

# 1206A-E70TTAG1

# 1200

204.9 kWm (Gross) @ 1500 rpm  
238.6 kWm (Gross) @ 1800 rpm

Series

## Electropak

### Basic technical data

|  |                          |
|--|--------------------------|
| Number of cylinders  | 6                        |
| Cylinder arrangement                                       | Vertical, inline         |
| Cycle  | 4 stroke DI              |
| Induction system   | Twin turbo charge cooled |
| Compression ratio  | 15.8:1                   |
| Bore   | 105 mm                   |
| Stroke   | 135 mm                   |
| Displacement   | 7.01 litres              |
| Direction of rotation when viewed from flywheel            | Anticlockwise            |
| Firing order   | 1, 5, 3, 6, 2, 4         |
| Estimated total weight including radiator support brackets |                          |
| Dry  | 797 kg                   |
| Wet  | 832 kg                   |

### Overall dimensions of Electropak

|  |         |
|--|---------|
| Height, including radiator support brackets      | 1426 mm |
| Length, front of radiator to rear of air cleaner | 1878 mm |
| Width  | 949 mm  |

### Moments of inertia (MK<sup>2</sup>)

|                              |                         |
|------------------------------|-------------------------|
| Engine rotational components | 0.4269 kgm <sup>2</sup> |
| Flywheel                     | 1.26 kgm <sup>2</sup>   |

### Centre of gravity

|                            |        |
|----------------------------|--------|
| Forward from rear of block | 476 mm |
| Above centre line of block | 199 mm |

### Performance

|   |                   |
|---|-------------------|
| Cyclic irregularity for engine standby power  |                   |
| At 110%   | 0.11              |
| Ratings   |                   |
| Steady state speed stability at constant load   | ± 0.25 %          |
| Average sound pressure level for bare engine (excluding inlet and exhaust noise) at 1 metre | 113dB(A) @1500rpm |
| Average sound pressure level for bare engine (excluding inlet and exhaust noise) at 1 metre | 117dB(A) @1800rpm |

#### Notes:

- all data based on operation to ISO 3046/1:2002 standard reference conditions.
- for engines operating in ambient conditions other than the standard reference conditions stated below, a suitable derate must be applied
- derate tables for increased ambient temperature and/or altitude are available, please contact Perkins Applications Department.

### Test conditions

|   |          |
|---|----------|
| Air temperature                                       | 25°C     |
| Barometric pressure                                   | 101 kPa  |
| Relative humidity                                     | 10.7 %   |
| Air inlet restriction at maximum power                | 5 kPa    |
| Exhaust back pressure at maximum power (turbo outlet) |          |
| 1500 rpm  | 16.5 kPa |
| 1800 rpm  | 25.1 kPa |
| Fuel temperature (inlet pump)                         | 40 °C    |
| All ratings certified to within                       | ± 3%     |

## General installation

| Designation   | Units               | Engine speed @ 1500 rpm |                | Engine speed @ 1800 rpm |                |
|---|---------------------|-------------------------|----------------|-------------------------|----------------|
|   |                     | Prime (50Hz)            | Standby (50Hz) | Prime (60Hz)            | Standby (60Hz) |
| Gross engine power                                    | kWb                 | 186.3                   | 204.9          | 216.8                   | 238.6          |
| Gross BMEP  | kPa                 | 2126.9                  | 2338.8         | 2062.2                  | 2269.7         |
| Mean piston speed                                     | m/s                 | 6.75                    |                | 8.1                     |                |
| ElectropaK nett engine power                          | kW                  | 177.3                   | 195.9          | 201.8                   | 223.6          |
| Engine coolant flow against 35 kPa restriction        | litres/min          | 249                     |                | 300                     |                |
| Combustion air flow                                   | kg/h                | 781.4                   | 838.9          | 975.4                   | 1024.0         |
| Combustion air flow                                   | m <sup>3</sup> /min | 10.8                    | 11.6           | 13.6                    | 14.3           |
| Exhaust gas flow (maximum) at atmospheric pressure    | m <sup>3</sup> /min | 24.53                   | 26.88          | 28.65                   | 31.56          |
| Exhaust gas temperature (maximum) TC out              | °C                  | 445                     | 482            | 443                     | 501            |
| Overall thermal efficiency                            | %                   | 40.8                    | 40.4           | 39.4                    | 38.4           |
| Typical Generator sets electrical output (0.8pf 25°C) | kWe                 | 160                     | 176            | 180                     | 200            |
|   | kVA                 | 200                     | 225            | 225                     | 250            |
| Assumed alternator efficiency                         | %                   | 92                      |                | 89.5                    |                |

## Energy balance

| Designation  | Units | Engine speed @ 1500 rpm |                | Engine speed @ 1800 rpm |                |
|--|-------|-------------------------|----------------|-------------------------|----------------|
|  |       | Prime (50Hz)            | Standby (50Hz) | Prime (60Hz)            | Standby (60Hz) |
| Energy in fuel   | kWt   | 456.3                   | 506.6          | 550.8                   | 621.1          |
| Energy in power output (gross)   | kWb   | 186.3                   | 204.9          | 216.8                   | 238.6          |
| Energy to cooling fan  | kWm   | 9                       | 9              | 15                      | 15             |
| Energy in power output (nett)  | kWm   | 177.3                   | 195.9          | 201.8                   | 223.6          |
| Energy to exhaust<br>(Not to be utilised for heat recovery, does include energy input from combustion air) | kWt   | 177.9                   | 201.2          | 223.5                   | 254.3          |
| Energy to ACC coolant  | kWt   | 32.1                    | 35.4           | 42.7                    | 46.6           |
| Energy to coolant radiator   | kWt   | 101.5                   | 108.6          | 121.1                   | 135.3          |
| Energy to radiation (atmosphere)<br>(Includes heat rejected to fuel (via return to tank flow))             | kWt   | 22.8                    | 25.3           | 27.5                    | 31             |

## Cooling system

### Total coolant capacity

|  |             |
|--|-------------|
| ElectropaK (with radiator) .....                     | 25 litres   |
| ElectropaK (without radiator) .....                  | 13.7 litres |
| Maximum top tank temperature .....                   | 112°C       |
| Maximum static pressure head on pump .....           | 70 kPa      |
| Temperature rise across engine .....                 | 8 °C        |
| Maximum permissible external system resistance ..... | 35 kPa      |
| Thermostat operation range .....                     | 82-93°C     |

### Radiator

|                                   |                      |
|-----------------------------------|----------------------|
| Radiator face area .....          | 0.444 m <sup>2</sup> |
| Material and number of rows ..... | Aluminium 57         |
| Material and fins per inch .....  | 10                   |
| Width of matrix .....             | 550 mm               |
| Height of matrix .....            | 800 mm               |
| Pressure cap setting .....        | 100 kPa              |

### Fan

|                              |                          |
|------------------------------|--------------------------|
| Type .....                   | Pusher Fan               |
| Diameter .....               | 724 mm                   |
| Number of blades .....       | 7                        |
| Material .....               | Heramid & Steel          |
| Drive ratio .....            | 1.33:1                   |
| Airflow at rated speed ..... | 4.42 m <sup>3</sup> /min |

### Recommended coolant

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.

### Duct allowance

| Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow |                      |                     |                     |
|--|----------------------|---------------------|---------------------|
| Power  | Ambient clearance °C | Duct allowance (Pa) | m <sup>3</sup> /sec |
| 200 kVA (50Hz)   | 55                   | 200                 | 4.42                |
| 200 kWe (60Hz)   | 50                   | 200                 | 5.62                |

## Fuel system

|   |                           |
|---|---------------------------|
| Type of injection .....                                 | Common Rail               |
| Fuel injection pump .....                               | Denso HP4                 |
| Fuel injector .....                                     | Denso G3S                 |
| Nozzle opening pressure .....                           | 5 MPa                     |
| Maximum particle size .....                             | 4 Microns                 |
| Fuel lift pump type .....                               | Brushless Electric        |
| Flow/hour .....   | 3.5 Litres/hour @ 200 kPa |
| Maximum low pressure system pressure .....              | 400 kPa                   |
| Pressure measured at ELP inlet .....                    | -20 to +15 kPa            |
| Maximum fuel temperature at fuel regulator return ..... | 75 °C                     |
| Maximum fuel filter service interval .....              | 500 hours                 |
| Governor type .....                                     | Electronic ECM            |
| Speed control conforms to .....                         | N/A                       |

## Fuel specification

USA Fed Off Highway .....

Europe Off Highway .....

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

## Fuel consumption

| Power rating % | 186.3kW/1500 rpm Prime |           |
|----------------|------------------------|-----------|
|                | g/kWh                  | litres/hr |
| 25             | 239.2                  | 13.2      |
| 50             | 209.6                  | 23.3      |
| 75             | 204.9                  | 34.1      |
| 100            | 204.3                  | 45.3      |
| 110            | 206.2                  | 50.3      |

| Power rating % | 216.6kW/1800 rpm Prime |           |
|----------------|------------------------|-----------|
|                | g/kWh                  | litres/hr |
| 25             | 262.4                  | 17        |
| 50             | 217.1                  | 28.1      |
| 75             | 208.9                  | 40.5      |
| 100            | 211.5                  | 54.6      |
| 110            | 217.1                  | 61.7      |

## Cold start recommendations

### Minimum battery cold cranking amps

| Air temperature/oil viscosity limit | With glow plugs 12V AZF and P5 |      | Without glow plugs 12V AZF |      |
|-------------------------------------|--------------------------------|------|----------------------------|------|
|                                     | 15W40                          | 950  | 15W40                      | 950  |
| -5°C                                | 15W40                          | 950  | 15W40                      | 950  |
| -10°C                               | 15W40                          | 950  | 15W40                      | 950  |
| -15°C                               | 10W40                          | 1650 | 15W40                      | (1)  |
| -20°C                               | 10W40                          | 1650 | 10W40                      | (1)  |
| -25°C                               | 5W30                           | 1900 | 5W30                       | (1)  |
| Maximum battery CCA                 |                                | 2400 |                            | 2400 |

**Note:** Glow plugs needed below -10°C.

**Note:** For cable sizes see Applications and Installation Manual.

1. Must use glow plugs.

## Lubrication system

### Total system capacity

|   |           |
|---|-----------|
| Maximum sump capacity .....                           | 16 litres |
| Minimum sump capacity .....                           | 13 litres |
| Maximum oil temperature (continuous operation).....   | 125°C     |
| Maximum oil temperature (intermittent operation)..... | 135°C     |

### Lubricating oil pressure

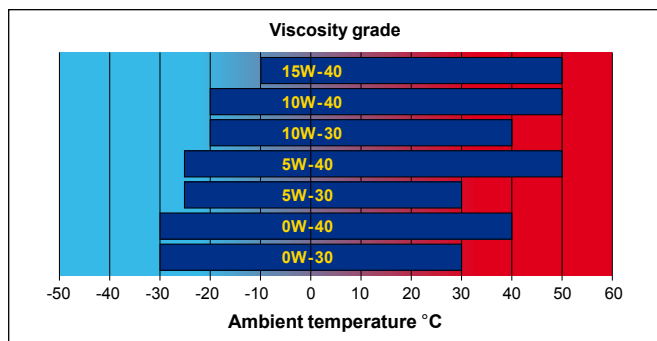
|   |               |
|---|---------------|
| Relief valve opens.....                       | 545-595 kPa   |
| Minimum oil pressure.....                     | 300 kPa       |
| At maximum no-load speed .....                | 700 kPa       |
| Oil flow at rated speed.....                  | 70 litres/min |
| Oil consumption at full load rated speed..... | 0.08% of fuel |

### Engine operating angles

Front up, front down, right side or left side..... 30°

## Recommended SAE viscosity

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



## Induction system

### Maximum air intake restriction of engine

|                   |       |
|-------------------|-------|
| Clean filter..... | 3 kPa |
| Dirty filter..... | 8 kPa |

## Exhaust system

|  |         |
|--|---------|
| Exhaust outlet size.....                       | 76.3 mm |
| Maximum back pressure (exhaust elbow out)..... | 7 kPa   |

## Electrical system

|  |                   |
|--|-------------------|
| Alternator.....                        | 100 amps/12 volts |
| Starter motor.....                     | 5 kW/12 volts     |
| Number of teeth on flywheel.....       | 134               |
| Number of teeth on starter pinion..... | 13                |
| Engine stop method.....                | ECM               |

## Engine mounting

Maximum static bending moment at rear face of block..... 1130 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 after engine starts to crank) |         |             |       |
|---|---------|-------------|-------|
| Description   | Units   | Prime power |       |
|   |         | 60 Hz       | 50 Hz |
| Prime power   | %       | 67          | 75    |
| Load  | kWm     | 138         | 131   |
| Frequency recovery  | Seconds | 0.7         | 0.95  |

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

|  |                       |
|--|-----------------------|
| Engine block temperature.....                    | 90°C                  |
| Ambient temperature.....                         | 25°C                  |
| Governing mode.....                              | 0 %                   |
| Alternator inertia.....                          | 2.93 kgm <sup>2</sup> |
| Under frequency roll off (UFRO) point set to ... | 20 %vlt/10 %Frequency |
| LAM on/off.....                                  | off                   |

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

**Note:** Derate curves for altitude and humidity can be found in the relevant Derate Chart.

**Note:** The latest versions of general arrangement drawings should be requested from the Perkins Applications Department.