

# Perkins based INDUSTRIAL GAS ENGINES

## Technical Data

### Q3 Series

#### Gas Engine - Generating Set specification

##### Basic technical data

Number of cylinders... 3  
 Cylinder arrangement... Vertical in-line  
 Cycle... Four stroke  
 Induction system... Turbocharged  
 Compression ratio... 13 : 1  
 Bore... 105 mm (4.13 in)  
 Stroke... 127 mm (4.99 in)  
 Cubic capacity... 3.3 litres  
 Direction of rotation... Clockwise view from front  
 Firing order... 1,2,3

##### Estimated total weight (including radiator and mounting brackets)

Total weight (engine only)  
 -dry... 398kg  
 -wet... 416kg

##### Overall dimensions

-height... 1050mm  
 -length... 1010mm  
 -width (including mounting brackets)... 640mm

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

Engine rotational components... 0.141 kgm<sup>2</sup>  
 Flywheel... 1.14 kgm<sup>2</sup>

##### General Installation

## Q3.3TSI

35.3 kWm @ 1500 rev/min

38.3 kWm @ 1800 rev/min

##### Centre of gravity (wet)

- forward from rear of block... 215mm  
 - above centre line of block... 120mm  
 - offset of RHS of centre line... 25mm

##### Test conditions

Air temperature... 25 °C  
 Barometric pressure... 100 kPa  
 Relative humidity... 30%

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 Quantum Technical Service Department.

Designation	Units	Type of Operation			
		Prime	Stand-by	Prime	Stand-by
		Hz	Hz	Hz	Hz
		1500	1500	1800	1800
Gross engine power	kWm	31.9	36.2	35.1	40.0
Brake mean effective pressure	kPa	773	878	710	807
Engine coolant flow 35 kPa restriction	l/min	48	48	88	88
Combustion air flow	m <sup>3</sup> /min	2.5	2.9	3.1	3.7
Exhaust gas flow (max)	m <sup>3</sup> /min	5.5	6.3	6.6	7.5
Exhaust gas outlet temperature (max at standby)	°C	503	496	486	476.2
Cooling fan air flow (200kPa external restriction)	m <sup>3</sup> /min	53	53	70	70
Overall thermal efficiency (net)	%	35.6	36.4	34.6	35.5
Genset electrical output	kWe	28	32	31	35
	kVA	35	40	39	55
Power factor		0.8	0.8	0.8	0.8
Actual alternator efficiency	%	90.4	90.4	91.8	91.5
Fuel consumption	m <sup>3</sup> /hr	8.8	9.8	9.8	10.9
<b>Energy balance</b>					
Power in fuel (Fuel heat of combustion)	kW	87.1	97.0	96.7	107.8
Power output (gross)	kW	31.9	36.2	35.1	40.0
Power to cooling fan	kW	0.9	0.9	1.7	1.7
Power output (net)	kW	31.0	35.3	33.4	38.3
Power to coolant and lubricating oil	kW	22.2	24.8	26.8	27.4
Power to exhaust	kW	23.5	26.7	27.6	31.3
(Recoverable power, exhaust cooled to 120 °C)	kW	18.6	21.0	21.5	24.0
Power to radiation	kW	9.5	9.2	7.2	9.2

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 (114.8 °F) if a canopy is 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 Quantum Technical Service Department.

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## Cooling System

### Radiator

- face area ..... 0.28 m<sup>2</sup>
- rows and materials ..... single row aluminium
- matrix density and material ..... 12.5 aluminium fins/inch
- width of matrix ..... 526 mm
- height of matrix ..... 524 mm

### Fan

- diameter ..... 457mm
- drive ratio ..... 0.85:1
- number of blades ..... 7
- material ..... Composite
- type ..... Pusher

### Coolant

- Total system capacity
  - with radiator ..... 10.2 litres
  - without radiator ..... 4.4 litres
- Maximum top tank temperature ..... 105 °C
- Thermostat operating range ..... 82 - 93 °C

Recommended coolant: 50 % ethylene glycol with a corrosion inhibitor (BS 658 : 1992 or MOD AL39) and 50% clean fresh water.

## Electrical system

- Type ..... Negative ground
- Alternator voltage ..... 12 V
- Starter motor voltage ..... 12 V
- Starter motor power ..... 3.2 kW
- Number of teeth on flywheel ..... 126
- Pull in current of starter motor solenoid ..... 60 amps
- Hold in current of starter motor solenoid ..... 15 amps

## Cold start recommendations

- Minimum cranking speed ..... 80 rev/min

## Battery Requirement

- Min. 1 x 643 12V battery (BS3911 440CCA / SAE J537 660CCA)

## Exhaust system

- Maximum back pressure
  - 1500 rev/min ..... 10 kPa
  - 1800 rev/min ..... 15 kPa
- Exhaust outlet size ..... 56 mm

## Fuel System

- Type of carburettor ..... CV diaphragm mixer
  - Throttle actuator ..... Electrical controlled butterfly
  - Gas supply pressure ..... min 25 mbar \*
- \* For supply pressure below this value, please contact Quantum Technical Dept. for advice.  
Installation of gas supply and shut-off valves to be in accordance with local regulations.

## Ignition system

- Primary system type ..... Electronic inductive system
- Ignition coils ..... 1 per cylinder

All information in this datasheet is correct at time of print but is subject to change without prior notice.

## Fuel Specification

- Recommended fuel ..... Natural Gas LHV at 35.66 MJ/m<sup>3</sup>
- Gas supplies must be filtered to the same standard as the engine intake air ie. maximum particle size not to exceed 5 micron.

## Fuel consumption (Sm<sup>3</sup>/hr)

Speed	Power rating % of prime rating				
	110	100	75	50	25
1500	9.80	8.79	7.12	5.26	3.85
1800	10.89	9.76	7.60	6.12	4.39

## Induction system

### Maximum air intake restriction

- clean filter ..... 2 kPa
- dirty filter ..... 4 kPa
- air filter type ..... Dry

## Lubrication system

### Lubricating oil capacity

- Total system ..... 8.3 litres
- Sump only ..... 6.2 / 7.8 litres (min/max)

### Maximum engine operating angles:

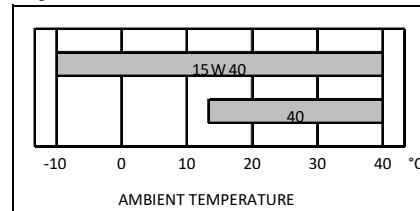
- front up, front down, right side or left side ..... 25°

### Lubricating oil pressure

- relief valve opens ..... 415 - 470 kPa
- at maximum no-load speed ..... 276 - 414 kPa
- Max continuous oil temperature (in rail) ..... 125 °C

## Recommended lubricating oils

A single or multigrade oil must be used of low ash type (<0.6 %wt), formulated for natural gas engines. See chart below for temperature range.



## Mountings

- Maximum static bending moment at rear face of block ..... 791Nm

The information given in this document is for guidance only. All tests were conducted using an engine installed and services to Quantum ES Ltd recommendations.

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