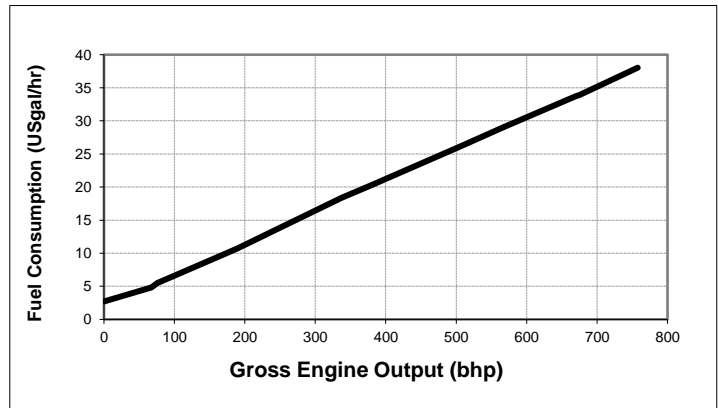
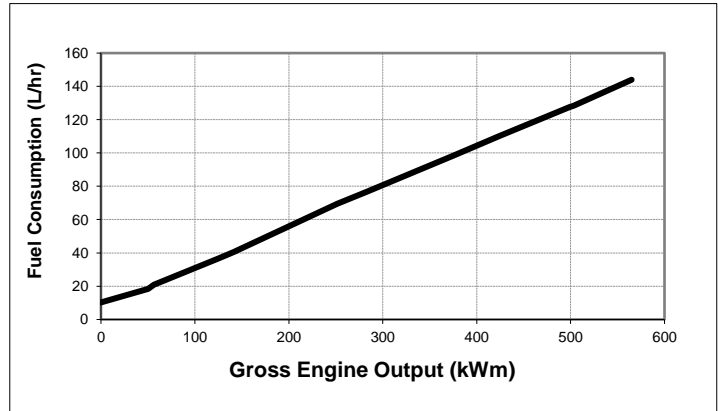
	<b>Engine Performance Data</b> Cummins Inc. Columbus, Indiana 47202-3005 http://www.cummins.com	<b>G-Drive</b>		<b>Date</b> 2-Aug-19		
		<b>QSK19-G12</b> FR4773		<b>Configuration</b> D193103GX03	<b>CPL</b> 4270	<b>Revision</b> 0
<b>Compression Ratio</b>	15.0:1	<b>Displacement</b>		18.9 L (1150 in <sup>3</sup> )		
<b>Fuel System</b>	Cummins MCRS	<b>Aspiration</b>		Turbocharged and Low Temperature Aftercooled		
<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		565	758	503	675	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	565	758	0.217	0.356	144.0	38.0
75	424	568	0.221	0.363	110.1	29.1
50	283	379	0.230	0.379	76.6	20.2
25	141	189	0.244	0.401	40.6	10.7
10	57	76	0.313	0.515	20.8	5.5
<b>Prime Power</b>						
100	503	675	0.217	0.357	128.3	33.9
75	377	506	0.223	0.366	98.9	26.1
50	252	337	0.235	0.386	69.5	18.4
25	126	169	0.249	0.410	36.9	9.7
<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

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	565	565	565	565	565	565	565	565	565	565
328	100	565	565	565	565	565	565	565	565	565	565
656	200	565	565	565	565	565	565	565	565	565	565
984	300	565	565	565	565	565	565	565	565	565	565
1312	400	565	565	565	565	565	565	565	565	565	565
1640	500	565	565	565	565	565	565	565	565	565	565
1969	600	565	565	565	565	565	565	565	565	565	565
2625	800	565	565	565	565	565	565	565	565	565	565
3281	1000	565	565	565	565	565	565	565	565	550	494
3937	1200	565	565	565	565	565	565	565	512	456	401
4593	1400	565	565	565	565	565	530	474	419	363	307
5249	1600	565	565	565	548	492	437	381	325	270	214
5906	1800	565	565	565	455	399	343	288	232	177	121
6562	2000	565	565	473	361	306	250	195	139	83	28
Maximum Altitude Capability(ft)		7478	6696	5913	5130	4738	4347	3955	3564	3172	2781
Maximum Altitude Capability(m)		2279	2041	1802	1564	1444	1325	1206	1086	967	848

## 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	503	503	503	503	503	503	503	503	503	502
328	100	503	503	503	503	503	503	503	503	502	501
656	200	503	503	503	503	503	503	503	502	501	500
984	300	503	503	503	503	503	503	503	501	500	499
1312	400	503	503	503	503	503	503	502	500	499	498
1640	500	503	503	503	503	503	502	501	499	498	497
1969	600	503	503	503	503	502	501	500	498	497	496
2625	800	503	503	503	501	500	499	498	496	495	494
3281	1000	503	503	502	499	498	497	496	494	493	492
3937	1200	503	502	500	497	496	495	494	492	491	483
4593	1400	502	500	498	495	494	493	492	490	479	459
5249	1600	500	498	496	493	492	491	490	474	455	435
5906	1800	498	496	494	491	490	489	469	450	431	411
6562	2000	496	494	492	489	484	465	445	426	406	387
Maximum Altitude Capability(ft)		4385	3602	2819	2037	1645	1254	862	471	79	-312
Maximum Altitude Capability(m)		1337	1098	859	621	501	382	263	143	24	-95

## 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	-14447	-7831	-1215	500	500	500	500	500	500	500
328	100	-11675	-5059	500	500	500	500	500	500	500	500
656	200	-8902	-2286	500	500	500	500	500	500	500	500
984	300	-6130	487	500	500	500	500	500	500	500	500
1312	400	-3357	500	500	500	500	500	500	500	500	500
1640	500	-585	500	500	500	500	500	500	500	500	500
1969	600	500	500	500	500	500	500	500	500	500	500
2625	800	500	500	500	500	500	500	500	500	500	499
3281	1000	500	500	500	500	500	500	500	500	497	488
3937	1200	500	500	500	500	500	500	500	495	486	477
4593	1400	500	500	500	500	500	500	492	484	475	466
5249	1600	500	500	500	500	499	490	482	473	464	455
5906	1800	500	500	500	497	488	479	471	462	453	444
6562	2000	500	500	500	486	477	469	460	451	442	433
Maximum Altitude Capability(ft)		8918	7861	6803	5746	5217	4688	4160	3631	3102	2573
Maximum Altitude Capability(m)		2718	2396	2074	1751	1590	1429	1268	1107	946	784

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 Low Temperature Aftercooled		
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 4023 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)	23.6	(598.2)
Center of Gravity Above Crankshaft Centerline	in (mm)	11.1	(281.9)

**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)	11.0	(75.8)
Engine Water Flow at Stated Friction Head External to Engine:			
2.5 psi Friction Head (1500 rpm)	US gpm (L/m)	162	(613)
Maximum Friction Head (1500 rpm)	US gpm (L/m)	145	(549)
Coolant Capacity - Engine High Temperature Circuit	US gal (L)	11.0	(41.6)
Minimum Pressure Cap Rating at Sea Level	psi (kPa)	15.0	(103.4)
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)	220 / 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	(10.1)
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)	40 - 60	(276 - 414)
Max Oil Temperature	°F (°C)	250	(121)
Oil Capacity : Low - High	US gal (L)	17 - 19	(64 - 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)	0.0	(N/A)
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)	120	(454)
Max Return Fuel Flow	US gph (L/hr)	75	(284)

**Electrical System**

System Voltage	volts	24
Minimum Recommended Battery Capacity		
Cold Soak @ 0 °F (-18 °C)	CCA	900
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)	758 (565)	675 (503)	670 (500)
Brake Mean Effective Pressure	psi (kPa)	347 (2393)	309 (2131)	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)	1685 (796)	1514 (715)	1540 (727)
Exhaust Gas Temp	°F (°C)	957 (514)	954 (513)	943 (507)
Exhaust Gas Flow	ft <sup>3</sup> /min (L/sec)	4246 (2004)	3823 (1805)	3857 (1821)
Air:Fuel Ratio		26.8:1	27:1	27.6:1
Radiated Heat to Ambient	BTU/min (kWm)	3292 (58)	2934 (52)	2921 (52)
Heat to JW Radiator	BTU/min (kWm)	12770 (225)	11434 (202)	10801 (190)
Heat to Exhaust	BTU/min (kWm)	29717 (523)	26587 (468)	26618 (469)
* Heat to Fuel	BTU/min (kWm)	N/A (N/A)	0 (0)	0 (0)
Heat to Aftercooler Radiator	BTU/min (kWm)	9361 (165)	7636 (135)	7741 (137)
Charge Air Flow	lb/min (kg/min)	120 (55)	108 (49)	110 (50)
Turbo Comp Outlet Pressure	psi (kPa)	38.9 (269)	34 (235)	34 (235)
Turbo Comp Outlet Temp	°F (°C)	431 (222)	396 (203)	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. 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)	0.09	37	60	0.09	40	64	0.09	39	62
NOx (Oxides of Nitrogen as NO <sub>2</sub> )	4.35	1828	893	4.11	1756	857	3.97	1668	812
CO (Carbon Monoxide)	0.68	285	226	0.91	392	311	0.84	354	283
PM (Particulate Matter)	0.06	0	N/A	0.07	0	N/A	0.06	0	N/A
SO <sub>2</sub> (Sulfur Dioxide)	0.005	1.6	0.7	0.005	1.7	0.7	0.005	1.6	0.7
CO <sub>2</sub> (Carbon Dioxide)	530	222841	113491	520	222203	113167	530	222304	113218

**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.