

*ENGINE DATASHEET*



# 1106D-E70TAG Electric Power Engines

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

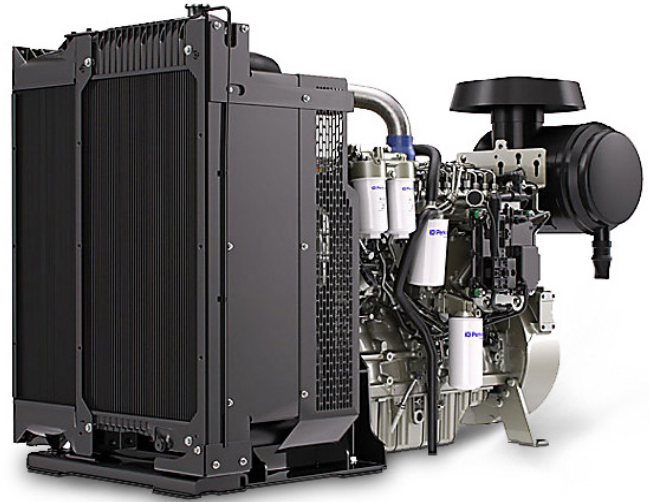
**Power range 1800 rpm** 156-235 kW (engine gross power)

**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 <sup>3</sup> )	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  $\theta$ ) 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	✓	✓	✓	✓

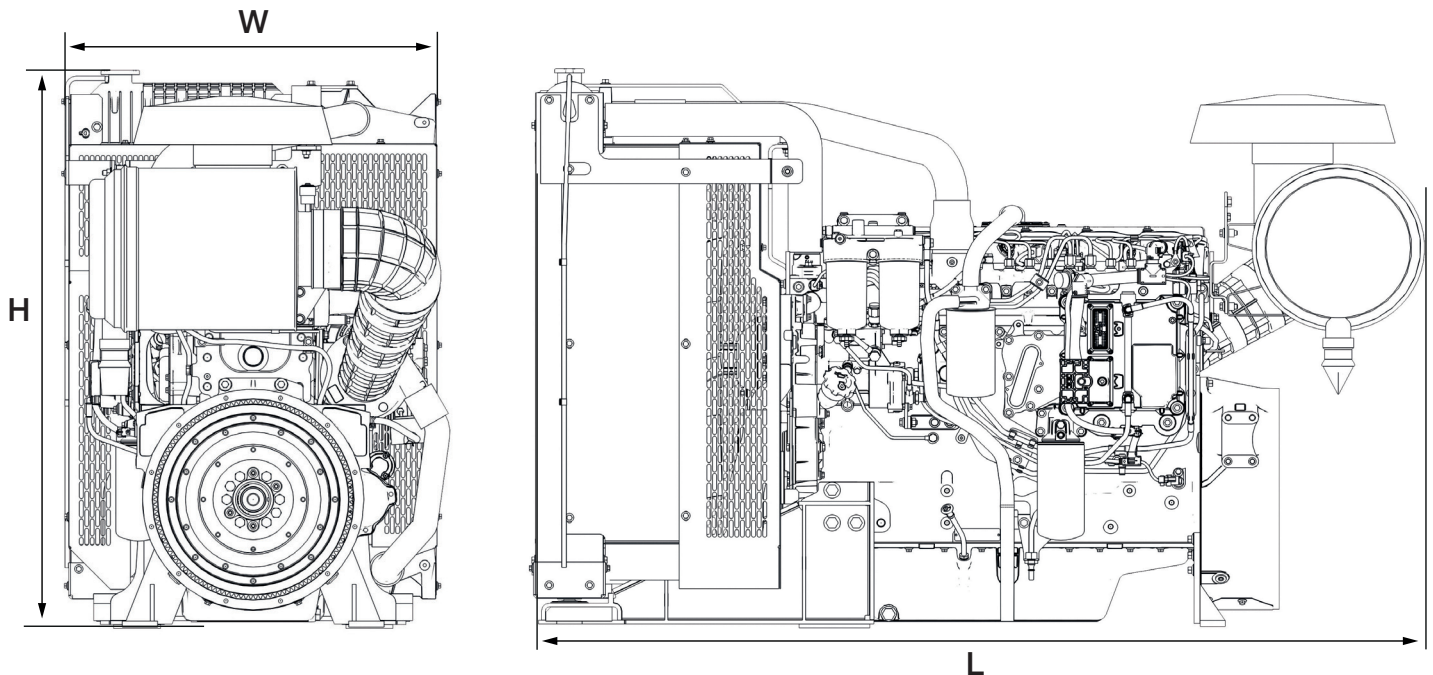
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## Engine package weights and dimensions



	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-E70TAG5

# 1100

234.5 kWm (Gross) @ 1800 rpm

## ElectropaK

Series

### Basic technical data

Number of cylinders	6
Cylinder arrangement	In-line
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	1142 mm
Length (air cleaner fitted)	1763 mm
Width	788 mm

### Moments of inertia

Engine rotational components	0.27 kgm <sup>2</sup>
Flywheel	1.26(SAE2) kgm <sup>2</sup>

### 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	± 0.76%
Cyclic irregularity at standby power	0.009
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... 101.7dB(A)

### Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	48%
Air inlet restriction at maximum power	- 8 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.

### General installation

General Installation	Units	Standby
Gross engine power	kW	234.5
Brake mean effective pressure	kPa	2234.1
Mean piston speed	m/s	8.1
ElectropaK nett engine power	kW	223.5
Engine coolant flow (against 35 kPa restriction)	litres/min	170.0
Combustion air flow (at STP)	m <sup>3</sup> /min	18.5
Exhaust gas flow (maximum)	m <sup>3</sup> /min	38.47
Exhaust gas temperature (maximum) in manifold (after turbocharger)	°C	553
Nett engine thermal efficiency	%	39.8
Typical genset electrical output (0.8pf 25°C)	kWe	200
	kVA	250
Regenerative power (estimated)	kW	3.0
Assumed alternator efficiency	%	92
Energy balance		
Heat in fuel	kW	590.8
Power to cooling fan	kW	8.5
Power to coolant and lubricating oil	kW	91.9
Power to exhaust	kW	181.2
Power to residual losses (alternator)	kW	3.1
Energy to charge coolers	kW	47.4
Power to radiation	kW	35.2

**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.

## Cooling system

### Cooling pack

Overall weight (wet)	90 kg
Overall face area	611200 mm <sup>2</sup>
Width	764 mm
Height	800 mm

### Radiator

Face area	351,840 mm <sup>2</sup>
Number of rows and materials	4 rows, Aluminium
Matrix density and material	10 fins per inch, Aluminium
Width of matrix	440 mm
Height of matrix	800 mm
Pressure cap setting (minimum)	100 kPa

### Charge cooler

Face area	203,483 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
Drive ratio	1.2:1
Number of blades	9
Material	Nylon
Type	Pusher
Air flow @ 1800 rpm	6.75 kg/s
Power @ 1800 rpm	8.5 kW

### Coolant

Total system capacity	21 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	kg/s
Duct allowance with inhibited coolant at 53°C			
Minimum air flow	1800	0.12	6.2
Duct allowance with inhibited coolant at 46°C			
Minimum air flow	1800	0.200	5.6

## Electrical system

Alternator	13SI
Alternator voltage	12 volts
Alternator output	100 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 <sup>(1)</sup>	12 volts 68 amps
Hold-in current of starter motor solenoid @ 25°C maximum <sup>(1)</sup>	12 volts 20 amps
Engine stop method	CAN link signal or Hardwire input to engine ECM

<sup>1</sup> All leads to rated at 10 amps minimum

### Cold start recommendations

Minimum required cranking speed over TDC 60 rpm

	5 to -5°C	-5 to -20°C	-20 to -25°C
Starter	AZF		
Battery	1 x 750CCA	2 x 750CCA	2 x 900CCA
Maximum breakaway current	NA		
Cranking current	1000A		
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 - 1800 rpm	10 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 flow .....6.6 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	
	1800 rpm	
	g/kWh	litres/hr
110% Prime power	210.2	59.1
100% Prime power	214.9	54.4
75% Prime power	229.1	43.5
50% Prime power	233.4	29.5
25% Prime power	253.0	16.0

## Induction system

### Maximum air intake restriction

Clean filter .....4 kPa  
 Dirty filter.....8 kPa  
 Air filter type..... paper element

## Lubrication system

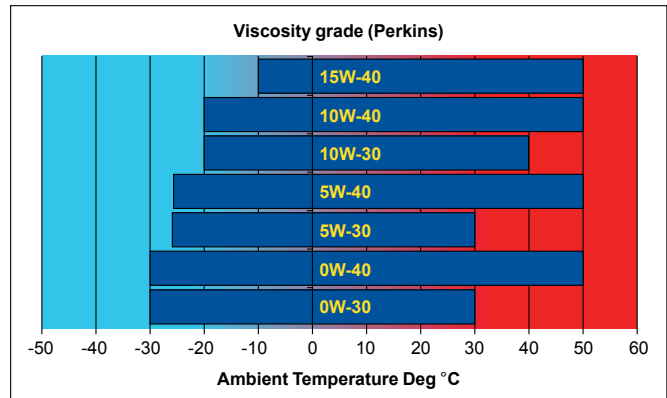
Maximum total system oil capacity ..... 17.5 litres  
 Minimum oil capacity in sump ..... 12.5 litres  
 Maximum oil capacity in sump ..... 15.5 litres  
 Maximum engine operating angles -  
 Front up, front down, right side, left side..... 7°  
 Sump drain plug tapping size .....3/4 - 16 UNF  
 Shutdown switch setting (where fitted)  
 Oil pressure shut down switch ..... 90 kPa Falling

### Lubricating oil

Relief valve opening pressure .....430 kPa  
 Pressure at maximum speed .....340 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 CI4  
 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).

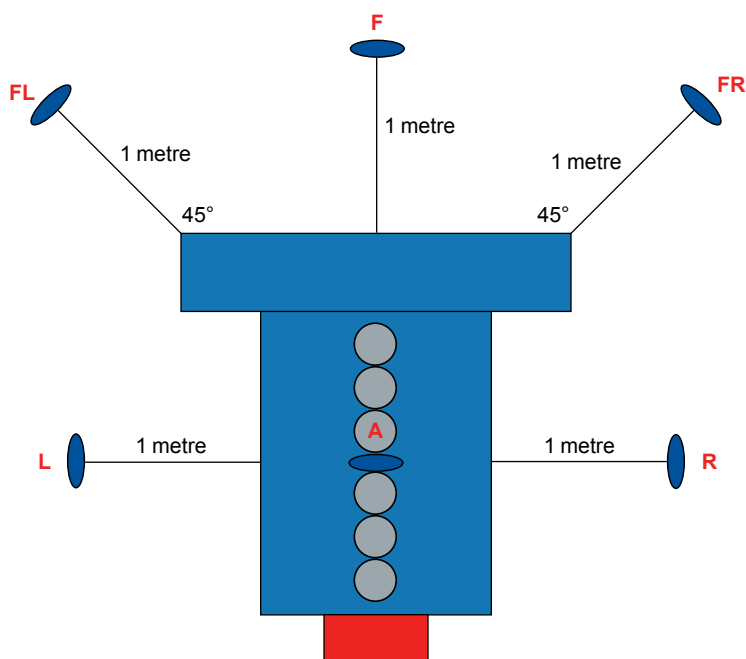
Description	Units	1800 rpm
% of prime power	%	66
Load	kWe	120
Transient frequency deviation	%	8.7
Frequency recovery time	Seconds	0.8



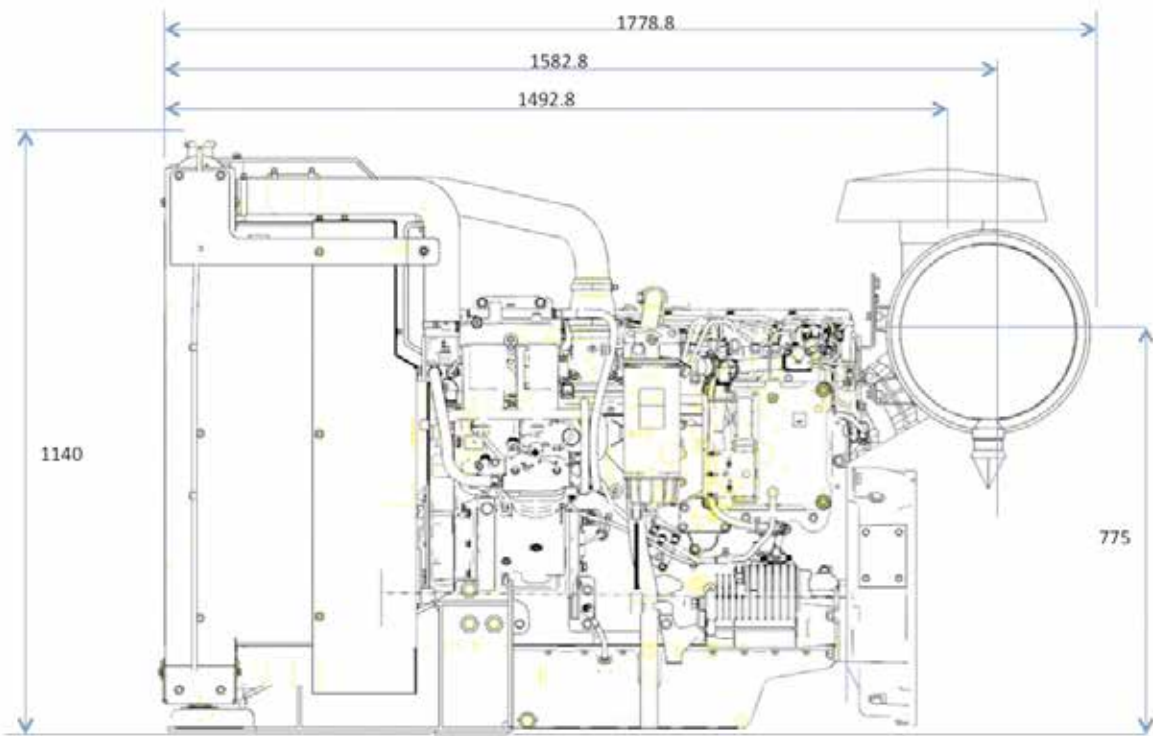
## Noise data

### Noise levels

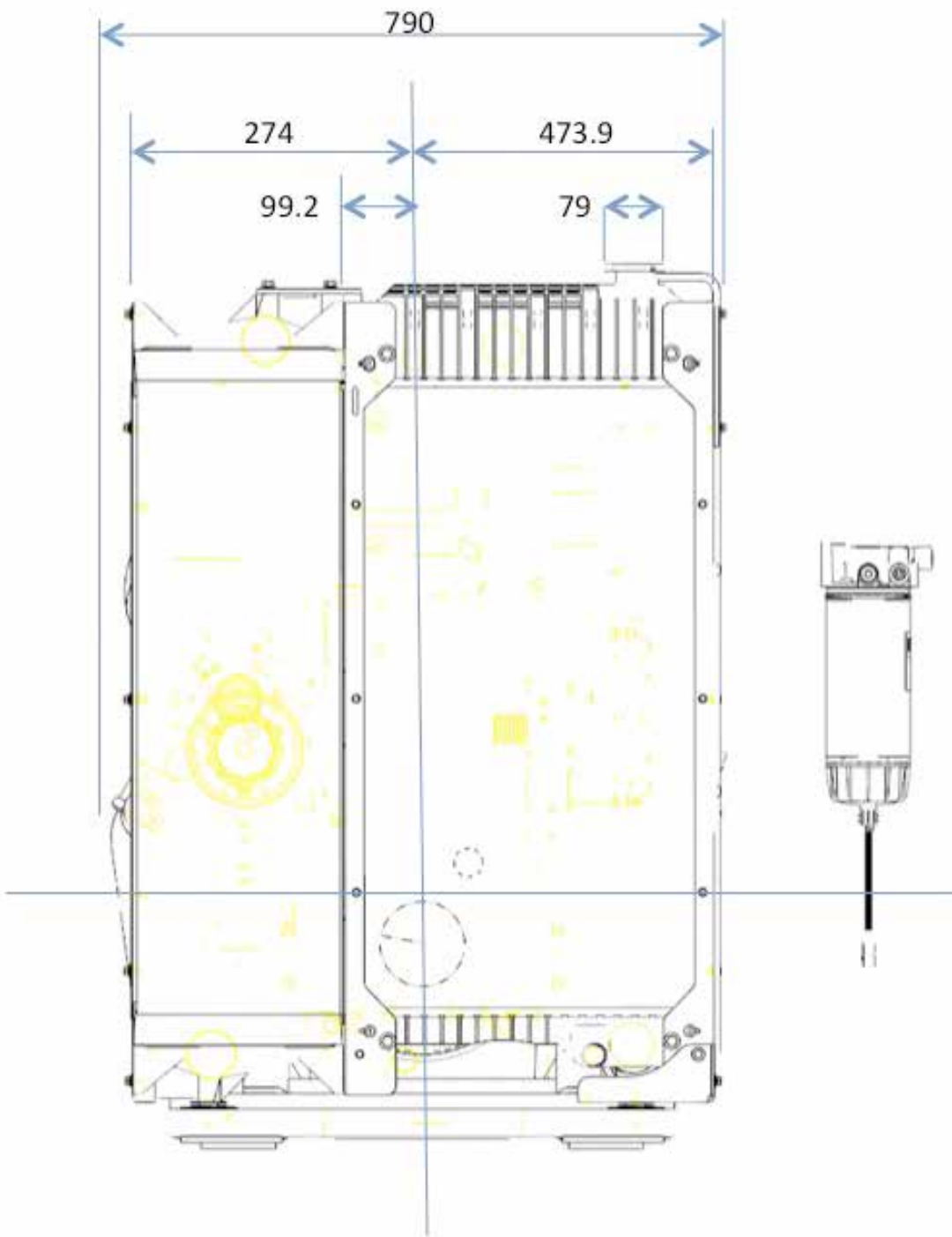
Position	Noise level dB(A)	
	Prime power	Standby
A	NA	99.7
R	NA	102.2
FR	NA	102.6
F	NA	103.7
FL	NA	101.9
L	NA	101.6



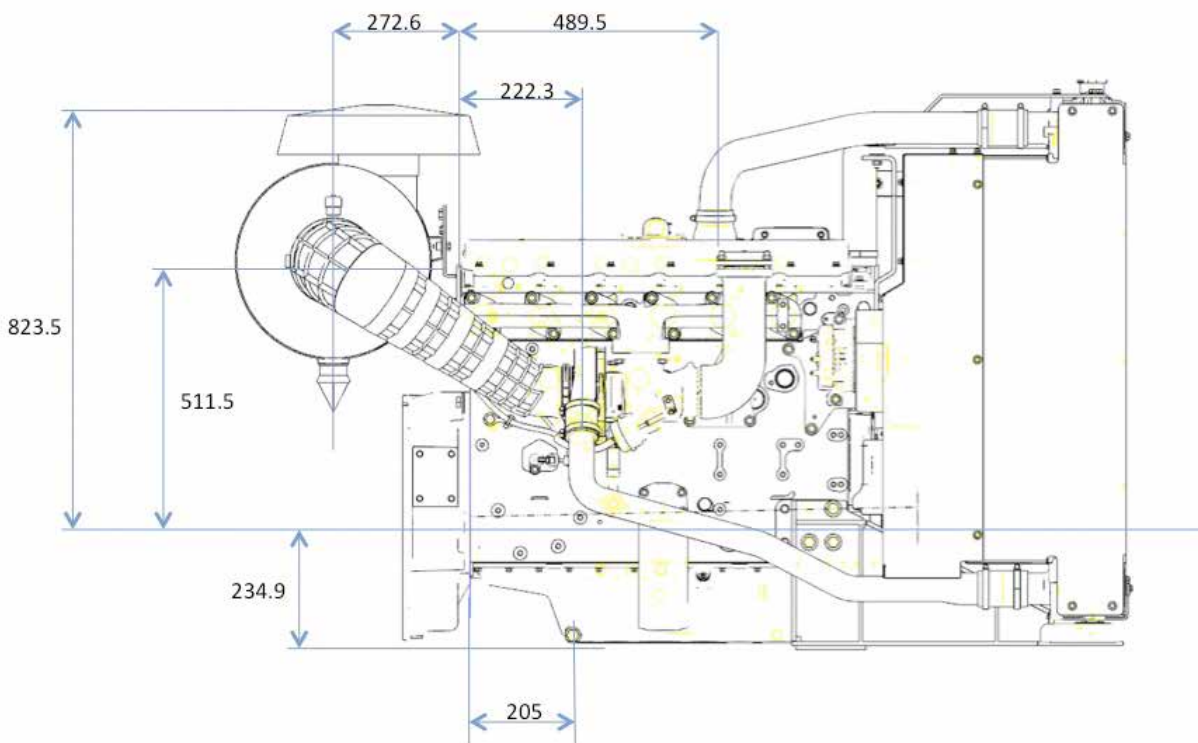
## 1106D-E70TAG5 - Left side view



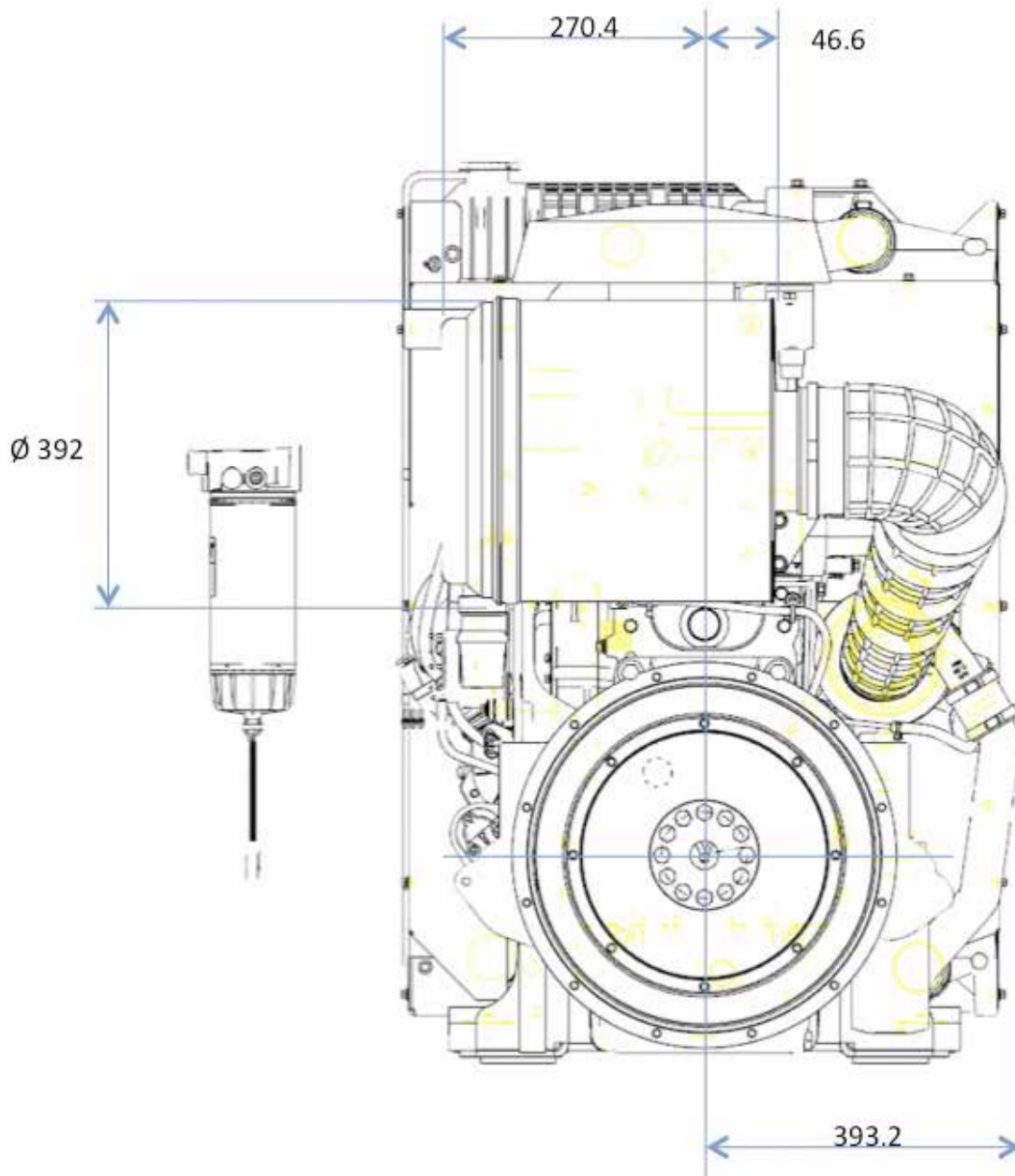
# 1106D-E70TAG5 - Front view



## 1106D-E70TAG5 - Right side view



# 1106D-E70TAG5 - Rear view



# 1106D-E70TAG5 - Plan view

