



# Diesel Generator Set QSK60 Series

2000-2250 kVA Prime



## Reliable and Durable

Cummins® 'QSK60 series' (Quantum leap in product technology) diesel engine with strong regrindable crankshaft, high strength connecting rod, high pressure injection full authority electronic fuel system, 2 pump 2 loop coolant system. 'QSK60 series' generating sets are more reliable and durable. Engines have clocked millions of hours operating in some of the world's most demanding conditions. Current engines are regularly upgraded with new technologies for better performance and economy. The ultimate proof of superior performance and reliability is the fact that Cummins® manufactures these engines in India.

## Unmatched Warranty

Cummins® 'QSK60 series' diesel engine generating sets are a truly cost effective solution to long term power need backed by industry best, 2 years / 5000 hrs warranty, for the entire generating set. With superior experience in technology, design capability, commitment, reliability and quality we offer an unmatched 5 years or 5000 hours (including above 2 years) warranty coverage on 5 critical components (5C) of the engine – Cylinder Head, Camshaft, Crankshaft, Cylinder Block, Connecting Rod against manufacturing defect (5C warranty is offered only for India source product).

## Cummins Advantage

Special features of Cummins® 'QSK60 series' engines like full authority electronic injection, low temperature aftercooler, optimised turbocharging and precision injection timing make these engines the ultimate in exceptional fuel efficiency all across the operating range.

## Single Source Power Assurance

Design, manufacture and testing of engine, alternator and other accessories is done by Cummins Group of companies for optimum performance and is backed by a countrywide product the entire package.

## Standard scope

**Engine:** Cummins® 'QSK60 series' full authority electronic injection, water cooled engine, 16 cylinder, 4 stroke, rated at 1500 RPM, conforming to ISO 3046 /IS 13018 has the following specifications:

- Cummins Full Authority electronics
- Cummins HPI injectors
- Cummins turbocharger, pulse tuned exhaust manifold, stainless steel exhaust flexible connections (4 Turbos)
- Radiator or heat exchanger, coolant inhibitor
- Plate type lube oil cooler
- Outboard aftercoolers
- Full flow paper element filters - fuel, lube oil and by-pass
- Dry type replaceable paper element air cleaner with restriction indicator
- Flywheel housing & flywheel to suit single bearing alternator
- Starting motor – Electric
- Battery charging alternator
- Cummins PowerCommand® microprocessor based genset controller
- First fill lube oil

## Alternator: Stamford brushless alternator

- Separately excited, self-regulated
- Salient pole revolving field
- Single / double bearing
- VPI epoxy impregnated insulation technology
- Re-greasable deep groove Single bearing
- Excitation - PMG based brushless
- Space heaters, RTD/BTD - (without scanner).

## Accessories:

- Silencer suitably optimized to reduce noise
- Sturdy base rail
- 990 ltrs. free standing fuel tank
- Batteries with connecting leads and terminals

**Optionals**

**Engine:** Heat exchanger, No cool, 398 lts. oil pan

**Alternator:** Double Bearing

**Control Panel:** PC3.3

- Bargraph For PC3.3 Panel with kW, Power factor, Frequency, Current, Voltage
- Remote HMI

AMF control panel, Battery charger, Remote/Auto start panel, Auto/

Manual synchronizing panel, Audio/Visual annunciation for faults

**Control panel:****PowerCommand® PC 3.3 with MLD**

The PowerCommand® control system is an integrated microprocessor based generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing.

**AmpSentry™** – Includes integral AmpSentry™ protection, which provides a full range of alternator protection function which are matched to the alternator provided.

**Power Management** – Control function provides battery monitoring, testing and a smart starting control system.

**Advanced Control Methodology** – Three phase sensing, FET based full wave rectified voltage regulation and a PWM output for stable operation with all load types.

**Communications Interface** – Control comes standard with PCCNet and Modbus interface.

**Regulation Compliant** – Prototype tested: UL, CSA and CE compliant.

**Service** - InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

**Reliable Design** – For reliable operations in harsh environment.

**Multi-language support**

**Independent of PC/ laptop for setting up**

**Operator panel features**

**Operator Panel Features** – The operator panel, in addition to the alternator, displays the Utility/ AC Bus data.

**Operator/ Display Functions**

- 320 x 240 pixels graphic LED backlight LCD with bar graph for displaying electrical parameters
- Auto, manual, start, stop, fault reset and lamp test/panel lamp switches
- Alpha-numeric display with pushbuttons
- LED lamps indicating genset running, remote start, not in auto, common shutdown, common warning, manual run mode, auto mode and stop

**Paralleling Control Functions**

- Digital frequency synchronization and voltage matching
- Isochronous kW and kvar load sharing controls
- Droop kW and kvar control
- Sync check
- Extended paralleling (Peak Shave/Base Load)
- Digital power transfer control (AMF) provides load transfer operation in open or closed transition or soft (ramping) transfer mode

**Alternator Data**

- Line-to-neutral and line-to-line AC volts
- 3-phase AC current
- Frequency
- kW, kvar, power factor kVA (three phase and total)

**Engine Data**

- DC voltage
- Engine speed
- Lube oil pressure
- Coolant temperature/ low level
- Comprehensive FAE data (where applicable)

**Other Data**

- Genset model data
- Start attempts, starts, running hours, kW hours
- Load profile (operating hours at % load in 5% increments)
- Fault history
- Data logging and fault simulation (requires InPower)

**Standard control functions****Digital Governing**

- Integrated digital electronic isochronous governor
- - Temperature dynamic governing

**Digital Voltage Regulation**

- Integrated digital electronic voltage regulator
- 3-phase, 4-wire line-to-line sensing
- Configurable torque matching

**AmpSentry™ AC Protection**

- AmpSentry™ protective relay
- Over current and short circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse var shutdown
- Field overload

**Engine protection**

- Battery voltage monitoring, protection and testing
- Over speed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- Fail to start (over crank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown

**MLD features**

- Load dependent start/stop
- Run hour equalization
- Built-in Logic
- Single point MLD setting
- System monitoring
- Master-less
- Single point remote start
- Predictive Load input
- Dedicated screens

**Telematics Offerings**

- Fault Code Alerts on Email & SMS
- Advisory Services
- Fuel Level Monitoring on Email & SMS
- Multiple Gensets Central Monitoring
- Automatic Reports Generation

## Technical Data

| Generator set specifications                            |                                                      |                                                            |                                                            |                                                            |
|---------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|
| Model                                                   | C2000 D5 P                                           |                                                            | C2250 D5 P                                                 |                                                            |
| Prime Power Rating kVA                                  | 2000                                                 |                                                            | 2250                                                       |                                                            |
| Output Voltage and Frequency                            | 415V/ *3.3/ *6.6/ 11KV - 50Hz                        |                                                            | 415V/ *3.3/ *6.6/ 11KV - 50Hz                              |                                                            |
| Power Factor                                            | 0.8 (lag)                                            |                                                            | 0.8 (lag)                                                  |                                                            |
| No. of phases                                           | 3 phase                                              |                                                            | 3 phase                                                    |                                                            |
|                                                         |                                                      |                                                            |                                                            |                                                            |
| Engine specifications                                   |                                                      |                                                            |                                                            |                                                            |
| Make                                                    | Cummins                                              |                                                            | Cummins                                                    |                                                            |
| Model                                                   | QSK 60 G4                                            |                                                            | QSK 60 G8                                                  |                                                            |
| No. of cylinders                                        | 16                                                   |                                                            | 16                                                         |                                                            |
| Aspiration                                              | Turbocharged - LTA Aftercooled                       |                                                            | Turbocharged - LTA Aftercooled                             |                                                            |
| Bore x Stroke                                           | 159 mm x 190 mm                                      |                                                            | 159 mm x 190 mm                                            |                                                            |
| Displacement                                            | 60.2 ltrs                                            |                                                            | 60.2 ltrs                                                  |                                                            |
| Output - Prime                                          | 2319 bhp (1730 kWm)                                  |                                                            | 2603 bhp (1942 kWm)                                        |                                                            |
| Fuel consumption @ 75% load with Rad/HE                 | 291/281 ltr/hr                                       |                                                            | 331/321 ltr/hr                                             |                                                            |
| Fuel consumption @ 100% load with Rad/HE 390/380 ltr/hr | 390/380 ltr/hr                                       |                                                            | 441/430 ltr/hr                                             |                                                            |
| Total wet weight ( engine + radiator)                   | 9904 kg                                              |                                                            | 9904 kg                                                    |                                                            |
| Length x Width x Height (engine)                        | 2780 x 1591 x 1960 mm                                |                                                            | 2780 x 1591 x 1960 mm                                      |                                                            |
| Compression Ratio                                       | 14.5:1                                               |                                                            | 14.5:1                                                     |                                                            |
| Piston Speed                                            | 9.5 m/s                                              |                                                            | 9.5 m/s                                                    |                                                            |
| Governor / Class                                        | Electronic / A1                                      |                                                            | Electronic / A1                                            |                                                            |
| Lubricating oil sytem capacity                          | 261 ltrs                                             |                                                            | 261 ltrs                                                   |                                                            |
| Coolant capacity (engine + radiator)                    | 621 ltrs                                             |                                                            | 621 ltrs                                                   |                                                            |
| Combustion air intake @ 100% load (+/- 5%)              | 136 m³/min                                           |                                                            | 156 m³/min                                                 |                                                            |
| Exhaust Temperature                                     | 430 °C                                               |                                                            | 485 °C                                                     |                                                            |
|                                                         |                                                      |                                                            |                                                            |                                                            |
| Alternator specifications                               |                                                      |                                                            |                                                            |                                                            |
| Make                                                    | Stamford-LT                                          | Stamford-HT                                                | Stamford-LT                                                | Stamford-HT                                                |
| Frame size / Model No.                                  | S7L1D-G4                                             | HVSI804R                                                   | S7L1D-H4                                                   | HVSI804R                                                   |
| Voltage Regulation                                      | ± 0.5%                                               | ± 0.5%                                                     | ± 0.5%                                                     | ± 0.5%                                                     |
| Insulation                                              | Class H                                              | Class F                                                    | Class H                                                    | Class F                                                    |
| Standard Enclosure                                      | IP 23                                                | IP 23                                                      | IP 23                                                      | IP 23                                                      |
| Winding Pitch                                           | 2 / 3 Pitch                                          | 2 / 3 Pitch                                                | 2 / 3 Pitch                                                | 2 / 3 Pitch                                                |
| Stator Winding                                          | Double Layer Concentric                              | Double layer lap, form wound                               | Double layer lap, form wound                               | Double layerlap, form wound                                |
| Rotor Dynamically balanced with grade 2.5               | Dynamically balanced with grade 2.5                  | Dynamically balanced with grade 2.5                        | Dynamically balanced with grade 2.5                        | Dynamically balanced with grade 2.5                        |
| Wave form distortion                                    | NO LOAD <1.5% NON-ISTORTING BALANCED LINEAR LOAD <5% | No load < 1.5 %, non distorting balanced linear load < 3 % | No load < 1.8 %, non distorting balanced linear load < 5 % | No load < 1.5 %, non distorting balanced linear load < 5 % |
| Total Harmonic Factor                                   | Better than 2%                                       | Better than 2%                                             | Better than 2%                                             | Better than 2%                                             |

\* Refer to Factory for 3.3/\*6.6 KV & Alternator frame

## Conformance Standards

IS/IEC 60034-1, BS 5000, IS 1460, ISO 8528, IS 13018, ISO 3046, ISO 9001

## Rating Definitions

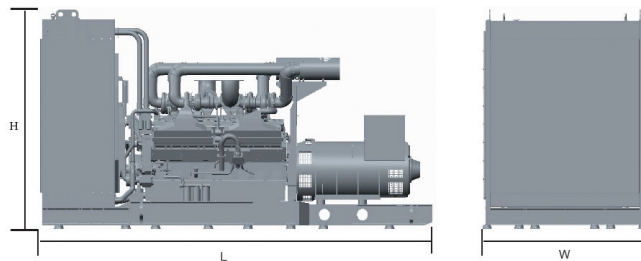
### Prime Power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046 and IS 13018.

- Fuel consumption data is based on diesel having specific gravity of 0.85 and conforming to IS:1460
- Fuel consumption tolerance is +5%

**Typical Diesel Genset Dimensions\***

| Genset Model | Rating (kVA) | Length (mm) | Width (mm) | Height (mm) | Weight (kgs.) (Wet) | Std. Fuel Tank Capacity (Ltrs - External) |
|--------------|--------------|-------------|------------|-------------|---------------------|-------------------------------------------|
| C2000D5P     | 2000 kVA     | 5950        | 2594       | 3304        | 17333               | 990                                       |
| C2250D5P     | 2250 kVA     | 6175        | 2494       | 3115        | 18976               | 990                                       |



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