FDK ENERGY

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DATA SHEET

DIESEL GENERATOR 770KW
MODEL#FDK-CC960/H2
60HZ/1800RPM
CUMMINS MODEL: KTA38-G1

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-CC960/H2	Engine Make	Cummins CHINA
Prime Power	700KW/875KVA	Engine Model	KTA38-G1
Standby Power	770KW/960KVA	Alternator model	Stamford HCI634G
Output Frequency / Rated speed	60Hz/1800rpm	Control System	DSE7320
Rated Voltage	277V/480V	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	KTA38-G1	Aspiration	Turbo-charged
Engine Manufacturer	Cummins CHINA CCEC	Bore x Stroke (mm x mm)	159×159
		Displacement	38L
Cylinder quantity	12	Compression Ratio	14.5:1
Cylinder Arrangement	60° Vee;	Prime power / Speed (KW/RPM)	769kw/1800
Cycle	4	Standby power/ Speed (KW/RPM)	847kw/1800

CE ISO9001:2008

Type Injection System	Direct Injection Cummins PT	Fuel Consumption at 100% load (g/KWh)	165 at 1800rpm
Piston Speed	9.5m/s	Starter motor	24V
Friction Energy Output	127kw	Low idle	725-775pm
Total Lubrication System Capacity (L)	135	Coolant Capacity (L)	112

Alternator Specifications

Alternator model	HCI634G	Number of phase	3
Alternator manufacturer	STAMFORD	Rated voltage	480V (Available with custom requirements)
Exciter type	Single bearing, Brushless, Self-excited	Power factor	0.8
Rated output prime power	1000KVA	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.

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)	4100×1820×2300
Weight (kg)	8000

Soundproof Version

Overall Size: L×W×H (mm)	20FT CONTAINER
Weight (kg)	12000

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.**

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE PERFORMANCE CURVE

CONFIGURATION	ENGINE MODEL: KTA38-G1	CURVE NUMBER: FR-6080	CPL No.: 0851
D233019DX02			DATE: 2013/6/25

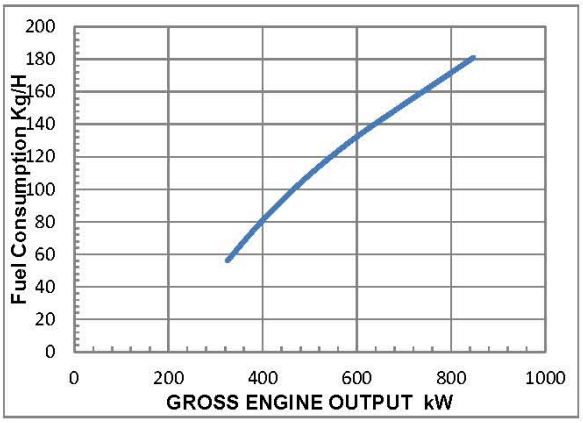
Displacement: 38L	(2300)	Aspiration: Turbocharged , Aftercooled	RATING
BoreXStroke: 159X159mm	(6.25X6.25 in.)	Fuel System: Cummins PT	847 kW(1135 BHP)@1800r/min
Compress Ratio: 14.5:1		No. of Cylinder: V-12	701 kW(940 BHP)@1500r/min

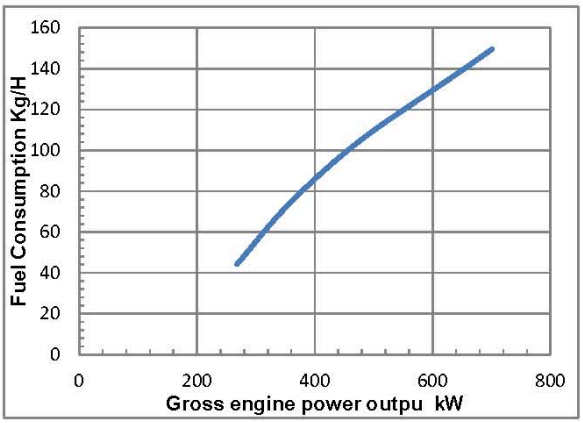
All data is based on the engine operating with fuel system, water pump, and 20 in. H2O(4.98kPa) inlet air restriction with 5.8 in.(147mm) inner diameter, and with 2 in. Hg(7kPa) exhaust restriction with 8 in.(203mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolant as 50% ethylene glycol/50% water. All data is subject to change without notice.

GROSS ENGINE POWER OUTPUT

SPEED	STANDBY POWER		PRIME POWER		CONTINUOUS POWER	
rpm	BHP	kW	BHP	kW	BHP	kW
1800	1135	847	1030	769	900	672
1500	940	701	850	634	810	604

FUEL CONSUMPTION





OUTPUT POWER			CONSUMPTION		BFSC	
%	BHP	kW	Lb/h	Kg/h	g/kW.h	Lb/BHP.h
			1800RPM			
STNADBY						
100	1135	847	399	181	214	0.352
PRIME						
100	1030	769	365	166	216	0.355
75	773	577	281	128	221	0.364
50	580	433	201	91	210	0.346
25	435	325	124	56	173	0.284
CONTINUOUS						
100	900	672	0	0	0	0. 000
			1500RPM			
STANDBY						
100	940	701	330	150	213	0.351
PRIME						
100	850	634	300	136	215	0.353
75	638	476	230	105	220	0.361
50	479	357	163	74	207	0.340
25	359	268	97	44	165	0.271
CONTINUOUS						
100	810	604	0	0	0	0. 000

Curves shown above represent gross engine performance capabilites obtained and corrected in accordance with SAE J1995 conditions of 29.61 in. Hg(100kPa) barometric pressure [300ft.(91m) altitude] 77deg F (25 deg C) inlet temperature, and 0.30 in. Hg(1kPa) water vapor pressure with No.2 diesel fuel.

TECHNICAL DATA DEPT. CERTIFIED WITHIN 5% CHIEF ENGINEER

Cummins Engine Company, Inc.

Exhaust Emissions Data Sheet

Data Sheet: DS-3642-G
Date: Sept., 1992

Engine

Model: KTA38-G1
Type: 4 cycle, 60° Vee, 12 Cylinder Diesel
Aspiration: Turbocharged and Aftercooled
Compression Ratio: 14.5:1
Emissions Control Device: Turbo, Aftercooling

Application: A.C. Generator Drive
Config. Number: D233019DX02
Bore: 6.25 in. (159 mm)
Stroke: 6.25 in. (159 mm)
Displacement: 2300 cu. in. (37.8 liters)

Performance Data

	Standby	Prime
BHP @ 1800 RPM (60 Hz)	1135	1030
Fuel Consumption (gallons/hour)	56.4	51.5
Air to Fuel Ratio	30.6	31.3
Exhaust Gas Flow (CFM)	7285	6655
Exhaust Gas Temperature (°F)	915	895

Exhaust Emissions Data

(All values are grams/hp-hour)

Component		Standby	Prime
HC	(Total Unburned Hydrocarbons)	0.10	0.08
NOx	(Oxides of Nitrogen as NO_2)	11.60	10.46
CO	(Carbon Monoxide)	1.18	0.82
PM	(Particulate Matter)	0.12	0.13
SO_2	(Sulfur Dioxide)	0.62	0.63
CO_2	(Carbon Dioxide)	510	510
N_2	(Nitrogen)	3700	3800
O_2	(Oxygen)	590	610
H_2O	(Water Vapor)	180	190

Test Conditions

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification: ASTM D975 No. 2-D diesel fuel with 0.2% sulfur content (by weight) and 42-50 cetane number.
Fuel Temperature: 99° F ± 9° (at fuel pump inlet)
Intake Air Temperature: 77° F ± 9°
Barometric Pressure: 29.6 in. Hg ± 1 in. Hg
Humidity: NOx measurement corrected to 75 grains H_2O/lb. dry air

The HC, NOx, and CO emissions data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimates. This data is subject to instrumentation, measurement, and engine-to-engine variability. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Specifications May Change Without Notice

Cummins Engine Company, Inc.

Exhaust Emissions Data Sheet

Data Sheet: DS-3642-G
Date: Sept., 1992

Engine

Model:	KTA38-G1	**Application:**	A.C. Generator Drive
Type:	4 cycle, 60° Vee, 12 Cylinder Diesel	**Config. Number:**	D233019DX02
Aspiration:	Turbocharged and Aftercooled	**Bore:**	6.25 in. (159 mm)
Compression Ratio:	14.5:1	**Stroke:**	6.25 in. (159 mm)
Emissions Control Device:	Turbo, Aftercooling	**Displacement:**	2300 cu. in. (37.8 liters)

Performance Data	Standby	Prime
BHP @ 1500 RPM (50 Hz)	940	850
Fuel Consumption (gallons/hour)	46.6	42.3
Air to Fuel Ratio	25.0	25.9
Exhaust Gas Flow (CFM)	5255	4780
Exhaust Gas Temperature (° F)	1015	1000

Exhaust Emissions Data

(All values are grams/hp-hour)

Component		Standby	Prime
HC	(Total Unburned Hydrocarbons)	0.22	0.16
NOx	(Oxides of Nitrogen as NO_2)	10.59	9.53
CO	(Carbon Monoxide)	1.50	1.12
PM	(Particulate Matter)	1.35	1.49
SO_2	(Sulfur Dioxide)	0.62	0.62
CO_2	(Carbon Dioxide)	510	490
N_2	(Nitrogen)	3000	3100
O_2	(Oxygen)	380	420
H_2O	(Water Vapor)	180	180

Test Conditions

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load (± 2%). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	ASTM D975 No. 2-D diesel fuel with 0.2% sulfur content (by weight) and 42-50 cetane number.
Fuel Temperature:	99° F ± 9° (at fuel pump inlet)
Intake Air Temperature:	77° F ± 9°
Barometric Pressure:	29.6 in. Hg ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H_2O/lb. dry air

The HC, NOx, and CO emissions data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimates. This data is subject to instrumentation, measurement, and engine-to-engine variability. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Specifications May Change Without Notice

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been foumulated 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 appliacations.

STANDBY POWER RATING is appliable 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

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 shouled not exceed a 70% average of period of 250 hours.

The total operating time at 100% Prime Power shall not exceed 500 hours per year.

A 10% overload capablility is available for aperiod 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, theat the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at 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 Temperatrue And Altitude:

The engine may be operated at:

1800RPM up to 5,000 ft.(1,500m) and 104°F (40℃) without power deration.

1500RPM up to 5,000 ft.1,500m) and 104°F (40℃) without power deration.

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

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

ENGINE MODEL (S):	**KTA38-G1**	
STAND_BY:	1135 BH @1800r/min 847 kW	REFERENCE INFORMATION:
		CONFIGURATION..... D233019DX02
PRIME:	1030 BH @1800r/min 769 kW	CPL NUMBER 0851
		PERFORMANCE CURVE NUMBER..... FR-6080

GENERALENGINE DATA

Type	4 Cycle , 60° Vee , 12 Cylind	
Aspiration	Turbocharged , Aftercooled	
Bore—in.(mm)×stroke—in.(mm)	6.25×6.25	(159×159)
Displacement—in^3(L)	2300	(38)
Compression Ratio	14.5:1	
Dry Weight		
Fan Hub to Flywheel Engine —lb(kg)	8200	(3719)
Radiator Cooled Engine —lb(kg)	9625	(4366)
Wet Weight		
Fan Hub to Flywheel Engine —lb(kg)	8700	(3946)
Radiator Cooled Engine —lb(kg)	11030	(5003)
Moment of Inertia of Rotating Components (Excluding Flywheel) —$lb_m.ft^2$($kg•m^2$)	94	(3.96)
·With FW6001 Flywheel —$kg•m^2$($lb_m.ft^2$)	10.45	(248.0)
·With FW6011 Flywheel —$kg•m^2$($lb_m.ft^2$)	20.78	(493.0)
C.G. Distance From Front Face of Block—in(mm)	31.5	(801)
C.G. Distance Above Crank Centerline—in(mm)	11	(279)
Maximum Allowable Bending Moment at Rear Face of Block —N•m(lb.ft)	2000	(907)
Firing Order	1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L	

ENGINE MOUNTINC

Moment of Inertia About Roll Axis —$lb.ft^2$($kg•m^2$)		

EXHAUST SYSTEM

Maximum Allowable Back Pressure (1500/1800 rpm) —in.Hg(kPa)	2.3/3	(7.8/10.2)
Maximum Allowable Back Pressure —in.Hg(kPa)	3	(10)
Exhaust Pipe Size Normally Acceptable —in(mm)	6	(152)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner		
Clean Element —in.H_2O(kPa)	15	(3.73)
Clean Element —in.H_2O(kPa)	15	(3.73)
Intake Air Alarm Temperature (1500/1800 rpm)—°C(°F)	82	(180)

COOLING SYSTEM

Coolant Capacity		
With heat exchanger HX 4073 (With out explantion tank) —U.S.Gal(L)	18	(66)
With explantion tank & LTA—U.S.Gal(L)	30	(112)
Maximum Coolant Friction Heat External to Engine @1500 rpm —PSI(kPa)	7	(48.3)
@1500 rpm —PSI(kPa)	10	(68.9)
Minimum Raw Water Flow @ 90°F(32℃) to Heat Exchanger With HX 4073—GPM(L/mir	54	(204.4)

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

Maximum Raw Water Inlet Pressure @ Heat Exchanger HX 4073—PSI(kPa)	50	(344.7)
Maximum Raw Water Inlet Pressure @ Heat Exchanger HX 6076 —PSI(kPa)	50	(344.7)
Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(℃)	220/212	(104/100)
Standard Thermostat (modulating) Range— °F(℃)	180-200	(82-93)
Maximum Allowable Coolant Temperature —°F(℃)	205	(96.1)
Minimum Coolant Makeup Capacity —U.S.Gal(L)	6.3	(23.8)
Maximum Raw water Inlet Friction —PSI(kPa)	10	(254.0)
Minimum Allowable Fill Rate —U.S.GPM(L/min)	5	(18.9)
Maximum Allowable Initial Fill Time —min	5	
Minimum Allowable Coolant Expansion Space —% of System Capacity	5	
Maximum Allowable Inlet Coolant Temperature at Limited situation (Stand_by/Prime) —'	160/150	(71/66)

LUBRICATION SYSTEM

Oil Pressure		
@ Idle —PSI(kPa)	20	(138)
@ Rated Speed —PSI(kPa)	45-65	(310-448)
Oil Flow at Rated Speed —U.S.GPM(L/min)	124	(469.4)
Maximum Allowable Oil Temperature —°F(℃)	250	(121.0)
By-Pass Filter Capacity		
Spin-on Cartridge Type —U.S.Gal(L)	2 X 0.7	(2 X 2.6)
Replaceable Element Type —U.S.Gal(L)	2 X 2.9	(2 X 11.0)
Oil Pan Capacity (Option OP6024)		
High —U.S.Gal(L)	40.0	(151.4)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L)	45.0	(170.3)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L)	35.7	(135.1)
Angularty of Standard Oil Pan (Option OPI		
Front Down	30°	

FUEL SYSTEM

Fuel Injection System	Cummins PT	
Maximum Fuel Consumption at Maximum Rated Output and Speed —lb/h(kg/h)		
Maximum allowable Restriction to PT Fuel Pump		
With Clean Fuel Filter —in.Hg(kPa)	4	(13.55)
With Dirty Fuel Filter —in.Hg(kPa)	10	(33.86)
Maximum Fuel Supply at Rated Power and Speed —lb/h(kg/h)		
Maximum Allowable Injector Return Line Restriction		
With Check Valves —in.Hg(kPa)	7	(22)
Less Check Valves —in.Hg(kPa)	3	(8)
Minimum Allowable Fuel Tank Vent Capability —ft^3/h （L/h）	15	(425)
(With 2.5 in. Hg (63 mm Hg) or Less Back Pressure)		
Starter (Heavy, Anode)—Volt		24
Battary Recharge System,Negative ground—A		35
Maximum Allowable Resistance of Starting Circuit—Ω		0.002
Minimum Recommended Battary Capacity		
·Cold Soak at 50°F(10℃) or Above—0°F CCA		1200
·Cold Soak at 32~50°F(0~10℃) or Above—0°F CCA		1280
·Cold Soak at 0~32°F(-18~0℃) or Above—0°F CCA		1800

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

PERFORMANCE DATA

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler, not included are alternator, compressor, fan, optional equipment and driven components. Data represents gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions fo 29.61 in Hg(100 kPa) barometric pressure[300ft. (90 m) altitude], 77°F (25℃) inlet air temperature, and 0.30 in. Hg (1kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2. All data is subject to change without notice

	STAND_BY		PRIME	
	60 Hz	50 Hz	60 Hz	50 Hz
Engine Speed r/min	1800	1500	1800	1500
Idle Speed r/min	725-775	725-775	725-775	725-775
Gross Power Output BHP(kW)	1135(847)	940(701)	1030(769)	850(634)
Brake Mean Effective Pressure PSI(kPa)	216(1488)	214(1478)	196(1351)	194(1336)
Piston Speed ft/min(m/s)	1870(9.5)	1555(7.9)	1870(9.5)	1555(7.9)
Friction Horsepower BHP(kW)	170(127)	115(86)	170(127)	115(86)
Intake Air FlowCFM(L/s)	2750(1298)	1850(873)	2550(1204)	1700(802)
Exhaust Gas Flow CFM(L/s)	7285(3439)	5255(2480)	6655(3141)	4780(2256)
Exhaust Gas Temperature °F(℃)	915(491)	1015(546)	895(479)	1000(538)
Heat Rejection to Ambient BTU/min(kW)	7330(129)	6055(106)	6690(0)	5495(97)
Heat Rejection to Coolant BTU/min(kW)	29510(519)	24440(430)	26780(471)	22100(389)
Engine Water Flow L/s(U.S.GPM) @ 3psi	390(24.6)	310(19.6)	390(24.6)	310(19.6)

Chanvge Log

Date	Author	Change Description
2013/6/25	Jiang Li	Release