

# Technical Data

## 400 Series

## 403C-11G

Electropak

11,4 kW @ 1800 rev/min

### Basic technical data

Number of cylinders . . . . . 3  
 Cylinder arrangement . . . . . Vertical in-line  
 Cycle . . . . . four stroke  
 Induction system . . . . . Naturally aspirated  
 Compression ratio . . . . . 23:1  
 Bore . . . . . 77 mm (3.03 in)  
 Stroke . . . . . 81 mm (3.19 in)  
 Cubic capacity . . . . . 1.131 litres (69 in<sup>3</sup>)  
 Direction of rotation . . . . . clockwise viewed from front  
 Firing order . . . . . 1, 2, 3  
 Estimated total weight (dry) . . . . . 129,2 kg (284.8 lb)  
 Estimated total weight (wet) . . . . . TBA kg ( lb)

### Overall dimensions

-height . . . . . 700 mm (27.6 in)  
 -length . . . . . 776 mm (30.6 in)  
 -width . . . . . 449 mm (17.7 in)

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

-engine . . . . . TBA kg m<sup>2</sup>  
 -flywheel . . . . . 1,51 kg m<sup>2</sup>

### Centre of gravity

-forward from rear of block . . . . . TBA mm ( in)  
 -above centre line of block . . . . . TBA mm ( in)  
 -offset to RHS of centre line . . . . . TBA mm ( in)

### Performance

**Note:** All data based on operation to ISO 14396 standard reference conditions.

Speed variation at constant load . . . . . ± 0,5%  
 Cyclic irregularity  
 -at 110% stand-by power . . . . . TBA

### Test conditions

-air temperature . . . . . 25 °C (77 °F)  
 -barometric pressure . . . . . 100 kPa (29.61 in hg)

### Sound level

Average sound pressure level for bare engine  
 (without inlet and exhaust) at 1 metre . . . . . 78,5 dB(A)  
 -all ratings certified to within . . . . . ± 5%

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.

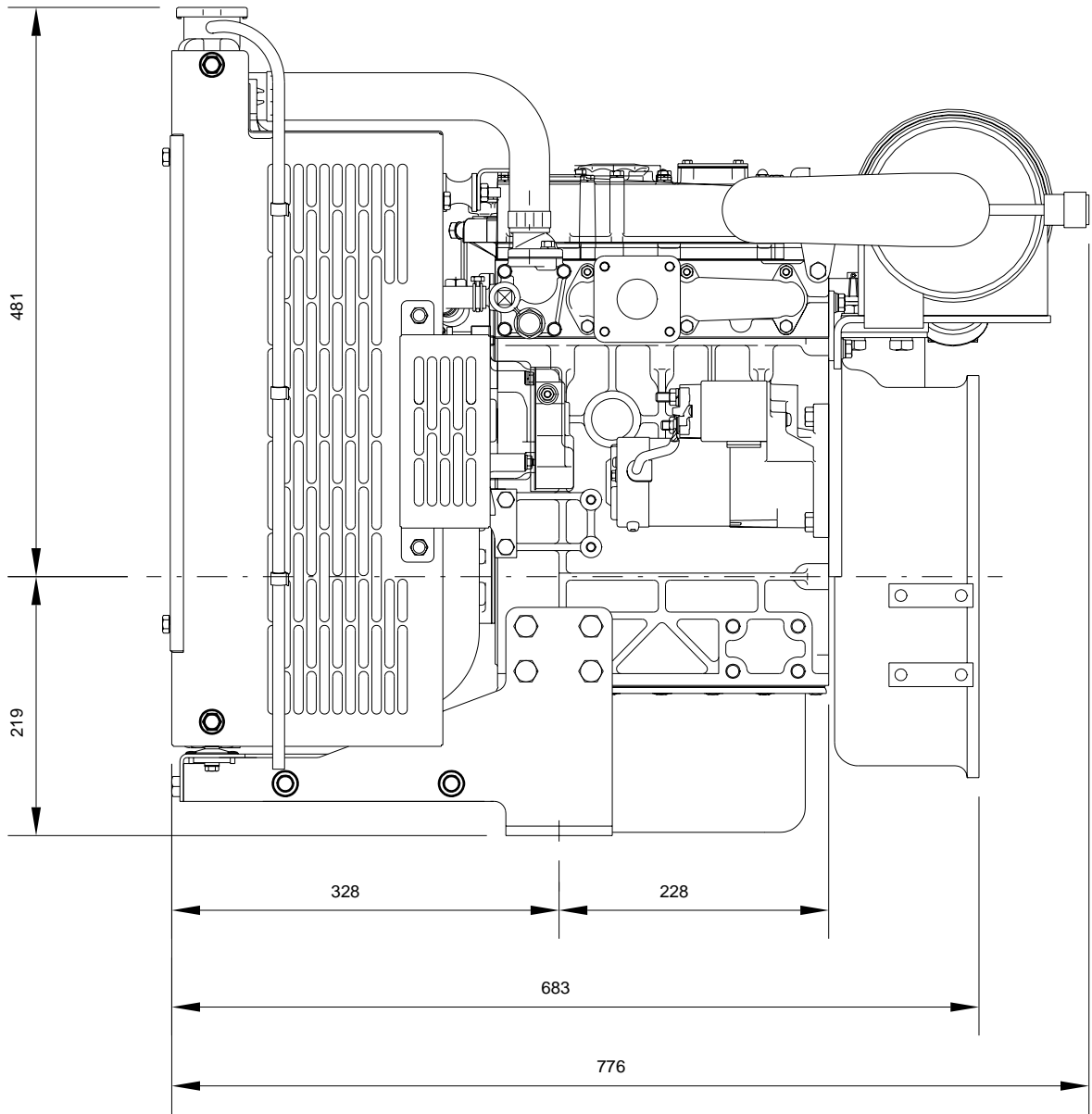
For details of load acceptance values, contact the applications department at Perkins Engines Company Limited, Stafford.

### General installation

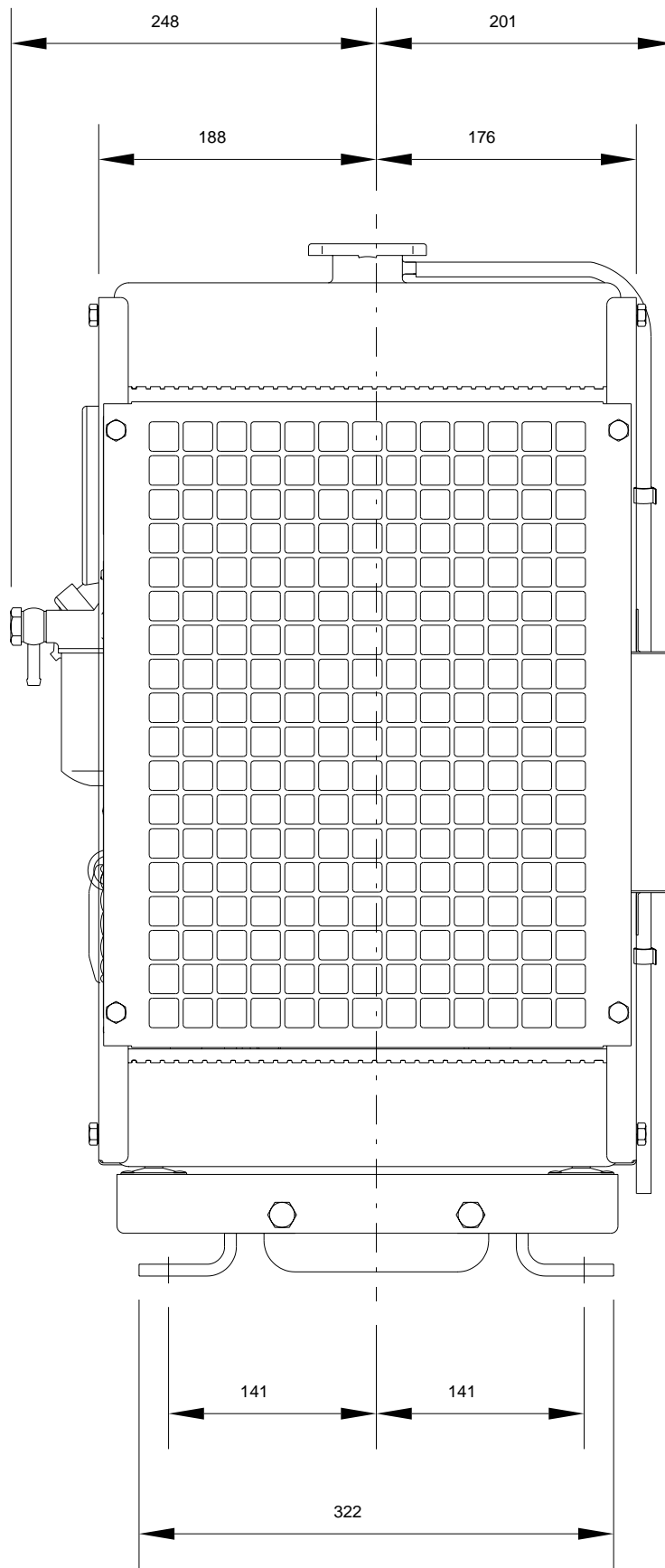
| Designation                                     | Units                                      | Type of operation and application |             |
|---|--|-----------------------------------|-------------|
|   |  | Prime                             | Stand-by    |
|   |  | 60Hz                              | 60Hz        |
| Gross engine power                              | kW (bhp)                                   | 10,7 (14.3)                       | 11,8 (15.8) |
| Brake mean effective pressure                   | kPa (lbf/in <sup>2</sup> )                 | TBA                               | TBA         |
| Mean piston speed                               | m/s (ft/s)                                 | 4.9 (16.1)                        |             |
| Electropak net engine power                     | kW (bhp)                                   | 10,3 (13.9)                       | 11,4 (15.4) |
| Engine coolant flow (Water Pump Ratio 1.285:1)  | l/min (UK gal/min)                         | 32,5 (7.1)                        |             |
| Combustion air flow                             | m <sup>3</sup> /min (ft <sup>3</sup> /min) | 0,9 (31.3)                        |             |
| Exhaust gas flow (max)                          | m <sup>3</sup> /min (ft <sup>3</sup> /min) | 2.21 (78.0)                       | 2,4 (86.4)  |
| Exhaust gas temperature (max)                   | °C (°F)                                    | 437 (818)                         | 515 (959)   |
| Cooling fan air flow Zero Duct Allowance        | m <sup>3</sup> /min (ft <sup>3</sup> /min) | 46.8 (1653)                       |             |
| Cooling fan air flow (0.125 kPa Duct Allowance) | m <sup>3</sup> /min (ft <sup>3</sup> /min) | 35.4 (1250)                       |             |
| <b>Energy balance</b>                           |  |                                   |             |
| Energy in fuel (heat of combustion)             | kW (Btu/min)                               | 31,8 (1809)                       | 37,8 (2149) |
| Gross heat to power                             | kW (Btu/min)                               | 10,1 (576)                        | 11,8 (671)  |
| Energy to coolant and lubricating oil           | kW (Btu/min)                               | 10,2 (580)                        | 12,1 (688)  |
| Energy to exhaust                               | kW (Btu/min)                               | 8,9 (507)                         | 10,8 (614)  |
| Heat to radiation                               | kW (Btu/min)                               | 2,6 (146)                         | 3,1 (176)   |

**Caution:** The airflows shown in this table will provide acceptable cooling for an open power unit operating in ambient temperatures of up to 53 °C (127 °F) or 46 °C (115 °F) if a canopy is fitted with an air flow restriction of up to 0.125 kPa. If the power unit is to be enclosed totally, a cooling test should be done to check that the engine cooling is acceptable. If there is insufficient cooling, contact Perkins Technical Service Department.

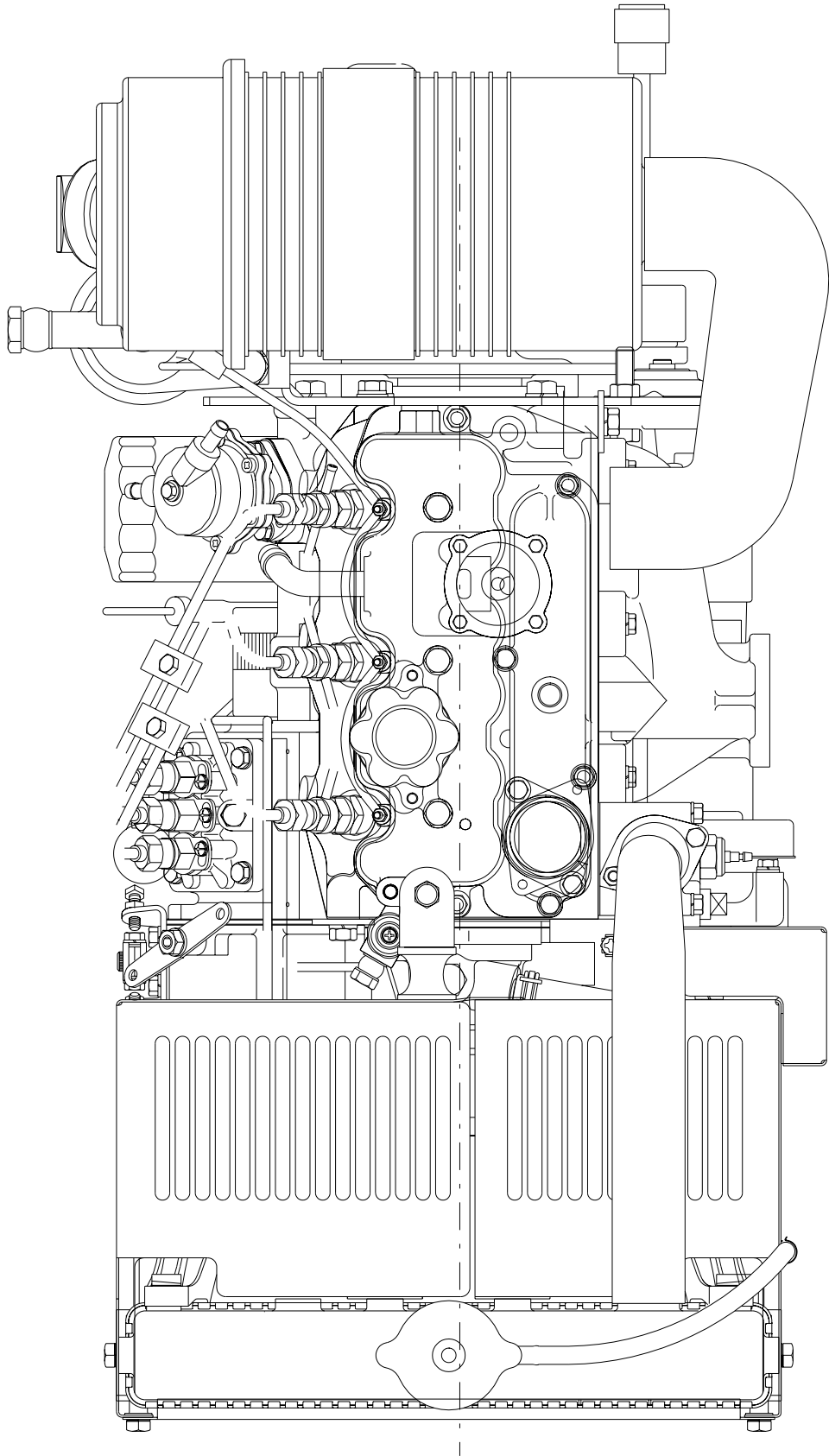
403C-11G ElectropaK, left side view



403C-11G ElectropaK, front view



403C-11G ElectropaK, plan view



## Cooling system

### Radiator

-face area .....0,147 m<sup>2</sup> (1-58 ft<sup>2</sup>)  
 -rows and materials ..... 2 rows, Aluminium  
 -matrix density and material ..... 14,5 FPI, Aluminium  
 -width of matrix ..... 334 mm (13-1 in)  
 -height of matrix ..... 440 mm (17-3 in)  
 -pressure cap setting ..... 90 kPa (13.05 lb/in<sup>2</sup>)  
 Estimated cooling air flow reserve .....0,125 kPa

### Fan

-diameter ..... 320 mm (12.6 in)  
 -drive ratio .....1,285:1  
 -number of blades ..... 7  
 -material ..... Plastic  
 -type ..... Pusher

### Coolant

Total system capacity  
 -with radiator ..... 5,2 litres (9.2 UK pints)  
 -without radiator ..... 1,9 litres (3.3 UK pints)  
 -draindown capacity ..... TBA litres ( UK pints)  
 Maximum top tank temperature ..... 110 °C (230 °F)  
 Minimum temperature to engine ..... TBA °C ( °F)  
 Temperature rise across engine ..... TBA °C ( °F)  
 Max permissible external system resistance ..... TBA kPa ( lbf/in<sup>2</sup>)  
 Thermostat operation range ..... 75 - 87°C (167 - 189 °F)  
 Recommended coolant:  
 50% ethylene glycol with a corrosion inhibitor (BS 6580 :1992 or ASTM D3306-89 or AS2108) and 50% clean fresh water.

## Electrical System

-alternator ..... 15 amps, 12 V  
 -starter motor ..... 1,1 kW, 12 V

### Cold start recommendations

Minimum cranking speed ..... TBA rev/min

| Minimum starting temperature |    | Grade of engine lubricating oil | Battery specifications |                            |                            |                       |
|------------------------------|----|---------------------------------|------------------------|----------------------------|----------------------------|-----------------------|
|                              |    |                                 | BS3911 Cold start amps | SAEJ537 Cold cranking amps | Number of batteries needed | Commercial ref number |
| 0                            | 32 | 20W                             | 340                    | 540                        | 1                          | 069                   |
| -15                          | 5  | 10W                             | 340                    | 540                        | 1                          | 069                   |
| -20                          | -4 | 5W                              | 420                    | 590                        | 1                          | 072                   |

## Exhaust system

Maximum back pressure ..... 10,2 kPa (3.012 in Hg)  
 Exhaust outlet size  
 -horizontal ..... 34 mm (1.4 in)  
 -vertical ..... 40 mm (1.6 in)

## Fuel system

Type of injection ..... Indirect injection  
 Fuel injection pump ..... Cassette type  
 Fuel injector ..... Pintle nozzle  
 Nozzle opening pressure ..... 14-7 MPa (2133 lbf/in<sup>2</sup>)

### Fuel lift pump

-flow/hour ..... 63 litres/hr (16-6 UK gals/hr)  
 -pressure ..... 10 kPa (1-45 lbf/in<sup>2</sup>)  
 Maximum suction head ..... 0,8 m (2.6 ft)  
 Maximum static pressure head ..... 3,0 m (9.8 ft)  
 Governor type ..... Mechanical

### Fuel specification

| Fuel specification                     |                    |
|--|--------------------|
| Density (kg/l @ 15 °C)                 | 0,835 - 0,855      |
| Viscosity (mm <sup>2</sup> /s @ 40 °C) | 2,0 - 4,5          |
| Sulphur Content                        | 0.2% mass, maximum |
| Cetane Number                          | 45 minimum         |

### Fuel consumption

| Power rating      |           |           |           |
|-------------------|-----------|-----------|-----------|
| g/kWh (litres/hr) |           |           |           |
| 110%              | 100%      | 75%       | 50%       |
| 268 (3-8)         | 248 (3-1) | 257 (2-4) | 280 (1-8) |

**Induction system**

**Maximum air intake restriction**

- clean filter ... ..3,0 kPa (0.44 lbf/in<sup>2</sup>)
- dirty filter ... ..6,4 kPa (0.93 lbf/in<sup>2</sup>)
- air filter type ... ..Dry element type

**Lubrication system**

**Lubricating oil capacity**

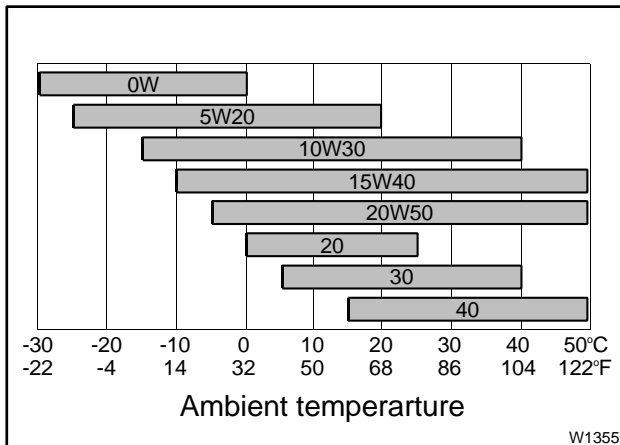
- Total system... ..4,9 litres (8.6 UK pints)
- Minimum... ..3,4 litres (6.0 UK pints)
- Maximum engine operating angles
- front up, front down, right side or left side... ..35° continuous

**Lubricating oil pressure**

- relief valve opens ... ..304 - 500 kPa (44.1 - 72.5 lbf/in<sup>2</sup>)
- at maximum no-load speed. ....TBA
- Normal oil temperature. ....125 °C (257 °F)

**Recommended SAE viscosity**

A single or multigrade oil must be used which conforms API-CH-4 or ACEA E5.



**Maximum static bending moment**

at rear face of block... ..TBA Nm ( lb ft)

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