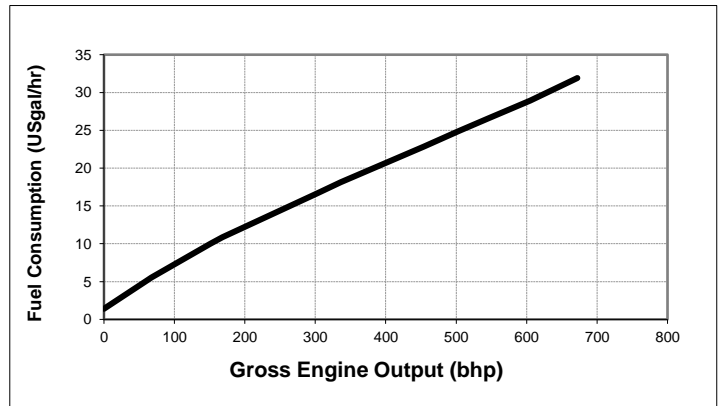
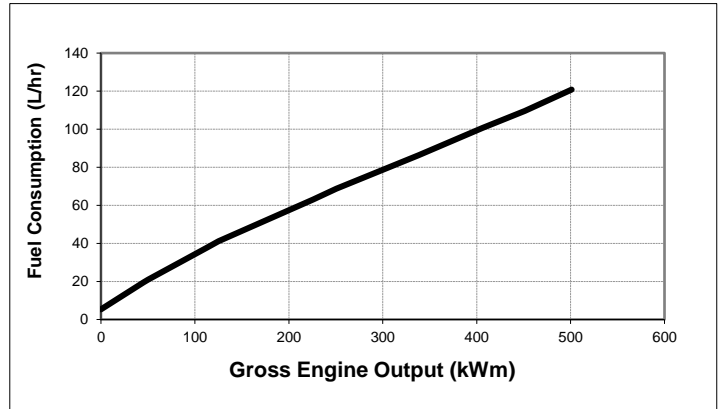
	Engine Performance Data Cummins Inc. Columbus, Indiana 47202-3005 http://www.cummins.com	G-Drive		Date		
		QSK19-G13 FR4790		2-Aug-19		
				Configuration D193103GX03	CPL 4382	Revision 0
Compression Ratio	15.8:1	Displacement	18.9 L (1150 in ³)			
Fuel System	Cummins MCRS	Aspiration	Turbocharged and Charge Air Cooled			
Aftertreatment	0	Emission Compliance	Noncertified EPA Tier 3			

Engine Speed		Standby Power		Prime Power		Continuous Power	
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
Standby Power						
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
Prime Power						
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
Continuous Power						
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 ³ (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 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)	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 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)	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 ³ /min (L/sec)	1469 (694)	1398 (660)	1304 (616)
Exhaust Gas Temp	°F (°C)	906 (486)	891 (478)	901 (483)
Exhaust Gas Flow	ft ³ /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) 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. 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 ³	PPM	g/bhp-hr	mg/Nm ³	PPM	g/bhp-hr	mg/Nm ³	PPM
HC (Total Unburned Hydrocarbons)	0.04	28	28	0.04	31	31	0.05	35	35
NOx (Oxides of Nitrogen as NO ₂)	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 ₂ (Sulfur Dioxide)	0.004	1.8	0.7	0.004	1.8	0.7	0.005	1.8	0.7
CO ₂ (Carbon Dioxide)	479	223745	113952	484	223387	113770	494	223416	113784

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.