

404D-22TG

33.3 kWm (gross) @ 1800 rpm

Electropak

400

Series

Basic technical data

Number of cylinders	4
Cylinder arrangement	Vertical in-line
Cycle	Four stroke
Induction system	Turbo charged
Compression ratio	23,3 : 1
Bore	84 mm
Stroke	100 mm
Displacement	2.216 litres
Direction of rotation	Anti-clockwise when viewed from flywheel
Firing order	1, 3, 4, 2
Estimated total weight (dry)	242 kg

Overall dimensions

Length	973 mm
Width	590 mm
Height	973 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 $\pm 0.5\%$

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 76 dB(A)

-all ratings certified to within $\pm 5\%$

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 (EU97/68/EC Stage IIIA) and EPA Interim Tier 4 (EPA 40 CFR Part 1039 Interim Tier 4) legislation for non-road mobile machinery, powered by constant speed engines.

Installation data

Designation	Units	Type of operation and application	
		Prime	Stand-by
		60Hz	60Hz
Gross engine power	kWb	30.3	33.3
Brake mean effective pressure	kPa	911.8	1002.1
Mean piston speed	m/s	6	
Engine coolant flow (coolant pump ratio 1:1:1)	l/min	56,2	
Combustion air flow	m³/min	2.49	
Exhaust gas flow (max)	m³/min	7.5	
Exhaust gas temperature (max)	°C	530	
Overall thermal efficiency (nett)	%	32.7	
Typical genset electrical output (0,8 pf 25°C)	kWe	26.3	29.0
	kVA	32.9	36.3
Assumed alternator efficiency	%	89	
Energy balance			
Energy in fuel (heat of combustion)	kWt	90.7	99.8
Energy in power output (gross)	kWb	30.3	33.3
Energy to cooling fan	kWt	0.7	
Energy in power output (nett)	kWm	29.6	32.6
Energy to coolant and lubricating oil	kWt	30.6	33.7
Energy to exhaust	kWt	23.3	25.6
Energy to radiation	kWt	6.5	7.2

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 ... 110 kPa
 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
65°C	0	2.3
57°C	125	1.7

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 rpm

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 - 1800 rpm

Power rating %			
110	100	75	50
g/kWh (litres/hr) estimated			
247 (9.3)	241 (8.3)	237 (6.1)	249 (4.9)

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

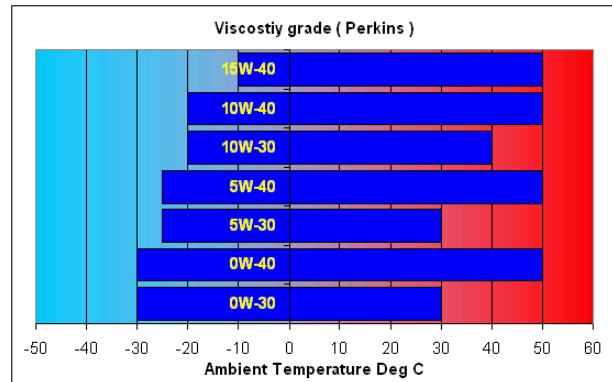
Max. sump capacity ... 10.6 litres
 Min. sump capacity ... 8.9 litres
 Maximum engine operating angles
 -front up, front down, right side or left side ... 35° continuous

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 ... 15.2 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

Load acceptance complies with the requirements of classification 3 and 4

of ISO 8528-12 and G2 operating limits stated in ISO 8528-5

This was obtained under the following test conditions:

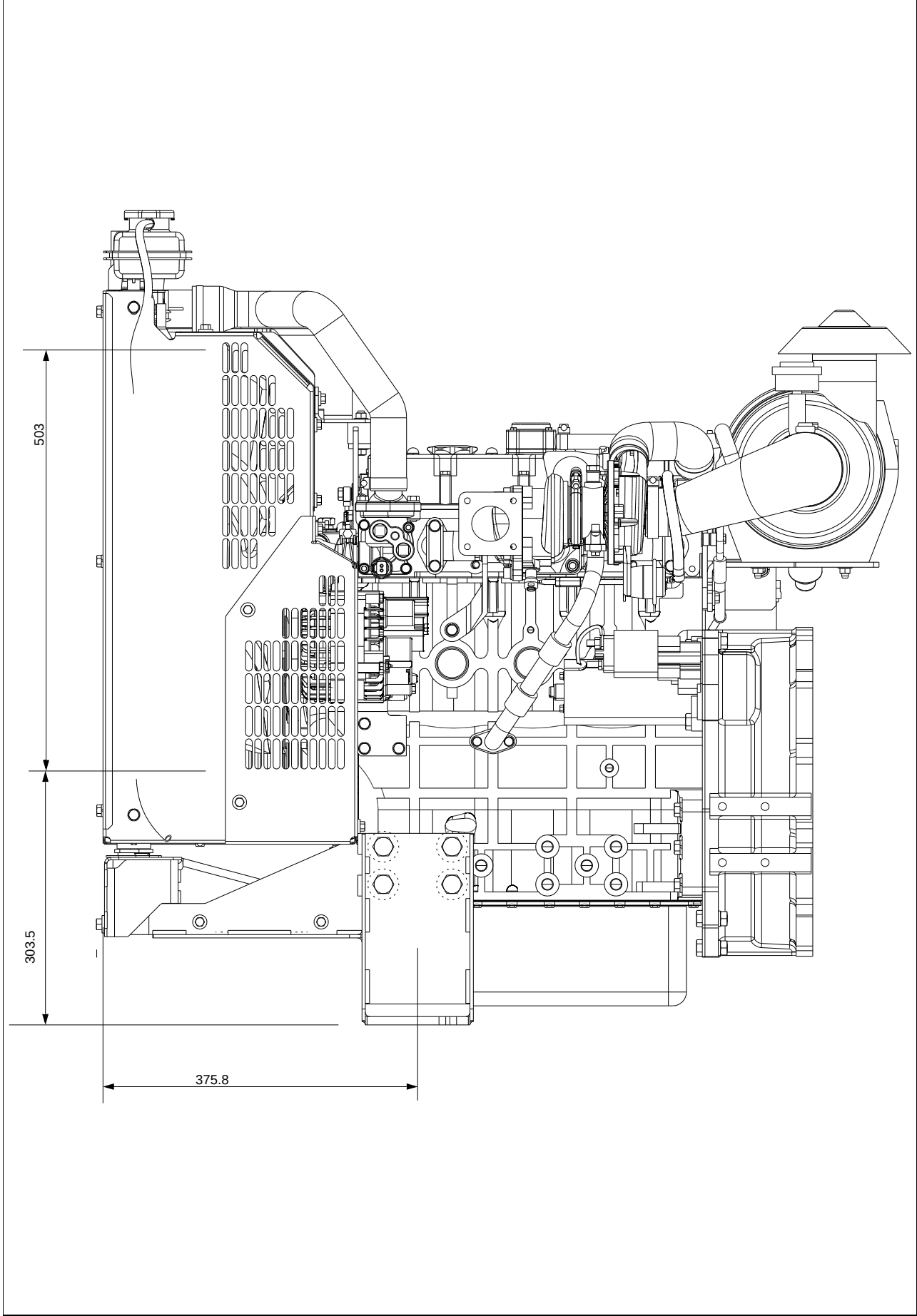
-minimum engine block temperature ... 65°C
 -ambient temperature ... 10°C
 -governing mode ... 5 %
 -alternator inertia ... 0.1461 kgm²
 -under frequency roll off (UFRO) point set to 2% Volt / 1% frequency
 -UFRO rate set to ... 1 Hz below rated speed
 LAM on/off ... Off

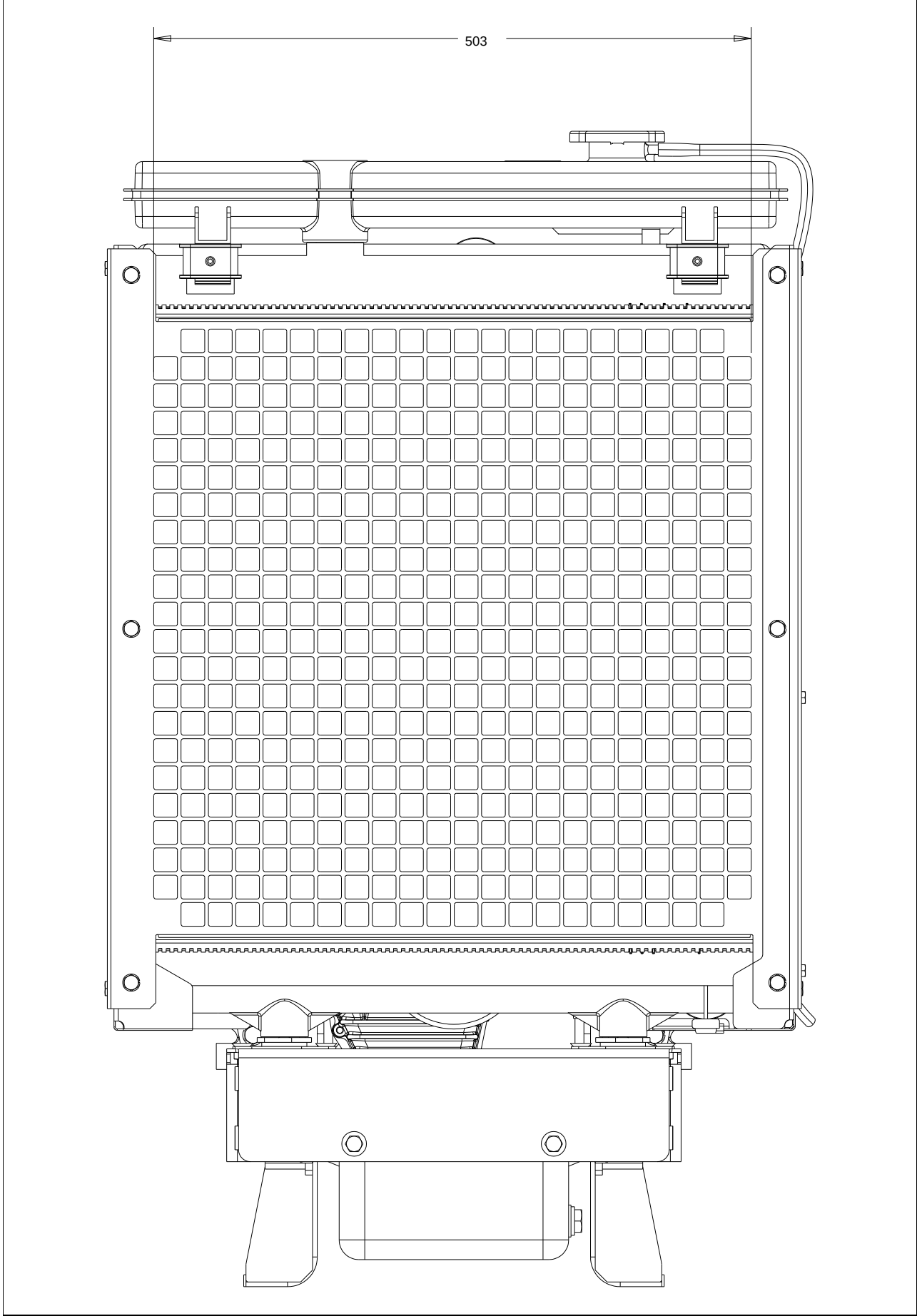
All tests were conducted using an engine which was installed and serviced to Perkins Engines Company Limited recommendations.

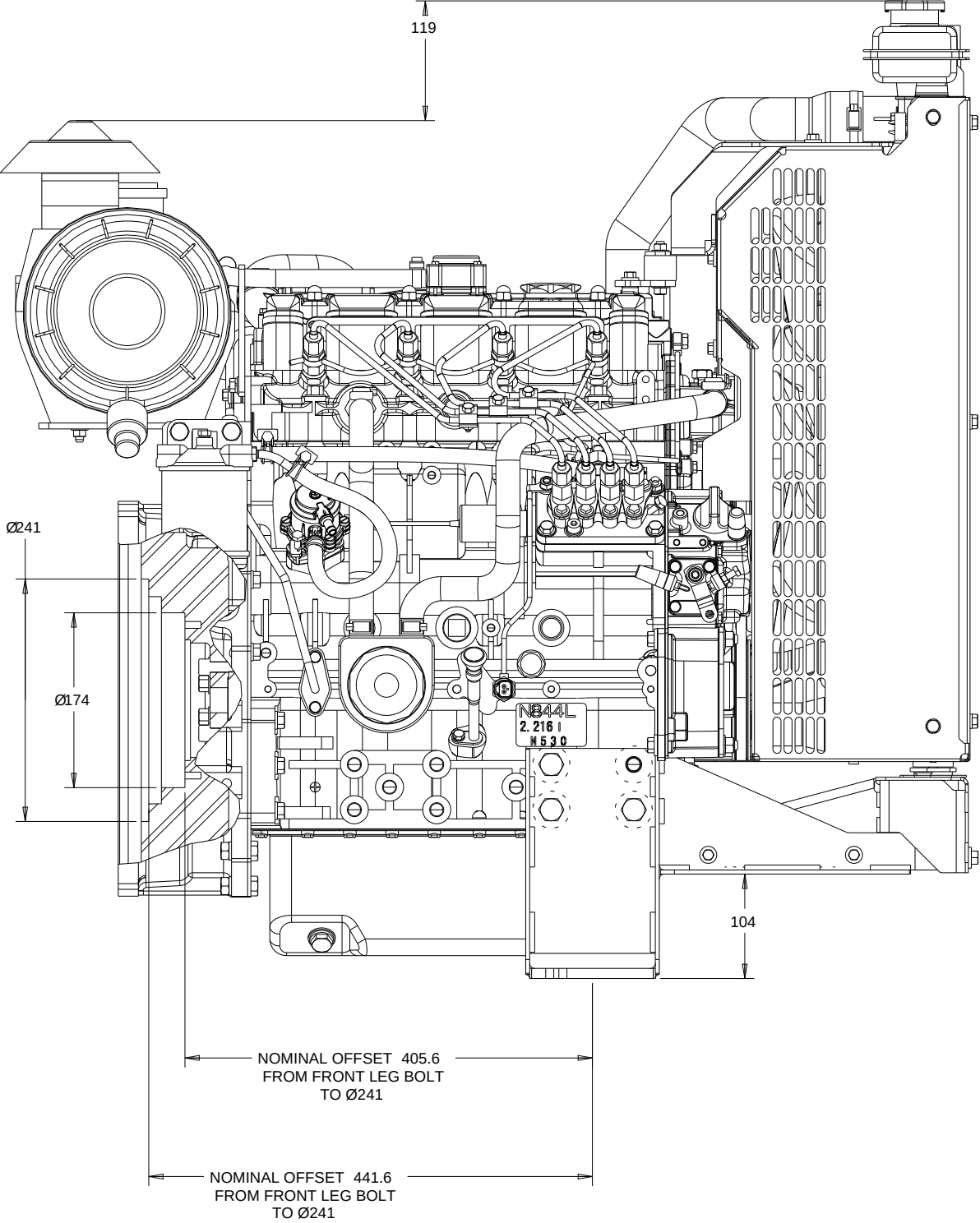
Derate Curves

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

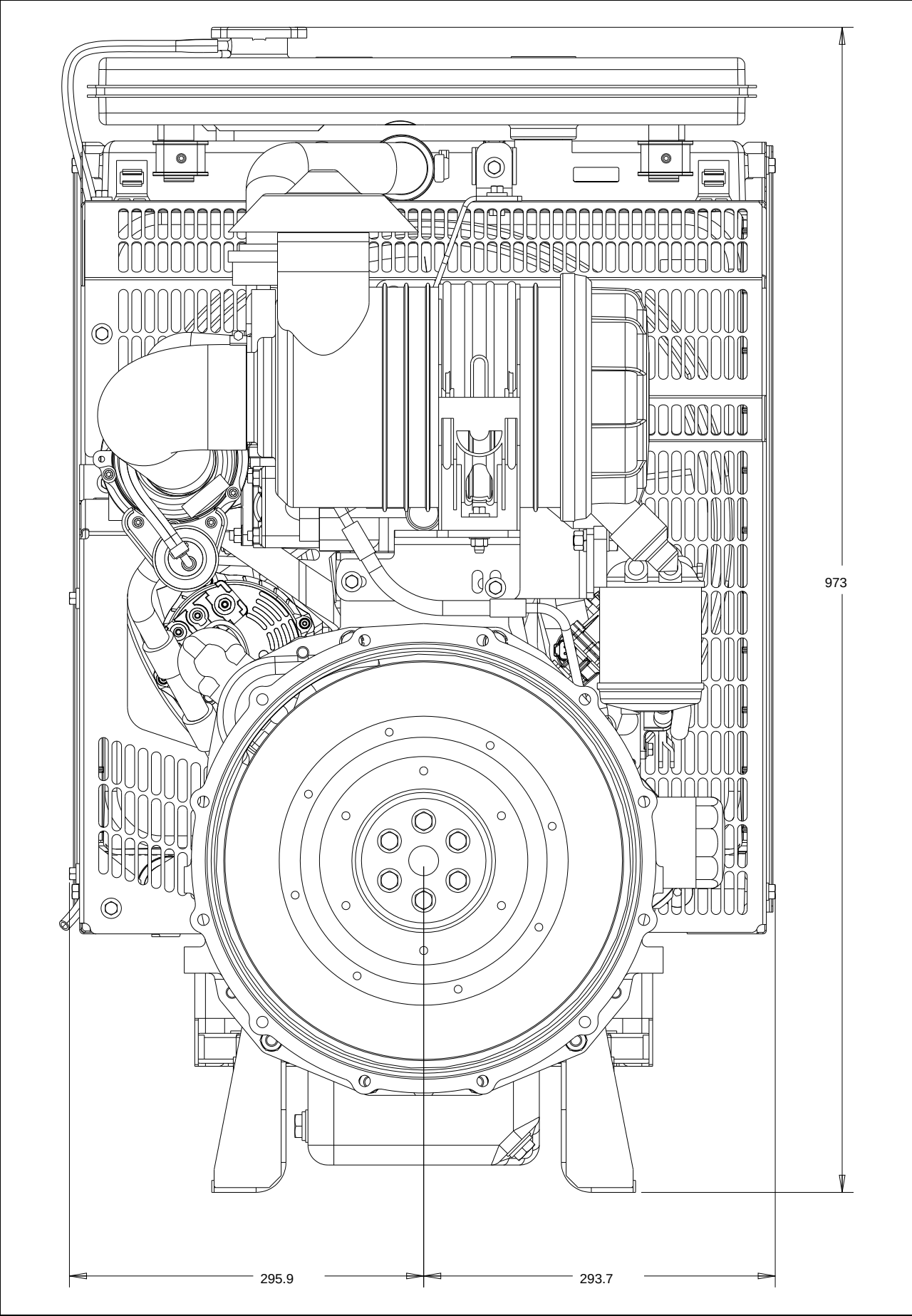
The general arrangement drawings shown in this data sheet are for guidance only. For installation purposes, latest versions should be requested from the Applications Department, Perkins Engines Stafford, ST16 3UB United Kingdom.







Rear view



Plan view

