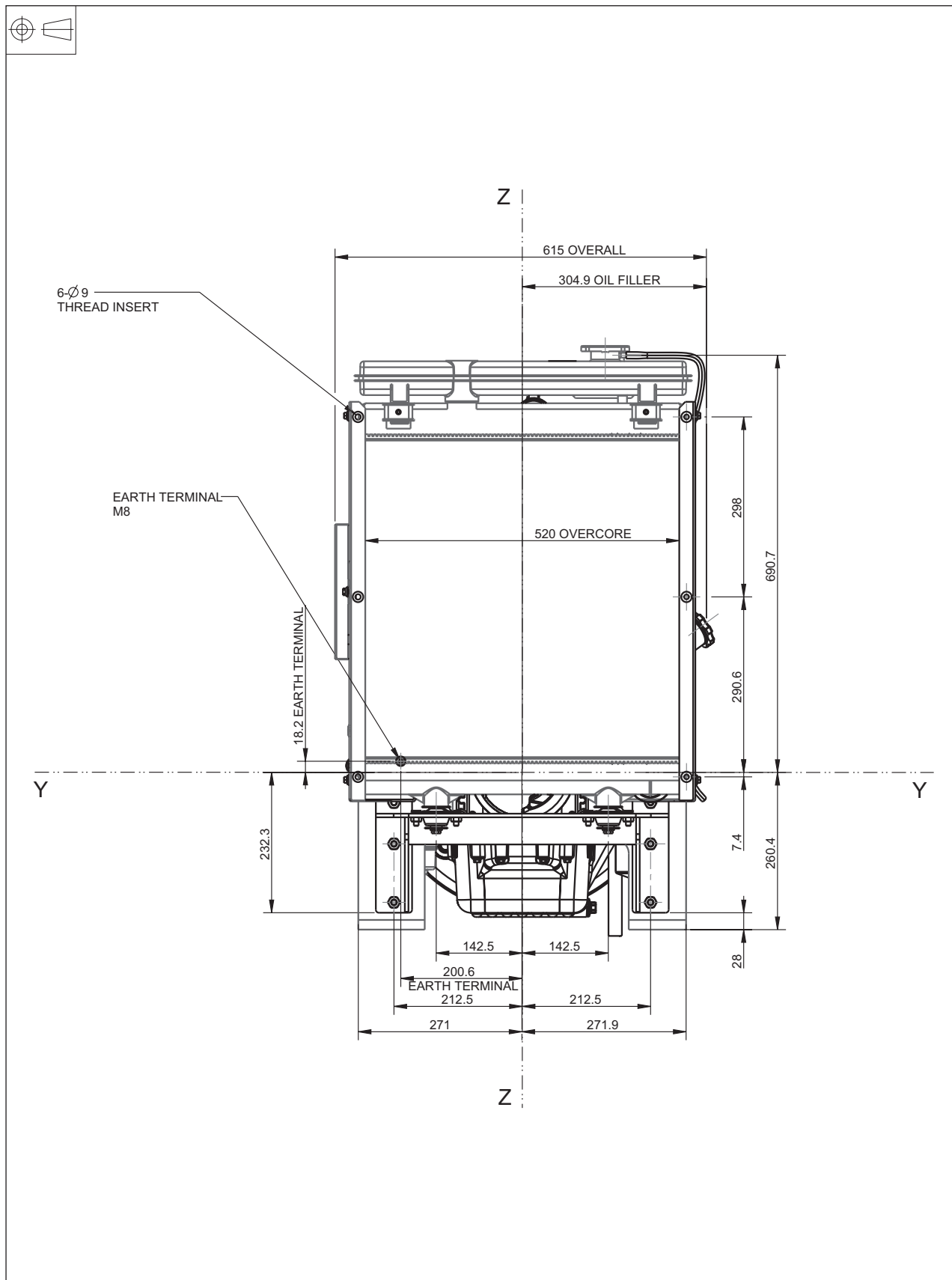
Alternator efficiency .....	87%
Minimum ambient temperature .....	15 °C
Governing mode .....	5%
Typical alternator inertia .....	0.1676 kgm <sup>2</sup>

All tests were conducted using an engine installed and serviced to Perkins Engine Company Limited recommendations.

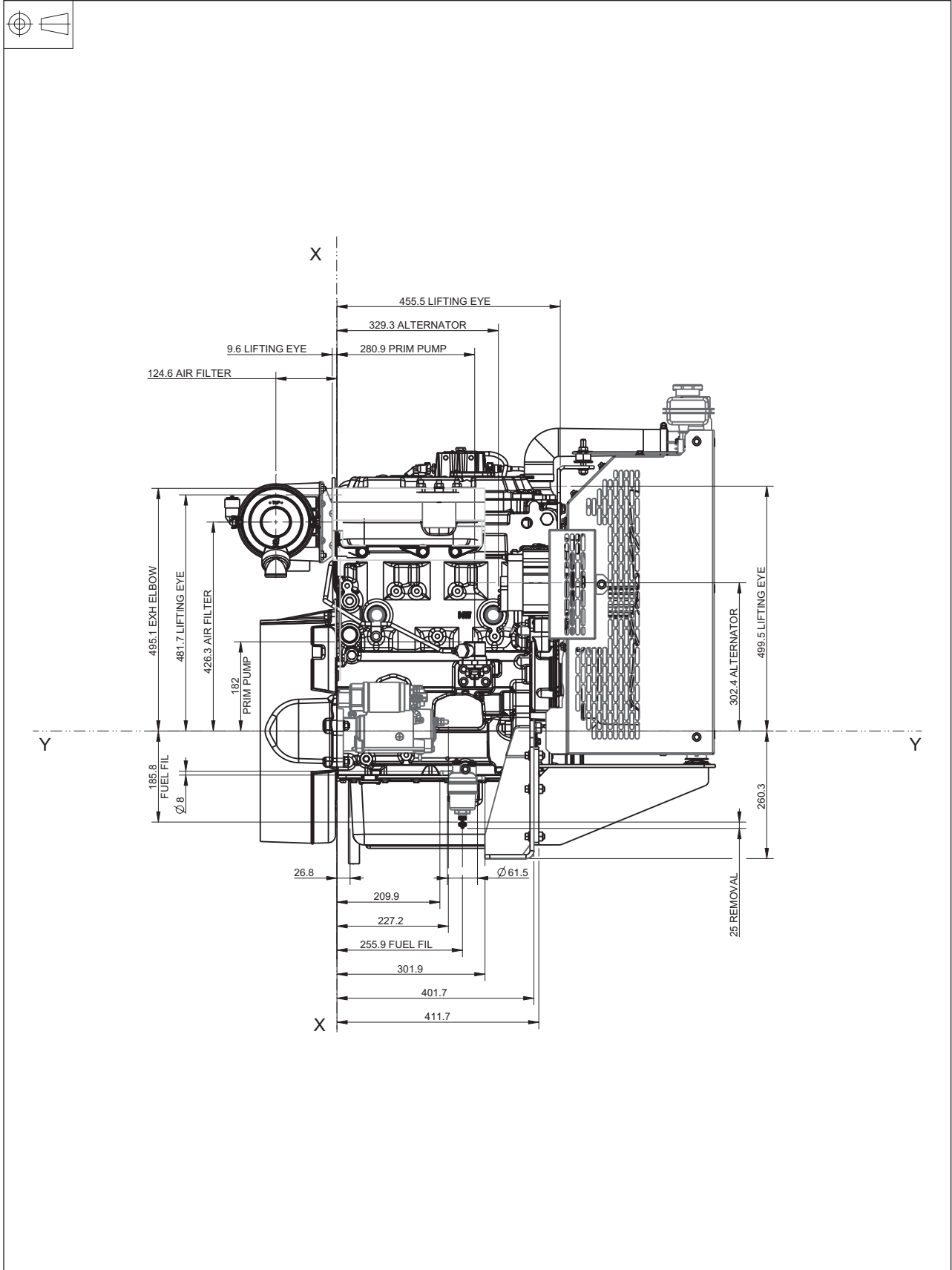
# 1103A-33G - Left side view



# 1103A-33G - Front side view



# 1103A-33G - Right side view



# 1103A-33G - Rear side view

