

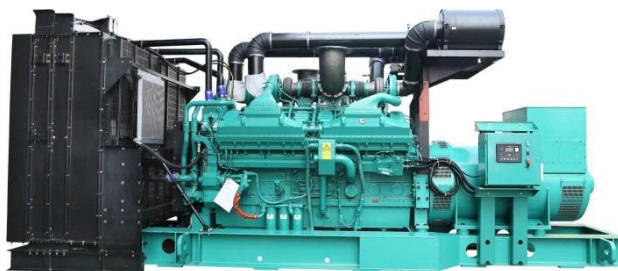
DATA SHEET

DIESEL GENERATOR 1600KW

MODEL#FDK-CG2000/H1

50HZ/1500RPM

CUMMINS MODEL: QSK60-G3



General Features:

- ♦ All qualified generator sets are subjected to a comprehensive performance test which includes 50% load, 70% load, 100% load, 110% load and to check, verify that all control systems, alarm and shut-down protection.
- ♦ Equipped with battery charger and 24V high performance maintenance-free lead-acid starting batteries and connecting cables.
- ♦ Stainless galvanized zinc plates with strong corrosion-proof.
- ♦ Vibration isolators between the engine/alternator and base frame.
- ♦ Equipped with industrial silencer and flexible exhaust hose.
- ♦ Designed to comply with ISO8528/GB2820.
- ♦ Powered by Cummins engine and coupled with Stamford alternator.
- ♦ Water jacket preheater, oil heater and double air cleaner, etc. are available.

FDK Diesel Generator Set Data

Genset Model	FDK-CG1650/H1	Engine Made	Cummins
Prime Power	1500KW/1875KVA	Engine Model	QSK60-G3
Standby Power	1600KW/2000KVA	Alternator model	Stamford PI734E
Output Frequency / Rated speed	50Hz/1500rpm	Control System	DSE7320
Rated Voltage	230V/400V	Phase	Three

(1) **Prime power:** The rating is available for an unlimited of annual operating hours in variable load applications, in accordance with ISO8528-1.A 10% overload is available for a period of 1 hour within 12-hour period of operation, in accordance with ISO 3046-1.

(2) **Standby power:** The rating is applicable for supplying emergency power in variable load applications for up to 200 hours per year in accordance with ISO8528-1. Overload is not allowed.

(3) **Rated voltage:** available with customer requirement.

Engine Specifications (DETAILED in APPENDIX)

Engine Model	QSK60-G3	Aspiration	Turbo-charged
Engine Manufacturer	Cummins ORIGINAL UK	Bore x Stroke (mm x mm)	159×190
Cylinder quantity	16	Displacement	60.2L
Cylinder Arrangement	60° Vee	Compression Ratio	14.5:1
Cycle	4	Prime power / Speed (KW/RPM)	1615kw/1500
		Standby power/ Speed (KW/RPM)	1970kw/1500



Type Injection System	Cummins HPI-PT	Fuel Consumption at 100% load (g/KWh)	191 at 1500rpm
Piston Speed	9.5m/s	Starter motor	DC24V
Friction Energy Output	146kw	Low idle	700-900pm
Total Lubrication System Capacity	280L	Coolant Capacity (L)	157

Alternator Specifications

Alternator model	PI734E	Number of phase	3
Alternator manufacturer	STAMFORD	Rated voltage	400V (Available with custom requirements)
Exciter type	Single bearing, Brushless, Self-excited	Power factor	0.8
Rated output prime power	1900 KVA	Voltage regulation NL-FL	±1%
Rated speed	1500 rpm	Insulation grade	H
Rated frequency	50Hz	Protection grade	IP23

Alternator option: Leroy Somer, MECC, Marathon, Engga, Faraday

Control System DSE7320 (DETAILED in INSTRUCTION)

DSE7320 is an advanced control module based on micro-processor, containing all necessary functions for protection of the genset and the breaker control. It can monitor the mains supply, breaker control and automatically start the engine when the mains are abnormal. Accurately measure various operational parameters and display all values and alarms information on the LCD. In addition, the control module can automatically shut down the engine and indicate the engine failure.

FEATURES

- ◆ Microprocessor control, with high stability and credibility.
- ◆ Monitoring and measuring operational parameters of the mains supply and genset.
- ◆ Indicating operation status, fault conditions, all parameters and alarms.
- ◆ Multiple protections; multiple parameters display, like pressure, temp. etc.
- ◆ Manual, automatic and remote work mode selectable.
- ◆ Real time clock for time and date display, overall runtime display, 250 log entries.
- ◆ Overall power output display.
- ◆ Integral speed/frequency detecting, telling status of start, rated operation, overspeed etc.
- ◆ Communication with PC via RS485 OR RS232 interface, using MODBUS protocol.

Soundproof Enclosure Specification

FDK silent generator is designed by professional acoustic engineers based on years of experience. Now we can make the noise of the generator less than 80-85dB(A) at 1m, or 70-75dB(A) at 7m, 60-65dB(A) at 15m.

FEATURES

- ◆ Multi-way air intake and exhaust guarantee the power performance of the generator.
- ◆ Large-scale impedance combined type silencer effectively reduce noise of the generator.
- ◆ Internal high performance rubber damper and flexible materials reduce vibration.
- ◆ Base mounted fuel tank supports the generator running for 8 hours.



ISO9001:2008

FDK reserves the right to change the specifications and designs without notice.

Optional

Generator set	Alternator	Low environment Temp	ATS
<input type="checkbox"/> Open generator set <input type="checkbox"/> Silent generator set <input type="checkbox"/> Trailer generator set <input type="checkbox"/> ABB MCCB circuit breaker	<input type="checkbox"/> Stamford <input type="checkbox"/> Marathon <input type="checkbox"/> Mecc Alte <input type="checkbox"/> Leroy Somer <input type="checkbox"/> Farady <input type="checkbox"/> Engga	<input type="checkbox"/> Water heater <input type="checkbox"/> Oil heater <input type="checkbox"/> Battery heater	<input type="checkbox"/> CHINT <input type="checkbox"/> SCHNEIDER <input type="checkbox"/> ABB
Fuel system	Control system	Voltage	Synchronized system
<input type="checkbox"/> 12hrs base tank <input type="checkbox"/> 24hrs base tank <input type="checkbox"/> Dual wall base fuel tank <input type="checkbox"/> Outside fuel tank	<input type="checkbox"/> AMF function <input type="checkbox"/> ATS control cabinet <input type="checkbox"/> DSE7320 <input type="checkbox"/> DSE7510 <input type="checkbox"/> GU620A	<input type="checkbox"/> 415/240V <input type="checkbox"/> 400/230V <input type="checkbox"/> 380/220V <input type="checkbox"/> 220/127V <input type="checkbox"/> 200/115V	<input type="checkbox"/> CHINT Cabinet <input type="checkbox"/> SCHNEIDER Cabinet <input type="checkbox"/> DSE8610 Module <input type="checkbox"/> COMAQ Module <input type="checkbox"/> DEIF Module

Dimension & Weight

Open

Overall Size: L×W×H (mm)	5900×2100×2750
Weight (kg)	16000


Soundproof Version

Overall Size: L×W×H (mm)	40FT CONTAINER
Weight (kg)	29000

Sales Promises

- ◆ FDK provides a full line of brand new and high quality products. Each and every unit is strictly factory tested before shipment.
- ◆ Quality warranty is according to our standard conditions: 12 months from BL date or 1000 running hours, whichever comes first.
- ◆ Service and parts are available from FDK or distributors in your location.
- ◆ FDK guarantee use **BRAND NEW & GENUINE MACHINE.**



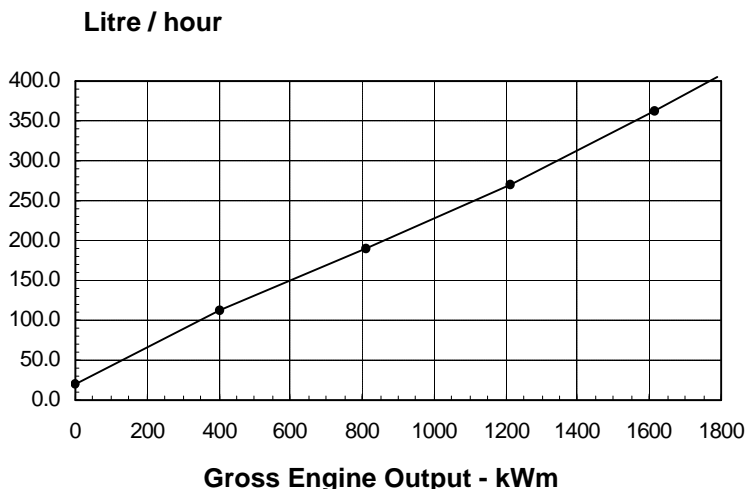
	Cummins Inc. Columbus, Indiana 47201 Engine Data Sheet	Basic Engine Model: QSK60-G3	Curve Number: FR-6283	<i>G-DRIVE</i> QSK 1
		Engine Critical Parts List: CPL: 2824	Date: 4Dec03	
Displacement : 60.2 litre (3673 in³)		Bore : 159 mm (6.25 in.) Stroke : 190 mm (7.48 in.)		
No. of Cylinders : 16		Aspiration : Turbocharged and Low Temperature Aftercooled (2 Pump / 2 Loop)		
Emissions: Refer to Emission Data Sheet for Details.				

Engine Ratings:

Engine Speed RPM	Standby Power		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
1500	1790	2399	1615	2165	1305	1749

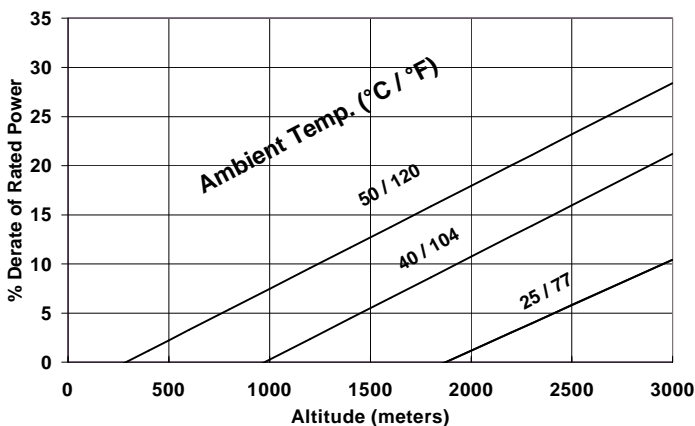
Engine Fuel Consumption @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/kWm-h	lb/BHP-h	litre/hour	U.S. Gal/hour
STANDBY POWER						
100	1790	2399	0.193	0.317	406	107.1
PRIME POWER						
100	1615	2165	0.191	0.314	363	95.7
75	1211	1624	0.190	0.312	270	71.3
50	808	1082	0.200	0.329	190	50.2
25	404	541	0.235	0.387	112	29.5
CONTINUOUS POWER						
100	1305	1749	0.190	0.313	292	77.1

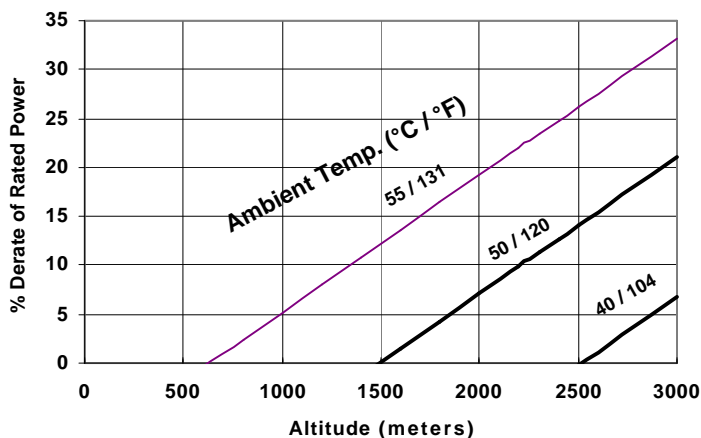


Power Derate Curves:

Standby / Prime Power



Continuous Power



Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 3.3% per 300 m (1000 ft), and 10% per 10° C (18° F).

CONVERSIONS: (litres = U.S. Gal x 3.785) (U.S. Gal = litres x 0.2642)

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. **STANDBY POWER RATING:** Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency. **PRIME POWER RATING:** Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories: **UNLIMITED TIME RUNNING PRIME POWER:** Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year. **LIMITED TIME RUNNING PRIME POWER:** Limited Time Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating. **CONTINUOUS POWER RATING:** Applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

Data Subject to Change Without Notice

Reference AEB 10.47 for determining Electrical Output.
 Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2.
 Derates shown are based on 15 in H₂O air intake restriction and 2 in Hg exhaust back pressure.
 The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: Limited Production
 Data Tolerance: ± 5%
 Chief Engineer: *D.K. Trueblood*

Cummins Inc. Engine Data Sheet

ENGINE MODEL : QSK60-G3

CONFIGURATION NUMBER : D593002GX03

DATA SHEET : DS-6283-LP

DATE : 4Dec03

PERFORMANCE CURVE : FR-6283

INSTALLATION DIAGRAM

• Fan to Flywheel : 3170381

CPL NUMBER

• Engine Critical Parts List : 2824

GENERAL ENGINE DATA

Type.....	4-Cycle; 60° Vee; 16-Cylinder Diesel	
Aspiration.....	Turbocharged and Low Temperature Aftercooled (2 Pump / 2 Loop)	
Bore x Stroke.....	— mm x mm (in x in)	159 x 190 (6.25 x 7.48)
Displacement.....	— litre (in ³)	60.2 (3673)
Compression Ratio.....		14.5 : 1
Dry Weight		
Fan to Flywheel Engine (with SAE 0 Flywheel and Flywheel Housing).....	— kg (lb)	7185 (15835)
Wet Weight		
Fan to Flywheel Engine.....	— kg (lb)	7540 (16620)
Moment of Inertia of Rotating Components		
• with FW 6043 Flywheel (SAE 0).....	— kg • m ² (lb _m • ft ²)	15.77 (375.5)
• with FW 6037 Flywheel (SAE 00).....	— kg • m ² (lb _m • ft ²)	26.23 (622.4)
Center of Gravity from Front Face of Block.....	— mm (in)	1001 (39.4)
Center of Gravity Above Crankshaft Centerline.....	— mm (in)	219 (8.6)
Maximum Static Loading at Rear Main Bearing.....	— kg (lb)	1134 (2500)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block.....	— N • m (lb • ft)	10350 (7634)
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EXHAUST SYSTEM

Maximum Back Pressure at 1500 RPM (Standby Power).....	— mm Hg (in Hg)	51 (2)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction		
• with Dirty Filter Element.....	— kPa (in H ₂ O)	6.2 (25)
• with Clean Filter Element.....	— kPa (in H ₂ O)	3.7 (15)

COOLING SYSTEM (Separate Circuit Aftercooling Required)

Coolant Capacity — Engine.....	— litre (US gal)	157 (42)
— Aftercoolers.....	— litre (US gal)	34 (9)
Minimum Pressure Cap (for Cooling Systems with less than 2m [6 ft.] Static Head).....	— kPa (psi)	76 (11)
Maximum Static Head of Coolant Above Engine Crank Centerline.....	— m (ft)	18.3 (60)

Jacket Water Circuit Requirements:

Maximum Coolant Friction Head External to Engine — 1500 rpm.....	— kPa (psi)	48 (7)
Maximum Top Tank Temperature for Standby / Prime Power.....	— °C (°F)	104 / 100 (220 / 212)
Thermostat (Modulating) Range.....	— °C (°F)	82 - 93 (180 - 200)

Aftercooler Circuit Requirements:

Maximum Coolant Friction Head External to Engine — 1500 rpm.....	— kPa (psi)	35 (5)
Maximum Inlet Water Temperature to Aftercoolers @ 25 °C (77 °F).....	— °C (°F)	49 (120)
Maximum Inlet Water Temperature to Aftercoolers.....	— °C (°F)	65 (150)
Thermostat (Modulating) Range.....	— °C (°F)	46 - 57 (115 - 135)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed.....	— kPa (psi)	138 (20)
@ Governed Speed.....	— kPa (psi)	345-483 (50-70)
Maximum Oil Temperature.....	— °C (°F)	121 (250)
Oil Capacity with OP6073 Oil Pan: Low-High.....	— litre (US gal)	231-261 (61-69)
Total System Capacity (with Combo Filter).....	— litre (US gal)	280 (74)

FUEL SYSTEM

		Cummins HPI-PT	
Type Injection System.....			
Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter.....	— mm Hg (in Hg)	120	(4.0)
— with Dirty Fuel Filter.....	— mm Hg (in Hg)	203	(8.0)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head).....	— mm Hg (in Hg)	229	(9.0)
Maximum Fuel Inlet Temperature.....	°C (°F)	70	(160)
Maximum Fuel Flow to Injection Pump.....	— litre / hr (US gph)	1515	(400)
Maximum Drain Flow.....	— litre / hr (US gph)	1400	(370)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement).....	— volt	24
Battery Charging System, Negative Ground.....	— ampere	40
Maximum Allowable Resistance of Cranking Circuit.....	— ohm	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and Above.....	— 0°F CCA	1800
• Cold Soak @ 0 °C to 10 °C (32 °F to 50 °F).....	— 0°F CCA	1800
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F).....	— 0°F CCA	2200

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with _____ watt Coolant Heater to Rated Speed.....	— °C (°F)	TBD	(TBD)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed.....	— °C (°F)	-12	(10)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature).....	— °C (°F)	10	(50)

PERFORMANCE DATA

All data is based on:

- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
- Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
- ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure	: 100 kPa (29.53 in Hg)	Air Temperature	: 25 °C (77 °F)
Altitude	: 110 m (361 ft)	Relative Humidity	: 30%
Air Intake Restriction	: 381 mm H ₂ O (15 in H ₂ O)	Exhaust Restriction	: 51 mm Hg (2 in Hg)

Steady State Stability Band at any Constant Load.....	— %	+/- 0.25
Estimated Free Field Sound Pressure Level of a Typical Generator Set; Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); @ 1500 rpm.....	— dBA	93.4 (est.)
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°.....	— dBA	108 (est.)

Governed Engine Speed.....	— rpm	
Engine Idle Speed.....	— rpm	
Gross Engine Power Output.....	— kW _m (BHP)	
Brake Mean Effective Pressure.....	— kPa (psi)	
Piston Speed.....	— m / s (ft / min)	
Friction Horsepower.....	— kW _m (HP)	
Engine Jacket Water Flow at Stated Friction Head External to Engine:		
• 4 psi Friction Head.....	— litre / s (US gpm)	
• Maximum Friction Head.....	— litre / s (US gpm)	

Engine Data

Intake Air Flow.....	— litre / s (cfm)	
Exhaust Gas Temperature.....	— °C (°F)	
Exhaust Gas Flow.....	— litre / s (cfm)	
Air to Fuel Ratio.....	— air : fuel	
Radiated Heat to Ambient.....	— kW _m (BTU / min)	
Heat Rejection to Engine Jacket Radiator.....	— kW _m (BTU / min)	
Heat Rejection to Exhaust.....	— kW _m (BTU / min)	
Heat Rejection to Fuel*.....	— kW _m (BTU / min)	

Engine Aftercooler Data

Heat Rejection to Aftercooler Radiator.....	— kW _m (BTU / min)	
Aftercooler Water Flow at Stated Friction Head External to Engine:		
• 2 psi Friction Head.....	— litre / s (US gpm)	
• Maximum Friction Head.....	— litre / s (US gpm)	

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
		1500		1500
		700 - 900		700 - 900
		1790 (2399)		1615 (2165)
		2379 (345)		2144 (311)
		9.5 (1869)		9.5 (1869)
		146 (196)		146 (196)
	Not Applicable for 1800 RPM Operation		Not Applicable for 1800 RPM Operation	
		26.5 (420)		26.5 (420)
		25.2 (400)		25.2 (400)
		2255 (4780)		2150 (4555)
		440 (820)		415 (775)
		5525 (11700)		5105 (10815)
		26.9:1		28.7:1
		160 (9020)		145 (8165)
		460 (26000)		420 (23950)
		1120 (63700)		1020 (57950)
		35 (2000)		35 (2000)
		405 (22925)		355 (20175)
		7.1 (112)		7.1 (112)
		6.9 (109)		6.9 (109)

* This is the maximum heat rejection to fuel, which is at low load

N.A. - Data is Not Available

N/A - Not Applicable to this Engine

TBD - To Be Determined

ENGINE MODEL : QSK60-G3

DATA SHEET : DS-6283-LP

DATE : 4Dec03

CURVE NO. : FR-6283

Cummins Inc.

Columbus, Indiana 47202-3005