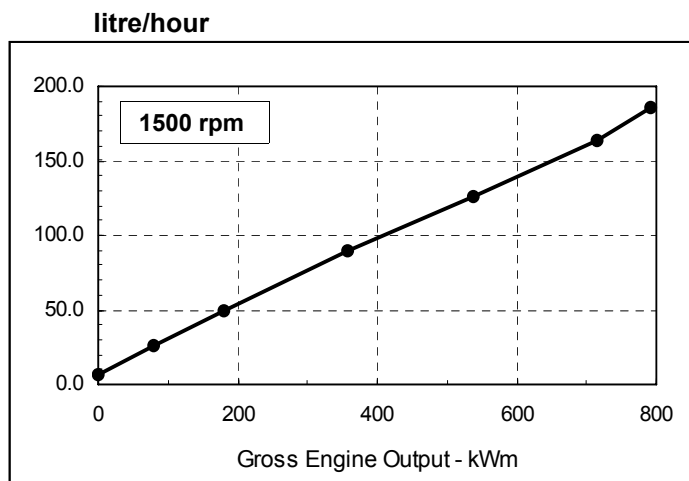


	Cummins Inc. Columbus, Indiana 47202-3005	Basic Engine Model: QSK23-G9 NR2	Curve Number: FR-50063	<i>G-DRIVE</i> QSK 1
	Engine Data Sheet	Engine Critical Parts List: CPL: 3083	Date: 4Dec07	
Displacement : 23.15 litre (1413 in ³)		Bore: 170 mm (6.69 in.) Stroke : 170 mm (6.69 in.)		
No. of Cylinders : 6		Aspiration : Turbocharged and Air to Air Aftercooled		

Engine Speed	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	791	1060	716	960	537	720

Engine Performance Data @ 1500 rpm

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm·h	lb/ hp·h	litre/ hour	US gal/ hour
STANDBY POWER						
100	791	1060	0.200	0.329	186	49.1
PRIME POWER						
100	716	960	0.193	0.318	163	43.0
75	537	720	0.200	0.329	126	33.3
50	358	480	0.211	0.347	89	23.4
25	179	240	0.238	0.392	50	13.2
CONTINUOUS POWER						
100	537	720	0.200	0.329	126	33.3



CONVERSIONS:(litres = US Gal x 3.785) (US Gal = litres x 0.2642)

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 maximum of an 80% average load factor and 200 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 AEB 10.47 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. Derates shown are based on 15 in H₂O air intake restriction and 2 in Hg exhaust back pressure.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/US gal). 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: --Limited Production--

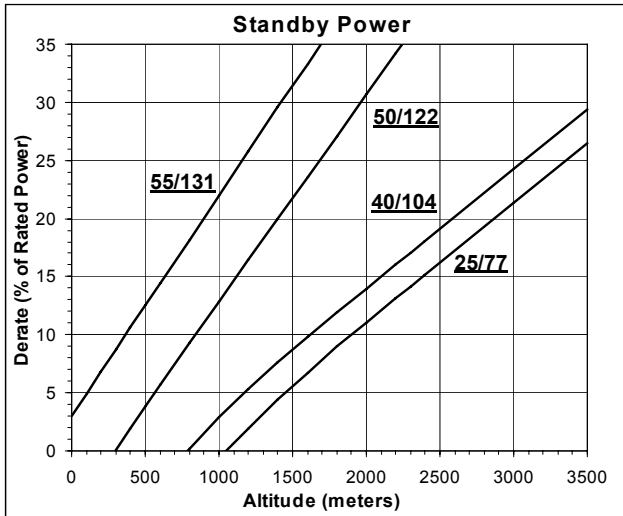
Data Tolerance: ± 5%

Chief Engineer:

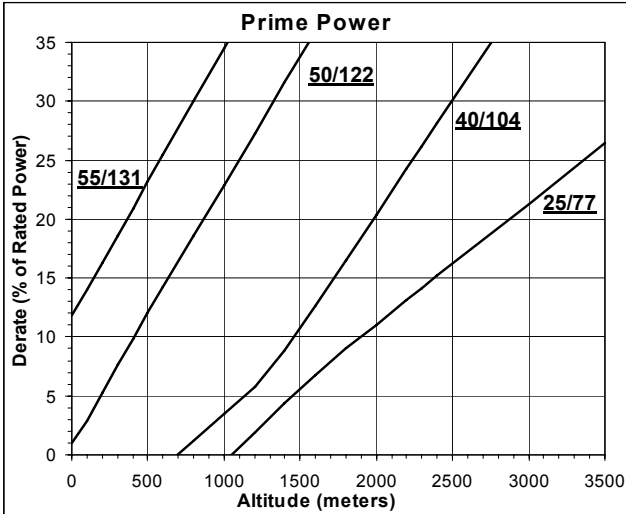


1500 rpm Derate Curves

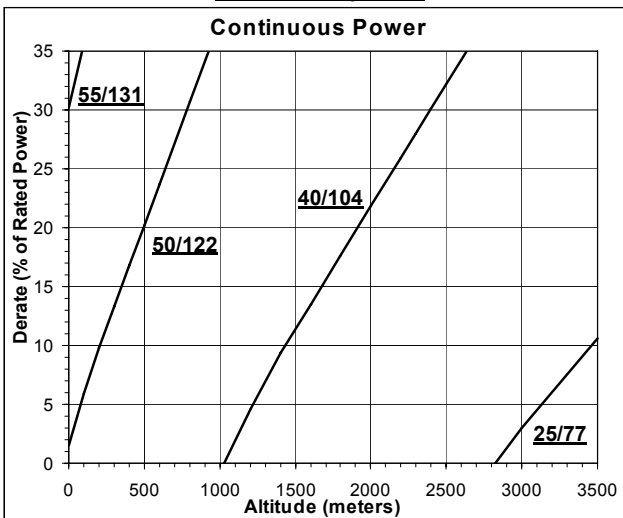
Ambient Temp. °C/°F



Ambient Temp. °C/°F



Ambient Temp. °C/°F



Operation At Elevated Temperature And Altitude:

For **Standby Operation** above these conditions, derate by an additional 6% per 300 m (1000 ft), and 24% per 10° C (18° F).

For **Prime Operation** above these conditions, derate by an additional 7% per 300 m (1000 ft), and 28% per 10° C (18° F).

For **Continuous Operation** above these conditions, derate by an additional 16% per 300 m (1000 ft), and 62% per 10° C (18° F).

Cummins Inc.

Engine Data Sheet

ENGINE MODEL: **QSK23-G9 NR2**

CONFIGURATION NUMBER: D893001GX03

DATA SHEET : DS-50063

DATE : 4Dec07

PERFORMANCE CURVE : FR-50063

INSTALLATION DIAGRAM

• Fan to Flywheel: 3170553

CPL NUMBER

• Engine Critical Parts List: 3083

GENERAL ENGINE DATA

Type	Inline 6-Cylinder Diesel	
Aspiration	Turbocharged and Low Temperature Aftercooled	
Bore x Stroke	6.69 x 6.69 (170 x 170)	
Displacement	1413 (23.15)	
Compression Ratio	16.0 : 1	
Dry Weight (Approximate), Fan to Flywheel Engine	6060	(2755)
Wet Weight (Approximate), Fan to Flywheel Engine	6170	(2805)
Moment of Inertia of Rotating Components • with (SAE 0)	270	(11.6)
Center of Gravity from Rear Face of Block	28.5	(725)
Center of Gravity Above Crankshaft Centerline	9.5	(240)
Maximum Static Loading at Rear Main Bearing	2160	(990)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	2340	(3205)
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EXHAUST SYSTEM

Maximum Back Pressure	3	(10.2)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction • with Dirty Filter Element	25	(6.2)
• with Clean Filter Element	15	(3.7)

COOLING SYSTEM**Jacket Water Circuit Requirements**

Coolant Capacity — Engine Only	12.3	(46.5)
Maximum Static Head of Coolant Above Engine Crank Centerline	60	(18.3)
Standard Thermostat (Modulating) Range	170-194	(76.5-90)
Minimum Pressure Cap	10	(69)
Maximum Top Tank Temperature for Standby / Prime Power	220-212	(104-100)
Maximum Coolant Friction Head External to Engine	5	(34)

Charge Air Cooler Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold - 1500 rpm	63	(35)
Maximum Air Pressure Drop from Turbo Air outlet to Intake Manifold - 1500 rpm	4	(102)
Maximum Intake Manifold Temperature @ 77 °F (25 °C) ambient - 1500 rpm	140	(60)
Maximum Intake Manifold Temperature for engine protection (Shut Down Threshold)	180	(82)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	21	(145)
@ Governed Speed	50-65	(345-448)
Maximum Oil Temperature	248	(120)
Oil Capacity with OP TBD Oil Pan : Low - High	17-25	(66-95)
Total System Capacity (Including Filter)	19-27	(74-103)

FUEL SYSTEM

Type Injection System	Cummins HPI-PT
Maximum Restriction at Lift Pump(clean/dirty filter)..... — in Hg (kPa)	4.0/8.0 (14/27)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — in Hg (kPa)	9.0 (30)
Maximum Fuel Flow to Injector Pump	181 (684)
Maximum Return Fuel Flow	175 (662)
Maximum Fuel Inlet Temperature	160 (70)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)	— volt	24
Battery Charging System, Negative Ground	— ampere	35
Maximum Allowable Resistance of Cranking Circuit	— ohm	0.002
Minimum Recommended Battery Capacity		
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)	— 0°F CCA	1800

COLD START CAPABILITY

Minimum Ambient Temperature for NFPA 110 Cold Start (90 degree °F Coolant Temperature)	— °F (°C)	50 (10)
Minimum Ambient Temperature for Unaided Cold Start	— °F (°C)	32 (0)

PERFORMANCE DATA

- All data is based on:
- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
 - Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
 - ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure : 100 kPa (29.53 in Hg)	Air Temperature : 25 °C (77 °F)
Altitude : 110 m (361 ft)	Relative Humidity : 30%
Air Intake Restriction : 381 mm H ₂ O (15 in H ₂ O)	Exhaust Restriction : 51 mm HG (2 in Hg)

Steady State Stability Band at Any Constant Load	— %	+/-	0.25
Estimated Free Field Sound Pressure Level of a Typical Generator Set;			
Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); @1800 rpm	— dBA		TBD
Exhaust Noise at 1 m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45 °	— dBA		TBD

Governed Engine Speed	rpm
Engine Idle Speed	rpm
Gross Engine Power Output	hp (kW)
Brake Mean Effective Pressure	psi (kPa)
Piston Speed	ft/min (m/s)
Friction Horsepower	hp (kW)
Engine Water Flow at Stated Friction Head External to Engine:	
• 3 psi Friction Head	US gpm (litre/s)
• Maximum Friction Head	US gpm (litre/s)

Engine Data

Intake Air Flow	cfm (litre/s)
Exhaust Gas Temperature	°F (°C)
Exhaust Gas Flow	cfm (litre/s)
Air to Fuel Ratio	air : fuel
Radiated Heat to Ambient	BTU/min (kW)
Heat Rejection to Jacket Coolant	BTU/min (kW)
Heat Rejection to Exhaust	BTU/min (kW)
Heat Rejected to Fuel*	BTU/min (kW)
Heat Rejected to Aftercooler	BTU/min (kW)
Charge Air Flow	lb/min (kg/min)
Turbocharger Compressor Outlet Pressure	psi (kPa)
Turbocharger Compressor Outlet Temperature	°F (°C)

STANDBY POWER		PRIME POWER	
60 hz	50 hz	60 hz	50 hz
1800	1500 750	1800	1500 750
	1060 (791)		960 (716)
	396 (2732)		359 (2474)
	1675 (8.6)		2010 (10.3)
	96 (72)		124 (93)
	132 (8.3)		132 (8.3)
Not Applicable for 1800 rpm Operation	125 (7.9)	Not Applicable for 1800 rpm Operation	125 (7.9)
	1994 (942)		1817 (858)
	906 (486)		856 (458)
	4795 (2264)		4299 (2029)
	25.4 : 1		26.4 : 1
	4250 (75)		3723 (66)
	14977 (264)		12992 (229)
	30944 (544)		26400 (464)
	387 (7)		387 (7)
	10718 (189)		8849 (156)
	147 (67)		134 (61)
	44 (304)		38 (262)
	431 (222)		391 (200)

* This is the maximum heat rejection to fuel.

N.A. - Not Available

N/A - Not Applicable to this Engine

TBD - To Be Determined

ENGINE MODEL : QSK23-G9 NR2

DATA SHEET : DS-50063

DATE : 4Dec07

CURVE NO. : FR-50063