FDK ENERGY

GUANGDONG FUDIANKANG DIESEL GENSET CO., LTD
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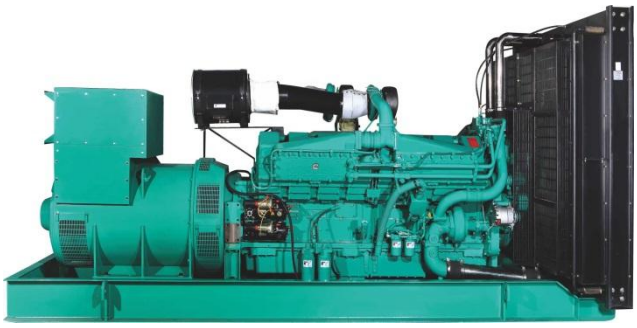
DATA SHEET

DIESEL GENERATOR 350KW
MODEL#FDK-CC440/H1
50HZ/1500RPM
CUMMINS MODEL: QSNT-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-CC440/H1	Engine Make	Cummins
Prime Power	320KW/400KVA	Engine Model	QSNT-G3
Standby Power	350KW/438KVA	Alternator model	Stamford HCI444FS
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	QSNT-G3	Aspiration	Turbo-charged
Engine Manufacturer	Cummins (CCEC CHINA)	Bore x Stroke (mm x mm)	140×152
		Displacement	14L
Cylinder quantity	6	Compression Ratio	16.7:1
Cylinder Arrangement	In-line	Prime power / Speed (KW/RPM)	358/1500
Cycle	4	Standby power/ Speed (KW/RPM)	392/1500

CE ISO9001:2008 FDK reserves the right to change the specifications and designs without noice.

Type Injection System	CELECT
Piston Speed	7.62m/s
Friction Energy Output	43.8kw
Total Lubrication System Capacity (L)	38.6

Fuel Consumption at 100% load (L/HOUR)	108 at 1500rpm
Starter motor	DC24V
Low idle	700-800rpm
Coolant Capacity (L)	21L

Alternator Specifications

Alternator model	HCI444FS
Alternator manufacturer	STAMFORD
Exciter type	Single bearing, Brushless, Self-excited
Rated output prime power	400KVA
Rated speed	1500 rpm
Rated frequency	50Hz

Number of phase	3
Rated voltage	400V (Available with custom requirements)
Power factor	0.8
Voltage regulation NL-FL	≤±1%
Insulation grade	H
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.

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Optional

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

Dimension & Weight

Open

Overall Size: L×W×H (mm)	3250×1360×2100
Weight (kg)	2910

Soundproof Version

Overall Size: L×W×H (mm)	4500×1600×2500
Weight (kg)	5290

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.**

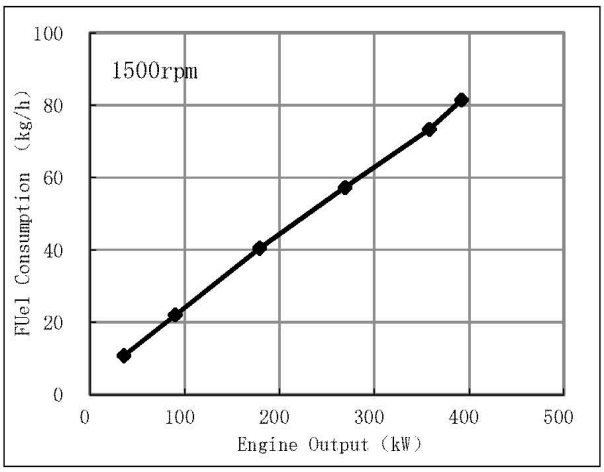
Engine Performance Data Chongqing Cummins Chongqing,Chnia http://www.cummins.com	G-Drive QSNT-G3 FR11390	Revision 21-Mar-2017	
		Configuration D093677GX03	CPL 4691

Compression Ration	16.7:1	Displacement	14L (855 in^3)
Fuel System	CELECT	Aspiration	Turbocharged and Charge Air Cooled
Emission Certificatio	STG IIIA, NRMM 3		

Engine Speed	Standby Power		Prime Power		Continuous Power	
rpm	kW	HP	kW	HP	kW	HP
1500	392	525	358	480	321	430
1800	403	540	358	480	321	430

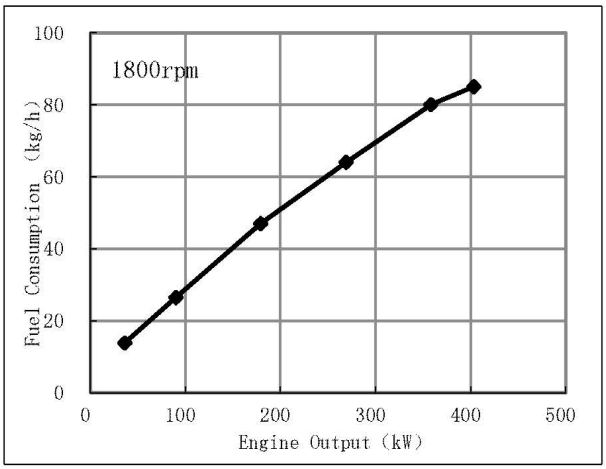
Engine Performance Data @ 1500 rpm

Output Power			Fuel Consumption			
%	HP	kW	lb/hp·h	kg/kW·h	lb/h	kg/h
Standby Power						
100	525	392	0.070	0.208	37.0	81.5
Prime Power						
100	480	358	0.069	0.205	33.3	73.4
75	360	269	0.072	0.213	26.0	57.3
50	240	179	0.077	0.226	18.4	40.5
25	120	90	0.083	0.244	10.0	22.0
10	48	36	0.102	0.300	4.9	10.8
Continuous Power						
100	430	321	0.070	0.208	30.3	66.8



Engine Performance Data @ 1800 rpm

Output Power			Fuel Consumption			
%	HP	kW	lb/hp·h	kg/kW·h	lb/h	kg/h
Standby Power						
100	540	403	0.071	0.211	38.6	85.0
Prime Power						
100	480	358	0.076	0.223	36.3	80.0
75	360	269	0.081	0.238	29.0	64.0
50	240	179	0.089	0.263	21.3	47.0
25	120	90	0.100	0.293	12.0	26.4
10	48	36	0.130	0.383	6.3	13.8
Continuous Power						
100	430	321	0.079	0.232	33.8	74.5



Data Subject to Change Without Notice

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.

All data are based on 15 in H_2O(3.7kPa) air intake restriction and 3.0 in Hg (10kPa) exhaust restriction.

The fuel consumption data is based on No. 2 diesel fuel. 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: Production
Tolerance: ±5%

Chief Engineer:
Guan Rong

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

STANDBY POWER RATING is 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.

CONTINUOUS POWER RATING is 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.

PRIME POWER RATING is 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

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.

Reference Standards:
BS-5514 and DIN-6271 standards are based on ISO-3046.

Operation at Elevated Temperature and Altitude:
The engine may be operated at:

1800 RPM up to 4920 ft. (1500 m) and 104 °F (40 °C) without power deration.

1500 RPM up to 4920 ft. (1500 m) and 104 °F (40 °C) without power deration.

For sustained operation above these conditions, derated by 4% per 1,000 ft. (300 m), and 1% per 10 °F (2% per 11 °C).

General Engine Data

Type		6-Cylinder;In-line;4-Cycle	
Aspiration		Turbocharged and Charge Air Cooled	
Bore x Stroke	— in.×in. (mm×mm)	5.5x6.0	140x152
Displacement	— in.3(L)	855	14
Compression Ratio		16.3:1	
Firing Order		1-5-3-6-2-4	
Dry Weight			
--Including Flywheel and Generator Excluding other Electrial Component	— lb. (kg)	3219	(1460)
Wet Weight			
--Engine Only	— lb. (kg)	3330	(1510)
Moment of Inertia of Rotating Components			
- With FW1010 Flywheel	— lb.·ft.^{2} (kg·m^2)	118.5	(4.99)
Center of Gravity			
--From Front Face of Block	— in.(mm)	22.67	(575.7)
--From Engine Centerline to Left Side of Engine (as view from rear of engine)	— in.(mm)	0.51	(12.9)
--above crankshaft centerline	— in.(mm)	6.48	(164.6)

ENGINE MOUNTING

Max Bending Moment at Rear Face of Block	— lb-ft (N.m)	1000	(1356)

EXHAUST SYSTEM

Maximum Allowable Back Pressure	— in.Hg (kPa)	3.0	(10)
Recommended Exhaust Pipe Diameter	— in.(mm)	5.0	(127)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction			
--with Dirty Filter Element	— in.H_2O(kPa)	25	(6.2)
--with Heavy Duty Air Cleaner and Clean Filter Element	— in.H_2O(kPa)	15	(3.7)
Maximum Allowable Intake Air Temperature ΔT	— °F (°C)	30	(17)

COOLING SYSTEM

Coolant Capacity - Engine Only	— U.S. gal (L)	5.5	(21.0)
Maximum Coolant Friction Head External to Engine	— PSI (kPa)	5	(34.5)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft. (m)	46	(14)
Standard Thermostat (Modulating) Range	— °F (°C)	180-202	(82-94)
Minimum Allowable Pressure Cap	— PSI (kPa)	10	(69)
Maximum Top Tank Temperature for Standby/PrimePower	— °F (°C)	220/212	(104/100)
Minimum Top Tank Temperature	— °F (°C)	160	(71)
Minimum Coolant Expansion Space - % of System Capacity		6	
Max Air Pressure Drop from Turbo Air Outlet to Intake Manifold	— kPa (in.Hg)	13.5	(4)
Max Intake Manifold Temperature @ 77°F(25℃) Ambient	— °F (°C)	140	(60)
Max CAC Outlet delta Temperature at an ambient of ≥25℃(77°F)	— °F (°C)	63	(35)
Max Intake Manifold Air Temperature Derate/Alarm	— °F (°C)	185	(85)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— PSI (kPa)	15	(103)
@ Governed Speed	— PSI (kPa)	35-50	(241-345)
Maximum Allowable Oil Temperature	— °F (°C)	250	(121)
Oil Pan Capacity - Low / High	— U.S. gal. (L)	7.5/9.5	(28.4/36.0)
Total System Capacity	— U.S. gal. (L)	10.2	(38.6)
Angularity of Oil Pan - Front Down/Front Up/Side to Side		38°	

FUEL SYSTEM

Type Injection System		CELECT	
Maximum Fuel Supply Restriction at Fuel Pump Inlet			
-- With Clean Fuel Filter	— in Hg (kPa)	6	(20)
-- With Dirty Fuel Filter	— in Hg (kPa)	10	(34)
Maximum Fuel Drain Restriction (total head)			
-- With Check Valve	— in Hg (kPa)	6.5	(22)
-- Without Check Valve	— in Hg (kPa)	2.5	(8.5)
Max Supply Fuel Flow @1500/1800rpm	— lb/hr(kg/hr)	562/606	(255/275)
Max Return Fuel Flow @1500/1800rpm	— lb/hr(kg/hr)	386/430	(175/195)
Maximum Fuel Inlet Temperature	— °F (°C)	160	(71)

ELECTRICAL SYSTEM

System Voltage	— volt	24	
Minimum Recommended Battery Capacity for Engine only)			
-- cold cranking amperes @ cold soak at 50℉(10℃) and above	— CCA	600	
-- cold cranking amperes @ cold soak at 32℉-50℉(0℃-10℃)	— CCA	640	
-- cold cranking amperes @ cold soak at 0℉-32℉(-18℃-0℃)	— CCA	900	
-- reserve capacity (RC) @ cold soak at 0℉(-18℃) or above	— min	320	
Max Starting Circuit Resistance	— Ohm	0.002	

Cold Start Capability

Cold Start Capability			
--Minimum Cranking Speed	— r/min	130	
--Minimum Ambient Temp for Unaided Cold Start	— °F (°C)	10.4	(-12)

Performance Data

		Standby Power		Prime Power	
		60Hz	50Hz	60Hz	50Hz
Governed Engine Speed	rpm	1800	1500	1800	1500
Engine Idle Speed	rpm	700-800	700-800	700-800	700-800
Gross Engine Power Output	HP(kW)	540 (403)	525 (392)	480 (358)	480 (358)
Brake Mean Effective Pressure	PSI(kPa)	272 (1919)	325 (2240)	247 (1705)	297 (2046)
Friction Power	HP(kW)	59 (43.8)	42 (31.4)	59 (43.8)	42 (31.4)
Intake Air Flow	ft^3/min (L/s)	1169 (552)	1083 (511)	1164 (550)	1004 (474)
Charge Air Flow	lb/min (kg/h)	85 (2317)	78 (2140)	85 (2305)	73 (1988)
Turbo Comp Outlet Pressure	PSI(kPa)	34 (235)	35 (242)	33 (231)	31 (216)
Turbo Comp Outlet Temp	°F (°C)	374 (190)	383 (195)	370 (188)	352 (178)
Exhaust Gas Temperature	°F (°C)	919 (493)	932 (500)	905 (485)	912 (489)
Exhaust Gas Flow	kg/h	2402	2222	2385	2062
Heat Rejection to Exhaust	BTU/min (kW)	19904 (350)	18425 (324)	18653 (328)	16662 (293)
Heat Rejection to Ambient	BTU/min (kW)	1137 (20)	1080 (19)	1024 (18)	1024 (18)
Heat Rejection to Fuel	BTU/min (kW)	500 (8.8)	455 (8)	330 (5.8)	313 (5.5)
Heat Rejection to Exhaust	BTU/min (kW)	8189 (144)	8018 (141)	7620 (134)	7222 (127)
Heat Rejected to Aftercooler	BTU/min (kW)	5061 (89)	4948 (87)	4834 (85)	4094 (72)