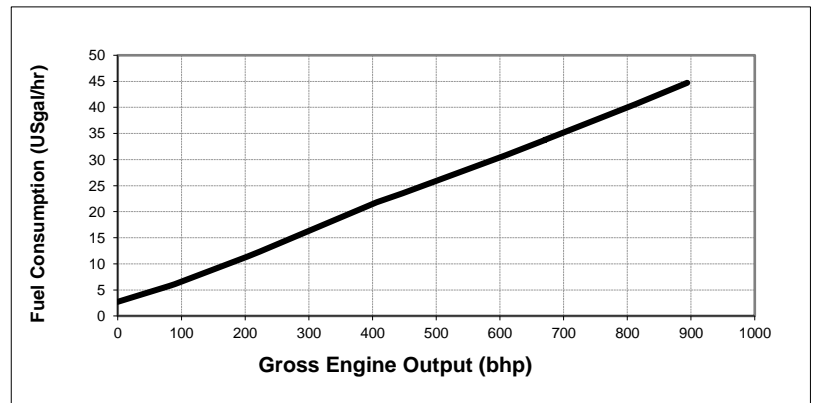
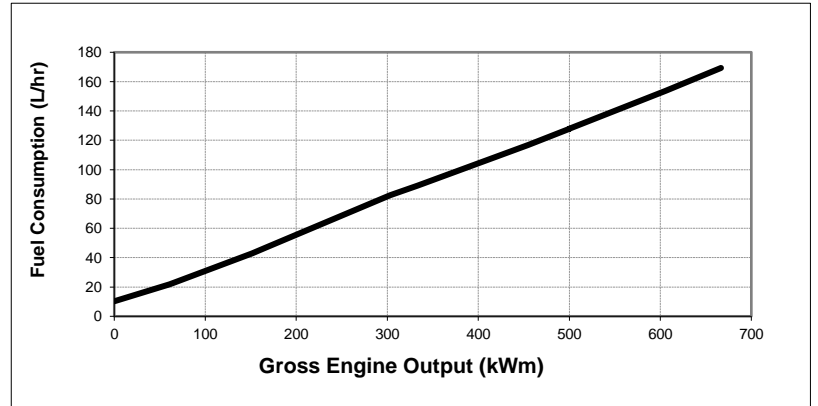
	Engine Performance Data Cummins Inc. Columbus, Indiana 47202-3005 http://www.cummins.com	G-Drive		Date		
		QSK19-G11 FR4769		2-Aug-19		
				Configuration D193103GX03	CPL 4270	Revision 0
Compression Ratio	15.0:1	Displacement	18.9 L (1150 in ³)			
Fuel System	Cummins MCRS	Aspiration	Turbocharged and Charge Air Cooled			
Aftertreatment	0	Emission Compliance	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
Standby Power						
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
Prime Power						
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
Continuous Power						
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. 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.</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.
	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	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 ³ (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 ² (kg • m ²)	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)	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 ₂ O (kPa)	10.0	(2.5)
With Heavy Duty Air Cleaner and Clean Filter Element	in H ₂ O (kPa)	0.0	(0)
With Dirty Filter Element	in H ₂ 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 ³ /min (L/sec)	1939 (916)	1787 (844)	1540 (727)
Exhaust Gas Temp	°F (°C)	965 (519)	957 (514)	943 (507)
Exhaust Gas Flow	ft ³ /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) ¹²³												
1500 rpm	Engine ⁴	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 ⁵	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 ³	PPM	g/bhp-hr	mg/Nm ³	PPM	g/bhp-hr	mg/Nm ³	PPM
HC (Total Unburned Hydrocarbons)	0.08	32	31	0.09	37	34	0.09	39	35
NOx (Oxides of Nitrogen as NO ₂)	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 ₂ (Sulfur Dioxide)	0.005	1.0	0.4	0.005	0.9	0.4	0.005	0.9	0.4
CO ₂ (Carbon Dioxide)	539	133682	68083	530	129650	66030	530	123835	63068

Note: mg/Nm³ and PPM numbers are measured dry and corrected to 5% O₂ content.

mg/Nm³ 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 H₂O/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.