

## DATA SHEET

DIESEL GENERATOR 400KW

MODEL#FDK-CD500/H1

50HZ/1500RPM

CUMMINS MODEL: QSZ13-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-CD500/H1	Engine Make	Cummins
Prime Power	360KW/450KVA	Engine Model	QSZ13-G3
Standby Power	400KW/500KVA	Alternator model	Stamford HCI544C
Output Frequency / Rated speed	50Hz/1500rpm	Control System	DSE6020
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	QSZ13-G3	Aspiration	Turbo-charged
Engine Manufacturer	Cummins (China Dongfeng)	Bore x Stroke (mm x mm)	130×163
Cylinder quantity	6	Displacement	13L
Cylinder Arrangement	Not available	Compression Ratio	17:1
Cycle	Not available	Prime power / Speed (KW/RPM)	450/1500
		Standby power/ Speed (KW/RPM)	470/1500



Speed governor	MCRS	Fuel Consumption at 100% load (g/KWh)	199 at 1500rpm
Piston Speed	8.15m/s	Starter motor	DC24V
Friction Energy Output	31kw	Alternator	DC24V
Total Lubrication System Capacity (L)	45.42	Low idle	700rpm
Coolant Capacity (L)	23.1		

## Alternator Specifications

Alternator model	HCI544C	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	500KVA	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 DSE6020 (DETAILED in INSTRUCTION)

DSE6020 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)	3400×1400×1800
Weight (kg)	3050

### Soundproof Version

Overall Size: L×W×H (mm)	5000×1900×2250
Weight (kg)	5400

## 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.**





# Dongfeng Cummins Technical Operations

Engine Model : QSZ13-G3

Curve and Datasheet : FR20322

Rev04 2012.6



**Generator Engine Performance Data**

Dongfeng Cummins Engine Co.,Ltd  
Xiangfan, Hubei Province, China

Engine Model

**QSZ13-G3**

Curve Number

FR20322

CPL Code

3690

Compression Ratio: 17:1

Cylinders: 6

Bore: 130 mm

Stroke: 163 mm

Displacement: 13.0 L

Engine Configuration: D0C3004GX03

Fuel System: HPCR

Aspiration: Turbocharged & Charge Air Cooled

Governor Regulation: ≤1%

Emission Certification: MEP STAGE II

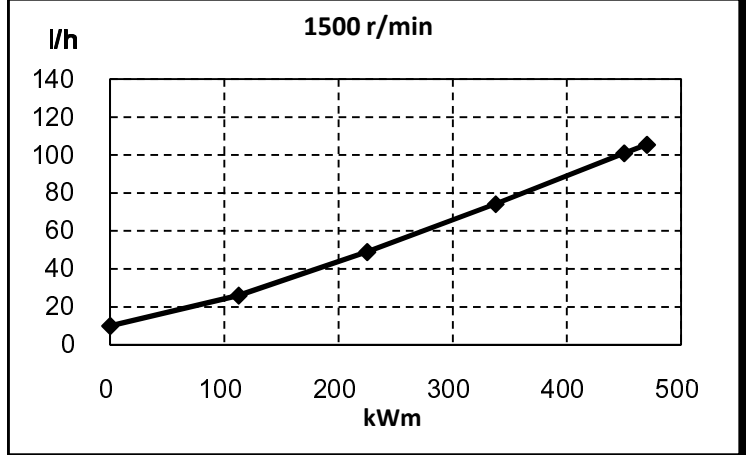
**Engine Ratings\*:**

Engine Speed	Standby Power		Prime Power		Continuous Power	
r/min	bhp	kWm	bhp	kWm	bhp	kWm
1500	629	470	603	450	529	395
1800	670	500	603	450	529	395

\* All ratings refer to AEB26.02.

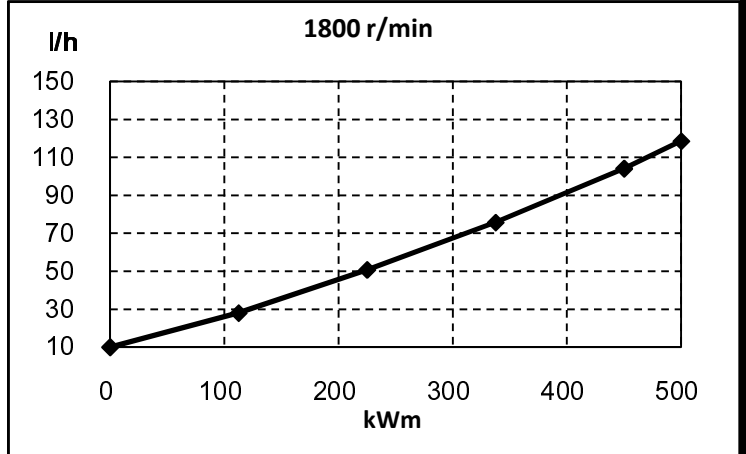
**Engine Fuel Consumption @1500 r/min**

OUTPUT POWER			FUEL CONSUMPTION			
%	bhp	kWm	lb/bhp.h	g/kWm.h	gal/h	l/h
<b>Standby Power</b>						
100	629	470	0.317	193	400	105.5
<b>Prime Power</b>						
100	603	450	0.317	193	383	101.0
75	452	338	0.311	189	281	74.2
50	301	225	0.308	187	185	48.9
25	151	113	0.327	199	99	26.0
<b>Continuous Power</b>						
100	529	395	0.314	191	332	87.7



**Engine Fuel Consumption @1800 r/min**

OUTPUT POWER			FUEL CONSUMPTION			
%	bhp	kWm	lb/bhp.h	g/kWm.h	gal/h	l/h
<b>Standby Power</b>						
100	670	500	0.336	204	450	118.6
<b>Prime Power</b>						
100	603	450	0.327	199	395	104.1
75	452	338	0.317	193	287	75.7
50	301	225	0.319	194	192	50.8
25	151	113	0.352	214	106	28.0
<b>Continuous Power</b>						
100	529	395	0.319	194	338	89.1



Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with GB/T18297 conditions of 29.61 in Hg (100 kPa) barometric pressure [263 ft (80 m) altitude], 77 deg F (25 deg C) inlet air temperature, and 0.30 in Hg (1 kPa) water vapor pressure with No. 2 diesel fuel.

All data obtained is based on the engine operating, under the test conditions of 14.9 in H<sub>2</sub>O (3.7kPa) inlet air restriction and 2.95 in Hg (10 kPa) exhaust restriction, not included are alternator, fan, optional equipment and driven components.

The engine may be operated up to 5200 m (17,060 ft.) altitude.



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Xiangfan, Hubei Province, China

Engine Model

**QSZ13-G3**

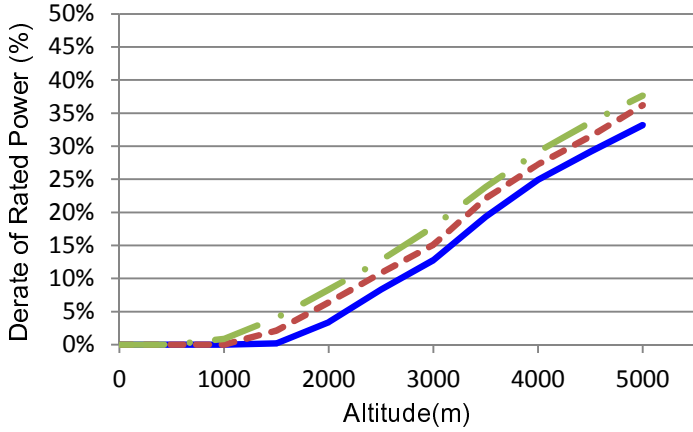
Curve Number

FR20322

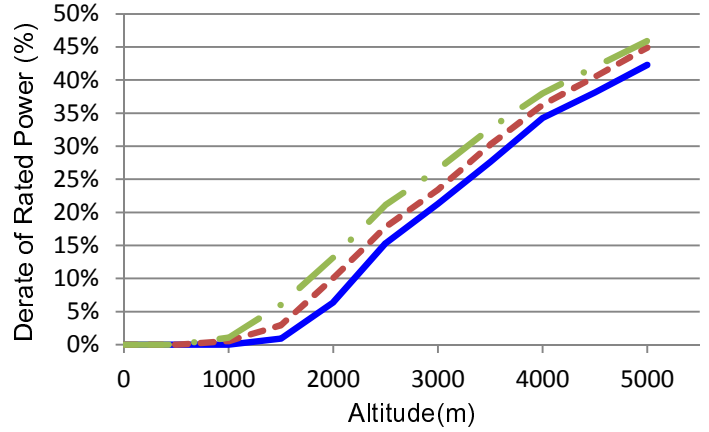
CPL Code

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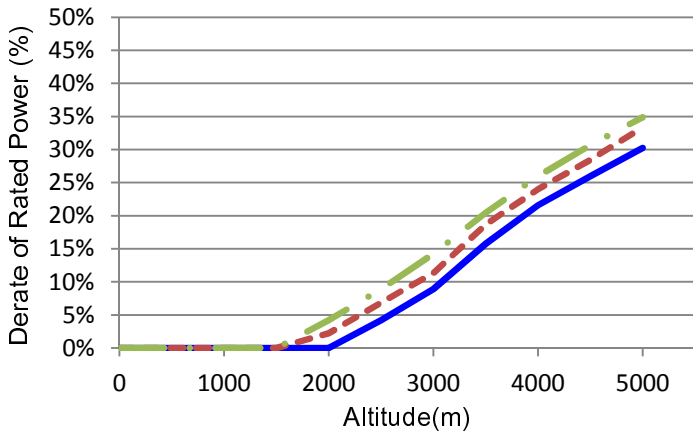
**Power Derate Curves @1500 r/min**  
Standby Power



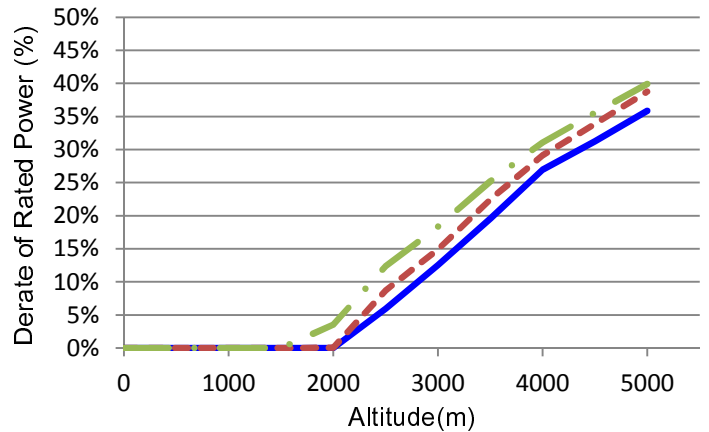
**Power Derate Curves @1800 r/min**  
Standby Power



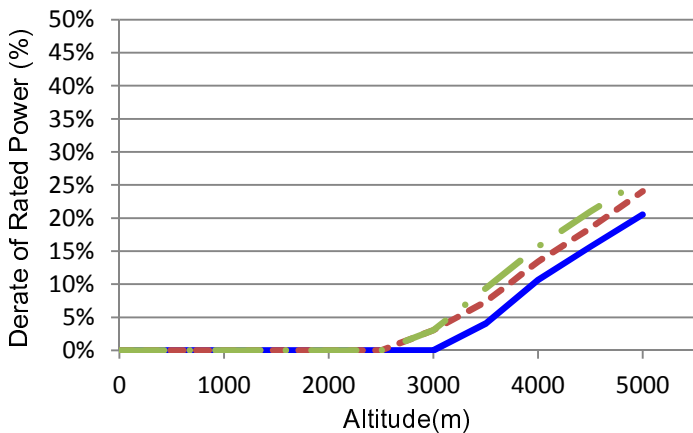
Prime Power



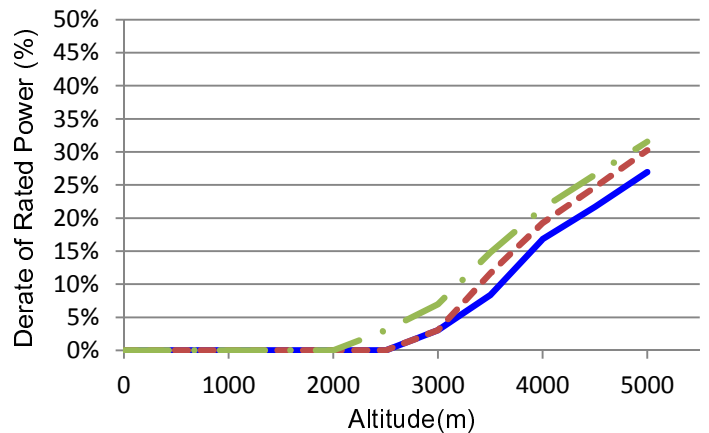
Prime Power



Continuous Power



Continuous Power



Air temperature — 25 °C (77°F) — 40 °C (104°F) — 50 °C (122°F)

Engine tested under the ISA conditions of 50 deg C charge temperature, 3.7kPa inlet air restriction and 10 kPa exhaust restriction.



<b>Generator Engine Performance Data</b> Dongfeng Cummins Engine Co.,Ltd Xiangfan, Hubei Province, China	Engine Model	Curve Number	CPL Code
	<b>QSZ13-G3</b>	FR20322	3690

**GENERAL ENGINE DATA**

Type: .....	Four cycle; Inline; 6 Cylinder
Aspiration: .....	Turbocharged Charge Air Cooled
Compression Ratio: .....	17:1
Fire Order: .....	1-5-3-6-2-4
Bore x Stroke: .....	- mm 130 x 163
Displacement: .....	- L 13.0
Low Idle Speed: .....	- r/min 700
Maximum altitude for continuous operation: .....	- m 5200
Approximate Engine Weight - Dry: .....	- kg 1245
Approximate Engine Weight - Wet: .....	- kg 1310
Center of Gravity from front face of block: .....	- mm 519
Center of Gravity above crankshaft centerline: .....	- mm 201
Rotation inertia of Complete Engine (without flywheel): .....	- kg.m <sup>2</sup> 1.48

**ENGINE MOUNTING**

Maximum static mounting surface bending moment	
Rear face of block: .....	- N.m 1356
Maximum static bending moment of FAN: .....	- N.m 21
Maximum allowable weight on Engine Support: .....	- kg 1500

**AIR INDUCTION SYSTEM**

Whole air intake pipe size (recommendatory): .....	- mm 200
Charge air cooler pipe size normally acceptable: .....	- mm 110
Maximum temperature rise between ambient air and engine air inlet: .....	- °C 11.1
Maximum Temp. Rise Between Engine Air Intake and Intake Manifold: .....	- °C 30
Maximum Intake Manifold Temperature (unable to result in power loss at sea level): .....	- °C 60*
Maximum Intake Manifold Temperature for Engine Protection: .....	- °C 85
Maximum intake air restriction (heavy duty air cleaner):	
clean filter: .....	- kPa 3.2
dirty filter: .....	- kPa 6.2
Maximum allowable pressure drop across charge air cooler and OEM CAC piping (CACDP): .....	- kPa 13

**EXHAUST SYSTEM**

Max. back pressure imposed by complete exhaust system: .....	- kPa 13
Maximum allowable static bending moment at exhaust outlet flange: .....	- N.m 27
Exhaust pipe size normally acceptable:.....	- mm 130

\*When excess the temperature.the durability/reliability/performance of the engine maybe impaired.



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**LUBRICATION SYSTEM**

Oil pressure @ idle - minimum: .....	- kPa	82.7
Typical oil pressure range - warm engine: .....	- kPa	207 - 276
Total system capacity (standard pan): .....	- L	45.42
Maximum lube oil flow to all accessories: .....	- L/min	7.57

**COOLING SYSTEM**

Coolant Capacity (Engine Only): .....	- L	23.1
Engine coolant circuit thermostat opening temperature: .....	- °C	82
Engine coolant circuit thermostat fully open temperature: .....	- °C	94
Maximum coolant temperature - engine out: .....	- °C	102
Minimum operating block coolant temperature: .....	- °C	71
Maximum coolant temperature for engine protection controls: .....	- °C	107
Maximum coolant pressure(exclusive of pressure cap; closed thermostat at maximum no load speed): .....	- kPa	407
Minimum pressure cap rating at sea level: .....	- kPa	103
Maximum Coolant Friction Head External to Engine: .....	- kPa	75
Maximum deaeration time: .....	- min	25
Minimum fill rate (low level alarm required for most engines): .....	- L/min	19
Maximum coolant expansion space (% total system capacity): .....	- %	10
Minimum coolant expansion space (% total system capacity): .....	- %	6

**FUEL SYSTEM**

Maximum allowable restriction @ OEM point with maximum fuel flow: .....	- kPa	13.5
Maximum fuel drain restriction (total head) before (or without) check valve:.....	- kPa	27
Minimum fuel tank venting requirement: .....	- L/s	0.2
Maximum fuel inlet temperature: .....	- °C	71
Maximum heat rejection to return fuel.....	- kW	5.36
Maximum design fuel flow: .....	- kg/h	204

**ELECTRICAL SYSTEM**

System voltage: .....	- <u>V</u>	24
Minimum battery capacity-cold soak at -18 C (0 F) or above		
Engine only cold cranking amperes: .....	- CCA	900
Engine only reserve capacity: .....	- min	270

**COLD START CAPABILITY**

Minimum ambient temperature for unaided cold start: .....	- °C	-15
Minimum ambient temperature for aided cold start (Intake Air Heater): .....	- °C	-30

**Exhaust Emissions Data**

Gaseous Emissions per GB 20891-2007:		1500 r/min	1800 r/min
- Weight-Specific Nox: .....	- g/kW.h	5.102	5.080
- Weight-Specific HC: .....	- g/kW.h	0.105	0.117
- Weight-Specific CO: .....	- g/kW.h	0.400	0.483
- Weight-Specific Particulates: .....	- g/kW.h	0.030	0.047





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**Performance Data**

All data is based on: Engine operating with fuel system, water pump, lubricating oil pump and air cleaner; not included are alternator, fan, and optional equipment and driven components.

- Test Condition:
- GB18297 Engine test code - Performance
  - Barometric Pressure : 100 kPa (29.53 in Hg)
  - Air Temperature: 25 °C (77 °F)
  - Altitude: 80 m (263 ft)
  - Relative Humidity: 50%

Steady State Stability Band at any constant load (+/-): 5%

		Standby Power		Prime Power	
Engine Speed	r/min	1500	1800	1500	1800
Gross Engine PowerOutput	kWm	470	500	450	450
Torque:	N.m	2992	2653	2865	2388
Brake Mean EffectivePressure	kPa	2892	2564	2769	2308
Piston Speed	m/s	8.15	9.78	8.15	9.78
Friction Horsepower	kW	31	45	31	45
Coolant Flow	L/min	366	438	366	438
Fuel Consumption	kg/h	90.7	102.0	86.9	89.6
<u>Engine Data</u>					
Intake Air Flow	m <sup>3</sup> /min.	30.3	38.3	29.7	35.8
Exhaust Gas Temp - DryStack	°C	547	506	530	473
Exhaust Gas Flow	kg/min.	37.3	43.1	36.5	40.3
Air to Fuel ratio		23.7	26.6	24.2	28.3
Heat Rejection to Ambient	kW	76	81	73	73
Heat Rejection to JacketCoolant	kW	171	188	154	165
Heat Rejection to Exhaust	kW	406	432	389	389
Heat Rejection to Fuel*	kW	5	5	5	5
<u>ATA CAC</u>					
Heat Rejection to Aftercooler	kW	97	112	93	106
TurbochargerCompressor Outlet	kPa	264	267	250	245
Charge Air Flow	kg/min	36	45	35	42
TurbochargerCompressor Outlet	°C	207	213	198	198

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

TBD = To Be Decided

N/A = Not Applicable

All data is subject to change without notice, sorry for inform.

Dongfeng Cummins Engine Co., Ltd.



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Engine Model

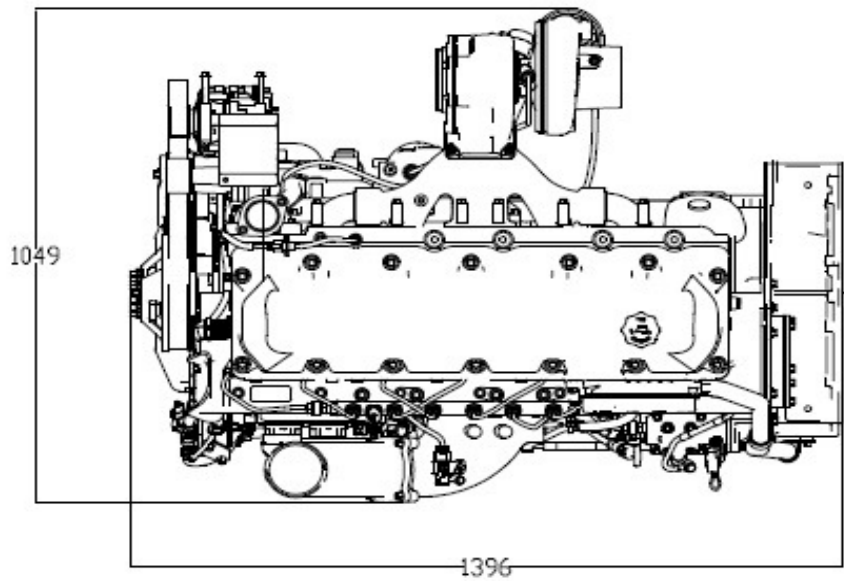
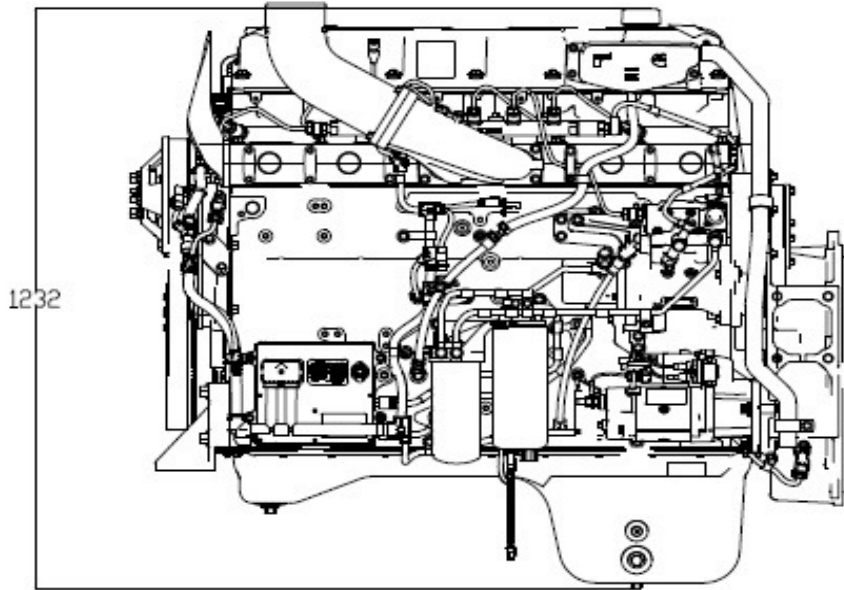
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Engine Model

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**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.

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7