### Basic technical data

- **Number of cylinders**: 4
- **Cylinder arrangement**: Vertical in-line
- **Cycle**: 4 stroke
- **Induction system**: Turbocharged, air to air charge cooled
- **Compression ratio**: 16.7:1
- **Bore**: 105 mm
- **Stroke**: 127 mm
- **Cubic capacity**: 4.399 litres
- **Direction of rotation**: Anticlockwise when viewed from flywheel
- **Direction of rotation**: Clockwise when viewed from front of engine
- **Firing order**: 1, 3, 4, 2

### Estimated total weight of IOPU
- **Dry**: 439 kg
- **Wet**: 448 kg

### Overall dimensions
- **Height**: 1087 mm
- **Length**: 1358 mm
- **Width (including mounting brackets)**: 746 mm

### Centre of gravity
- **Forward from rear of block**: 237.0 mm
- **Above centre line of block**: 167.0 mm
- **Offset to RHS of centre line**: -1.5 mm

### Moments of inertia
- **Engine rotational excluding crank pulley and flywheel**: 0.124 kgm²
- **Flywheel**: 1.2 kgm²

### Performance

**Note:** All performance data based on operation to ISO Standard reference conditions.

- Steady state speed stability at constant load: ±0.25%
- Cyclic irregularity at rated power with 1.2 kgm² flywheel: TBA

### Test conditions

- **Air temperature**: 25°C
- **Barometric pressure**: 100 kPa
- **Relative humidity**: 30%
- **Air inlet restriction at rated speed**: 3 kPa
- **Exhaust back pressure at rated speed (nominal)**: 15 kPa(60Hz) / 6 kPa(50Hz)

### Sound level

- **Estimated ElectropaK sound power level @ 1 metre without inlet and exhaust**: 105.5 dB(amps)

**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 capability

Certified against the requirements of EU (EU 97/68/EC Stage IIIa) legislation for non-road mobile machinery, powered by constant speed engines.
### General installation

<table>
<thead>
<tr>
<th>Designation</th>
<th>Units</th>
<th>TAG2 60Hz</th>
<th></th>
<th>TAG2 50Hz</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Prime</td>
<td>Standby</td>
<td>Prime</td>
<td>Standby</td>
</tr>
<tr>
<td>Gross engine power</td>
<td>kWb</td>
<td>109.7</td>
<td>120.1</td>
<td>95.8</td>
<td>105.1</td>
</tr>
<tr>
<td>ElectropaK nett engine power</td>
<td>kWm</td>
<td>104.2</td>
<td>114.6</td>
<td>91.3</td>
<td>100.6</td>
</tr>
<tr>
<td>Brake mean effective pressure</td>
<td>kPa</td>
<td>1662</td>
<td>1820</td>
<td>1742</td>
<td>1911</td>
</tr>
<tr>
<td>Combustion air flow (at rated speed)</td>
<td>m³/min</td>
<td>8.64</td>
<td>8.82</td>
<td>6.42</td>
<td>6.74</td>
</tr>
<tr>
<td>Exhaust gas flow (maximum)</td>
<td>m³/min</td>
<td>19.48</td>
<td>20.15</td>
<td>16.41</td>
<td>17.4</td>
</tr>
<tr>
<td>Exhaust gas mass flow (maximum)</td>
<td>kg/min</td>
<td>10.18</td>
<td>10.37</td>
<td>7.73</td>
<td>8.05</td>
</tr>
<tr>
<td>Exhaust gas temperature in manifold maximum</td>
<td>°C</td>
<td>634</td>
<td>659</td>
<td>657</td>
<td>675</td>
</tr>
<tr>
<td>Boost pressure ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall thermal efficiency (nett)</td>
<td></td>
<td>39.5%</td>
<td>40.1%</td>
<td>40.6%</td>
<td>40.8%</td>
</tr>
<tr>
<td>Typical genset electrical output (0.8 pf 25°C)</td>
<td></td>
<td>113.6</td>
<td>125.0</td>
<td>100.0</td>
<td>110.0</td>
</tr>
<tr>
<td>Assumed alternator efficiency</td>
<td></td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.4%</td>
<td>90.2%</td>
</tr>
</tbody>
</table>

### Energy balance

<table>
<thead>
<tr>
<th>Designation</th>
<th>Units</th>
<th>TAG2 60Hz</th>
<th></th>
<th>TAG2 50Hz</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Prime</td>
<td>Standby</td>
<td>Prime</td>
<td>Standby</td>
</tr>
<tr>
<td>Energy in fuel</td>
<td>kWt</td>
<td>277.5</td>
<td>299.5</td>
<td>236.2</td>
<td>257.5</td>
</tr>
<tr>
<td>Energy to power output (gross)</td>
<td>kWt</td>
<td>109.7</td>
<td>120.1</td>
<td>95.8</td>
<td>105.1</td>
</tr>
<tr>
<td>Energy to cooling fan</td>
<td>kWm</td>
<td>5.0</td>
<td>5.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Energy to power (nett)</td>
<td>kWm</td>
<td>104.2</td>
<td>114.6</td>
<td>91.3</td>
<td>100.6</td>
</tr>
<tr>
<td>Energy to exhaust</td>
<td>kWt</td>
<td>86.3</td>
<td>91.3</td>
<td>70.1</td>
<td>74.8</td>
</tr>
<tr>
<td>Energy to coolant and oil</td>
<td>kWt</td>
<td>50.6</td>
<td>54.9</td>
<td>47.1</td>
<td>51.9</td>
</tr>
<tr>
<td>Energy to charge cooler</td>
<td>kWt</td>
<td>17.0</td>
<td>18.1</td>
<td>10.6</td>
<td>11.9</td>
</tr>
<tr>
<td>Energy to radiation</td>
<td>kWt</td>
<td>14.4</td>
<td>15.6</td>
<td>13.1</td>
<td>14.3</td>
</tr>
</tbody>
</table>
Cooling system

Cooling pack
Overall weight (wet)............... 68.5 kg
Overall face area of matrix ........ 0.43 m²
Width of matrix.................... 629 mm
Height of matrix................... 690 mm
Radiator
Face area................................ 0.3 m²
Number of rows and material...... 38 rows, Aluminium
Matrix density and material......... 10 fins per inch, Aluminium
Width of matrix....................... 438 mm
Height of matrix...................... 690 mm
Maximum top tank temperature..... 108°C
Pressure cap setting (minimum)... 110 kPa
Charge cooler
Face area................................ 0.13 m²
Number of rows and materials...... 9 rows, Aluminium
Matrix density and material......... 7.5 fins per inch, Aluminium
Width of matrix....................... 191 mm
Height of matrix...................... 690 mm
Fan
Diameter............................... 559 mm
Drive ratio........................... 1.25:1
Number of blades.................... 7
Blade material......................... Composite
Type................................... Pusher
Coolant
Total system capacity
With radiator.......................... 17.0 litres
Without radiator....................... 7.0 litres
Coolant pump drive................... Gear
Coolant pump drive ratio............. 2:1
Maximum top tank temperature..... 110°C
Temperature rise across engine (rating dependent)...... 6.6 - 7.0°C
Thermostat operation range........ 82 - 97°C
Recommended coolant: 50% ethylene glycol with a corrosion inhibitor (BS 658:1992 or MOD AL39) and 50% clean fresh water.
Duct allowance

<table>
<thead>
<tr>
<th>°C</th>
<th>kPa</th>
<th>m³/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>0</td>
<td>218</td>
</tr>
<tr>
<td>50</td>
<td>120</td>
<td>184</td>
</tr>
<tr>
<td>46</td>
<td>200</td>
<td>154</td>
</tr>
</tbody>
</table>

Cold start recommendation

<table>
<thead>
<tr>
<th>Minimum required cranking speed over TDC 60 rpm</th>
<th>5 to -10°C</th>
<th>-10 to -20°C</th>
<th>-20 to -25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>15W40</td>
<td>10W40</td>
<td>5W40</td>
</tr>
<tr>
<td>Starter</td>
<td>AZE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td>1 x 950 CCA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cranking current</td>
<td>600 amps</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.

Fuel system
Type of injection.................................. Direct
Fuel injection pump.............................. Common rail
Fuel atomiser...................................... Unit injector / multi-hole
Nozzle opening pressure......................... 160 MPa
Maximum allowable fuel temperature............ 80°C
Fuel lift pump delivery......................... 200 l/h
Fuel lift pump
Maximum flow through customer filter........... 130 litres/hour
Maximum fuel supply restriction at lift pump... 40 kPa
Maximum fuel return restriction @ low idle.... 50 kPa
Maximum fuel return flow......................... 6.6 m³/min
Maximum suction head............................ 17 kPa (1.7 m)
Maximum static pressure head..................... 10 kPa (1.0 m)
Governor type.................................... Control by ECM
Speed control to................................. ISO 8528, G3
Fuel specification
USA Fed Off Highway EPA2D 89.330-96
Density (kg/l @ 15°C)............................. 0.8373
Viscosity (mm²/s @ 40°C).......................... 0.0386
Sulphur content.................................. 0.02
Cetane number.................................... 53.8

Fuel consumption litres/hour

<table>
<thead>
<tr>
<th>60Hz Power Rating</th>
<th>110%</th>
<th>100%</th>
<th>75%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29.85</td>
<td>27.65</td>
<td>22.24</td>
<td>15.91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50Hz Power Rating</th>
<th>110%</th>
<th>100%</th>
<th>75%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25.65</td>
<td>23.54</td>
<td>20.36</td>
<td>14.63</td>
</tr>
</tbody>
</table>
Electrical system

Alternator type .......................................................... 8SI
Alternator voltage ....................................................... 12 volts
Alternator output ....................................................... 65 amps
Starter motor type ...................................................... AZE
Starter motor voltage .................................................. 12 volts
Starter motor power .................................................... 3.2 kW
Number of teeth on flywheel ........................................ 126
Number of teeth on starter pinion .................................. 10
Minimum cranking speed ............................................. 130 rpm
Starter solenoid maximum pull-in current @ 0°C ............ TBA
Starter solenoid maximum hold-in current @ 0°C .......... TBA

Exhaust system

Maximum back pressure ............................................. 15 kPa
Exhaust outlet size ..................................................... 64 mm

Induction system

Maximum air intake restriction
Clean filter ............................................................. 3 kPa
Dirty filter .............................................................. 5 kPa
Air filter type ........................................................ .2 stage cyclonic/paper element

Load acceptance

<p>| Initial load application when engine reaches rated speed, 15 seconds (maximum) after engine starts to crank |</p>
<table>
<thead>
<tr>
<th>Prime power %</th>
<th>Transient frequency deviation %</th>
<th>Frequency recovery time seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
<td>7.1</td>
<td>1.02</td>
</tr>
</tbody>
</table>

- The above complies with the requirements of classifications 3 and 4 of ISO 8528-12 and G2 operating limits stated in ISO 8528-5
- The above figures were obtained under test conditions as follows:

Minimum engine block temperature .................................... 45°C
Alternator efficiency .................................................. 90%
Ambient temperature ................................................... 15°C
Governing mode ............................................................... Isochronous
Mechanical governing .................................................. 4 % ± 1 %
Alternator inertia ......................................................... 8 kgm²
Flywheel inertia ......................................................... 14 kgm²
Under frequency roll off point (UFRO) set to ......................... Hz below rated UFRO rate set to ................................... 2% voltage / 1% frequency
LAM on/off ................................................................. Off

Load acceptance

72 7.1 1.02

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

Mountings

Maximum static bending moment at rear face of block ........... 791 N
Flywheel housing ......................................................... SAE3

Lubrication system

Lubricating oil capacity total system ................................ 8.4 litres
Maximum sump capacity ................................................ 6.9 litres
Minimum sump capacity ................................................ 5.6 litres
Maximum engine operating angles
Front up, front down, right side or left side .................... 24°

Oil temperature (maximum intermittent operation) ............. 125°C
Oil temperature (maximum intermittent operation) .......... 125°C
Oil consumption at full load as a % of fuel consumption ........ 0.10%

Recommended SAE viscosity

A single or multigrade oil must be used which conforms to API-CC/SE or CCMC-D1, see illustration below:

Recommended oil specification ........................................... CH4

Viscosity grade (Perkins)

15W-40
10W-40
10W-30
5W-40
5W-30
0W-40
0W-30

-40 -30 -20 -10 0 10 20 30 40 50 60

Ambient Temperature Deg °C

Viscosity grade (Perkins)

15W-40
10W-40
10W-30
5W-40
5W-30
0W-40
0W-30

-40 -30 -20 -10 0 10 20 30 40 50 60

Ambient Temperature Deg °C