

1103C-33TG3

1100

45.6 kWm @ 1500 rpm

Diesel engine - Electropak

Series

Basic technical data

| | |
|-----------------------|--|
| Number of cylinders | 3 |
| Cylinder arrangement | Vertical in-line |
| Cycle | Four stroke |
| Induction system | Turbocharged |
| Compression ratio | 18.23 : 1 |
| Bore | 105 mm (4.13 in) |
| Stroke | 127 mm (4.99 in) |
| Cubic capacity | 3.3 litres |
| Direction of rotation | Anti-clockwise when view from flywheel |
| Firing order | 1,2,3 |

Total weight (fan to flywheel)

| | |
|-----|--------|
| Dry | 341 kg |
| Wet | 359 kg |

Overall dimensions of Electropak

| | |
|-------------------------------------|------------------------|
| Height | 951 mm (37.44 inches) |
| Length | 1045 mm (41.14 inches) |
| Width (including mounting brackets) | 631 mm (24.84 inches) |

Moment of inertia

| | |
|------------------|-----------------------|
| Engine: | |
| - longitudinal | 25 kgm ² |
| - horizontal | 42 kgm ² |
| - axial | 25 kgm ² |
| Flywheel (polar) | 1.14 kgm ² |

Centre of gravity (fan to flywheel)

| | |
|------------------------------|------------------------|
| Forward from rear of block | 123 mm (4.84 inches) |
| Above centre line of block | 139 mm (5.47 inches) |
| Offset of RHS of centre line | - 4.7 mm (0.19 inches) |

Performance

Steady state speed stability at constant load: G2 $\pm 0.5\%$
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% |
| Air inlet restriction at maximum power | 3.5 kPa |
| Exhaust back pressure | 12 kPa |
| Fuel temperature (pump inlet) | 40°C |

Sound Level

Estimated sound power level for bare engine without inlet and exhaust at 1 metre
@1500 rpm 98 dB(A)

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.

Emission statement: Certified against the requirements of EU2007 legislation for non-road mobile machinery, powered by constant speed engines (EU97/68/EC Stage II)

Cyclic irregularity (for engine & flywheel) Prime Power:

@1500 rpm $\pm 0.045\%$

General installation

1103C-33TG3

| Designation | Units | Type of operation and application | |
|--|---------------------|-----------------------------------|------------------------|
| | | Prime power 50 Hz | Standby power 50 Hz |
| Gross engine power | kWb | 41.9 | 46.5 |
| Fan Power | kWm | 0.9 | |
| Brake mean effective pressure (gross) | kPa | 1023 | 1128 |
| ElectropaK nett engine power | kWm | 40.9 | 45.6 |
| Engine coolant flow 35 kPa restriction | litres/min | 125.5 | |
| Combustion air flow | m ³ /min | 2.9 | 3.1 |
| Exhaust gas flow (max.) | m ³ /min | 7.0 | 7.7 |
| Exhaust gas temperature (max.) in manifold | °C | 610 | 660 |
| Overall thermal efficiency (nett) | % | 38.0 | 38.4 |
| Boost pressure ratio | | 1.75 | 1.85 |
| Typical Genset electrical output (0.8 pf 25°C) | kWe | 37.0 | 41.0 |
| | kVA | 46.0 | 51.0 |
| Friction power and pumping losses | kWm | 7.7 | |
| Assumed alternator efficiency | % | 90 | |
| Cooling fan air flow | m ³ /min | 53.0 | |
| Specific fuel consumption | l/min | 0.20 | 0.21 |

Energy balance

| Designation | Units | Prime power 50 Hz | Standby power 50 Hz |
|---------------------------------------|-------|-------------------|---------------------|
| Energy in fuel | kWt | 110.1 | 121.5 |
| Energy in power output (gross) | kWb | 41.9 | 46.5 |
| Energy in power output (nett) | kWm | 40.9 | 45.6 |
| Energy to cooling fan | kWm | 0.9 | |
| Energy to coolant and lubricating oil | kWt | 26.4 | 29.0 |
| Energy to exhaust | kWt | 34.1 | 37.5 |
| Energy to radiation | kWt | 7.7 | 8.5 |

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.

Cooling system

Radiator

| | |
|-----------------------------|--|
| Face area | 0.276 m ² (2.97 ft ²) |
| 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 |
| Max 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 | 15 kPa |
| Exhaust outlet size | 56 mm (2.2 inches) |

Fuel System

| | |
|--------------------------------|--------------------|
| Type of injection | Direct |
| Fuel injection pump | Rotary |
| Fuel atomiser | Multi-hole |
| Nozzel opening pressure | 29.0 MPa (290 bar) |
| Nozzel Static injection timing | TDC |

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 | 20 kPa |

Governor type

| | |
|--|--------------------|
| Speed control for diesel to conform to | |
| Mechanical | ISO 8528, Class G2 |

Fuel specification

| | |
|--------------------|----------------------------------|
| Fuel Specification | BS2869 1998 Class A2 or BS EN590 |
|--------------------|----------------------------------|

Fuel consumption

| Load | Type of operation and application | |
|------|-----------------------------------|-----------|
| | g/kWh | litres/hr |
| 110% | 216 | 11.7 |
| 100% | 217 | 10.7 |
| 75% | 224 | 8.6 |
| 50% | 237 | 6.1 |
| 25% | 274 | 3.5 |

Induction system

Maximum air intake restriction

| | |
|-----------------|----------------------------------|
| Clean filter | 4 kPa |
| Dirty filter | 5 kPa |
| Air filter type | 2 Stage cyclonic / paper element |

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 | 80 rpm |
|------------------------------|--------|

Starter specification

| Starter motor type | Min. starting temp. °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 |

* Start aid fitted

Note: CCA - Cold Cracking Amps to SAEJ537.

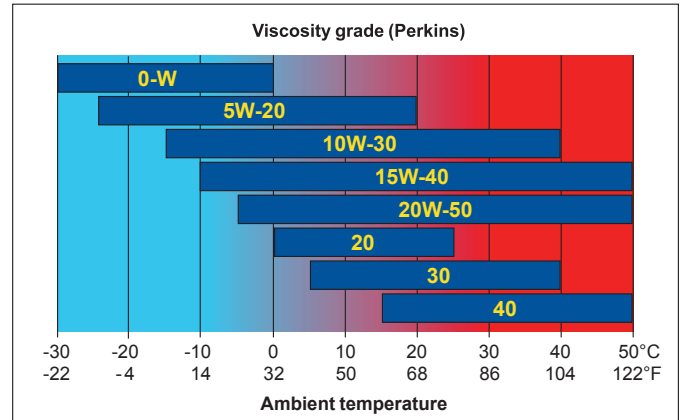
Note: Battery capacity is defined by the 20 hour rate.

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 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 |
| Prime power | % | 90 |
| Load | kWm (kWe) | 33.0 |
| Transient frequency deviation | % | < 10 |
| Frequency recovery | Seconds | < 5 |

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

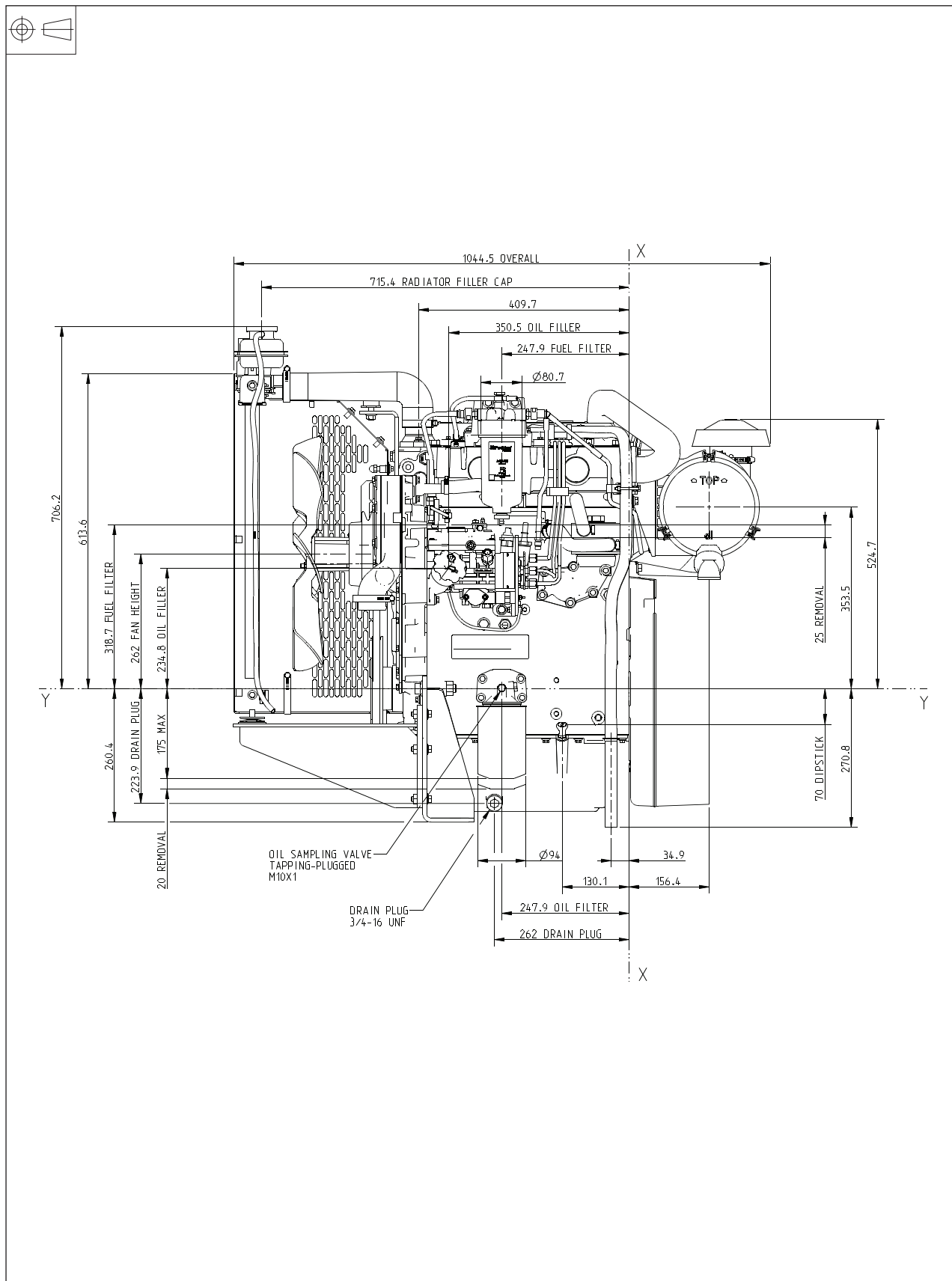
The above figures were obtained under the test conditions as follows:

| | |
|-----------------------------------|------------------------|
| Engine block temperature..... | 45 °C |
| Alternator efficiency..... | .89% |
| Minimum ambient temperature | 10 °C |
| Isochronous governing: | |
| Typical alternator inertia | 0.496 kgm ² |

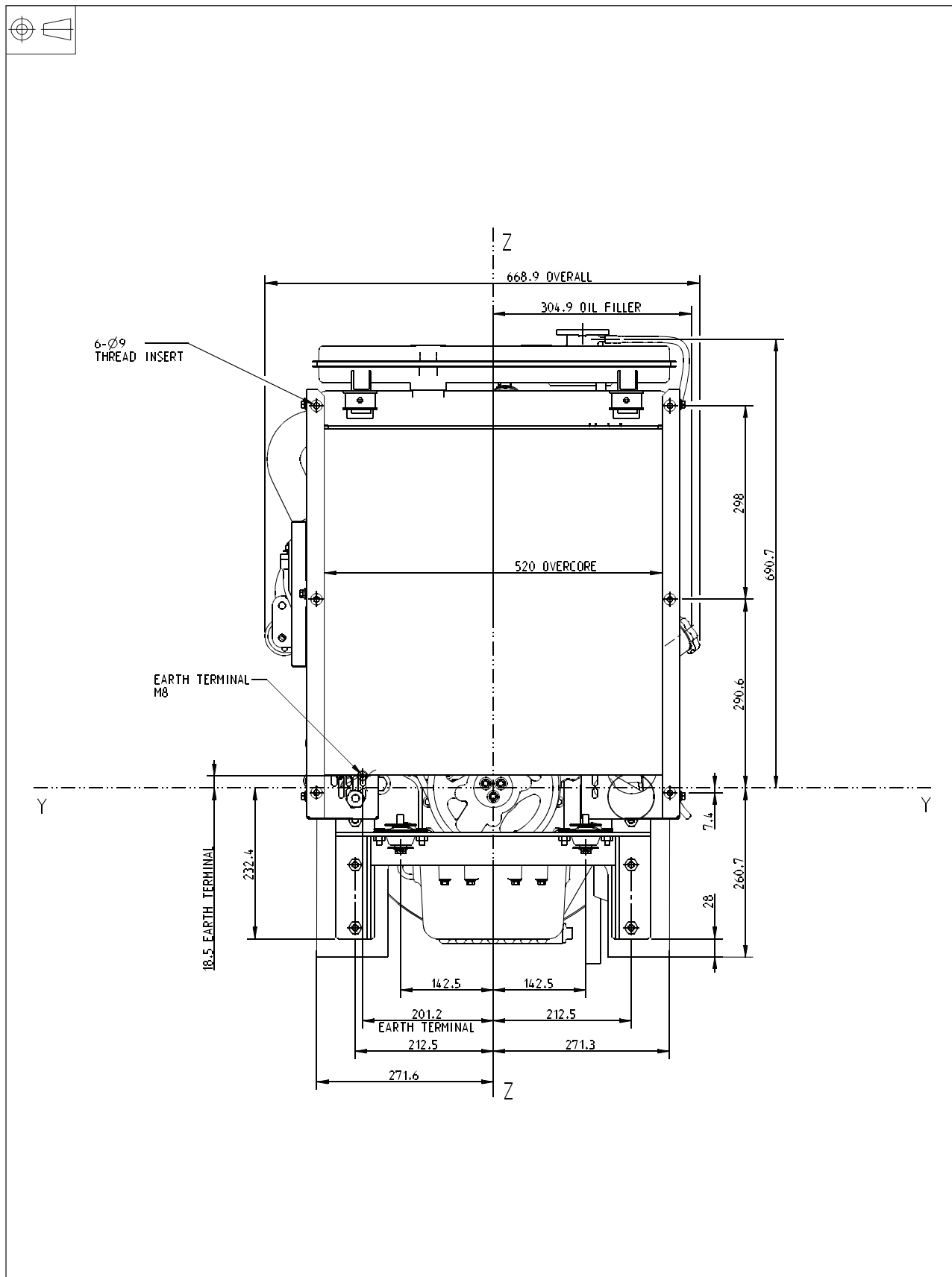
All tests were conducted using an engine installed and serviced to Perkins Engine Company Limited recommendations.

The information given in this document is for guidance only.

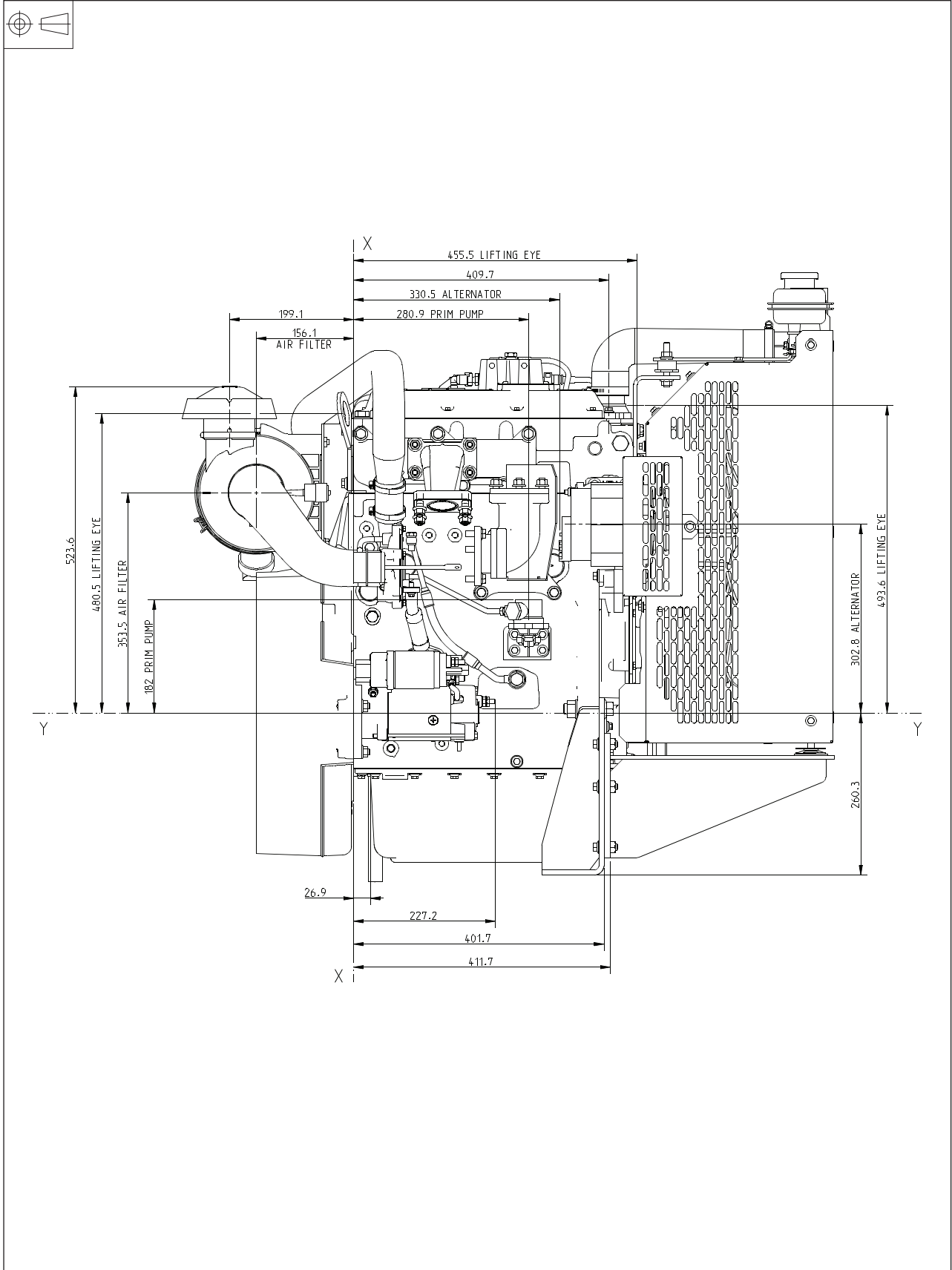
1103C-33TG3 - Left side view



1103C-33TG3 - Front side view



1103C-33TG3 - Right side view



1103C-33TG3 - Rear side view

