Diesel generator set
QSX15 series engine
450 kW – 500 kW Standby

Description
Cummins® commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.

Features
Cummins heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent Magnet Generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

Enclosures - Optional weather protective and sound attenuated enclosures are available.

Fuel tanks - Dual wall sub-base fuel tanks are also available.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

<table>
<thead>
<tr>
<th>Model</th>
<th>Standby rating 60 Hz kW (kVA)</th>
<th>Prime rating 60 Hz kW (kVA)</th>
<th>Continuous rating 60 Hz kW (kVA)</th>
<th>Data sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFEJ</td>
<td>450 (563)</td>
<td>410 (513)</td>
<td></td>
<td>D-3400</td>
</tr>
<tr>
<td>DFEK</td>
<td>500 (625)</td>
<td>455 (569)</td>
<td></td>
<td>D-3401</td>
</tr>
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</table>
### Generator set specifications

<table>
<thead>
<tr>
<th>Spec</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor regulation class</td>
<td>ISO 8528 part 1 Class G3</td>
</tr>
<tr>
<td>Voltage regulation, no load to full load</td>
<td>± 0.5%</td>
</tr>
<tr>
<td>Random voltage variation</td>
<td>± 0.5%</td>
</tr>
<tr>
<td>Frequency regulation</td>
<td>Isochronous</td>
</tr>
<tr>
<td>Random frequency variation</td>
<td>± 0.25%</td>
</tr>
<tr>
<td>EMS compatibility</td>
<td>IEC 61000-4-2: Level 4 Electrostatic discharge</td>
</tr>
<tr>
<td></td>
<td>IEC 61000-4-3: Level 3 Radiated susceptibility</td>
</tr>
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</table>

### Engine specifications

<table>
<thead>
<tr>
<th>Spec</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Turbocharged with air-to-air charge air-cooling</td>
</tr>
<tr>
<td>Bore</td>
<td>136.9 mm (5.39 in.)</td>
</tr>
<tr>
<td>Stroke</td>
<td>168.9 mm (6.65 in.)</td>
</tr>
<tr>
<td>Displacement</td>
<td>14.9 L (912.0 in³)</td>
</tr>
<tr>
<td>Cylinder block</td>
<td>Cast iron with replaceable wet liners, in-line 6 cylinder</td>
</tr>
<tr>
<td>Battery capacity</td>
<td>1400 Amps minimum at ambient temperature 0 °C (32 °F)</td>
</tr>
<tr>
<td>Battery charging alternator</td>
<td>35 Amps</td>
</tr>
<tr>
<td>Starting voltage</td>
<td>24 volt, negative ground</td>
</tr>
<tr>
<td>Fuel system</td>
<td>Full authority electronic (FAE) Cummings HPI-TP</td>
</tr>
<tr>
<td>Fuel filter</td>
<td></td>
</tr>
<tr>
<td>Air cleaner type</td>
<td></td>
</tr>
<tr>
<td>Lube oil filter type(s)</td>
<td>Single spin-on combination full flow and bypass filters</td>
</tr>
<tr>
<td>Standard cooling system</td>
<td>40 °C (104 °F) ambient radiator</td>
</tr>
</tbody>
</table>

### Alternator specifications

<table>
<thead>
<tr>
<th>Spec</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Brushless, 4 pole, drip-proof revolving field</td>
</tr>
<tr>
<td>Stator</td>
<td>2/3 pitch</td>
</tr>
<tr>
<td>Rotor</td>
<td>Single bearing, flexible discs</td>
</tr>
<tr>
<td>Insulation system</td>
<td>Class H</td>
</tr>
<tr>
<td>Standard temperature rise</td>
<td>125 °C standby at 40 °C ambient</td>
</tr>
<tr>
<td>Exciter type</td>
<td>PMG (Permanent Magnet Generator)</td>
</tr>
<tr>
<td>Phase rotation</td>
<td>A (U), B (V), C (W)</td>
</tr>
<tr>
<td>Alternator cooling</td>
<td>Direct drive centrifugal blower fan</td>
</tr>
<tr>
<td>AC waveform total harmonic distortion (THDV)</td>
<td>&lt; 5% no load to full linear load, &lt; 3% for any single harmonic</td>
</tr>
<tr>
<td>Telephone influence factor (TIF)</td>
<td>&lt; 50% per NEMA MG1-22.43</td>
</tr>
<tr>
<td>Telephone harmonic factor (THF)</td>
<td>&lt; 3%</td>
</tr>
</tbody>
</table>

### Available voltages

**60 Hz Line – Neutral/Line - Line**

- 110/190
- 110/220
- 115/200
- 115/230
- 120/208
- 127/220
- 139/240
- 220/380
- 230/400
- 240/416
- 255/440
- 277/480
- 347/600

Note: Consult factory for other voltages.
**Generator set options**

**Engine**
- 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40°F)
- 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 °C (40°F)
- 120 V 300 W lube oil heater
- Heavy duty air cleaner with safety element

**Alternator**
- 80 °C rise
- 105 °C rise
- 150 °C rise
- 120/240 V 200 W anti-condensation heater

**Exhaust system**
- Critical grade exhaust silencer
- Exhaust packages
- Industrial grade exhaust silencer
- Residential grade exhaust silencer

**Fuel system**
- 1022 L (270 gal) sub-base tank
- 1136 L (300 gal) sub-base tank
- 1514 L (400 gal) sub-base tank
- 1893 L (500 gal) sub-base tank
- 2271 L (600 gal) sub-base tank
- 2498 L (660 gal) sub-base tank
- 3218 L (850 gal) sub-base tank
- 6435 L (1700 gal) sub-base tank
- 9558 L (2525 gal) sub-base tank

**Cooling system**
- High ambient 50 °C radiator

**Control system 2.3**

The **PowerCommand 2.3 control system** - An integrated generator set control system providing voltage regulation, engine protection, generator protection, operator interface and isochronous governing (optional).

**Control** – Provides battery monitoring and testing features and smart-starting control system.

**InPower™** – PC-based service tool available for detailed diagnostics.

**PCCNet RS485** – Network interface (standard) to devices such as remote annunciator for NFPA 110 applications.

**Control boards** – Potted for environmental protection.

**Ambient operation** – Suitable for operation in ambient temperatures from -40 °C to +70 °C and altitudes to 13,000 feet (5000 meters). Prototype tested - UL, CSA and CE compliant.

**AC protection**
- AmpSentry protective relay
- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload
- Overload warning
- Reverse kW shutdown
- Reverse Var shutdown
- Short circuit protection

**Engine protection**
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning

**Fuel protection**
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

**Operator/display panel**
- Manual off switch
- 128 x 128 Alpha-numeric display with push button access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C

**Alternator data**
- Line-to-Neutral AC volts
- Line-to-Line AC volts
- 3-phase AC current
- Frequency
- kVA, kW, power factor

**Engine data**
- DC voltage
- Lube oil pressure
- Coolant temperature

*Note: Some options may not be available on all models - consult factory for availability.*
Control functions
- Time delay start and cool down
- Glow plug control (some models)
- Cycle cranking
- PCCNet interface
- (4) Configurable inputs
- (4) Configurable outputs
- Remote emergency stop
- Battle short mode
- Load shed
- Real time clock with exerciser
- Derate

Digital governing (optional)
- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation
- Integrated digital electronic voltage regulator
- 3-phase Line-to-Line sensing
- Configurable torque matching
- Fault current regulation under single or three phase fault conditions

Other data
- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)
- Total kilowatt hours
- Load profile

Options
- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand for Windows® remote monitoring software (direct connect)
- AC output analogue meters
- PowerCommand 2.3 and 3.3 control with AmpSentry protection

For further detail on PC 2.3 see document S-1569.
For further detail on PC 3.3 see document S-1570.

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours.
Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

This outline drawing if for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

<table>
<thead>
<tr>
<th>Model</th>
<th>Dim ‘A’ mm (in.)</th>
<th>Dim ‘B’ mm (in.)</th>
<th>Dim ‘C’ mm (in.)</th>
<th>Set weight dry* kg (lbs)</th>
<th>Set weight wet* kg (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFEJ</td>
<td>3864 (152.1)</td>
<td>1524 (60.0)</td>
<td>1812 (71.3)</td>
<td>4098 (9035)</td>
<td>4234 (9335)</td>
</tr>
<tr>
<td>DFEK</td>
<td>3864 (152.1)</td>
<td>1524 (60.0)</td>
<td>1812 (71.3)</td>
<td>4325 (9535)</td>
<td>4461 (9835)</td>
</tr>
</tbody>
</table>

*Weights represent a set with standard features. See outline drawings for weights of other configurations.
 Codes and standards  
Codes or standards compliance may not be available with all model configurations – consult factory for availability.

| ISO 9001 | UL | The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems. | U.S EPA | Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards, 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation. |
| --- | --- | --- | --- | |
| All low voltage models are CSA certified to product class 4215-01. | International Building Code | The generator set package is available certified for seismic application in accordance with the following International Building Code: IBC2000, IBC2003, IBC2006, IBC2009 and IBC2012. | |

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building’s electrical system except through an approved device or after building main switch is open.