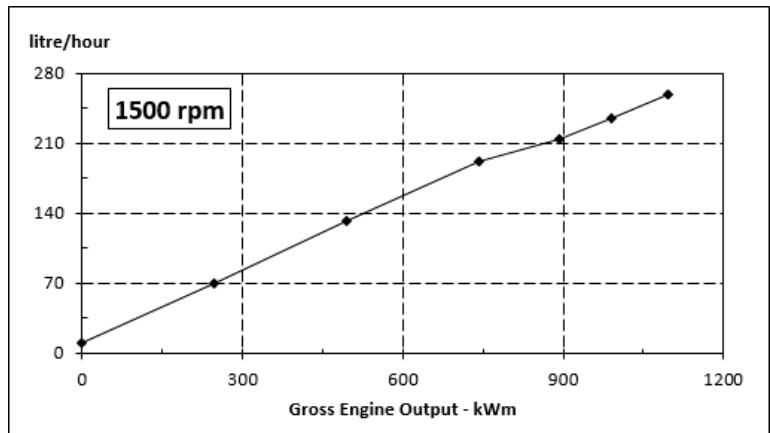
	康明斯公司 印第安纳哥伦布 47202-3005 发动机性能数据单	发动机型号: QSK38-G2	曲线号: FR6787	G-驱 QSK 1
		发动机关键零件清单: CPL : 3570	日期: 2014/08/25	
压缩比: 15:1		排量: 37.7 L (2301 in³)		
燃油系统: Cummins MCRS		进气方式: 涡轮增压, 中冷		
排放认证: 无认证				

发动机转速		备用功率		常用功率		持续功率	
rpm	bhp	kWm	bhp	kWm	bhp	kWm	kWm
1500	1470	1096	1326	989	1197	893	

发动机性能数据 @ 1500 RPM

输出功率			燃油消耗			
%	bhp	kWm	lb/ bhp-h	kg/ kWm-h	US gal/ hour	litre/ hour
备用功率						
100	1470	1097	0.330	0.200	68.3	259
常用功率						
100	1326	989	0.332	0.202	62.0	235
75	995	742	0.360	0.219	50.4	191
50	663	495	0.374	0.227	34.9	132
25	332	247	0.399	0.243	18.6	71
持续功率						
100	1197	893	0.335	204	56.6	214



单位换算: (litres = US Gal x 3.785) (US Gal = litres x 0.2642)

数据如有更改, 恕不另行通知

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。 **备用功率标定:** 适用于在市电停电期间提供应急电源。该标定无超负荷能力, 且该备用功率标定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。 **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:** 限时常用功率在不变更负荷应用中可以使用有限的小时数。它适用于预先通知的断电情况, 如电网限电。在功率块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。但客户应该意识到, 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, 请按持续功率标定运行。 **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。

如需发电输出数据, 请参见应用工程公告AEB 10.47。

上述代表发动机整体性能数据的获得和修正均是基于ISO-3046 标准规定的标准条件: 大气压力100 kPa (29.53 in Hg), 海拔 [110 m (361 ft)], 进气温度25 °C (77 °F), 相对湿度30%, 使用标准2#柴油或符合ASTM D2的柴油。

降功率数据是基于 10/15 in H₂O 的进气阻力和 1.5/2.0 in Hg 的排气背压给定的 @ 1500/ 1800 RPM。

燃油消耗数据是基于比重为0.85kg/(7.1 lbs/US gal)的No.2柴油而得到的。功率输出曲线是基于发动机带燃油系统、水泵和机油泵试验时获得的, 而不包括交流发电机、风扇、其它选用设备和被驱动的部件。

数据状态: **最终版本**

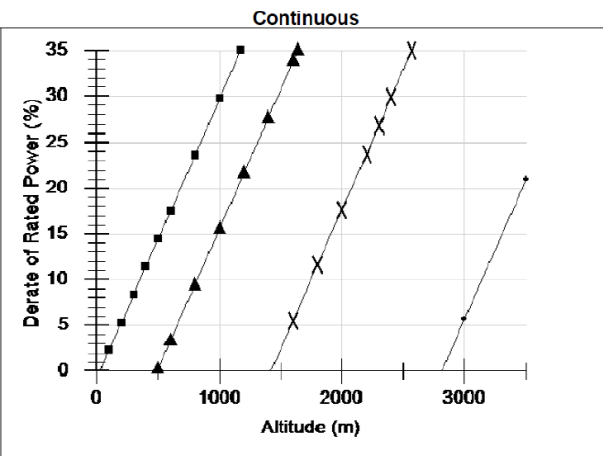
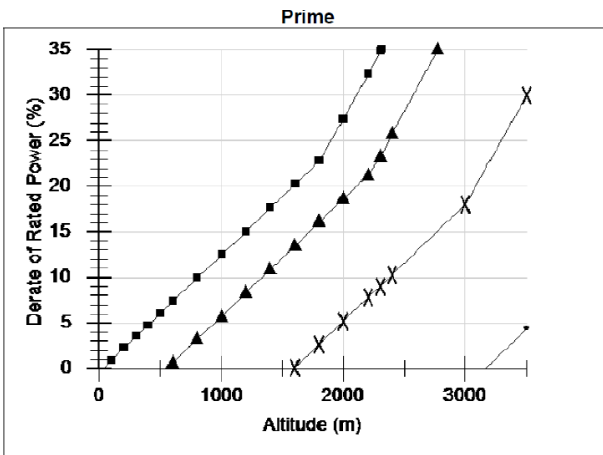
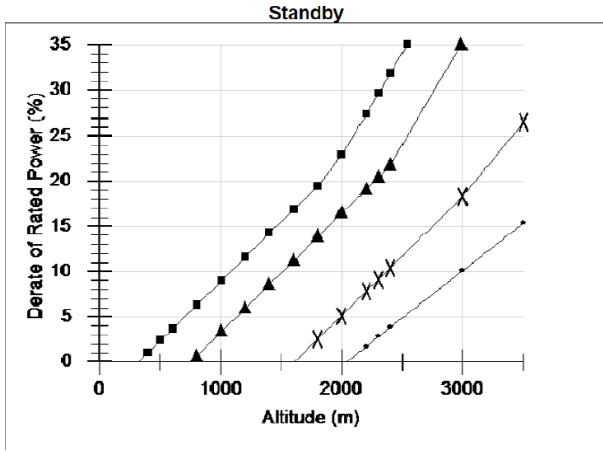
数据公差: **± 5%**

总工程师:



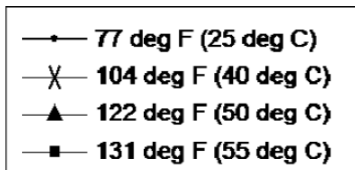
QSK38-G2

1500 RPM 降功率曲线



在高海拔和高环境温度下的运行:

对 **备用功率** 在超过上图的环境条件时, 海拔每升高1000 ft (300 m), 再降低功率 6%, 大气温度每升高18 delta deg F (10 delta deg C), 再降低功率 19%。
 对 **常用功率** 在超过上图的环境条件时, 海拔每升高1000 ft (300 m), 再降低功率 6%, 大气温度每升高18 delta deg F (10 delta deg C), 再降低功率 21%。
 对 **持续功率** 在超过上图的环境条件时, 海拔每升高1000 ft (300 m), 再降低功率 7%, 大气温度每升高18 delta deg F (10 delta deg C), 再降低功率 24%。



康明斯公司

发动机数据单

发动机型号: QSK38-G2

特征编号: D233042GX03

数据单: FR6787

日期: 2014/08/25

安装图

• 风扇飞轮: 4954124

CPL号

• 发动机关键零件清单: 3570

整机数据

发动机型式	四冲程; V型; 12缸	
进气方式	涡轮增压, 低温中冷	
缸径 x 行程	6.25 x 6.25	(159 x 159)
排量	2,301	(37.7)
压缩比	15 : 1	
干重 (大约)	8,433	(3,825)
湿重 (大约)	9,039	(4,100)
旋转部件的转动惯量		
• 带飞轮 FW 6074	— lb _m • ft ² (kg • m ²)	246.8 (10.4)
• 带飞轮 FW 6077	— lb _m • ft ² (kg • m ²)	493.6 (20.8)
质心至缸体后端面的距离	— in (mm)	31.5 (801)
质心在曲轴中心线上方	— in (mm)	6.8 (173)
后端轴承最大静载荷	— lb _m (kg)	2,000 (907)

发动机悬置安装

缸体后端面允许的最大弯矩

排气系统

允许的最大排气背压@ 备用功率

进气系统

最大进气阻力		
• 脏滤芯	— in H ₂ O (kPa)	25 (6.2)
• 带普通空气滤清器和干净滤芯	— in H ₂ O (kPa)	15 (3.7)

冷却系统

水套水回路要求

冷却液容量 — 仅发动机	— gal (litre)	28 (106)
海平面允许的最小压力盖压力	— psi (kPa)	11 (76)
冷却水的最大静压在发动机曲轴中心线上方	— ft (m)	60 (18.3)
顶部水箱允许的最高温度-备用/常用功率	— °F (°C)	220 / 212 (104 / 100)
节温器温度调节范围	— °F (°C)	180 - 202 (82 - 94)
发动机外部最大冷却水阻力 - 1800 RPM	— psi (kPa)	10 (68.9)

中冷器回路要求

冷却液容量 — 中冷器	— gal (litre)	6 (22.7)
发动机外部最大冷却水阻力 - 1800 RPM	— psi (kPa)	10 (68.9)
进入中冷器的最高冷却液温度 @ 77 °F (25 °C) 的环境温度时	— °F (°C)	120 (49)
进入中冷器的最高冷却液温度 @ 极限环境温度条件下, 备用/常用功率	— °F (°C)	160 / 150 (71 / 66)
节温器温度调节范围	— °F (°C)	115 - 135 (46 - 57)

润滑系统

机油压力 @ 最小低怠速时	— psi (kPa)	20 (138)
@ 控制转速时	— psi (kPa)	50 - 70 (344.7 - 482.6)
最高机油温度	— °F (°C)	248 (120)
机油盘 OP 6107 容量: 低 - 高	— US gal (litre)	37 - 44 (140.4 - 166.6)
系统总容量 (包含复合滤清器)	— US gal (litre)	45 (170.3)

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燃油系统

	Cummins MCRS	
燃油系统型式.....		
燃油泵入口处允许的最大供油阻力 (干净/脏滤芯)..... — in Hg (kPa)	5 / 10	(16.9 / 34)
燃油器回油管路允许的最大阻力 (包含摩擦阻力和静压)..... — in Hg (kPa)	10	(34)
最高进油温度..... — °F (°C)	160	(71)
最大供油流量 - 1800 RPM..... — US gph (litre/hr)	159	(602)
最大回油流量 - 1800 RPM..... — US gph (litre/hr)	94	(356)

电气系统

系统电压..... — volt	24
最小推荐电池容量	
• 冷态 @ 10 °C (50 °F) 及以上..... — CCA	1,800
• 冷态 @ 0 °C 至 10 °C (32 °F 至 50 °F)..... — CCA	1,800
• 冷态 @ -18 °C 至 0 °C (0 °F 至 32 °F)..... — CCA	1,800
起动电路允许的最大电阻..... — ohm	0.002

冷起动力

无辅助冷起动		
最低曲轴转速..... — RPM	150	
无辅助冷起动的最低环境温度..... — °F (°C)	45	(7.2)

性能数据

- 所有数据均基于:
- 发动机带燃油系统、水泵、机油泵、空滤器和消声器时试验获得的, 而不包括交流发电机空压机、风扇、其它选用设备和被驱动的部件。
 - 测试时使用符合ASTM D975标准的2#柴油。
 - ISO 3046, 第1部分, 标准参考条件:
 大气压力: 100 kPa (29.53 in Hg) 进气温度: 25 °C (77 °F)
 海拔: 110 m (361 ft) 相对湿度: 30%

任意恒载下的稳态稳定带..... — %	+/-	0.25
估计的典型发电机组自由场声压级		
不包含排气噪声; 在额定工况, 距离 7.5 m (24.6 ft)处; @ 1800 RPM..... — 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 @ 1800 RPM..... — dBA		96.3

	备用功率		常用功率	
	60 hz	50 hz	60 hz	50 hz
发动机控制转速..... RPM	N/A	1,800	N/A	1,800
发动机怠速..... RPM	N/A	700 - 900	N/A	700 - 900
发动机输出总功率..... hp (kW)	N/A	1,470 (1,097)	N/A	1,326 (989)
平均有效压力..... psi (kpa)	N/A	337 (2,326)	N/A	304 (2,098)
活塞平均速度..... ft/min (m/s)	N/A	1,562 (7.9)	N/A	1,562 (7.9)
摩擦损失功率..... hp (kW)	N/A	115 (86)	N/A	115 (86)
在一定的发动机外部阻力的情况下, 发动机冷却水流量:				
• 在4 psi 流动阻力时..... gpm (L/s)	N/A	274 (1,037)	N/A	274 (1,037)
• 在最大外部流动阻力时..... gpm (L/s)	N/A	209 (791)	N/A	209 (791)
发动机数据				
进气流量..... cfm (L/s)	N/A	3,231 (1,525)	N/A	3,576 (1,409)
排气温度 - 干式排气管..... °F (°C)	N/A	856 (459)	N/A	836 (447)
排气流量..... cfm (L/s)	N/A	7,570 (3,573)	N/A	6,966 (3,288)
空燃比..... 空气: 燃料	N/A	28.6 : 1	N/A	29.1 : 1
散失到环境中的热量..... BTU/min (kW)	N/A	5,912 (104)	N/A	5,374 (95)
散失到水套冷却液中的热量..... BTU/min (kW)	N/A	23,678 (416)	N/A	21,465 (378)
散失到排气中的热量..... BTU/min (kW)	N/A	39,547 (695)	N/A	37,524 (660)
散失到*燃油中的热量..... BTU/min (kW)	N/A	379 (7)	N/A	414 (7)
2P / 2L				
散失到中冷器冷却液中的热量..... BTU/min (kW)	N/A	15,921 (280)	N/A	13,353 (235)
在一定的发动机外部阻力的情况下, 中冷器冷却水流量:				
• 在2 psi 流动阻力时..... gpm (L/s)	N/A	137 (9)	N/A	137 (9)
• 在最大外部流动阻力时..... gpm (L/s)	N/A	116 (7)	N/A	116 (7)

* 这是散失到燃油的最大热量。

发动机型号: **QSK38-G2**

数据单: **FR6787**

日期: **2014/08/25**

N.A. - Not Available不可用


N/A - Not Applicable to this Engine不适用

TBD - To Be Determined待定

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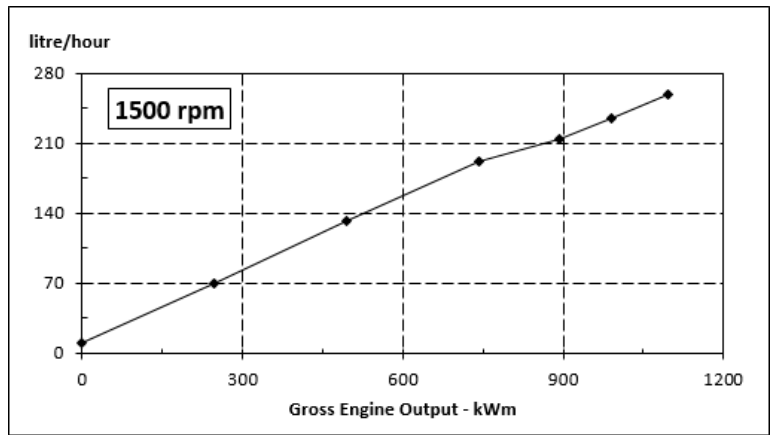
受控版本位于 gce.cummins.com

	Cummins Inc. Columbus, Indiana 47202-3005 ENGINE PERFORMANCE DATASHEET	Basic Engine Model: QSK38-G2	Curve Number: FR6787	G-DRIVE QSK 1
		Engine Critical Parts List: CPL : 3570	Date: 25 AUG 14	
Compression Ratio : 15:1		Displacement : 37.7 L (2301 in³)		
Fuel System : Cummins MCRS		Aspiration : Turbocharged and Aftercooled		
Emission Certification : Non-Certified				

Engine Speed	Standby Power		Prime Power		Continuous Power	
rpm	bhp	kWm	bhp	kWm	bhp	kWm
1500	1470	1096	1326	989	1197	893

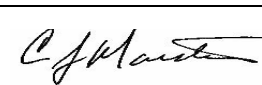
Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	bhp	kWm	lb/ bhp-h	kg/ kWm-h	US gal/ hour	litre/ hour
STANDBY POWER						
100	1470	1097	0.330	0.200	68.3	259
PRIME POWER						
100	1326	989	0.332	0.202	62.0	235
75	995	742	0.360	0.219	50.4	191
50	663	495	0.374	0.227	34.9	132
25	332	247	0.399	0.243	18.6	71
CONTINUOUS POWER						
100	1197	893	0.335	204	56.6	214



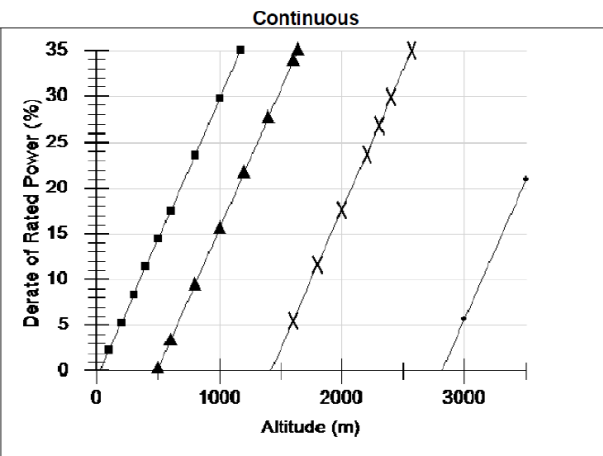
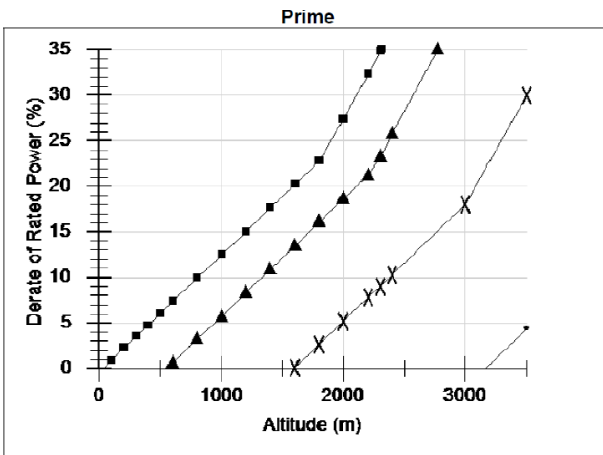
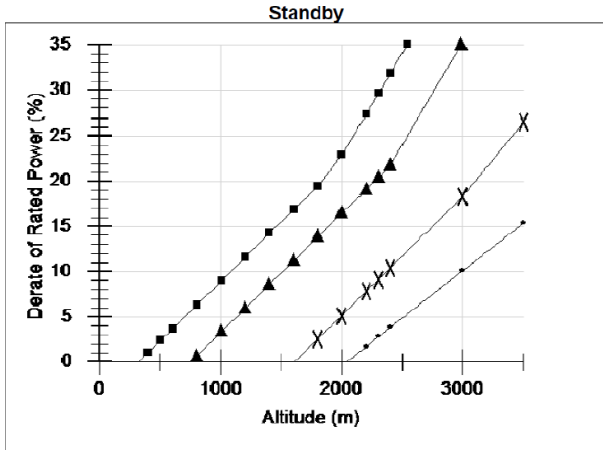
CONVERSIONS:(litres = US Gal x 3.785) (US Gal = litres x 0.2642)

Data Subject to Change Without Notice

<p>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.</p>	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 10/15 in H ₂ O air intake restriction and 1.5/2.0 in Hg exhaust back pressure @ 1500/1800 RPM.
	The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (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: Final Data Tolerance: ± 5% Chief Engineer: 

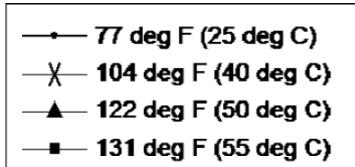
QSK38-G2

1500 RPM Derate Curves



Operation at Elevated Temperature and Altitude:

For **Standby** operation above these conditions, derate by an additional 6% per 1000 ft (300 m), and 19% per 18 delta deg F (10 delta deg C)
 For **Prime** operation above these conditions, derate by an additional 6% per 1000 ft (300 m), and 21% per 18 delta deg F (10 delta deg C)
 For **Continuous** operation above these conditions, derate by an additional 7% per 1000 ft (300 m), and 24% per 18 delta deg F (10 delta deg C)



Cummins Inc.

Engine Data Sheet

ENGINE MODEL : QSK38-G2

CONFIGURATION NUMBER : D233042GX03

DATA SHEET: FR6787

DATE: 25 AUG 14

INSTALLATION DIAGRAM

- Fan to Flywheel: 4954124

CPL NUMBER

- Engine Critical Parts List: 3570

GENERAL ENGINE DATA

Type	Four Cycle; Vee; 12 Cylinder	
Aspiration	Turbocharged and Low Temp Aftercooled	
Bore x Stroke	6.25 x 6.25	(159 x 159)
Displacement	2,301	(37.7)
Compression Ratio	15 : 1	
Dry Weight (Approximate)	8,433	(3,825)
Wet Weight (Approximate)	9,039	(4,100)
Moment of Inertia of Rotating Components		
• with FW 6074 Flywheel	246.8	(10.4)
• with FW 6077 Flywheel	493.6	(20.8)
Center of Gravity from Rear Face of Block	31.5	(801)
Center of Gravity Above Crankshaft Centerline	6.8	(173)
Maximum Static Loading at Rear Main Bearing	2,000	(907)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	4,500	(6,101)
--	-------	---------

EXHAUST SYSTEM

Maximum Back Pressure at Standby Power	2	(7)
--	---	-----

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction		
• with Dirty Filter Element	25	(6.2)
• with Normal Duty Air Cleaner and Clean Filter Element	15	(3.7)

COOLING SYSTEM**Jacket Water Circuit Requirement**

Coolant Capacity — Engine	28	(106)
Minimum Pressure Cap Rating at Sea Level	11	(76)
Maximum Static Head of Coolant Above Crankshaft Centerline	60	(18.3)
Maximum Coolant Temperature (Max Top Tank Temp) for Standby/Prime Power	220 / 212	(104 / 100)
Thermostat (Modulating) Range	180 - 202	(82 - 94)
Maximum coolant friction head external to engine - 1800 RPM	10	(68.9)

Aftercooler Circuit Requirements

Coolant Capacity — Aftercooler	6	(22.7)
Maximum Coolant Friction Head External to Engine - 1800 RPM	10	(68.9)
Maximum Coolant Temperature into Aftercooler @ 77 °F (25 °C) Ambient	120	(49)
Maximum Coolant Temperature into Aftercooler @		
Limiting Ambient Conditions for Standby/Prime power	160 / 150	(71 / 66)
Thermostat (Modulating) Range	115 - 135	(46 - 57)

LUBRICATION SYSTEM

Oil Pressure @ Minimum Idle Speed	20	(138)
@ Governed Speed	50 - 70	(344.7 - 482.6)
Maximum Oil Temperature	248	(120)
Oil Capacity with OP 6107 Oil Pan : Low - High	37 - 44	(140.4 - 166.6)
Total System Capacity (with Combo Filter)	45	(170.3)

FUEL SYSTEM

Type Injection System.....	Cummins MCRS	
Maximum Fuel Supply Restriction at Fuel Pump Inlet (clean/dirty filter)	5 / 10	(16.9 / 34)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	10	(34)
Maximum Fuel Inlet Temperature	160	(71)
Maximum Supply Fuel Flow - 1800 RPM.....	159	(602)
Maximum Return Fuel Flow - 1800 RPM.....	94	(356)

ELECTRICAL SYSTEM

System Voltage.....	— volt	24
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and above	— CCA	1,800
• Cold Soak @ 0 °C to 10 °C (32 °F to 50°F)	— CCA	1,800
• Cold Soak @ -18 °C to 0 °C(0 °C to 32°F)	— CCA	1,800
Maximum Starting Circuit Resistance	— ohm	0.002

COLD START CAPABILITY

Unaided Cold Start		
Minimum Cranking Speed	— RPM	150
Minimum Ambient Temperature for Unaided Cold Start.....	— °F (°C)	45 (7.2)

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 (24.6 ft); @ 1800 RPM	— dBA		99.4
Exhaust Noise at 1 m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45° @ 1800 RPM.....	— dBA		96.3

	STANDBY POWER		PRIME POWER		
	60 hz	50 hz	60 hz	50 hz	
Governed Engine Speed	RPM	N/A	1,800	N/A	1,800
Engine Idle Speed.....	RPM	N/A	700 - 900	N/A	700 - 900
Gross Engine Power Output	hp (kW)	N/A	1,470 (1,097)	N/A	1,326 (989)
Brake Mean Effective Pressure	psi (kpa)	N/A	337 (2,326)	N/A	304 (2,098)
Piston Speed	ft/min (m/s)	N/A	1,562 (7.9)	N/A	1,562 (7.9)
Friction Horsepower	hp (kW)	N/A	115 (86)	N/A	115 (86)
Engine Water Flow at Stated Friction Head External to Engine:					
• 4 psi Friction Head.....	gpm (L/s)	N/A	274 (1,037)	N/A	274 (1,037)
• Maximum Friction Head	gpm (L/s)	N/A	209 (791)	N/A	209 (791)
Engine Data					
Intake Air Flow	cfm (L/s)	N/A	3,231 (1,525)	N/A	3,576 (1,409)
Exhaust Gas Temperature - Dry Stack	°F (°C)	N/A	856 (459)	N/A	836 (447)
Exhaust Gas Flow	cfm (L/s)	N/A	7,570 (3,573)	N/A	6,966 (3,288)
Air to Fuel Ratio	air : fuel	N/A	28.6 : 1	N/A	29.1 : 1
Radiated Heat to Ambient	BTU/min (kW)	N/A	5,912 (104)	N/A	5,374 (95)
Heat Rejection to Jacket Coolant	BTU/min (kW)	N/A	23,678 (416)	N/A	21,465 (378)
Heat Rejection to Exhaust.....	BTU/min (kW)	N/A	39,547 (695)	N/A	37,524 (660)
Heat Rejected to *Fuel	BTU/min (kW)	N/A	379 (7)	N/A	414 (7)
2P / 2L					
Heat Rejection to Aftercooler Coolant	BTU/min (kW)	N/A	15,921 (280)	N/A	13,353 (235)
Aftercooler Water Flow at Stated Friction Head External to Engine:					
• 2 psi Friction Head.....	gpm (L/s)	N/A	137 (9)	N/A	137 (9)
• Maximum Friction Head	gpm (L/s)	N/A	116 (7)	N/A	116 (7)

* This is the maximum heat rejection to fuel.

ENGINE MODEL : QSK38-G2
DATA SHEET : FR6787
DATE : 25 AUG 14

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