

1103D-33 G3

1100

32.3 kWm @ 1500 rpm

Diesel engine Electropak

Series

Basic technical data

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	Four stroke
Induction system	Naturally Aspirated
Compression ratio	19.25 : 1
Bore	105 mm (4.13 inches)
Stroke	127 mm (4.99 inches)
Cubic capacity	3.3 litres
Direction of rotation	Anti-clockwise when viewed from flywheel
Firing order	1,2,3

Estimated total weight (fan to flywheel)

Dry	329 kg
Wet	348 kg

Overall dimensions

Height	951 mm (37.44 inches)
Length	1000 mm (39.37 inches)
Width (including mounting brackets)	631 mm (24.84 inches)

Moment of inertia (mk²)

Engine:	
- longitudinal	23.3 kgm ²
- horizontal	38.1 kgm ²
- axial	24.4 kgm ²
Flywheel (polar)	1.14 kgm ²

Centre of gravity (fan to flywheel)

Forward from rear of block	192.9mm
Above centre line of block	139 mm
Offset of RHS of centre line	- 4.7 mm

Performance

Speed variation at constant load $\pm 0.5\%$

Note: All data based on operation to ISO/TR14396, ISO 3046/1 standard reference conditions.

Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	30%
Air inlet restriction at maximum power	3 kPa
Exhaust back pressure	15 kPa
Fuel temperature (pump inlet)	40°C

Sound Level

Estimated sound power level (bare engine without inlet and exhaust at 1 metre):	
@1500 rpm	99 dB(A)
All ratings certified to within	$\pm 5\%$

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.

Emissions capability

Certified against the requirements of EU (EU 97/68/EC Stage IIIa) legislation for non-road mobile machinery, powered by constant speed engines.

Cyclic irregularity (for engine & flywheel)

Prime Power:	
@1500 rpm	$\pm 0.5\%$

General installation

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Designation	Units	Type of operation and application	
		Prime power 1500 rpm	Standby power 1500 rpm
Gross engine power	kWb	29.7	33.0
Fan Power	kWm	0.7	
Gross BMEP	kPa	1023	1128
Mean piston speed	m/s (ft/s)	6.35 (20.8)	
ElectropaK nett engine power	kWm	29.0	32.3
Engine coolant flow 35 kPa system restriction	litres/min	125.0	
Combustion air flow (at STP)	m ³ /min	2.13	2.16
Exhaust gas flow (max.)	m ³ /min	5.25	5.49
Exhaust gas outlet temperature (max. at standby)	°C	515.0	570.0
Cooling fan air flow (200 kPa external restriction)	m ³ /min	45.6	
Overall thermal efficiency (nett)	%	36.4	36.3
Typical Genset electrical output (0.8pf 25°C)	kWe	25	28
	kVA	32	35
Friction power and pumping loss	kW	7.7	
Assumed alternator efficiency	%	89%	
Specific Fuel Consumption	litres/min	0.13	0.15

Energy balance

Designation	Units	Prime power 1500rpm	Standby power 1500rpm
Power in fuel (Fuel heat of combustion)	kWt	81.6	91.0
Power output (gross)	kWb	29.7	33.0
Power to cooling fan	kWm	0.7	
Power output (nett)	kWm	29.0	32.3
Power to coolant and lubricating oil	kWt	21.3	23.9
Power to exhaust	kWt	26.1	29.1
Power to radiation	kWt	4.5	5.0

Note: 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 m ² (2.97 ft ²)
Rows and materials	Single row aluminium
Matrix density and material	Aluminium 12,7 fins/inch
Width of matrix	526 mm (20.7 inches)
Height of matrix	524 mm (20.6 inches)
Pressure cap setting	107 kPa

Fan

Diameter	457mm (18 in)
Drive ratio	0.85:1
Number of blades	7
Material	Composite
Type	Pusher

Coolant

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

Total system capacity:

With radiator	10.2 litres (21.5 pt)
Without radiator	4.4 litres (9.2 pt)
Maximum top tank temperature	110 °C (230 °F)
Thermostat operating range	82 - 93 °C (180 - 199 °F)

Lubrication system

Lubricating oil capacity

Total system	8.3 litres (17.5 pt)
Sump minimum	6.2 litres (13.1 pt)
Sump maximum	7.8 litres (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
Oil temperature at normal operating conditions	110 °C
Max continuous oil temperature (in rail)	125 °C (257 °F)
Oil consumption at full load as a % of fuel consumption	0.15%

Exhaust system

Maximum back pressure	
1500 rpm	15 kPa
Exhaust outlet size	56 mm (2.2 inches)

Fuel System

Type of injection	Direct
Fuel injection pump	DP210
Fuel atomiser	Multi-hole
Nozzle opening pressure	29 MPa (290 bar)

Fuel lift pump

Type	Mechanical
Flow/hour	120 - 150 litres/h (211 - 264 pt/m)
Pressure	30 - 75 kPa (4.4 - 10.9 psi)
Maximum suction head (with clean filter):	
at 1.7 m using 8mm dia bore pipe	17 kPa
Maximum static pressure head:	
at 2.0 m using 8mm dia bore pipe	30 kPa

Governor type

Speed control for diesel to conform to:

Mechanical governor	ISO 8528, Class G2
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Fuel specification

Fuel Specification	BS2869 1998 Class A2 or BS EN590
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/kWhr)

		Power rating				
Speed		110%	100%	75%	50%	25%
1500	Litres	8.8	8	6.1	4.37	2.69
	SFC	229.1	227.2	224	235	295

Induction system

Maximum air intake restriction

Clean filter	3 kPa
Dirty filter	6.6 kPa
Air filter type	2 stage cyclonic / paper element

Electrical system

Type	Negative ground
Alternator voltage	12 volts
Alternator output	65 amps
Starter motor voltage	12 volts
Starter motor power	3 kW
Number of teeth on flywheel	126
Engine stop solenoid	12 volts
Stop solenoid (maximum):	
Pull in current @ -25 °C ⁽¹⁾	10 amps
Hold in current @ -25 °C ⁽¹⁾	10 amps
1. All leads to rated at 10 amps minimum	

Cold start recommendations

Minimum cranking speed 80 rpm

Starter specification

Starter motor type	Min. starting temp. °C (°F)	Minimum battery type for SAE lubricating oil viscosity			
		15W	10W	5W	0W
12 volt 3.0 kW	-5 (23)	1 x A			
	-15 (5)*		1 x A		
	-20 (-4)*			1 x B	
	-25 (-13)*				1 x B

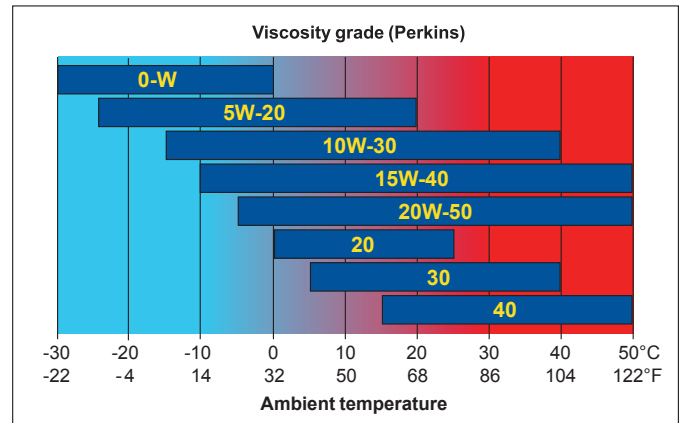
* Start aid fitted

Battery specification

Commercial Ref N°	Perkins code	Battery minimum performance		
		BS 3911	SAE J537	DIN 43539.2
643	A	440	660	400
647	B	510	770	465
069	C	340	540	300
655	D	570	810	490

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 maximum after engine starts to crank)		
Descriptor	Units	1500 rpm
Prime power	%	90
Load	kWm (kWe)	21.6
Transient frequency deviation	%	<10
Frequency recovery	Seconds	< 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	45 °C
Alternator efficiency	TBA%
Minimum ambient temperature	10 °C

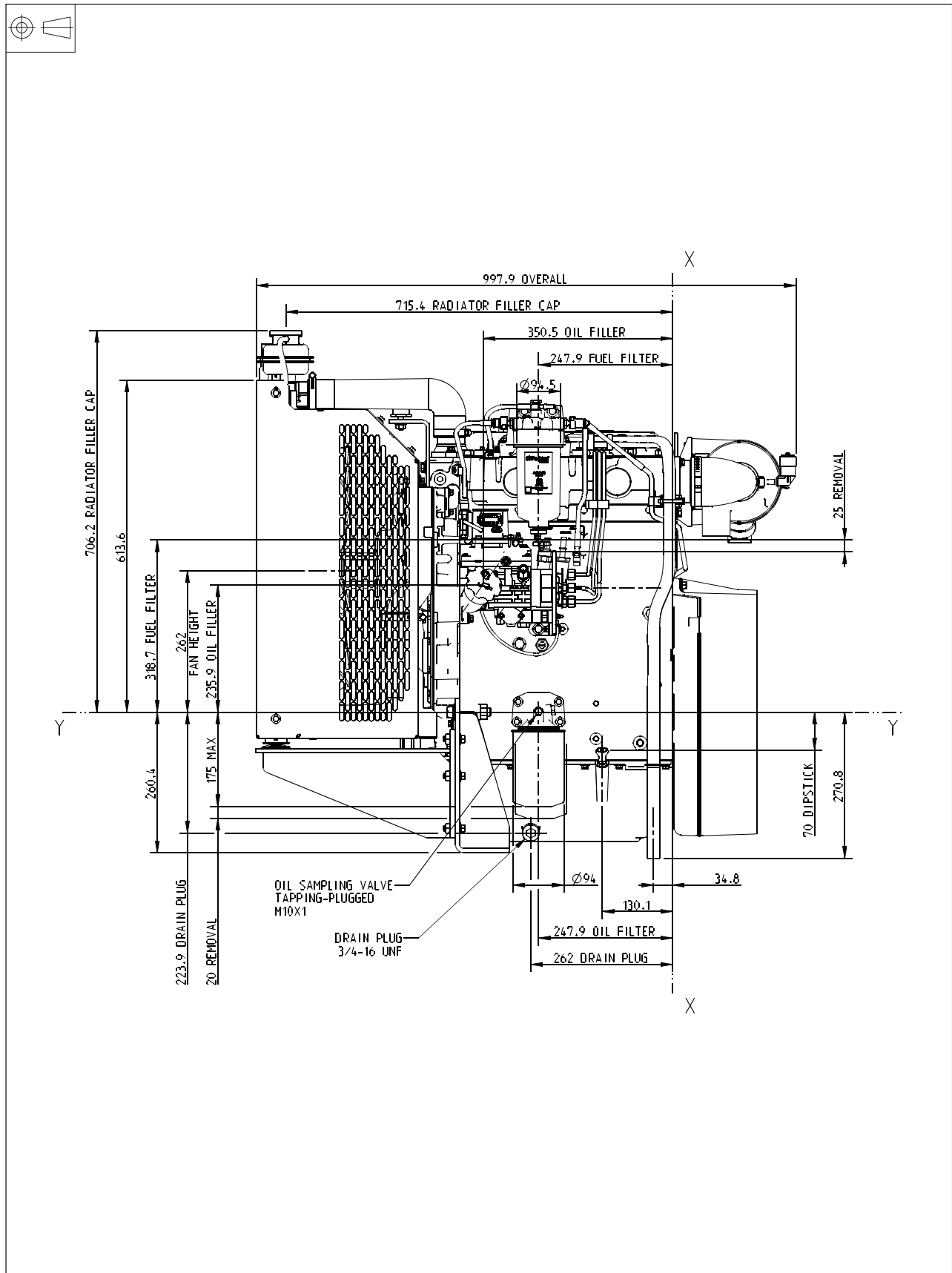
Isochronous governing

Typical alternator inertia

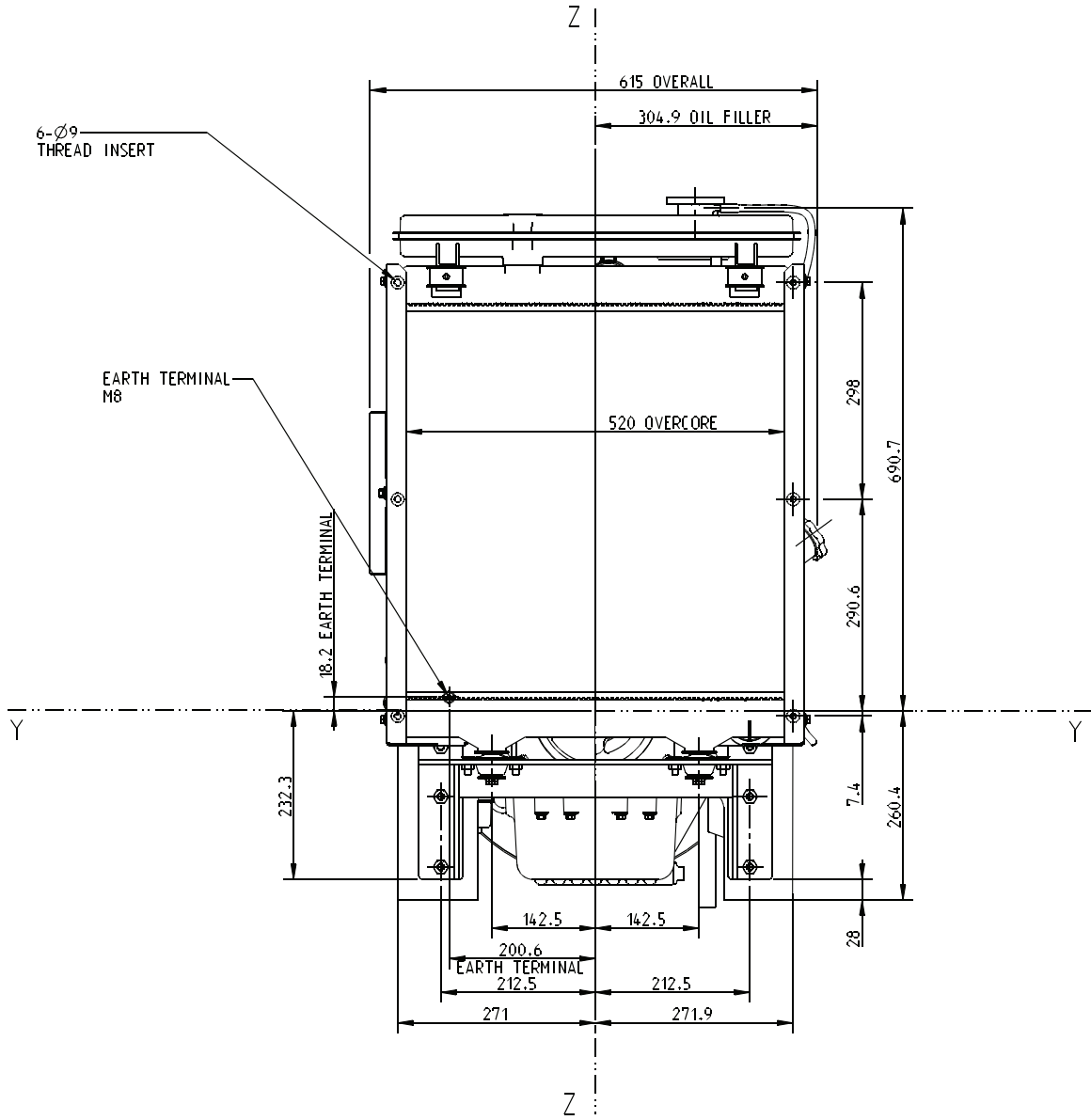
All tests were conducted using an engine installed and serviced to Perkins Engine Company Limited recommendations.

The information given in this document is for guidance only.

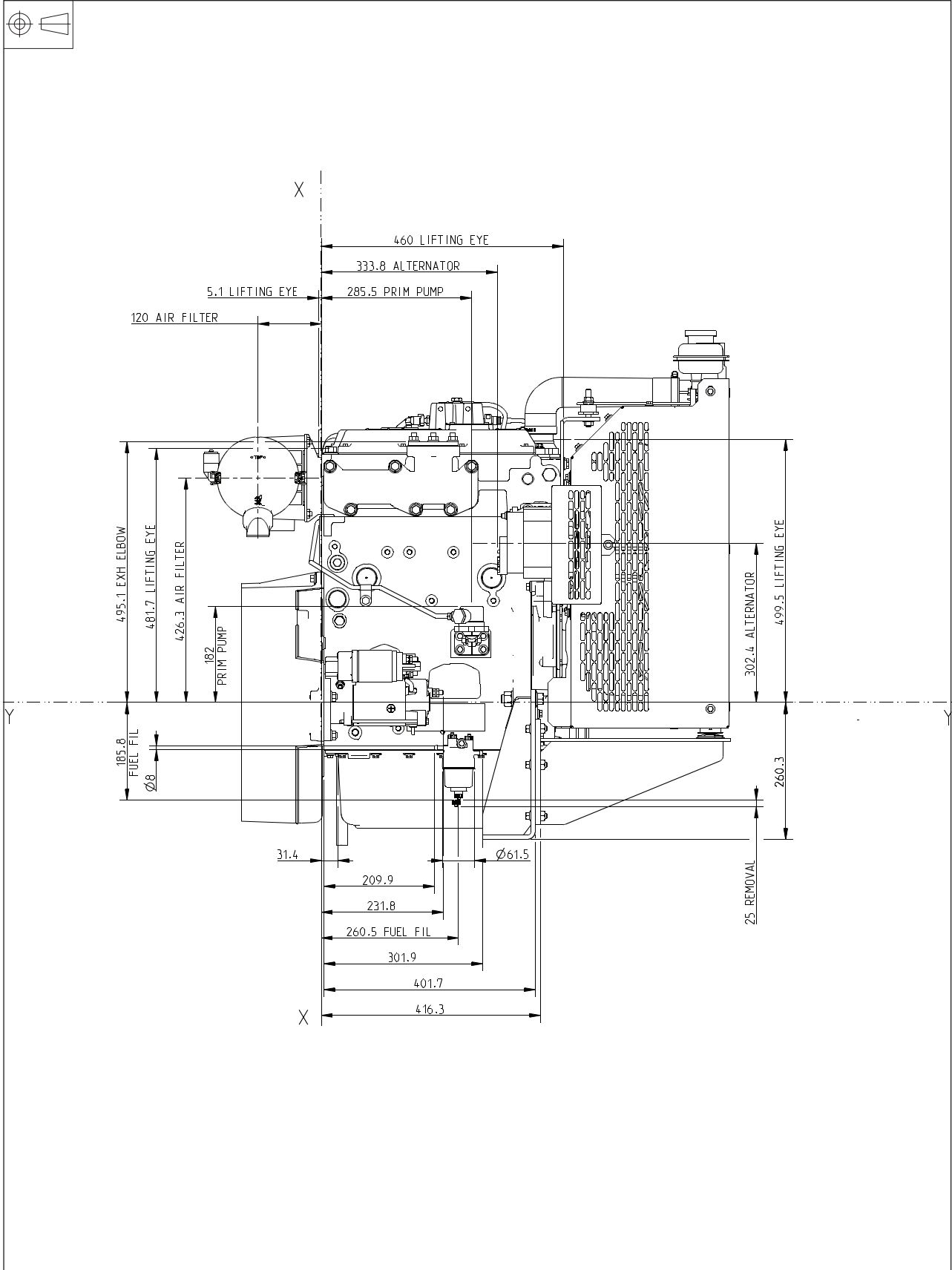
1103D-33 G3 ElectropaK - Left side view



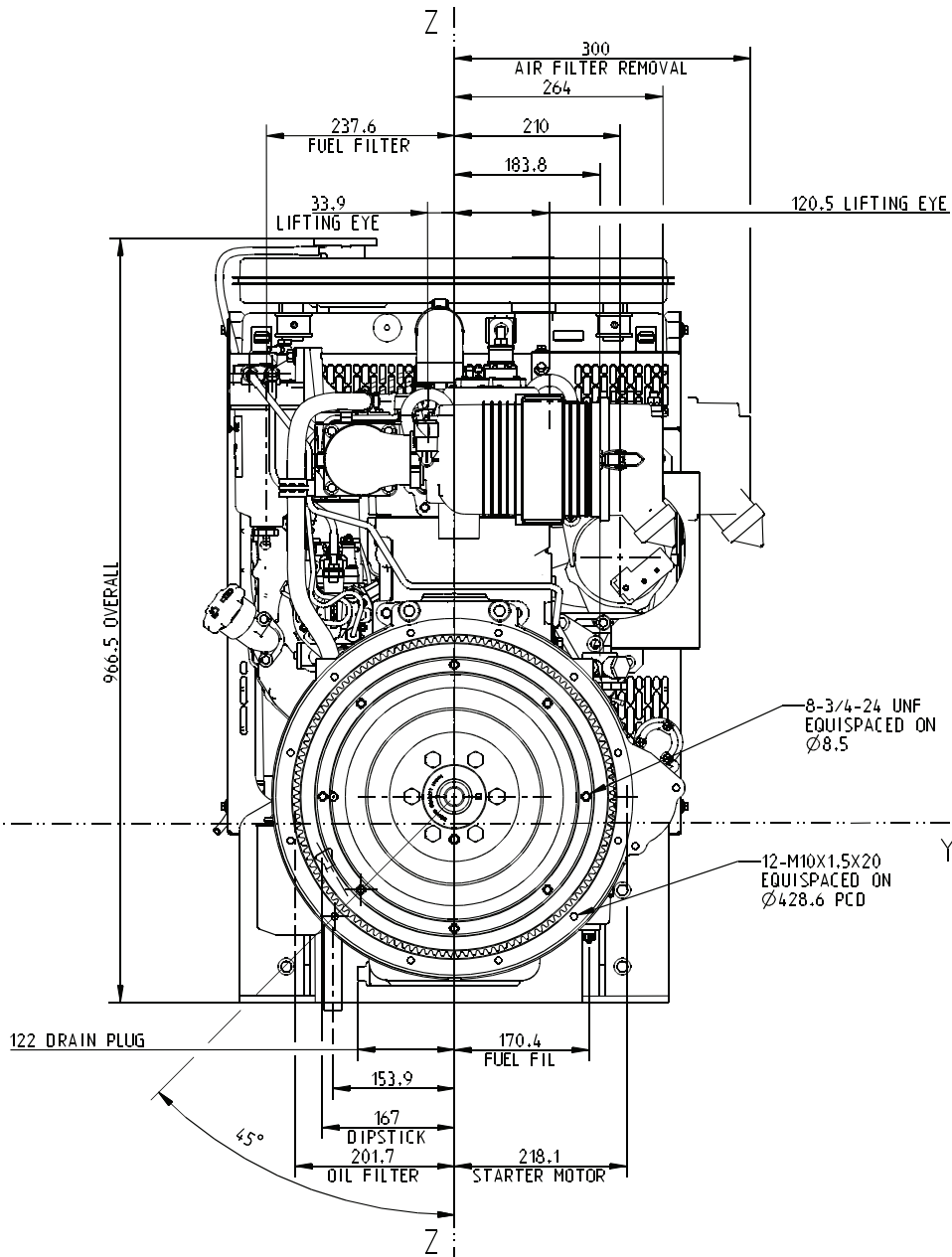
1103D-33 G3 ElectropaK - Front side view



1103D-33 G3 ElectropaK - Right side view



1103D-33 G3 ElectropaK - Rear side view



1103D-33 G3 ElectropaK - Aerial view

