



Cummins Inc.

Columbus, Indiana 47202-3005

Engine Data Sheet

Basic Engine Model:
QSM11-G4 NR3

Engine Critical Parts List:
CPL: 41778

Curve Number:
FR-20138

Date:
19Jun07

**G-DRIVE
QSM
1**

Displacement : **10.8 litre (661 in³)**

Bore : **125mm (4.92 in.)** Stroke : **147 mm (5.79 in.)**

No. of Cylinders : **6**

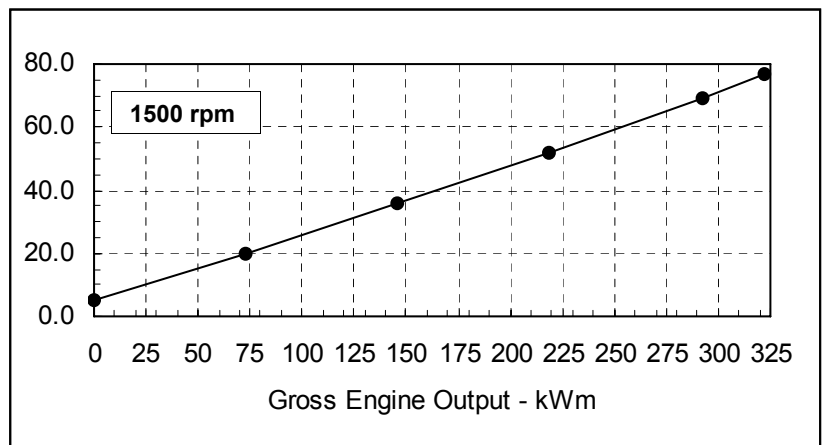
Aspiration : **Turbocharged and Air to Air Aftercooled**

Engine Speed rpm	Standby Power		Prime Power		Continuous Power	
	kWm	hp	kWm	hp	kWm	hp
1500	322	431	292	392	259	347
1800	351	470	318	426	282	378

Engine Performance Data @ 1500 rpm

litre/hour

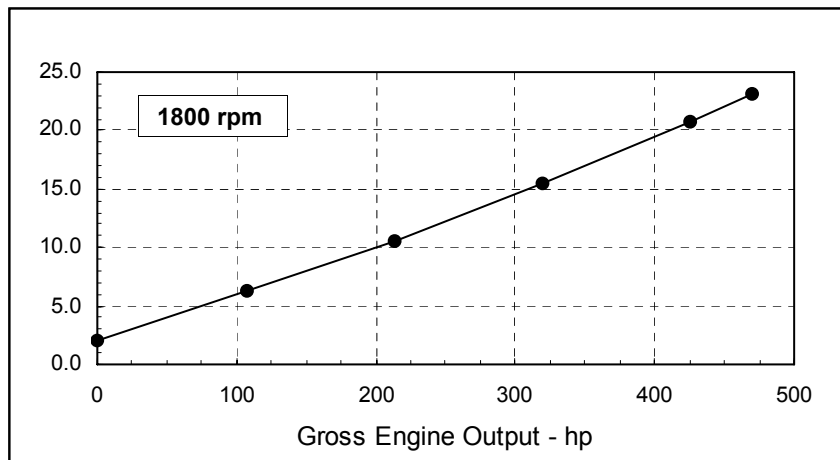
OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm·h	lb/ hp·h	litre/ hour	US gal/ hour
STANDBY POWER						
100	322	431	0.203	0.333	77	20.2
PRIME POWER						
100	292	392	0.201	0.331	69	18.2
75	219	294	0.202	0.332	52	13.7
50	146	196	0.209	0.343	36	9.5
25	73	98	0.228	0.375	20	5.2
CONTINUOUS POWER						
100	259	347	0.201	0.330	61	16.1



Engine Performance Data @ 1800 rpm

US gallons/hour

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	hp	kg/ kWm·h	lb/ hp·h	litre/ hour	US gal/ hour
STANDBY POWER						
100	351	470	0.213	0.350	88	23.2
PRIME POWER						
100	318	426	0.210	0.345	78	20.7
75	238	320	0.209	0.344	59	15.5
50	159	213	0.216	0.355	40	10.6
25	79	107	0.254	0.417	24	6.3
CONTINUOUS POWER						
100	282	378	0.209	0.344	69	18.3



CONVERSIONS: (litres = US Gal x 3.785) (US 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/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.

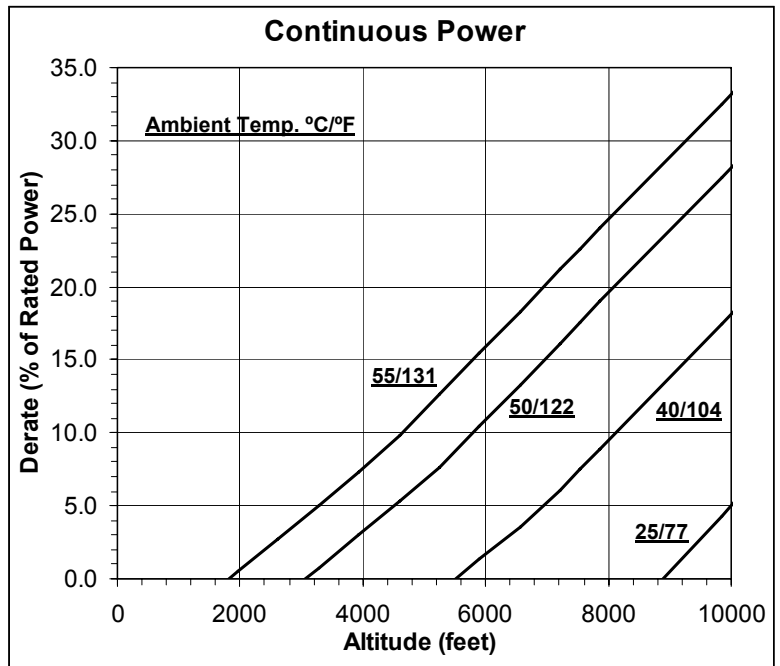
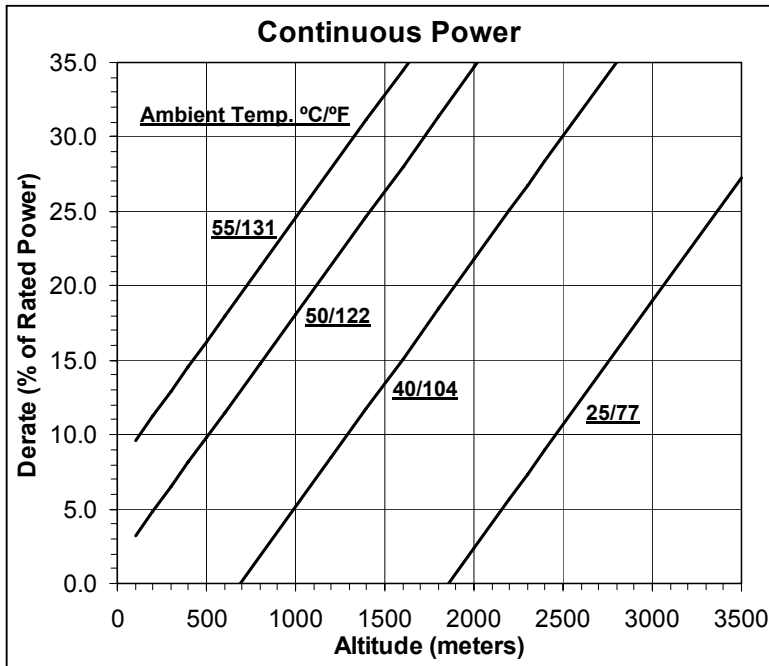
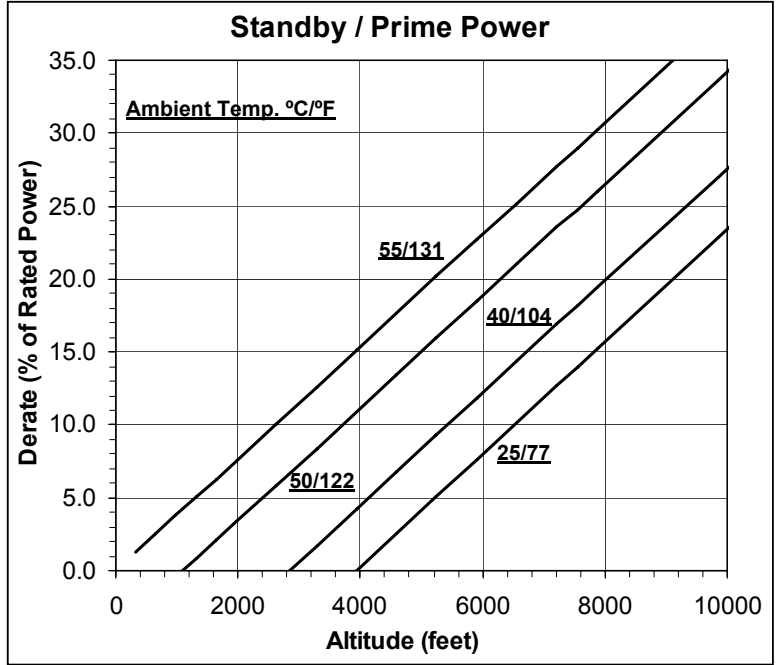
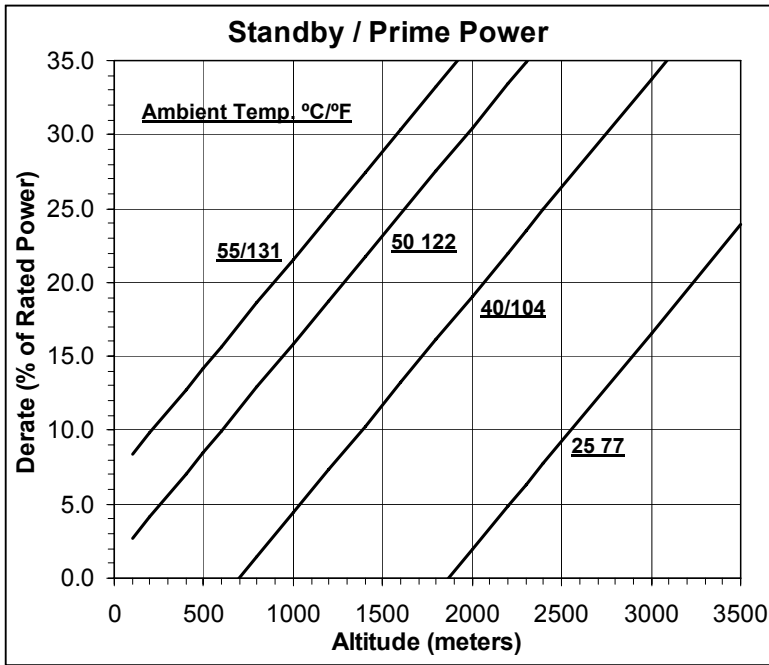
Data Status: Limited Production

Data Tolerance: ± 5%

Chief Engineer:

1500 rpm Derate Curves

1800 rpm Derate Curves



Operation At Elevated Temperature And Altitude:

For **Standby/Prime Operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 8% per 10 °C (18 °F).
 For **Continuous Operation** above these conditions, derate by an additional 5% per 300 m (1000 ft), and 10% per 10 °C (18 °F).

Operation At Elevated Temperature And Altitude:

For **Standby/Prime Operation** above these conditions, derate by an additional 4% per 300 m (1000 ft), and 11% per 10 °C (18 °F).
 For **Continuous Operation** above these conditions, derate by an additional 5% per 300 m (1000 ft), and 13% per 10 °C (18 °F).

Cummins Inc.
Engine Data Sheet

ENGINE MODEL : QSM11-G4 NR3

CONFIGURATION NUMBER : D353026GX03

DATA SHEET : DS-20138

DATE : 19Jun07

PERFORMANCE CURVE : FR-20138

INSTALLATION DIAGRAM

• Fan to Flywheel: 4953764

CPL NUMBER

• Engine Critical Parts List: 41778

GENERAL ENGINE DATA

Type	Inline 6-Cylinder Diesel
Aspiration	Turbocharged and Charge Air Cooled
Bore x Stroke	4.92 x 5.79 (125 X 147)
Displacement	661 (10.8)
Compression Ratio	16.1 :1
Dry Weight (Approximate), Fan to Flywheel Engine	2190 (993)
Wet Weight (Approximate), Fan to Flywheel Engine	2295 (1041)
Moment of Inertia of Rotating Components	
• with FW 2141 Flywheel	43.2 (1.82)
Center of Gravity from Front Face of Block	16.9 (429)
Center of Gravity Above Crankshaft Centerline	8.3 (211)
Maximum Static Loading at Rear Main Bearing	TBD TBD

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	1000 (1356)
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EXHAUST SYSTEM

Maximum Back Pressure	3 (10.25)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction:	
• with Dirty Filter Element	25 (85)
• with Clean Filter Element	15 (51)

COOLING SYSTEM

Jacket Water Circuit Requirements

Coolant Capacity — Engine Only	3.1 (11.7)
Maximum Static Head of Coolant Above Engine Crank Centerline	14 (46)
Standard Thermostat (Modulating) Range	82-93 (28-34)
Minimum Pressure Cap	10 (69)
Maximum Top Tank Temperature for Standby / Prime Power	220-212 (104-100)
Maximum Coolant Friction Head External to Engine	10 (69)

Charge Air Cooler Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold - 1500/1800 rpm	45 (25)
Maximum Air Pressure Drop from Turbo Air outlet to Intake Manifold - 1500/1800 rpm .	3 (10)
Maximum Intake Manifold Temperature @ 77 °F (25 °C) ambient - 1500/1800 rpm	199 (93)
Maximum Intake Manifold Temperature for engine protection (Shut Down Threshold)	482 (250)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed (minimum)	12 (83)
@ Governed Speed	30-40 (207-276)
Maximum Oil Temperature	280 (138)
Oil Capacity with OP 2082 Oil Pan : Low - High	8-9 (30-34)
Total System Capacity (With Combo Filters)	9.7 (36.7)

FUEL SYSTEM

Type Injection System.....	Cummins Select
Maximum Restriction at Lift Pump(clean/dirty filter)..... — in Hg (kPa)	4/8 (13.5/27)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — in Hg (kPa)	2.5 (8.4)
Maximum Fuel Flow to Injector Pump — US gph (litre/hr)	77.5 (293)
Maximum Return Fuel Flow — US gph (litre/hr)	73 (276)
Maximum Fuel Inlet Temperature — °F (°C)	160 (71)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)..... — volt	24
Battery Charging System, Negative Ground..... — ampere	70
Maximum Allowable Resistance of Cranking Circuit..... — ohm	0.002
Minimum Recommended Battery Capacity	
• Cold Soak @ -18 °C to 0 °C (0 °F to 32 °F)..... — 0°F CCA	1250

COLD START CAPABILITY

Minimum Ambient Temperature for Cold Start with 1500 watt Coolant Heater to Rated Speed — °F (°C)	7 (-14)
Minimum Ambient Temperature for Unaided Cold Start to Idle Speed..... — °F (°C)	25 (-4)
Minimum Ambient Temperature for NFPA 110 Cold Start (90° F Minimum Coolant Temperature)..... — °F (°C)	40 (4)

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	90.9
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°..... — dBA	99.6

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

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
	1800	1500	1800	1500.
	700-900	700-900	700-900	700-900
Governed Engine Speed..... rpm	1800	1500	1800	1500.
Engine Idle Speed..... rpm	700-900	700-900	700-900	700-900
Gross Engine Power Output..... kW _m (hp)	351 (470)	322 (431)	318 (426)	292 (392)
Brake Mean Effective Pressure..... kPa (psi)	2158 (313)	2372 (344)	1951 (283)	2158 (313)
Piston Speed..... m/s (ft/min)	8.8 (1737)	7.4 (1448)	8.8 (1737)	7.4 (1448)
Friction Horsepower..... kW _m (hp)	42 (56)	28 (37)	42 (56)	28 (37)
Engine Jacket Water Flow at Stated Friction Head External to Engine:				
• 3 psi Friction Head..... litre/s (US gpm)	7.5 (120)	6.3 (100)	7.5 (120)	6.3 (100)
• Maximum Friction Head..... litre/s (US gpm)	6.9 (110)	5.4 (85)	6.9 (110)	5.4 (85)
Intake Air Flow..... litre/s (cfm)	410 (870)	365 (770)	385 (815)	340 (715)
Exhaust Gas Temperature..... °C (°F)	545 (1015)	535 (990)	515 (960)	520 (960)
Exhaust Gas Flow..... litre/s (cfm)	1110 (2350)	950 (2010)	1010 (2140)	875 (1850)
Air-to-Fuel Ratio..... air : fuel	22.6 : 1	22.9 : 1	23.8 : 1	23.6 : 1
Radiated Heat to Ambient..... kW _m (BTU/min)	35 (2005)	31 (1755)	31 (1790)	28 (1582)
Heat Rejection to Jacket Water Coolant..... kW _m (BTU/min)	185 (10525)	154 (8768)	147 (8345)	122 (6926)
Heat Rejection to Exhaust..... kW _m (BTU/min)	227 (12925)	201 (11420)	218 (12425)	200 (11375)
Heat Rejection to Fuel*..... kW _m (BTU/min)	3.5 (200)	2.6 (150)	3.5 (200)	2.6 (150)
Charge Air Cooler Heat Rejection..... kW _m (BTU/min)	82 (4685)	62 (3549)	71 (4067)	52 (2985)
Turbo Compressor Outlet Temperature..... °C (°F)	213 (415)	186 (366)	195 (383)	172 (341)
Turbo Compressor Outlet Pressure..... kPa (psi)	248 (36)	220 (32)	227 (33)	193 (28)

Engine Data

Intake Air Flow..... litre/s (cfm)	410 (870)
Exhaust Gas Temperature..... °C (°F)	545 (1015)
Exhaust Gas Flow..... litre/s (cfm)	1110 (2350)
Air-to-Fuel Ratio..... air : fuel	22.6 : 1
Radiated Heat to Ambient..... kW _m (BTU/min)	35 (2005)
Heat Rejection to Jacket Water Coolant..... kW _m (BTU/min)	185 (10525)
Heat Rejection to Exhaust..... kW _m (BTU/min)	227 (12925)
Heat Rejection to Fuel*..... kW _m (BTU/min)	3.5 (200)
Charge Air Cooler Heat Rejection..... kW _m (BTU/min)	82 (4685)
Turbo Compressor Outlet Temperature..... °C (°F)	213 (415)
Turbo Compressor Outlet Pressure..... kPa (psi)	248 (36)

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

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

ENGINE MODEL : QSM11-G4 NR3
DATA SHEET : DS-20138
DATE : 19Jun07
CURVE NO. : FR-20138