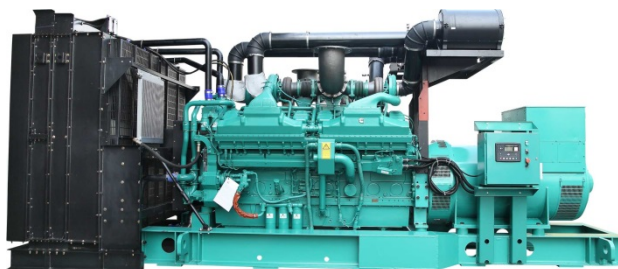


DATA SHEET

DIESEL GENERATOR 415KW
 MODEL#FDK-CG415/H2
 60HZ/1800RPM
 CUMMINS MODEL: QSX15-G6



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-CG415/H2
Prime Power	375KW/470KVA
Standby Power	415KW/520KVA
Output Frequency / Rated speed	60Hz/1800rpm
Rated Voltage	230V/400V

Engine Make	Cummins
Engine Model	QSX15-G6
Alternator model	Stamford HCI444F
Control System	DSE7320
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	QSX15-G6
Engine Manufacturer	Cummins (Onan USA)
Cylinder quantity	6
Cylinder Arrangement	In-line
Cycle	4

Aspiration	Turbo-charged
Bore x Stroke (mm x mm)	137x169
Displacement	15L
Compression Ratio	17:1
Prime power / Speed (KW/RPM)	414/1800
Standby power/ Speed (KW/RPM)	455/1800



ISO9001:2008

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

Type Injection System	HPI-TP	Fuel Consumption at 100% load (g/KWh)	201 at 1800rpm
Piston Speed	10.1m/s	Starter motor	24V
Friction Energy Output	52kw	Alternator	24V
Total Lubrication System Capacity (L)	91	Low idle	675-775rpm
Coolant Capacity (L)	24		

Alternator Specifications

Alternator model	HCI444F	Number of phase	3
Alternator manufacturer	STAMFORD	Rated voltage	440V (Available with custom requirements)
Exciter type	Single bearing, Brushless, Self-excited	Power factor	0.8
Rated output prime power	480KVA	Voltage regulation NL-FL	±1%
Rated speed	1800 rpm	Insulation grade	H
Rated frequency	60Hz	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: LxWxH (mm)	3300x1430x1950
Weight (kg)	4300

Soundproof Version

Overall Size: LxWxH (mm)	4500x1430x2400
Weight (kg)	5100

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 47202-3005
Engine Data Sheet

Basic Engine Model:
QSX15-G6
Engine Critical Parts List:
CPL: 8588

Curve Number:
FR-10699
Date:
17May07

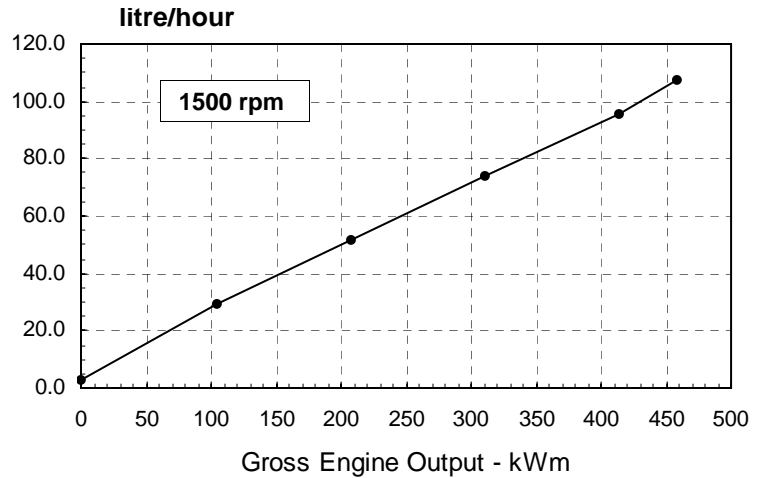
G-DRIVE
QSX
1

Displacement : 15 liter (912 in³) Bore : 137 mm (5.39 in.) Stroke : 169 mm (6.65 in.)
No. of Cylinders : 6 Aspiration : Turbocharged and Charge Air Cooled

Engine Speed rpm	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	459	615	414	555	291	390
1800	455	610	414	555	295	395

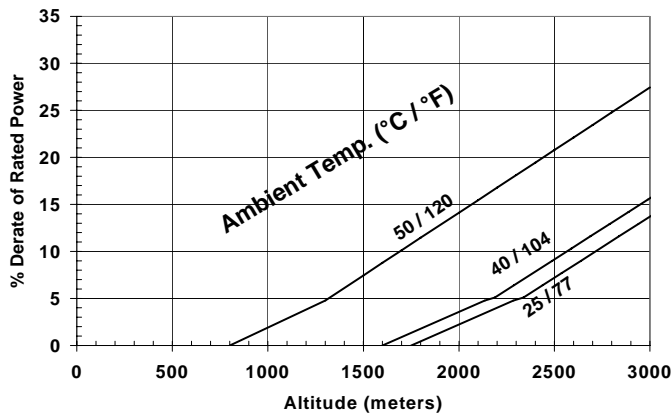
Engine Performance Data @ 1500 rpm

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm-h	lb/ hp-h	liter/ hour	US gal/ hour
STANDBY POWER						
100	459	615	0.199	0.328	108	28.4
PRIME POWER						
100	414	555	0.197	0.324	95.9	25.3
75	311	416	0.204	0.335	74.3	19.6
50	207	278	0.211	0.347	51.3	13.6
25	104	139	0.240	0.394	29.1	7.7
CONTINUOUS POWER						
100	291	395	0.205	0.337	71.0	18.7

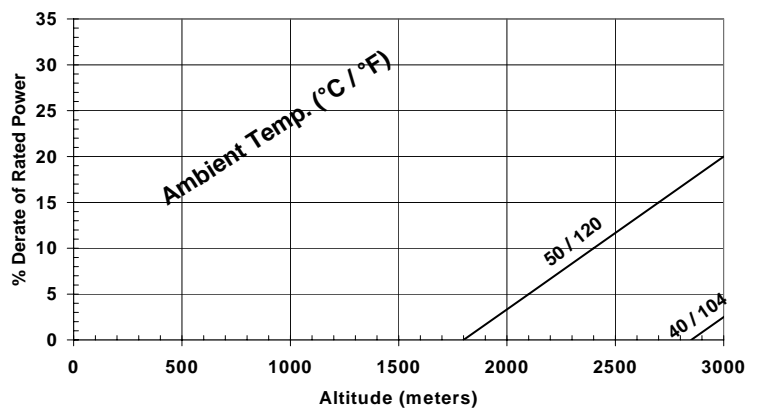


Power Derate Curves:

Standby / Prime Power



Continuous Power



Operation At Elevated Temperature And Altitude:

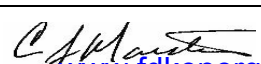
For sustained operation above these conditions, derate by an additional 1.8% per 300 m (1000 ft), and 10% per 10° C (18° F).


CONVERSIONS: (Liters = US Gal x 3.785) (USGal = Liters 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/liter (7.1 lbs/US 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: 
www.fdkenergy.com

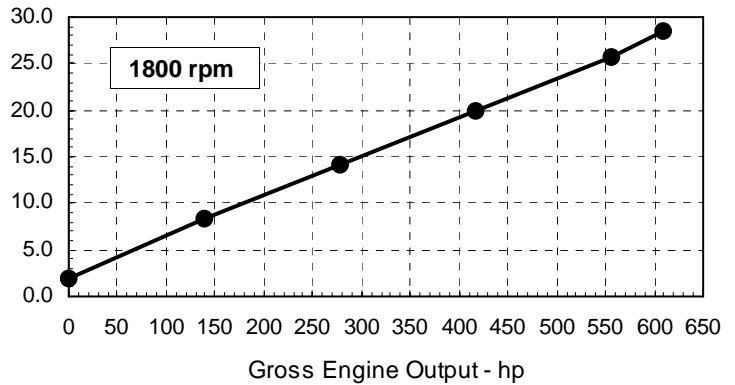
	Cummins Inc. Columbus, Indiana 47201 Engine Data Sheet	Basic Engine Model: QSX15-G6	Curve Number: FR-10699
		Engine Critical Parts List: CPL: 8588	Date: 17May07
Displacement : 15 liter (912 in ³)		Bore : 137 mm (5.39 in.) Stroke : 169 mm (6.65 in.)	
No. of Cylinders : 6		Aspiration : Turbocharged and Charge Air Cooled	

Engine Speed rpm	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	459	615	414	555	291	390
1800	455	610	414	555	295	395

Engine Performance Data @ 1800 rpm

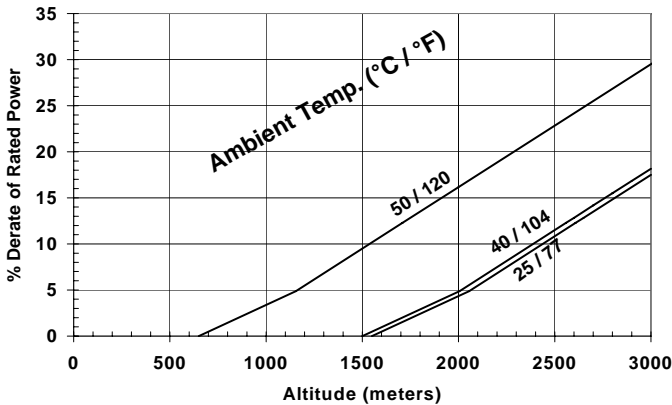
OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm-h	lb/ hp-h	liter/ hour	US gal/ hour
STANDBY POWER						
100	455	610	0.201	0.330	107	28.4
PRIME POWER						
100	414	555	0.201	0.330	97.6	25.8
75	311	416	0.206	0.339	75.2	19.9
50	207	278	0.219	0.361	53.4	14.1
25	104	139	0.261	0.430	31.8	8.4
CONTINUOUS POWER						
100	295	395	0.209	0.343	72.7	19.1

US gallons/hour

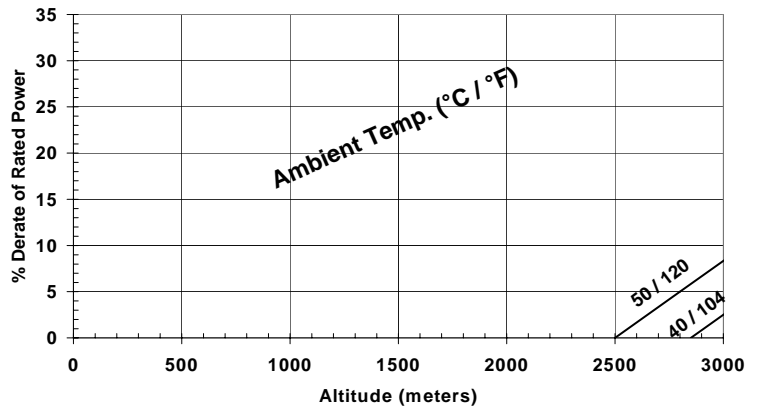


Power Derate Curves:

Standby / Prime Power



Continuous Power



Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 3.5% per 300 m (1000 ft), and 9% per 10 °C (18 °F).

CONVERSIONS:(Liters = US Gal x 3.785) (USGal = Liters x 0.2642)

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/liter (7.1 lbs/US 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:


www.fdkenergy.com

Cummins Inc.

Engine Data Sheet

ENGINE MODEL : QSX15-G6

CONFIGURATION NUMBER : D103003GX03

DATA SHEET : DS-10699

DATE : 17May07

PERFORMANCE CURVE : FR-10699

INSTALLATION DIAGRAM

- Fan to Flywheel: 3170370

CPL NUMBER

- Engine Critical Parts List :8588

GENERAL ENGINE DATA

Type	4 Cycle; In-line; 6-Cylinder Diesel
Aspiration	Turbocharged and Charge Air Cooled
Bore x Stroke	5.39 x 6.65 (137 x 169)
Displacement	912 (15)
Compression Ratio	17 : 1
Dry Weight (Approximate), Fan to Flywheel Engine	— lb (kg) 3020 (1370)
Wet Weight (Approximate), Fan to Flywheel Engine	— lb (kg) 3250 (1475)
Moment of Inertia of Rotating Components	
• with FW 1022 Flywheel	— lb _m • ft ² (kg • m ²) 106.7 (4.5)
• with FW 1025 Flywheel	— lb _m • ft ² (kg • m ²) 192.0 (8.1)
Center of Gravity from Front Face of Block	— in (mm) 19 (483)
Center of Gravity above Crankshaft Centerline	— in (mm) 10 (255)
Maximum Static Loading at Rear Main Bearing	— lb (kg) 5400 (2450)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— lb • ft (N • m) 1500 (2034)
--	-------------------------------

EXHAUST SYSTEM

Maximum Back Pressure at Standby Power Rating	— in Hg (mm Hg) 3 (76)
Maximum Bending Moment to the Turbo Flange	— lb • ft (N • m) 11 (15)

AIR INDUCTION SYSTEM

Maximum Temperature Rise Between Engine Air Inlet and Intake Manifold	— °F (°C) 43 (24)
Maximum Intake Air Restriction Including Air Filter Plumbing	
• with Dirty Filter Element	— in H ₂ O (mm H ₂ O) 25 (635)
• with Clean Filter Element	— in H ₂ O (mm H ₂ O) 15 (381)
Maximum Allowable Pressure Drop from Turbo Outlet to Intake Manifold	— in Hg (mm Hg) 4 (102)

COOLING SYSTEM

Coolant Capacity — Engine Only	— US qt (liter) 25 (24)
Maximum Coolant Friction Head External to Engine	— 1800 rpm..... — psi (kPa) 10 (69)
— 1500 rpm.....	— psi (kPa) 8 (55)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft (m) 46 (14)
Standard Thermostat (Modulating) Range	— °F (°C) 180-200 (82-93)
Minimum Pressure Cap	— psi (kPa) 10 (70)
Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C) 230/220 (110/104)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed (Minimum)	— psi (kPa) 20 (138)
@ Pressure Range — Cold	— psi (kPa) Up to 130 (Up to 900)
— Warm	— psi (kPa) 35-40 (242-276)
Maximum Oil Temperature	— °F (°C) 250 (121)
Oil Capacity with OP 1493 Oil Pan : High - Low	— US gal (liter) 22-19 (83-72)
Total System Capacity (Including Filter)	— US gal (liter) 24 (91)

FUEL SYSTEM

Type Injection System	Cummins HPI-TP
Maximum Restriction at OEM Inlet Connection..... — in Hg (mm Hg)	5.0 (127)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)..... — in Hg (mm Hg)	6.5 (165)
Maximum Fuel Flow to Injection Pump	112 (424)
Maximum Fuel Inlet Temperature..... — °F (°C)	160 (71)
Maximum Return Fuel Flow	102 (386)
Maximum Return Fuel Temperature @ 160°F (71°C) Fuel Inlet Temperature..... — °F (°C)	210 (99)
Minimum Fuel Tank Vent Capability..... — cfm (liter/s)	1.2 (.55)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)..... — volt	24
Maximum Allowable Resistance of Cranking Circuit..... — ohm	0.002
Minimum Recommended Battery Capacity	
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)..... — 0°F CCA	1425

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with Coolant Heater to Rated Speed	7	(-14)
Minimum Ambient Temperature for Unaided Cold Start to Low Idle Speed.....	25	(-4)
Minimum Ambient Temperature for NFPA 110 Cold Start (90°F minimum coolant temperature).....	32	(0)

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%

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 (25 ft); 1800 rpm / 1500 rpm	— dBA	89.0 / 89.5
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°; 1800 rpm / 1500 rpm	— dBA	125 / 123

Governed Engine Speed.....	rpm
Engine Idle Speed.....	rpm
Gross Engine Power Output.....	hp (kW _m)
Brake Mean Effective Pressure.....	psi (kPa)
Piston Speed.....	ft/min (m/s)
Friction Horsepower.....	HP (kW _m)
Engine Water Flow at Stated Friction Head External to Engine:	
• 3 psi Friction Head.....	US gpm (liter/s)
• Maximum Friction Head.....	US gpm (liter/s)
Turbo Compressor Outlet Pressure.....	psi (kPa)
Turbo Compressor Outlet Temperature	°F (°C)
Intake Air Flow.....	cfm (liter/s)
Exhaust Gas Temperature	°F (°C)
Exhaust Gas Flow	cfm (liter s)
Air-to-Fuel Ratio	air : fuel
Radiated Heat to Ambient	BTU/min (kW _m)
Heat Rejection to Coolant.....	BTU/min (kW _m)
Heat Rejection to Exhaust.....	BTU/min (kW _m)
Heat Rejection to Fuel *	BTU/min (kW _m)
Heat Rejection to Aftercooler.....	BTU/min (kW _m)

	STAND POWERBY		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
	1800	1500	1800	1500
	675 - 775	675 - 775	675 - 775	675 - 775
	610 (455)	615 (459)	555 (414)	555 (414)
	293 (2020)	356 (2454)	267 (1840)	321 (2213)
	1995 (10.1)	1663 (8.4)	1995 (10.1)	1663 (8.4)
	70 (52)	50 (37)	70 (52)	50 (37)
	105 (6.6)	84 (5.3)	105 (6.6)	84 (5.3)
	87 (5.5)	68 (4.3)	87 (5.5)	68 (4.3)
	34 (236)	35 (240)	32 (220)	31 (214)
	407 (208)	410 (210)	385 (196)	372 (189)
	1290 (608)	1160 (550)	1260 (595)	1070 (505)
	830 (443)	960 (515)	815 (435)	910 (488)
	3200 (1510)	2900 (1370)	2905 (1370)	2660 (1255)
	28.5 : 1	25.2 : 1	29.9 : 1	26.5 : 1
	2050 (36)	2000 (35)	2090 (37)	1630 (29)
	7365 (130)	8230 (144)	6930 (122)	7220 (127)
	18700 (329)	19300 (339)	17200 (302)	17400 (306)
	450 (8)	450 (8)	450 (8)	450 (8)
	6200 (109)	5830 (103)	5480 (96)	5830 (103)

* Maximum heat rejection which occurs at rated speed, no load.

N.A. - Data is Not Available
N/A - Not Applicable to this Engine
TBD - To Be Determined

ENGINE MODEL : QSX15-G6
DATA SHEET : DS-10699
DATE : 17May07
CURVE NO. : FR-10699

Cummins Inc.

Columbus, Indiana 47202-3005

• Limited Production •

www.fdkenergy.com