

# 1103A-33TG1

46.5 kWm @ 1500 rpm

54.5 kWm @ 1800 rpm

## Genset

# 1100

## Series

### Basic technical data

Number of cylinders .....	3
Cylinder arrangement .....	Vertical in-line
Cycle .....	Four stroke
Induction system .....	Turbocharged
Compression ratio .....	17.25 : 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 .....	420 kg
Wet .....	438 kg

### Overall dimensions

Height .....	951 mm (37.44 inches)
Length .....	1049 mm (41.29 inches)
Width (including mounting brackets) .....	634 mm (24.96 inches)

### Moment of inertia

Engine:

- longitudinal .....	25 kgm <sup>2</sup>
- horizontal .....	42 kgm <sup>2</sup>
- axial .....	25 kgm <sup>2</sup>
Flywheel (polar) .....	1.14 kgm <sup>2</sup>

### Centre of gravity (wet)

Forward from rear of block .....	215 mm (8.46 inches)
Above centre line of block .....	120 mm (4.72 inches)
Offset of RHS of centre line .....	25 mm (0.98 inches)

### Performance

Steady state speed stability at constant load: G2 .....  $\pm 0.75\%$

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

### Test conditions

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

### Sound Level

Overall sound pressure level (cooling pack and air cleaner fitted):

@1500 rpm .....	88.2 dB(A)
@1800 rpm .....	92.1 dB(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:** If the engine is to operate in ambient conditions other than those of the test conditions, suitable adjustments must be made for these changes. For full details, contact Perkins Technical Service Department.

### Cyclic irregularity (for engine and flywheel)

#### Prime power:

@1500 rpm .....	$\pm 0.045\%$
@1800 rpm .....	$\pm 0.031\%$

## General installation

### 1103A-33TG1

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	kWm	42.2	46.5	50.5	54.5
Brake mean effective pressure	kPa (lbf/in <sup>2</sup> )	1023 (148.3)	1128 (163.6)	1020 (147.9)	1124 (163.0)
Mean piston speed	m/s (ft/s)	6.35 (20.8)		7.62 (25.0)	
ElectropaK nett engine power	kWm	41.3	45.6	48.8	53.9
Engine coolant flow 35 kPa restriction	litres/min (UK gal/min)	125.5 (27.6)		151.0 (33.2)	
Combustion air flow	m <sup>3</sup> /min (ft <sup>3</sup> /min)	2.9 (102.4)	3.1 (109.4)	3.7 (130.6)	3.9 (137.7)
Exhaust gas flow (maximum)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	7.0 (247.2)	7.7 (271.9)	8.8 (310.7)	9.5 (335.4)
Exhaust gas temperature (maximum) in manifold	°C (°F)	492 (917.6)	537 (999.6)	510 (950.0)	551 (1023.8)
Cooling fan air flow	m <sup>3</sup> /min (ft <sup>3</sup> /min)	53.0 (1871.6)		70.0 (2472.0)	
Overall thermal efficiency (nett)	%	39.8	38.7	39.3	39.1
Typical Genset electrical output (0.8pf 25°C)	kWe	36.0	39.7	42.5	46.9
	kVA	45.0	49.6	53.1	58.7
Assumed alternator efficiency	%	87			

## Energy balance

Designation	Units	Prime power 50 Hz	Standby power 50 Hz	Prime power 60 Hz	Standby power 60 Hz
Power in fuel (Fuel heat of combustion)	kW (Btu/min)	106.0 (6033.4)	120.0 (6830.3)	129.0 (7342.6)	142.0 (8082.5)
Power output (gross)	kW (Btu/min)	42.2 (2402.0)	46.5 (2646.7)	50.5 (2874.4)	55.6 (3164.7)
Power to cooling fan	kW (Btu/min)	0.9 (51.2)		1.7 (96.7)	
Power output (nett)	kW (Btu/min)	41.3 (2350.7)	45.6 (2595.5)	49.0 (2789.0)	53.9 (3067.9)
Power to coolant and lubricating oil	kW (Btu/min)	26.0 (1479.9)	30.0 (1707.5)	31.0 (1764.5)	34.0 (1935.2)
Power to exhaust	kW (Btu/min)	30.0 (1707.5)	35.0 (1992.1)	39.0 (2219.8)	43.0 (2447.5)
Power to radiation	kW (Btu/min)	7.0 (398.4)	8.0 (455.3)	8.0 (455.3)	9.0 (512.2)

**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.

## 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 ..... 125 °C (257 °F)  
Oil consumption at full load as a % of fuel consumption ..... 0.15%

## Exhaust system

Maximum back pressure  
1500 rpm. .... 10 kPa  
1800 rpm ..... 15 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 ..... 29.0 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. .... 20 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	11.77	10.52	7.98	5.58	3.28
	Gallons	2.59	2.31	1.76	1.23	0.72
	SFC (g/kwh)	210.6	206.9	209.4	220.4	261

### Induction system

Maximum air intake restriction

Clean filter ..... 5 kPa  
Dirty filter ..... 8 kPa  
Air filter type ..... Dry

## 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 ..... 105 rpm

### Starter specification

Starter motor type	Minimum starting temperature °C (°F)	Lubricating oil viscosity SAE / battery type - values in CCA			
		15W/40	10W/40	5W/40	5W/30
12 volt 3.0 kW	-10 (14)*	1 x 660			
	-15 (5)*		1 x 660		
	-20 (-4)*			1 x 660	
	-25 (-13)*				2 x 570

\* Starting aid fitted

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

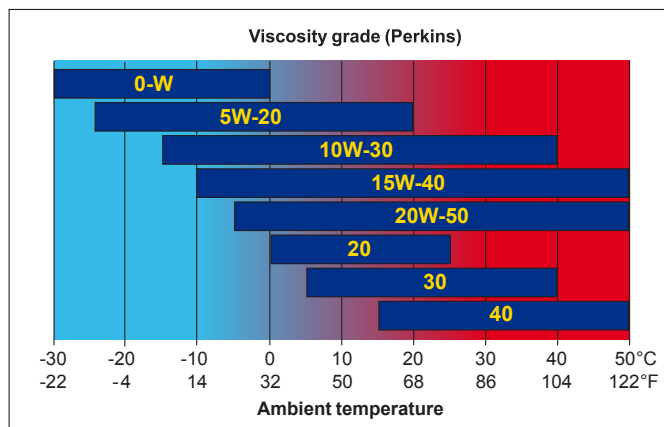
**Note:** Battery capacity is defined by the 20 hour rate.

**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 must be used which conforms to API-CG4 / CH4, see illustration below.



## Mountings

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

## Load acceptance

Initial load application: When engine reaches rated speed (15 seconds maximum after engine starts to crank)			
	Units	1500 rpm	1800 rpm
Prime power	%	90	90
Load	kWm (kWe)	38.0 (32.3)	45.5 (38.2)
Transient frequency deviation	%	< 10	< 10
Frequency recovery	Seconds	< 5	< 5

The above complies with requirements of Classification 3 and 4 of ISO 8528 - 12 and G2 operating limits stated in ISO 8528 - 5.

The above figures were obtained under the test conditions as follows:

Engine block temperature..... 105 °C

Alternator efficiency..... 87%

Minimum ambient temperature ..... 10 °C

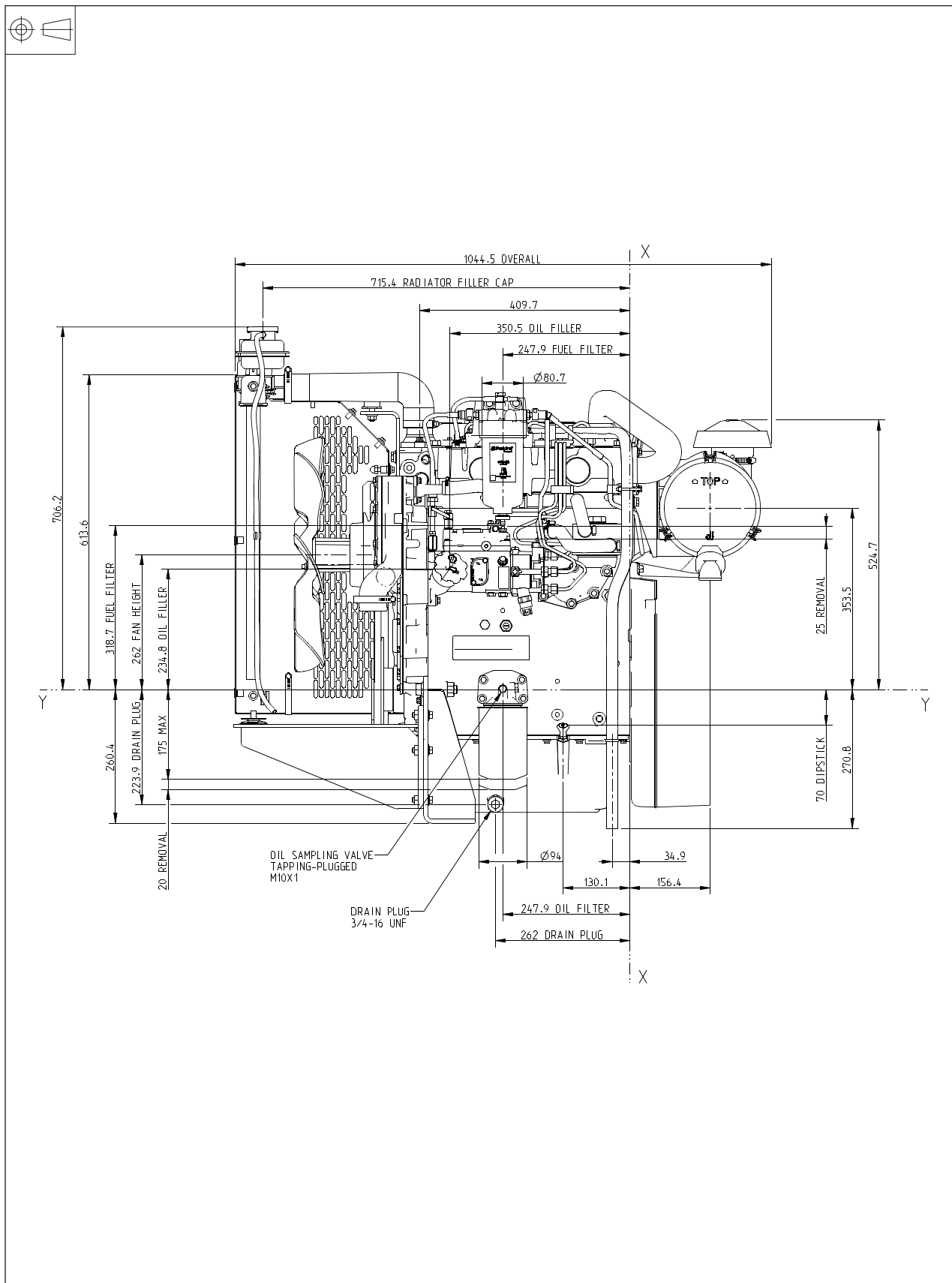
### Isochronous governing:

Typical alternator inertia ..... 0.364 kgm<sup>2</sup>

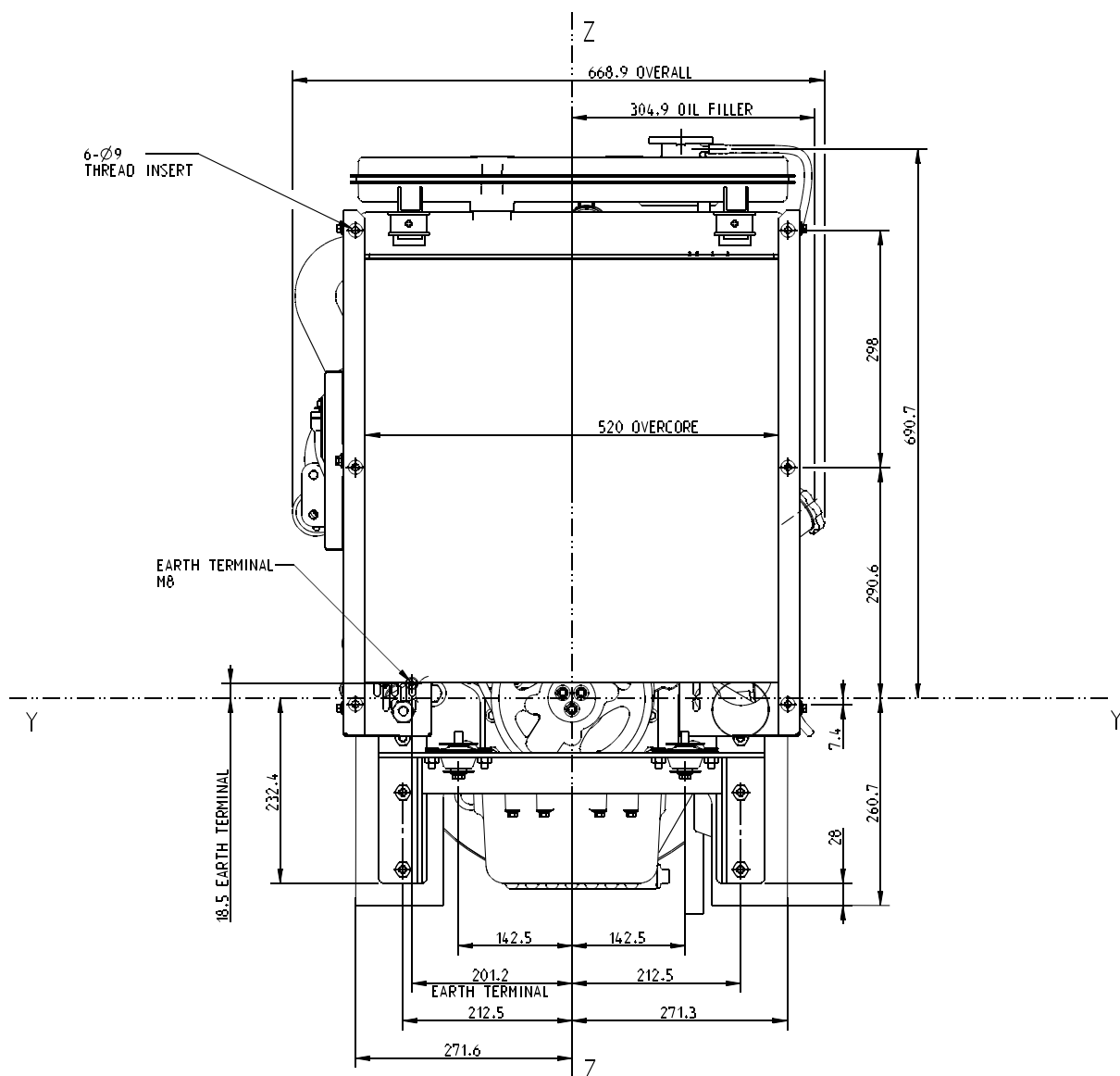
All tests were conducted using an engine installed and serviced to Perkins Engine Company Limited recommendations.

**The information given in this document is for guidance only.**

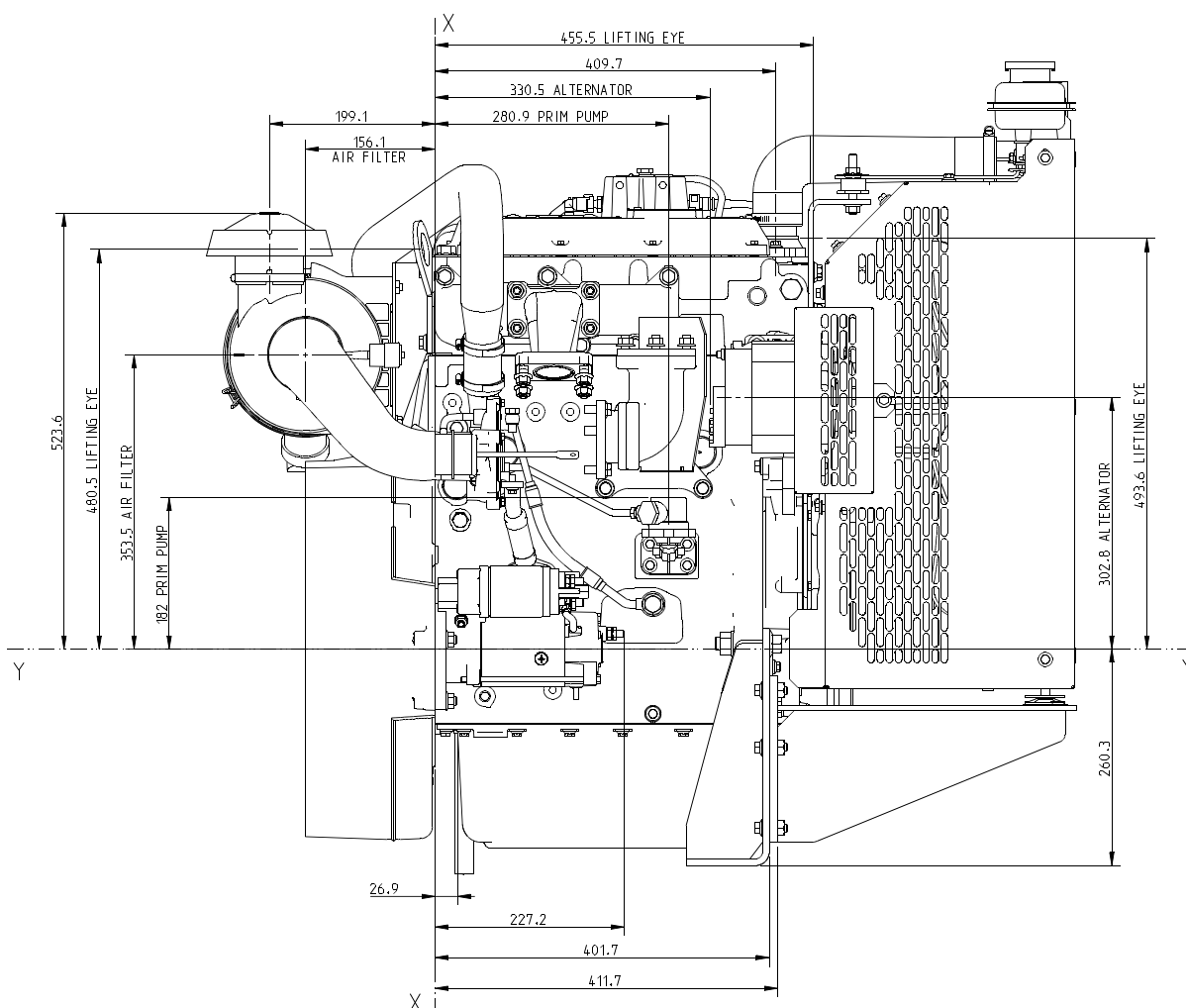
## 1103A-33TG1 - Left side view



## 1103A-33TG1 - Front side view



## 1103A-33TG1 - Right side view



## 1103A-33TG1 - Rear side view

