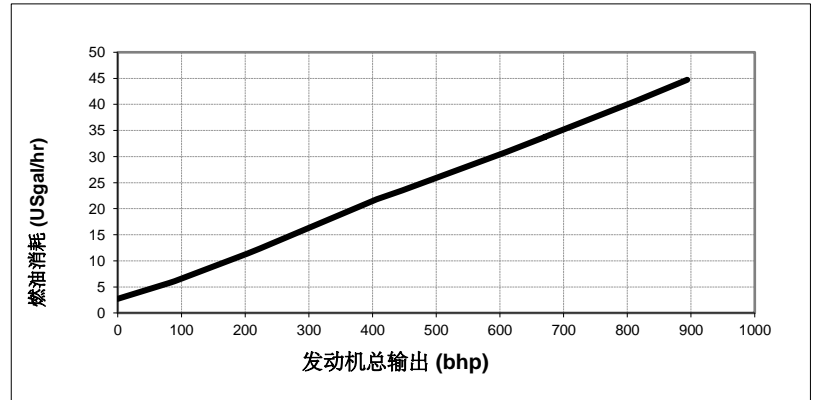
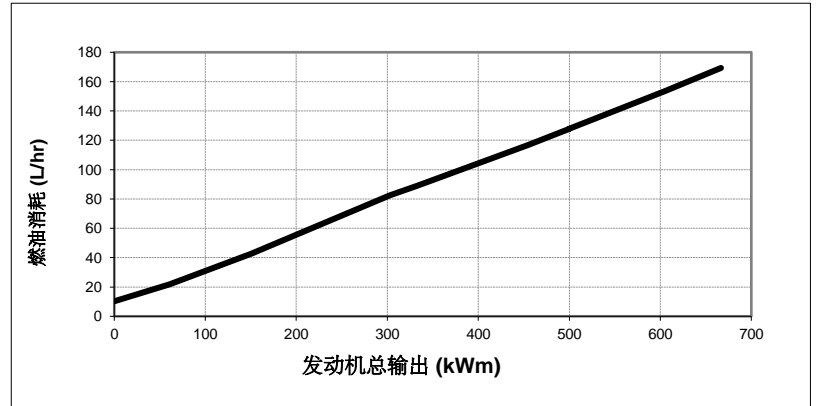


	<b>发动机性能数据</b> <b>康明斯公司</b> 印第安纳哥伦布 47202-3005 <a href="http://www.cummins.com">http://www.cummins.com</a>	<b>G-驱</b>		日期		
		<b>QSK19-G11</b>		2019/08/02		
		<b>FR4769</b>		特征编号 D193103GX03	CPL 4270	版本 0
压缩比	15.0:1	排量	18.9 L (1150 in <sup>3</sup> )			
燃油系统	Cummins MCRS	进气方式	涡轮增压, 空空中冷			
后处理	0	排放合规	EPA Tier 2			

发动机转速	备用功率		常用功率		持续功率	
rpm	kWm	bhp	kWm	bhp	kWm	bhp
1500	667	894	606	813	500	670

### 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	667	894	0.216	0.355	169.3	44.7
75	500	671	0.217	0.357	127.8	33.8
50	333	447	0.227	0.374	89.1	23.5
25	167	224	0.239	0.392	46.8	12.4
10	67	89	0.295	0.486	23.2	6.1
<b>常用功率</b>						
100	606	813	0.216	0.355	153.8	40.6
75	455	610	0.218	0.359	116.8	30.9
50	303	407	0.231	0.380	82.4	21.8
25	152	203	0.241	0.396	43.0	11.3
<b>持续功率</b>						
100	500	670	0.217	0.357	127.7	33.7



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	667	667	667	667	667	667	667	667	659	649
328	100	667	667	667	667	667	667	667	662	651	638
656	200	667	667	667	667	667	667	666	653	640	626
984	300	667	667	667	667	667	667	655	642	629	615
1312	400	667	667	667	667	667	657	644	631	617	604
1640	500	667	667	667	667	659	646	633	620	606	593
1969	600	667	667	667	662	648	635	622	608	595	582
2625	800	667	667	666	639	626	613	599	586	573	559
3281	1000	667	667	644	617	604	590	577	564	550	537
3937	1200	667	648	621	595	581	568	555	541	528	515
4593	1400	652	626	599	572	559	546	532	519	506	493
5249	1600	630	603	577	550	537	523	510	497	484	470
5906	1800	608	581	554	528	515	501	488	475	461	448
6562	2000	585	559	532	506	492	479	466	452	439	426
最大海拔能力(ft)		4169	3386	2603	1820	1428	1037	619	90	-439	-968
最大海拔能力(m)		1271	1032	793	555	435	316	189	27	-134	-295

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	606	606	606	606	606	604	594	579	562	546
328	100	606	606	606	606	606	598	581	565	548	532
656	200	606	606	606	606	601	584	568	551	535	518
984	300	606	606	606	603	587	570	554	537	521	504
1312	400	606	606	606	589	573	556	540	524	507	491
1640	500	606	606	606	576	559	543	526	510	493	477
1969	600	606	606	595	562	545	529	512	496	479	463
2625	800	606	600	567	534	518	501	485	468	452	435
3281	1000	605	573	540	507	490	474	457	441	424	408
3937	1200	578	545	512	479	463	446	430	413	397	380
4593	1400	550	517	484	451	435	418	402	386	369	353
5249	1600	523	490	457	424	407	391	374	358	341	325
5906	1800	495	462	429	396	380	363	347	330	314	297
6562	2000	467	434	402	369	352	336	319	303	286	270
最大海拔能力(ft)		3262	2479	1696	862	390	-130	-659	-1188	-1716	-2245
最大海拔能力(m)		994	755	517	263	119	-40	-201	-362	-523	-684

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	439	406	374	341	325	308	292	276	260	243
328	100	425	393	360	327	311	295	278	262	246	230
656	200	411	379	346	314	297	281	265	248	232	216
984	300	398	365	333	300	284	267	251	235	219	202
1312	400	384	352	319	286	270	254	237	221	205	189
1640	500	370	338	305	273	256	240	224	208	191	175
1969	600	357	324	292	259	243	226	210	194	178	161
2625	800	330	297	264	232	215	199	183	167	150	134
3281	1000	302	270	237	204	188	172	156	139	123	107
3937	1200	275	242	210	177	161	145	128	112	96	79
4593	1400	248	215	182	150	133	117	101	85	68	52
5249	1600	220	188	155	122	106	90	74	57	41	25
5906	1800	193	160	128	95	79	63	46	30	14	-3
6562	2000	166	133	100	68	52	35	19	3	-14	-30
最大海拔能力(ft)		-1462	-2245	-3028	-3811	-4202	-4594	-4985	-5376	-5768	-6159
最大海拔能力(m)		-446	-684	-923	-1161	-1281	-1400	-1519	-1639	-1758	-1877

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	15.0:1		
干重(大约)	lbm (kg)	4190	(1901)
湿重(大约)	lbm (kg)	4350	(1973)
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)	2.0	(6.8)

## 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)	181 - 203	(83 - 95)

## 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	°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)
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)时(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)	70 - N/A	(483 - N/A)
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	(84)

## 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)
喷油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)	102	(386)
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	35	

## 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)	894 (667)	813 (606)	670 (500)
平均有效压力	psi (kPa)	409 (2820)	372 (2565)	307 (2117)
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)	1939 (916)	1787 (844)	1540 (727)
排气温度	°F (°C)	965 (519)	957 (514)	943 (507)
排气流量	ft <sup>3</sup> /min (L/sec)	4887 (2307)	4495 (2122)	3857 (1821)
空燃比		26.2:1	26.6:1	27.6:1
散失到环境中的热量	BTU/min (kWm)	3871 (69)	3517 (62)	2921 (52)
散失到水套冷却液中的热量	BTU/min (kWm)	13741 (242)	13122 (231)	10801 (190)
散失到排气中的热量	BTU/min (kWm)	34601 (609)	31554 (555)	26618 (469)
* 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)	12335 (217)	10508 (185)	7741 (137)
增压空气流量	lb/min (kg/min)	139 (64)	128 (59)	110 (50)
增压器压气机出口压力	psi (kPa)	46.7 (322)	42 (290)	34 (235)
增压器压气机出口温度	°F (°C)	484 (252)	451 (233)	395 (202)

\*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)													
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)	0.08	32	31	0.09	37	34	0.09	39	35
NOx (氮氧化物, 例如 NO <sub>2</sub> )	4.79	1991	580	4.59	1930	547	3.97	1668	453
CO (一氧化碳)	0.40	167	80	0.53	225	105	0.84	354	158
PM (颗粒物)	0.05	0	N/A	0.05	0	N/A	0.06	0	N/A
SO <sub>2</sub> (二氧化硫)	0.005	1.0	0.4	0.005	0.9	0.4	0.005	0.9	0.4
CO <sub>2</sub> (二氧化碳)	539	133682	68083	530	129650	66030	530	123835	63068

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:

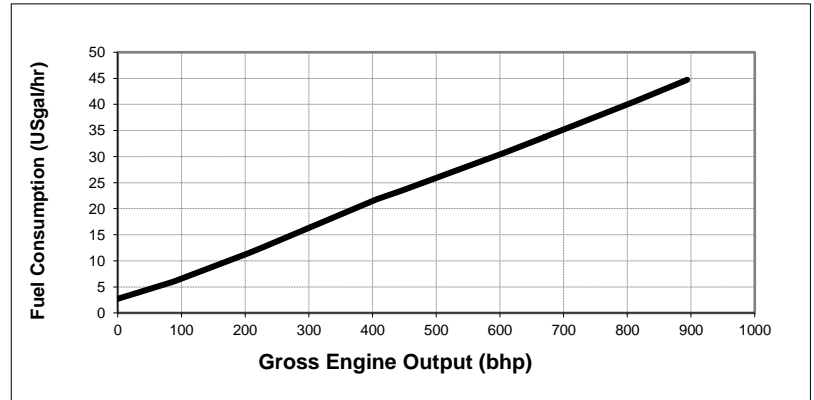
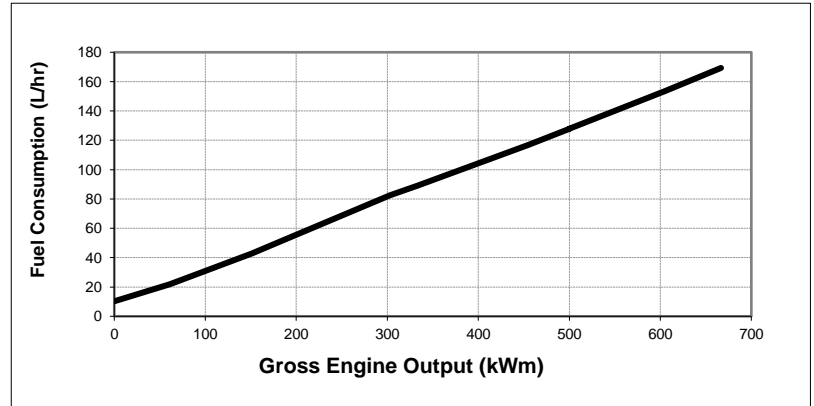
进气温度 25 °C (77°F), 进油温度 40 °C (104°F), 大气压力 100 kPa (29.53 in Hg); 干燥空气湿度 10.7 g/kg (75 grains H<sub>2</sub>O/lb) (需要进行 NOx 校正); 进气阻力设置为干净空滤器允许的最大限值; 排气背压设置为允许的最大限值。

	<b>Engine Performance Data</b> <b>Cummins Inc.</b> Columbus, Indiana 47202-3005 <a href="http://www.cummins.com">http://www.cummins.com</a>		<b>G-Drive</b>		<b>Date</b> 2-Aug-19		
			<b>QSK19-G11</b>		<b>Configuration</b> D193103GX03	<b>CPL</b> 4270	<b>Revision</b> 0
	<b>FR4769</b>		<b>Displacement</b> 18.9 L (1150 in <sup>3</sup> )		<b>Fuel System</b> Cummins MCRS		
<b>Compression Ratio</b> 15.0:1		<b>Aspiration</b> Turbocharged and Charge Air Cooled		<b>Aftertreatment</b> 0			
<b>Emission Compliance</b> EPA Tier 2							

Engine Speed	Standby Power		Prime Power		Continuous Power	
rpm	kWm	bhp	kWm	bhp	kWm	bhp
1500	667	894	606	813	500	670

**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	667	894	0.216	0.355	169.3	44.7
75	500	671	0.217	0.357	127.8	33.8
50	333	447	0.227	0.374	89.1	23.5
25	167	224	0.239	0.392	46.8	12.4
10	67	89	0.295	0.486	23.2	6.1
<b>Prime Power</b>						
100	606	813	0.216	0.355	153.8	40.6
75	455	610	0.218	0.359	116.8	30.9
50	303	407	0.231	0.380	82.4	21.8
25	152	203	0.241	0.396	43.0	11.3
<b>Continuous Power</b>						
100	500	670	0.217	0.357	127.7	33.7



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

<p>These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. <b>STANDBY POWER RATING:</b> 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. <b>PRIME POWER RATING:</b> 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: <b>UNLIMITED TIME RUNNING PRIME POWER:</b> 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. <b>LIMITED TIME RUNNING PRIME POWER:</b> 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. <b>CONTINUOUS POWER RATING:</b> 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 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.
	<b>Data Status :</b> Production <b>Tolerance :</b> +/-5% <b>Chief Engineer :</b> 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	667	667	667	667	667	667	667	667	659	649
328	100	667	667	667	667	667	667	667	662	651	638
656	200	667	667	667	667	667	667	666	663	640	626
984	300	667	667	667	667	667	667	665	642	629	615
1312	400	667	667	667	667	667	657	644	631	617	604
1640	500	667	667	667	667	659	646	633	620	606	593
1969	600	667	667	667	662	648	635	622	608	595	582
2625	800	667	667	666	639	626	613	599	586	573	559
3281	1000	667	667	644	617	604	590	577	564	550	537
3937	1200	667	648	621	595	581	568	555	541	528	515
4593	1400	652	626	599	572	559	546	532	519	506	493
5249	1600	630	603	577	550	537	523	510	497	484	470
5906	1800	608	581	554	528	515	501	488	475	461	448
6562	2000	585	559	532	506	492	479	466	452	439	426
Maximum Altitude Capability(ft)		4169	3386	2603	1820	1428	1037	619	90	-439	-968
Maximum Altitude Capability(m)		1271	1032	793	555	435	316	189	27	-134	-295

## 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	606	606	606	606	606	604	594	579	562	546
328	100	606	606	606	606	606	598	581	565	548	532
656	200	606	606	606	606	601	584	568	551	535	518
984	300	606	606	606	603	587	570	554	537	521	504
1312	400	606	606	606	589	573	556	540	524	507	491
1640	500	606	606	606	576	559	543	526	510	493	477
1969	600	606	606	595	562	545	529	512	496	479	463
2625	800	606	600	567	534	518	501	485	468	452	435
3281	1000	605	573	540	507	490	474	457	441	424	408
3937	1200	578	545	512	479	463	446	430	413	397	380
4593	1400	550	517	484	451	435	418	402	386	369	353
5249	1600	523	490	457	424	407	391	374	358	341	325
5906	1800	495	462	429	396	380	363	347	330	314	297
6562	2000	467	434	402	369	352	336	319	303	286	270
Maximum Altitude Capability(ft)		3262	2479	1696	862	390	-130	-659	-1188	-1716	-2245
Maximum Altitude Capability(m)		994	755	517	263	119	-40	-201	-362	-523	-684

## 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	439	406	374	341	325	308	292	276	260	243
328	100	425	393	360	327	311	295	278	262	246	230
656	200	411	379	346	314	297	281	265	248	232	216
984	300	398	365	333	300	284	267	251	235	219	202
1312	400	384	352	319	286	270	254	237	221	205	189
1640	500	370	338	305	273	256	240	224	208	191	175
1969	600	357	324	292	259	243	226	210	194	178	161
2625	800	330	297	264	232	215	199	183	167	150	134
3281	1000	302	270	237	204	188	172	156	139	123	107
3937	1200	275	242	210	177	161	145	128	112	96	79
4593	1400	248	215	182	150	133	117	101	85	68	52
5249	1600	220	188	155	122	106	90	74	57	41	25
5906	1800	193	160	128	95	79	63	46	30	14	-3
6562	2000	166	133	100	68	52	35	19	3	-14	-30
Maximum Altitude Capability(ft)		-1462	-2245	-3028	-3811	-4202	-4594	-4985	-5376	-5768	-6159
Maximum Altitude Capability(m)		-446	-684	-923	-1161	-1281	-1400	-1519	-1639	-1758	-1877

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	15.0:1		
Dry Weight (Approximate)	lbm (kg)	4190	(1901)
Wet Weight (Approximate)	lbm (kg)	4350	(1973)
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)
--	-----------------	------	--------

**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)	2.0	(6.8)

**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)	181 - 203	(83 - 95)

**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)
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)	70 - N/A	(483 - N/A)
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	(84)

**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)	102	(386)
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	35

**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)	894 (667)	813 (606)	670 (500)
Brake Mean Effective Pressure	psi (kPa)	409 (2820)	372 (2565)	307 (2117)
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)	1939 (916)	1787 (844)	1540 (727)
Exhaust Gas Temp	°F (°C)	965 (519)	957 (514)	943 (507)
Exhaust Gas Flow	ft <sup>3</sup> /min (L/sec)	4887 (2307)	4495 (2122)	3857 (1821)
Air:Fuel Ratio		26.2:1	26.6:1	27.6:1
Radiated Heat to Ambient	BTU/min (kWm)	3871 (69)	3517 (62)	2921 (52)
Heat to JW Radiator	BTU/min (kWm)	13741 (242)	13122 (231)	10801 (190)
Heat to Exhaust	BTU/min (kWm)	34601 (609)	31554 (555)	26618 (469)
* Heat to Fuel	BTU/min (kWm)	N/A (N/A)	0 (0)	0 (0)
Heat to Aftercooler Radiator	BTU/min (kWm)	12335 (217)	10508 (185)	7741 (137)
Charge Air Flow	lb/min (kg/min)	139 (64)	128 (59)	110 (50)
Turbo Comp Outlet Pressure	psi (kPa)	46.7 (322)	42 (290)	34 (235)
Turbo Comp Outlet Temp	°F (°C)	484 (252)	451 (233)	395 (202)

\* 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. 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)	0.08	32	31	0.09	37	34	0.09	39	35
NOx (Oxides of Nitrogen as NO <sub>2</sub> )	4.79	1991	580	4.59	1930	547	3.97	1668	453
CO (Carbon Monoxide)	0.40	167	80	0.53	225	105	0.84	354	158
PM (Particulate Matter)	0.05	0	N/A	0.05	0	N/A	0.06	0	N/A
SO <sub>2</sub> (Sulfur Dioxide)	0.005	1.0	0.4	0.005	0.9	0.4	0.005	0.9	0.4
CO <sub>2</sub> (Carbon Dioxide)	539	133682	68083	530	129650	66030	530	123835	63068

**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.