

Technical Data

2500 Series

2506D-E15TAG2

Diesel Engine - ElectropaK

Basic technical data

Number of cylinders ... 6
 Cylinder arrangement ... Vertical, In-line
 Cycle ... 4 stroke
 Induction system ... turbocharged, air to air charge cooling
 Combustion system ... direct injection
 Compression ratio ... 16:1
 Bore ... 137 mm
 Stroke ... 171 mm
 Cubic capacity ... 15,2 litres
 Direction of rotation ... anti-clockwise viewed on flywheel
 Firing order (cylinder 1 furthest from flywheel) ... 1, 5, 3, 6, 2, 4

Total weight of ElectropaK

-dry (engine only) ... 1799 kg
 -wet ... 1880 kg

Overall dimensions of ElectropaK

-height ... 1718 mm
 -length ... 2657 mm
 -width ... 1120 mm

Moments of inertia (mk²)

Engine ... 2.3291 kgm²
 Flywheel ... 1.96355 kgm²

Performance

Note: All data based on operation to ISO 3046/1, BS5514 and DIN 6271 standard reference conditions.

Cyclic irregularity

Engine / flywheel maximum: ... 1:60

Ratings

Steady state stability at constant speed ... $\pm 0.25\%$
 Electrical ratings are based on average alternator efficiency and are for guidance only (0.8 power factor being used).

Operating point

Engine speed ... 1500 rev/min
 Cooling water maximum exit temperature ... $< 107^{\circ}\text{C}$

Fuel data

To conform to ... BS2869 class A2 or BS EN590

Test conditions

-air temperature ... 25°C
 -barometric pressure ... 100 kPa
 -relative humidity ... 30%
 -air inlet restriction at maximum power (nominal) ... 2,5 kPa
 -exhaust back pressure at maximum power (nominal) ... 6,0 kPa
 -maximum fuel temperature (inlet pump) ... 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.

For test conditions relevant to data on load acceptance, refer to page 13.

Sound level

Estimated sound pressure at 1 metre ... 107.5 dB(A)

General installation

Designation	Units	Type of operation and application	
		Prime	Standby
		50 Hz @ 1500 rev/min	
Gross engine power	kWb	453	497
Fan power	kWm	10	
Restriction losses	kWm	8.2	8.6
ElectropaK nett engine power	kWm	435	478
Gross brake mean effective pressure	kPa	2396	2628
Combustion air flow	kg/s	0.68	0.71
Exhaust gas temperature after turbo (Max.)	°C	N/A	420
Exhaust gas flow	kg/s	0.72	0.75
Boost pressure ratio	-	3.73	3.92
Overall thermal efficiency (nett)	%	39	41
Mean piston speed	m/s	8.6	
Engine coolant flow	l/sec	350	
Cooling fan air flow (zero duct allowance)	m ³ /min	624	
Typical Gen Set electrical output (0.8 pf)	kWe	400	440
	kVA	500	550
Assumed alternator efficiency	%	92	

Rating definitions

Prime power

Variable load. Unlimited hours usage with an average load factor of 80% of the published Prime Power rating over each 24 hour period. A 10% overload is available for 1 hour in every 12 hours operation.

Standby power

Variable load. Limited to 500 hours annual usage up to 300 hours of which may be continuous running. No overload is permitted.

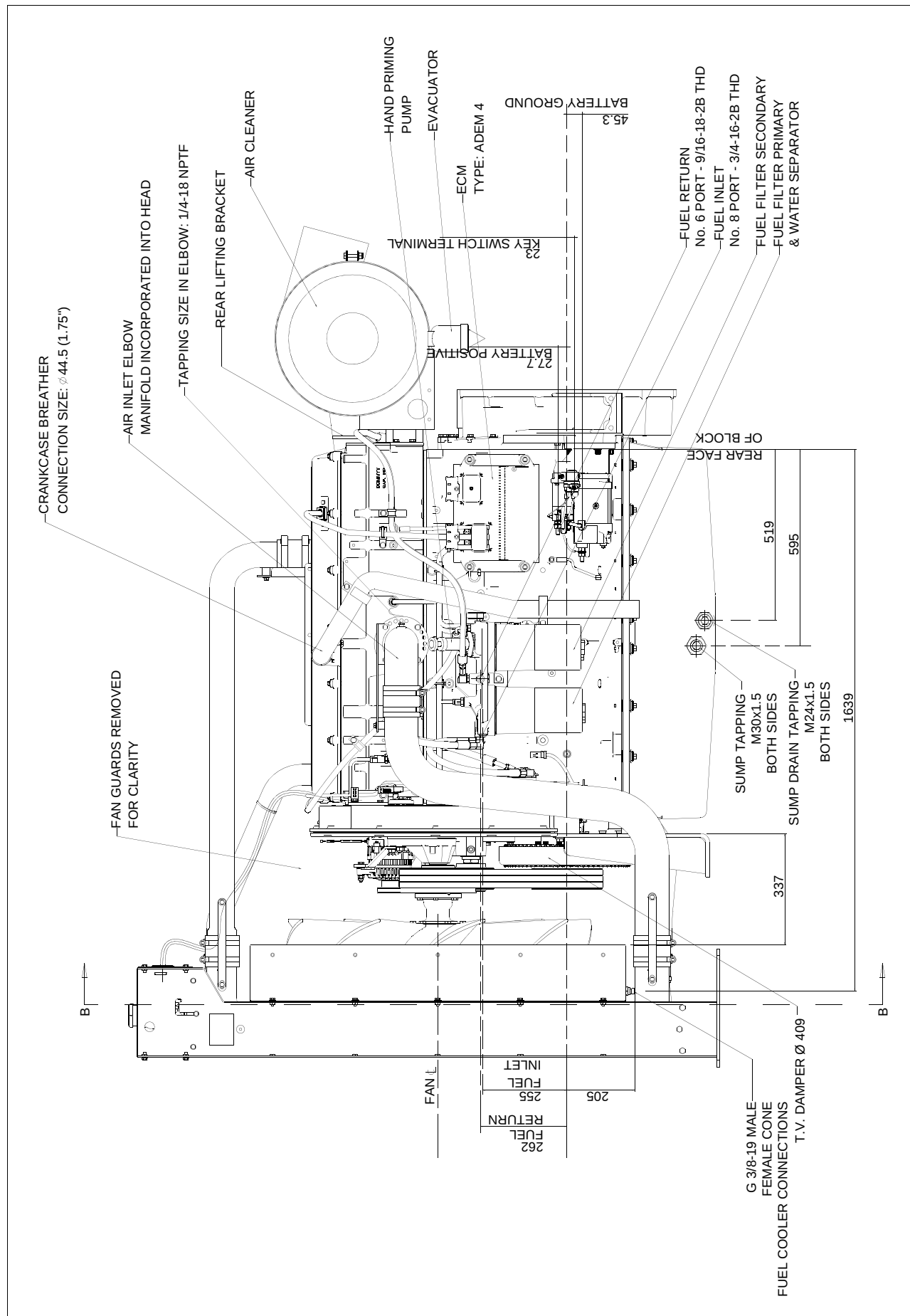
Emissions capability

Certified against the requirements of EU2011 Stage 3A legislation for non-road mobile machinery, powered by constant speed engines.

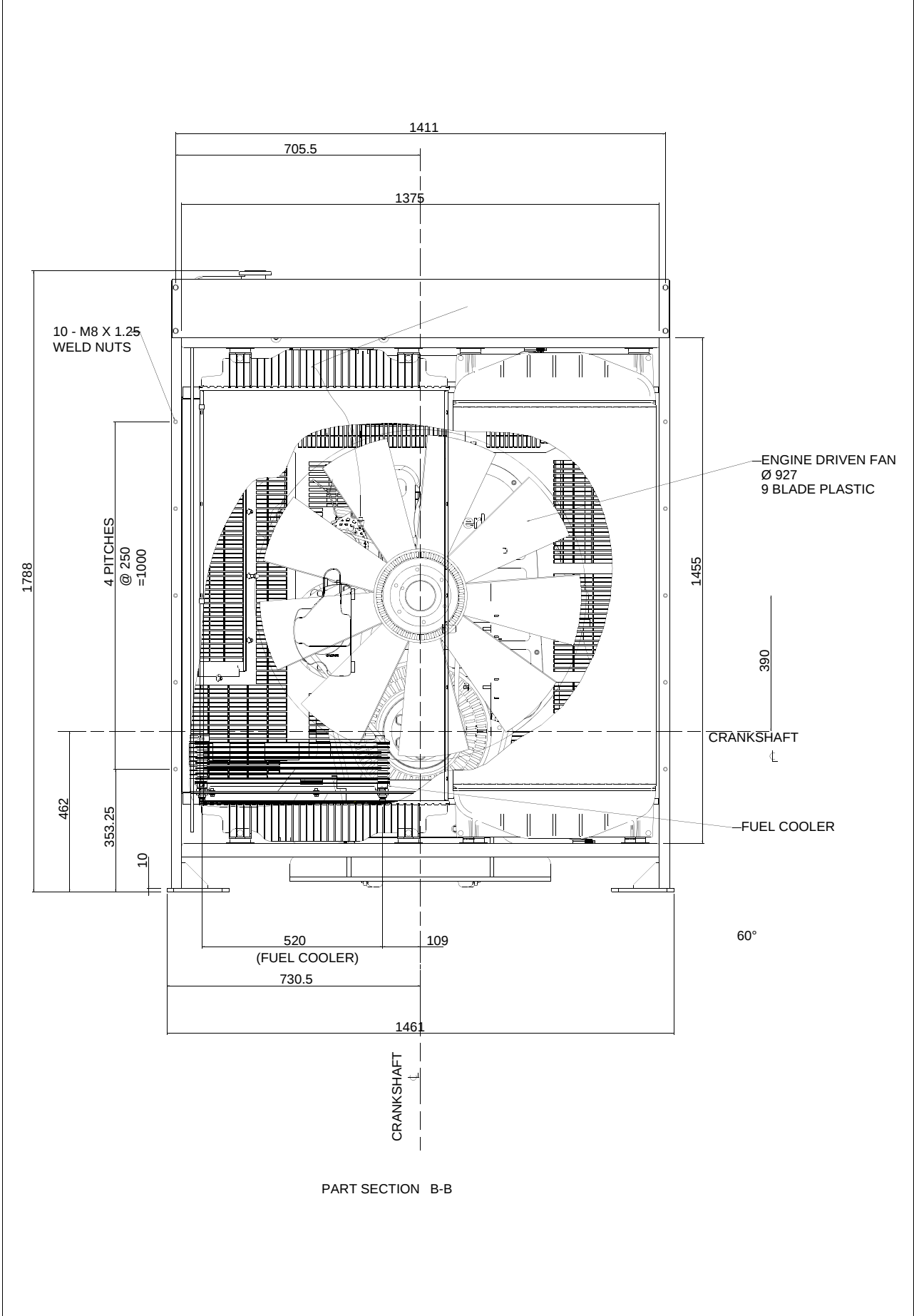
Energy balance

Designation	Units	Type of operation and application	
		Prime	Standby
		50 Hz @ 1500 rev/min	
Energy in fuel	kWt	1106	1166
Energy in power output (gross)	kWb	453	497
Energy to cooling fan and restrictions	kWm	18.2	18.6
Energy in power output (nett)	kWm	435	478
Energy to exhaust	kWt	323	344
Energy to coolant and oil	kWt	170	150
Energy to radiation	kWt	25	35
Energy to charge cooler	kWt	135	140

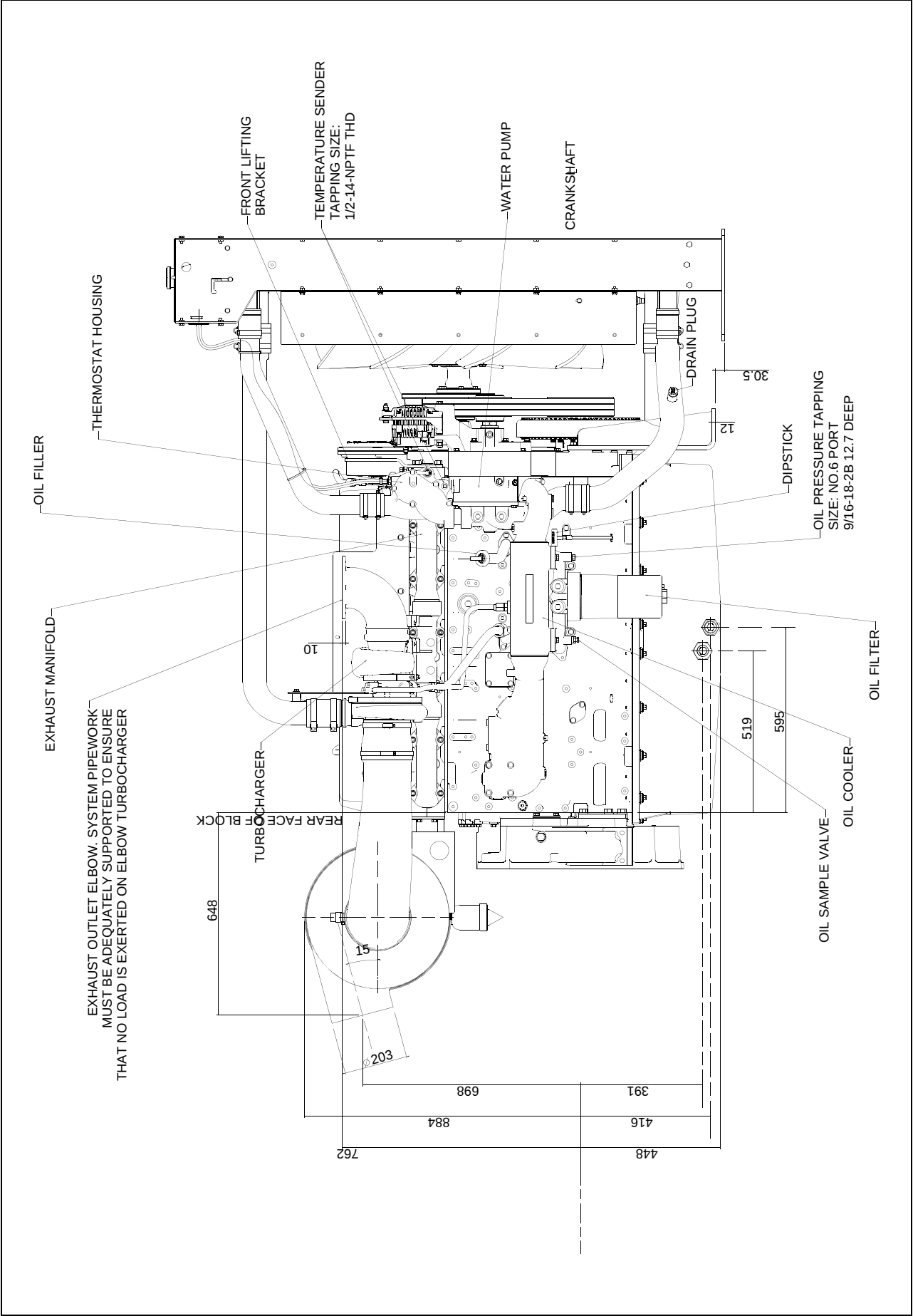
2506D-E15TAG2 - left side view



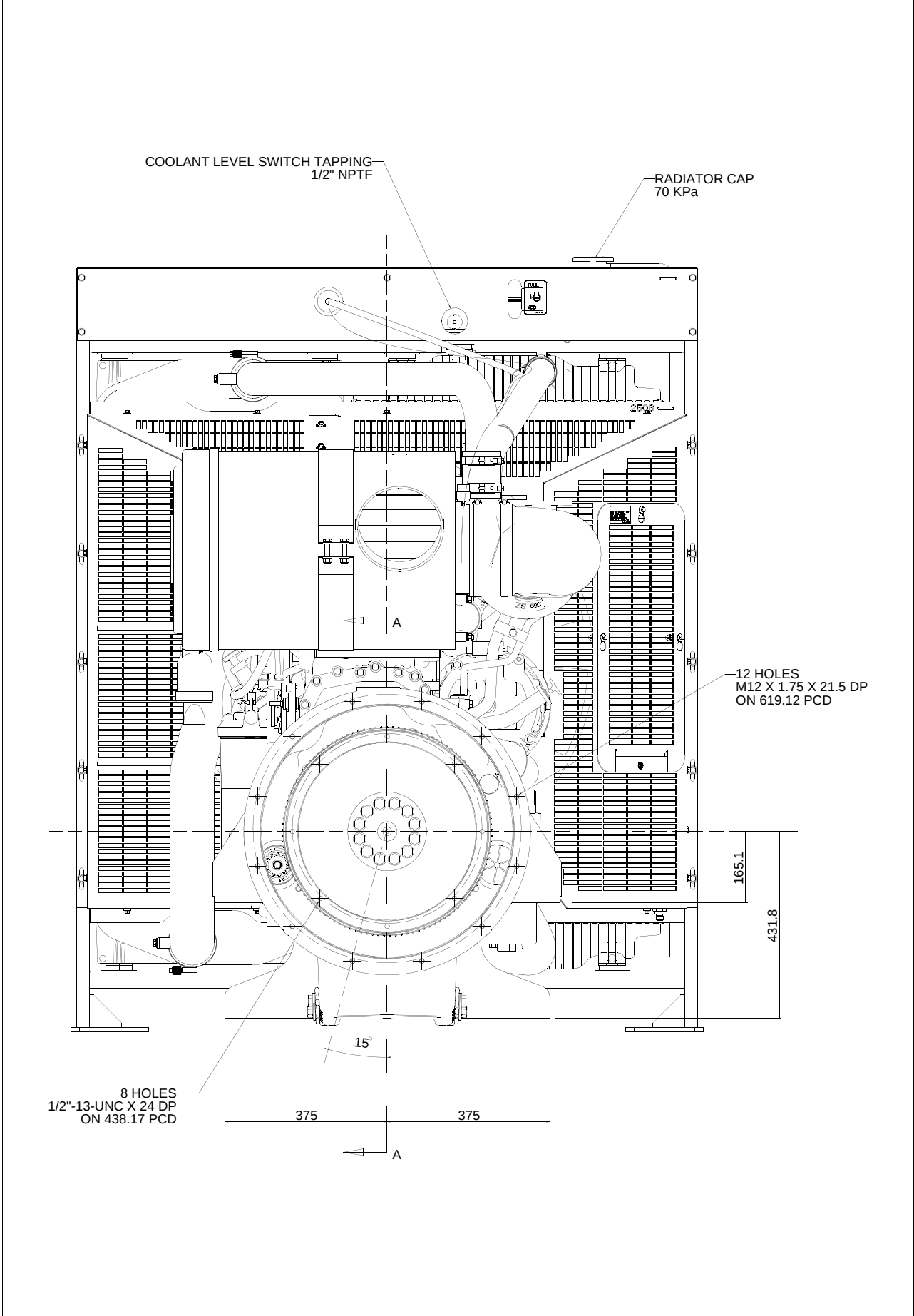
2506D-E15TAG2 - front view



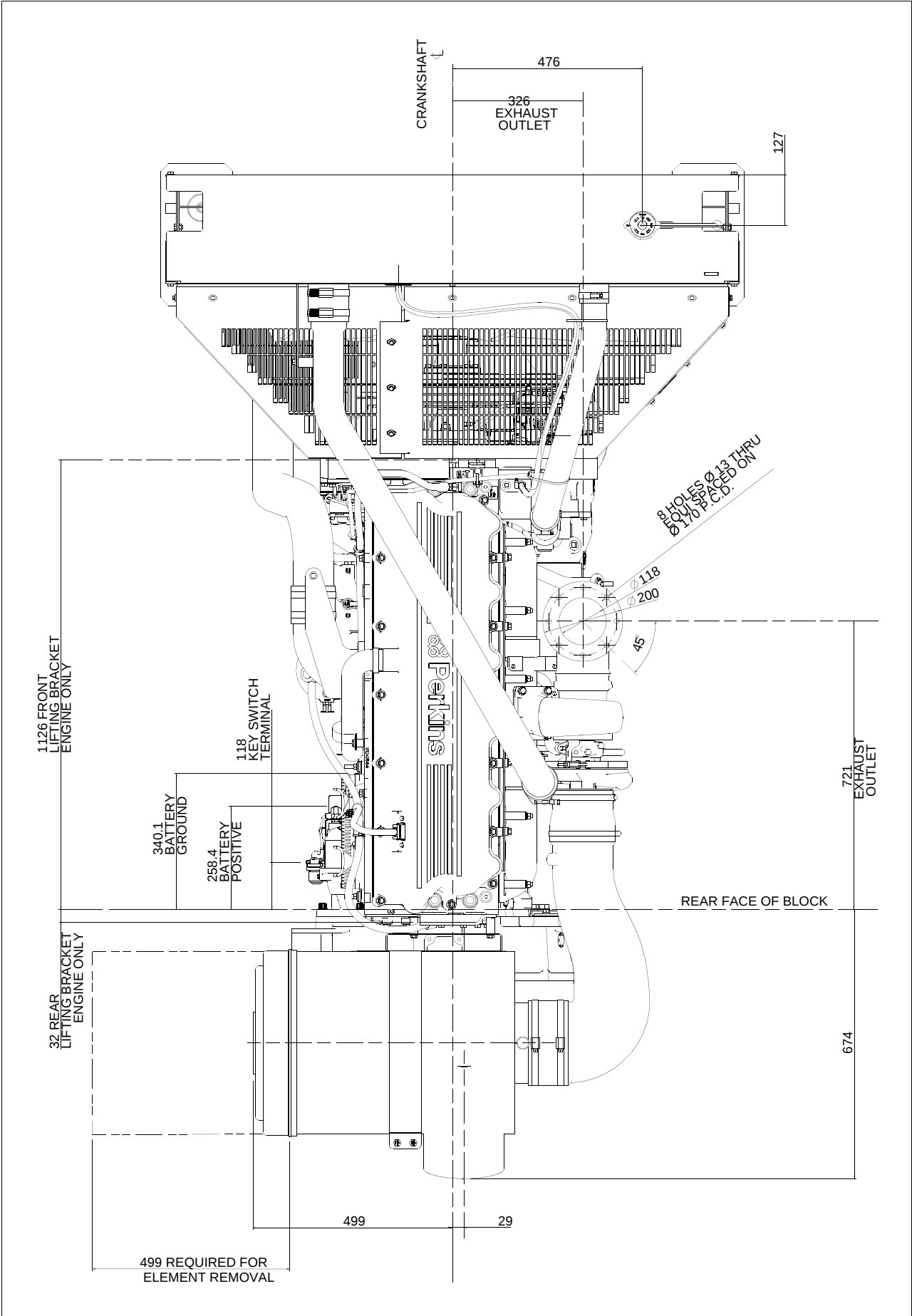
2506D-E15TAG2 - right side view



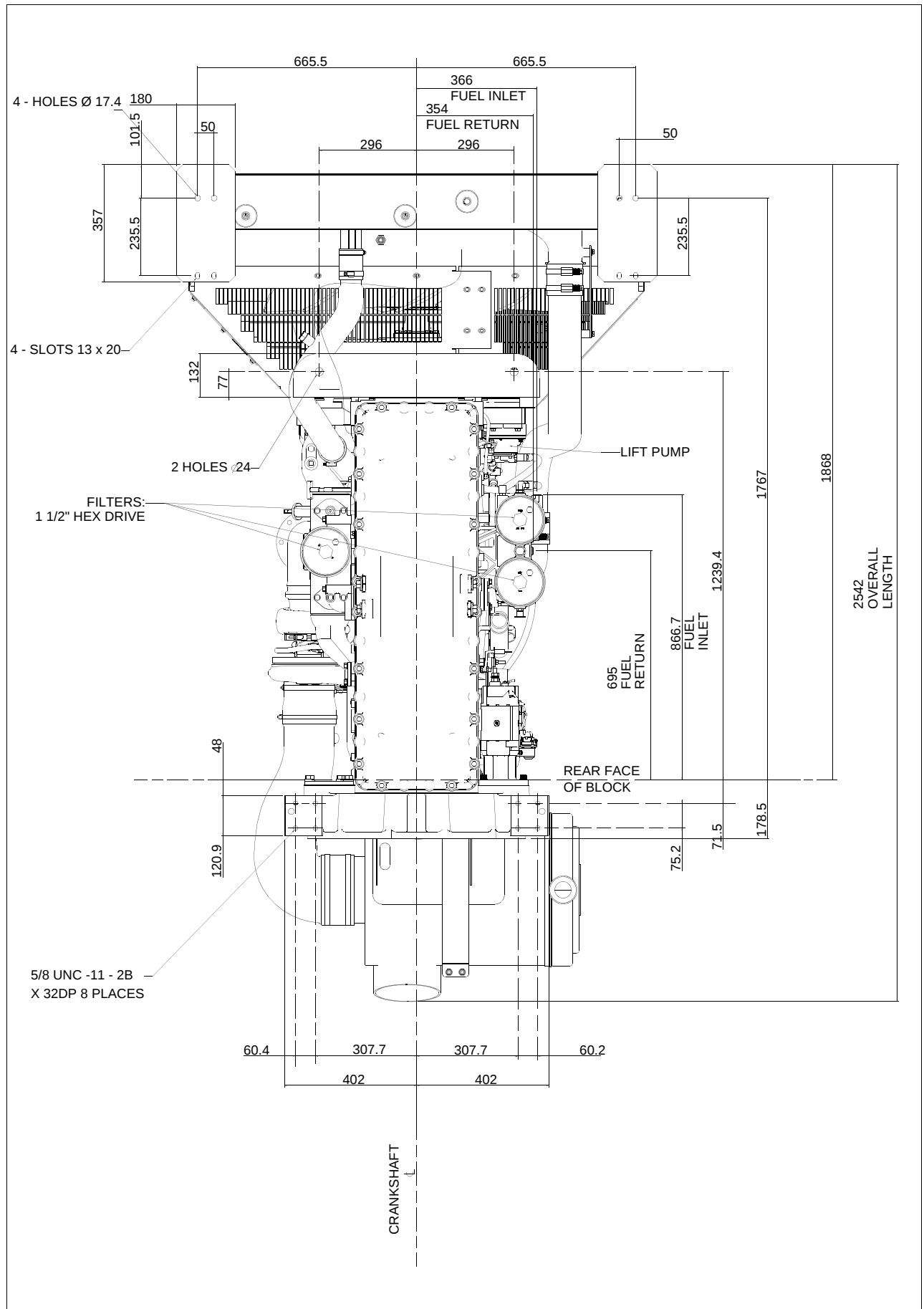
2506D-E15TAG2 - rear view



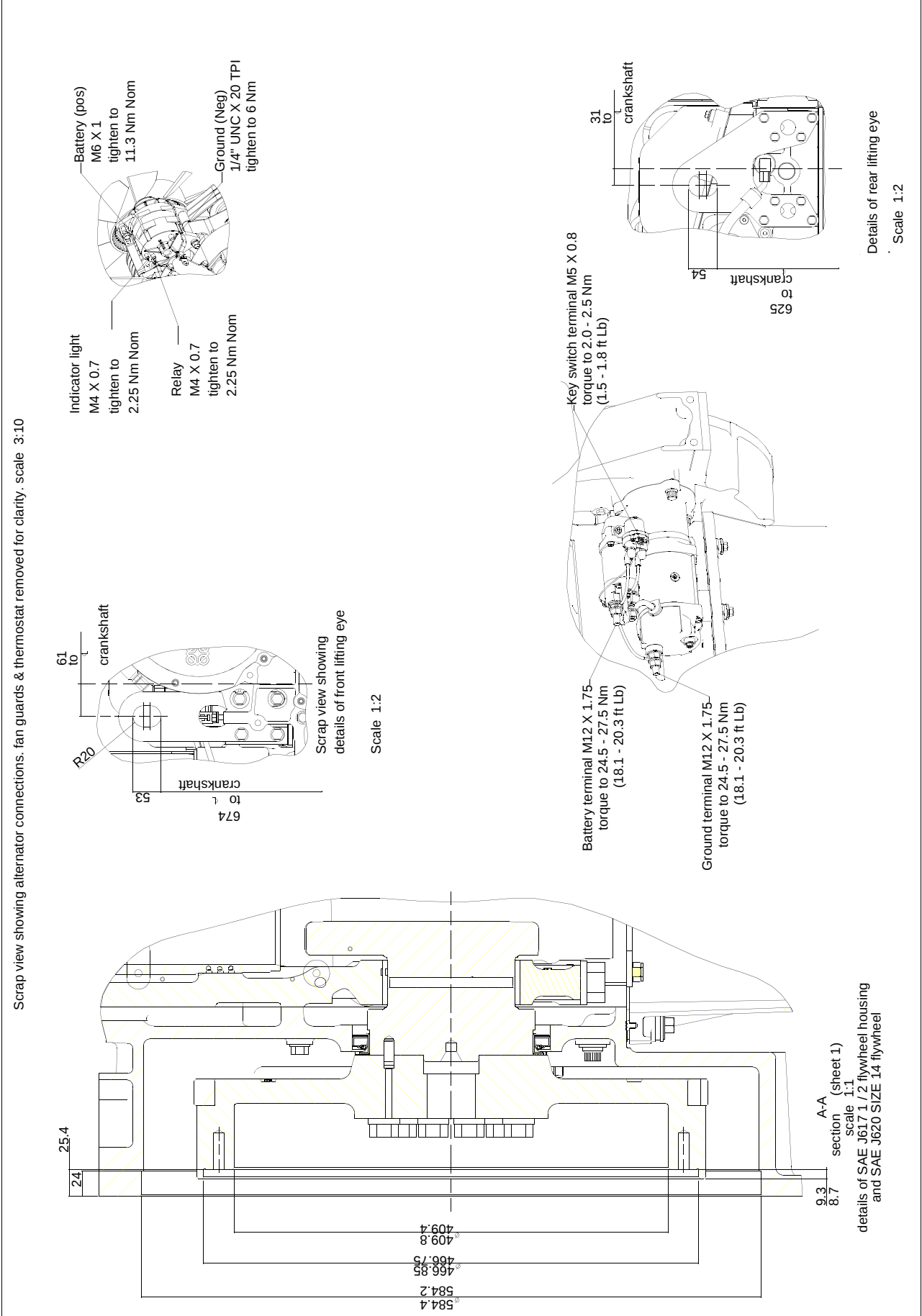
2506D-E15TAG2 - plan view



2506D-E15TAG2 - underside views



2506D-E15TAG2 - miscellaneous views



Cooling system

Recommended coolant:

50% inhibited ethylene glycol or 50% inhibited propylene glycol and 50% clean fresh water. Where there is no likelihood of ambient temperatures below 10°C, clean 'soft' water may be used, treated with 1% by volume of Perkins inhibitor in the cooling system.

The inhibitor is available from all Perkins Distributors.

Total system coolant capacity ... 48.0 litres

Maximum pressure in crankcase water jacket ... 276 kPa

Maximum top tank temperature ... 107°C

Maximum static pressure on pump ... 170 kPa

Maximum permissible restriction to coolant pump flow ... 30 kPa

Temperature rise across engine with inhibited coolant

-standby power ... 10°C

-prime power ... 9°C

Thermostat operation range ... 88 to 98°C

Radiator

-face area ... 0.819 m²

-weight (dry) ... 158 kg

-rows and materials ... 2 rows, Aluminium

-matrix density and material ... 15 fins per inch, Aluminium

-width of matrix ... 694.6 mm

-height of matrix ... 1180 mm

-pressure cap setting (minimum) ... 70 kPa

Charge cooler with integral radiator

-face area ... 0.630 m²

-number of rows and material ... 2 row, Aluminium

-matrix density and material ... 10 fins per inch, Aluminium

-width of matrix ... 580.6 mm

-height of matrix ... 1085 mm

Coolant pump

Speed ... 1946 rev/min

Method of drive ... gear

Fan

-diameter ... 927 mm

-drive ratio ... 0.92:1

-number of blades ... 9

-material ... B3WG6 or PA6GF30 nylon 6 glass filled 30%

-type ... ACS 367500

Cooling clearance

Ambient cooling clearance (standby power) based on air temperature at fan of 7°C above the ambient

2506D-E15TAG2 maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow			
Duct allowance with 50% glycol at 50°C			
Description	rev/min	Units	Standby
Duct allowance	1500	kPa	0.125
Minimum airflow	1500	m ³ /min	555
Duct allowance with 50% glycol at 42°C			
Duct allowance	1500	kPa	0.2
Minimum airflow	1500	m ³ /min	515

Electrical system

Type ... 12V negative earth

Alternator

-type ... 22SI

-voltage ... 24 Volts

-output ... 70 amps

Starter

-type ... 42MT

-motor voltage ... 24 Volts

-motor power ... 7.5 kW

Number of teeth

-on the flywheel ... 113

-on starter pinion ... 11

Minimum cranking speed ... 100 rev/min

Pull-in current of starter motor solenoid @ -25°C Max. ⁽¹⁾ 57 amps

Hold-in current of starter motor solenoid @ -25°C Max. ⁽¹⁾ 16 amps

1. All leads to rated at 10 amps minimum.

Cold start recommendations

Temperature range 5 to -10°C (41 to 14 °F)	
Oil:	15W40
Starter:	42MT
Battery:	2x 12V 128 Ah
Max. breakaway current:	1250 amps
Cranking current:	676 amps
Aids:	None
Minimum mean cranking speed:	120 rev/min

Temperature range -11 to -25°C (12.2 to -13 °F)	
Oil:	0W40
Starter:	42MT
Battery:	2x 12V 128 Ah
Max. breakaway current:	1250 amps
Cranking current:	880 amps
Aids:	block heater 1.5 kW
Minimum mean cranking speed:	120 rev/min

Notes:

- Battery capacity is defined by the 20 hour rate
- The oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater
- 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 ... 6,8 kPa
Exhaust outlet size (internal) ... 127 mm

Recommended exhaust pipe diameter

length	mm
up to 10 m	150
10 m to 20 m	150
20 m to 30 m	200

Fuel system

Type of injection ... MEUI
Injector type ... MEUI
Injector pressure ... 200 MPa

Fuel lift pump

Type ... gear driven
Delivery flow ... 457 litres/hr
Pressure ... 550 kPa
Maximum suction head at pump inlet ... 3 m
Maximum static pressure head ... 4 m
Fuel inlet temperature to be less than ... 55°C
Governor type ... electronic
Governing to ... ISO 8528-5 class G3 steady state

Fuel filtration level

-primary ... 10 µm
-secondary ... 2 µm

Fuel consumption

Designation	Fuel consumption calculated on nett rated powers	
	g/kWh	litres/hr
	1500 rev/min	
Standby	208	115
Prime	209	106
At 75% of Prime	216	82
At 50% of Prime	230	58

Induction system

Maximum air intake restriction

-clean filter ... 3,7 kPa
-dirty filter ... 6,2 kPa
-air filter type ... paper element 457 mm diameter

Lubrication system

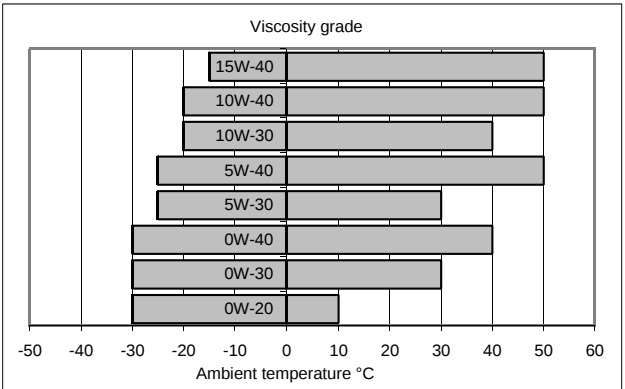
The recommended SAE viscosity is a multigrade oil (15W40) which adequately meets the specifications of API C14
Total system capacity ... 62,0 litres
Maximum sump capacity ... 53,0 litres
Minimum sump capacity ... 45,0 litres
Lubricating oil pressure, at rated speed ... 420 kPa
Nominal (minimum) ... 200 kPa
Oil relief valve opens ... 620 kPa
Oil filter screen spacing ... 30 µm
Sump drain plug tapping size ... M24
Oil pump speed and drive method ... 1,16 x engine speed, gear
Oil flow ... 3,5 litres/sec
Oil consumption at full load rated speed (as a percentage of fuel consumption) ... 0,1%
Oil temperature (in rail) maximum continuous operation ... 114°C

Normal operating angles

-front and rear ... 7°
-side tilt ... 7°

Recommended SAE viscosity

A single or multigrade oil must be used which conforms API C14 or ACEA E5.



Mountings

Maximum static bending moment at rear face of block ... 1356 Nm

Centre of gravity (bare dry engine)

-forward of rear face of cylinder block ... 570 mm
-above crankshaft centre line ... 240 mm

Engine management system

Full electronic engine management system controlling:

- Speed governing
- Air / fuel ratio
- Start / stop sequence
- Engine protection and diagnostics.

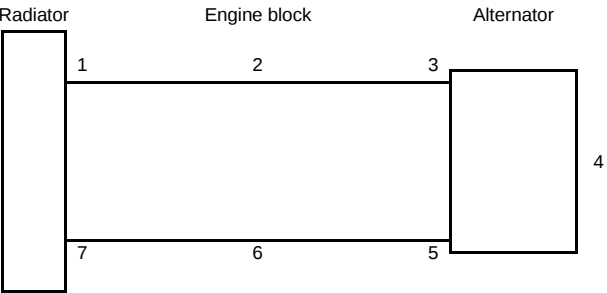
Noise data

Noise levels

The figures for total noise are typical for an engine running at Prime Power rating in a semi-reverberant environment and measured at a distance of one meter from the periphery of the engine.

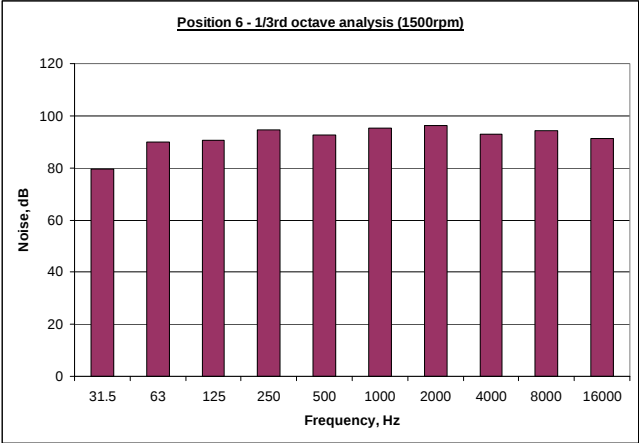
Octave analysis

the following histograms show an octave band analysis at the position of the maximum noise level.



Position	Noise, dBA
1	107.3
2	107.3
3	106.6
4	n/a
5	106.6
6	107.4
7	107.5

Frequency, Hz	Noise, dB
31.5	79.5
63	89.8
125	90.7
250	94.5
500	92.6
1000	95.2
2000	96.2
4000	92.9
8000	94.1
16000	91.4



Typical load acceptance

Model / engine speed	Initial Load Acceptance When engine reaches rated speed (15 seconds maximum after engine starts to crank)				2nd Load Application Immediately after engine has recovered to rated speed (5 seconds after initial load application)			
	Prime power%	Load kWm (kWe) Nett	Transient frequency deviation %	Frequency recovery time seconds	Prime power%	Load kWm (kWe) Nett	Transient frequency deviation %	Frequency recovery time seconds
1500 rev/min	55	220	≤10	5	45	180	≤10	5

The above figures were obtained under test conditions as follows:

Engine block temperature 45°C
 Ambient temperature 15°C
 Governing mode Isochronous
 Alternator inertia 8.14 kgm²
 Under frequency roll off (UFRO) point set to.. ... 1 Hz below rated frequency
 UFRO rate set to.. ... 2% voltage / 1% frequency
 LAM on / off off
 Assumed alternator efficiency 95%

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

The applied load is a percentage of generator electrical output, using alternator efficiencies as published in the general installation section of this Technical Data Sheet.

The information given on this Technical Data Sheet is for standard ratings only. For ratings other than those shown, please contact Perkins Engines Company Limited, Stafford.

The information given in this document is for guidance only.



Perkins Engines Company Limited
Peterborough PE1 5NA United Kingdom
Telephone +44 (0) 1733 583000
Fax +44 (0) 1733 582240
www.perkins.com

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