

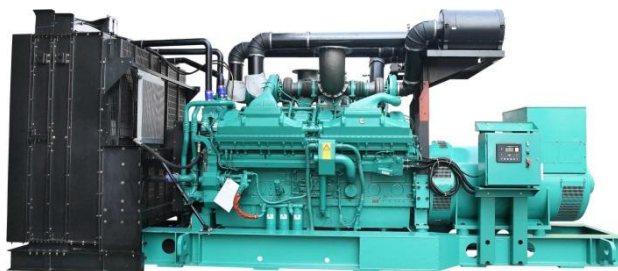
DATA SHEET

DIESEL GENERATOR 650KW

MODEL#FDK-CG810/H1

50HZ/1500RPM

CUMMINS MODEL: QSK23-G2



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-CG810/H1	Engine Make	Cummins Original
Prime Power	600KW/750KVA	Engine Model	QSK23-G2
Standby Power	650KW/810KVA	Alternator model	Stamford LVI634B
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	QSK23-G2	Aspiration	Turbo-charged
Engine Manufacturer	Cummins ORIGINAL	Bore x Stroke (mm x mm)	170×170
Cylinder quantity	6	Displacement	23.15L
Cylinder Arrangement	In-line	Compression Ratio	16.0:1
Cycle	4	Prime power / Speed (KW/RPM)	656kw/1500
		Standby power/ Speed (KW/RPM)	724kw/1500



Type Injection System	Cummins HPI-PT	Total Lubrication System Capacity (L)	103
Piston Speed	8.6m/s	Fuel Consumption at 100% load (L/H)	151 at 1500rpm
Friction Energy Output	72kw	Starter motor	DC24V
		Low idle	750pm
		Coolant Capacity (L)	46.5

Alternator Specifications

Alternator model	LVI634B	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	750KVA	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.



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)	3800×1818×2350
Weight (kg)	7000

Soundproof Version

Overall Size: L×W×H (mm)	5800×2000×2550
Weight (kg)	9300

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.**





Engine Performance Data

Cummins Inc

Columbus, Indiana 47202-3005
 http://www.cummins.com

Power Generation

QSK38-G2

FR 6700

Configuration
D233042GX03

CPL Code
3268

Revision
19-Jun-2009

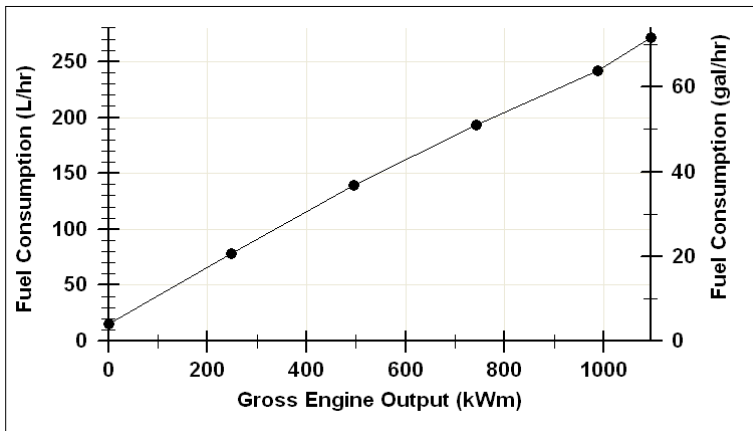
Compression Ratio: **15:1** Displacement: **2,301 in3 (37.7 L)**
 Fuel System: **Cummins MCRS** Aspiration: **Turbocharged and Aftercooled**
 Emission Certification: **U.S. EPA Tier 2, CARB Tier 2 (without Centinel)**

Engine Ratings:

Engine Speed	Standby Power		Prime Power		Continuous Power	
	RPM	bhp	kWm	bhp	kWm	bhp
1,500	1,470	1,096	1,326	989	1,197	893

Engine Fuel Consumption @1,500 RPM

Output Power			Fuel Consumption			
%	bhp	kWm	lb/ bhp-h	kg/ kWm-h	gal/hr	l/hr
Standby Power						
100	1,470	1,096	0.346	0.210	71.6	271
Prime Power						
100	1,326	989	0.342	0.208	63.8	242
75	995	742	0.364	0.221	51	193
50	663	494	0.393	0.239	36.7	139
25	332	248	0.442	0.269	20.6	78
Continuous Power						
100	1,197	893	0.343	0.209	57.8	219



Rating Type:

Data Subject to Change Without Notice

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.

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.

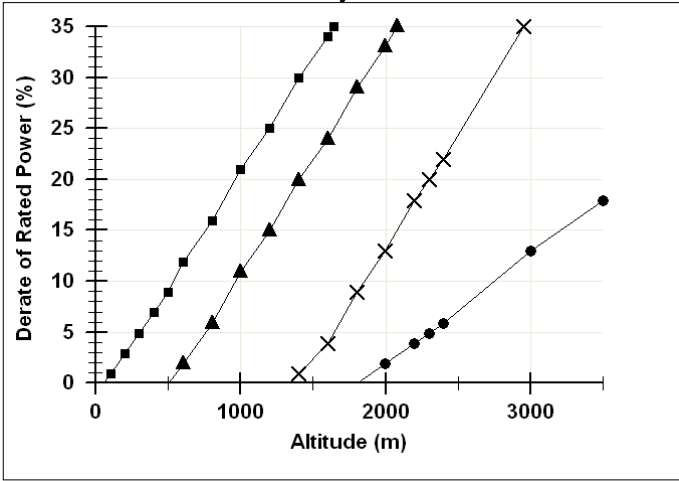
The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: Final-(Measured data)

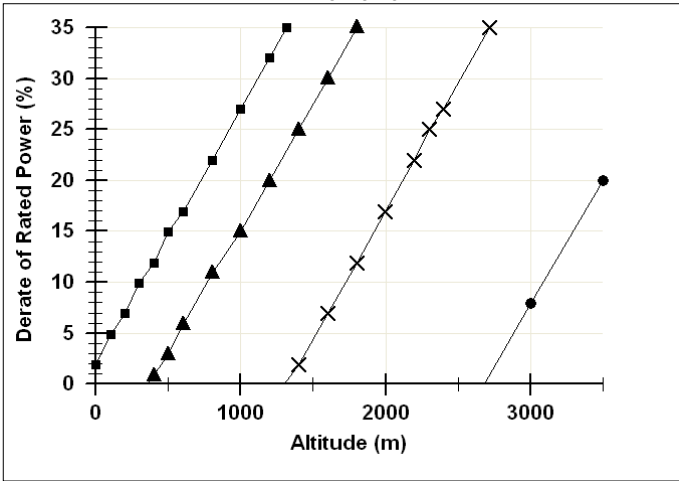
Data Tolerance: +/- 5 %

CHIEF ENGINEER: Cary J Marston

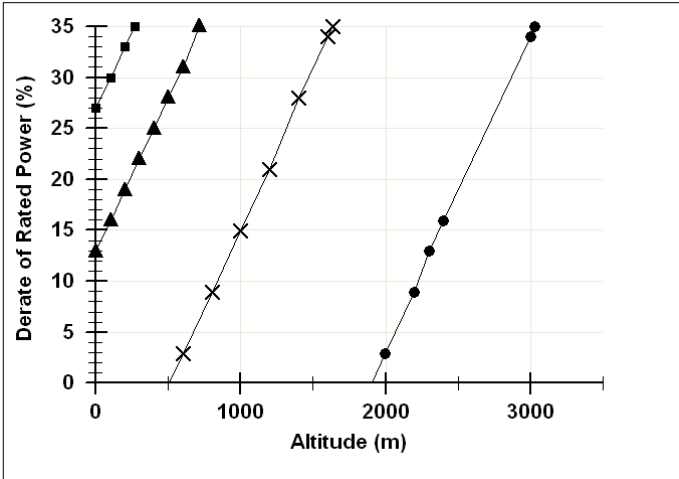
**1,500 RPM Power Derate Curves
Standby Power**



Prime Power



Continuous Power



Operation at Elevated Temperature and Altitude:

For standby operation above these conditions, derate by an additional 7 % per 1,000 ft (305 m), and 20 % per 18 delta deg F (10 delta deg C)
 For prime operation above these conditions, derate by an additional 7 % per 1,000 ft (305 m), and 23 % per 18 delta deg F (10 delta deg C)

- 77 deg F (25 deg C)
- × 104 deg F (40 deg C)
- ▲ 122 deg F (50 deg C)
- 131 deg F (55 deg C)

General Engine Data

Type	Four cycle; Vee; 12 Cylinder Turbocharged and Aftercooled	
Aspiration		
Bore x Stroke	6.25 x 6.25 in	159 x 159 mm
Displacement	2,301 in ³	37.7 L
Compression Ratio	15:1	
Approximate engine weight (wet)	9,039 lbm	4,100 kg
Moment of Inertia of Rotating Components		
with FW6074 Flywheel	93 in-lbf-sec**2	10.4 kg-m**2
with FW6077 Flywheel	184 in-lbf-sec**2	20.8 kg-m**2
Center of Gravity		
from rear face of block	31.54 in	801 mm
above crankshaft centerline	6.8 in	173 mm
Maximum Static Loading at Rear Main Bearing	2,000 lbm	907 kg

Engine Mounting

Maximum Bending Moment at Rear Face of Block	4,500 lb-ft	6,101 N-m
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Exhaust System

Maximum back pressure at Standby Power	2 in-Hg	7 kPa
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Air Induction System

Maximum Intake Air Restriction		
with Dirty Filter Element	25 in H ₂ O	6.2 kPa
with Normal Duty Air Cleaner and Clean Filter Element	15 in H ₂ O	3.7 kPa

Cooling System

Coolant Capacity		
Engine	112 quarts	106 L
Aftercoolers	24 quarts	22.7 L
Minimum pressure cap rating at sea level	11 psi	76 kPa
Maximum static head of coolant above crankshaft centerline	60 ft	18.3 m

Jacket Water Circuit Requirements

Maximum Coolant Friction Head External to Engine - 1,500 RPM	10 psi	68.9 kPa
Maximum Coolant Temperature (Max Top Tank Temp) for standby/prime power	220 / 212 deg F	104 / 100 deg C
Thermostat (Modulating) Range	180 - 202 deg F	82 - 94 deg C

Aftercooler Circuit Requirements

Maximum Coolant Friction Head External to Engine - 1,500 RPM	10 psi	68.9 kPa
Maximum coolant temperature into the aftercooler @ 25C (77F) ambient	120 deg F	49 deg C
Maximum coolant temperature into aftercooler @ Limiting Ambient conditions for standby/prime power	160 / 150 deg F	71 / 66 deg C
Thermostat (Modulating) Range	115 - 135 deg F	46 - 57 deg C

Lubrication System

Oil Pressure		
@ Minimum low idle	20 psi	138 kPa
@ Governed speed	50 - 70 psi	344.7 - 482.6 kPa
Maximum Oil Temperature	248 deg F	120 deg C
Oil Capacity with OP Oil Pan: Low-High	37 - 44 gal	140.1 - 166.6 L
Total System Capacity (with Combo Filter)	45 gal	170.3 L

Fuel System

Type Injection System	Cummins MCRS	
Maximum fuel supply restriction at fuel pump inlet		
with clean fuel filter element(s) at maximum fuel flow	5 in-Hg	16.9 kPa
with dirty fuel filter element(s) at maximum fuel flow	10 in-Hg	34 kPa
Maximum fuel inlet temperature	160 deg F	71 deg C
Maximum supply fuel flow	167 gal/hr	632 L/hr
Maximum return fuel flow	94 gal/hr	356 L/hr

Electrical System

System voltage	24 V
Minimum Recommended Battery Capacity	
cold soak at 10 deg C (50 deg F) and above	
cold soak at 0 to 10 deg C (32 to 50 deg F)	
cold soak at -18 to 0 deg C (0 to 32 deg F)	1,800 CCA
Maximum starting circuit resistance	0.002 Ohm

Cold start capability

Unaided Cold Start		
Minimum cranking speed		150 RPM
Minimum ambient temperature for unaided cold start	45 deg F	7.2 deg C

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%

Estimated Free Field Sound Pressure Level of a Typical Generator Set; 1,500 RPM 99.7 dBa

Exhaust Noise at Rated 1 m Horizontally From Centerline of Exhaust Pipe Outlet Upwards at 45%; 1,500 RPM 97.3 dBa

Governed Engine Speed	RPM	Standby Power		Prime Power	
		1,800	1,500	1,800	1,500
Engine Idle Speed			700 - 1,200		700 - 1,200
Gross Engine Power Output	hp (kW)		1,470 (1,096)		1,326 (989)
Brake Mean Effective Pressure	psi (kPa)		336 (2,317)		303 (2,089)
Piston Speed	ft/min (m/s)		1,562 (7.9)		1,562 (7.9)
Friction Horsepower	hp (kW)		115 (86)		115 (86)
Engine Jacket Water Flow at Stated Friction Head external to Engine					
- 2.5 psi Friction Head	gpm (L/min)		274 (1,037)		274 (1,037)
- Maximum Friction Head	gpm (L/min)		209 (791)		209 (791)
<u>Engine Data</u>					
Intake Air Flow	ft ³ /min (L/s)		3,290 (1,553)		2,997 (1,414)
Exhaust Gas Temp - Dry Stack	deg F (deg C)		891 (477)		874 (468)
Exhaust Gas Flow	ft ³ /min (L/s)		7,892 (3,725)		7,166 (3,382)
Air to Fuel ratio			27.7:1		28.3:1
Heat Rejection to Ambient	BTU/min (kW)		6,211 (109)		5,534 (97)
Heat Rejection to Jacket Coolant	BTU/min (kW)		23,678 (416)		21,465 (377)
Heat Rejection to Exhaust	BTU/min (kW)		46,354 (815)		41,292 (726)
Heat Rejection to Fuel*	BTU/min (kW)		379 (6.7)		379 (6.7)
<u>2P2L</u>					
Heat Rejection to Aftercooler Coolant	BTU/min (kW)		16,544 (291)		13,745 (242)
Aftercooler Water Flow at Stated Friction Head external to Engine					
- 2.5 psi Friction Head	gpm (L/min)		137 (519)		137 (519)
- Maximum Friction Head	gpm (L/min)		116 (439)		116 (439)

*This is the maximum heat rejection, not specified to the load listed.

End of Report