

# Technical Data

## 400 Series

## 403C-15G

### Electropak

**22,9 kW @ 3000 rev/min**

#### Basic technical data

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	Four stroke
Induction system	Indirect injection
Compression ratio	22.5 : 1
Bore	84 mm (3.3 in)
Stroke	90 mm (3.5 in)
Cubic capacity	1,496 litres (91 in <sup>3</sup> )
Direction of rotation	Clockwise viewed from front
Firing order	1, 2, 3
Estimated total weight (dry)	175 kg (386 lb)
Estimated total weight (wet)	TBA kg (TBA lb)
<b>Overall dimensions</b>	
-height	791 mm (31.1 in)
-length	820 mm (32.3 in)
-width	476 mm (18.7 in)
<b>Moments of inertia (GD<sup>2</sup>)</b>	
-engine	TBA kg m <sup>2</sup>
-flywheel	0,63 kg m <sup>2</sup>
<b>Centre of gravity</b>	
-forward from rear of block	TBA mm (TBA in)
-above centre line of block	TBA mm (TBA in)
-offset to Rhs of centre line	TBA mm (TBA 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 ...84.3 dbA  
 -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.

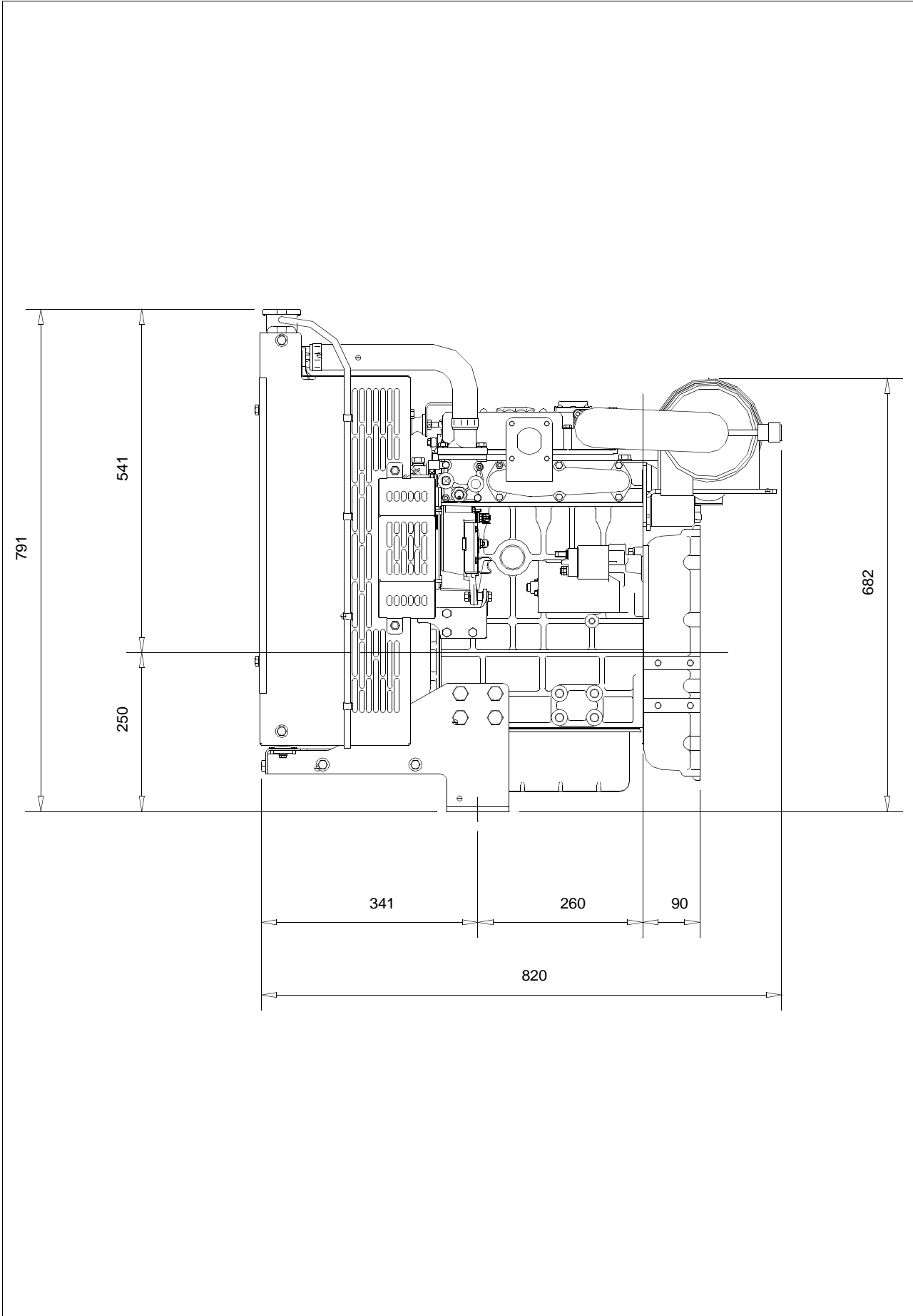
TBA% of the prime power rating can be applied 10 seconds after the starter motor is energised. The remaining TBA% can be applied 15 seconds after start if the ambient temperature is not less than 15 °C (59 °F). If it is less than 15 °C (59 °F), an immersion heater is recommended. For additional information, contact Perkins Technical Service Department.

#### General installation

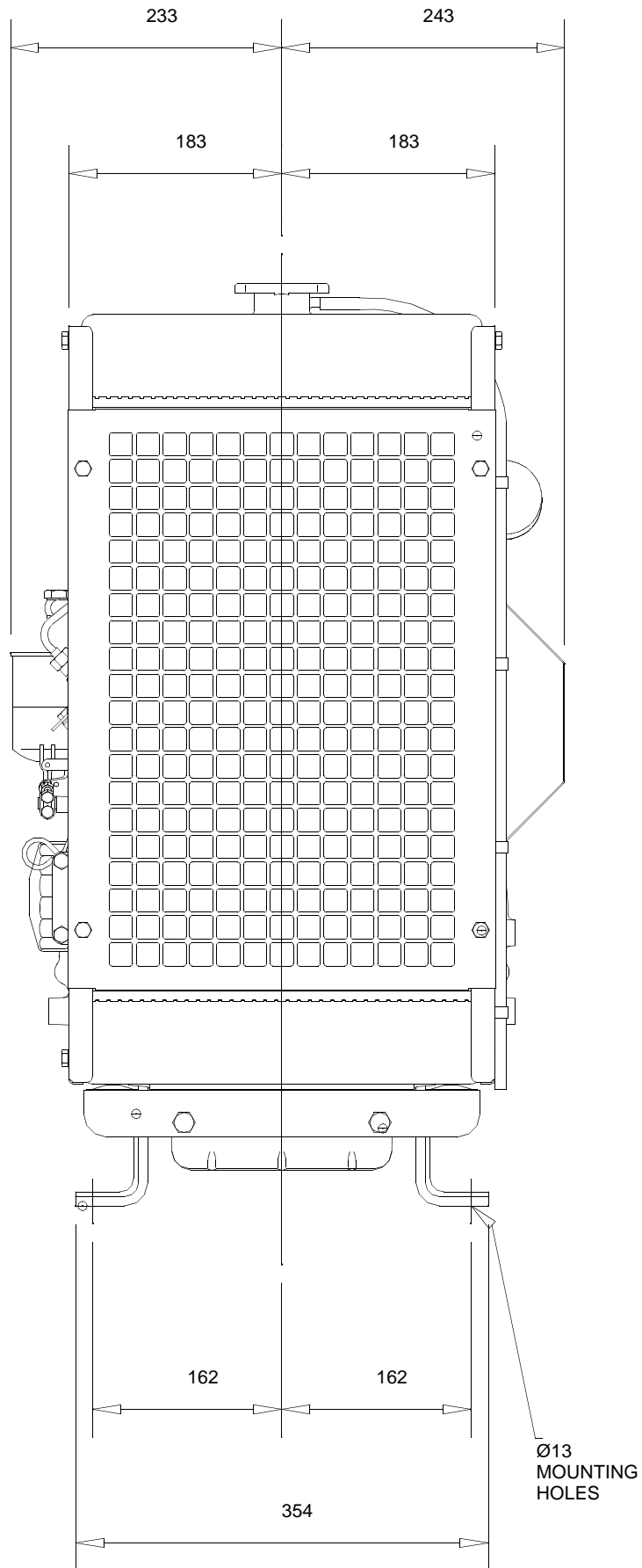
Designation	Units	Type of operation and application	
		Prime	Stand-by
		60Hz	60Hz
Gross engine power (to BSAU141A)	kW (bhp)	21,7 (29.1)	23,9 (32.1)
Brake mean effective pressure	kPa (lbf/in <sup>2</sup> )	575,1 (83.4)	639 (92.7)
Mean Piston speed	m/s (ft/s)	9 (29.5)	9 (29.5)
Electropak net engine power	kW (bhp)	20,7 (27.8)	22,9 (31.0)
Engine coolant flow (coolant pump ratio 1.5:1)	l/min (UK gal/min)	72,3 (15.9)	72,3 (15.9)
Combustion air flow	m <sup>3</sup> /min (ft <sup>3</sup> /min)	2 (70.6)	2 (70.6)
Exhaust gas flow (max)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	5,52 (195)	5,93 (209)
Exhaust gas temperature (max)	°C (°F)	515 (959)	575 (1067)
Cooling fan air flow (zero duct allowance)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	73,8 (2606)	73,8 (2606)
Cooling fan air flow (0,125 kPa duct allowance)	m <sup>3</sup> /min (ft <sup>3</sup> /min)	69 (2436)	69 (2436)
<b>Energy balance</b>			
Energy in fuel (heat of combustion)	kW (Btu/min)	66,9 (3807)	74,6 (4244)
Gross heat to power	kW (Btu/min)	21,7 (1235)	23,9 (1360)
Energy to coolant and lubricating oil	kW (Btu/min)	21,4 (1218)	23,9 (1358)
Energy to exhaust	kW (Btu/min)	17,7 (1007)	19,9 (1132)
Heat to radiation	kW (Btu/min)	6,3 (358)	6,9 (395)

**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 (46 °C if a canopy fitted). 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.

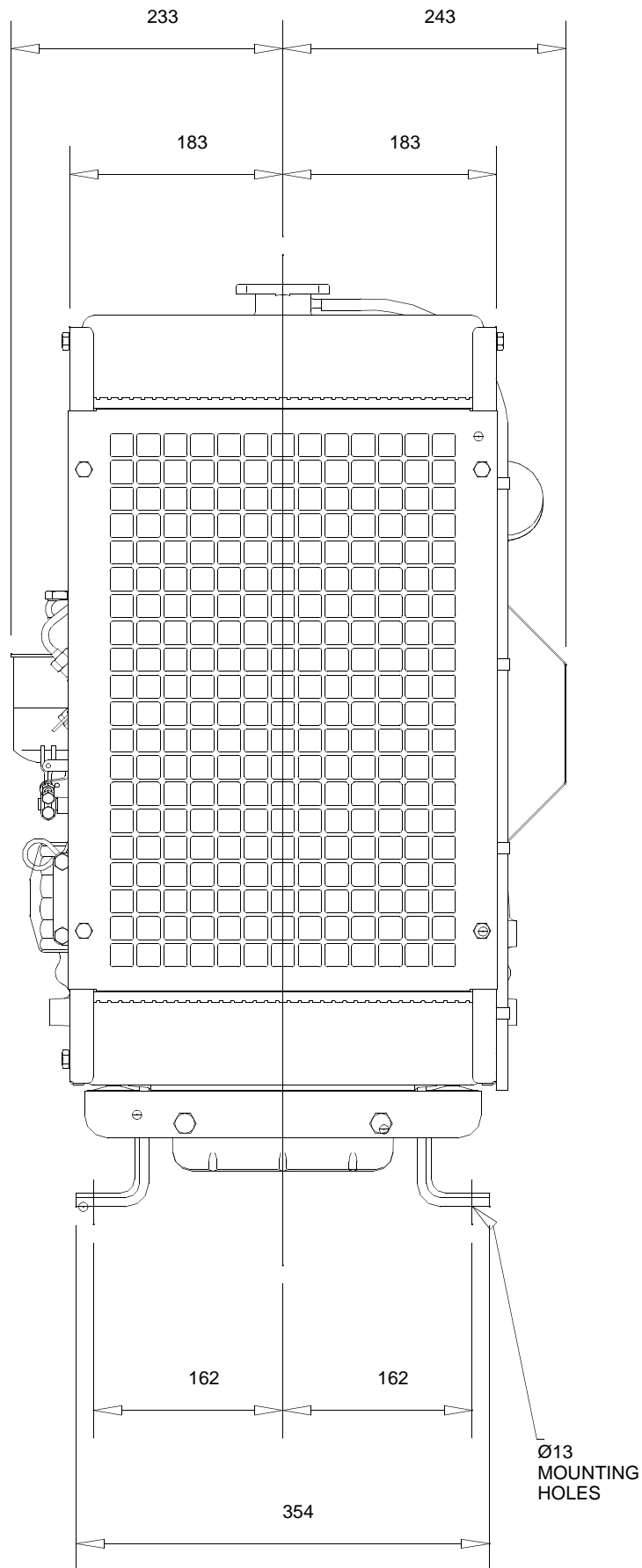
403C-15G Electropak, left side view



403-15G ElectropaK, front view



403-15G ElectropaK, front view



**Cooling system**

**Radiator**

- face area ..... 0,167 m<sup>2</sup> (1.79 ft<sup>2</sup>)
- rows and materials..... 2 rows, Aluminium
- matrix density and material ..... 14.5 fins per inch, Aluminium
- width of matrix..... 334,2 mm (13.2 in)
- height of matrix ..... 500 mm (19.7 in)
- pressure cap setting ..... 90 kPa (13.05 lbf/in<sup>2</sup>)
- Estimated cooling air flow reserve ..... 0,125 kPa

**Fan**

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

**Coolant**

- Total system capacity
- with radiator ..... 5,98 litres (10.5 UK pints)
- without radiator ..... 2,6 litres (4.6 UK pints)
- draindown capacity ..... TBA litres (TBA UK pints)
- Maximum top tank temperature ..... 110 °C (230 °F)
- Minimum temperature to engine ..... TBA °C (TBA °F)
- Temperature rise across engine ..... TBA °C (TBA °F)
- Max permissible external system resistance TBA kPa (TBA lbf/in<sup>2</sup>)
- Thermostat operation range. .... 82 - 95 °C (180 - 203 °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. .... 55 A, 12 V
- starter motor ..... 2 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	Perkins Type
°C	°F					
0	32	20W	420	590	1	072
-15	5	10W	420	590	1	072
-20	-4	5W	540	740	1	647

**Exhaust system**

- Maximum back pressure ..... 10,2 kPa (3.012 in Hg)
- Exhaust outlet size..... 42 mm (1.65 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 m (9.84 ft)

**Governor type** ..... Mechanical

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

**Specific Fuel consumption g/kWh (litres/hr)**

Power rating %			
110	100	75	50
264 (7,5)	264 (6,8)	284 (5,5)	338 (4,4)

**Induction system**

**Maximum air intake restriction**

- clean filter. .... 3 kPa (0.435 in H2O)
- dirty filter..... 6,4 kPa (0.928 in H2O)
- air filter type..... Dry element type

**Lubrication system**

**Lubricating oil capacity**

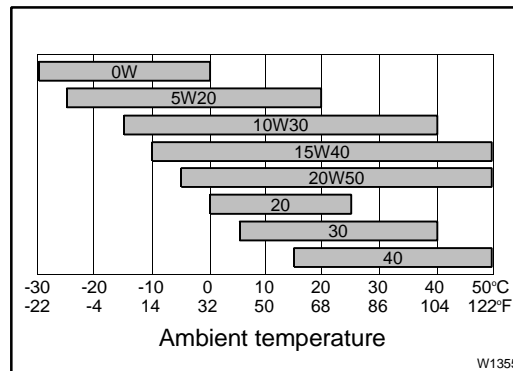
- Total system..... 6 litres (10.5 UK pints)
- Minimum ..... 4,5 litres (7.9 UK pints)
- Maximum engine operating angles
- front up, front down, right side or left side ..... 35° continuous

**Lubricating oil pressure**

- relief valve opens ..... 262 - 359 kPa (38 - 52.1 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 bending moment**

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



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