403D-11G

9.5 kW @ 1500 rpm

ElectropaK

400 Series

Basic technical data

Number of cylinders	3
Cylinder arrangement	Vertical inline
Cycle	4 stroke
Induction system	Naturally aspirated
Compression ratio	23:1
Bore	77 mm
Stroke	81 mm
Cubic capacity	1.131 litres
Direction of rotation when viewed from flywheel	Anticlockwise
Firing order	1, 2, 3

Weight of ElectropaK

Dry (estimated)	129.2 kg

Overall dimensions of ElectropaK

Height	700 mm
Length	776 mm
Width (including mounting brackets)	449 mm

Moments of inertia (mk²)

Engine rotational components	0.12 kgm²
Flywheel	1.51 kgm²

Centre of gravity

Forward from rear of block	98 mm
Above centre line of block	67 mm
Offset to RHS of centre line	2 mm

Ratings

Steady state speed stability at constant load	± 0.75%

Performance

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

Note: For engines operating in ambient conditions other than the standard reference conditions stated below, a suitable derate must be applied.

Note: Derate tables for increased ambient temperature and/or altitude are available, please contact Perkins Applications Department.

Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	31.5%
Air inlet restriction at maximum power (nominal)	3 kPa
Exhaust back pressure at maximum power (nominal)	10.2 kPa
Fuel temperature (inlet pump)	40°C
All ratings certified to within	± 5%

Sound level

Average sound pressure level for bare engine (without inlet and exhaust) at 1 metre	76.7 dB(A)

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 Statement: Certified against the requirements of EU2007 (EU 97/68/EC Stage II) legislation for nonroad mobile machinery, powered by constant speed engines.

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General installation, 403D-11G ElectropaK @ 1500 rpm

Designation	Units	Type of operation and application	
		Prime power (50 Hz)	Standby power (50 Hz)
Gross engine power	kWb	8.6	9.5
ElectropaK nett engine power	kWm	8.4	9.3
Gross BMEP	kPa	610	672
Engine coolant flow (Water pump ratio 1.285:1)	litres/min	27.3	
Combustion air flow	m³/min	0.7	
Exhaust gas flow (maximum)	m³/min	1.66	1.8
Exhaust gas temperature outlet (maximum)	°C	368	420
Overall thermal efficiency (nett)	%	32	31
Typical Generator sets electrical output (0.8 pf 25ºC)	kWe	7.2	8.0
	kVA	9.0	10
Assumed alternator efficiency	%	86	

Energy balance

Designation	Units	Type of operation and application	
		Prime power (50 Hz)	Standby power (50 Hz)
Energy in fuel (heat of combustion)	kWt	25.9	29.5
Energy in power output (gross)	kWb	8.6	9.5
Energy to cooling fan	kWm	0.2	
Energy in power output (nett)	kWm	8.4	9.3
Energy to coolant and lubricating oil	kWt	8.3	9.5
Energy to exhaust	kWt	7.3	8.0
Energy to radiation	kWt	1.7	2.5

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Cooling system

Radiator

Radiator face area ..... 0.147 m²
Material and number of rows ..... Aluminium, 2 rows
Material and matrix density ..... Aluminium, 14.5 fins/inch
Width of matrix ..... 334 mm
Height of matrix ..... 440 mm
Pressure cap setting ..... 90 kPa
Estimated cooling air flow reserve ..... 0.125 kPa

Fan

Diameter ..... 320 mm
Drive ratio 1.25:1
Number of blades 7
Material ..... Plastic
Type ..... Pusher

Total coolant capacity

ElectropaK (with radiator) ..... 5.2 litres
ElectropaK (without radiator) ..... 1.9 litres
Maximum top tank temperature ..... 112°C
Maximum static pressure head on pump ..... 30.4 kPa
Thermostat operation range ..... 75-87°C

Note: 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 to cooling airflow and resultant minimum airflow		
Ambient clearance 50% Glycol	**Duct allowance (Pa)**	**m³/sec**
53°C	0	0.67
46°C	125	0.44

Electrical system

Alternator ..... 15 amps, 12 volts
Starter motor ..... 1.4 kW, 12 volts
Number of teeth on flywheel 96
Number of teeth on starter pinion 9

Exhaust system

Maximum back pressure ..... 10.2 kPa

Exhaust outlet size

Horizontal ..... 34 mm
Vertical ..... 40 mm

Engine mounting

Maximum static bending moment at rear face of block ..... 500 Nm

Fuel system

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

Fuel lift pump

Fuel lift pump type ..... Mechanical (camshaft driven)
Flow/hour ..... 63 litres/hour
Pressure ..... 10 kPa
Maximum suction head ..... 0.8 m
Maximum static pressure head ..... 3.0 m
Maximum fuel temperature at lift pump inlet ..... 65°C
Maximum fuel filter service interval ..... 500 hours
Governor type ..... Mechanical
Speed control conforms to G2

Fuel specification

USA Fed Off Highway EPA2D 89.330-96
Europe Off Highway ..... CEC RF-06-99

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

Fuel consumption

Fuel consumption for 403D-11G @ 1500 rpm				
Power rating	**110%**	**100%**	**75%**	**50%**
g/kWh	261	252	258	286
Litres/hour	3.1	2.7	2.1	1.5

Cold start recommendations

Minimum cranking speed @ 1500 rpm

Minimum starting temperature	Grade of engine lubricating oil	Battery specifications			
		BS3911 Cold start amps	**SAEJ537 Cold cranking amps**	**Number of batteries required**	**Commercial reference number**
0°C	20W	340	540	1	069
-15°C	10W	340	540	1	069
-20°C	5W	420	590	1	072

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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

Maximum sump capacity ... . 4.4 litres
Total system... .. .. 4.9 litres
Minimum. .. .. 3.4 litres

Maximum engine operating angles

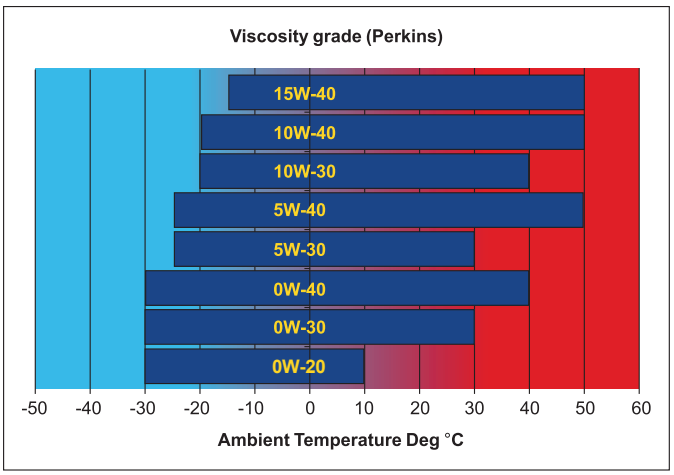
Front up, front down, right side or left side .. .. 35° continuous

Lubricating oil pressure

Minimum oil pressure... .. ..120 kPa
Relief valve opens. .. ..304-500 kPa
At maximum no-load speed .. .. .TBA
Normal oil temperature .. .. .125°C
Oil flow at rated speed.. .. ..6.6 litres/min

Recommended SAE viscosity

A single or multigrade oil conforming to API-CH-4 or ACEA E5 must be used.



Engine mounting

Maximum static bending moment at rear face of block.. .. .. 500 Nm

Load acceptance

The figures below comply 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)		
Descriptor	**Units**	**50 Hz**
Prime power	%	100
Load	kWm (kWe)	8.4 (7.2)
Transient frequency deviation	%	+10/-12
Frequency recovery	Seconds	5

The figures shown in the table above were obtained under the following test conditions:

Ambient temperature ... . 10°C
Governing mode ... . mechanical
Alternator inertia ... .0.1027 kgm²

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

Note: The general arrangement drawings shown in this data sheet are for guidance only. The latest versions should be requested from the Perkins Applications Department.

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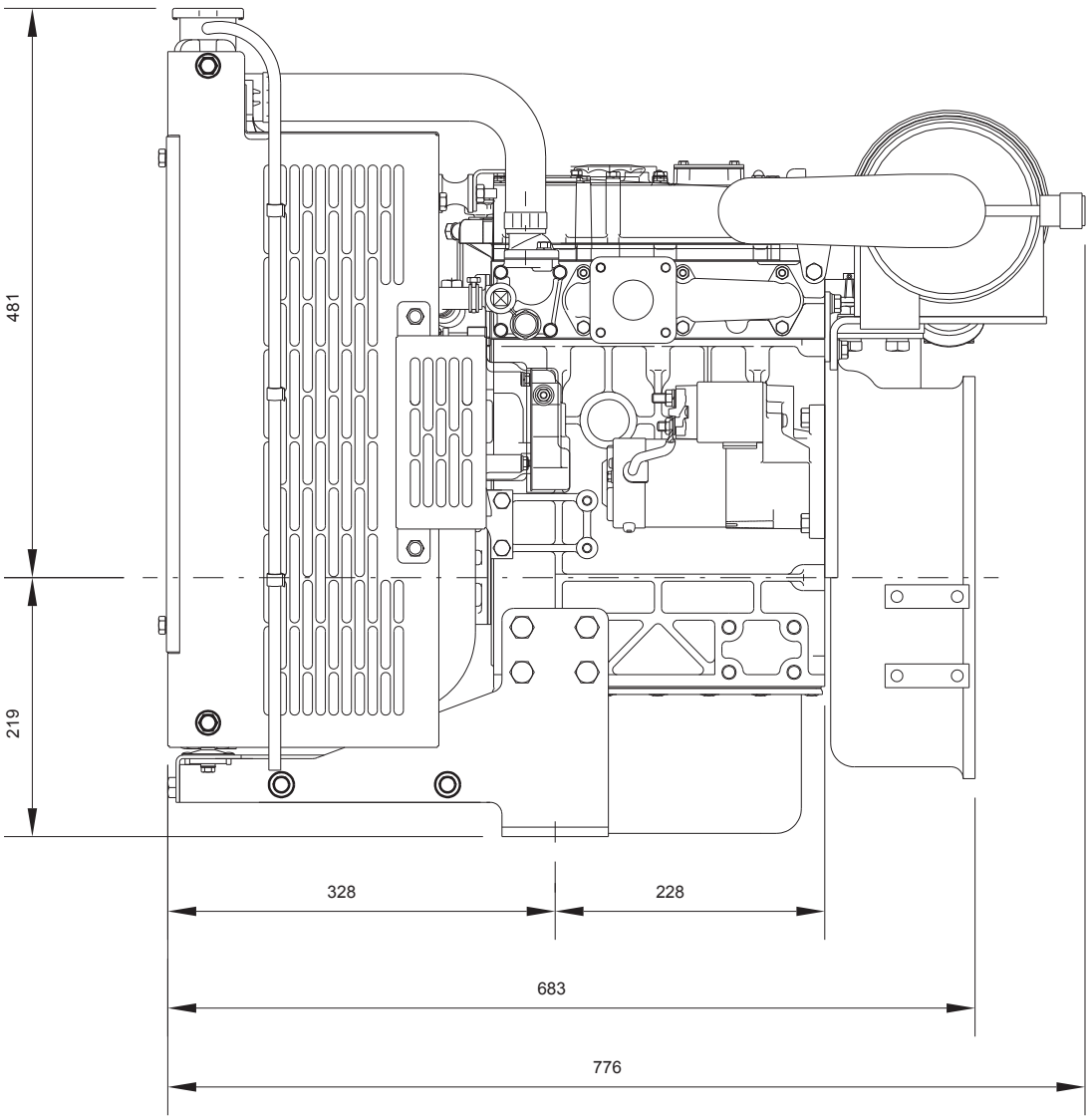
403D-11G ElectropaK - Left side view



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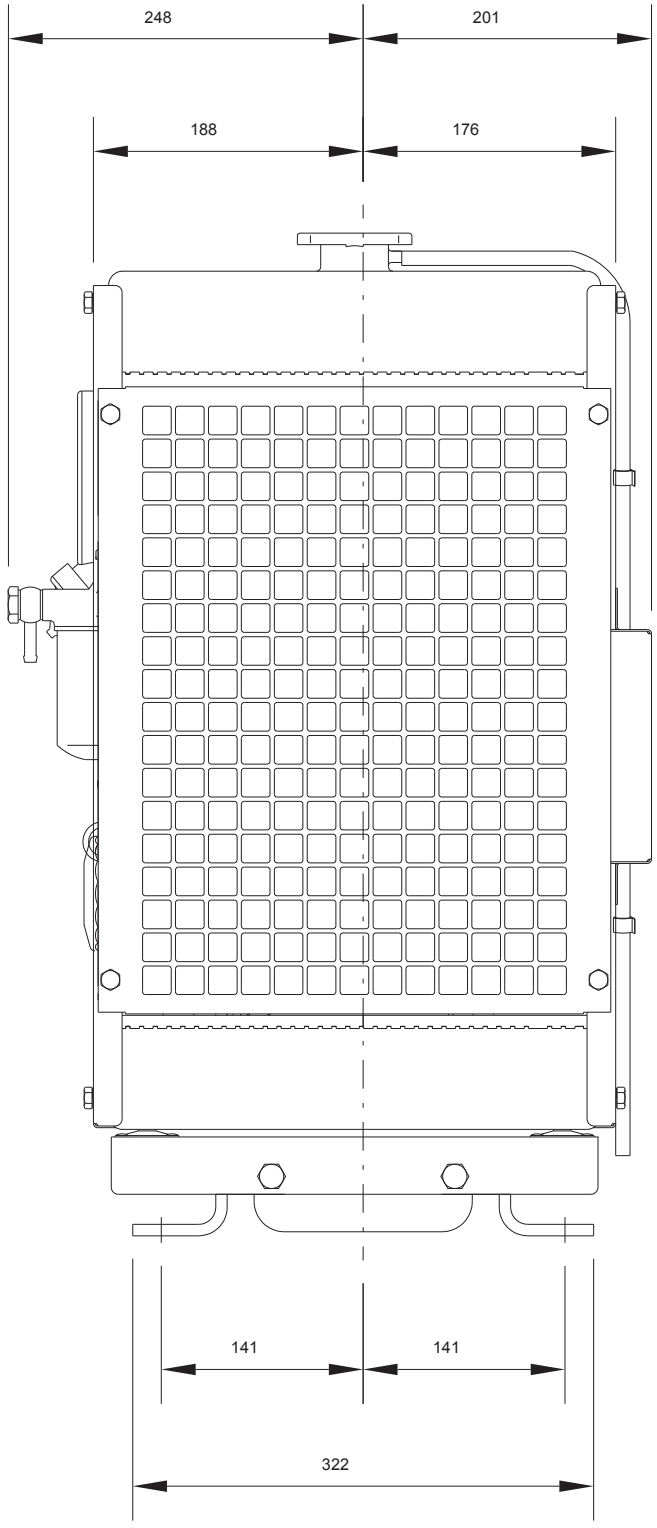
403D-11G ElectropaK - Front view



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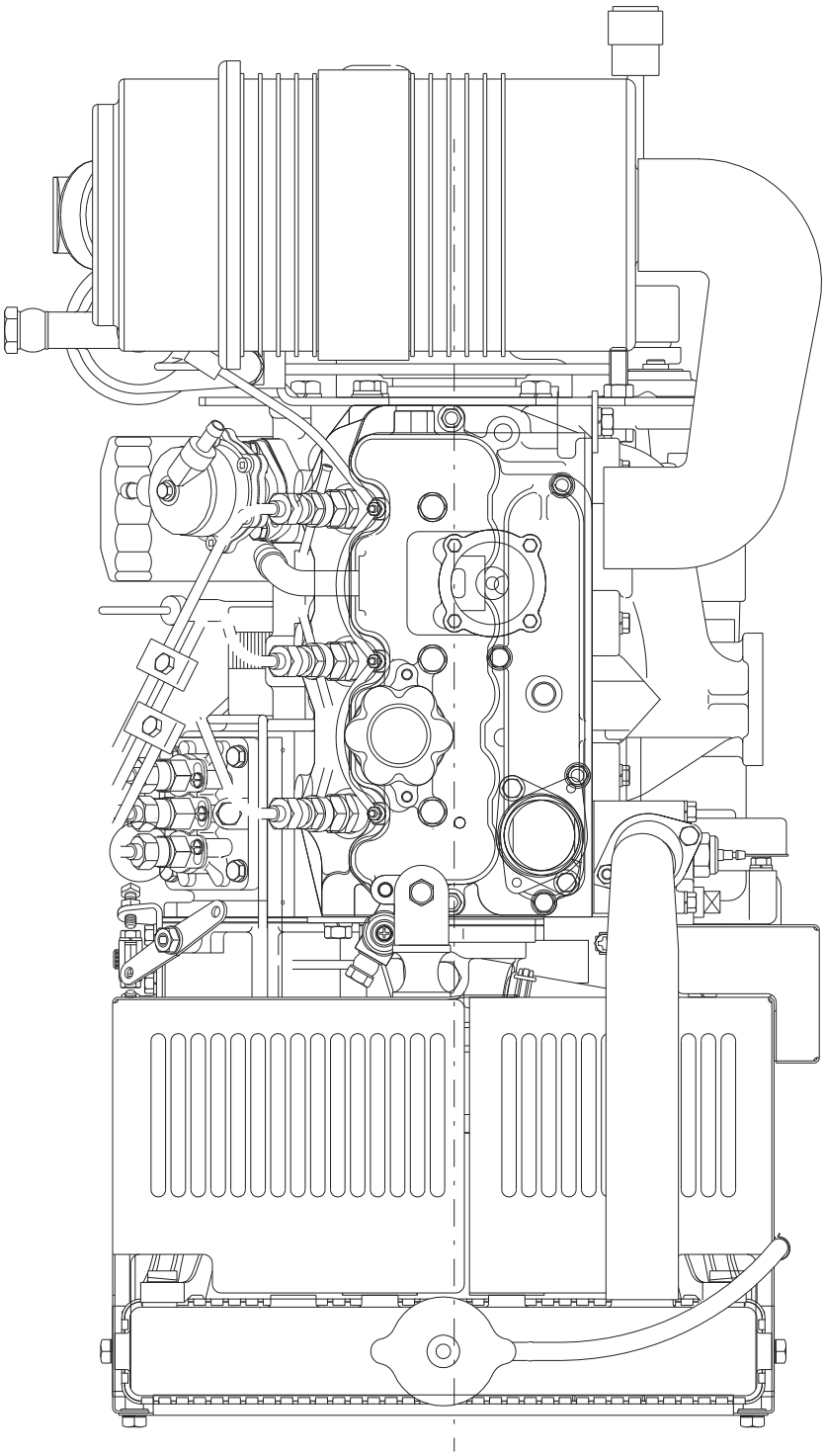
403D-11G ElectropaK - Plan view



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