Power Generation

# Diesel Powered Generating Sets 608 kW - 715 kW 50 Hz QSK23 Series Engine

## Standard Genset Features

### Cummins¤ Heavy-Duty Engine
- Rugged 4-cycle industrial diesel engine delivers reliable power and low emissions.
- Full authority engine

### Alternator
- Low reactance 2/3 pitch
- Class H insulation, IP 23
- 12 Lead Reconnectable
- Low voltage distortion with non-linear loads

### Permanent Magnet Generator (pmg)
- Enhanced motor starting
- Fault-clearing short circuit capability
- Excitation system isolated from non-linear loads

### Full Load Pick-Up
- PowerCommand™ Gensets accept 100% of full nameplate standby rating in one step, in compliance with NFPA110

### Single-Source Responsibility
- Design, manufacture and test of all major set components and accessories by Cummins Power Generation and affiliated companies

### Single-Source Warranty
- All generator set components and systems are covered by one year prime or two year standby warranty
- Optional extended warranty programs available

## PowerCommand System Control Features

### Integrated Control System
- Microprocessor control system
- Reliable and optimum genset performance
- Integrated governor and voltage regulation system
- RFI/EMI and surge tested and approved

### Alarm and Status Message Display
- Information on all critical parameters of the genset

### Ampsentry“ Protection
- Power management system that guards the electrical integrity of the alternator and power system from the effects of overcurrent, over/under voltage, under frequency and overload conditions

### Battery Monitoring System
- Battery load test each time the engine is started
- Alarm for weak battery condition
- Monitors the battery system for low and high voltage

### AC Output Metering
- RMS digital metering
- Analogue metering indication of operating trends

### Genset Monitoring
- Monitors status of all engine and alternator functions
- Digitally displays status of all engine and alternator functions
- Monitors and detects engine sender failures

### UL508 Listed Control Panel
- Single-membrane panel and gasketed enclosure

### Smart Starting Control System
- Multi-functional digital control system integrates fuel ramping and field excitation to minimise frequency and voltage overshoot and limit black smoke

### Optional PowerCommand Digital Paralleling Control
- The PowerCommand Control can be equipped to provide digital paralleling controls for synchronising and load sharing on-set

**Quality Assurance**
Registered Firm Certificate Number FM509 in accordance with: BS EN ISO 9001

Quality Assurance Schedule 3420/1

One Source — Engine — Alternator — Controls — Generating Set — One Name

**Cummins Power Generation, Cummins Engines and Newage Alternators are all part of the same group**

| 50 Hz Ratings | | | | |
|---|---|---|---|---|
| **Model Prime** | **Prime kVA** (kW) | **Model Standby** | **Standby kVA** (kW) | **Engine Model** |
| **608 DQCB** | **760** (608) | **672 DQCB** | **840** (672) | **QSK23G3** |
| **651 DQCC** | **814** (651) | **715 DQCC** | **894** (715) | **QSK23G3** |

# A Single Source for *all* Power System Solutions

# Specifications

## Generator Set Performance

### Voltage Regulation
Maintains voltage output to within –1.0%.
At any power factor between 0.8 lagging and unity.
At any variations from No load to Full load.
At any variations from Cold to Hot.
At speed droop variations up to 4.5%.

### Frequency Regulation
Isochronous under varying loads from no load to 100% full load.

### Random Frequency Variation
Will not exceed –0.25% of its mean value for constant loads — no load to full load.

### Waveform
Total harmonic distortion open circuit voltage waveform in the order of 1.5%. Three-phase balanced load in the order of 5.0%.

### Telephone Influence Factor (TIF)
TIF better than 50.
THF to BS4999 Part 40 better than 2%.

### Alternator Temperature Rise
Class H insulation. Temperature rise up to 125¡C permitted.

### Radio Interference
In compliance with BS800 and VDE levels G and N.

## Engine

Cummins QSK23G3 direct injection engines. Six-cylinder, in-line. 23.15 litres.

### Type
Water cooled, four cycle, turbo charged and air to air aftercooled.

### Construction
Four valves per cylinder, forged steel crankshaft and connecting rods, cast iron block, replaceable wet liners.

### Starting
24 volt negative earth. Battery charging 35 amp alternator. Cranking current 900 amps at 0°C.

### Fuel System
24 volt fail safe fuel actuator. Spin-on element fuel filters. Cummins HPI - TP fuel injection system with integral electronic governor. Dual flexible fuel lines and connectors. Fuel/water separator.

### Filters
Dry element air filters with restriction indicator and spin-on combination element oil filter with full flow and bypass filteration. Spin on corrosion resistor filter.

### Cooling
40°C radiator as standard with 50°C ambient as option.

## Alternator

### Type
Brushless, single bearing, revolving field, 4-pole, drip proof, screen protected.
Class H insulation.
Enclosed to IP23 (NEMA 1) standard.
IC 01 cooling system.
Fully interconnected damper winding.
AC exciter and rotating rectifier unit.
Epoxy coated stator winding.
Rotor and exciter impregnated with tropical grade insulating oil and acid resisting polyester resin. Dynamically balanced rotor to BS5625 grade 2.5.
Sealed for life bearings.
Layer wound mechanically wedged rotor.

### Exciter
Triple dipped in moisture, oil and acid resisting polyester varnish and coated with anti-tracking varnish.
Sealed solid state automatic voltage regulator — self-exciting, self-regulating.
Output windings with 2/3 pitch for improved harmonics and paralleling ability.
Close coupled engine/alternator for perfect alignment.

## Compliance Standards

To BS4999/5000 pt 99,
VDE 0530, UTE5100,
NEMA MG1-22, CEMA,
IEC 34, CSA A22.2,
AS1359, BSS5514,
ISO 3046, ISO 8528

## Chassis

Fabricated and welded steel chassis
Anti vibration mounts

### Finish
Etch undercoated and finished in high gloss durable green

### General
Complete set of operating and instruction manuals

## Generator Set Options

### Engine
- Heavy duty air cleaner
- Coolant heater and thermostat
- Tool kit
- Lead acid batteries, cable and fitted tray
- NiCad batteries
- Sump drain pump
- Oil and water drain taps
- CE Compliance (guarding)
- Exhaust temperature monitoring

### Cooling
- Oil temperature indication

### Alternator
- Anti-Condensation heater
- Thermistors

### Exhaust System
- Industrial type silencer
- Residential type silencer
- Length of flexible exhaust and bellows

### Fuel System
- Hand fuel transfer pump
- Automatic fuel transfer pump
- Free-standing 450, 900 and 1350 litre fuel tanks with stand
- Fuel tank level switch
- High fuel level warning
- Low fuel level warning
- Low fuel level shutdown

### Control Panel
- See separate list on Control Panel pages
- 3 or 4 pole circuit breaker
- Battery charger 5 amp or 10 amp
- Cable entrance box

# Technical Data

## QSK23 Generating Sets – 50 Hz

| | Prime | Standby | Prime | Standby |
|---|---|---|---|---|
| Ratings kVA (kW) | 814 (651) | 894 (715) | 760 (608) | 840 (672) |
| Model | 651 DQCC | 715 DQCC | 608 DQCB | 672 DQCB |
| Engine Model | QSK23G3 | QSK23G3 | QSK23G3 | QSK23G3 |
| Aspiration | Turbocharged and Air to Air After Cooled | Turbocharged and Air to Air After Cooled | Turbocharged and Air to Air After Cooled | Turbocharged and Air to Air After Cooled |
| Gross Engine Power Output (kWm) | 701 | 768 | 656 | 724 |
| BMEP (kPA) | 2441 | 2675 | 2282 | 2516 |
| Bore (mm) | 170 | 170 | 170 | 170 |
| Stroke (mm) | 170 | 170 | 170 | 170 |
| Displacement (L) | 23.15 | 23.15 | 23.15 | 23.15 |
| Cylinder Arrangement | 6 In-Line | 6 In-Line | 6 In-Line | 6 In-Line |
| Piston Speed (m/s) | 8.6 | 8.6 | 8.6 | 8.6 |
| Compression Ratio | 16:1 | 16:1 | 16:1 | 16:1 |
| Lube Oil Capacity (L) | 135 | 135 | 135 | 135 |
| Overspeed Limit RPM | 2600 | 2600 | 2600 | 2600 |
| Fuel Consumption Load | 1/4 \| 1/2 \| 3/4 \| Full | 1/4 \| 1/2 \| 3/4 \| Full | 1/4 \| 1/2 \| 3/4 \| Full | 1/4 \| 1/2 \| 3/4 \| Full |
| Fuel Consumption l/hr | 46 \| 85 \| 121 \| 161 | 50 \| 92 \| 132 \| 178 | 44 \| 79 \| 117 \| 151 | 47 \| 86 \| 127 \| 168 |
| Maximum Fuel Flow (l/h) | 684 | 684 | 684 | 684 |
| Maximum Inlet Restriction mm. Hg | 203 | 203 | 203 | 203 |
| Maximum Return Restriction mm, Hg | 229 | 229 | 229 | 229 |
| Maximum Fuel Inlet Temperature ¡C | 70 | 70 | 70 | 70 |
| Maximum Fuel Return Temperature ¡C | 71 | 71 | 71 | 71 |
| Coolant Capacity (With Radiator) litres | 95.5 | 95.5 | 95.5 | 95.5 |
| Coolant Flow Rate (engine jacket) litres/s | 7.6 | 7.6 | 7.6 | 7.6 |
| Heat rejection to Eng Jacket Coolant kWm | 215 | 222 | 204 | 227 |
| Heat Rejection to Aftercooler kWm | 122 | 146 | 110 | 122 |
| Heat Rejection to Fuel kWm | 6.8 | 6.8 | 6.8 | 6.8 |
| Heat Rejection to Exhaust kWm | 507 | 570 | 482 | 536 |
| Heat Radiated to Ambient (Engine) kW | 65 | 71 | 61 | 67 |
| Max Coolant Friction Head (JW) kPa | 34 | 34 | 34 | 34 |
| Maximum Coolant Static Head above crank centerline m | 18.3 | 18.3 | 18.3 | 18.3 |
| Max Top Tank Temp (Jacket)°C | 100 | 104 | 100 | 104 |
| Max Inlet Temp (aftercooler) °C | 73 | 73 | 73 | 73 |
| Combustion Air $m^3$/min | 48.9 | 53.28 | 46.74 | 49.26 |
| Maximum Air Cleaner Restriction with clean filter element in. $H_2O$ | 381 | 381 | 381 | 381 |
| Alternator Cooling Air $m^3$/min | 96.84 | 96.84 | 96.84 | 96.84 |
| Radiator Cooling Air $m^3$/min | 882 | 882 | 882 | 882 |
| Max Static Restriction in. $H_2O$ | 0.5 | 0.5 | 0.5 | 0.5 |
| Exhaust Gas Flow (l/s) | 2259 | 2463 | 2183 | 2334 |
| Exhaust Gas Temperature °C | 532 | 543 | 541 | 550 |
| Maximum Back Pressure (mm Hg) | 76.2 | 76.2 | 76.2 | 76.2 |
| Derating Factors — Engine | RTF | RTF | RTF | RTF |

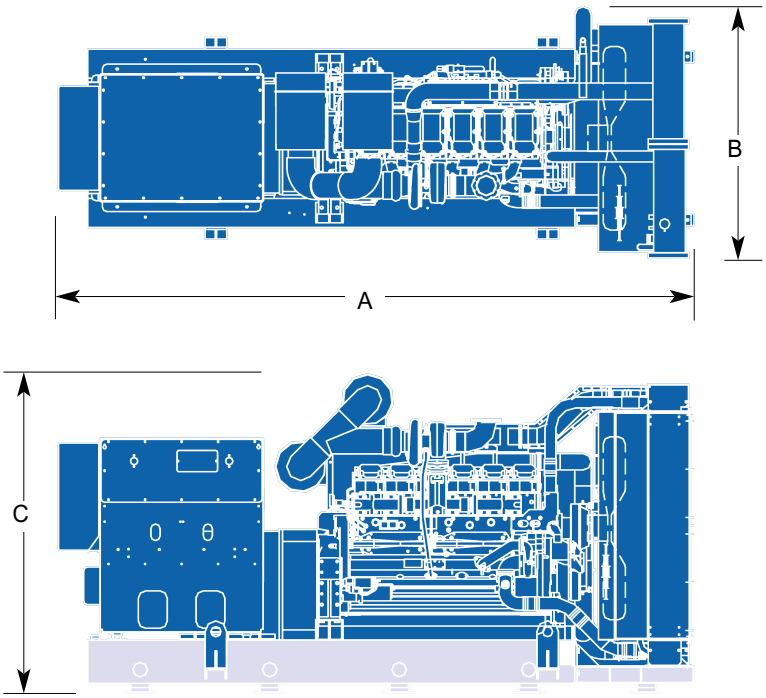
**Ratings**

Prime: Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimted number of hours. A 10% overload capability is available for limited time. Nominally rated. (Equivalent to Prime Power in accordance with ISO 8528 and overload power in accordance with ISO3046, AS2789, DIN6271 and BS5514).

Standby: Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. Nominally Rated (equivalent to fuel stop power in accordance with ISO 3046, AS2789, DIN6271 and BS5514).

Prime and standby ratings are outputs at 40°C ambient temperature and 1000 m ASL.

# Dimensions and Weights – 50 Hz




| Model | Dim A mm (in) | Dim B mm (in) | Dim C mm (in) | Set Weight* dry kg (lbs) | Set Weight* wet kg (lbs) |
|---|---|---|---|---|---|
| **DQCB** | **4414** (173.8) | **1738** (68.4) | **2214** (87.2) | **6527** (14392) | **6668** (14703) |
| **DQCC** | **4414** (173.8) | **1738** (68.4) | **2214** (87.2) | **6682** (14734) | **6623** (15045) |

*Set weights are **without** sub-base tank. Dimensions and weights are for **guidance** only.
Do not use for installation design. Ask for certified drawings on your specific application.

**See your distributor for more information.**

**Cummins Power Generation Limited**
**Manston Park, Columbus Avenue**
**Manston, Ramsgate**
**Kent CT12 5BF, UK**
**Telephone: +44 (0)1843 255000**
**Fax: +44 (0)1843 255902**
**Email: cpg.uk@cummins.com**
**www.cumminspower.com**
**www.cummins.com**