

# 403A-15G2

15.4 kWm (Gross) @ 1500 rpm

## Electropak

# 400

## Series

### Basic technical data

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	four stroke
Induction system	Naturally aspirated
Compression ratio	22.5:1
Bore	84 mm
Stroke	90 mm
Displacement	1.496 litres
Direction of rotation	anti-clockwise when viewed from flywheel
Firing order	1, 2, 3
Estimated total weight (dry)	197 kg

### Overall dimensions

-height	793 mm
-length	820 mm
-width	469 mm

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

-engine rotational components	0.45 kgcm <sup>2</sup>
-flywheel	2.01 kg m <sup>2</sup>

### Centre of gravity

-forward from rear of block	139 mm
-above centre line of block	67 mm

### Performance

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

Steady state speed stability at constant load	± 0.75%
Cyclic irregularity	
-at 110% stand-by power	TBA

### Test conditions

-air temperature	25°C
-barometric pressure	100 kPa
-relative humidity	31.5%
-air inlet restriction at maximum power (nominal)	3 kPa
-exhaust back pressure at maximum power (nominal)	10.2 kPa
-fuel temperature (inlet pump)	40°C

### Sound level

Average sound pressure level for bare engine (without inlet and exhaust) at 1 metre

	76.7 dB(A)
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-all ratings certified to within

	± 5%
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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.

**General installation, 403A-15G2 Electropak @ 1500 rpm**

Designation	Units	Type of operation and application	
		Prime	Stand-by
		50Hz	50Hz
Gross engine power	kWb	14	15.4
Brake mean effective pressure	kPa	746	820
Mean piston speed	m/s	4.5	
ElectropaK net engine power	kW	13.84	15.24
Engine coolant flow against 35 kPa restriction	l/min	40.3	
Combustion air flow	m <sup>3</sup> /min	1.0	TBA
Exhaust gas flow (max)	m <sup>3</sup> /min	2.2	TBA
Exhaust gas temperature (max)	°C	470	580
Overall thermal efficiency	%	33.35	33.42
Typical genset electrical output (0.8 pf 25°C)	kWe	12.04	13.26
	kVA	15.05	16.57
Assumed alternator efficiency	%	87	
Energy balance			
Energy in fuel (heat of combustion)	kW	41.5	45.6
Energy in power output (gross)	kW	14.0	15.4
Energy to cooling fan	kWt	0.16	
Energy in power output (nett)	kWm	13.84	15.24
Energy to coolant and lubricating oil	kW	13.3	14.6
Energy to exhaust	kW	10.7	11.6
Energy to radiation	kW	3.5	4.0

## Cooling system

### Radiator

-face area ... 0.167 m<sup>2</sup>  
 -rows and materials ... 2 rows, Aluminium  
 -matrix density and material ... 4.5 fins per inch, Aluminium  
 -width of matrix ... 334.2 mm  
 -height of matrix ... 500.0 mm  
 -pressure cap setting ... 90 kPa  
 Estimated cooling air flow reserve ... 0.125 kPa

### Fan

-diameter ... 320 mm  
 -drive ratio ... 1.25:1  
 -number of blades ... 6  
 -material ... Plastic  
 -type ... Pusher

### Coolant

Total system capacity  
 With radiator ... 6.0 litres  
 Without radiator ... 2.6 litres  
 Maximum top tank temperature ... 112°C  
 Max static pressure head on pump ... 30.4 kPa  
 Temperature rise across engine ... 5.1°C  
 Max permissible external system resistance ... TBA kPa  
 Thermostat operation range ... 82 - 95°C

### Recommended coolant:

Recommended coolant: 50% anti freeze / 50% water. For complete details of recommended coolant specifications, refer to the Operation and Maintenance Manual for this engine model

### Duct allowance

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow		
Ambient clearance 50% Glycol	Duct allowance Pa	m <sup>3</sup> /sec
53°C	45	41.4
46°C	83	41.4

## Electrical System

-alternator ... 15 amps, 12 V  
 -starter motor ... 2 kW, 12 V

## Cold start recommendations

Minimum cranking speed ... 150 rev/min

Minimum starting temp	Grade of engine lubricating oil	Battery specifications			
		BS3911 Cold start amps	SAEJ537 Cold cranking amps	Number of batteries required	Commercial ref number
0	20W	420	590	1	72
-15	10W	420	590	1	72
-20	5W	540	740	1	647

## Exhaust system

Maximum back pressure ... 10.2 kPa  
 Exhaust outlet size ... 42 mm

## Fuel system

Type of injection ... Indirect injection  
 Fuel injection pump ... Cassette type  
 Fuel injector ... Pintle nozzle  
 Nozzle opening pressure ... 14.7 MPa  
 Max particle size ... 25 microns

### Fuel lift pump

-type ... mechanical (camshaft driven)  
 -flow/hour ... 63 litres/hr  
 -pressure ... 10 kPa  
 Maximum suction head ... 0.8 m  
 Maximum static pressure head ... 3.0 m  
 Max. fuel temperature at lift pump inlet ... 40°C  
 Max. fuel filter service interval ... 1000 hrs  
 Governor type ... Mechanical  
 Speed control conforms to ... G2

### Fuel specification

**USA Fed Off Highway - EPA2D 89.330-96**

**Europe Off Highway - CEC RF-06-99**

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

### Fuel consumption

	Power rating%				
	110	100	75	50	25
g/kWh	277	260	251	271	355
(litres/hr)	5.04	4.30	3.11	2.24	1.47

## Induction system

Maximum air intake restriction  
 -clean filter ... 3.0 kPa  
 -dirty filter ... 6.4 kPa  
 -air filter type ... dry element type

## Lubrication system

### Lubricating oil capacity

Maximum sump capacity . . . . . 6.0 litres  
 Minimum sump capacity . . . . . 4.5 litres

### Maximum engine operating angles

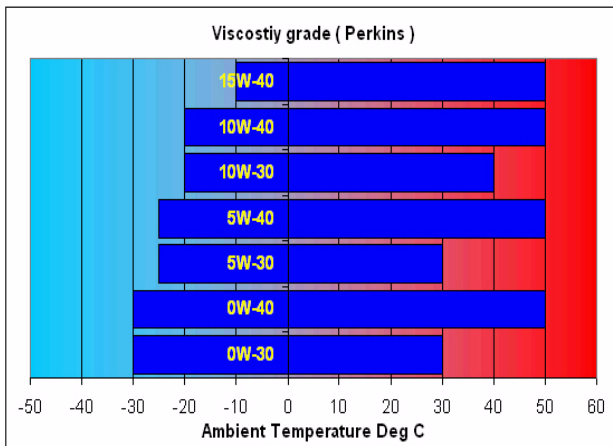
-front up, front down, right side or left side . . . . . 35° continuous

### Lubricating oil pressure

-relief valve opens . . . . . 262 - 359 kPa  
 Minimum oil pressure . . . . . 120 kPa  
 -at maximum no-load speed . . . . . TBA  
 Max. oil temperature - continuous operation . . . . . 125°C  
 Max. oil temperature - intermittent operation . . . . . 135°C  
 Oil flow at rated speed . . . . . 10.9 litres /min

### 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 . . . . . 990 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 maximum after engine starts to crank)		
Descriptor	Units	50 Hz
% of prime power	%	60
Transient frequency deviation	%	10
Frequency recovery	Seconds	5

The above figures were obtained under the following test conditions:

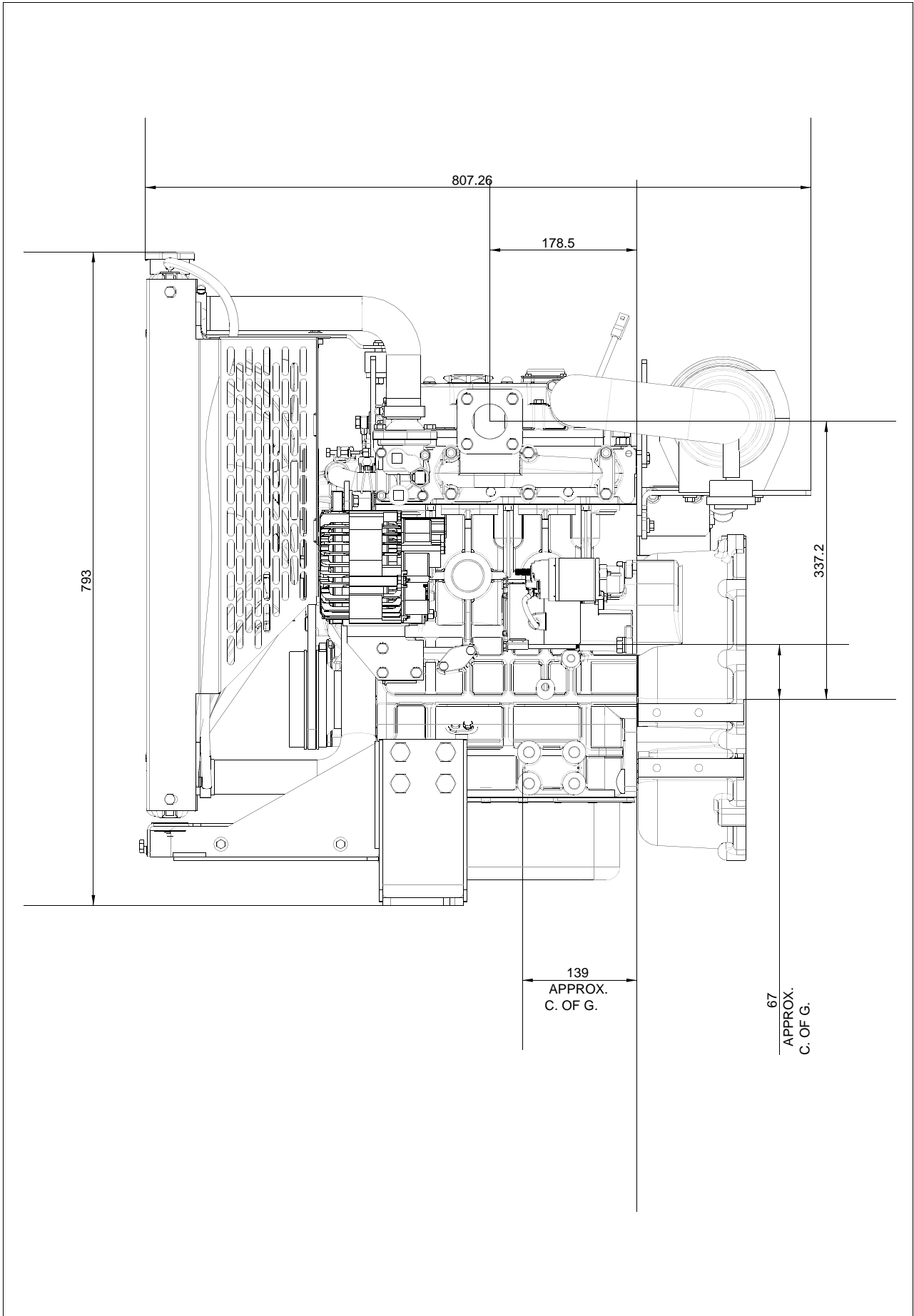
- minimum engine block temperature . . . . . TBA°C
  - ambient temperature . . . . . 25°C
  - governing mode . . . . . 5%
  - alternator inertia . . . . . TBA kgm<sup>2</sup>
  - under frequency roll off (UFRO) point set to 2% Volt / 1% frequency
  - UFRO rate set to . . . . . 1 Hz below rated speed
  - LAM on/off . . . . . off
- All tests were conducted using an engine which was installed and serviced to Perkins Engines Company Limited recommendations.

### Derate curves

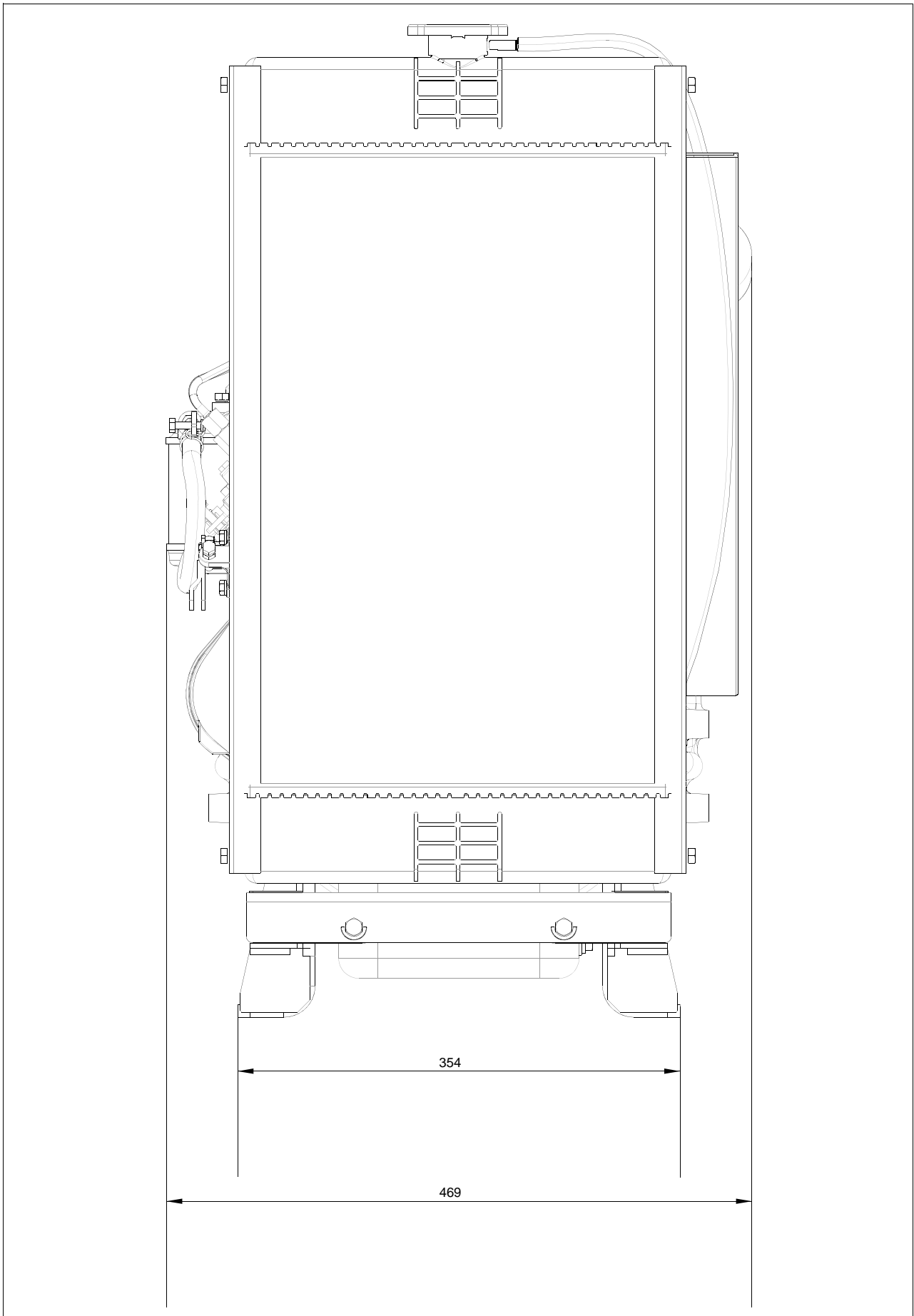
Derate curves for altitude and humidity can be found in Chapter 6 of the 400 Series Engine Sales Manual.

The general arrangement drawings shown in this data sheet are for guidance only. For installation purposes, latest versions should be requested from the Applications Dept., Perkins Engines Stafford, Recommended SAE

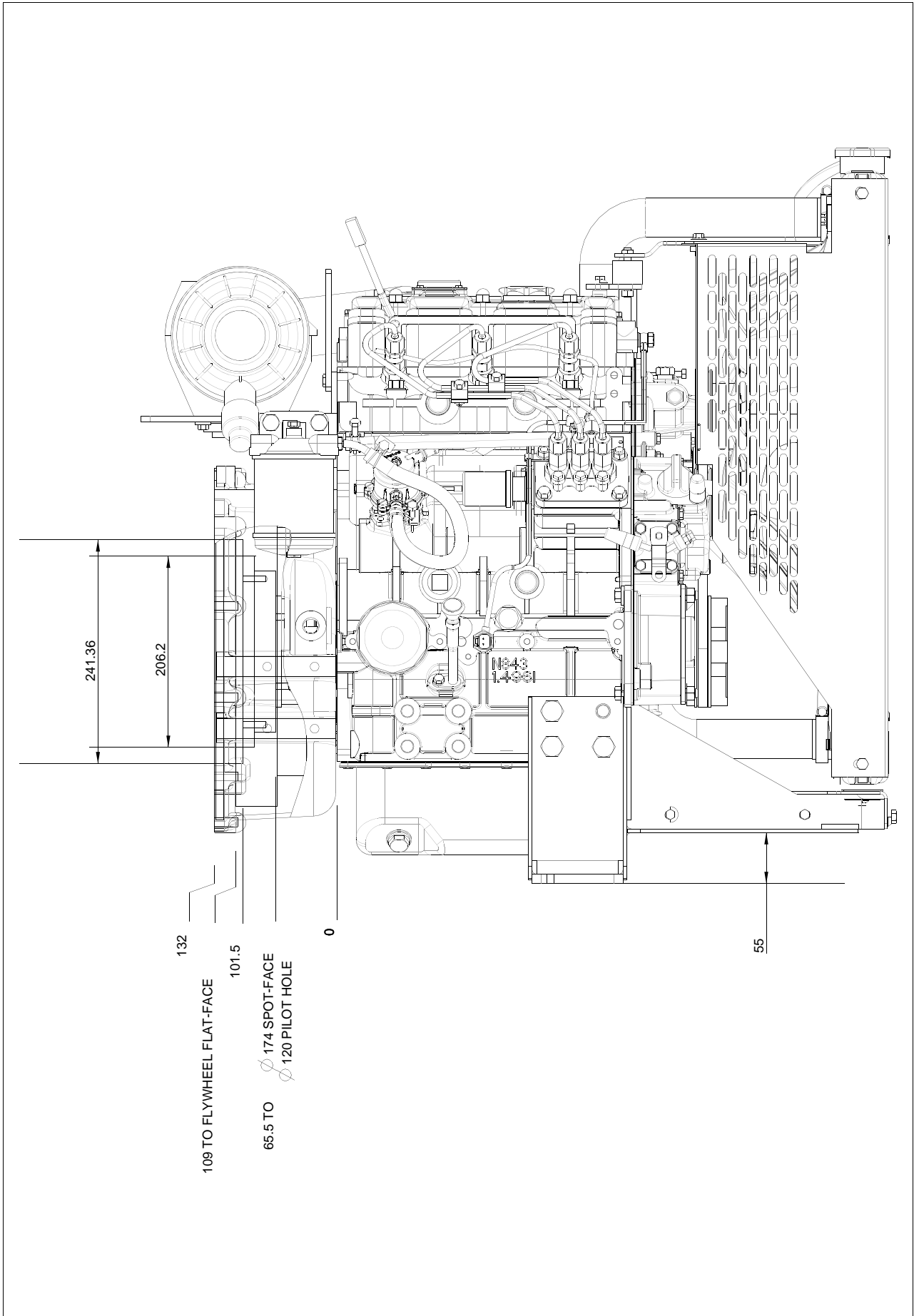
403A-15G2 ElectropaK, left view



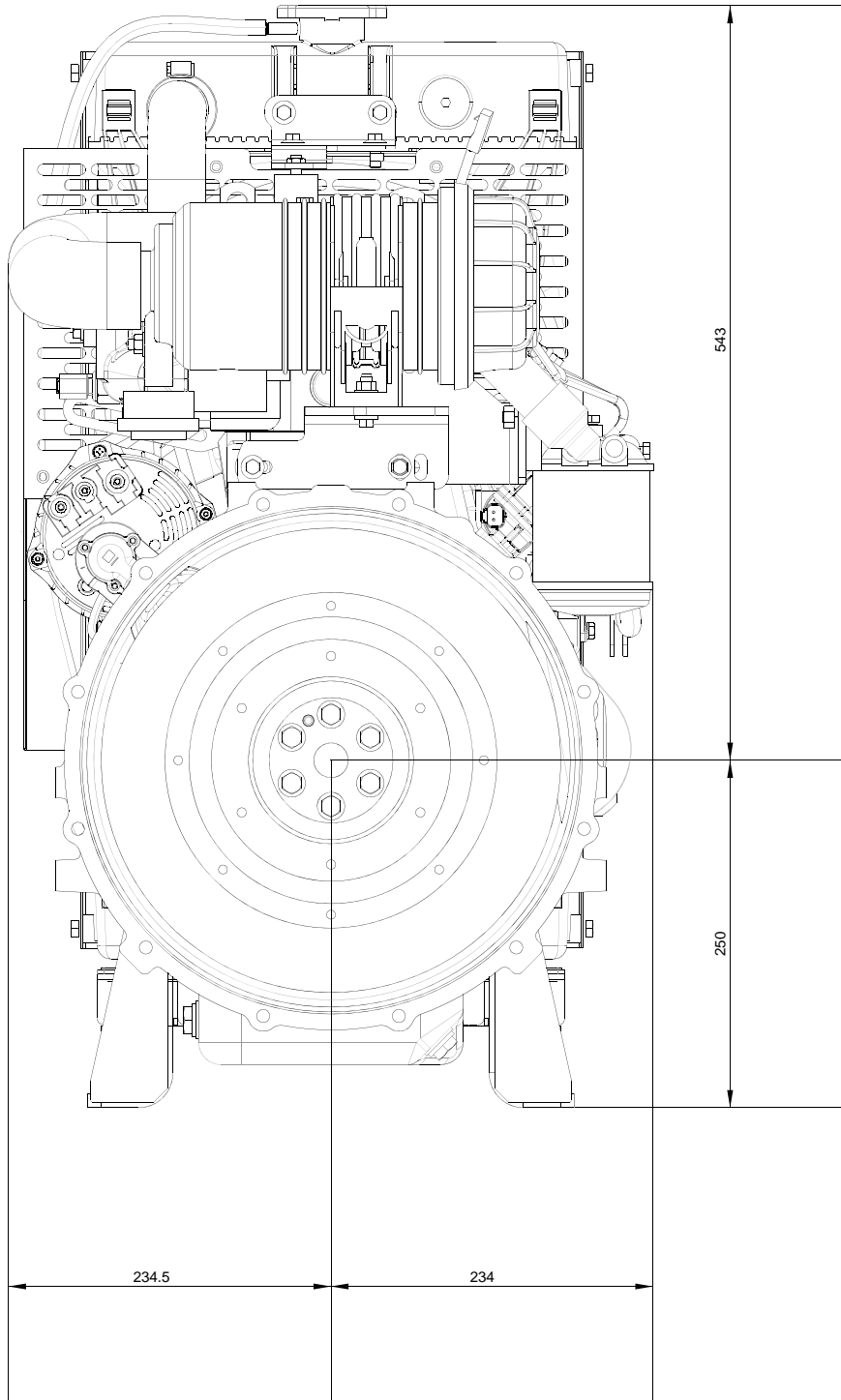
403A-15G2 ElectropaK, front view



403A-15G2 ElectropaK, right view

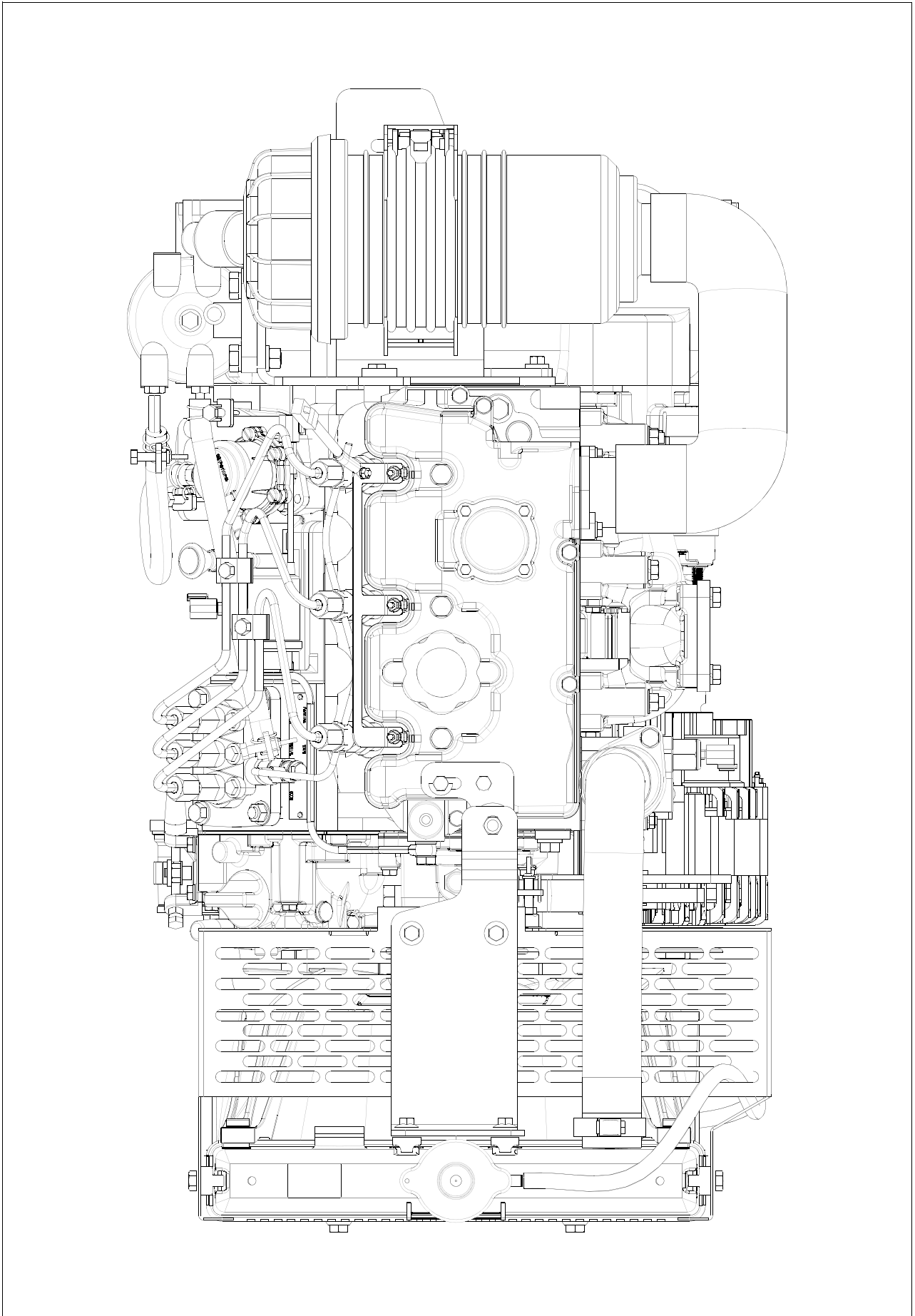


403A-15G2 ElectropaK, rear view





403A-15G2 ElectropaK, plan view



403A-15G2 ElectropaK, underside view

