

# 1106A-70TG1

155.8 kWm (Gross) @ 1800 rpm

## Electropak

# 1100

## Series

### Basic technical data

Number of cylinders	6
Cylinder arrangement	In-line
Cycle	4 stroke
Induction system	Turbocharged
Combustion system	Direct injection diesel
Compression ratio	18.2:1
Bore	105 mm
Stroke	135 mm
Cubic capacity	7.01 litres
Direction of rotation	Anticlockwise when viewed from flywheel
Firing order	1, 5, 3, 6, 2, 4
Estimated total weight (dry)	738.7 kg
Estimated total weight (wet)	761.7 kg

### Overall dimensions, Electropak

Height	1092 mm
Length (air cleaner fitted)	1648 mm
Width	760 mm

### Moments of inertia

Engine rotational components	0.27 kgm <sup>2</sup>
Flywheel	1.2 kgm <sup>2</sup>

### Centre of gravity, Electropak

Forward from rear of block (wet)	426 mm
Above crankshaft centre line (wet)	159 mm
Offset to RHS of crankshaft centre line (wet)	-14 mm

### Performance

Speed variation at constant load	± 0.75%
Cyclic irregularity at standby power	0.028
All ratings within	± 5%

**Note:** All data based on operation to ISO 3046-1:2002 standard reference conditions.

### Sound level

Average sound pressure level for prime power @ 1 m TBA dB(A)

### Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	31.5%
Air inlet restriction at maximum power	5 kPa (maximum)
Exhaust back pressure at maximum power	6 kPa (maximum)
Fuel temperature	40°C

**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.

## General installation

General installation	Units	Prime	Standby
Gross engine power	kW	140.5	155.4
Gross BMEP	kPa	1336.2	1477.9
Mean piston speed	metre/s	8.1	
ElectropaK nett engine power	kW	133.5	148.4
Engine coolant flow (against 35 kPa restriction)	litres/min	170	
Combustion air flow (at STP)	m³/min	11.28	11.86
Exhaust gas flow (maximum)	m³/min	27.83	29.72
Exhaust gas temperature (maximum) in manifold (after turbocharger)	°C	526	
Nett engine thermal efficiency	%	37.9	38.4
Typical generator set electrical output (0.8pf 25°C)	kWe	121.5	135
	kVA	151.9	168.8
Regenerative power (estimated)	kW	7.0	
Assumed alternator efficiency	%	91	

## Rating definitions

### Prime power

Unlimited hours usage, with an average load factor of 80 percent over each 24 hour period. A 10 percent 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 percent 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	Standby
Heat in fuel	kW	352	386.8
Power to cooling fan	kW	7.0	
Power to coolant and lubricating oil	kW	84.2	92.0
Power to exhaust	kW	113.6	124.5
Power to radiation	kW	13.7	14.9

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

## Cooling system

### Radiator

Overall weight (wet) .....	35 kg
Face area .....	464025 mm <sup>2</sup>
Number of rows and materials .....	2 rows, aluminium
Matrix density and material .....	12.7 fins per inch, aluminium
Width of matrix .....	672.5 mm
Height of matrix .....	690 mm
Pressure cap setting (minimum) .....	110 kPa

### Fan

Diameter .....	558.8 mm
Drive ratio .....	1.25:1
Number of blades .....	7
Material .....	Nylon
Type .....	Pusher
Air flow, 1800 rpm @ 200 Pa air side restriction .....	182 m <sup>3</sup> /min
Power, 1800 rpm @ 200 Pa air side restriction .....	4.6 kW

### Coolant

Total system capacity .....	21 litres
System capacity .....	10%
Engine capacity .....	9.5 litres
Maximum top tank temperature .....	110°C
Temperature rise across engine (maximum rating dependent) .....	6°C - 12°C
Maximum permissible external system resistance .....	35 kPa
Thermostat operation range .....	82°C to 93°C
Shutdown switch setting .....	118°C
Coolant pump method of drive .....	Gear
Recommended coolant immersion heater rating (minimum) .....	0.75 kW
Recommended coolant .....	BS6580 - 1992, ASTM D3306 and ELC coolants to 1E1966

### Duct allowance

Maximum additional restriction (duct allowance to cooling airflow and resultant minimum air flow) - standby power

Description	rpm	kPa	m <sup>3</sup> /min
Duct allowance with inhibited coolant at 50°C			
Minimum air flow	1800	0.120	252
Duct allowance with inhibited coolant at 46°C			
Minimum air flow	1800	0.200	234

## Electrical system

Alternator .....	8SI
Alternator voltage .....	12 volts
Alternator output .....	65 amps
Starter .....	AZF
Starter motor voltage .....	12 volts
Starter motor power .....	4.2 kW
Number of teeth on the flywheel .....	126
Pull-in and hold-in current of starter motor solenoid @ 25°C maximum <sup>(1)</sup> .....	68 amps at 12 volts
hold-in current of starter motor solenoid @ 25°C maximum <sup>(1)</sup> .....	20 amps at 12 volts
Engine stop method .....	Solenoid
<sup>1</sup> All leads to rated at 10 amps minimum	

### Cold start recommendations

Minimum required cranking speed over TDC .....

	5 to -10°C	-10 to -20°C	-20 to -25°C
Oil	15W40	10W40	5W40
Starter	AZF		
Battery	2x 1200 CCA		
Cranking current	960		
Aids	None	Glow plugs	
Minimum mean cranking speed	130 rpm	100 rpm	100 rpm

**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 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.

## Exhaust system

Maximum back pressure - 1800 rpm .....	6.0 kPa
Exhaust outlet, internal diameter .....	72 mm

## Fuel system

### Injection components

Injector ..... Mechanical  
Fuel pump..... DP310G

### Fuel priming

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

### Fuel feed

Maximum fuel flow ..... 3 litres/min  
Maximum suction head at engine fuel pump inlet..... 50 kPa  
Maximum static pressure head ..... 50 kPa  
Fuel temperature at engine fuel pump inlet..... 85°C  
Tolerance on fuel consumption .....  $\pm 5\%$

### Fuel specification

Fuel standard. .... Various (contact Perkins Technical Department)

### Fuel consumption

Load	Type of operation and application	
	g/kWh	litres/hr
110% Prime power	209.7	38.8
Prime power	210.9	35.2
75% Prime power	210.8	26.5
50% Prime power	209.3	18.0
25% Prime power	243.1	10.5

## Induction system

### Maximum air intake restriction

Clean filter ..... 3 kPa  
Dirty filter..... 5 kPa  
Air filter type..... Paper element

## Lubrication system

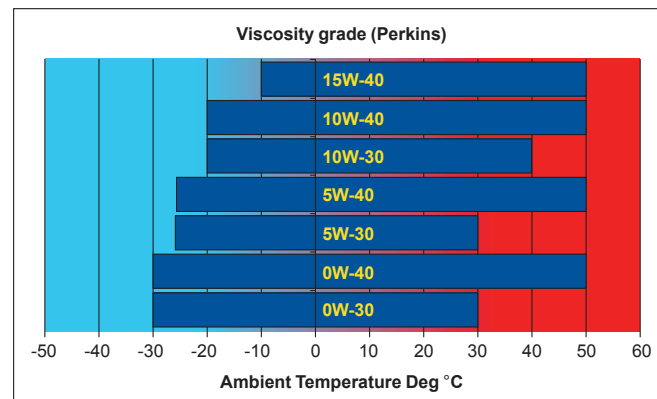
Maximum total system oil capacity ..... 18.0 litres  
Minimum oil capacity in sump ..... 12.5 litres  
Maximum oil capacity in sump ..... 16.1 litres  
Maximum engine operating angles -  
Front up, front down, right side, left side..... 25°  
Sump drain plug tapping size. .... 3/4 - 16 UNF  
Shutdown switch setting (where fitted)

### Lubricating oil

Relief valve opening pressure ..... 460 kPa  
Pressure at maximum speed ..... 520 kPa  
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 CH4 or C14  
ACEA E5 must be used, see illustration below:



## Mountings

Maximum static bending moment at rear face of block..... 1130 Nm  
Maximum permissible overhung load  
on the flywheel..... Calculated on request  
Maximum bending moment at rear of flywheel housing.....  
.....  $\pm 3000$  in shock Nm

## Load acceptance

The data 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).

Description	Units	Cold Condition
% of Prime power	%	100
Load	kWe	121.5
Transient frequency deviation	%	$< 10$
Frequency recovery time	Seconds	1.8

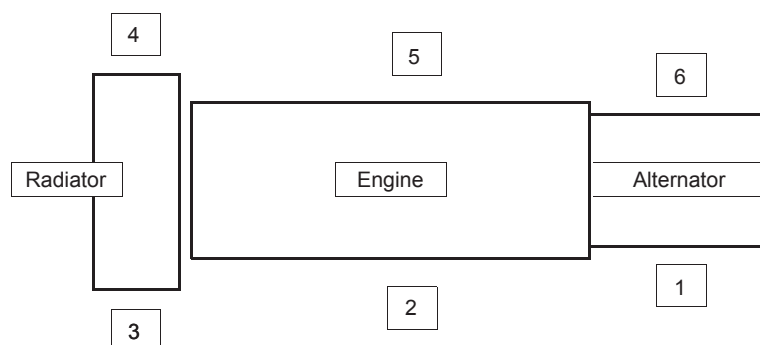
## Noise data

### Noise levels

Noise level dB(A)		
Position	Prime power	Standby
1	100.1	100.3
2	97.3	97.2
3	97.8	97.6
4	101.3	101.3
5	102.6	102.5
6	99.0	99.0

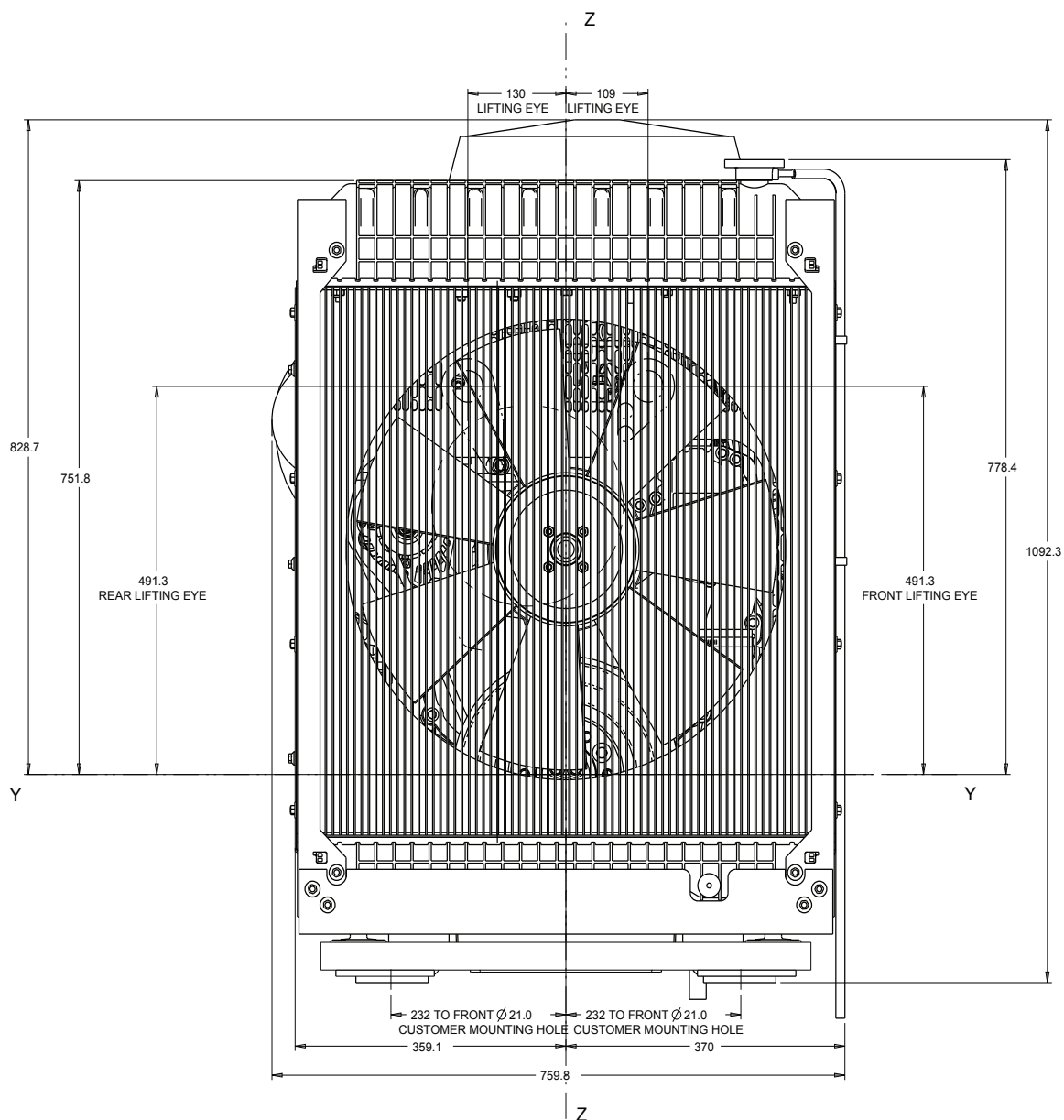
Noise reference level 65 dB(A)

$\frac{1}{3}$  Octave analysis: TBC

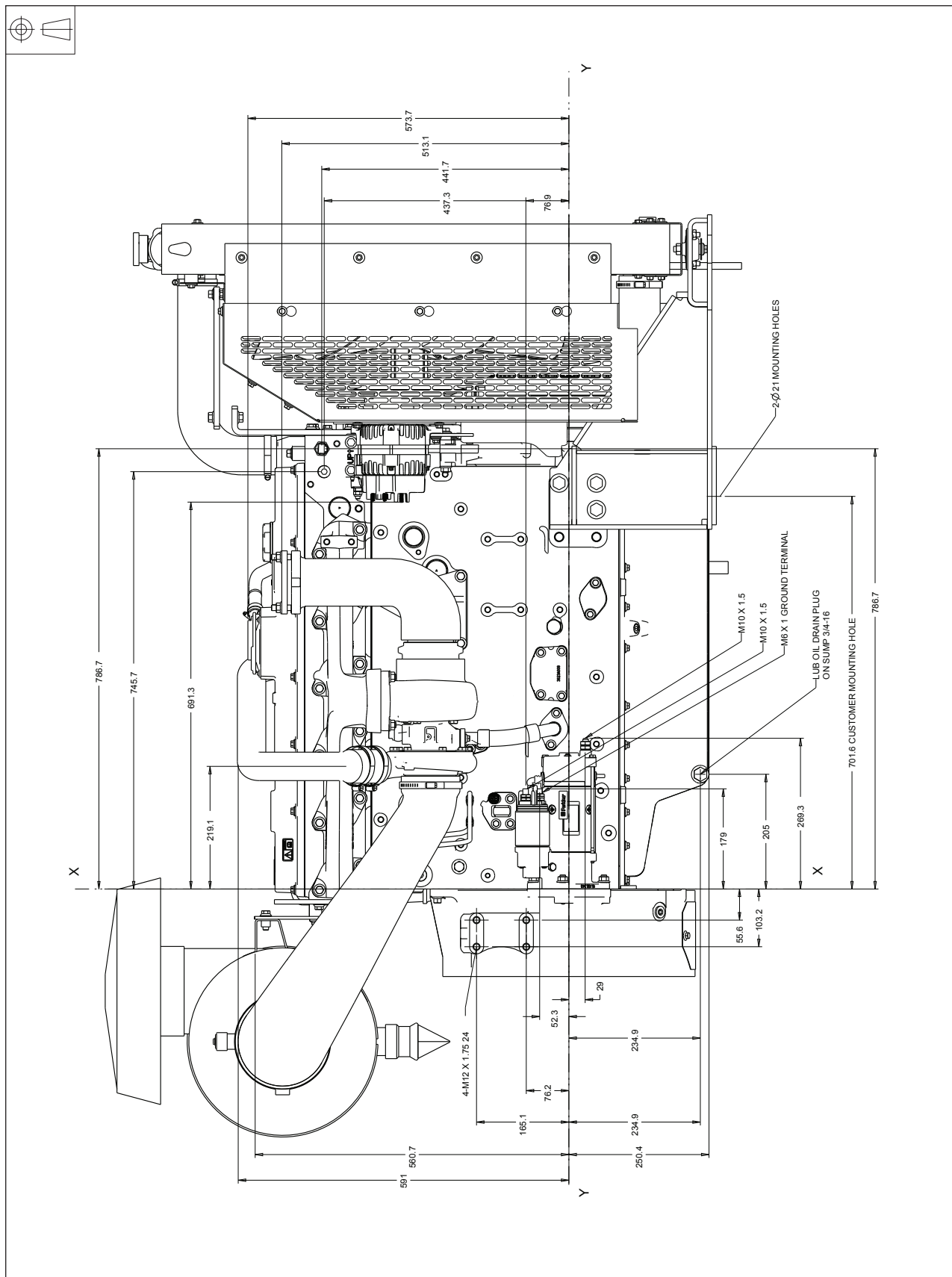




## 1106A-70TG1 - Front view

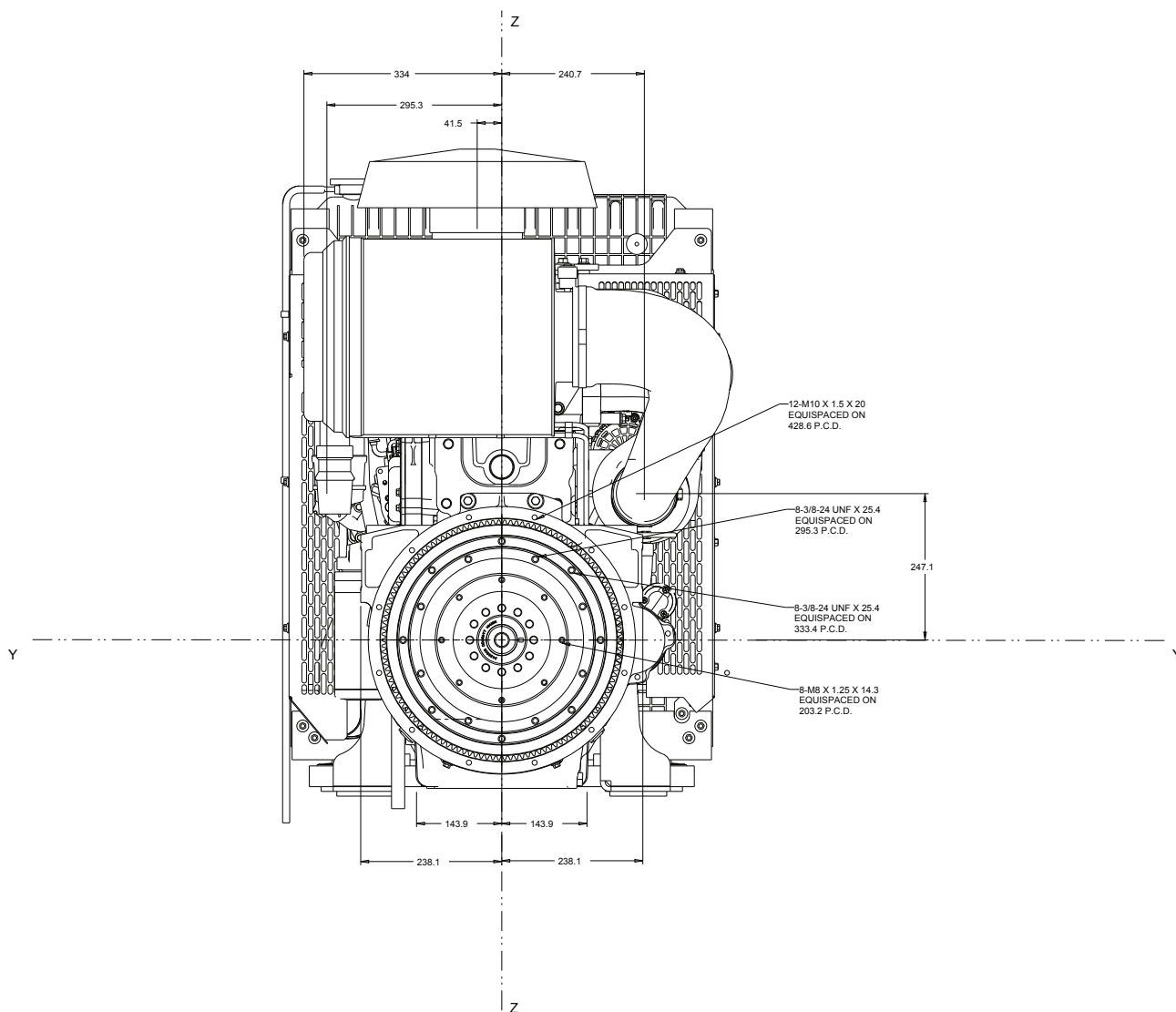


## 1106A-70TG1 - Right side view





## 1106A-70TG1 - Rear view



## 1106A-70TG1 - Plan view

