

Technical Data

1100 Series

Gen Set

1103A-33TG1

45,6 kWm @ 1500 rev/min
53,9 kWm @ 1800 rev/min

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
 Total weight (engine only)
 -dry 420 kg
 -wet 438 kg

Overall dimensions

-height 951 mm (37.44 in)
 -length 1049 mm (41.29 in)
 -width (including mounting brackets) 634 mm (24.96 in)

Moment of inertia (mk²)

Engine:
 - longitudinal 25 kgm²
 - horizontal 42 kgm²
 - axial 25 kgm²
 Flywheel (polar) 1.14 kgm²

Centre of gravity (wet)

- forward from rear of block 215 mm (8.46 in)
 - above centre line of block 120 mm (4.72 in)
 - offset of RHS of centre line 25 mm (0.98 in)

Performance

Steady state speed stability at constant load:
 G2 ± 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):
 - at 1500 rev/min 88,2 dBA
 - at 1800 rev/min 92,1 dBA

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.

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.

General installation

| Designation | Units | Type of Operation and Application | | | |
|---|--|-----------------------------------|-----------------|-----------------|-----------------|
| | | Prime | Stand-by | Prime | Stand-by |
| | | 50 Hz | 50 Hz | 60 Hz | 60 Hz |
| Gross engine power | kWm | 42,2 | 46,5 | 50,5 | 55,6 |
| Brake mean effective pressure | kPa (lbf/in ²) | 1023 (148.3) | 1128 (163.6) | 1020 (147.9) | 1124 (163.0) |
| Mean piston speed | m/s (ft/s) | 6,35 (20.8) | 6,35 (20.8) | 7,62 (25.0) | 7,62 (25.0) |
| ElectropaK net engine power | kWm | 41,3 | 45,6 | 48,8 | 53,9 |
| Engine coolant flow 35 kPa restriction | l/min (UK gal/min) | 125,5 (27.6) | 125,5 (27.6) | 151,0 (33.2) | 151,0 (33.2) |
| Combustion air flow | m ³ /min (ft ³ /min) | 2,9 (102.4) | 3,1 (109.4) | 3,7 (130.6) | 3,9 (137.7) |
| Exhaust gas flow (max) | m ³ /min (ft ³ /min) | 7,0 (247.2) | 7,7 (271.9) | 8,8 (310.7) | 9,5 (335.4) |
| Exhaust gas temperature (max) in manifold | °C (°F) | 492 (917.6) | 537 (999.6) | 510 (950.0) | 551 (1023.8) |
| Cooling fan air flow | m ³ /min (ft ³ /min) | 53,0 (1871.6) | 53,0 (1871.6) | 70,0 (2472.0) | 70,0 (2472.0) |
| Overall thermal efficiency | % | 39,8 | 38,7 | 39,3 | 39,1 |
| Typical genset electrical unit (0.8 pf 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 | | | | | |
| 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) | 0,9 (51.2) | 1,7 (96.7) | 1,7 (96.7) |
| Power output (net) | 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) |

Caution: 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 m² (2.97 ft²)
 -rows and materials single row aluminium
 -matrix density and material Aluminium 12.5 fins/inch
 -width of matrix 526 mm (20.7 in)
 -height of matrix 524 mm (20.6 in)
 -pressure cap setting 107 kPa

Fan

-diameter 457 mm (18 in)
 -drive ratio 0.85 : 1
 -number of blades 7
 -material Composite
 -type Pusher

Coolant

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

Electrical system

Type Negative ground
 Alternator voltage 12 V
 Alternator output 65 amps
 Starter motor voltage 12 V
 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 V
 Stop solenoid (minimum)
 -pull in current 10 amps
 -hold in current 10 amps

Cold start recommendations

Minimum cranking speed 105 rev/min

Starter specification

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

* - Glow plug start aid fitted.

Note: CCA - Cold Cracking Amps to SAEJ537.

Notes:

- Battery capacity is defined by the 20 hour rate
- 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.
- 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.

Exhaust system

Maximum back pressure
 -1500 rev/min 10 kPa
 -1800 rev/min 15 kPa
 Exhaust outlet size 56 mm (2.2 in)

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 Electrical
 -flow/hour 120 - 150 l/h (211 - 264 pt/m)
 -pressure 30 - 75 kPa (4.4 - 10.9 psi)
 Maximum suction head:
 -1500 rev/min 20 kPa

Governor type

Electronic governor (optional) Woodward LCG2
 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 ² /s @ 40 °C) | 2,5 - 3,5 |
| Sulphur content (%) | 0,1 - 0,2 |
| Cetane number | 45 - 50 |

Fuel consumption litres/hour (UK gals/hr)

| Speed | Power rating | | | | |
|-------|--------------|------------|-----------|-----------|-----------|
| | 110% | 100% | 75% | 50% | 25% |
| 1500 | 12,0 (2.6) | 10,7 (2.3) | 8,2 (1.8) | 5,7 (1.2) | 3,4 (0.7) |
| 1800 | 14,3 (3.1) | 12,9 (2.8) | 9,9 (2.1) | 7,1 (1.5) | 4,3 (0.9) |

Induction system

Maximum air intake restriction

-clean filter 5 kPa
 -dirty filter 8 kPa
 -air filter type Dry

Lubrication system

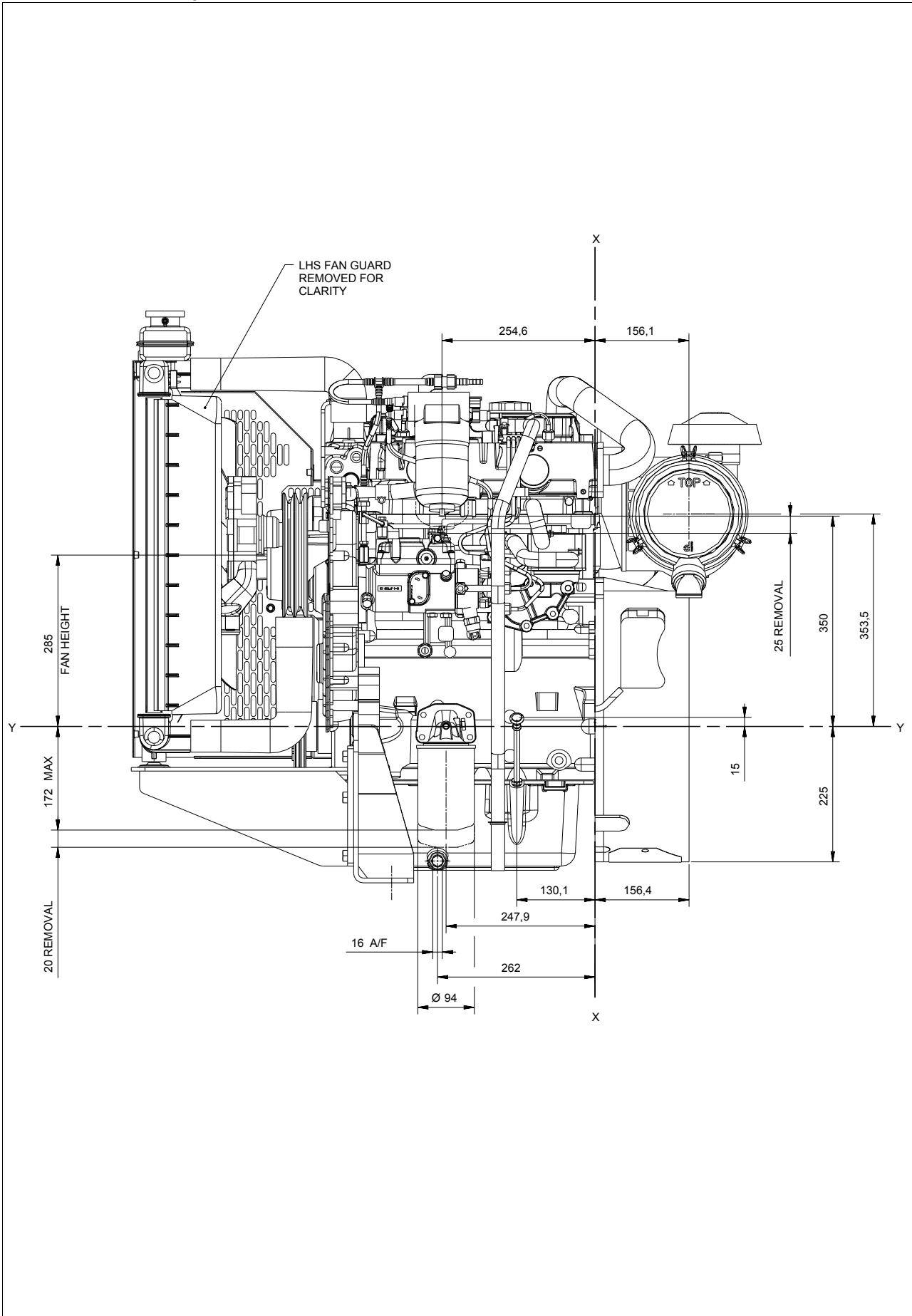
Lubricating oil capacity

Total system 8,3 l (17.5 pt)
 Sump minimum 6,2 l (13.1 pt)
 Sump maximum 7.8 l (16.4 pt)
 Maximum engine operating angles:
 -front up, front down, right side or left side 25°

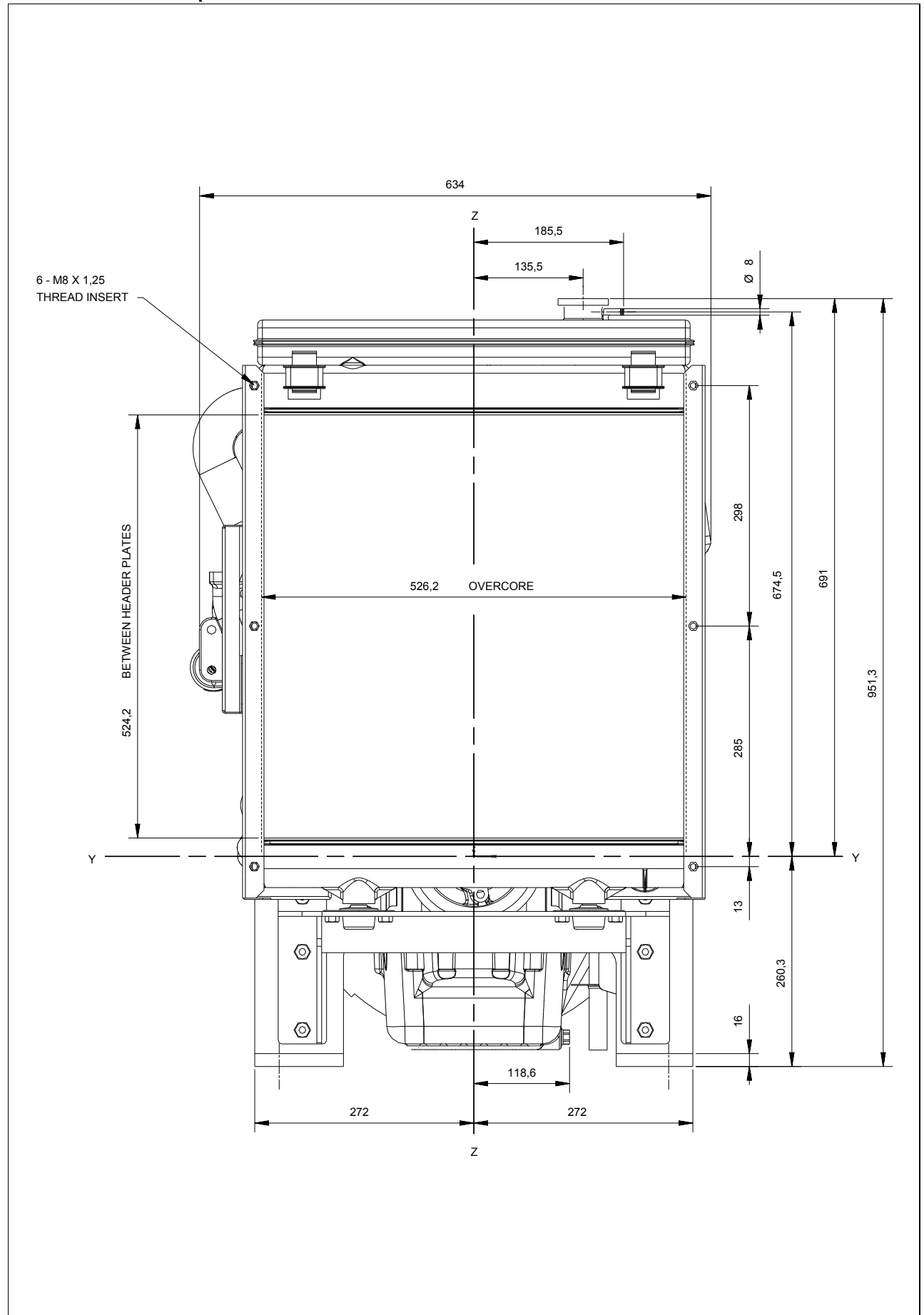
Lubricating oil pressure

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

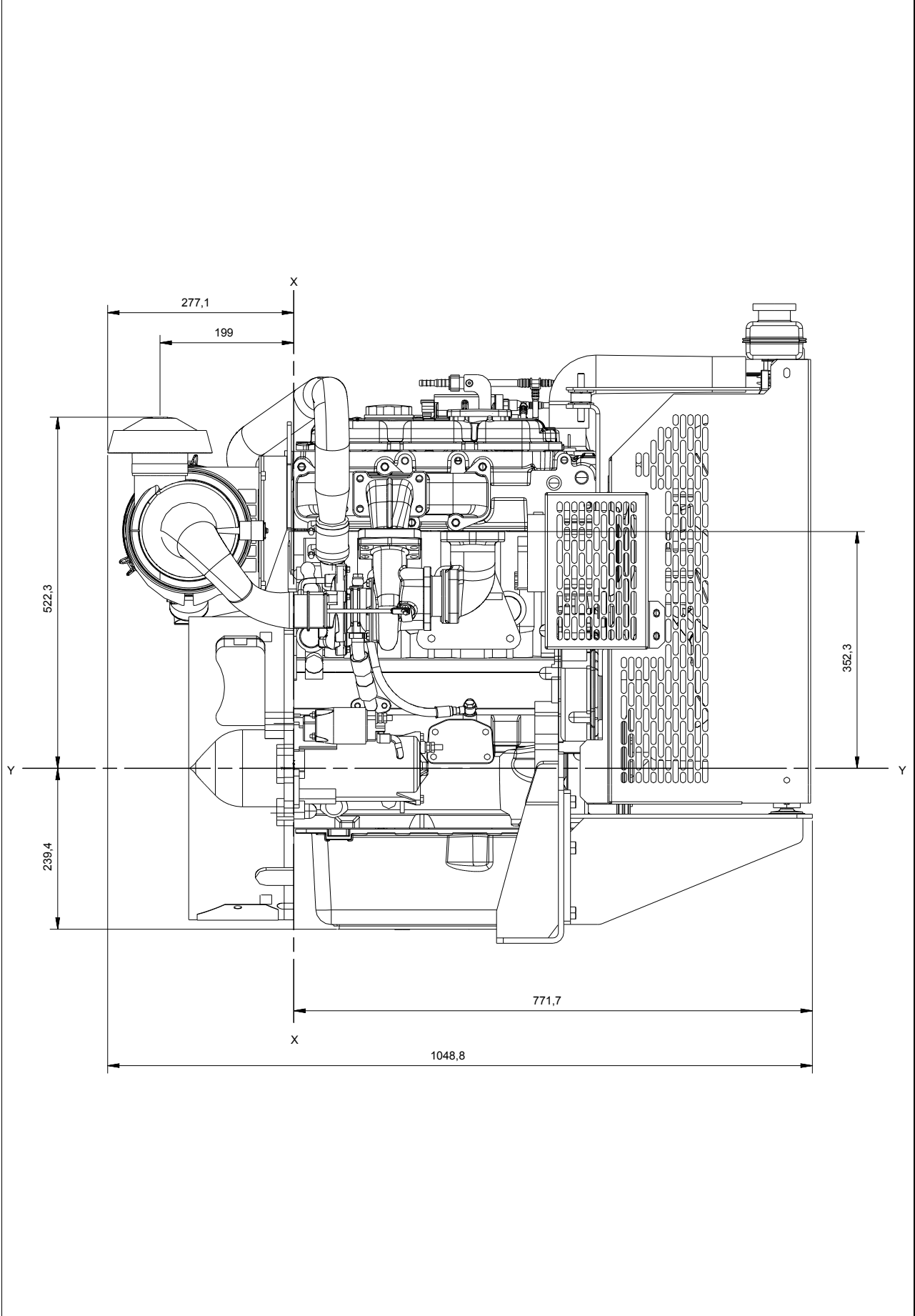
1103A-33TG1 ElectropaK - left view



1103A-33TG1 ElectropaK - front view



1103A-33TG1 ElectropaK - right view

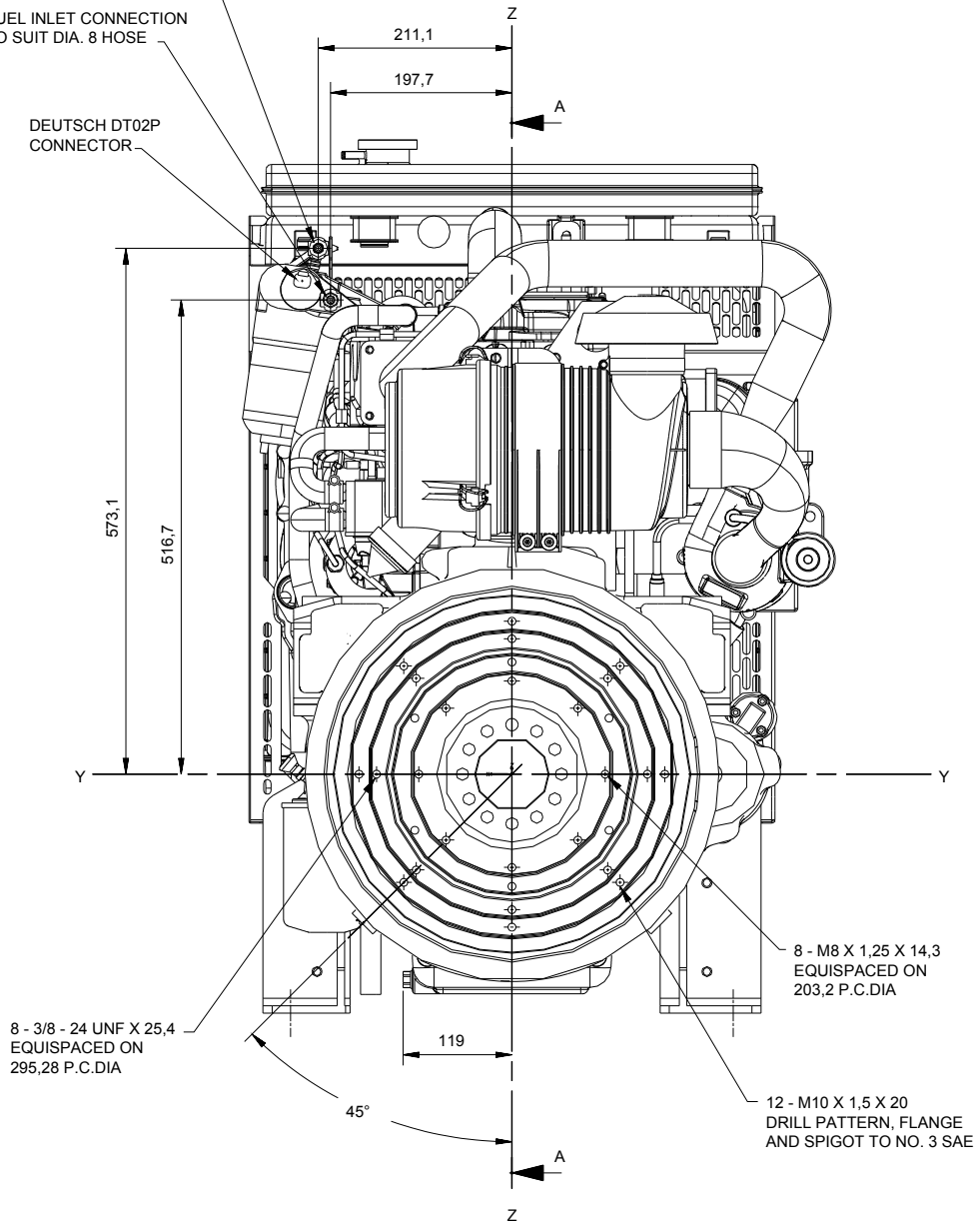


1103A-33TG1 Electropak - rear view

FUEL RETURN CONNECTION TO
SUIT DIA. 8 OR DIA. 10 HOSE.

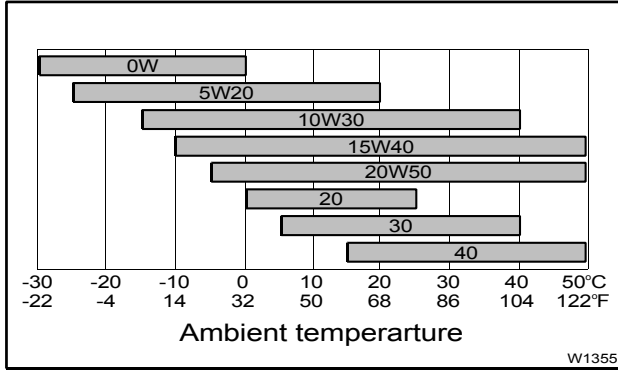
FUEL INLET CONNECTION
TO SUIT DIA. 8 HOSE

DEUTSCH DT02P
CONNECTOR



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 max after engine starts to crank) | | | |
|--|-------------|----------------|----------------|
| | Units | 1500 rev/min | 1800 rev/min |
| 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 & 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 kgm²

All tests were conducted using an engine installed and services to Perkins Engines Company Limited recommendations

The information given in this document is for guidance only.



Perkins Engines Company Limited

Peterborough PE1 5NA United Kingdom

Telephone +44 (0) 1733 583000

Fax +44 (0) 1733 582240

www.perkins.com

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