康明斯发动机有限公司
发动机性能曲线

特征编号	发动机型号：KT38-GA	性能曲线号： FR-6923	CPL号： 3804
D232045GX03			日期： 2013/6/25

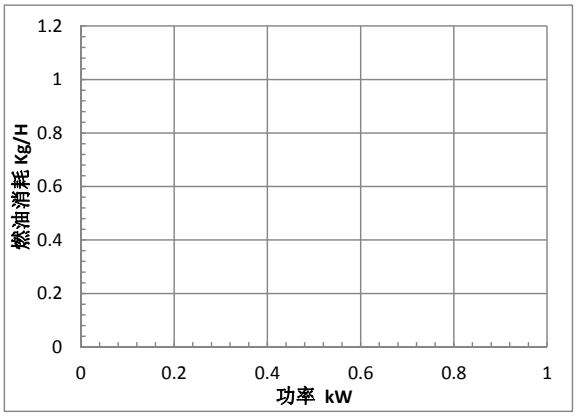
排量： 38L	(2300)	进气方式： 废气涡轮增压	功率标定	
缸径X行程： 159X159mm	(6.25X6.25 in.)	燃油系统： 康明斯PT系统		
压缩比： 14.5:1		气缸数： V-12	711 kW(953 BHP)@1500r/min	

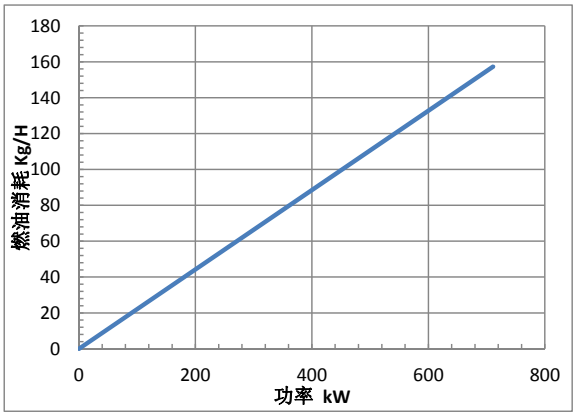
所有的数据均是基于发动机带燃油泵、水泵、机油泵、空滤器和消声器运转时获得的，但不包括交流发电机、空压机、风扇、选用设备和驱动件。数据随时可能更改，恕不另行通知。

发动机输出功率

发动机转速	备用功率		常用功率		持续功率	
rpm	BHP	kW	BHP	kW	BHP	kW
1800						
1500	953	711	867	647		

燃油消耗





输出功率			燃油消耗量		燃油消耗率	
%	BHP	kW	Lb/h	Kg/h	g/kW.h	Lb/BHP.h
1800RPM						
1500RPM						
备用功率						
100	953	711	347	157	221	0.364
常用功率						

以上所有的数据都是基于或修正至SAE J1995标准规定的条件——海拔90m（300ft.），大气压力100kPa（29.61in.Hg），进气温度25℃（77°F），水蒸汽压力1.0kPa（相对湿度30%），使用美国标准2#柴油。

CCEC 技术部发布　　允差5%　　总工批准

康明斯内部资料

CCEC CUMMINS ENGINE COMPANY LTD.
ENGINE PERFORMANCE CURVE

CONFIGURATION	ENGINE MODEL: KT38-GA	CURVE NUMBER: FR-6923	CPL No.: 3804
D232045GX03			DATE: 2013/6/25

Displacement: 38L (2300) Aspiration: Turbocharged , RATING

BoreXStroke: 159X159mm (6.25X6.25 in.) Fuel System: Cummins PT

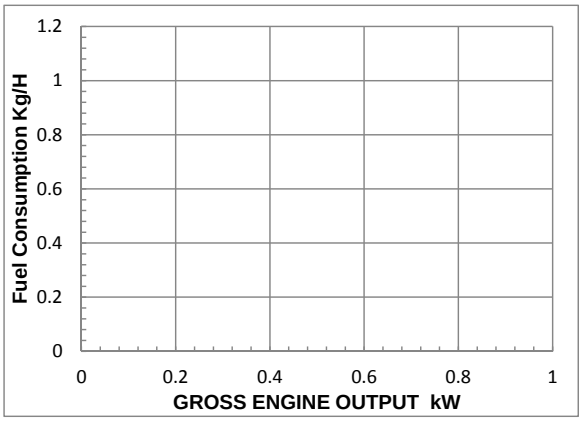
Compress Ratio: 14.5:1 No. of Cylinder: V-12 711 kW(953 BHP)@1500r/min

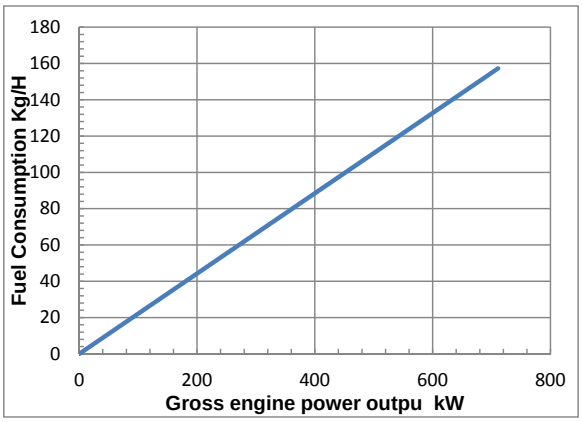
All data is based on the engine operating with fuel system, water pump, and 20 in. H2O(4.98kPa) inlet air restriction with 5.8 in.(147mm) inner diameter, and with 2 in. Hg(7kPa) exhaust restriction with 8 in.(203mm) inner diameter; not included are alternator, fan, optional equipment and driven components. 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						
1500	953	711	867	647		

FUEL CONSUMPTION





OUTPUT POWER			CONSUMPTION		BFSC	
%	BHP	kW	Lb/h	Kg/h	g/kW.h	Lb/BHP.h
			1800RPM			
			1500RPM			
STANDBY						
100	953	711	347	157	221	0.364

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

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G驱动发动机功率标定使用准则

以下准则阐明了确保G驱动发动机应用于交流发电机组的正确使用规范。G驱动发动机并不是为变速的直流发电机组而设计的，也不是作为直流发电机组的动力来使用。

备用功率标定 是在市电出现异常时作为应急电源使用时的瞬时最大功率。该标定无超负荷能力。且不能与市电并网运行。

此标定的发动机应安装在有效电网覆盖区域内。备用功率标定的发动机按平均负荷率为80%来使用，一年不超过200小时。在备用功率点使用时每年不超过25小时。备用功率标定的发动机只能在断电时作为应急电源使用。电网预先通知的断电不属于应急电源使用范畴。

持续功率标定

可以恒定按100%标定负荷、无时限连续使用的功率。按此标定的发动机无超负荷能力。

常用功率标定是可以替代商业电网电力来使用的功率。常用功率必须按下列两种类型之一来使用。

无时限运行常用功率

按常用功率标定的发动机，可有效地变负荷无时限使用。在每250小时的运行周期内，可变负荷的均值不能超过所标定常用功率的70%。

一年内，100%常用功率的整个运行时间不超过500小时。

在12小时运行周期内，有1小时有效超负荷10%的能力。在一年内，超负荷10%运行的整个时间不超过25小时。

限时运行常用功率

按常用功率标定的发动机，可以无时限运行于不变负荷用途。诸如使用功率低而输出功率受限的场合。在功率决不会超过常用功率标定的前提下，每年内可与市电并网运行750小时。但长期高负荷运行将缩短发动机寿命。一年内并网运行超过750小时时，请按持续功率标定运行。

参考标准：

以ISO-3046为基础的BS-5514和DIN-6271标准。

环境温度和海拔变化后的修正：

发动机可以在下面的条件下运行，而功率不必进行调整：

转速为1500r/min的发动机，海拔高度低于15000m (5000ft)，环境温度低于40℃(104°F)。

发动机超出上述条件运行，海拔高度高于1500m (5000ft)时，每升高300m (1000ft)，功率下调4%；环境温度高于40℃(104°F)时，每升高11℃，功率下调2% (升高10°F，下调1%)。

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:

1500RPM up to 5,000 ft.(1500m) 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℃).

康明斯发动机有限公司
数据单

发动机型号:	**KT38-GA**	**参考信息:**	
备用功率:	**711 kW @1500r/min**	**特征编号**	**D232045GX03**
	953 BHP	**CPL**	**3804**
常用功率:	**647 kW @1500r/min**	**数据单号**	**DS-6923**
	867 BHP	**性能曲线号**	**FR-6923**

整机数据

机型	四冲程、V型、十二缸	
进气方式	废气涡轮增压	
缸径—mm(in.)×冲程—mm(in.)	159×159	(6.25×6.25)
排量—L(in^3)	38	(2300)
压缩比	14.5:1	
发动机干重		
风冷带飞轮—kg(lb)	3606	(7950)
热交换器—kg(lb)	4457	(9825)
发动机湿重		
风冷带飞轮—kg(lb)	3810	(8400)
热交换器—kg(lb)	4859	(10713)
运动零件相对于曲轴中心线的转动惯量（不包括飞轮）—kg•m^2($lb_m.ft^2$)	3.96	(94.0)
• 飞轮选用件FW 6001F—kg•m^2($lb_m.ft^2$)	10.45	(248.0)
• 飞轮选用件FW 6011F—kg•m^2($lb_m.ft^2$)	20.78	(493.0)
质心至飞轮壳后端的距离(FH6024) mm(in)	980	(38.6)
质心在曲轴中心线上方—mm(in)	279	(11.0)
后端主轴承允许的最大静载荷—kg(lb)	907	(2000)
发火顺序	1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L	

发动机悬置安装

在缸体后端面处的最大允许弯矩—N•m(lb.ft)	6101	(4500)

排气系统

最大允许排气背压—kPa(in.Hg)	10	(3)
标准容许的排气管直径—mm(in)	152	(6)

进气系统

允许的最大进气阻力		
脏滤芯—kPa(in. H_2O)	6.23	(25)
干净滤芯—kPa(in.H_2O)	3.73	(15)

冷却系统

冷却液容量		
仅发动机—L(U.S.Gal)	106.0	(28.0)
包含热交换器HX 6076（不包含膨胀水箱）— L(U.S.Gal)	199.5	(52.7)
海平面高度压力盖允许的最小压力—kPa(PSI)	69	(10)
外循环水最大阻力 —kPa(PSI)	34.5	(5.0)
冷却系统外部最大压力损失 —kPa(PSI)	34.5	(5.0)
热交换器HX 6076中的生水在32℃（90° F）时的最小流量—L/min(GPM)	409	(108)
热交换器HX 6076中的生水最大进水压力—kPa(PSI)	345	(50)

康明斯发动机有限公司
数据单

顶部水箱允许的最高温度（备用/常用）—℃(°F)	104/100	(220/212)
标准节温器温度调节范围—℃(°F)	82-93	(180-200)
最大冷却液静压（不使用压力盖）—kPa(PSI)	103	(15)
最小冷却液补水能力—L(U.S.Gal)	23.8	(6.3)
生水泵最大进水阻力—mm Hg(in. Hg)	254	(10)
允许的最小补水速率—L/min(U.S.GPM)	18.9	(5)
允许的最大首次补水时间—min	5	
允许的最小冷却液膨胀体积占系统容积—%	5	
允许的最大排气时间—min	25	

润滑系统

机油压力		
低怠速时(最小)—kPa(PSI)	138	(20)
额定转速时—kPa(PSI)	310-448	(45-65)
额定转速时的机油流量—L/min(U.S.GPM)	469	(124)
允许的最高机油温度—℃(°F)	121	(250)
机油旁通滤清器容量		
旋装式—L(U.S.Gal)	2 X 2.6	(2 X 0.7)
可换滤芯式—L(U.S.Gal)	2 X 11.0	(2 X 2.9)
机油盘容量（选用件 OP6023）		
高位—L(U.S.Gal)	113.6	(30.0)
低位—L(U.S.Gal)	87.1	(23.0)
系统总容量（包含旁通滤清器）—L(U.S.Gal)	135.1	(35.7)
标准机油盘的倾斜角（选用件 OP6023）		
前俯角	30°	
前仰角	30°	

燃油系统

燃油喷射系统形式	康明斯PT直喷系统	
最大标定功率和转速时的最大燃油消耗量—kg/h(lb/h)		
燃油泵进油口的最大供油阻力		
滤清器在清洁状态最大供油流量时—kPa(in.Hg)	13.55	(4)
滤清器在脏的状态最大供油流量时—kPa(in.Hg)	27.09	(8)
额定功率和转速时的最大供油量—kg/h(lb/h)		
允许的喷油器最大燃油回油阻		
带单向阀—kPa(in.Hg)	22.0	(6.5)
不带单向阀—kPa(in.Hg)	8.5	(2.5)
允许的最小燃油箱通气能力—L/h（ft^3/h）	425	(15)
[在背压为8.4kPa（2.5in.Hg）或更低的背压时]		

电气及启动系统

启动马达(重型，正极)—Volt	24
电瓶充电系统，负极接地—A	35
起动电路允许的最大电阻—Ω	0.002
推荐的电瓶最小容量	
·在10℃（50° F）或以上时—0°F CCA	1200
·在0℃至10℃（32°F至50° F）或以上时—0°F CCA	1280
·在-18℃至0℃（0°F至32° F）或以上时—0°F CCA	1800

康明斯发动机有限公司
数据单

性能数据

在任意恒定负荷下的转速稳定性—%.....±0.25

所有的数据均是基于发动机带燃油泵、水泵、机油泵、空滤器和消声器运转时获得的，但不包括交流发电机、空压机、风扇、选用设备和驱动件。所有的数据都是基于SAE J1349标准规定的条件——海拔90m（300ft.），大气压力100kPa（29.61in.Hg），进气温度25℃（77°F），水蒸汽压力1.0kPa（0.30in.Hg），使用标准2#柴油或符合ASTM D2的柴油。数据随时可能更改，恕不另行通知。

	备用功率		常用功率	
	60 Hz	50 Hz	60 Hz	50 Hz
转速r/min		1500		1500
怠速r/min		575-650		575-650
输出总功率kW(BHP)		711(953)		647(867)
平均有效压力kPa(PSI)		1499(217)		1364(198)
活塞平均速度m/s(ft/min)		7.9(1555)		7.9(1555)
摩擦功率kW(BHP)		86(115)		86(115)
进气流量L/s(CFM)		873(1849)		802(1699)
排气流量 L/s(CFM)		2681(5680)		2341(4960)
排气温度 ℃(°F)		569(1056)		543(1009)
对环境的散热量kW(BTU/min)		102(5782)		93(5262)
对冷却液的散热量 kW(BTU/min)		508(28910)		463(26308)
发动机冷却液流量 L/s(U.S.GPM)阻力为27.5kpa时		19.6(310)		19.6(310)

CCEC CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

ENGINE MODEL (S):	**KT38-GA**		
STAND_BY:	953 BHP 711 kW	@1500r/min	**REFERENCE INFORMATION:**
			CONFIGURATION..... **D232045GX03**
PRIME:	867 BHP 647 kW	@1500r/min	**CPL NUMBER** **3804**
			PERFORMANCE CURVE NUMBER..... **FR-6923**

GENERALENGINE DATA

Type	4 Cycle , 60° Vee , 12 Cylind	
Aspiration	Turbocharged ,	
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)	7950	(3606)
Radiator Cooled Engine —lb(kg)	9825	(4457)
Wet Weight		
Fan Hub to Flywheel Engine —lb(kg)	8400	(3810)
Radiator Cooled Engine —lb(kg)	10713	(4859)
Moment of Inertia of Rotating Components (Excluding Flywheel) —$lb_m.ft^2$($kg•m^2$)	94	(3.96)
·With FW 6001 Flywheel —$kg•m^2$($lb_m.ft^2$)	10.45	(248.0)
·With FW 6011 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)—℃(°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)

CCEC 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 OP6023)		
High —U.S.Gal(L)	30.0	(113.6)
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 OP		
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

CCEC 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 altemator, 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		1500		1500
Idle Speed r/min		575-650		575-650
Gross Power Output BHP(kW)		953(711)		867(647)
Brake Mean Effective Pressure PSI(kPa)		217(1499)		198(1364)
Piston Speed ft/min(m/s)		1555(7.9)		1555(7.9)
Friction Horsepower BHP(kW)		115(86)		115(86)
Intake Air FlowCFM(L/s)		1849(873)		1699(802)
Exhaust Gas Flow CFM(L/s)		5680(2681)		4960(2341)
Exhaust Gas Temperature °F(℃)		1056(569)		1009(543)
Heat Rejection to Ambient BTU/min(kW)		5782(102)		5262(93)
Heat Rejection to Coolant BTU/min(kW)		28910(508)		26308(463)
Engine Water Flow L/s(U.S.GPM) @ 4psi		310(19.6)		310(19.6)

Chanvge Log

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