ElectropaK

Basic technical data

Number of cylinders .............................................. 6
Cylinder arrangement .............................................. Inline
Cycle ....................................................................... 4 stroke
Induction system ...................................................... Turbocharged and air charge cooled
Combustion system .................................................. Direct injection diesel
Compression ratio ................................................... 16.8 : 1
Bore ....................................................................... 105 mm
Stroke ...................................................................... 135 mm
Cubic capacity ......................................................... 7.01 litres
Direction of rotation ................................................ Anticlockwise when viewed from flywheel
Firing order .............................................................. 1, 5, 3, 6, 2, 4
Estimated total weight (dry) ...................................... 788 kg
Estimated total weight (wet) ...................................... 822 kg

Overall dimensions (ElectropaK)

Height ..................................................................... 1087 mm
Length (air cleaner fitted) .......................................... 1706 mm
Width ..................................................................... 773 mm

Moments of inertia

Engine rotational components .................................. 0.27 kgm²
Flywheel ................................................................... 1.26 (SAE2) kgm²

General installation

<table>
<thead>
<tr>
<th>General Installation</th>
<th>Units</th>
<th>50 Hz (1500 rpm)</th>
<th>60 Hz (1800 rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prime</td>
<td>Standby</td>
<td>Prime</td>
</tr>
<tr>
<td>Gross engine power</td>
<td>kW</td>
<td>135.9</td>
<td>149.7</td>
</tr>
<tr>
<td>Brake mean effective pressure</td>
<td>kPa</td>
<td>1549.7</td>
<td>1707.9</td>
</tr>
<tr>
<td>Mean piston speed</td>
<td>m/s</td>
<td>6.7</td>
<td>8.1</td>
</tr>
<tr>
<td>ElectropaK nett engine power</td>
<td>kW</td>
<td>129.0</td>
<td>142.9</td>
</tr>
<tr>
<td>Engine coolant flow (against 35 kPa restriction)</td>
<td>litres/min</td>
<td>142</td>
<td>170</td>
</tr>
<tr>
<td>Exhaust gas flow (maximum)</td>
<td>m³/min</td>
<td>24.00</td>
<td>25.00</td>
</tr>
<tr>
<td>Exhaust gas temperature (maximum) in manifold (after turbocharger)</td>
<td>°C</td>
<td>513</td>
<td>450</td>
</tr>
<tr>
<td>Nett engine thermal efficiency</td>
<td>%</td>
<td>36.6</td>
<td>37.4</td>
</tr>
<tr>
<td>Typical genset electrical output (0.8pf 25°C)</td>
<td>kWe</td>
<td>114</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>kVA</td>
<td>142</td>
<td>157</td>
</tr>
<tr>
<td>Regenerative power (estimated)</td>
<td>kW</td>
<td>11.5</td>
<td>13.2</td>
</tr>
<tr>
<td>Assumed alternator efficiency</td>
<td>%</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>Energy balance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat in fuel</td>
<td>kW</td>
<td>352.4</td>
<td>381.5</td>
</tr>
<tr>
<td>Power to cooling fan</td>
<td>kW</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Power to coolant and lubricating oil</td>
<td>kW</td>
<td>64.0</td>
<td>72.5</td>
</tr>
<tr>
<td>Power to residual losses (alternator)</td>
<td>kW</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Power to exhaust</td>
<td>kW</td>
<td>107.5</td>
<td>114.1</td>
</tr>
<tr>
<td>Energy to charge coolers</td>
<td>kW</td>
<td>19.4</td>
<td>21.2</td>
</tr>
<tr>
<td>Power to radiation</td>
<td>kW</td>
<td>24.0</td>
<td>25.4</td>
</tr>
</tbody>
</table>

Centre of gravity, ElectropaK

Forward from rear of block (wet) ................................... 476 mm
Above crankshaft centre line (wet) .................................. 176 mm
Offset to RHS of crankshaft centre line (wet) .......... ± 16 mm

Performance

Speed variation at constant load .................................. ± 0.18%
Cyclic irregularity at standby power ................................ ± 0.003
All ratings within ......................................................... ± 3%

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

Sound level

Average sound pressure level for standby power @ 1 m ........ TBC

Test conditions

Air temperature ......................................................... 25°C
Barometric pressure .................................................. 100 kPa
Relative humidity ..................................................... 44%
Air inlet restriction at maximum power ................... ± 5 kPa (maximum)
Exhaust back pressure at maximum power ................. ± 15 kPa (maximum)
Fuel temperature ...................................................... 40°C

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.

Energy balance

Heat in fuel

Power to cooling fan

Power to coolant and lubricating oil

Power to residual losses (alternator)

Power to exhaust

Energy to charge coolers

Power to radiation

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

Standby power: Limited to 500 hours annual usage, with an average load factor of 80% of the published standby power rating over each 24 hour period. Up to 300 hours of annual usage may be run continuously. No overload is permitted on standby power.
Cooling system

Cooling pack
- Overall weight (wet): 45 kg
- Overall face area: 469,200 mm²
- Width: 684 mm
- Height: 690 mm

Radiator
- Face area: 303,600 mm²
- Number of rows and materials: 4 rows, Aluminium
- Matrix density and material: 11.3 fins per inch, Aluminium
- Width of matrix: 440 mm
- Height of matrix: 690 mm
- Pressure cap setting (minimum): 110 kPa

Charge cooler
- Face area: 151,800 mm²
- Number of rows and materials: 2 rows, Aluminium
- Matrix density and material: 10 fins per inch, Aluminium
- Width of matrix: 220 mm
- Height of matrix: 690 mm

Fan
- Diameter: 635 mm
- Drive ratio: 1.25:1
- Number of blades: 7
- Material: Nylon
- Type: Pusher
- Air flow @ 1800 rpm: 282 m³/min
- Power @ 1800 rpm: 6 kW

Coolant
- Total system capacity: 20.5 litres
- System drawdown capacity: 10%
- Engine capacity: 9.5 litres
- Maximum top tank temperature: 108°C
- Temperature rise across engine (maximum rating dependent): 12°C
- Maximum permissible external system resistance: 35 kPa
- Thermostat operation range: 82°C to 95°C
- Shutdown switch setting: 114°C
- Cooling pump method of drive: GEAR
- Recommended coolant immersion heater rating (minimum): 0.75 kW
- Recommended coolant: S65580 - 1992, ASTM D3306 and ELC coolants to 1E1966

Duct allowance
- Maximum additional restriction (duct allowance to cooling airflow and resultant minimum air flow) - Standby power

<table>
<thead>
<tr>
<th>Description</th>
<th>rpm</th>
<th>kPa</th>
<th>m³/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct allowance with inhibited coolant at 53°C</td>
<td>1500</td>
<td>0.125</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>1800</td>
<td>0.12</td>
<td>258</td>
</tr>
<tr>
<td>Duct allowance with inhibited coolant at 46°C</td>
<td>1500</td>
<td>0.200</td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>1800</td>
<td>0.200</td>
<td>228</td>
</tr>
</tbody>
</table>

Electrical system

- Alternator: 8SI
- Alternator voltage: 12 volts
- Alternator output: 65 amps
- Starter: AZF
- Starter voltage: 12 volts
- Starter motor voltage: 4.0 kW
- Number of teeth on the flywheel: 126
- Pull-in current of starter motor solenoid: 12 volts 68 amps
- Hold-in current of starter motor solenoid: 12 volts 20 amps
- Engine stop method: CAN link signal or Hardwire input to engine ECM

Cold start recommendations
- Minimum required cranking speed over TDC: 60 rpm

<table>
<thead>
<tr>
<th>Temperature</th>
<th>5 to -5°C</th>
<th>-5 to -20°C</th>
<th>-20 to -25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>1 x 750 CCA</td>
<td>2 x 750 CCA</td>
<td>2 x 900 CCA</td>
</tr>
<tr>
<td>Maximum breakaway current</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cranking current</td>
<td>1000 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aids</td>
<td>None</td>
<td>Glowplugs</td>
<td></td>
</tr>
<tr>
<td>Minimum mean cranking speed</td>
<td>130 rpm</td>
<td>100 rpm</td>
<td>100 rpm</td>
</tr>
</tbody>
</table>

Note: Battery capacity is defined by the 20 hour rate.

Note: If a change to a low viscosity oil is made, the cranking torque necessary at low ambient temperatures is much reduced. The starting equipment has been selected to take advantage of this. It is important to change to the appropriate multigrade oil in anticipation of operating in low ambient temperatures.

Exhaust system
- Maximum back pressure: 1500 rpm & 1800 rpm: 15 kPa
- Exhaust outlet, internal diameter: 115.9 mm
Fuel system

**Injection components**
- Injector: Electronic CRIN2
- Fuel pump: CB28

**Fuel priming**
- Priming pump type: Manual
- Maximum priming time: 180 seconds

**Fuel feed**
- Maximum fuel flow: 6.6 litres/min
- Maximum suction head at engine fuel pump inlet: -17 kPa
- Fuel temperature at engine fuel pump inlet: 75°C
- Tolerance on fuel consumption: ± 5%

**Fuel specification**
- Fuel standard: ISO 8528-12 and G2 operating limits stated in ISO 8528-5
- Oil consumption at full load: 2% of fuel
- Maximum continuous oil temperature (in rail): 125°C

**Fuel consumption**
<table>
<thead>
<tr>
<th>Load</th>
<th>Type of operation and application</th>
<th>1500 rpm</th>
<th>1800 rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g/kWh litres/hr</td>
<td>g/kWh litres/hr</td>
<td></td>
</tr>
<tr>
<td>110% Prime power</td>
<td>212.6</td>
<td>212.6</td>
<td></td>
</tr>
<tr>
<td>100% Prime power</td>
<td>216.5</td>
<td>214.6</td>
<td></td>
</tr>
<tr>
<td>75% Prime power</td>
<td>229.6</td>
<td>231.4</td>
<td></td>
</tr>
<tr>
<td>50% Prime power</td>
<td>234.1</td>
<td>240.3</td>
<td></td>
</tr>
<tr>
<td>25% Prime power</td>
<td>249.6</td>
<td>263.9</td>
<td></td>
</tr>
</tbody>
</table>

**Induction system**
- Maximum air intake restriction
  - Clean filter: 8 kPa
  - Dirty filter: 4 kPa
  - Air filter type: Paper element

**Lubrication system**
- Maximum total system oil capacity: 17.5 litres
- Minimum oil capacity in sump: 12.5 litres
- Maximum oil capacity in sump: 15.5 litres
- Maximum engine operating angles:
  - Front up, front down, right side, left side: 7°
  - Sump drain plug tapping size: 3/4 - 16 UNF
  - Shutdown switch setting (where fitted): Manual
- Oil pressure shut down switch: 90 kPa

**Relief valve opening pressure**: 430 kPa
- Pressure at maximum speed: 340 kPa
- Maximum continuous oil temperature (in rail): 125°C
- Oil consumption at full load (% of fuel): < 0.1

**Recommended SAE viscosity**
A multigrade oil must be used which conforms to API CH4 or CI4. ACEA E5 must be used, see illustration below.

**Mountings**
- Maximum static bending moment at rear face of block: 1130 Nm
- Maximum permissible overhung load on the flywheel: Calculated on request
- Maximum bending moment at rear of flywheel housing: ± 3000 in Shock Nm

Initial load application: When engine reaches rated speed (15 seconds after engine starts to crank)

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
<th>1500 rpm</th>
<th>1800 rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of prime power</td>
<td>%</td>
<td>95.0</td>
<td>93.5</td>
</tr>
<tr>
<td>Load</td>
<td>kWe</td>
<td>120.0</td>
<td>121.5</td>
</tr>
<tr>
<td>Transient frequency deviation</td>
<td>%</td>
<td>18.9</td>
<td>9.5</td>
</tr>
<tr>
<td>Frequency recovery time</td>
<td>Seconds</td>
<td>1.6</td>
<td>0.9</td>
</tr>
</tbody>
</table>
## Noise data

### Noise levels (predicted)

<table>
<thead>
<tr>
<th>Position</th>
<th>50 Hz</th>
<th>60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>95.6</td>
<td>99.8</td>
</tr>
<tr>
<td>R</td>
<td>95.6</td>
<td>99.3</td>
</tr>
<tr>
<td>L</td>
<td>95.4</td>
<td>99.0</td>
</tr>
<tr>
<td>A</td>
<td>92.9</td>
<td>96.2</td>
</tr>
<tr>
<td>FR</td>
<td>94.7</td>
<td>98.9</td>
</tr>
<tr>
<td>FL</td>
<td>94.9</td>
<td>98.9</td>
</tr>
</tbody>
</table>

![Diagram showing noise measurement positions: FL, 45°, FR, 45°, F, L, R, A. 1 metre distance from the engine for each measurement.](attachment:image.png)