重庆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：	数据单号：	CPL号： 3573
D233042GX03	QSK38-G5A	FR 549	日期： 2019/8/19

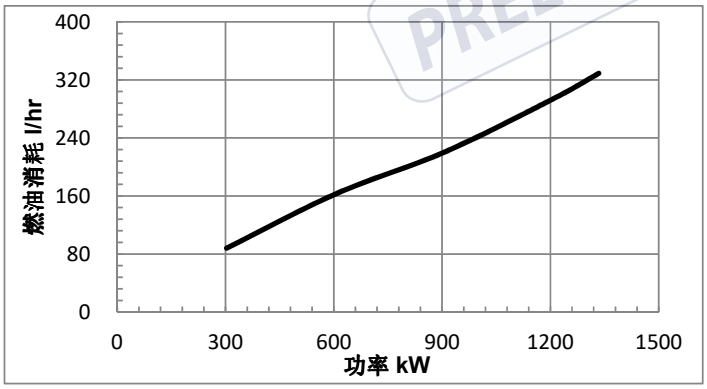
排量：	37.7L	(2301 in^3)	进气方式：	增压+低温中冷	功率标定
缸径X行程：	159X159mm	(6.25X6.25 in.)	燃油系统：	康明斯MCRS系统	备用： 1334 kW(1788 HP)@1500 RPM
压缩比：	15:1		排放认证：	CS III	常用： 1212 kW(1624 HP)@1500 RPM

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、选用设备和被驱动件。冷却液流量和散热量是基于50%乙二醇/50%水获得的。所有数据如有更改，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
1500	1788	1334	1624	1212	1250	933
-	-	-	-	-	-	-

燃油消耗



输出功率			燃油消耗			
%	BHP	kW	kg/ kWm-h	lb/ bhp-h	l/hr	Gal/ hr
			1500RPM			
备用功率						
100	1788	1334	211	0.354	329	87
常用功率						
100	1624	1212	208	0.349	295	78
75	1218	909	208	0.349	221	59
50	812	606	230	0.386	163	43
25	406	303	250	0.419	88	23
持续功率						
100	1250	933	208	0.349	227	60

以上所有的数据都是基于或修正至SAE J1995标准规定的条件—— 大气压力100kPa (29.61in.Hg），海拔91m（300ft.），进气温度25℃（77° F），水蒸汽压力1.0kPa（0.30in.Hg），使用美国标准2#柴油或符合ASTM D2标准的柴油。

数据状态：开发阶段

CCEC 技术部发布　　允差 ±5%　　总工批准

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1500m (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%)。

重庆康明斯发动机有限公司
发动机数据单

发动机型号: QSK38-G5A

备用功率： 1334 kW(1788 HP)@1500 RPM

常用功率： 1212 kW(1624 HP)@1500 RPM

参考信息:

特征编号..... D233042GX03
CPL..... 3573
数据单号..... FR 549
日期..... 2019/8/19

整机数据

机型	V型、四冲程、12缸柴油机	
进气方式	增压+低温中冷	
缸径—mm(in.)×行程—mm(in.)	159×159	(6.25×6.25)
排量—L(in^3)	37.7	(2301)
压缩比	15:1	
运动零件相对于曲轴中心线的转动惯量		
·飞轮选用件FW 6074 —kg•m^2(in-lbf-sec^2)	10.4	(93)
·飞轮选用件FW 6077 —kg•m^2(in-lbf-sec^2)	20.8	(184)
质心至缸体后端的距离(FH6024) —mm(in)	801	(31.54)
质心在曲轴中心线上方—mm(in)	173	(6.8)
后端主轴承允许的最大静载荷—kg(lb)	907	(2000)

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

允许最大的排气背压—kPa(in.Hg)	7	(2)

进气系统

允许的最大进气阻力		
脏滤芯—kPa(in. H_2O)	6.2	(25)
干净滤芯—kPa(in.H_2O)	3.7	(15)

冷却系统

水套冷却系统要求

冷却液容量		
发动机—L(quarts)	106	(112)
中冷器—L(quarts)	22.7	(24)
海平面高度压力盖允许的最小压力—kPa(PSI)	76	(11)
发动机曲轴中心线上方冷却系统的最大静压头高度—m(ft.)	18.3	(60)
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)	82-94	(180-202)
发动机外部最大冷却水阻力@1500/1800rpm —kPa(PSI)	68.9/68.9	(10/10)

中冷器要求

外部中冷器最大冷却水阻力@1500/1800rpm —kPa(PSI)	68.9/68.9	(10/10)
进入中冷器的最高冷却液温度 @ 环境温度25℃ (77°F) 时 —℃(°F)	49	(120)
进入中冷器的最高冷却液温度 @ 极限环境条件下，备用/常用 —℃(°F)	71/66	(160/150)
节温器温度调节范围 —℃(°F)	46-57	(115-135)

重庆康明斯发动机有限公司
中国，重庆
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重庆康明斯发动机有限公司
发动机数据单

润滑系统

机油压力		
@最小低怠速时—kPa(PSI)	138	(20)
@额定转速时—kPa(PSI)	344.7-482.6	(50-70)
允许的最高机油温度—℃(°F)	120	(248)
机油盘容量（选用件OP6125): 低位/高位—L(U.S.Gal)	140.1-166.6	(37-44)
系统总容量（包含复合滤清器）—L(U.S.Gal)	170.3	(45)

燃油系统

燃油喷射系统形式	康明斯MCRS系统	
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)	16.9	(5)
滤清器在脏的状态最大供油流量时—kPa(in.Hg)	34	(10)
最高进油温度—°C(°F)	71	(160)
最大供油流量— L/h(U.S.Gal/h)	602	(159)
最大回油流量— L/h(U.S.Gal/h)	356	(94)

电气系统

系统电压—Volt		24
推荐的电瓶最小容量		
·冷态在10°C（50°F）及以上时— CCA		
·冷态在0°C至10°C（32°F至50°F）时— CCA		1800
·冷态在-18°C至0°C（0°F至32°F）时— CCA		
起动电路允许的最大电阻—Ω		0.002

冷起动能力

无辅助冷起动最低曲轴转速— RPM		150
无辅助条件下的最低冷起动温度— °C(°F)	7	(45)

性能数据

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、选用设备和被驱动件。
- 使用符合ASTM D975标准的2#柴油。
- ISO 3046，第1部分，标准规定的条件：

大气压力： 100kPa（29.53 in.Hg） 进气温度：25°C（77°F）

任意恒定负荷下的转速稳定性(+/-)—%	0.25
估计的典型发电机组自由场声压级	
不包括排气噪声；在7.5m(24.6ft.)处，额定负载时 —dBa	99.4
在排气管中心线水平面上距离1米处朝上45°方向的排气噪声 —dBA	96.3

所有数据如有更改，恕不另行通知。

重庆康明斯发动机有限公司
发动机数据单

	备用功率		常用功率	
		50 Hz		50 Hz
额定转速r/min		1500		1500
怠速r/min		700-900		700-900
输出总功率kW(BHP)		1,334(1,782)		1,212 (1,641)
平均有效压力kPa(PSI)		2,807 (407)		2,255 (327)
活塞平均速度m/s(ft/min)		9.5 (1,870)		9.5 (1,870)
摩擦功率kW(BHP)		86 (115)		86 (115)
在一定的发动机外部阻力的情况下，发动机冷却水流量：				
.在5psi - 2.5psi流动阻力时 L/min(gpm)		1,037 (274)		1,037 (274)
.在最大外部流动阻力时 L/min(gpm)		791 (209)		791 (209)
发动机数据				
进气流量L/s(CFM)		1,738(3,683)		1,660 (3,519)
排气温度-干式排气管 °C(°F)		535 (995)		525 (977)
排气流量 L/s(CFM)		4,263 (9,033)		4,077 (8,638)
空燃比 A/F		23.34		23.8
散失到环境的热量kW(BTU/min)		960 (54,623)		119 (6,828)
散失到冷却液的热量 kW(BTU/min)		486 (27,661)		457 (26,040)
散失到排气的热量 kW(BTU/min)		960 (54,623)		898 (51,061)
散失到燃油的热量 kW(BTU/min)		6.7 (379)		6.7 (379)
双泵双循环				
散失到中冷器冷却液的热量 kW(BTU/min)		348 (19,820)		314 (17,940)
在一定的发动机外部阻力的情况下，中冷器冷却液的流量：				
.在5psi - 2.5psi流动阻力时 L/min(gpm)		519 (137)		519 (137)
.在最大外部流动阻力时 L/min(gpm)		439 (116)		439 (116)

重庆康明斯发动机有限公司
中国，重庆
以上参数如有更改，恕不另行通知。

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE PERFORMANCE CURVE

CONFIGURATION	ENGINE MODEL:	DATA SHEET:	CPL No.:
D233042GX03	QSK38-G5A	FR 549	3573
			DATE: 2019/8/19

Displacement:	37.7L	(2301 in^3)	Aspiration:	Turbocharged & LTA
BoreXStroke:	159X159mm	(6.25X6.25 in.)	Fuel System:	Cummins MCRS
Compress Ratio:	15:1		Emission:	CS III

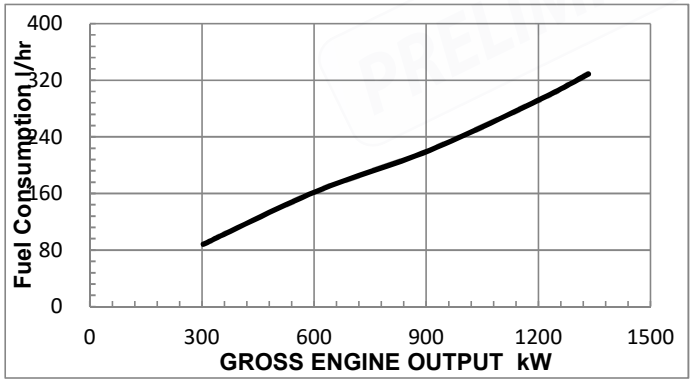
RATING
STANDBY: 1334 kW(1788 HP)@1500 RPM
PRIME: 1212 kW(1624 HP)@1500 RPM

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler; 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
1500	1788	1334	1624	1212	1250	933
-	-	-	-	-	-	-

FUEL CONSUMPTION



OUTPUT POWER			FUEL CONSUMPTION			
%	BHP	kW	kg/ kWm-h	lb/ bhp-h	l/hr	Gal/ hr
			1500RPM			
STNADBY						
100	1788	1334	211	0.354	329	87
PRIME						
100	1624	1212	208	0.349	295	78
75	1218	909	208	0.349	221	59
50	812	606	230	0.386	163	43
25	406	303	250	0.419	88	23
CONTINUOUS						
100	1250	933	208	0.349	227	60

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 or a fuel corresponding to ASTM D2.

DATA STATUS: Development

TECHNICAL DATA DEPT. CERTIFIED WITHIN 5% CHIEF ENGINEER

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. (1,500m) and 104°F (40°C) without power deration.

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

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

ENGINE MODEL(S): QSK38-G5A

STAND_BY: 1334 kW(1788 HP)@1500 RPM

PRIME: 1212 kW(1624 HP)@1500 RPM

REFERENCE INFORMATION:

CONFIGURATION	**D233042GX03**
CPL NUMBER	**3573**
DATA SHEET	**FR 549**
DATE	**2019/8/19**

GENERAL ENGINE DATA

Type	Four cycle; Vee; 12 Cylinder	
Aspiration	Turbocharged & LTA	
Bore—in.(mm)×stroke—in.(mm)	6.25×6.25	(159×159)
Displacement—in^3(L)	2301	(37.7)
Compression Ratio	15:1	
Moment of Inertia of Rotating Components		
·With FW 6074 Flywheel —in-lbf-sec^2($kg•m^2$)	93	(10.4)
·With FW 6077 lywheel —in-lbf-sec^2($kg•m^2$)	184	(20.8)
C.G. Distance From Rear Face of block —in(mm)	31.5	(801)
C.G. Distance Above Crank Centerline—in(mm)	6.8	(173)
Maximum Static Loading at Rear Main Bearing —lb(kg)	2000	(907)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block—lb.ft(N•m)	4500	(6101)

EXHAUST SYSTEM

Maximum Allowable Back Pressure —in.Hg(kPa)	2	(7)

AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner		
Dirty Element —in.H_2O(kPa)	25	(6.2)
Clean Element —in.H_2O(kPa)	15	(3.7)

COOLING SYSTEM

Jacket Water Circuit Requirements

Coolant Capacity		
Engine Only —quarts(L)	112	(106)
After-cooler Only —quarts(L)	24	(22.7)
Minimum Allowable Pressure Cap @ sea level— PSI(kPa)	11	(76)
Maximum Static Head of Coolant Above Engine Crank Centerline —ft.(m)	60	(18.3)
Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(℃)	220/212	(104/100)
Standard Thermostat (modulating) Range— °F(℃)	180-202	(82-94)
Maximum Coolant Friction Heat External to Engine @1500/1800 rpm —PSI(kPa)	10/10	(68.9/68.9)

Aftercooler Circuit Requirements

Maximum Coolant Friction Heat External to Engine @1500/1800 rpm —PSI(kPa)	10/10	(68.9/68.9)
Maximum coolant temperature into the aftercooler @ 25℃ (77°F) ambient —°F(℃)	120	(49)
Maximum coolant temperature into the aftercooler @ Limiting Ambient conditions for Standby/Prime power —°F(℃)	160/150	(71/66)
Thermostat (Modulating) Range — °F(℃)	115-135	(46-57)

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

LUBRICATION SYSTEM

Oil Pressure		
@Minimum low idle —PSI(kPa)	20	(138)
@ Rated Speed —PSI(kPa)	50-70	(344.7-482.6)
Maximum Allowable Oil Temperature —°F(℃)	248	(120)
Oil Capacity with OP 6125 Oil Pan: Low-High —U.S.Gal(L)	37-44	(140.1-166.6)
Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L)	45	(170.3)

FUEL SYSTEM

Fuel Injection System	Cummins MCRS	
Maximum fuel supply restriction at fuel pump inlet		
with clean fuel filter element(s) at maximum fuel flow —in.Hg(kPa)	5	(16.9)
with dirty fuel filter element(s) at maximum fuel flow —in.Hg(kPa)	10	(34)
Maximum fuel inlet temperature —°F(℃)	160	(71)
Maximum supply fuel flow — U.S.Gal/h(L/h)	159	(602)
Maximum return fuel flow — U.S.Gal/h(L/h)	94	(356)

ELECTRICAL SYSTEM

System Voltage —Volt		24
Minimum Recommended Battary Capacity		
·Cold Soak at 50°F(10℃) and Above — CCA		
·Cold Soak at 32~50°F(0~10℃) — CCA		1800
·Cold Soak at 0~32°F(-18~0℃) — CCA		
Maximum Allowable Resistance of Starting Circuit—Ω		0.002

COLD START CAPABILITY

Minimum Cranking Speed for Unaided Cold Start — RPM		150
Minimum Ambient Temperature for Unaided Cold Start — °F(℃)	45	(7)

PERFORMANCE DATA

All data is based on: • 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.

- Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
- ISO 3046, Part 1, Standard Reference Conditions of:

Barometric pressure： 29.53 in Hg(100 kPa) Inlet air temperature： 77°F (25°C)

Stability at Any Invariablenes Load (+/-) —%	0.25
Estimated Free Field Sound Pressure Level of a Typical Generator Set	
Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft) —dBa	99.4
Exhaust Noise at Rated 1 m Horizontally From Centerline of Exhaust Pipe Outlet Upwards at 45° —dBA	96.3

All data is subject to change without notice.

CHONGQING CUMMINS ENGINE COMPANY LTD.
ENGINE DATA SHEET

	Standby Power		Prime Power	
		50 Hz		50 Hz
Engine Speed r/min		1500		1500
Engine Idle Speed r/min		700-900		700-900
Gross Engine PowerOutput BHP(kW)		1,782(1,334)		1,641(1,212)
Brake Mean Effective Pressure PSI(kPa)		407 (2,807)		327(2,255)
Piston Speed ft/min(m/s)		1,870 (9.5)		1,870 (9.5)
Friction Horsepower BHP(kW)		115 (86)		115 (86)
Engine Jacket Coolant Flow at Stated Friction Head external to Engine:				
• 5 psi-2.5 psi FrictionHead U.S.GPM(L/min)		274 (1,037)		274 (1,037)
• Maximum Friction Head U.S.GPM(L/min)		209 (791)		209 (791)
Engine Data				
Intake Air Flow CFM(L/s)		3,683(1,738)		3,519(1,660)
Exhaust Gas Temperature - DryStack °F(℃)		995(535)		977(535)
Exhaust Gas Flow CFM(L/s)		9,033(4,263)		8,638(4,077)
Air to Fuel ratio		23.34		23.8
Heat Rejection to Ambient BTU/min(kW)		7,422(130)		6,828(119)
Heat Rejection to Jacket Coolant BTU/min(kW)		2,7661(486)		26,040(457)
Heat Rejection to Exhaust BTU/min(kW)		54,623(960)		5,1061(898)
Heat Rejection to Fuel BTU/min(kW)		379 (6.7)		379 (6.7)
2 P 2 L				
Heat Rejection to Aftercooler Coolant BTU/min(kW)		19,820(348)		17,940(314)
Aftercooler Coolant Flow at Stated Friction Head External to Engine:				
• 2 psi-2.5 psi Friction Head U.S.GPM(L/min)		137 (519)		137 (519)
• Maximum Friction Head U.S.GPM(L/min)		116 (439)		116 (439)