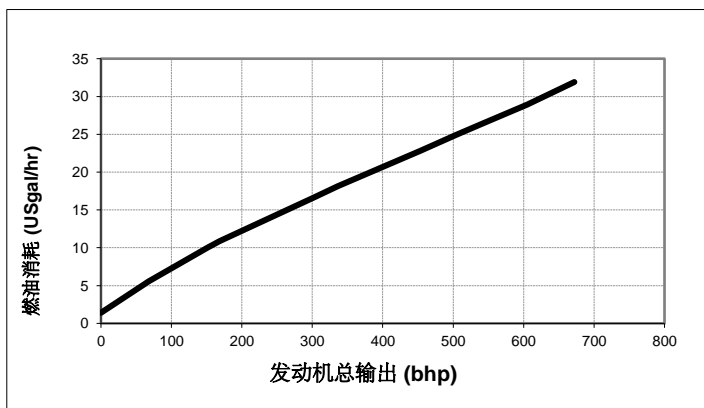
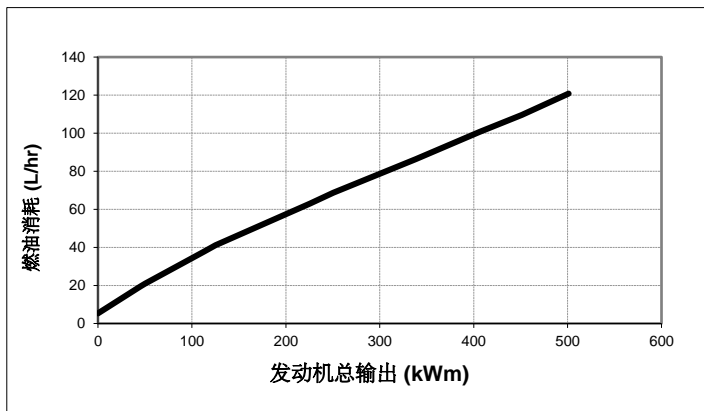


	<b>发动机性能数据</b> <b>康明斯公司</b> 印第安纳哥伦布 47202-3005 <a href="http://www.cummins.com">http://www.cummins.com</a>	<b>G-驱</b>		日期 2019/08/02		
		<b>QSK19-G13</b> <b>FR4790</b>		特征编号 D193103GX03	CPL 4382	版本 0
压缩比 15.8:1	燃油系统 Cummins MCRS	排量 18.9 L (1150 in³)	进气方式 涡轮增压, 空空冷			
后处理 0	排放合规 未认证 EPA Tier 3					

发动机转速	备用功率		常用功率		持续功率	
	kWm	bhp	kWm	bhp	kWm	bhp
rpm						
1500	501	672	451	605	406	545

### 发动机燃油消耗 @ 1500 rpm

输出功率			燃油消耗			
%	kWm	bhp	kg/kWm-hr	lb/bhp-hr	L/hr	US gal/hr
<b>备用功率</b>						
100	501	672	0.205	0.337	120.8	31.9
75	376	504	0.213	0.351	94.3	24.9
50	251	336	0.233	0.383	68.7	18.1
25	125	168	0.279	0.459	41.1	10.9
10	50	67	0.355	0.584	20.9	5.5
<b>常用功率</b>						
100	451	605	0.206	0.339	109.5	28.9
75	338	454	0.217	0.357	86.4	22.8
50	226	303	0.238	0.390	63.0	16.7
25	113	151	0.285	0.469	37.8	10.0
<b>持续功率</b>						
100	406	545	0.210	0.346	100.6	26.6



注释: 此数据单上的值尚未验证, 正在等待设计评审。有些值很可能不准确。

数据如有更改, 恕不另行通知

<p>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。 <b>备用功率标定:</b> 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。 <b>常用功率标定:</b> 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:</p> <p><b>无时限运行常用功率:</b> 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。 <b>限时运行常用功率:</b> 限时常用功率在不变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。 <b>持续功率标定:</b> 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。</p>	<p>如需发电输出数据, 请参见客户工程公告CEB00150。</p> <p>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。</p> <p>燃油消耗数据是基于比重为0.85kg/l(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。</p>
<p>数据状态: 产品</p> <p>数据公差: +/-5%</p> <p>总工程师: Jianguo Wu</p>	

## 1500 rpm 降功率表

备用

备用功率海拔修正能力 (kWm)											
运行环境温度 (°F)		77.0	86.0	95.0	104.0	108.5	113.0	117.5	122.0	126.5	131.0
运行环境温度 (°C)		25.0	30.0	35.0	40.0	42.5	45.0	47.5	50.0	52.5	55.0
海拔 (ft)	海拔 (m)										
0	0	501	501	501	501	501	501	501	501	501	501
328	100	501	501	501	501	501	501	501	501	501	501
656	200	501	501	501	501	501	501	501	501	501	501
984	300	501	501	501	501	501	501	501	501	501	501
1312	400	501	501	501	501	501	501	501	501	501	501
1640	500	501	501	501	501	501	501	501	501	501	501
1969	600	501	501	501	501	501	501	501	501	501	501
2625	800	501	501	501	501	501	501	501	501	501	501
3281	1000	501	501	501	501	501	501	501	501	501	501
3937	1200	501	501	501	501	501	501	501	501	501	501
4593	1400	501	501	501	501	501	501	501	501	501	501
5249	1600	501	501	501	501	501	501	501	501	501	501
5906	1800	501	501	501	501	501	501	501	501	501	501
6562	2000	501	501	501	501	501	501	501	501	501	494
最大海拔能力(ft)		11060	10277	9494	8711	8320	7928	7537	7145	6754	6363
最大海拔能力(m)		3371	3132	2894	2655	2536	2417	2297	2178	2059	1939

常用

常用功率海拔修正能力 (kWm)											
运行环境温度 (°F)		77.0	86.0	95.0	104.0	108.5	113.0	117.5	122.0	126.5	131.0
运行环境温度 (°C)		25.0	30.0	35.0	40.0	42.5	45.0	47.5	50.0	52.5	55.0
海拔 (ft)	海拔 (m)										
0	0	451	451	451	451	451	451	451	451	451	451
328	100	451	451	451	451	451	451	451	451	451	451
656	200	451	451	451	451	451	451	451	451	451	451
984	300	451	451	451	451	451	451	451	451	451	451
1312	400	451	451	451	451	451	451	451	451	451	451
1640	500	451	451	451	451	451	451	451	451	451	451
1969	600	451	451	451	451	451	451	451	451	451	451
2625	800	451	451	451	451	451	451	451	451	451	451
3281	1000	451	451	451	451	451	451	451	451	451	451
3937	1200	451	451	451	451	451	451	451	451	451	451
4593	1400	451	451	451	451	451	451	451	451	451	429
5249	1600	451	451	451	451	451	451	437	410	383	
5906	1800	451	451	451	451	451	446	419	391	364	337
6562	2000	451	451	451	451	428	400	373	346	318	291
最大海拔能力(ft)		8968	8185	7402	6619	6228	5836	5445	5053	4662	4270
最大海拔能力(m)		2733	2495	2256	2018	1898	1779	1660	1540	1421	1302

持续

持续功率海拔修正能力 (kWm)											
运行环境温度 (°F)		77.0	86.0	95.0	104.0	108.5	113.0	117.5	122.0	126.5	131.0
运行环境温度 (°C)		25.0	30.0	35.0	40.0	42.5	45.0	47.5	50.0	52.5	55.0
海拔 (ft)	海拔 (m)										
0	0	406	406	406	406	406	406	406	406	406	406
328	100	406	406	406	406	406	406	406	406	406	406
656	200	406	406	406	406	406	406	406	406	406	406
984	300	406	406	406	406	406	406	406	406	406	406
1312	400	406	406	406	406	406	406	406	406	406	402
1640	500	406	406	406	406	406	406	406	406	404	390
1969	600	406	406	406	406	406	406	406	406	393	379
2625	800	406	406	406	406	406	406	397	383	370	356
3281	1000	406	406	406	406	401	388	374	360	347	333
3937	1200	406	406	406	392	378	365	351	337	324	310
4593	1400	406	406	397	369	355	342	328	314	301	287
5249	1600	406	401	374	346	332	319	305	291	278	264
5906	1800	405	378	351	323	310	296	282	268	255	241
6562	2000	382	355	328	300	287	273	259	245	232	218
最大海拔能力(ft)		5879	5096	4313	3530	3139	2747	2356	1964	1573	1181
最大海拔能力(m)		1792	1553	1315	1076	957	837	718	599	479	360

海拔降功率数据是基于：压气机入口处的进气温度相对于环境温度的温升为 0°C 和冷却系统能力为 50°C 的极限环境温度。如果相对于环境温度的温升超过此值，请联系应用工程部。

对于高于表中温度或海拔值的运行，请联系应用工程部。

标准日气温和大气压与海拔的关系参考了 SAE AS210 表 A15。

## 整机数据

安装图号	0		
发动机型式	四冲程; 直列; 6 缸		
进气方式	涡轮增压, 空空中冷		
缸径 x 行程	in x in (mm x mm)	6.25 x 6.25	(159 x 159)
排量	in <sup>3</sup> (L)	1150	(18.9)
压缩比	15.8:1		
干重(大约)	lbm (kg)	4348	(1972)
湿重(大约)	lbm (kg)	4568	(2072)
后处理重量(大约)	lbm (kg)	N/A	(N/A)
旋转部件的转动惯量			
带飞轮 FW 4016, SAE 0	lbm • ft <sup>2</sup> (kg • m <sup>2</sup> )	195.0	(8.2)
重心至缸体后端面的距离	in (mm)	24.0	(609.6)
重心在曲轴中心线上方	in (mm)	11.0	(279.4)

## 发动机悬置安装

在缸体后端面处允许的最大弯矩	lb • ft (N • m)	1000	(1356)
----------------	-----------------	------	--------

## 排气系统

允许最大的静弯矩@ 排气口法兰	lb • ft (N • m)	0	(N/A)
备用功率最大背压 (排气口)	in Hg (kPa)	0.0	(0)

## 进气系统

压气机入口处相对环境温度的最大温升	°F (°C)	0	(-18)
最大进气阻力			
带普通空气滤清器和清洁的滤芯	in H <sub>2</sub> O (kPa)	10.0	(2.5)
带重型空气滤清器和清洁的滤芯	in H <sub>2</sub> O (kPa)	0.0	(0)
带脏滤芯	in H <sub>2</sub> O (kPa)	25.0	(6.2)

## 冷却系统

## 水套/高温回路要求

发动机外部最大冷却水阻力 (1500 rpm)	psi (kPa)	5.0	(34.5)
在一定的发动机外部阻力的情况下, 发动机冷却水流量:			
1 psi 流动阻力时 (1500 rpm)	US gpm (L/m)	128	(485)
在最大外部流动阻力时 (1500 rpm)	US gpm (L/m)	118	(447)
冷却液容量- 发动机高温回路	US gal (L)	11.0	(41.6)
海平面高度压力盖允许的最小压力	psi (kPa)	7.0	(48.3)
发动机曲轴中心线上方冷却系统的最大静压头高度	ft (m)	60.0	(18.3)
顶部水箱允许的最高温度-备用/常用功率	°F (°C)	219 / 212	(104 / 100)
节温器温度调节范围	°F (°C)	0 - 0	(-18 - -18)

## 低温回路(LTC) 要求

发动机外部最大冷却水阻力 (1500 rpm)	psi (kPa)	0.0	(N/A)
在一定的发动机外部阻力的情况下, 中冷器冷却液的流量:			
psi 流动阻力时 (1500 rpm)	US gpm (L/m)	0	(N/A)
最大外部流动阻力时 (1500 rpm)	US gpm (L/m)	0	(N/A)
进入LTC的最高冷却液温度 @ 77°F (25°C) 环境温度时	°F (°C)	0	(-18)
进入LTC的最高冷却液温度 @			
极限环境条件下, 备用/常用功率	°F (°C)	0 / 0	(-18 / -18)
节温器温度调节范围	°F (°C)	0 - 0	(-18 - -18)
冷却液容量- 发动机低温回路	US gal (L)	0.0	(N/A)

## 空空中冷器要求

空空中冷器与OEM空空中冷管道之间允许的最大压降 (1800 rpm)	in Hg (kPa)	3.0	(10.1)
空空中冷器出口与环境温度之间的最大温差@环境温度77°F (25°C)(CAC dT)	Δ°F (Δ°C)	38	(21)
空空中冷器出口最高温度@ 环境温度 ≤25 °C (77 °F)时	°F (°C)	115	(64)

## 润滑系统

机油压力@最小怠速时	psi (kPa)	20	(138)
机油压力@控制转速时	psi (kPa)	N/A - 70	(N/A - 483)
最高机油温度	°F (°C)	250	(121)
机油容量: 低 - 高	US gal (L)	16 - 19	(61 - 72)
系统总容量(带旋入式机油滤清器)	US gal (L)	22	(83)

## 燃油系统

允许的最大供油阻力@ 1级燃油过滤器入口	in Hg (kPa)	5.0	(16.9)
喷雾器回油管路允许的最大阻力 (包括摩擦阻力和静压)	in Hg (kPa)	10.0	(33.8)
最高进油温度	°F (°C)	160	(71)
最大供油流量	US gph (L/hr)	0	(N/A)
最大回油流量	US gph (L/hr)	65	(246)

## 电气系统

系统电压	volts	24
最低推荐电池容量 冷态 @ 0 °F (-18 °C)	CCA	0
起动电路允许的最大电阻	ohm	0.002
系统最大电流	amps	0

## 冷起动力

无辅助冷起动 最小起动速度	rpm	150
无辅助冷起动的最低环境温度	°F (°C)	10 (-12)

## 性能数据

最小怠速	rpm	700
最大怠速	rpm	0

		备用	常用	持续
		50 Hz	50 Hz	50 Hz
发动机控制转速	rpm	1500	1500	1500
发动机输出总功率	bhp (kWm)	672 (501)	605 (451)	545 (406)
平均有效压力	psi (kPa)	308 (2124)	277 (1910)	250 (1724)
摩擦损失功率	hp (kWm)	N/A (N/A)	N/A (N/A)	N/A (N/A)
进气流量	ft <sup>3</sup> /min (L/sec)	1469 (694)	1398 (660)	1304 (616)
排气温度	°F (°C)	906 (486)	891 (478)	901 (483)
排气流量	ft <sup>3</sup> /min (L/sec)	3647 (1722)	3442 (1625)	3232 (1526)
空燃比		27.8:1	29.2:1	29.7:1
散失到环境中的热量	BTU/min (kWm)	2762 (49)	2504 (45)	2300 (41)
散失到水套冷却液中的热量	BTU/min (kWm)	9578 (169)	9157 (162)	7506 (132)
散失到排气中的热量	BTU/min (kWm)	24199 (426)	22530 (397)	21131 (372)
* 散失到燃油中的热量	BTU/min (kWm)	N/A (N/A)	0 (0)	0 (0)
散失到中冷器中的热量	BTU/min (kWm)	6803 (120)	6031 (107)	5191 (92)
增压空气流量	lb/min (kg/min)	105 (48)	100 (46)	93 (43)
增压器压气机出口压力	psi (kPa)	34.9 (241)	32 (221)	29 (200)
增压器压气机出口温度	°F (°C)	387 (198)	365 (185)	348 (176)

\*这是散失到燃油的最大热量。

## 噪声排放

频率 (Hz)		123	31.5	63	125	250	500	1000	2000	4000	8000	16000	Overall
声功率 dB(A)		123	31.5	63	125	250	500	1000	2000	4000	8000	16000	Overall
1500 rpm	发动机 <sup>4</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50 Hz	排气 <sup>5</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1. 所引用的试验数据来自单台发电机组试验, 不构成任何特定发动机性能的保证。数据取决于仪器、测量和发动机间的可变性。

2. 试验参考程序ISO 3744和ANSI S12.34-1998 (如适用)。

3. 所有数据均为“A”加权, 四舍五入至最近的 dB。

4. 带“典型散热器和风扇”的发动机, 声功率 (dB)。

5. 距离开放烟筒1米处的发动机排气, 声压 (dB)。

## 排放数据

注意: 该数据是根据规定的试验方法和条件, 取自单台发动机试验。这些数据取决于仪器、测量和发动机间的可变性。现场排放试验数据不能保证达到这些水平。对于大气许可程序 (For air permit programs), 请联系应用工程部了解预期的现场变化。

## 名义废气排放数据 @ 1500 rpm

组成部分	备用			常用			持续		
	g/bhp-hr	mg/Nm <sup>3</sup>	PPM	g/bhp-hr	mg/Nm <sup>3</sup>	PPM	g/bhp-hr	mg/Nm <sup>3</sup>	PPM
HC (未燃烧碳氢化合物总量)	0.04	28	28	0.04	31	31	0.05	35	35
NO <sub>x</sub> (氮氧化物, 例如 NO <sub>2</sub> )	3.74	720	720	3.45	660	660	3.14	582	582
CO (一氧化碳)	0.41	151	151	0.48	178	178	0.67	243	243
PM (颗粒物)	0.01	5	N/A	0.02	6	N/A	0.03	12	N/A
SO <sub>2</sub> (二氧化硫)	0.004	1.8	0.7	0.004	1.8	0.7	0.005	1.8	0.7
CO <sub>2</sub> (二氧化碳)	479	223745	113952	484	223387	113770	494	223416	113784

注释: mg/Nm<sup>3</sup> 和 PPM 数的测量干燥并校正至5%的氧气含量。

mg/Nm<sup>3</sup> 值标准化为标准温度和压力 (0°C, 101.325 kPa)。

## 测试方法和条件:


按照ISO8178-1, 在发动机额定转速 (+/-2%) 和规定恒载 (+/-2%) 运行期间, 在发动机温度、压力和排放率稳定的情况下记录稳态排放。

## 燃油规格:

十六烷值52-54 (EU), 十六烷值42-48 (EPA), 引用指令97/68/EC中的硫的最大重量百分比为0.0015。

## 参考条件:

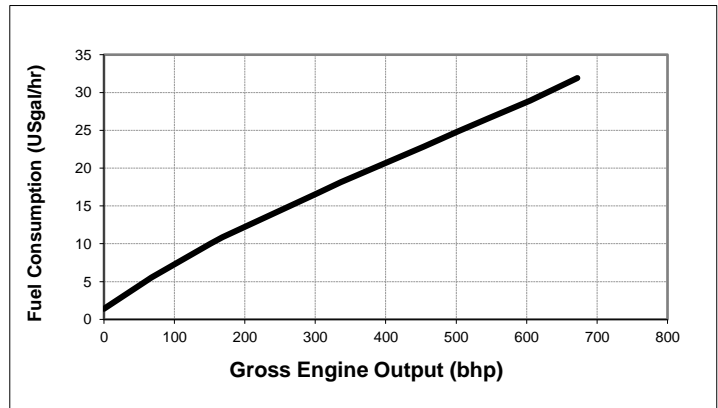
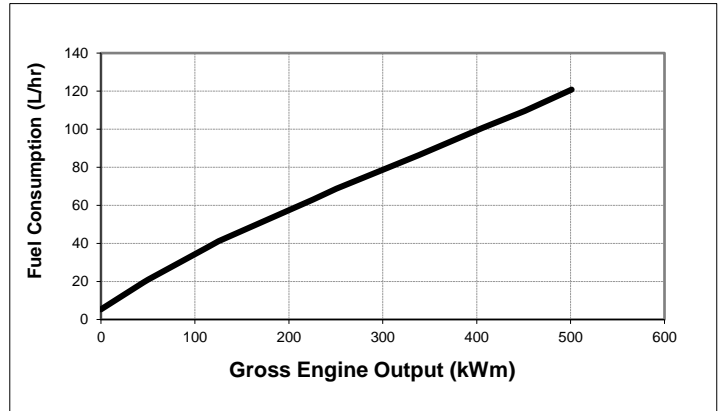
进气温度 25 °C (77°F), 进油温度 40 °C (104°F), 大气压力 100 kPa (29.53 in Hg); 干燥空气湿度 10.7 g/kg (75 grains H<sub>2</sub>O/lb) (需要进行 NO<sub>x</sub> 校正); 进气阻力设置为干净空滤器允许的最大限值; 排气背压设置为允许的最大限值。

	<b>Engine Performance Data</b> Cummins Inc. Columbus, Indiana 47202-3005 http://www.cummins.com	<b>G-Drive</b>		<b>Date</b> 2-Aug-19		
		<b>QSK19-G13</b>		<b>Configuration</b> D193103GX03	<b>CPL</b> 4382	<b>Revision</b> 0
<b>Compression Ratio</b>	15.8:1	<b>Displacement</b>		18.9 L (1150 in <sup>3</sup> )		
<b>Fuel System</b>	Cummins MCRS	<b>Aspiration</b>		Turbocharged and Charge Air Cooled		
<b>Aftertreatment</b>	0	<b>Emission Compliance</b>		Noncertified EPA Tier 3		

<b>Engine Speed</b>		<b>Standby Power</b>		<b>Prime Power</b>		<b>Continuous Power</b>	
rpm		kWm	bhp	kWm	bhp	kWm	bhp
1500		501	672	451	605	406	545

### Engine Fuel Consumption @ 1500 rpm

Output Power			Fuel Consumption			
%	kWm	bhp	kg/kWm-hr	lb/bhp-hr	L/hr	US gal/hr
<b>Standby Power</b>						
100	501	672	0.205	0.337	120.8	31.9
75	376	504	0.213	0.351	94.3	24.9
50	251	336	0.233	0.383	68.7	18.1
25	125	168	0.279	0.459	41.1	10.9
10	50	67	0.355	0.584	20.9	5.5
<b>Prime Power</b>						
100	451	605	0.206	0.339	109.5	28.9
75	338	454	0.217	0.357	86.4	22.8
50	226	303	0.238	0.390	63.0	16.7
25	113	151	0.285	0.469	37.8	10.0
<b>Continuous Power</b>						
100	406	545	0.210	0.346	100.6	26.6



**Note: The values on this datasheet have not been verified and are pending design review. There is a high possibility some values are inaccurate.**

Data Subject to Change Without Notice

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 Max of an 80% average load factor and 500 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.

Reference CEB00150 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.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.850 kg/L. 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 :** Production  
**Tolerance :** +/-5%  
**Chief Engineer :** Jianguo Wu

## 1500 rpm Power Derate Tables

## Standby

Standby Power Altitude Capability (kWm)											
Ambient Operating Temp. (°F)		77.0	86.0	95.0	104.0	108.5	113.0	117.5	122.0	126.5	131.0
Ambient Operating Temp. (°C)		25.0	30.0	35.0	40.0	42.5	45.0	47.5	50.0	52.5	55.0
Altitude (ft)	Altitude (m)										
0	0	501	501	501	501	501	501	501	501	501	501
328	100	501	501	501	501	501	501	501	501	501	501
656	200	501	501	501	501	501	501	501	501	501	501
984	300	501	501	501	501	501	501	501	501	501	501
1312	400	501	501	501	501	501	501	501	501	501	501
1640	500	501	501	501	501	501	501	501	501	501	501
1969	600	501	501	501	501	501	501	501	501	501	501
2625	800	501	501	501	501	501	501	501	501	501	501
3281	1000	501	501	501	501	501	501	501	501	501	501
3937	1200	501	501	501	501	501	501	501	501	501	501
4593	1400	501	501	501	501	501	501	501	501	501	501
5249	1600	501	501	501	501	501	501	501	501	501	501
5906	1800	501	501	501	501	501	501	501	501	501	501
6562	2000	501	501	501	501	501	501	501	501	501	494
Maximum Altitude Capability(ft)		11060	10277	9494	8711	8320	7928	7537	7145	6754	6363
Maximum Altitude Capability(m)		3371	3132	2894	2655	2536	2417	2297	2178	2059	1939

## Prime

Prime Power Altitude Capability (kWm)											
Ambient Operating Temp. (°F)		77.0	86.0	95.0	104.0	108.5	113.0	117.5	122.0	126.5	131.0
Ambient Operating Temp. (°C)		25.0	30.0	35.0	40.0	42.5	45.0	47.5	50.0	52.5	55.0
Altitude (ft)	Altitude (m)										
0	0	451	451	451	451	451	451	451	451	451	451
328	100	451	451	451	451	451	451	451	451	451	451
656	200	451	451	451	451	451	451	451	451	451	451
984	300	451	451	451	451	451	451	451	451	451	451
1312	400	451	451	451	451	451	451	451	451	451	451
1640	500	451	451	451	451	451	451	451	451	451	451
1969	600	451	451	451	451	451	451	451	451	451	451
2625	800	451	451	451	451	451	451	451	451	451	451
3281	1000	451	451	451	451	451	451	451	451	451	451
3937	1200	451	451	451	451	451	451	451	451	451	451
4593	1400	451	451	451	451	451	451	451	451	451	429
5249	1600	451	451	451	451	451	451	451	437	410	383
5906	1800	451	451	451	451	451	446	419	391	364	337
6562	2000	451	451	451	451	428	400	373	346	318	291
Maximum Altitude Capability(ft)		8968	8185	7402	6619	6228	5836	5445	5053	4662	4270
Maximum Altitude Capability(m)		2733	2495	2256	2018	1898	1779	1660	1540	1421	1302

## Continuous

Continuous Power Altitude Capability (kWm)											
Ambient Operating Temp. (°F)		77.0	86.0	95.0	104.0	108.5	113.0	117.5	122.0	126.5	131.0
Ambient Operating Temp. (°C)		25.0	30.0	35.0	40.0	42.5	45.0	47.5	50.0	52.5	55.0
Altitude (ft)	Altitude (m)										
0	0	406	406	406	406	406	406	406	406	406	406
328	100	406	406	406	406	406	406	406	406	406	406
656	200	406	406	406	406	406	406	406	406	406	406
984	300	406	406	406	406	406	406	406	406	406	406
1312	400	406	406	406	406	406	406	406	406	406	402
1640	500	406	406	406	406	406	406	406	406	404	390
1969	600	406	406	406	406	406	406	406	406	393	379
2625	800	406	406	406	406	406	406	397	383	370	356
3281	1000	406	406	406	406	401	388	374	360	347	333
3937	1200	406	406	406	392	378	365	351	337	324	310
4593	1400	406	406	397	369	355	342	328	314	301	287
5249	1600	406	401	374	346	332	319	305	291	278	264
5906	1800	405	378	351	323	310	296	282	268	255	241
6562	2000	382	355	328	300	287	273	259	245	232	218
Maximum Altitude Capability(ft)		5879	5096	4313	3530	3139	2747	2356	1964	1573	1181
Maximum Altitude Capability(m)		1792	1553	1315	1076	957	837	718	599	479	360

Altitude derate data is based on a 0°C air temperature rise over ambient at the compressor inlet and 50 °C LAT cooling system capability. Please contact Application Engineering if the air temperature rise over ambient exceeds this value.

Please contact Application Engineering for operation above table temperature or altitude values.

SAE AS210 Table A15 was referenced for standard day temperature and barometric pressure versus altitude.

**General Engine Data**

Installation Drawing Number	0		
Type	Four Cycle ; Inline ; 6 Cylinder		
Aspiration	Turbocharged and Charge Air Cooled		
Bore x Stroke	in x in (mm x mm)	6.25 x 6.25	(159 x 159)
Displacement	in <sup>3</sup> (L)	1150	(18.9)
Compression Ratio	15.8:1		
Dry Weight (Approximate)	lbm (kg)	4348	(1972)
Wet Weight (Approximate)	lbm (kg)	4568	(2072)
Aftertreatment Weight (Approximate)	lbm (kg)	N/A	(N/A)
Moment of Inertia of Rotating Components			
with FW 4016 Flywheel, SAE 0	lbm • ft <sup>2</sup> (kg • m <sup>2</sup> )	195.0	(8.2)
Center of Gravity from Rear Face of Block	in (mm)	24.0	(609.6)
Center of Gravity Above Crankshaft Centerline	in (mm)	11.0	(279.4)

**Engine Mounting**

Max Bending Moment at Rear Face of Block	lb • ft (N • m)	1000	(1356)
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**Exhaust System**

Max Allowable Static Bending Moment @ Exhaust Outlet Flange	lb • ft (N • m)	0	(N/A)
Max Back Pressure at Standby Power (Exhaust Outlet)	in Hg (kPa)	0.0	(0)

**Air Induction System**

Max Air Temperature Rise Over Ambient At Compressor Inlet	°F (°C)	0	(-18)
Max Intake Air Restriction			
With Normal Duty Air Cleaner and Clean Filter Element	in H <sub>2</sub> O (kPa)	10.0	(2.5)
With Heavy Duty Air Cleaner and Clean Filter Element	in H <sub>2</sub> O (kPa)	0.0	(0)
With Dirty Filter Element	in H <sub>2</sub> O (kPa)	25.0	(6.2)

**Cooling System****Jacket Water/ High Temperature Circuit Requirements**

Max Coolant Friction Head External to Engine (1500 rpm)	psi (kPa)	5.0	(34.5)
Engine Water Flow at Stated Friction Head External to Engine:			
1 psi Friction Head (1500 rpm)	US gpm (L/m)	128	(485)
Maximum Friction Head (1500 rpm)	US gpm (L/m)	118	(447)
Coolant Capacity - Engine High Temperature Circuit	US gal (L)	11.0	(41.6)
Minimum Pressure Cap Rating at Sea Level	psi (kPa)	7.0	(48.3)
Max Static Head of Coolant Above Crankshaft Centerline	ft (m)	60.0	(18.3)
Max Coolant (Top Tank) Temperature for Standby/Prime Power	°F (°C)	219 / 212	(104 / 100)
Thermostat (Modulating) Range	°F (°C)	0 - 0	(-18 - -18)

**Low Temperature Circuit (LTC) Requirements**

Max Coolant Friction Head External to Engine (1500 rpm)	psi (kPa)	0.0	(N/A)
Aftercooler Water Flow at Stated Friction Head External to Engine:			
psi Friction Head (1500 rpm)	US gpm (L/m)	0	(N/A)
Maximum Friction Head (1500 rpm)	US gpm (L/m)	0	(N/A)
Max Coolant Temp into LTC @ 77°F (25°C) Ambient	°F (°C)	0	(-18)
Max Coolant Temperature into LTC @			
Limiting Ambient Conditions for Standby/Prime Power	°F (°C)	0 / 0	(-18 / -18)
Thermostat (Modulating) Range	°F (°C)	0 - 0	(-18 - -18)
Coolant Capacity - Engine Low Temperature Circuit	US gal (L)	0.0	(N/A)

**Charge Air Cooler Requirements**

Max Allowable Pressure Drop Across Charge Air Cooler and OEM CAC piping (1800 rpm)	in Hg (kPa)	3.0	(10.1)
Max Charge Air Cooler Outlet to Ambient at 77°F (25°C)(CAC dT)	Δ°F (Δ°C)	38	(21)
Max CAC Outlet Temperature at ≤25 °C (77 °F) Ambient	°F (°C)	115	(64)



**Lubrication System**

Oil Pressure at Minimum Idle Speed	psi (kPa)	20	(138)
Oil Pressure at Governed Speed	psi (kPa)	N/A - 70	(N/A - 483)
Max Oil Temperature	°F (°C)	250	(121)
Oil Capacity : Low - High	US gal (L)	16 - 19	(61 - 72)
Total System Capacity (with Spin-On Filters)	US gal (L)	22	(83)

**Fuel System**

Max Allowable Fuel Supply Restriction at Stage 1 Filter Inlet	in Hg (kPa)	5.0	(16.9)
Max Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	in Hg (kPa)	10.0	(33.8)
Max Fuel Inlet Temperature	°F (°C)	160	(71)
Max Supply Fuel Flow	US gph (L/hr)	0	(N/A)
Max Return Fuel Flow	US gph (L/hr)	65	(246)

**Electrical System**

System Voltage	volts	24
Minimum Recommended Battery Capacity		
Cold Soak @ 0 °F (-18 °C)	CCA	0
Max Starting Circuit Resistance	ohm	0.002
Max Current Draw of the System	amps	0

**Cold Start Capability**

Unaided Cold Start		
Minimum Cranking Speed	rpm	150
Minimum Ambient Temp for Unaided Cold Start	°F (°C)	10 (-12)

**Performance Data**

Minimum Low Idle Speed	rpm	700
Maximum Low Idle Speed	rpm	0

		STANDBY	PRIME	CONTINUOUS
		50 Hz	50 Hz	50 Hz
Governed Engine Speed	rpm	1500	1500	1500
Gross Engine Power Output	bhp (kWm)	672 (501)	605 (451)	545 (406)
Brake Mean Effective Pressure	psi (kPa)	308 (2124)	277 (1910)	250 (1724)
Friction Power	hp (kWm)	N/A (N/A)	N/A (N/A)	N/A (N/A)
Intake Air Flow	ft <sup>3</sup> /min (L/sec)	1469 (694)	1398 (660)	1304 (616)
Exhaust Gas Temp	°F (°C)	906 (486)	891 (478)	901 (483)
Exhaust Gas Flow	ft <sup>3</sup> /min (L/sec)	3647 (1722)	3442 (1625)	3232 (1526)
Air:Fuel Ratio		27.8:1	29.2:1	29.7:1
Radiated Heat to Ambient	BTU/min (kWm)	2762 (49)	2504 (45)	2300 (41)
Heat to JW Radiator	BTU/min (kWm)	9578 (169)	9157 (162)	7506 (132)
Heat to Exhaust	BTU/min (kWm)	24199 (426)	22530 (397)	21131 (372)
* Heat to Fuel	BTU/min (kWm)	N/A (N/A)	0 (0)	0 (0)
Heat to Aftercooler Radiator	BTU/min (kWm)	6803 (120)	6031 (107)	5191 (92)
Charge Air Flow	lb/min (kg/min)	105 (48)	100 (46)	93 (43)
Turbo Comp Outlet Pressure	psi (kPa)	34.9 (241)	32 (221)	29 (200)
Turbo Comp Outlet Temp	°F (°C)	387 (198)	365 (185)	348 (176)

\* This is the maximum heat rejection to fuel.

**Noise Emissions**

Frequency (Hz)		31.5	63	125	250	500	1000	2000	4000	8000	16000	Overall
Sound Power dB(A) <sup>123</sup>												
1500 rpm	Engine <sup>4</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50 Hz	Exhaust <sup>5</sup>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1. The test figures quoted are from a single gen-set test and do not constitute a guarantee of performance for any particular engine. The data is subject to instrumentation, measurement, and engine to engine variability.

2. Test reference procedures ISO 3744 and ANSI S12.34-1998 as applicable.

3. All data are "A" weighted and are rounded to the nearest dB.

4. Excludes JW Radiator and Heat Exchanger Power (dB).

4. Engine with typical radiator and fan, Sound Power (dB).

5. Engine Exhaust at 1 Meter from open stack, Sound Pressure (dB).

## Emissions Data

**ATTENTION:** This data was taken from a single engine test according to the Test Methods and Conditions specified. This data is subject to instrumentation, measurement, and engine-to-engine variability. Field emissions test data is not guaranteed to these levels. For air permit programs, please contact Application Engineering for expected site variation.

### Nominal Exhaust Emissions Data @ 1500 rpm

Component	STANDBY			PRIME			CONTINUOUS		
	g/bhp-hr	mg/Nm <sup>3</sup>	PPM	g/bhp-hr	mg/Nm <sup>3</sup>	PPM	g/bhp-hr	mg/Nm <sup>3</sup>	PPM
HC (Total Unburned Hydrocarbons)	0.04	28	28	0.04	31	31	0.05	35	35
NOx (Oxides of Nitrogen as NO <sub>2</sub> )	3.74	720	720	3.45	660	660	3.14	582	582
CO (Carbon Monoxide)	0.41	151	151	0.48	178	178	0.67	243	243
PM (Particulate Matter)	0.01	5	N/A	0.02	6	N/A	0.03	12	N/A
SO <sub>2</sub> (Sulfur Dioxide)	0.004	1.8	0.7	0.004	1.8	0.7	0.005	1.8	0.7
CO <sub>2</sub> (Carbon Dioxide)	479	223745	113952	484	223387	113770	494	223416	113784

**Note:** mg/Nm<sup>3</sup> and PPM numbers are measured dry and corrected to 5% O<sub>2</sub> content.

mg/Nm<sup>3</sup> values are normalized to standard temperature and pressure (0°C, 101.325 kPa).

#### Test Methods and Conditions:

Steady-State emissions recorded per ISO8178-1 during operation at rated engine speed (+/- 2%) and stated constant load (+/-2%) with engine temperatures, pressures, and emission rates stabilized.

#### Fuel Specification:

52-54 Cetane Number (EU), 42-48 Cetane Number (EPA), 0.0015 Max. Wt. % Sulfur as referenced by directive 97/68/EC.

#### Reference:

25 °C (77°F) Air inlet Temperature, 40 °C (104°F) Fuel inlet Temperature, 100 kPa (29.53 in Hg) Barometric Pressure; 10.7 g/kg (75 grains H<sub>2</sub>O/lb) of dry air Humidity (required for NOx correction); Intake Restriction set to Max allowable limit for clean filter; Exhaust Back Pressure set to Max allowable limit.