### Basic technical data

- **Number of cylinders**: 3
- **Cylinder arrangement**: Vertical in-line
- **Cycle**: 4 stroke
- **Induction system**: Naturally aspirated
- **Compression ratio**: 22.5:1
- **Bore**: 84 mm
- **Stroke**: 90 mm
- **Displacement**: 1.496 litres
- **Direction of rotation when viewed from flywheel**: Anticlockwise
- **Firing order**: 1, 2, 3

### Weight of ElectropaK

- **Dry (estimated)**: 197 kg
- **Wet (estimated)**: 215 kg

### Overall dimensions of ElectropaK

- **Height**: 793 mm
- **Length**: 820 mm
- **Width**: 469 mm

### Centre of gravity

- **Forward from rear of block**: 139 mm
- **Above centre line of block**: 67 mm

### Moments of inertia

- **Engine rotational components**: 0.45 kgm²
- **Flywheel**: 2.01 kgm²

### Cyclic irregularity for engine standby power

At 110%: TBA

### Ratings

**Steady state speed stability at constant load**: ± 0.75%

**Performance**

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

**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%
### General installation, 403A-15G2 ElectropaK @ 1800 rpm

<table>
<thead>
<tr>
<th>Designation</th>
<th>Units</th>
<th>Type of operation and application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Prime power (60Hz)</td>
</tr>
<tr>
<td>Gross engine power</td>
<td>kWb</td>
<td>16.33</td>
</tr>
<tr>
<td>Gross BMEP</td>
<td>kPa</td>
<td>728</td>
</tr>
<tr>
<td>Mean piston speed</td>
<td>m/s</td>
<td>5.4</td>
</tr>
<tr>
<td>ElectropaK nett engine power</td>
<td>kW</td>
<td>16.1</td>
</tr>
<tr>
<td>Engine coolant flow against 35 kPa restriction</td>
<td>litres/min</td>
<td>55.2</td>
</tr>
<tr>
<td>Combustion air flow</td>
<td>m³/min</td>
<td>1.2</td>
</tr>
<tr>
<td>Exhaust gas flow (max.) at atmospheric pressure</td>
<td>m³/min</td>
<td>2.6</td>
</tr>
<tr>
<td>Exhaust gas temperature (max.)</td>
<td>°C</td>
<td>480</td>
</tr>
<tr>
<td>Overall thermal efficiency</td>
<td>%</td>
<td>33.04</td>
</tr>
<tr>
<td>Typical Generator sets electrical output (0.8pf 25°C)</td>
<td>kWe</td>
<td>14.01</td>
</tr>
<tr>
<td></td>
<td>kVA</td>
<td>17.51</td>
</tr>
<tr>
<td>Assumed alternator efficiency</td>
<td>%</td>
<td>87</td>
</tr>
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</table>

### Energy balance

<table>
<thead>
<tr>
<th>Designation</th>
<th>Units</th>
<th>Type of operation and application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Prime power (60Hz)</td>
</tr>
<tr>
<td>Energy in fuel</td>
<td>kWt</td>
<td>48.73</td>
</tr>
<tr>
<td>Energy in power output (gross)</td>
<td>kWb</td>
<td>16.33</td>
</tr>
<tr>
<td>Energy to cooling fan</td>
<td>kWm</td>
<td>0.23</td>
</tr>
<tr>
<td>Energy in power output (nett)</td>
<td>kWm</td>
<td>16.1</td>
</tr>
<tr>
<td>Energy to exhaust</td>
<td>kWt</td>
<td>15.6</td>
</tr>
<tr>
<td>Energy to coolant and oil</td>
<td>kWt</td>
<td>12.5</td>
</tr>
<tr>
<td>Energy to radiation</td>
<td>kWt</td>
<td>4.1</td>
</tr>
</tbody>
</table>
Cooling system

Recommended coolant: 50% anti freeze / 50% water.

For details of recommended coolant specifications, please refer to the Operation and Maintenance Manual (OMM) for this engine model.

Total coolant capacity

ElectropaK (with radiator) ........................................... 6.0 litres
ElectropaK (without radiator) ....................................... 2.6 litres
Maximum top tank temperature ................................... 112°C
Maximum static pressure head on pump ....................... 30.4 kPa
Temperature rise across engine .................................. 5.1°C
Maximum permissible external system resistance ............ TBA kPa
Thermostat operation range ....................................... 82 - 95°C

Radiator

Radiator face area .................................................... 0.167 m²
Material and number of rows .................................... Aluminium, 2 rows
Material and fins per inch ......................................... Aluminium, 4.5 fins/inch
Width of matrix ...................................................... 334.2 mm
Height of matrix ..................................................... 500 mm
Pressure cap setting ................................................ 90 kPa
Estimated cooling air flow reserve .............................. 0.125 kPa

Fan

Type ................................................................. Pusher
Diameter ............................................................. 320 mm
Number of blades .................................................. 6
Material ............................................................. Plastic
Drive ratio ........................................................... 1.25:1
Airflow at rated speed ............................................. 49 m³/min

Fuel system

Type of injection .................................................... Indirect injection
Fuel injection pump ................................................. Cassette type
Fuel injector ......................................................... Pintle nozzle
Flow/hour .......................................................... 63 litres/hr
Pressure ............................................................ 14.7 MPa
Maximum particle size ............................................. 25 microns
Fuel lift pump type ................................................ Mechanical (camshaft driven)
Maximum suction head .......................................... 0.8 m
Maximum static pressure head ................................... 3.0 m
Maximum fuel temperature at lift pump inlet .............. 40°C
Maximum fuel filter service interval ......................... 1000 hrs
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

Fuel consumption

<table>
<thead>
<tr>
<th>Power rating %</th>
<th>18 kW/1800 rpm</th>
<th>18 kW/1800 rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g/kWh</td>
<td>litres/hr</td>
</tr>
<tr>
<td>25</td>
<td>375</td>
<td>1.55</td>
</tr>
<tr>
<td>50</td>
<td>272</td>
<td>2.25</td>
</tr>
<tr>
<td>75</td>
<td>250</td>
<td>3.10</td>
</tr>
<tr>
<td>100</td>
<td>261</td>
<td>4.32</td>
</tr>
<tr>
<td></td>
<td>282</td>
<td>5.12</td>
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</tbody>
</table>

Cold start recommendations

Minimum cranking speed @ 1800 rpm

<table>
<thead>
<tr>
<th>Minimum starting temperature</th>
<th>Grade of engine lubricating oil</th>
<th>BS3911 Cold start amps</th>
<th>SAEJ337 Cold start amps</th>
<th>Number of batteries required</th>
<th>Commercial reference number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C</td>
<td>20W</td>
<td>420</td>
<td>590</td>
<td>1</td>
<td>72</td>
</tr>
<tr>
<td>-15°C</td>
<td>10W</td>
<td>420</td>
<td>590</td>
<td>1</td>
<td>72</td>
</tr>
<tr>
<td>-20°C</td>
<td>5W</td>
<td>540</td>
<td>740</td>
<td>1</td>
<td>647</td>
</tr>
</tbody>
</table>

Battery specifications

<table>
<thead>
<tr>
<th>Minimum starting temperature</th>
<th>Battery specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade of engine lubricating oil</td>
<td>BS3911</td>
</tr>
<tr>
<td>0°C</td>
<td>20W</td>
</tr>
<tr>
<td>-15°C</td>
<td>10W</td>
</tr>
<tr>
<td>-20°C</td>
<td>5W</td>
</tr>
</tbody>
</table>

Duct allowance - Maximum additional restriction to cooling airflow and resultant minimum airflow

<table>
<thead>
<tr>
<th>Ambient clearance 50% Glycol</th>
<th>Duct allowance (Pa)</th>
<th>m³/sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>53°C</td>
<td>65</td>
<td>48.6</td>
</tr>
<tr>
<td>46°C</td>
<td>125</td>
<td>48.6</td>
</tr>
</tbody>
</table>
Lubrication system

Total system capacity
- Maximum sump capacity: 6.0 litres
- Minimum sump capacity: 4.5 litres
- Maximum oil temperature (continuous operation): 125°C
- Maximum oil temperature (intermittent operation): 135°C

Lubricating oil pressure
- Relief valve opens: 262 - 359 kPa
- Minimum oil pressure: 120 kPa
- Maximum oil pressure at rated speed: 10.9 litres/min

Maximum engine operating angles
- Front up, front down, right side or left side: 35° continuous

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

Exhaust system
- Exhaust outlet size: 42 mm
- Maximum back pressure: 10.2 kPa

Electrical system
- Alternator: 15 amps, 12 volts
- Starter motor: 2 kW, 12 volts
- Number of teeth on flywheel: 109
- Engine stop method: Solenoid

Engine mounting
- Maximum static bending moment at rear face of block: 990 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.

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Prime power</td>
<td>60%</td>
</tr>
<tr>
<td>Transient frequency deviation</td>
<td>10%</td>
</tr>
<tr>
<td>Frequency recovery</td>
<td>5 seconds</td>
</tr>
</tbody>
</table>

The figures shown in the table above were obtained under the following test conditions:
- Engine block temperature: TBA°C
- Ambient temperature: 25°C
- Governing mode: 5%
- 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 installed and serviced to Perkins Engine Company Limited recommendations.

Derate curves
Derate curves for altitude and humidity can be found in Chapter 6 of the 400 Series Engine Specification Manual.

The general arrangement drawings shown in this data sheet are for guidance only. The latest versions should be requested from the Perkins Applications Department.
403A-15G2 - Front view