



Cummins Inc.

Columbus, Indiana 47201

Engine Data Sheet

Basic Engine Model:
QSK23-G1 NR1

Engine Critical Parts List:
CPL: 8352

Curve Number:
FR-50007

Date:
19Jul04

G-DRIVE
QSK
1

Displacement : **23.15 litre (1413 in³)**

Bore : **170 mm (6.69 in.)** Stroke : **170 mm (6.69 in.)**

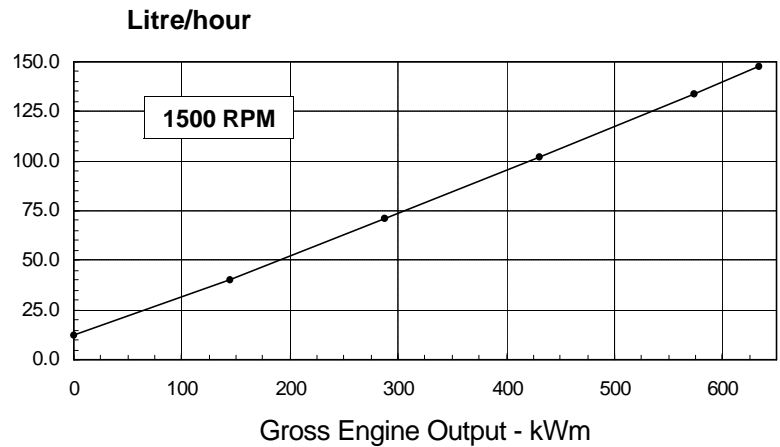
No. of Cylinders : **6**

Aspiration : **Turbocharged and Air to Air Aftercooled**

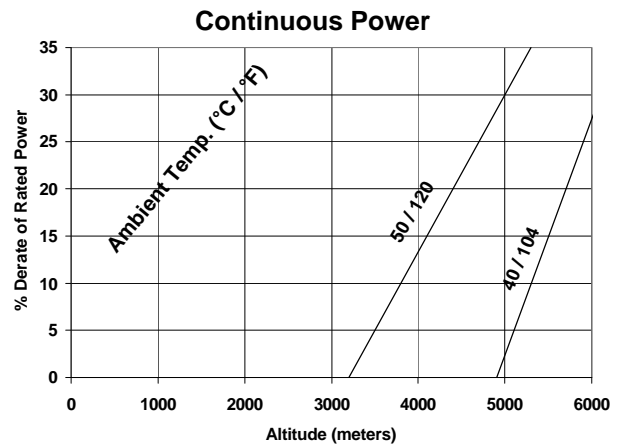
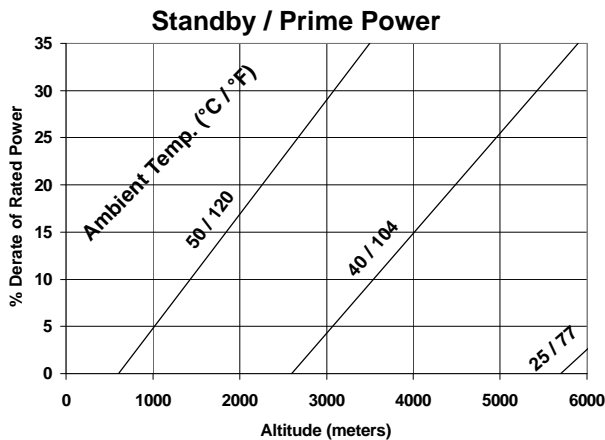
Engine Speed RPM	Standby Power		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
1500	634	850	574	770	433	580
1800	675	905	608	815	504	675

Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm-h	lb/ BHP-h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	634	850	0.198	0.326	148	39.0
PRIME POWER						
100	574	770	0.198	0.327	134	35.5
75	431	578	0.201	0.330	102	26.9
50	287	385	0.210	0.345	71	18.7
25	144	193	0.236	0.390	40	10.6
CONTINUOUS POWER						
100	433	580	0.200	0.330	102	27.0



Power Derate Curves @ 1500 RPM



Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 3.4% per 300 m (1000 ft), and 20% per 10° C (18° F).

CONVERSIONS: (litres = U.S. Gal x 3.785) (U.S. Gal = litres x 0.2642)

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.


Data Subject to Change Without Notice

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/U.S. 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.

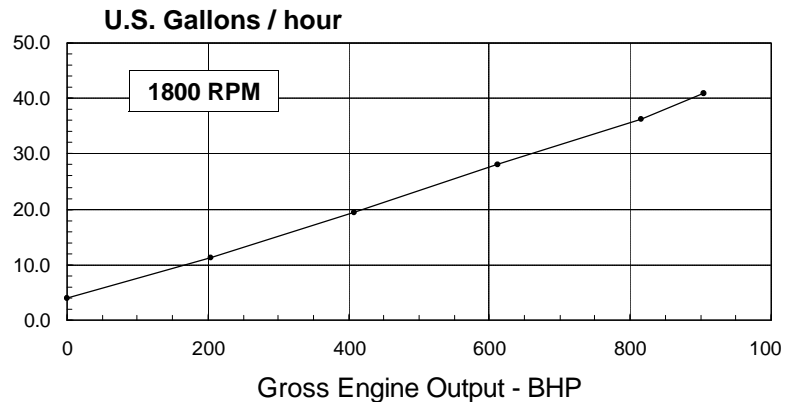
Data Status: Limited Production
Data Tolerance: ± 5%
Chief Engineer: *D.K. Trueblood*

	Cummins Inc. Columbus, Indiana 47201 Engine Data Sheet	Basic Engine Model: QSK23-G1 NR1	Curve Number: FR-50007	G-DRIVE QSK 2
		Engine Critical Parts List: CPL: 8352	Date: 19Jul04	
Displacement : 23.15 litre (1413 in³)		Bore : 170 mm (6.69 in.) Stroke : 170 mm (6.69 in.)		
No. of Cylinders : 6		Aspiration : Turbocharged and Air to Air Aftercooled		

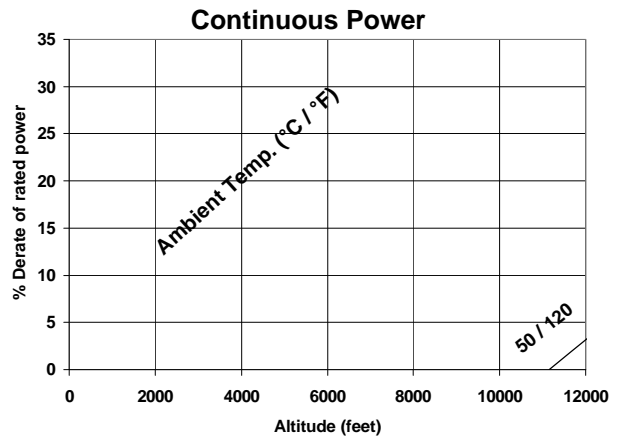
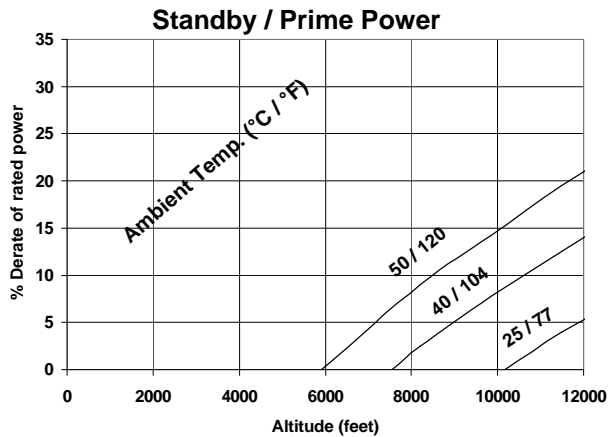
Engine Speed	Standby Power		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
1500	634	850	574	770	433	580
1800	675	905	608	815	504	675

Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm-h	lb/ BHP-h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	675	905	0.195	0.322	155	41.0
PRIME POWER						
100	608	815	0.192	0.316	137	36.3
75	456	611	0.200	0.328	107	28.2
50	304	408	0.207	0.340	74	19.5
25	152	204	0.235	0.390	42	11.2
CONTINUOUS POWER						
100	504	675	0.191	0.314	113	29.9



Power Derate Curves @ 1800 RPM



Operation At Elevated Temperature And Altitude:

For sustained operation above these conditions, derate by an additional 5.0% per 300 m (1000 ft), and 7% per 10° C (18° F).

CONVERSIONS: (litres = U.S. Gal x 3.785) (U.S. Gal = litres x 0.2642)

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Data Status: Limited Production
 Data Tolerance: ± 5%
 Chief Engineer: *D.K. Trueblood*

Cummins Inc.

Engine Data Sheet

ENGINE MODEL : **QSK23-G1 NR1** CONFIGURATION NUMBER : D893001GX03

DATA SHEET : LP50007

DATE : 5May03

PERFORMANCE CURVE : FR-50007

INSTALLATION DIAGRAM

• Fan to Flywheel : 3170553

CPL NUMBER

• Engine Critical Parts List : 8352

Para mayor información : ventas@plantaselectricasdemexico.com

GENERAL ENGINE DATA

Type	Inline 6-Cylinder Diesel
Aspiration	Turbocharged and Low Temperature Aftercooled
Bore x Stroke	170 x 170 (6.69 x 6.69)
Displacement..... — litre (in ³)	23.15 (1413)
Compression Ratio.....	16.0:1
Dry Weight	
Fan to Flywheel Engine..... — kg (lb)	2755 (6060)
Wet Weight	
Fan to Flywheel Engine..... — kg (lb)	2805 (6170)
Moment of Inertia of Rotating Components	
• with (SAE 0)..... — kg • m ² (lb _m • ft ²)	11.6 (270)
Center of Gravity from Front Face of Block..... — mm (in)	725 (28.5)
Center of Gravity Above Crankshaft Centerline..... — mm (in)	240 (9.5)
Maximum Static Loading at Rear Main Bearing..... — kg (lb)	980 (2160)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— N • m (lb • ft)	3205	(2340)
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EXHAUST SYSTEM

Maximum Back Pressure.....	— mm Hg (in Hg)	76.2	(3)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction:			
• with Dirty Filter Element.....	— mm H ₂ O (in H ₂ O)	635	(25)
• with Clean Filter Element.....	— mm H ₂ O (in H ₂ O)	381	(15)

COOLING SYSTEM

Coolant Capacity — Engine Only	— litre (US gal)	46.5	(12.3)
Minimum Pressure Cap.....	— kPa (psi)	69	(10)

Jacket Water Circuit Requirements

Maximum Static Head of Coolant Above Engine Crank Centerline.....	— m (ft)	18.3	(60)
Standard Thermostat (Modulating) Range	— °C (°F)	76.5-90	(170-194)
Maximum Top Tank Temperature for Standby . Prime Power	— °C (°F)	104 - 100	(220 - 212)
Maximum Coolant Friction Head External to the Engine - 1800 RPM.....	— kPa (psi)	48	(7)
-1500 RPM.....	— kPa (psi)	34	(5)

Air-to-Air Core Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold —1500 / 1800 rpm..	— °C (°F)	33	(60)
Maximum Air Press. Drop from Turbo Air Outlet to Intake Manifold — 1500 / 1800 rpm	— mm Hg (in Hg)	102	(4)
Maximum Intake Manifold Temperature at 25° C (77° F) Ambient	— °C (°F)	60	(140)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— kPa (psi)	145	(21)
@ Governed Speed	— kPa (psi)	345 - 448	(50 - 65)
Maximum Oil Temperature.....	— °C (°F)	120	(248)
Oil Capacity with OP TBD Oil Pan : Low - High	— litre (US gal)	66 - 95	(17 - 25)
Total System Capacity (With Filters).....	— litre (US gal)	74 - 103	(19 - 27)

FUEL SYSTEM

Type Injection System	Cummins HPI-PT
Maximum Restriction at Fuel Injection Pump — with Clean Fuel Filter	120 (4.0)
— with Dirty Fuel Filter.....	203 (8.0)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head).....	229 (9.0)
Maximum Inlet Temperature	70 (160)
Maximum Fuel Flow to Injection Pump	684 (181)
Maximum Drain Flow.....	662 (175)

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
Cranking Torque at Minimum Unaided Cold Start Temperature	— Nm (lb/ft)	982 (724)
Minimum Cranking Speed.....	— rpm	100
Minimum Recommended Battery Capacity		
• Cold Soak @ 10 °C (50 °F) and Above	— °F CCA	1200
• Cold Soak @ 0 °C to 10 °C (32 °F to 50 °F).....	— °F CCA	1280
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F).....	— °F CCA	1800

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with 1500 watt Coolant Heater to Rated Speed	— °C (°F)	-30 (-22)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed	— °C (°F)	0 (32)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature).....	— °C (°F)	10 (50)

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); @1500 rpm.....	— dBA	TBD
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°.....	— dBA	TBD

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
Governed Engine Speed	1800	1500	1800	1500
Engine Idle Speed.....	750	750	750	750
Gross Engine Power Output..... — kW _m (BHP)	675 (905)	634 (850)	608 (815)	574 (770)
Brake Mean Effective Pressure..... — kPa (psi)	1950 (283)	2205 (320)	1765 (256)	1990 (288)
Piston Speed..... — m / s (ft / min)	10.3 (2010)	8.6 (1675)	10.3 (2010)	8.6 (1675)
Friction Horsepower	93 (124)	72 (96)	93 (124)	72 (96)
Engine Jacket Water Flow at Stated Friction Head External to Engine:				
• 3 psi Friction Head..... — litre / s (US gpm)	10.4 (165)	7.9 (126)	10.4 (165)	7.9 (126)
• Maximum Friction Head	10.1 (160)	7.6 (120)	10.1 (160)	7.6 (120)
Intake Air Flow..... — litre / s (cfm)	955 (2023)	732 (1552)	897 (1901)	692 (1467)
Exhaust Gas Temperature	448 (839)	572 (1062)	437 (818)	563 (1045)
Exhaust Gas Flow	2362 (5005)	2145 (4546)	2184 (4627)	1998 (4234)
Air-to-Fuel Ratio	25.6 : 1	24.7 : 1	27.0 : 1	25.4 : 1
Radiated Heat to Ambient	62 (3557)	59 (3384)	55 (3144)	54 (3074)
Heat Rejection to Jacket Water Coolant.....	241 (13712)	227 (12937)	224 (12759)	212 (12052)
Heat Rejection to Exhaust.....	432 (24857)	465 (26465)	365 (20762)	420 (23883)
Heat Rejection to Fuel*.....	9.1 (520)	6.8 (387)	9.1 (520)	6.6 (375)
Charge Air Cooler Heat Rejection.....	138 (7869)	94 (5359)	120 (6820)	84 (4792)
Turbo Compressor Outlet Temperature	183 (362)	173 (343)	170 (338)	161 (321)
Turbo Compressor Outlet Pressure.....	221 (32)	186 (27)	193 (28)	159 (23)

* This is the maximum heat rejection to fuel, which is at low load

N.A. - Not Available
N/A - Not Applicable to this Engine
TBD - To Be Determined

ENGINE MODEL : QSK23-G1 NR1
DATA SHEET : DS-50007-LP
DATE : 19Jul04
CURVE NO. : FR-50007