

# Technical Data

## 1100D Series

Electropak

## 1106D-E66TAG3

159,4 kWm @ 1800 rev/min

### Basic technical data

Number of cylinders ... 6  
 Cylinder arrangement ... In-Line  
 Cycle ... 4 Strokes  
 Induction system ... Turbocharged and Air Charge Cooled  
 Combustion system ... Direct Injection Diesel  
 Compression ratio ... 16,2:1  
 Bore ... 105 mm (4.1 in)  
 Stroke ... 127 mm (5.0 in)  
 Cubic capacity ... 6,6 litres (402.8 in<sup>3</sup>)  
 Direction of rotation ... Clockwise  
 Firing order ... 1 5 3 6 2 4

### Estimated total weight

-dry ... 788 kg (1737 lb)  
 -wet ... 822 kg (1812 lb)

### Overall dimensions

-height ... 1140,4 mm (44.9 in)  
 -length (air cleaner fitted) ... 1728,3 mm (68.0 in)  
 -width ... 779,8 mm (30.7 in)

### Moments of inertia

Engine rotational components ... 0,27 kg m<sup>2</sup>  
 Flywheel ... 1,31 kg m<sup>2</sup>

### Centre of gravity (wet)

Forward from rear of block ... 476,3 mm (18.8 in)  
 Above crankshaft centre line ... 176,3 mm (6.9 in)  
 Offset to RHS of crankshaft centre line ... 17,0 mm (0.66 in)

### Performance

**Note:** All data based on operation to ISO 14396 and ISO 3046/1 standard reference conditions.

Speed variation at constant load ... ± 3%

### Cyclic irregularity at 110% stand-by power

-1800 rev/min ... 0,023

### Test conditions

-air temperature ... 25 °C (77 °F)  
 -barometric pressure ... 100 kPa (29.5 in hg)  
 -relative humidity ... 31,5 %

### Sound level

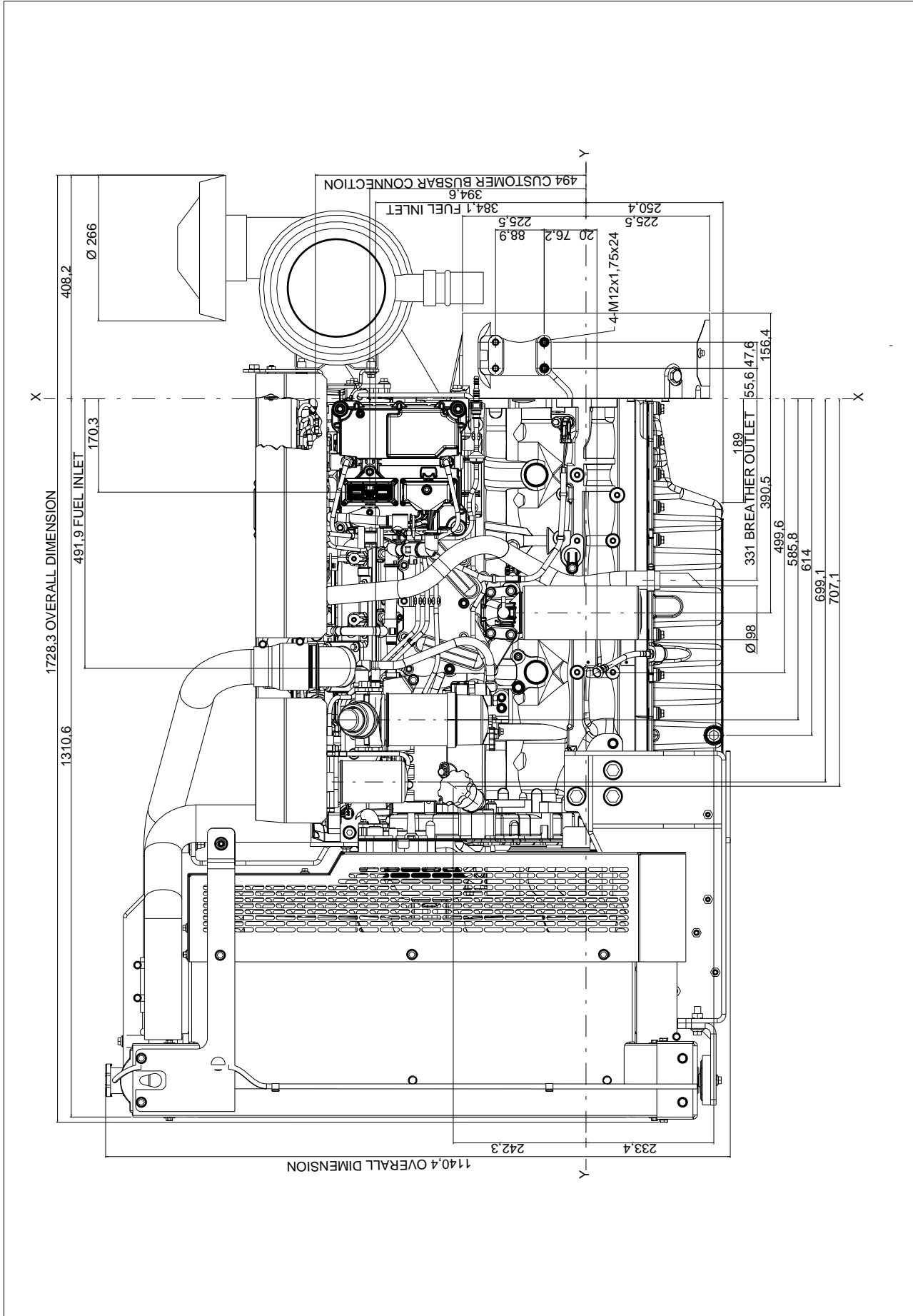
Average sound pressure level 100% Prime Power load for  
 -Electropak at 1 metre ... 100,2 dB(A)  
 All ratings certified to within ... ± 3%

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.

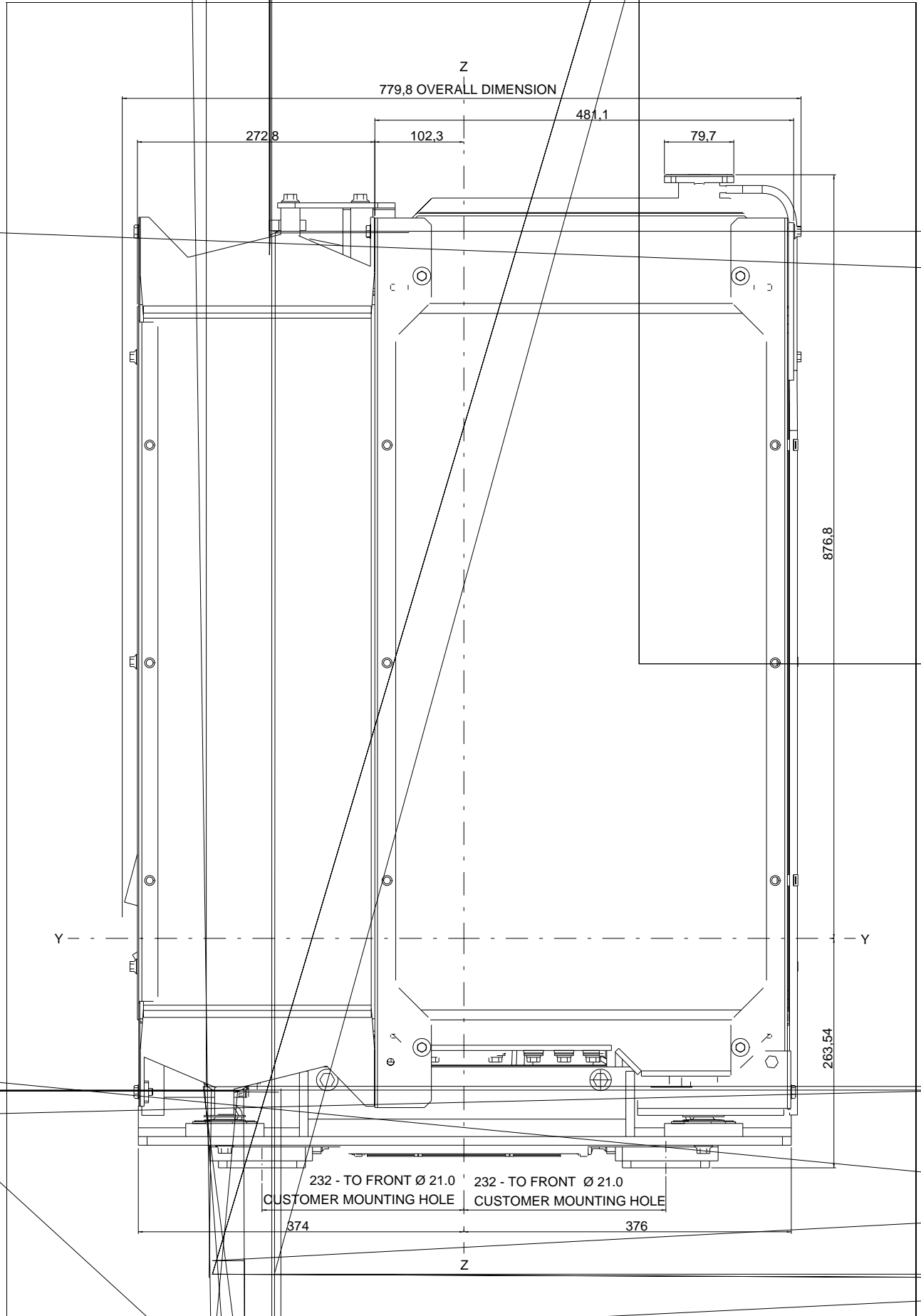
### General installation

Designation	Units	Type of operation and application	
		Prime	Standby
		60Hz	
Gross engine power	kWb (bhp)	154,4 (207.1)	171,4 (229.9)
Brake mean effective pressure	kPa (lbf/in <sup>2</sup> )	1560,0 (226.3)	1731,0 (251.1)
Mean piston speed	m/s (ft/s)	7,62 (25.0)	
Electropak net engine power	kWm (bhp)	142,4 (191.0)	159,4 (213.8)
Engine coolant flow (against 35 kPa restriction)	l/min (UK gal/min)	170,0 (37.4)	
Combustion air flow (at STP)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	12,4 (437.9)	12,7 (448.5)
Exhaust gas flow (max)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	29,5 (1041.8)	30,7 (1084.2)
Exhaust gas temperature (max) in manifold (after turbocharger)	°C (°F)	455,2 (851.4)	469,0 (876.2)
Net engine thermal efficiency	%	36,0	37,0
Typical genset electrical output (0.8pf 25 °C)	kWe	135,0	150,0
	kVA	169,0	188,0
Regenerative Power (estimated)	kW (bhp)	14,9 (20.0)	
Assumed alternator efficiency	%	92,2	91,8
<b>Energy balance</b>			
Power in fuel (fuel heat of combustion)	kWt (bhp)	400,9 (537.6)	435,9 (584.6)
	Btu/min	22819,1	24811,3
Power to cooling fan	kWm (bhp)	12,0 (16.1)	
	Btu/min	683,0	
Power to coolant and lubricating oil	kWt (bhp)	74,2 (99.5)	80,1 (107.4)
	Btu/min	4223,4	4559,3
Power to exhaust	kWt (bhp)	127,3 (170.7)	135,9 (182.2)
	Btu/min	7245,9	7735,4
Energy to charge coolers	kWt (bhp)	32,5 (43.6)	35,0 (46.9)
	Btu/min	1849,9	1992,2
Power to radiation	kWt (bhp)	12,4 (16.6)	13,5 (18.1)
	Btu/min	705,8	768,4

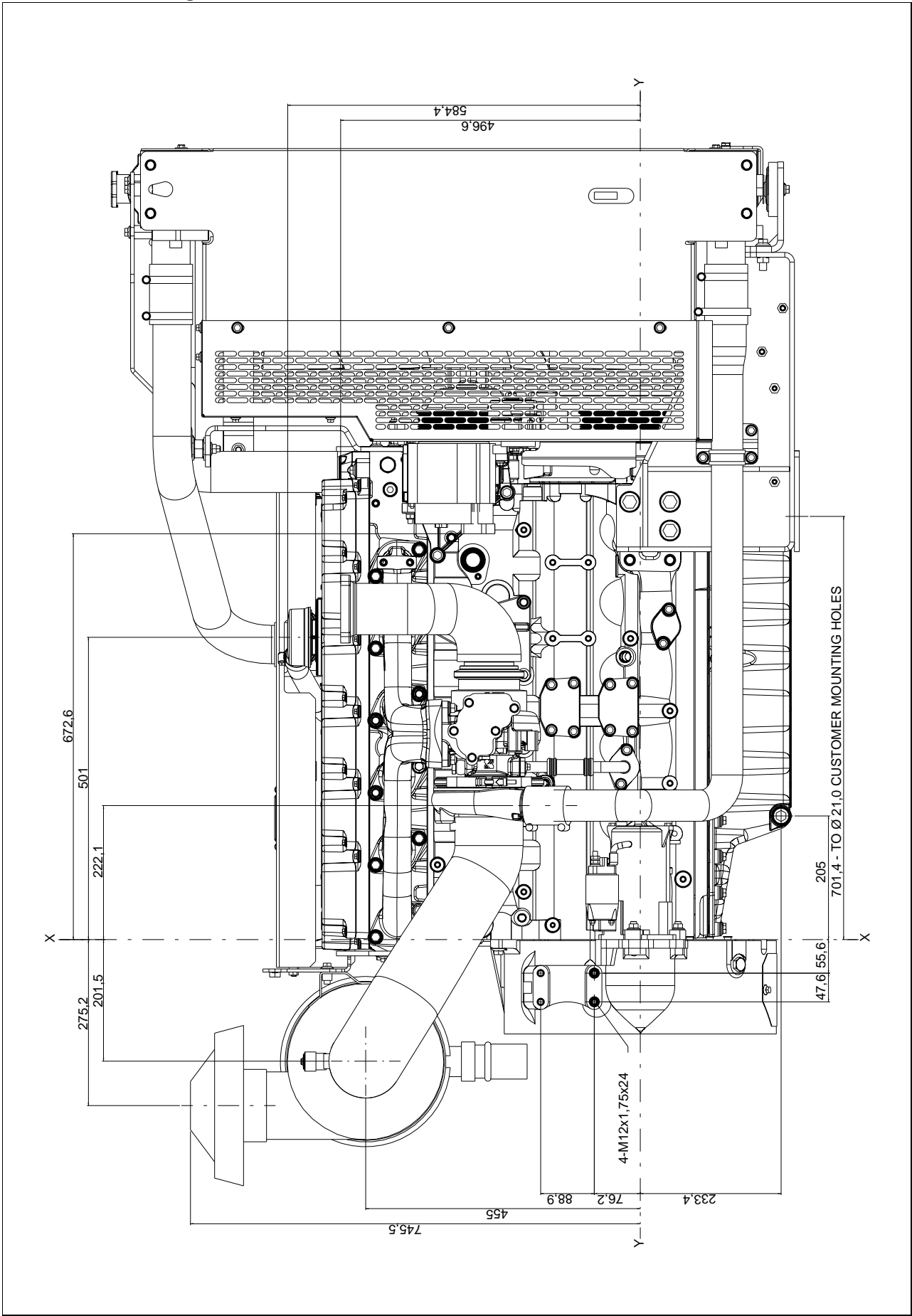
1106D-E66TAG3 - Left side view



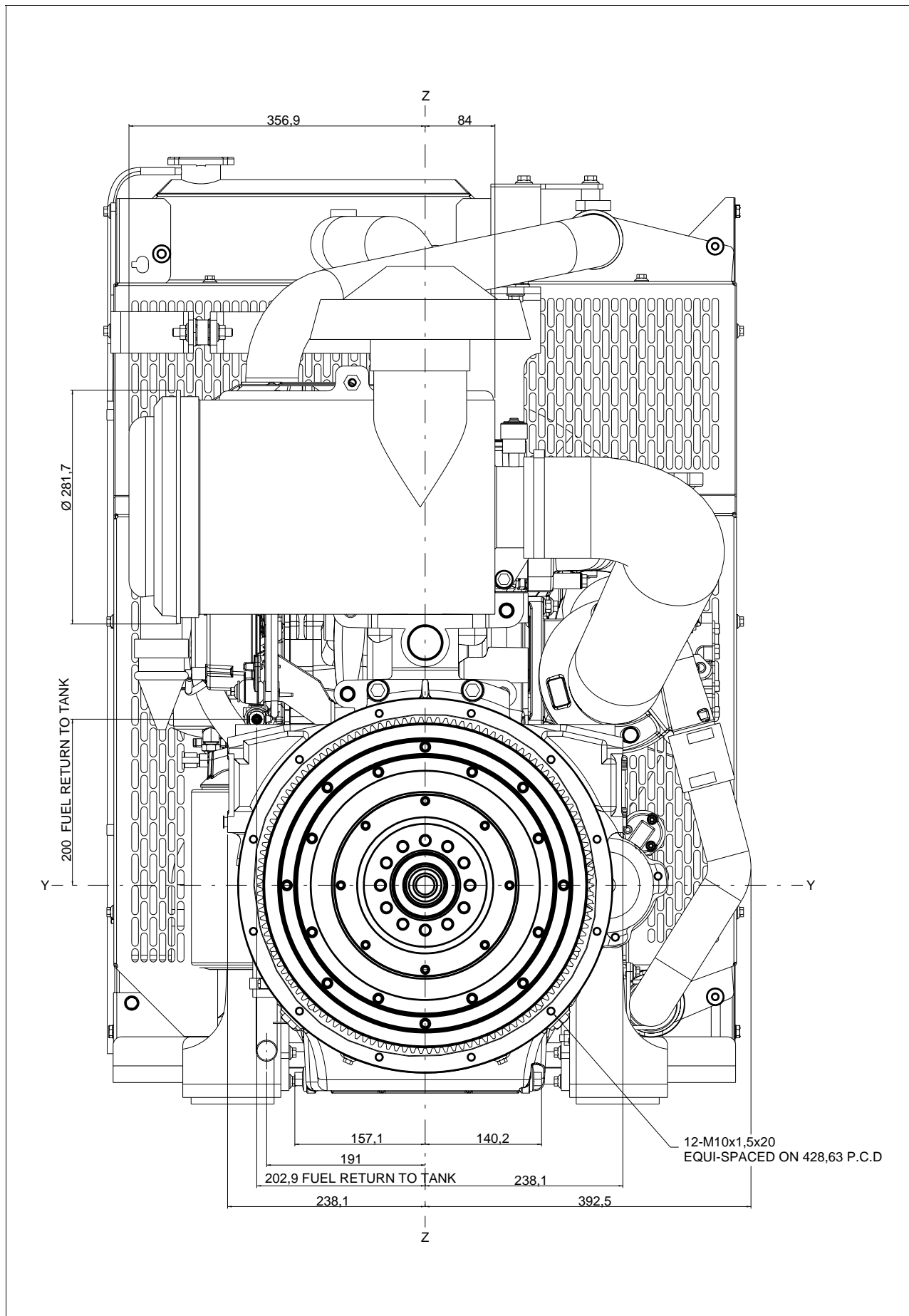
1106D-E66TAG3 - Front view



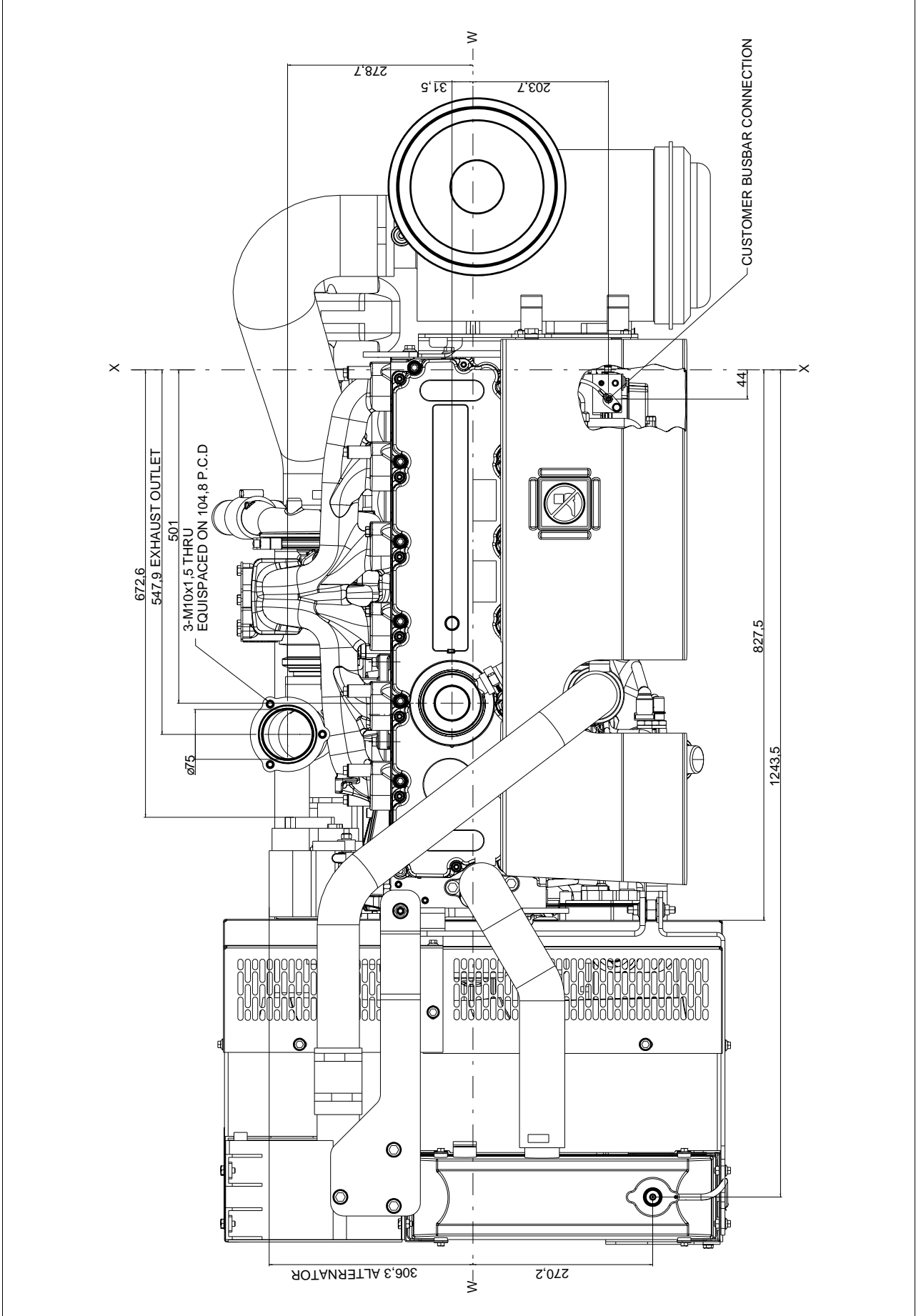
1106D-E66TAG3 - Right side view



1106D-E66TAG3 - Rear view



1106D-E66TAG3 - Plan view



## Cooling system

### Cooling pack

-overall weight (wet) ..... 71 kg  
 -overall face area ..... 554760 mm<sup>2</sup>  
 -width ..... 745 mm  
 -height ..... 1080 mm

### Radiator

Face area ..... 351200 mm<sup>2</sup>  
 Number of rows and materials ..... 5 rows, Aluminium  
 Matrix density and material ..... 10 fins per inch, Aluminium  
 Width of matrix ..... 439 mm (17.3 in)  
 Height of matrix ..... 800 mm (31.1 in)  
 Pressure cap setting (min) ..... 100 kPa (14.5 lb/in<sup>2</sup>)

### Charge cooler

Face area ..... 203560 mm<sup>2</sup>  
 Number of rows and materials ..... 2 rows, Aluminium  
 Matrix density and material ..... 10 fins per inch, Aluminium  
 Width of matrix ..... 258 mm  
 Height of matrix ..... 789 mm

### Fan

Diameter ..... 686 mm (27 in)  
 Drive ratio..... 1.2  
 Number of blades..... 7  
 Material ..... Nylon  
 Type ..... Pusher  
 Air flow @ 1800 rev/min ..... 313,8 m<sup>3</sup>/min

### Coolant

Total system capacity ..... 21 litres  
 System drawdown capacity ..... 10%  
 Engine capacity ..... 9,5 litres  
 Maximum top tank temperature ..... 112 °C (233.6 °F)  
 Temperature rise across engine  
 (max, rating dependent) ..... 6,6 to 7,0 °C (43.9 to 44.6 °F)  
 Max permissible external system resistance. .... 35 kPa (5.1 lbf/in<sup>2</sup>)  
 Thermostat operation range..... 82 to 95 °C (179.6 to 203 °F)  
 Shutdown switch setting ..... 118 °C (244.4 °F)  
 Coolant pump method of drive ..... gears  
 Coolant pump flow (against 35 kPa restriction). .... 170 litres/min  
 Recommended coolant immersion heater  
 rating (minimum) ..... 0,75 kW  
 Recommended coolant .....  
 .. ... BS6580 - 1992, ASTM D3306 and ELC coolants to 1E1966

## Electrical system

Alternator..... Denso A127i  
 Alternator voltage ..... 12 volts  
 Alternator output ..... 100 amps  
 Starter ..... 29MT  
 Starter motor voltage ..... 12 volts  
 Starter motor power ..... 3,3 kW  
 Number of teeth on the flywheel ..... 126  
 Pull-in current of starter motor solenoid  
 @ -25 °C max <sup>(1)</sup> ..... 102 amps  
 Hold-in current of starter motor solenoid  
 @ -25 °C max <sup>(1)</sup> ..... 15 amps  
 Engine stop method ..... via ECM

1 All leads to rated at 10 amps minimum

## Cold start recommendations

Minimum required cranking speed over TDC ..... 60 rev/min

Temperature Range	
5 to -10 °C	Oil: 15W40 Starter: 29MT Battery: 1x 900CCA Max breakaway current: 867 amps Cranking current: 404 (560 max) amps Aids: Glowplugs Minimum mean cranking speed: 107 rev/min

Temperature Range	
-10 to -20 °C	Oil: 10W40 Starter: 29MT Battery: 2x 770 CCA Max breakaway current: 984 amps Cranking current: 496 (683 max) amps Aids: Glowplugs Minimum mean cranking speed: 100 rev/min

Temperature Range	
-20 to -25 °C	Oil: 5W40 Starter: 29MT Battery: 2 x770 CCA Max breakaway current: 984 amps Cranking current: 496 (683 max) amps Aids: Glowplugs Minimum mean cranking speed: 100 rev/min

- Battery capacity is defined by the 20 hour rate
- If a change to a low viscosity oil is made, the cranking torque necessary at low ambient temperatures is much reduced. The starting equipment has been selected to take advantage of this. It is important to change to 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 @ 1800 rev/min ..... 15,0 kPa (4.4 in Hg)  
 Exhaust outlet, internal diameter ..... 90 mm (3.5 in)

**Fuel system**

**Injection components**

Injector ... Electronic  
 Fuel pump ... CR200

**Fuel priming**

Priming pump type ... Manual / Electronic  
 Maximum priming time ... 90 seconds

**Fuel feed**

Maximum fuel flow ... 1.5 litres/min  
 Maximum suction head at engine fuel pump inlet ... 30 kPa  
 Maximum static pressure head ... 600 kPa  
 Fuel temperature at engine fuel pump inlet ... 80 °C (176 °F)  
 Tolerance on fuel consumption ... + 3%

**Fuel specification**

Fuel standard ... BS2869, 1998 Class A2 or BS EN590

**Fuel consumption**

Load		Type of Operation and Application	
		60Hz Prime	60Hz Standby
100%	g/kWhr (l/hr)	218,1 (40.1)	212,1 (43.3)
75%	g/kWhr (l/hr)	229,0 (31.6)	225,6 (34.5)
50%	g/kWhr (l/hr)	245,4 (23.4)	241,5 (24.6)
25%	g/kWhr (l/hr)	269,5 (9.2)	271,4 (13.8)

**Induction system**

**Maximum air intake restriction**

-clean filter ... 5 kPa (in H<sub>2</sub>O)  
 -dirty filter ... 8 kPa (in H<sub>2</sub>O)  
 -air filter type ... Paper Element

**Lubrication system**

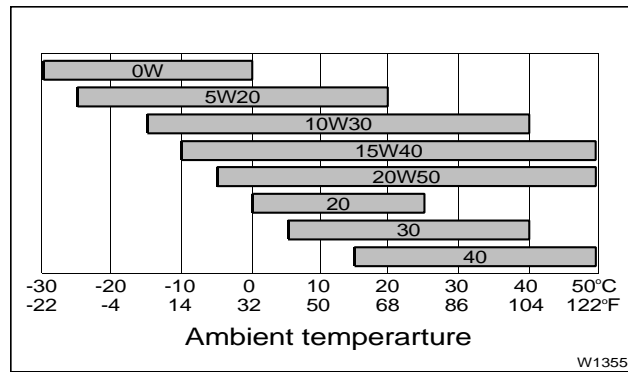
Maximum total system oil capacity ... 16.5 litres (34.9 UK pints)  
 Minimum oil capacity in sump ... 12.5 litres (26.4 UK pints)  
 Maximum oil capacity in sump ... 15.5 litres (32.8 UK pints)  
 Maximum engine operating angles - front up,  
 front down, right side, left side ... 25 °  
 Sump drain plug tapping size ... 3/4 - 16 UNF  
 Shutdown switch setting (where fitted) ... ECM controlled

**Lubricating oil**

-relief valve opening pressure ... 430 kPa (62.4 lbf/in<sup>2</sup>)  
 -pressure at maximum speed ... 450 kPa (65.3 lbf/in<sup>2</sup>)  
 -maximum continuous oil temperature (in rail) ... 125 °C  
 -oil consumption at full load (% of fuel) ... < 0.1

**Recommended SAE viscosity**

A multigrade oil must be used which conforms to API-CH-4/CI4.



**Mountings**

Maximum static bending moment at  
 -rear face of block ... 1130 Nm (833 lbf ft)  
 Maximum permissible overhung load  
 on the flywheel ... refer to the applications department  
 Maximum bending moment (in shock) at rear face  
 -of flywheel housing ... ± 3000 Nm

**Load acceptance (cold engine)**

The below complies with the 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	1800 rev/min (60 Hz)
% of Prime Power	%	55
Load	kW (kWe)	85 (74.25)
Transient frequency deviation	%	≤ -10
Frequency recovery	seconds	5

The above figures were obtained under the following test conditions:

-engine block temperature ... 15 °C  
 -alternator ... 91,8%  
 -minimum ambient temperature ... 10 °C  
 -governing mode ... Isochronous  
 -typical alternator inertia ... 1-3215 kgm<sup>2</sup>

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



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