

Technical Data

400 Series

404D-22TG

Electropak

Used for 25kVA generator

Basic technical data

Number of cylinders	4
Cylinder arrangement	Vertical in-line
Cycle	Four stroke
Induction system	Turbocharged
Compression ratio	23,3 : 1
Bore	84 mm
Stroke	100 mm
Cubic capacity	2.216 litres
Direction of rotation	Anti-clockwise when viewed from flywheel
Firing order	1, 3, 4, 2
Estimated total weight (dry)	kg

Overall dimensions

-height	973 mm
-length	973 mm
-width	590 mm

Moments of inertia (mk²)

-engine rotational components	0,44 kg m ²
-flywheel	2,55 kg m ²

Centre of gravity

-forward from rear of block	mm
-above centre line of block	mm
-offset to RHS of centre line	mm

Performance

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

Steady state speed stability at constant load

G3

Cyclic irregularity

-at 110% stand-by power

Test conditions

-air temperature	25 °C
-barometric pressure	100 kPa
-relative humidity	31,5%
-air inlet restriction at maximum power (nominal)	5 kPa
-exhaust back pressure at maximum power (nominal)	10,2 kPa
-fuel temperature (inlet pump)	40 °C

Sound level

Average sound pressure level for bare engine (without inlet and exhaust) at 1 metre

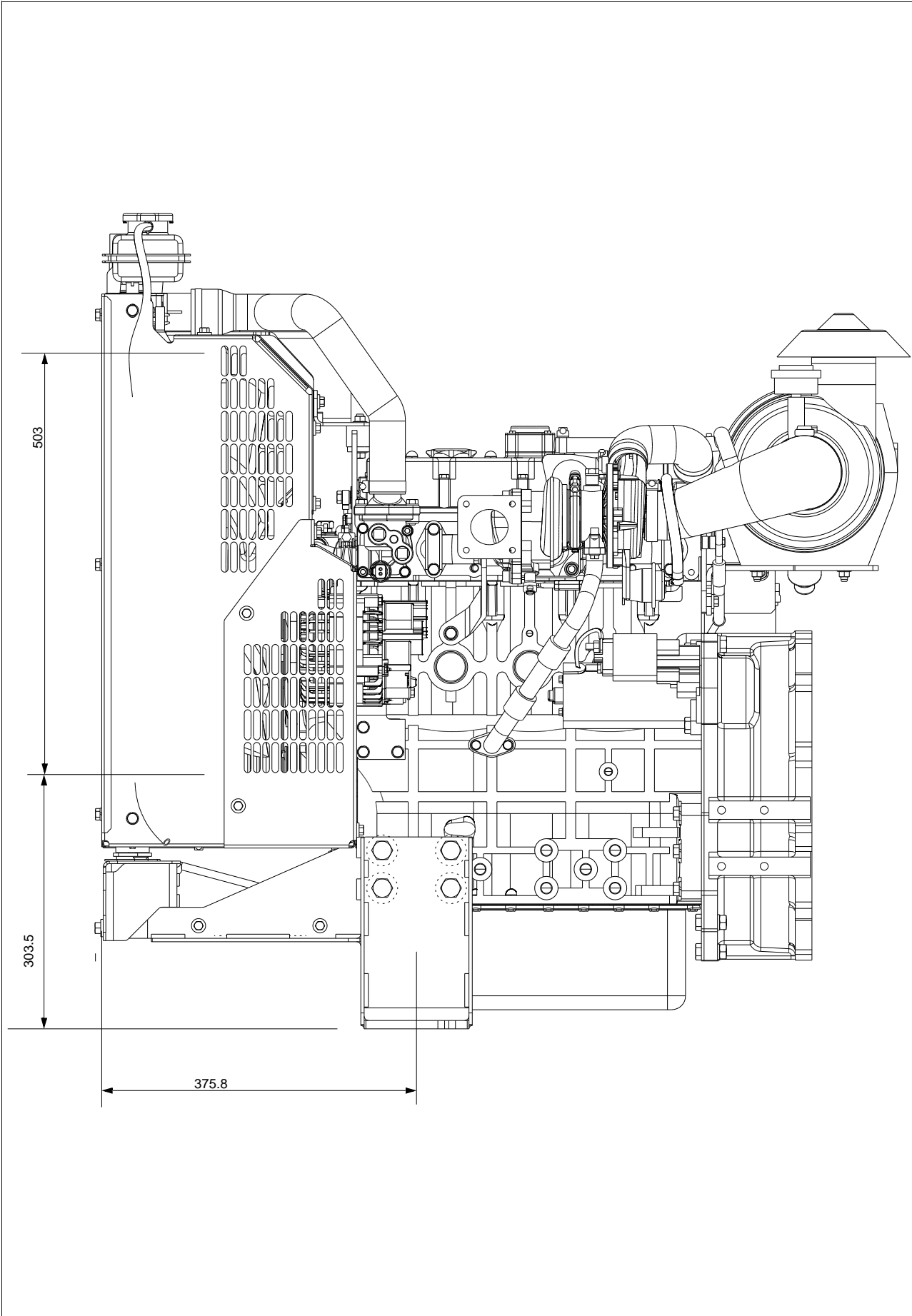
-all ratings certified to within

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.

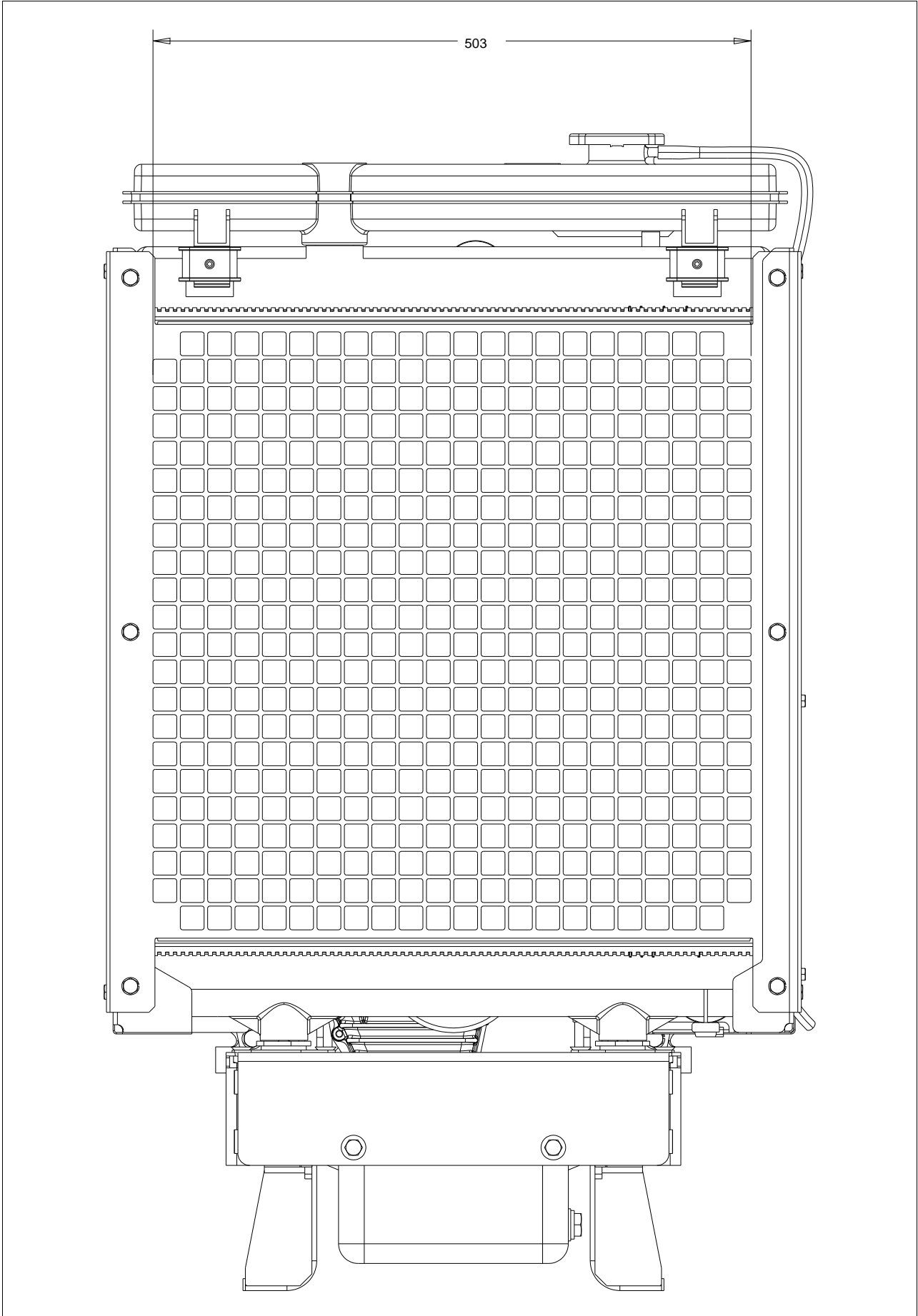
Emissions capability: Certified against the requirements of EU2007 (EU97/98/EC Stage 2) legislation for non-road mobile machinery, powered by constant speed engines.

Designation	Units	Type of operation and application	
		Prime	Stand-by
		50Hz	50Hz
Gross engine power	kWb	25.2	27.7
Brake mean effective pressure	kPa	910.0	1000.3
Mean piston speed	m/s	5	
Engine coolant flow (coolant pump ratio 1.1:1)	l/min	46.8	
Combustion air flow	m ³ /min	2.08	
Exhaust gas flow (max)	m ³ /min		
Exhaust gas temperature (max)	°C	490	
Overall thermal efficiency (nett)	%	36.8	
Typical genset electrical output (0,8 pf 25°C)	kWe	21.9	24.1
	kVA	27.4	30.1
Assumed alternator efficiency	%	88	
Energy balance			
Energy in fuel (heat of combustion)	kWt	67.6	74.4
Energy in power output (gross)	kWb	25.2	27.7
Energy to cooling fan	kWt	0.3	
Energy in power output (nett)	kWm	24.9	27.4
Energy to coolant and lubricating oil	kWt	23.8	26.2
Energy to exhaust	kWt	14.5	16.0
Energy to radiation	kWt	4.1	4.5

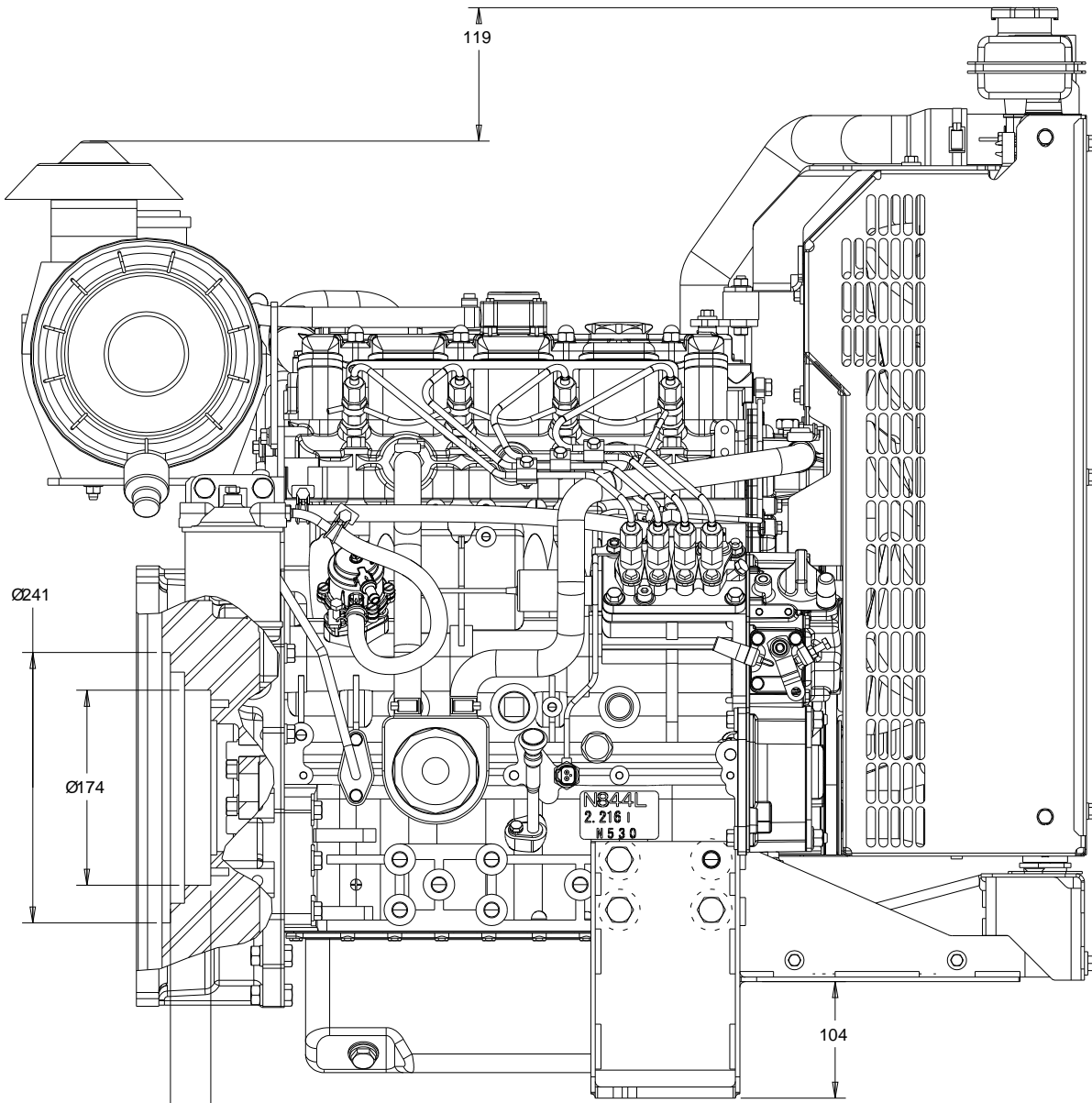
404D-22TG ElectropaK, left side view



404D-22TG ElectropaK, front view



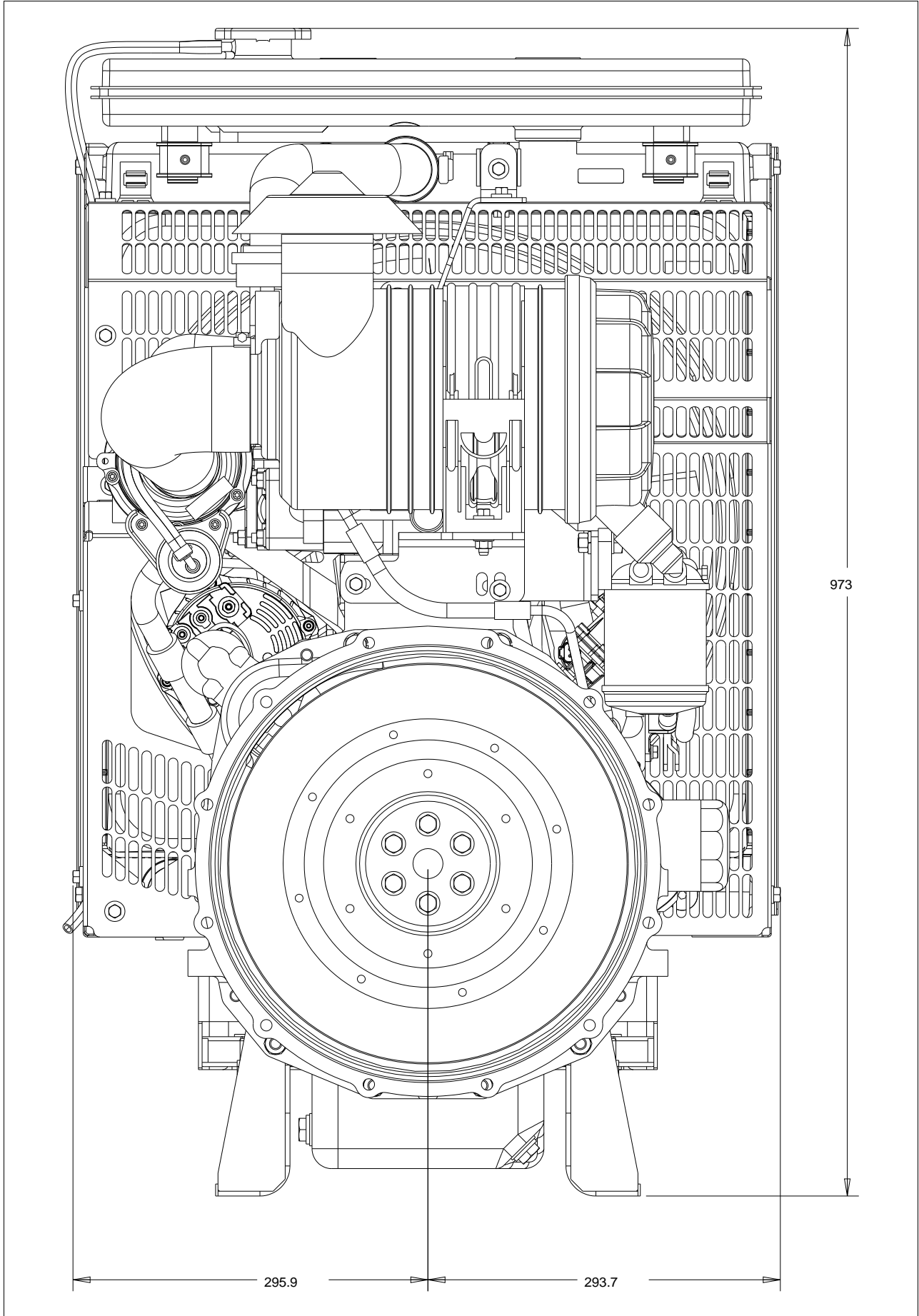
404D-22TG ElectropaK, right view



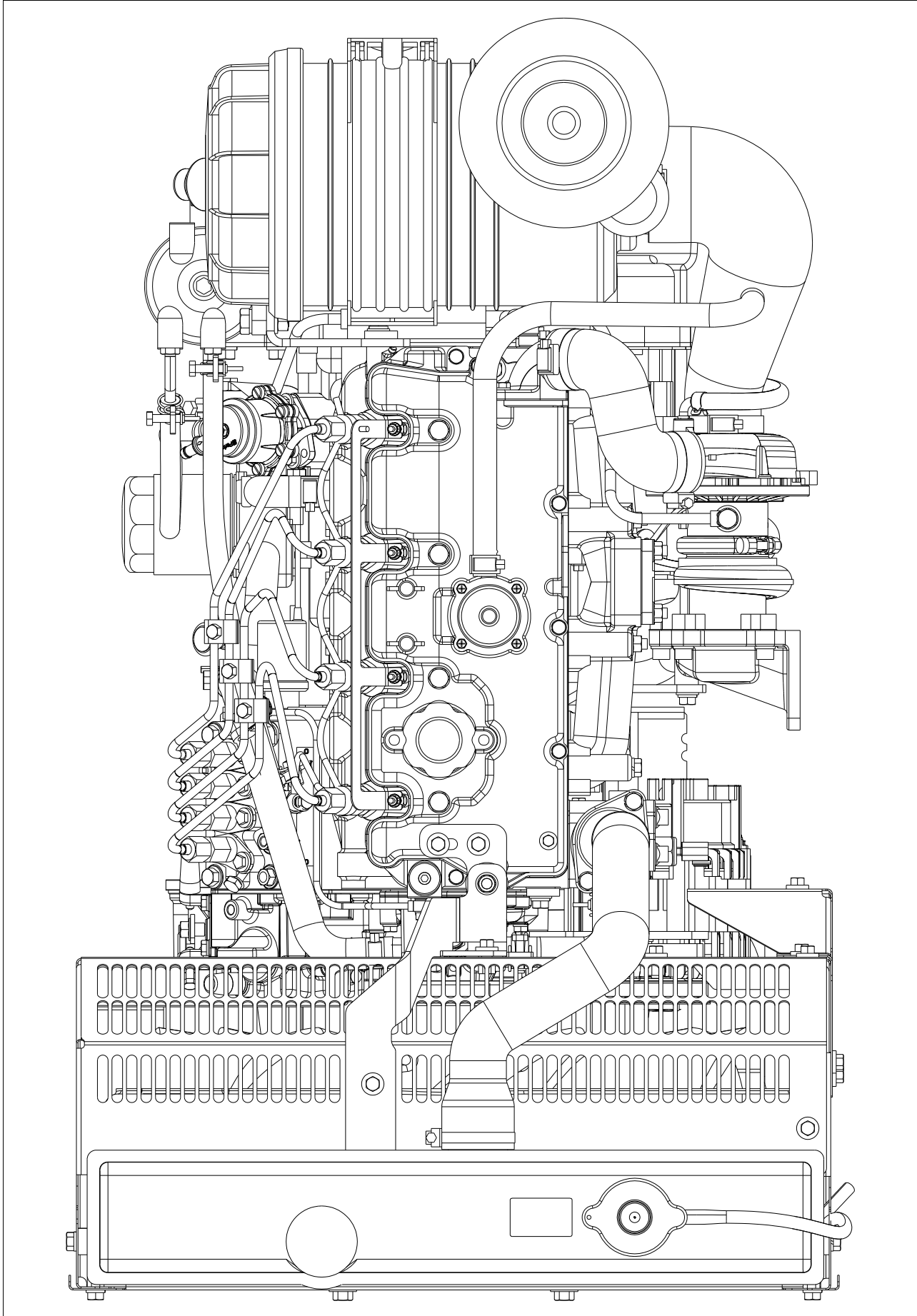
NOMINAL OFFSET 405.6
FROM FRONT LEG BOLT
TO Ø241

NOMINAL OFFSET 441.6
FROM FRONT LEG BOLT
TO Ø241

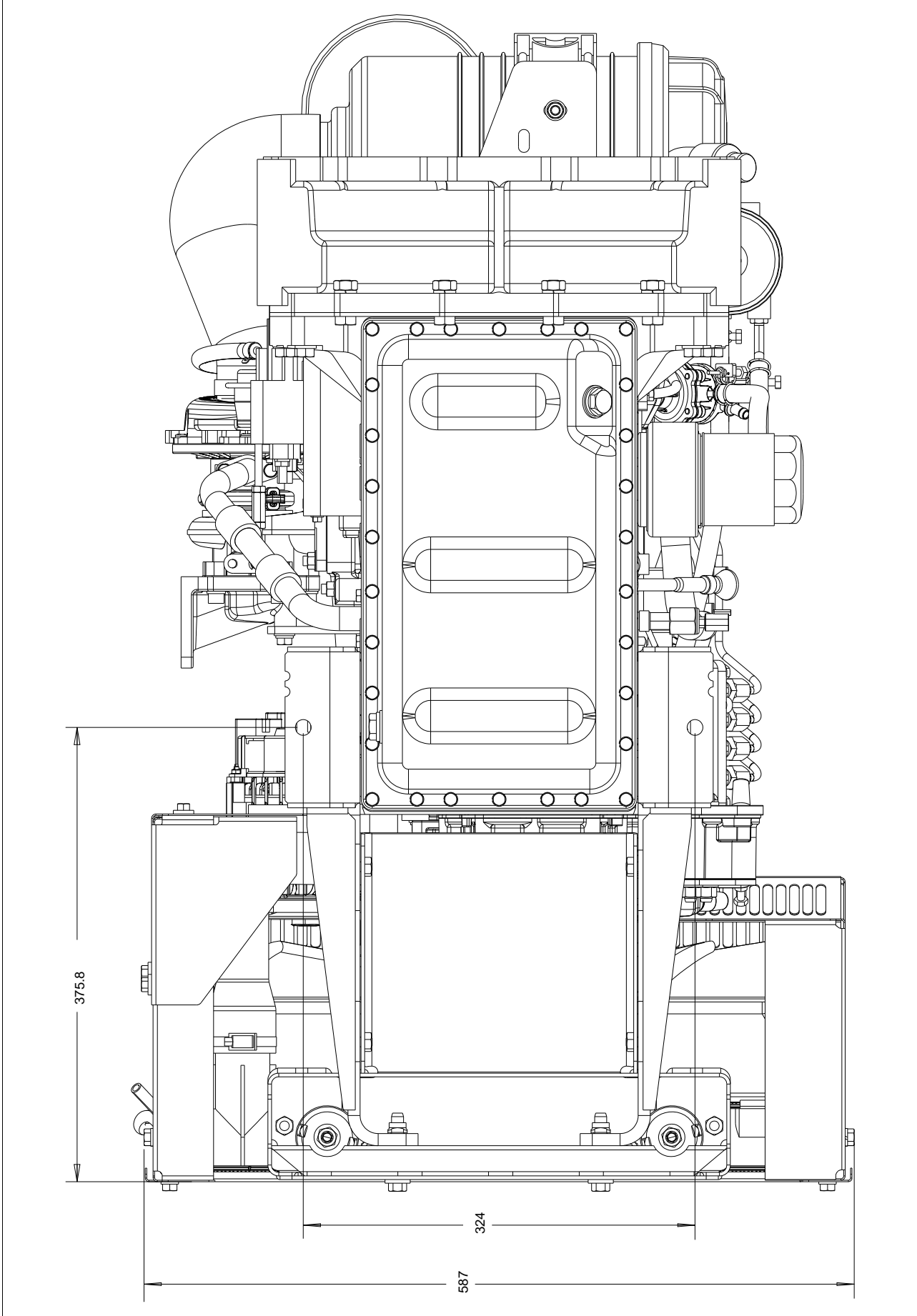
404D-22TG ElectropaK, rear view



404D-22TG ElectropaK, plan view



404D-22TG ElectropaK, view from below



Cooling system

Radiator

- face area 0.3 m²
- rows and materials 1 row, Aluminium
- matrix density and material 54 tubes / row
- width of matrix 570 mm
- height of matrix 524.2 mm
- pressure cap setting 110kPa
- Estimated cooling air flow reserve kPa

Fan

- diameter 457.2 mm
- drive ratio 1.1 :1
- number of blades 7
- material plastic
- type pusher

Coolant

- Total system capacity
- with radiator 9.32 litres
- without radiator 3.6 litres
- Maximum top tank temperature 112 °C
- Temperature rise across engine 7,5 °C
- Max permissible external system resistance kPa
- Thermostat operation range... .. 82 - 95 °C
- Max. static pressure head on pump 30,4 kPa
- Recommended coolant:
- Recommended coolant: 50% anti freeze / 50% water. For complete details of recommended coolant specifications, refer to the Operation and Maintenance Manual for this engine model.

Duct allowance

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow		
Ambient clearance 50% Glycol	Duct allowance Pa	m ³ /sec
N/A	N/A	N/A
N/A	N/A	N/A

Electrical system

- type 12V negative grounding
- alternator 65 amps, 12 V
- starter motor Delco Remy, 12 V
- starter solenoid pull-in current TBA
- starter solenoid hold-in current... .. TBA
- Number of teeth on starter pinion 9
- Number of teeth on flywheel 126

Cold start recommendations

Minimum engine cranking speed over TDC 150 rev/min

Minimum starting temperature °C	Grade of engine lubricating oil	Battery specifications			
		BS3911 Cold start amps	SAEJ537 Cold cranking amps	Number of batteries needed	Commercial ref number
0	20W	540	740	1	647
-15	10W	540	740	1	647
-20	5W	600	780	1	655

Note: Additional information for battery and cable limits can be found in the installation manual.

Exhaust system

Maximum back pressure ... 10,2 kPa
 Exhaust outlet size ... 42 mm

Fuel system

Type of injection ... Indirect injection
 Fuel injection pump ... Cassette type
 Fuel injector ... Pintle nozzle
 Nozzle opening pressure ... 14.7 MPa
 Max. particle size ... 25 microns

Fuel lift pump

-type ... mechanical (camshaft driven)
 -flow/hour ... 63 litres/hr
 -pressure ... 10 kPa
 Maximum suction head ... 0,8 m
 Maximum static pressure head ... 3,0 m
 Governor type ... Electronic/mechanical

Fuel specification

USA Fed Off Highway - EPA2D 89.330-96

Europe Off Highway - CEC RF-06-99

For further information on fuel specifications and restrictions, refer to the OMM Fuels section for this engine model.

Fuel consumption - 1500 rev/min

Power rating %			
110	100	75	50
g/kWh (litres/hr) estimated			
261 (8.3)	246 (7.1)	232 (5.0)	238 (3.5)

Note: All fuel consumption figures are based on Nett engine power

Induction system

Maximum air intake restriction

-clean filter ... 3,0 kPa
 -dirty filter ... 6,4 kPa
 -air filter type ... dry element type

Lubrication system

Lubricating oil capacity

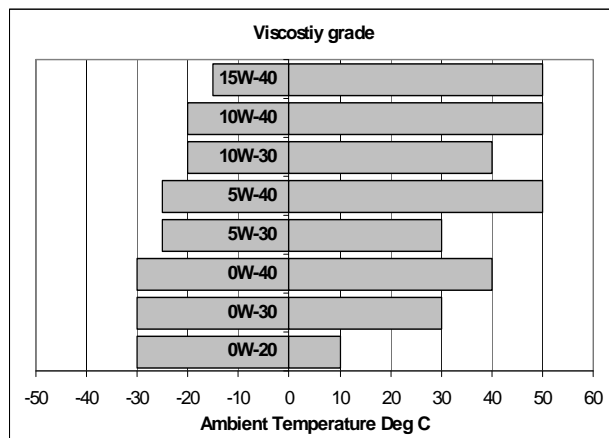
Max. sump capacity ... 10,6 litres
 Min. sump capacity ... 8,9 litres
 Maximum engine operating angles
 -front up, front down, right side or left side ... 35° continuous

Lubricating oil pressure

-relief valve opens ... 352 - 448 kPa
 Min oil pressure ... 120 kPa
 -at maximum no-load speed ... 147 kPa
 Oil flow at rated speed ... 13 litres/min
 Normal oil temperature ... 125 °C

Recommended SAE viscosity

A single or multigrade oil must be used which conforms API-CH-4 or ACEA E5.



Maximum static bending moment

at rear face of block ... 1400 Nm

Load acceptance

The below complies with the requirements of classification 3 and 4 of ISO 8528-12 and G2 operating limits stated in ISO 8528-5.

The general arrangement drawings shown in this data sheet are for guidance only. For installation purposes, latest versions should be requested from the Applications Department, Perkins Engines Stafford, ST16 3UB United Kingdom.

Initial load application: When engine reaches rated speed (15 seconds maximum after engine starts to crank)		
Descriptor	Units	50 Hz
% of prime power	%	N/A
Transient frequency deviation	%	N/A
Frequency recovery	Seconds	N/A

The above figures were obtained under the following test conditions:

- minimum engine block temperature.. °C
- ambient temperature. 25 °C
- governing mode 8 %
- alternator inertia tba kgm²
- under frequency roll off (UFRO) point set to 2% Volt / 1% frequency
- UFRO rate set to..... 1 Hz below rated speed
- LAM on/off.. Off

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

Derate Curves

Derate curves for altitude and humidity can be found in Chapter 6, of the 400D Engine Sales Manual.



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