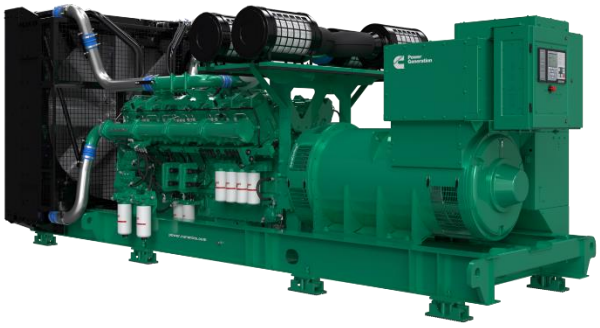
C1750D6E
C2000D6E

DIESEL GENERATOR SET SPECIFICATION SHEET

QSK50 ENGINE, 1750-2000 kWe, 60 Hz, EPA TIER 2 NSPS CERTIFIED (STATIONARY EMERGENCY)

DESCRIPTION

Cummins commercial generator sets are fully integrated power generation systems for stationary standby power and data center applications.
The Centum™ Series meets the demand for efficient and sustainable power with performance, flexibility, and commitment – for the next generation of power.



FEATURES

Cummins Heavy-Duty Engine: Rugged, four-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, fault clearing short-circuit capability and class H insulation.

ISO 8528-5 G3 Capable: Consult factory for site and configuration specific transient performance information.

HVO Fuel Compatible: Approved for use with paraffinic fuels (EN15940), including Hydrotreated Vegetable Oil (HVO), which has a very low life cycle carbon emission.

Data Center Continuous (DCC): Applicable for supplying power continuously to a constant or varying electrical load for unlimited hours in a data center application.

Uptime compliant: Meets the requirement of a Tier III and IV data center site by being rated to run for unlimited hours of operation when loaded to 'N' demand for the engine generator set.

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

Control System: The PowerCommand® digital 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™ protective relay, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling System: High ambient (40 °C) and enhanced high ambient (50 °C), integral set-mounted radiator systems, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

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 standard three-year warranty and worldwide distributor network.

MODELS

	Emergency Standby Power (ESP) Rating[1] kWe (kVA)	Prime Power (PRP) Rating[1,2] kWe (kVA)	Data Center Continuous (DCC) Rating[1,2] kWe (kVA)	Data Sheet
C1750D6E	1750 (2188)	1600 (2000)	1600 (2000)	NAD-6744
C2000D6E	2000 (2500)	1825 (2281)	1825 (2281)	NAD-6745

[1] All ratings include radiator fan losses.
[2] Prime rating and DCC at standby power rating available subject to Cummins' site-specific assessment; contact your Cummins distributor.

Bulletin NAS-6746 PD00001955 Produced in U.S.A. (Rev. 06/24)

Centum™ SERIES GENERATORS

GENERATOR SET SPECIFICATIONS

Performance class	Genset models have been tested in accordance with ISO 8528-5. Consult factory for transient performance information
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Electromagnetic compatibility performance	Emissions to EN 61000-6-2:2005 Immunity to EN 61000-6-4:2007+A1:2011 Complies with FCC PART 15 subpart B and ICES-002

ENGINE SPECIFICATIONS

Bore	159 mm (6.26 in.)
Stroke	159 mm (6.26 in.)
Displacement	49.8 liters (3039 in3)
Configuration	Four Cycle; Vee; 16 Cylinder
Battery capacity	1800 amps minimum at ambient temperature of -18 °C (0 °F)
Battery charging alternator	100A
Starting voltage	24 volts, negative ground
Fuel system	Cummins YZ Modular Common Rail System (MCRS)
Fuel filter	Two-stage, spin-on fuel filter and water separator system. Stage 1: remote mounted, 5 µm duplex filter with two priming pumps. Stage 2: engine mounted, 3 µm triple element filter
Air cleaner	Dry replaceable element
Lube oil filter	Four spin-on, combination full flow filter and bypass filters
Standard cooling system	High ambient cooling system

ALTERNATOR SPECIFICATIONS

Design	Brushless, 4-pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H
Standard temperature rise	125 ºC standby
Exciter type	Permanent Magnet Generator (PMG)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion (THDV)	< 5% no load to full linear load

AVAILABLE VOLTAGES (60 Hz LINE-TO-NEUTRAL / LINE-TO-LINE)[3]

277/480	254/440	220/380	2400/4160	347/600	7976/13800
7620/13200	3810/6600	3640/6300	3985/6900	6350/11000	7200/12470

[3] Additional voltages may be available; contact your Cummins distributor

GENERATOR SET OPTIONS AND ACCESSORIES[4]

Generator Set
- Oil sampling valve
- 10A battery charger
- Set mounted circuit breakers up to 3200 Amps
- Circuit breaker aux and trip contacts
- Anti-vibration mounts
- Battery temperature sensor
- IBC Certification
- HCAI Certification

Engine
- 240V thermo-statically controlled coolant heater
- 120/240V 500W lube oil heaters
- Heavy duty air cleaner
- Remote duplex fuel filter
- Engine oil filters - full flow with bypass
- Automatic oil make up system and monitoring
- Engine toolkit

Control Panel
- Masterless load demand
- Multiple language support
- 120/240V 100W control anti- condensation heater
- Exhaust pyrometer
- Ground fault indication
- Paralleling relay package
- Shutdown alarm relay package
- Mechanical hour meter
- 6x user-configurable relays
- 8 additional I/O relays

Alternator
- 80°C/105°C /125°C/150°C rise
- Stator winding temp sensor 2 RTDs/phase
- Bearing temp sensor RTDs
- 1-hole or 2-hole lug output terminal
- Cable entrance box set mounted top or bottom entry
- 120/240V 225W anti- condensation heater
- Generator Louvres

Exhaust System
- Industrial grade silencer
- Residential grade silencer
- Critical grade silencer

Cooling System
- Enhanced high ambient temperature (50 °C)
- Low coolant level warning
- Coolant heater

Data Center options
- Automatic oil make up system
- Closed crank ventilation system
- Oil sampling valve
- Propylene glycol coolant
- Customized testing

Miscellaneous
- Multilingual manuals
- 3-year extended warranty
- 5-year extended warranty
- 10-year extended warranty
- Witness testing
- Virtual witness test
- Tier 4 compliant aftertreatment kits shipped loose

[4] Some options may not be available on all models; contact your Cummins distributor.
Data Center options are available through RFQ with the Custom Applications Group and could result in additional lead-times. Please consult with the Custom Applications Group to understand feasibility

Bulletin NAS-6746 PD00001955 Produced in U.S.A. (Rev. 06/24)

Centum™
SERIES GENERATORS

PowerCommand® 3.3

CONTROL SYSTEM DESCRIPTION

The PowerCommand® 3.3 is an integrated, microprocessor-based, generator set control system providing voltage regulation, engine protection, alternator protection, operator interface and isochronous governing. Refer to document S-1570 for more detailed information on the control.

AmpSentry™: Includes integral AmpSentry™ protection, which provides a full range of alternator protection functions that are matched to the alternator provided.

Power Management: Control function provides battery monitoring and testing features and smart starting control system.

Advanced Control Methodology: Three phase sensing, full wave rectified voltage regulation, with a PWM output for stable operation with all load types.

Communications Interface: Control comes standard with PCCNet and Modbus interface.

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

Easily Upgradeable: PowerCommand® controls are designed with common control interfaces.

Reliable Design: The control system is designed for reliable operation in harsh environment.

Multi-Language Support

OPERATOR PANEL FEATURES

Operating/Display Functions

- Displays paralleling breaker status
- Provides direct control of the paralleling breaker
- 320 x 240 pixels graphic LED backlight LCD
- 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

- First Start Sensor™ system selects first genset to close to bus
- Phase lock loop synchronizer with voltage matching
- Sync check relay
- Isochronous kW and kVAR load sharing
- Load govern control for utility paralleling
- Extended paralleling (base load/peak shave) mode
- Digital power transfer control, for use with a breaker pair to provide open transition, closed transition, ramping closed transition, peaking and base load functions

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 and temperature
- Coolant temperature
- Comprehensive FAE data (where applicable)

OPERATOR PANEL FEATURES (CONT.)

Other Data

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

STANDARD CONTROL FEATURES

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 shutdown

Engine Protection

- Battery voltage monitoring, protection, and testing
- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Cranking lockout
- Sensor failure indication
- Full authority electronic engine protection

Control Functions

- Time delay start and cool down
- Real time clock for fault and event time stamping
- Exerciser clock and time of day start/stop
- Data logging
- Cycle cranking
- Load shed
- Configurable inputs and outputs (4)
- Remote emergency stop

Options

- Auxiliary output relays (2)

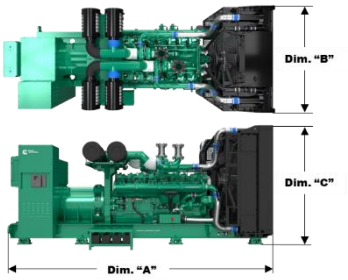
Bulletin NAS-6746 PD00001955 Produced in U.S.A. (Rev. 06/24)

Centum™ SERIES GENERATORS

RATING DEFINITIONS

Emergency Standby Power (ESP)	Prime Power (PRP)	Data Center Continuous (DCC)
Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Data shown above represents gross engine performance and capabilities as per ISO 3046-1, obtained and corrected in accordance with ISO 15550.	Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. Applicable for supplying power to varying electrical loads for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046-1. Data shown above represents gross engine performance and capabilities as per ISO 3046-1, obtained and corrected in accordance with ISO 15550.	Applicable for supplying power continuously to a constant or varying electrical load for unlimited hours in a data center application. Designed to comply with Uptime Institute® Tier III and IV data center site requirements by being rated to run for unlimited hours of operation when loaded to 'N' demand for the engine generator set.

GENERATOR SET DIMENSIONS AND WEIGHTS[5]



Model Name	Dim. "A" mm (in)	Dim. "B" mm (in)	Dim. "C" mm (in)
C1750D6E C2000D6E	5708 (224.7)	2470 (97.2)	2441 (96.1)

Model Name	As Shipped Cooling System Weight (Dry) kg (lb)	Installed Set Weight (Wet) kg (lb)
C1750D6E C2000D6E	14135 (31169)	14512 (32001)

[5] Do not use for installation design. Longest alternator (G-core) used for dimension "A". All weights are approximate and represent a generator set with standard features and heaviest alternator (low voltage G-core). "As Shipped Set Weight (No Cooling System)" includes weight from engine oil. "Installed Set Weight (Wet)" includes weight from engine oil and coolant. See respective model data sheet for specific model outline drawing number that contains weights of other configurations.

CODES AND STANDARDS[6]

ISO 9001 ISO 14001 ISO 45001	This product was manufactured in a facility whose quality management system is certified to ISO 9001 and its Health Safety Environmental Management Systems certified to ISO 14001 and ISO 45001.	UL LISTED	UL Listing to UL 2200, "Stationary Engine Generator Assemblies" is available for this genset model. The PowerCommand® control is listed to UL 508 – Category NITW7 for U.S. and Canadian usage.
PTS	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.	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	Engine certified to Stationary Emergency U.S. EPA New Source Performance Standards (NSPS), 40 CFR 60 subpart IIII Tier 2 exhaust emission levels. U.S. applications must be applied per this EPA regulation.
CSA	All genset models are available as CSA certifiedto CSA C22.2 No. 100.	IBC INTERNATIONAL BUILDING CODE	The generator set package is available certified for seismic application in accordance with International Building Code.

[6] Codes or standards compliance may not be available with all model configurations; contact your Cummins distributor.

Bulletin NAS-6746 PD00001955 Produced in U.S.A. (Rev. 06/24)

C2000D6E

DIESEL GENERATOR SET DATA SHEET

MODEL:	**C2000D6E**
FREQUENCY:	**60 Hz**
FUEL TYPE:	**DIESEL**
RATING:	**2000 kWe (2500 kVA) EMERGENCY STANDBY POWER (ESP)[1]**
	1825 kWe (2281 kVA) DATA CENTER CONTINUOUS (DCC)[1,2]
EMISSIONS CERTIFICATION:	**EPA NSPS STATIONARY EMERGENCY TIER 2**

GENERATOR SET PUBLICATIONS

Exhaust emission data sheet	EDS-3135 / EDS-3136
Exhaust emission compliance statement	EPA-2100 / EPA-2101
Sound data sheet	MSP-4178
Cooling system data sheet	MCP-2257 / MCP-2258
Seismic certificate of compliance	VMA-53914-01C (Revision 1)
Prototype test support data sheet	PTS-785 / PTS-803
Genset outline drawing	A060C089
Genset wiring schematic diagram	A073F079

ENGINE SPECIFICATIONS

		Emergency Standby Power (ESP)	Data Center Continuous (DCC)
Manufacturer		Cummins Inc.	
Model		QSK50 - G24 / G25	
Configuration		Four Cycle; Vee; 16 Cylinder	
Aspiration		Turbocharged and Charge Air Cooled	
Gross engine power output	kWm (bhp)	2204 (2956)	1975 (2648)
Brake mean effective pressure at set rated load	kPa (psi)	2951 (428)	2641 (383)
Bore	mm (in)	159 (6.26)	
Stroke	mm (in)	159 (6.26)	
Displacement	L (in^3)	49.8 (3039)	
Rated speed	rpm	1800	
Piston speed at rated speed	m/s (ft/min)	19.1 (3756)	
Compression ratio		14.2:1	
Lube oil capacity	L (US gal)	121 (32.0)	
Overspeed limit	rpm	2070	
Regenerative power	kWm (hp)	166 (223)	

FUEL CONSUMPTION

Rating	kWe (kVA)	2000 (2500)				1825 (2281)			
Load		25%	50%	75%	100%	25%	50%	75%	100%
Fuel Consumption	US gph	41.5	75	108	139.8	38	68	97	128.0
Fuel Consumption	L/h	157.0	283.9	408.8	529.1	143.8	257.4	367.1	484.5

[1] Generator set ratings include radiator fan losses
[2] DCC at standby power available subject to Cummins' site-specific assessment; contact your Cummins distributor

Bulletin NAD-6745 PD00001954 Produced in U.S.A. (Rev. 06/24)

Centum™ SERIES GENERATORS

FUEL SYSTEM

		Emergency Standby Power (ESP)	Data Center Continuous (DCC)
Maximum fuel flow	L/h (US gph)	958 (253)	
Maximum fuel inlet restriction	kPa (inHg)	40 (11.8)	
Maximum fuel inlet temperature	°C (°F)	70 (158)	
Maximum fuel return temperature	°C (°F)	129 (264)	

AIR SYSTEM

Combustion air flow (at set rated load)	m^3/min (scfm)	159.7 (5639)	156.3 (5521)
Maximum air cleaner restriction (dirty filter)	kPa (inH2O)	3.7 (15)	
Alternator cooling air flow	m^3/min (scfm)	222 (7850)	

EXHAUST SYSTEM

Exhaust flow (at set rated load)	m^3/min (cfm)	436 (15388)	415 (14654)
Exhaust temperature (at set rated load)	°C (°F)	535 (996)	512 (954)
Maximum back pressure	kPa (inH_2O)	6.7 (26.9)	

COOLING SYSTEM (SET MOUNTED) – HIGH AMBIENT

Engine model		QSK50 - G24	
Ambient design (limiting ambient temp.)	°C (°F)	40 (104)	
Fan load	kWm (hp)	89.5 (120)	
Coolant capacity (engine + radiator)	L (US gal)	140 (37)	
Cooling system air flow (at max. restriction)	m^3/min (acfm)	2073 (73210)	
Total heat rejection to radiator	MJ/min (Btu/min)	88 (83282)	80 (76207)
Total heat radiated to room	MJ/min (Btu/min)	7.0 (6675)	5.5 (5237)
Nominal air flow static restriction	kPa (inH_2O)	0.12 (0.5)	
Maximum fuel return line restriction	kPa (in Hg)	34.9 (10.3)	

COOLING SYSTEM (SET MOUNTED) – ENHANCED HIGH AMBIENT

Engine model		QSK50 - G25	
Ambient design (limiting ambient temp.)	°C (°F)	50.0 (122)	
Fan load	kWm (hp)	105.9 (142)	
Coolant capacity (engine + radiator)	L (US gal)	140 (37)	
Cooling system air flow (at max. restriction)	m^3/min (acfm)	2421 (85483)	
Total heat rejection to radiator	MJ/min (Btu/min)	88 (83282)	80 (76207)
Total heat radiated to room	MJ/min (Btu/min)	7.6 (7192)	6.4 (6026)
Nominal air flow static restriction	kPa (inH_2O)	0.12 (0.5)	
Maximum fuel return line restriction	kPa (in Hg)	34.9 (10.3)	

GENERATOR SET WEIGHTS[3]

		As Shipped Cooling System Weight (Dry)	Installed Set Weight (Wet)
C2000D6E	kg (lb)	14135 (31169)	14512 (32001)

[3] All weights are approximate and represent a generator set with standard features and heaviest alternator (low voltage G-core). “As Shipped Set Weight (No Cooling System)” includes weight from engine oil. “Installed Set Weight (Wet)” includes weight from engine oil and coolant. See respective model data sheet for specific model outline drawing number that contains weights of other configurations.

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GENERATOR SET DERATING FACTORS[4]

Emergency Standby Power (ESP)	**High Ambient Cooling System:** Full engine power available up to 400 m (1312 ft) at ambient temperature up to 40°C (104°F). From 400 m (1312 ft) to 2000 m (6562 ft) derates at 3% per 305 m (1000 ft). For temperature above 40°C engine derates at 10% per 10°C (18°F). **Enhanced High Ambient Cooling System:** Full engine power available at Sea level at ambient temperature up to 50°C (122°F). From 0 m (0 ft) to 2000 m (6562 ft) derates at 3.3% per 305 m (1000 ft). For temperature above 50°C engine derates at 3% per 10°C (18°F).
Data Center Continuous (DCC)	**High Ambient Cooling System:** Full engine power available up to 400 m (1312 ft) at ambient temperature up to 40°C (104°F). From 400 m (1312 ft) to 2000 m (6562 ft) derates at 2.8% per 305 m (1000 ft). For temperature above 40°C engine derates at 9.2% per 10°C (18°F). **Enhanced High Ambient Cooling System:** Full engine power available at Sea level at ambient temperature up to 50°C (122°F). From 0 m (0 ft) to 2000 m (6562 ft) derates at 3.1% per 305 m (1000 ft). For temperature above 50°C engine derates at 2.6% per 10°C (18°F).

[4] Note: Ambient operating temperature is defined as the air temperature measured at the room (or enclosure) inlet, assuming a temperature rise of 3 °C to the turbocharger compressor inlet.

RATING DEFINITIONS

Emergency Standby Power (ESP)	Data Center Continuous (DCC)
Applicable for supplying power to varying electrical loads for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Data shown above represents gross engine performance and capabilities as per ISO 3046-1, obtained and corrected in accordance with ISO 15550.	Applicable for supplying power continuously to a constant or varying electrical load for unlimited hours in a data center application. Designed to comply with Tier III and IV data center site requirements by being rated to run for unlimited hours of operation when loaded to 'N' demand for the engine generator set.

FORMULAS

Calculating Power Factor	Calculating Full Load Current (Three Phase AC Output)	Calculating Full Load Current (Single Phase AC Output)
$\cos\theta = \frac{Active\ (True, Real)\ Power}{Apparent\ Power} = \frac{P_{(kW)}}{\lvert S\rvert_{(kVA)}}$ Power Factor = 0.8 (industry standard)	$I = \frac{\lvert S\rvert_{(kVA)}}{\sqrt{3} \times V} = \frac{1000 \times P_{(kW)}}{\sqrt{3} \times V \times \cos\theta}$	$I = \frac{\lvert S\rvert_{(kVA)}}{V} = \frac{1000 \times P_{(kW)}}{V \times \cos\theta}$

Bulletin NAD-6745 PD00001954 Produced in U.S.A. (Rev. 06/24)

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