

ENGINE DATASHEET



1106D-E70TAG Electric Power Engines

Power range 1500 rpm 136-189 kW (engine gross power)

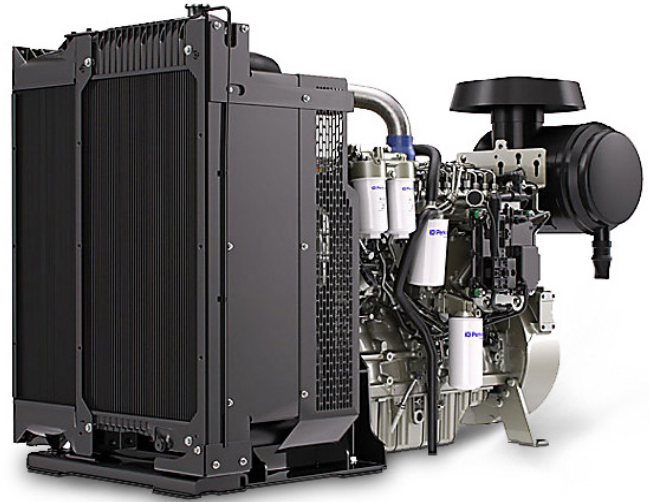
Power range 1800 rpm 156-235 kW (engine gross power)

Emissions EU Stage IIIA/U.S. EPA Tier 3/China Nonroad Stage III

Building upon Perkins proven reputation within the power generation industry, the 1106D Series range of Electropak engines now fit even closer to customers' needs.

In the world of power generation success is only gained by providing more for less. With the 1106D products, Perkins has engineered even higher levels of reliability, yet lowered the cost of ownership.

1100D engines are assembled around optimal, efficient manufacturing processes with state-of-the-art technology. They are built to provide the ideal power solution for customers who sell their applications into lesser regulated countries.



Features and benefits

- The Perkins® 1106D-E70TAG engines provide **greater productivity** through an improved power to weight ratio and have been designed for excellent load acceptance so your facility is powered quickly in all conditions.
- The 1106D high power density has been achieved in a 7 litre engine, using an electronic fuel injector system, making this engine robust for all markets which has the ability to cope with the variation of fuel qualities around the world delivering **high quality as standard**.
- Service intervals are set at 500 hours as standard assuming approved fuels and lubricating oils are used to deliver **low operating costs**.
- Through an experienced global network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. They have a comprehensive suite of web based tools at their finger tips, covering technical information, parts identification and ordering systems, all dedicated to **maximising the productivity** of your engine.
Perkins actively pursues product support excellence with our distribution network investing in their territory to provide you with a consistent quality of support across the globe.
- Throughout the entire life of a Perkins engine, we provide access to genuine factory specification parts giving reassurance that you receive excellent quality for the **lowest possible cost**, wherever your Perkins powered machine is operating in the world.

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Specification

	Model			
	1106D-E70TAG2	1106D-E70TAG3	1106D-E70TAG4	1106D-E70TAG5
Configuration	ElectropaK			
Cylinders	6 vertical in-line			
Displacement, litres (in ³)	7.01 (428)			
Aspiration	Turbocharged aftercooled			
Bore and stroke, mm (in)	105 x 135 (4.1 x 5.3)			
Combustion system	Direct injection			
Compression ratio	16.8:1			
Exhaust aftertreatment	N/A			
Rotation (viewed from flywheel)	Anti-clockwise, viewed on flywheel			
Total lubricating oil capacity, litres (US gal)	16.5 (4.4)			
Cooling system	Liquid			
Total coolant capacity, litres (US gal)	21 (5.5)			

Technical information

Model	Speed	Type of Operation	Engine Power		Typical Generator Output* (Net)		Prime Fuel Consumption			
			Gross	Net			110%	100%	75%	50%
	rpm		kW (hp)	kW (hp)	kVA	kWe	g/kWh	g/kWh	g/kWh	g/kWh
1106D-E70TAG2	1500	Prime	136 (182)	129 (173)	123	114	213	217	230	234
		Standby	149 (200)	143 (192)	135	126				
	1800	Prime	156 (209)	145 (194)	162	130	212	215	231	240
		Standby	171 (229)	161 (216)	178	143				
1106D-E70TAG3	1500	Prime	148 (198)	141 (189)	136	125	210	212	223	229
		Standby	163 (219)	156 (209)	150	138				
	1800	Prime	167 (224)	157 (211)	174	139	209	212	232	239
		Standby	184 (247)	173 (232)	191	153				
1106D-E70TAG4	1500	Prime	172 (231)	165 (221)	180	144	210	211	221	235
		Standby	189 (253)	182 (244)	200	160				
	1800	Prime	190 (255)	180 (241)	200	160	208	212	227	233
		Standby	209 (280)	199 (267)	219	175				
1106D-E70TAG5	1800	Prime	212 (284)	203 (272)	227	182	210	215	229	233
		Standby	235 (315)	224 (300)	250	200				

*Generator powers are typical and based on typical alternator efficiencies and a power factor (cos θ) or 0.8.

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Standard equipment

	Model			
	1106D-E70TAG2	1106D-E70TAG3	1106D-E70TAG4	1106D-E70TAG5
Electro unit or electropaK	ElectropaK	ElectropaK	ElectropaK	ElectropaK
Radiator fitted	✓	✓	✓	✓
Fuel filter, engine mounted	✓	✓	✓	✓
Water separator	✓	✓	✓	✓
Fuel priming pump (manual/electric)	Manual	Manual	Manual	Manual
Fuel cooler (not required for most installations)	✗	✗	✗	✗
Air filter, engine mounted	✓	✓	✓	✓
Engine ECM, engine mounted	✓	✓	✓	✓
Wiring harness to ECM	✓	✓	✓	✓
Wiring harness (all connectors to single customer interface)	✗	✗	✗	✗
Starter motor	✓	✓	✓	✓
Battery charging alternator	✓	✓	✓	✓
Flywheel housing	✓	✓	✓	✓
Flywheel	✓	✓	✓	✓
Fan	✓	✓	✓	✓
Fan guard	✓	✓	✓	✓
Temperature and oil pressure for automatic stop/alarm configurable	✓	✓	✓	✓

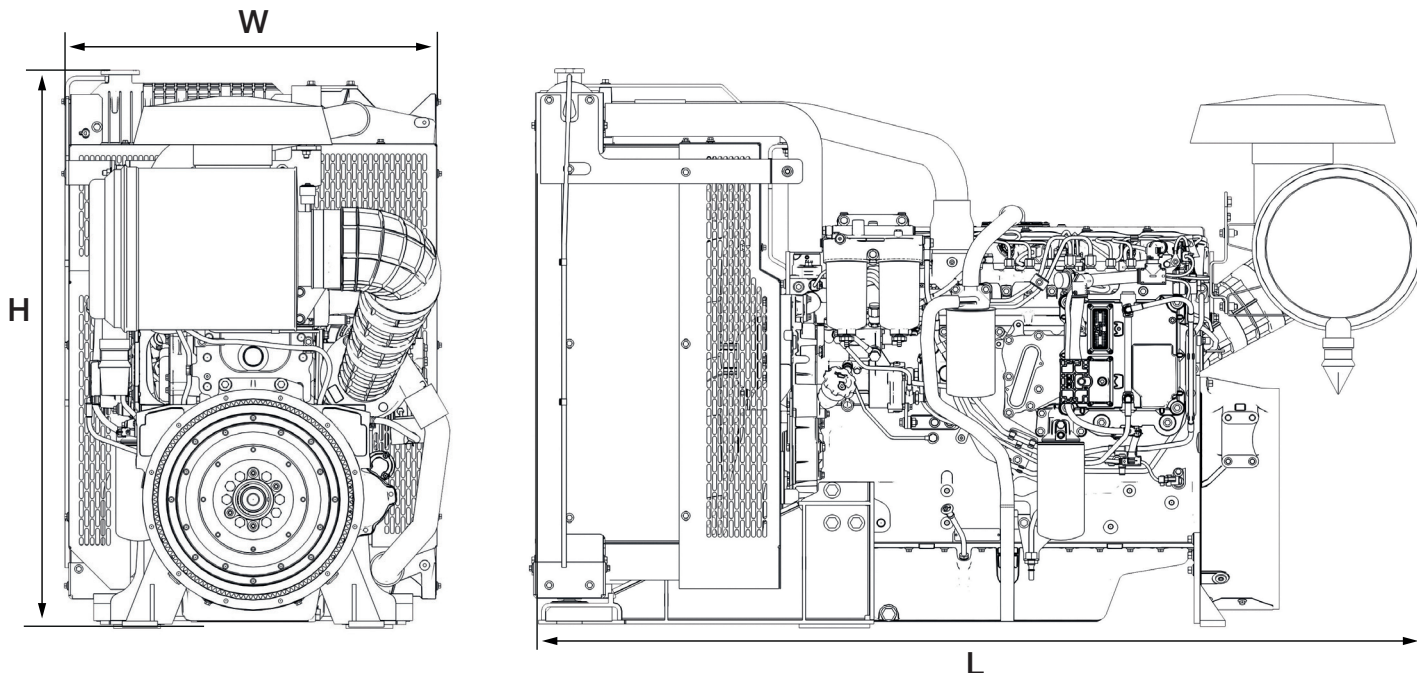
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Engine package weights and dimensions



	Model			
	1106D-E70TAG2	1106D-E70TAG3	1106D-E70TAG4	1106D-E70TAG5
Configuration	ElectropaK			
Dimensions, H x L x W, mm (in)	1142 x 1763 x 768 (45 x 69.4 x 30.2)			
Dry weight, kg (lb)	788 (1738)			

Prime power: Power available at variable load in lieu of a main power network. Overload of 10% is permitted for 1 hour in every 12 hours of operation.

Standby (maximum): Power available at variable load in the event of a main power network failure. No overload is permitted.

1106D-E70TAG4

1100

189 kWm (Gross) @ 1500 rpm
209 kWm (Gross) @ 1800 rpm

ElectropaK

Basic technical data

Number of cylinders	6
Cylinder arrangement	Inline
Cycle	4 stroke
Induction system	Turbocharged and air charge cooled
Combustion system	Direct injection diesel
Compression ratio	16.8 : 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)	788 kg
Estimated total weight (wet)	822 kg

Overall dimensions (ElectropaK)

Height	1087 mm
Length (air cleaner fitted)	1706 mm
Width	773 mm

Moments of inertia

Engine rotational components	0.27 kgm ²
Flywheel	1.26 (SAE2) kgm ²

General installation

General Installation	Units	50 Hz (1500 rpm)		60 Hz (1800 rpm)	
		Prime	Standby	Prime	Standby
Gross engine power	kW	171.5	188.7	190.4	209.4
Brake mean effective pressure	kPa	1956.4	2152.1	1809.5	1991.2
Mean piston speed	m/s	6.7		8.1	
ElectropaK nett engine power	kW	164.6	181.8	180.3	199.4
Engine coolant flow (against 35 kPa restriction)	litres/min	142		170	
Combustion air flow (at STP)	m ³ /min	12.8	13.2	15.2	15.4
Exhaust gas flow (maximum)	m ³ /min	30.20	31.70	33.82	34.27
Exhaust gas temperature (maximum) in manifold (after turbocharger)	°C	530		509	
Nett engine thermal efficiency	%	37.3	38.2	39.4	40.1
Typical genset electrical output (0.8pf 25°C)	kWe	144	160	160	175
	kVA	180	200	200	219
Regenerative power (estimated)	kW	14.5		16.1	
Assumed alternator efficiency	%	91	91	91	92
Energy balance					
Heat in fuel	kW	434.5	475.2	483.5	522.5
Power to cooling fan	kW	4		7	
Power to coolant and lubricating oil	kW	72.7	80.8	78.2	85.4
Power to residual losses (alternator)	kW	2.8		3.1	
Power to exhaust	kW	131.5	143.1	148.8	158.9
Energy to charge coolers	kW	30.9	32.9	35.9	36.6
Power to radiation	kW	27.9	29.8	30.2	32

Prime power: Unlimited hours usage with an average load factor of 80% of the published prime power over each 24 hour period. A 10% 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% 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.

Centre of gravity, ElectropaK

Forward from rear of block (wet)	476 mm
Above crankshaft centre line (wet)	176 mm
Offset to RHS of crankshaft centre line (wet)	-16 mm

Performance

Speed variation at constant load	± 0.28%
Cyclic irregularity at standby power	0.004
All ratings within	± 3%

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

Sound level

Average sound pressure level for standby power @ 1 m... 98.7 dB(A)

Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	53%
Air inlet restriction at maximum power	- 5 kPa (maximum)
Exhaust back pressure at maximum power	15 kPa (maximum)
Fuel temperature	40°C

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.

Cooling system

Cooling pack

Overall weight (wet)	45 kg
Overall face area	469,200 mm ²
Width	684 mm
Height	690 mm

Radiator

Face area	303,600 mm ²
Number of rows and materials	4 rows, Aluminium
Matrix density and material	11.3 fins per inch, Aluminium
Width of matrix	440 mm
Height of matrix	690 mm
Pressure cap setting (minimum)	110 kPa

Charge cooler

Face area	151,800 mm ²
Number of rows and materials	2 rows, Aluminium
Matrix density and material	10 fins per inch, Aluminium
Width of matrix	220 mm
Height of matrix	690 mm

Fan

Diameter	635 mm
Drive ratio	1.25:1
Number of blades	7
Material	Nylon
Type	Pusher
Air flow @ 1800 rpm	282 m ³ /min
Power @ 1800 rpm	8 kW

Coolant

Total system capacity	20.5 litres
System drawdown capacity	10%
Engine capacity	9.5 litres
Maximum top tank temperature	108°C
Temperature rise across engine (Maximum rating dependent)	12°C
Maximum permissible external system resistance	35 kPa
Thermostat operation range	82°C to 95°C
Shutdown switch setting	114°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 ³ /min
Duct allowance with inhibited coolant at 53°C			
Minimum air flow	1500	0.125	204
	1800	0.12	258
Duct allowance with inhibited coolant at 46°C			
Minimum air flow	1500	0.200	184
	1800	0.200	228

Electrical system

Alternator	8SI
Alternator voltage	12 volts
Alternator output	65 amps
Starter	AZF
Starter motor voltage	12 volts
Starter motor power	4.0 kW
Number of teeth on the flywheel	126
Pull-in current of starter motor solenoid @ 25°C maximum ⁽¹⁾	12 volts 68 amps
Hold-in current of starter motor solenoid @ 25°C maximum ⁽¹⁾	12 volts 20 amps
Engine stop method	CAN link signal or Hardwire input to engine ECM

¹ All leads to rated at 10 amps minimum

Cold start recommendations

Minimum required cranking speed over TDC

	5 to -5°C	-5 to -20°C	-20 to -25°C
Starter	AZF		
Battery	1 x 750 CCA	2 x 750 CCA	2 x 900 CCA
Maximum breakaway current	NA		
Cranking current	1000 A		
Aids	None	Glowplugs	
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 - 1500 & 1800 rpm	15 kPa
Exhaust outlet, internal diameter	115.9 mm

Fuel system

Injection components

Injector Electronic CRIN2
 Fuel pump.....CB28

Fuel priming

Priming pump type Manual
 Maximum priming time.....180 seconds

Fuel feed

Maximum fuel flow6.6 litres/min
 Maximum suction head at engine fuel pump inlet.....-17 kPa
 Maximum static pressure head 10 kPa
 Fuel temperature at engine fuel pump inlet..... 75°C
 Tolerance on fuel consumption ± 5%

Fuel specification

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

Fuel consumption

Load	Type of operation and application			
	1500 rpm		1800 rpm	
	g/kWh	litres/hr	g/kWh	litres/hr
110% Prime power	210.3	47.3	208.1	52.2
100% Prime power	211.3	43.4	211.9	48.3
75% Prime power	221.2	34.0	227.1	38.8
50% Prime power	235.1	24.1	233.3	23.6
25% Prime power	240.9	12.3	251.4	14.3

Induction system

Maximum air intake restriction

Clean filter4 kPa
 Dirty filter.....8 kPa
 Air filter type.....Paper element

Lubrication system

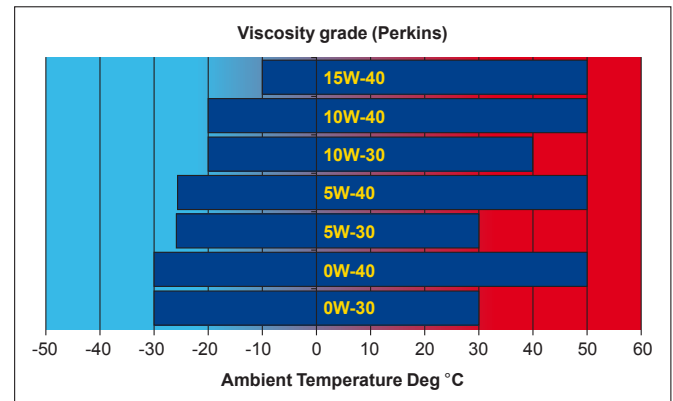
Maximum total system oil capacity 17.5 litres
 Minimum oil capacity in sump 12.5 litres
 Maximum oil capacity in sump 15.5 litres
 Maximum engine operating angles -
 Front up, front down, right side, left side..... 7°
 Sump drain plug tapping size3/4 - 16 UNF
 Shutdown switch setting (where fitted)
 Oil pressure shut down switch 90 kPa Falling

Lubricating oil

Relief valve opening pressure430 kPa
 Pressure at maximum speed340 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.....
 ± 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.

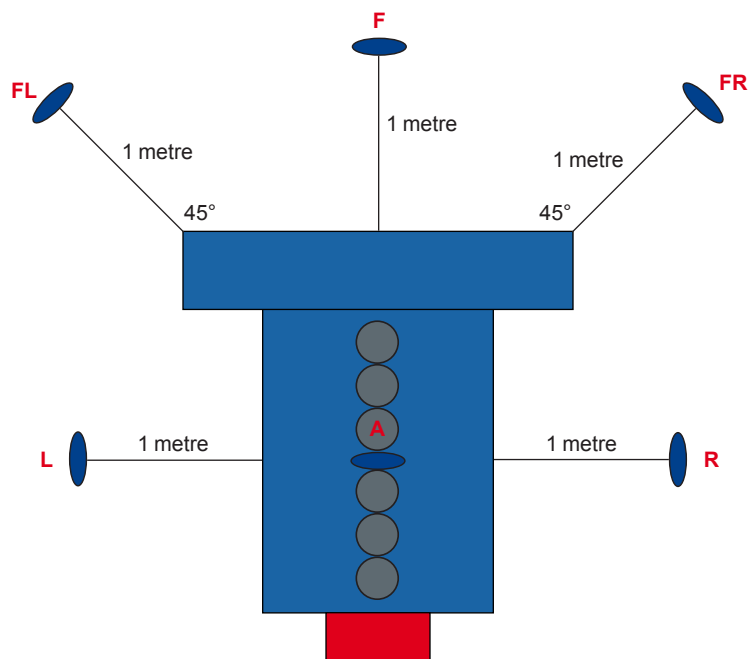
Initial load application: When engine reaches rated speed
 (15 seconds maximum after engine starts to crank).

Description	Units	1500 rpm	1800 rpm
% of prime power	%	75.0	77.0
Load	kWe	120.0	122.5
Transient frequency deviation	%	18.5	8.8
Frequency recovery time	Seconds	1.9	0.9

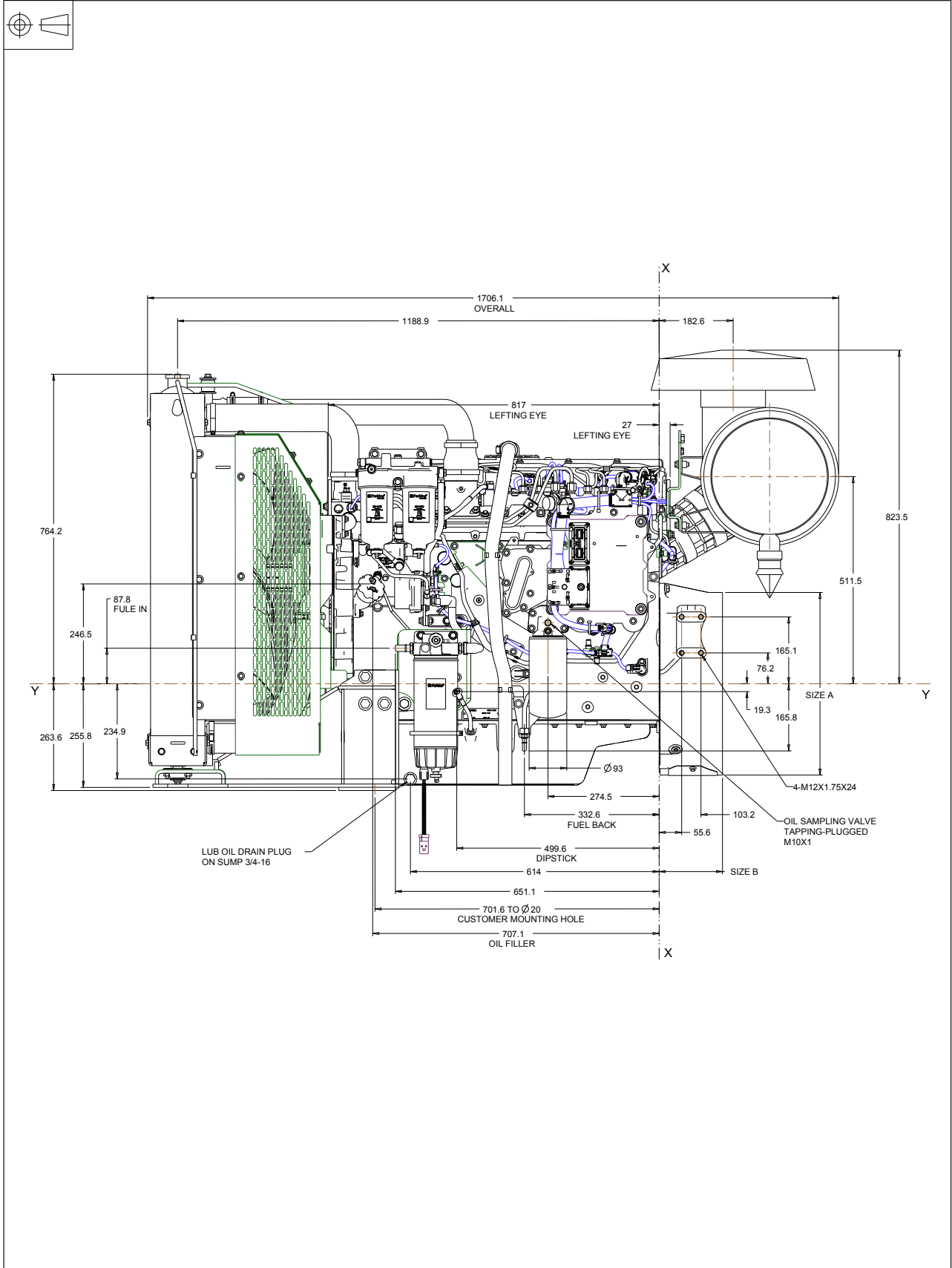
Noise data

Noise levels (predicted)

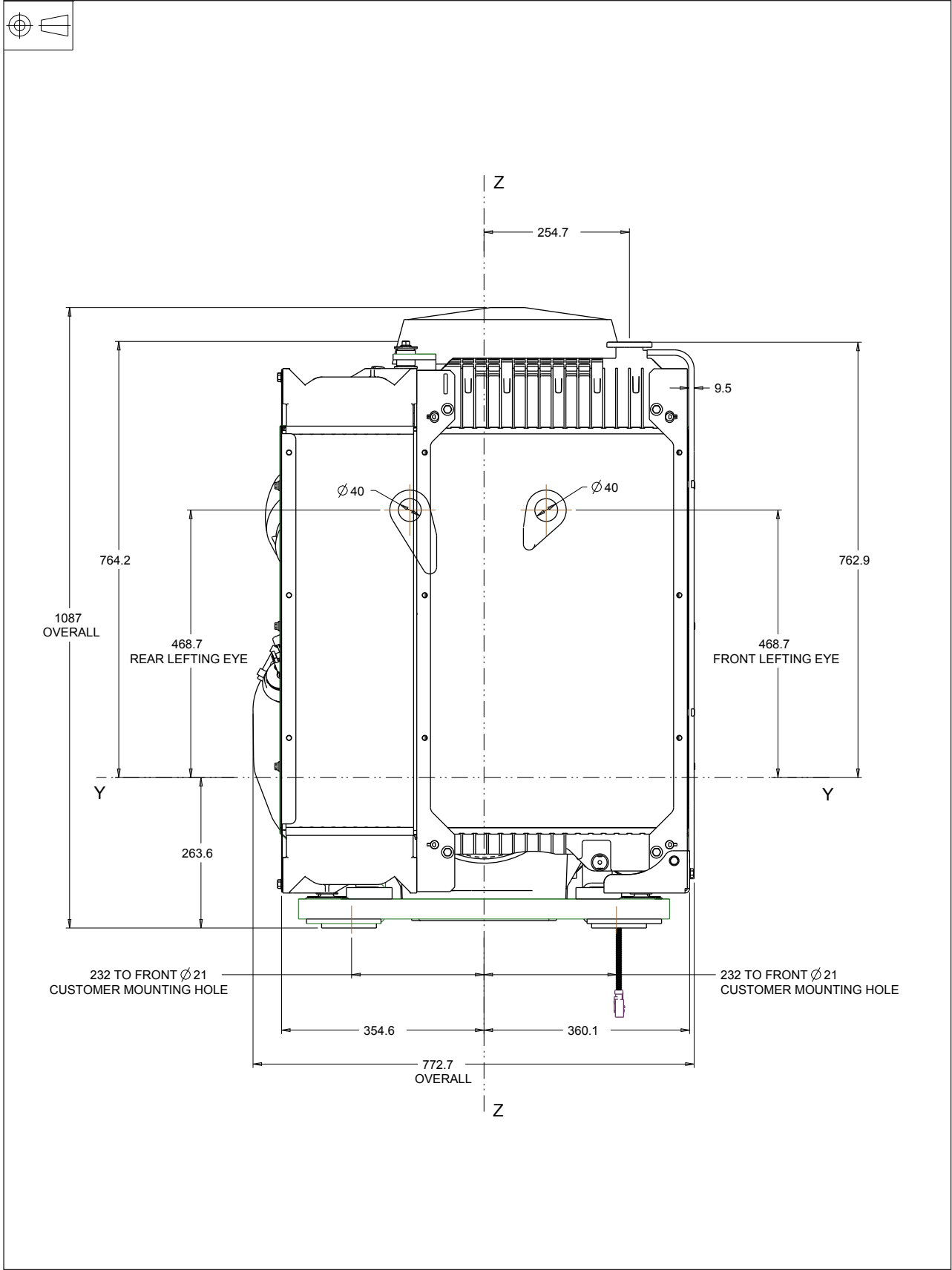
Prime power noise level dB(A)		
Position	50 Hz	60 Hz
F	95.8	99.8
R	96.3	99.4
L	96.0	99.0
A	93.4	96.4
FR	95.3	99.1
FL	95.3	99.0



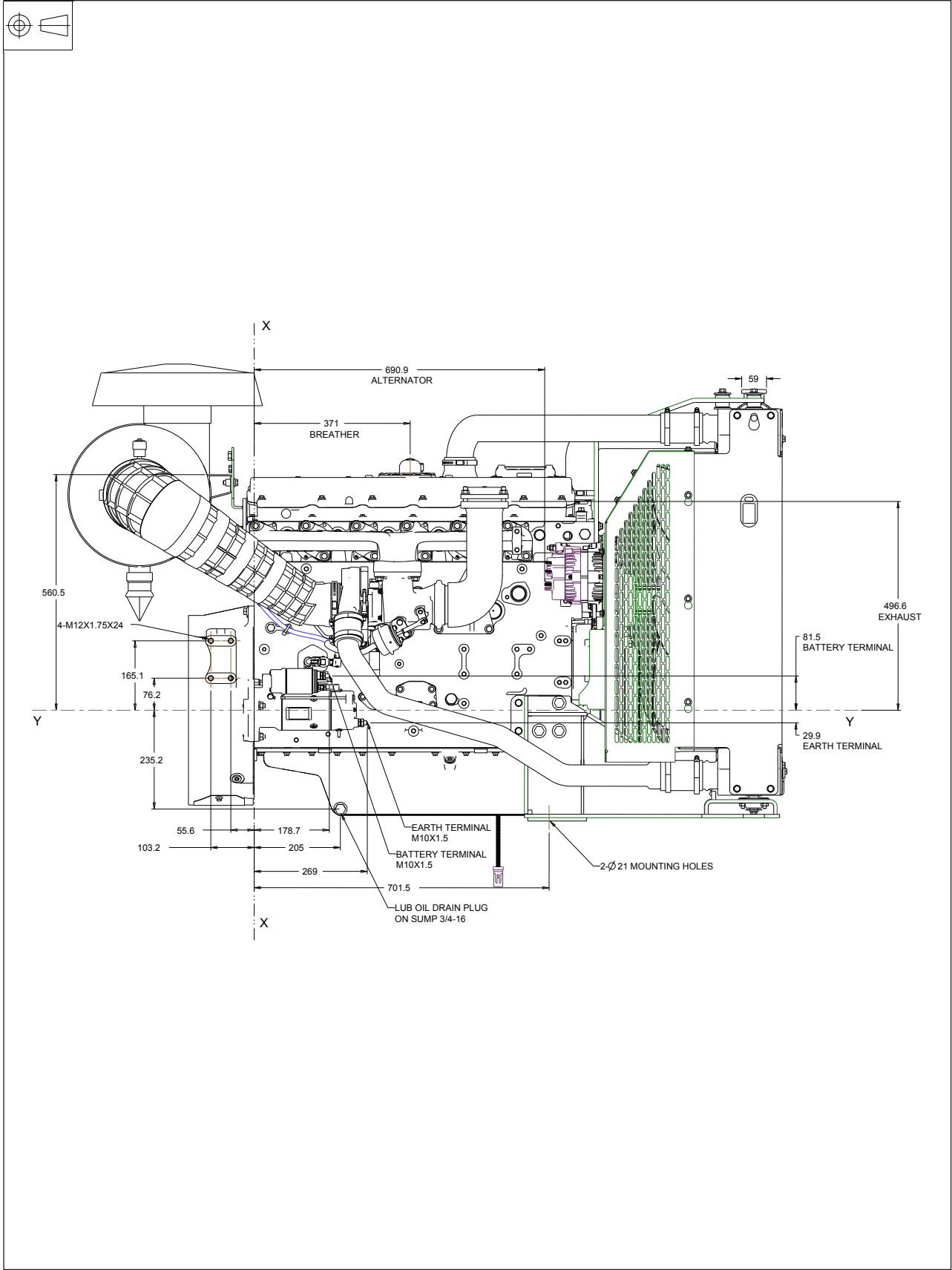
1106D-E70TAG4 - Left side view



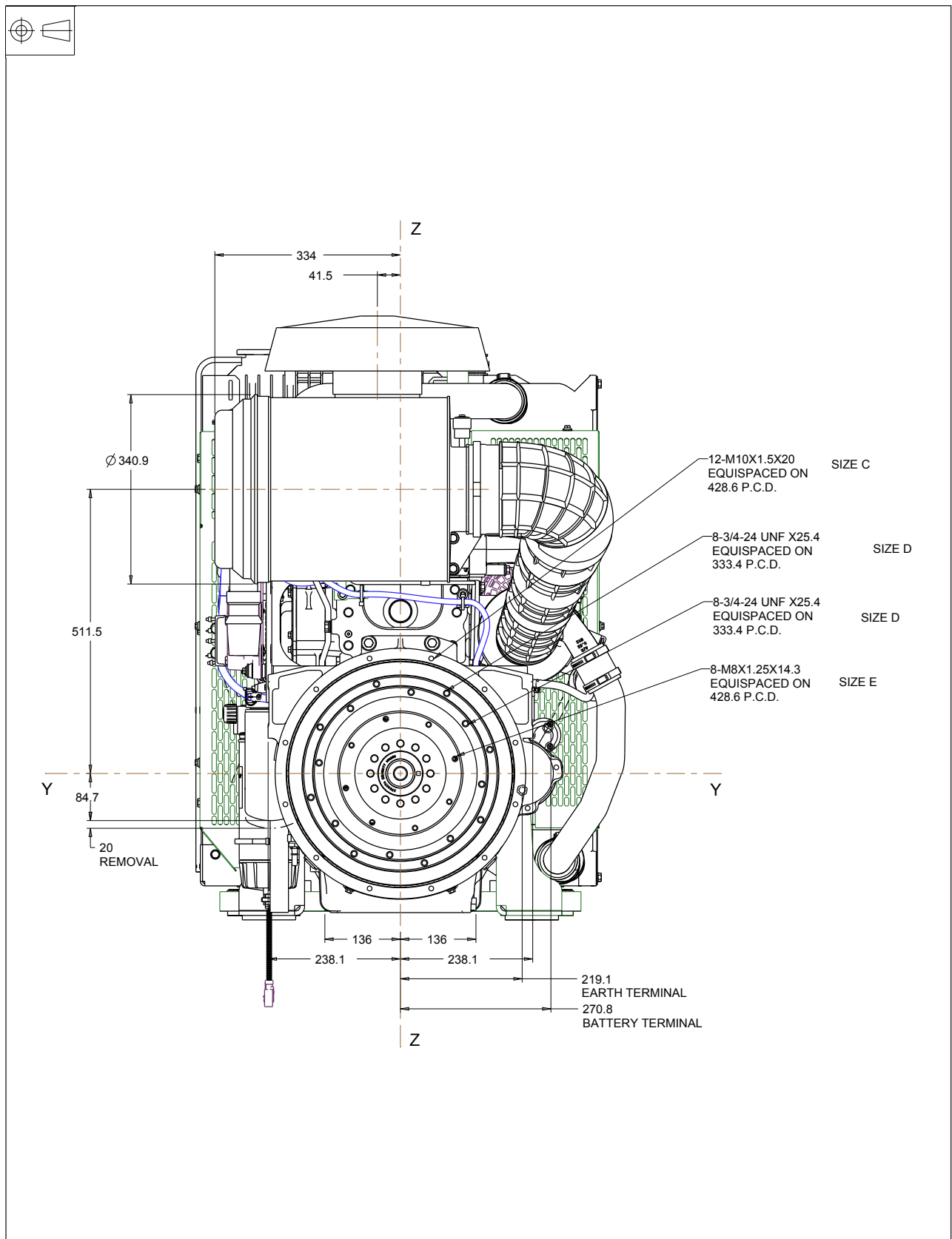
1106D-E70TAG4 - Front view



1106D-E70TAG4 - Right side view



1106D-E70TAG4 - Rear view



1106D-E70TAG4 - Plan view

