



Engine Performance Data

Cummins Inc

Columbus, Indiana 47202-3005
http://www.cummins.com

Power Generation

QSX15-G13

FR11012

Configuration
D103014GX03

CPL Code
3794

Revision
01-AUG-2012

Compression Ratio: **17.2:1**
Fuel System: **XPI**
Emission Certification: **EU Stage IIIA, EPA/CARB Tier 3**

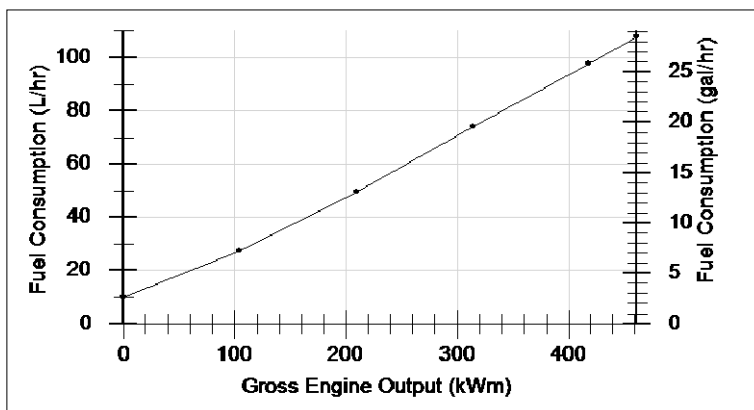
Displacement: **912 in3 (14.9 L)**
Aspiration: **Turbocharged Charge Air Cooled and EGR**

Engine Ratings:

Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	bhp	kWm	bhp	kWm	bhp	kWm
1,500	619	462	561	418	505	377
1,800	699	521	633	472	570	425

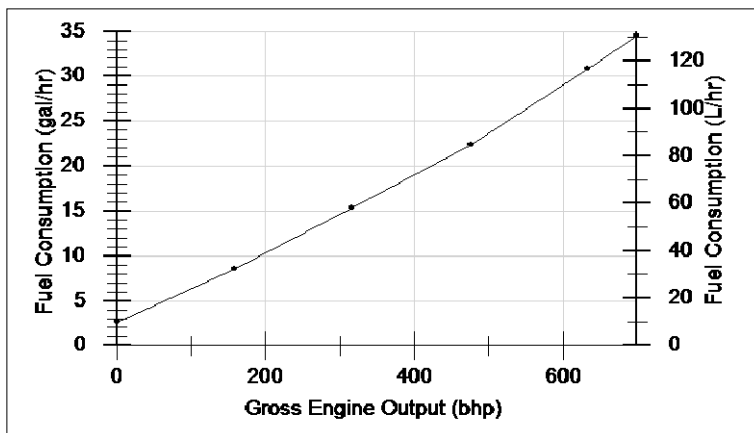
Engine Fuel Consumption @1,500 RPM

Output Power			Fuel Consumption			
%	bhp	kWm	lb/ bhp-h	kg/ kWm-h	gal/hr	l/hr
Standby Power						
100	619	462	0.327	0.199	28.5	108
Prime Power						
100	561	418	0.327	0.199	25.8	98
75	421	314	0.330	0.201	19.6	74
50	281	210	0.333	0.203	13.1	50
25	140	104	0.364	0.221	7.2	27
Continuous Power						
100	505	377	0.329	0.2	23.4	89



Engine Fuel Consumption @1,800 RPM

Output Power			Fuel Consumption			
%	bhp	kWm	lb/ bhp-h	kg/ kWm-h	gal/hr	l/hr
Standby Power						
100	699	521	0.350	0.213	34.5	130
Prime Power						
100	633	472	0.346	0.210	30.9	117
75	475	354	0.336	0.204	22.4	85
50	316	236	0.344	0.209	15.3	58
25	158	118	0.386	0.235	8.6	32
Continuous Power						
100	570	425	0.341	0.207	27.4	104



Rating Type:

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.

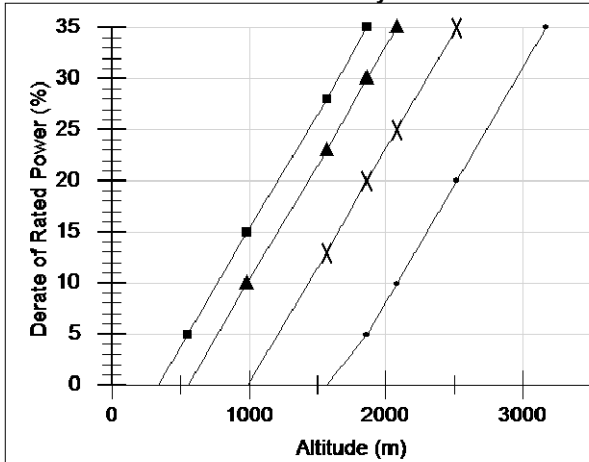
The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal). Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

Data Status: Preliminary - (Estimated data)

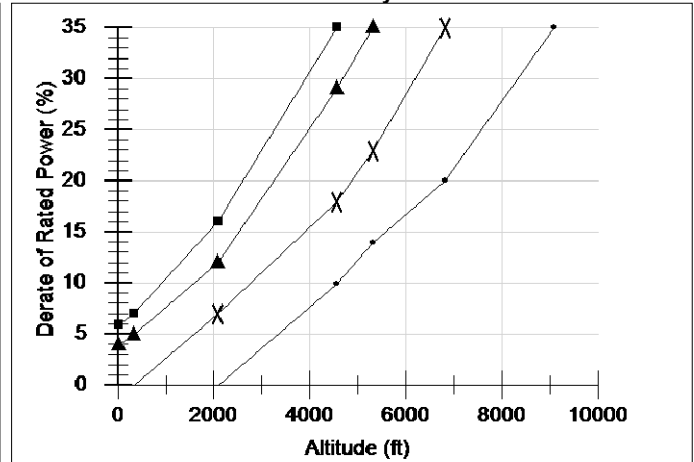
Data Tolerance: +/- 5 %

CHIEF ENGINEER: Cary J Marston

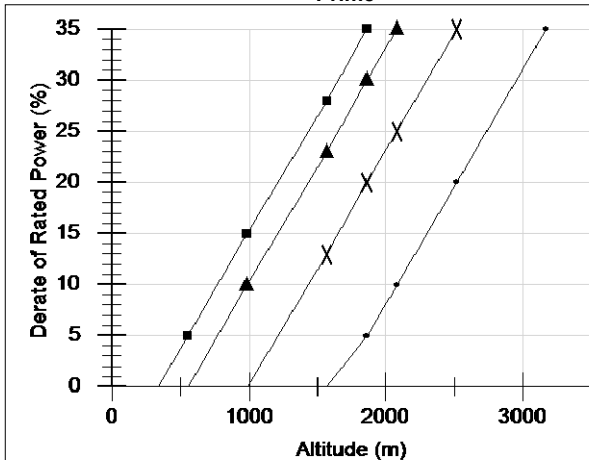
**1,500 RPM Power Derate Curves
Standby**



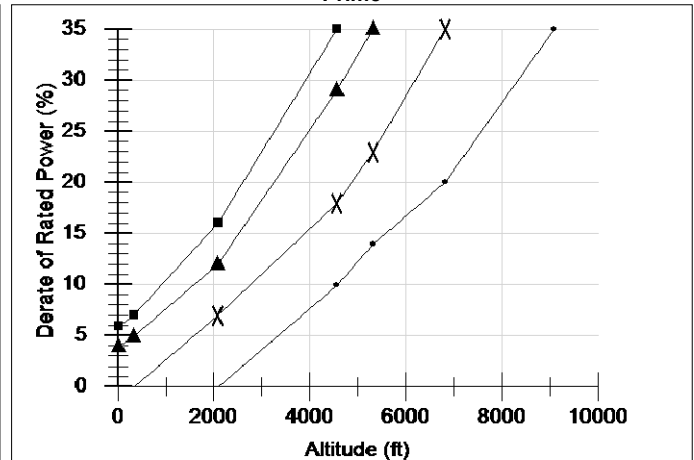
**1,800 RPM Power Derate Curves
Standby**



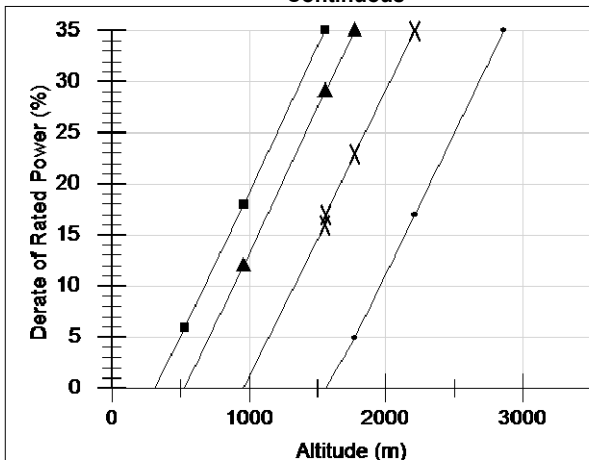
Prime



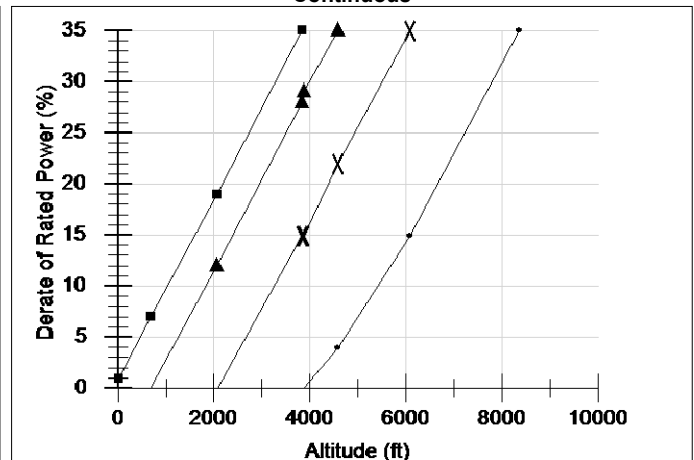
Prime



Continuous



Continuous



Operation at Elevated Temperature and Altitude:

For Standby operation above these conditions, derate by an additional 8 % per 984 ft (300 m), and 11 % per 18 delta deg F (10 delta deg C)
For Prime operation above these conditions, derate by an additional 8 % per 984 ft (300 m), and 11 % per 18 delta deg F (10 delta deg C)
For Continuous operation above these conditions, derate by an additional 8 % per 984 ft (300 m), and 12 % per 18 delta deg F (10 delta deg C)

- 77 deg F (25 deg C)
- X— 104 deg F (40 deg C)
- ▲ 122 deg F (50 deg C)
- 131 deg F (55 deg C)

Operation at Elevated Temperature and Altitude:

For Standby operation above these conditions, derate by an additional 8 % per 1,000 ft (305 m), and 12 % per 18 delta deg F (10 delta deg C)
For Prime operation above these conditions, derate by an additional 8 % per 984 ft (300 m), and 12 % per 18 delta deg F (10 delta deg C)
For Continuous above these conditions, derate by an additional 9 % per 1,000 ft (305 m), and 14 % per 18 delta deg F (10 delta deg C)

General Engine Data

Type	Four cycle; Inline; 6 Cylinder	
Aspiration	Turbocharged Charge Air Cooled and EGR	
Bore x Stroke	5.39 x 6.65 in	137 x 169 mm
Displacement	912 in3	14.9 L
Compression Ratio	17.2:1	
Approximate engine weight (wet)	3,166 lbm	1,436 kg
Moment of Inertia of Rotating Components		
with FW1022 Flywheel	40 in-lbf-sec**2	4.5 kg-m**2
with FW Flywheel	0 in-lbf-sec**2	0 kg-m**2
Center of Gravity		
from rear face of block	17.9 in	455 mm
above crankshaft centerline	9.6 in	244 mm

Engine Mounting

Maximum Bending Moment at Rear Face of Block	1,500 lb-ft	2,034 N-m
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Exhaust System

Maximum back pressure at Standby Power	3 in-Hg	10 kPa
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Air Induction System

Maximum Intake Air Restriction		
with Dirty Filter Element	25 in H2O	6.2 kPa
with Normal Duty Air Cleaner and Clean Filter Element	15 in H2O	3.7 kPa

Cooling System

Coolant Capacity		
Engine	35 quarts	33.1 L
Minimum pressure cap rating at sea level	15 psi	103 kPa
Maximum static head of coolant above crankshaft centerline	46 ft	14 m
Maximum Coolant Temperature (Max Top Tank Temp) for Standby/Prime power	230 / 220 deg F	110 / 104 deg C
Thermostat (Modulating) Range	180 - 200 deg F	82 - 93 deg C

Jacket Water Circuit Requirements

Maximum Coolant Friction Head External to Engine - 1,500/1,800 RPM	5 / 5 psi	34.5 / 34.5 kPa
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Aftercooler Circuit Requirements

Maximum coolant temperature into the aftercooler @ 25C (77F) ambient	0 deg F	-18 deg C
Maximum coolant temperature into aftercooler @ Limiting Ambient conditions for Standby/Prime power	0 / 0 deg F	-18 / -18 deg C

Charge Air Cooler Requirements

Maximum Intake Manifold Temperature Differential (Ambient to IMT) (IMTD) - 1,500/1,800 RPM	45 / 45 delta deg F	25 / 25 delta deg C
Maximum allowable pressure drop across charge air cooler and OEM CAC piping (IMPD) - 1,500/1,800 RPM	2.5 / 4 in-Hg	8 / 14 kPa
Maximum Intake Manifold Temperature for Engine Protection	0 deg F	-18 deg C

Lubrication System

Oil Pressure		
@ Minimum low idle	12 psi	83 kPa
@ Governed speed	20 - 40 psi	137.9 - 275.8 kPa
Maximum Oil Temperature	270 deg F	132 deg C
Oil Capacity with OP 1493 Oil Pan: Low-High	19 - 22 gal	71.9 - 83.3 L
Total System Capacity (with Combo Filter)	24 gal	90.8 L

Fuel System

Type Injection System	XPI	
Maximum fuel supply restriction at fuel pump inlet		
with clean fuel filter element(s) at maximum fuel flow	7.8 in-Hg	26.3 kPa
with dirty fuel filter element(s) at maximum fuel flow	10 in-Hg	34 kPa
Maximum Allowable Head on Injectors Return Line (Consisting of Friction Head and Static Head)	8 in-Hg	27 kPa
Maximum fuel inlet temperature	160 deg F	71 deg C
Maximum supply fuel flow	56.7 gal/hr	215 L/hr
Maximum return fuel flow	22 gal/hr	83 L/hr

Electrical System

System voltage	<u>24 V</u>	<u>12 V</u>
Minimum Recommended Battery Capacity		
cold soak at 10 deg C (50 deg F) and above	1,425 Amps	2,850 Amps
cold soak at 0 to 10 deg C (32 to 50 deg F)	1,425 CCA	2,850 CCA
cold soak at -18 to 0 deg C (0 to 32 deg F)	1,425 Amps	2,850 Amps
Maximum starting circuit resistance	0.002 Ohm	0.001 Ohm

Cold start capability

Unaided Cold Start		
Minimum cranking speed		110 RPM
Minimum ambient temperature for unaided cold start	15 deg F	-9.4 deg C
Breakaway torque at minimum unaided cold start temperature:	0 lb-ft	0 N-m
Aided Cold Start		
Minimum ambient temperature with coolant and lube heater only	-40 deg F	-40 deg C
Cold starting aids available	Block Heater, Oil Pan Heater	
Min Amb Temp for NFPA 110 Cold Start (90 deg F min coolant temp)	40 deg F	4.4 deg C

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%

Steady State Stability Band at any constant load (+/-) 0.25 %

		Standby Power		Prime Power	
		1,800	1,500	1,800	1,500
Governed Engine Speed	RPM				
Engine Idle Speed	RPM	700 - 1,200	700 - 1,200	700 - 1,200	700 - 1,200
Gross Engine PowerOutput	hp (kW)	699 (521)	619 (462)	633 (472)	561 (418)
Brake Mean EffectivePressure	psi (kPa)	337 (2,324)	358 (2,468)	305 (2,103)	325 (2,241)
Piston Speed	ft/min (m/s)	1,995 (10.1)	1,663 (8.4)	1,995 (10.1)	1,663 (8.4)
Friction Horsepower	hp (kW)	60 (45)	44 (32)	60 (45)	44 (32)
Engine Jacket Water Flow at Stated Friction Head					
external to Engine					
- 2.5 psi-2.5 psi FrictionHead	gpm (L/min)	128 (485)	105 (397)	128 (485)	105 (397)
- Maximum FrictionHead	gpm (L/min)	112 (424)	93 (352)	112 (424)	93 (352)
<u>Engine Data</u>					
Intake Air Flow	ft3/min (L/s)	1,051 (496)	945 (446)	1,004 (474)	886 (418)
Exhaust Gas Temp - DryStack	deg F (deg C)	1,035 (557)	929 (498)	968 (520)	911 (488)
Exhaust Gas Flow	ft3/min (L/s)	2,849 (1,345)	2,385 (1,126)	2,650 (1,251)	2,249 (1,061)
Air to Fuel ratio		18.4:1	19.9:1	19.7:1	20.7:1
Heat Rejection to Ambient	BTU/min (kW)	2,987 (53)	2,469 (43)	2,675 (47)	2,236 (39)
Heat Rejection to JacketCoolant	BTU/min (kW)	16,120 (283)	12,377 (218)	15,220 (268)	11,300 (199)
Heat Rejection to Exhaust	BTU/min (kW)	20,145 (354)	15,765 (277)	17,016 (299)	14,460 (254)
Heat Rejection to Fuel*	BTU/min (kW)	103 (1.8)	61 (1.1)	78 (1.4)	54 (0.9)
<u>ATA CAC</u>					
Heat Rejection toAftercooler	BTU/min (kW)	5,647 (99)	4,795 (84)	5,014 (88)	4,056 (71)
Charge Air Flow	lb/min (kg/min)	75 (34)	67 (30)	72 (33)	63 (29)
TurbochargerCompressor Outlet	in-Hg (kPa)	79 (265)	80 (270)	73 (247)	71 (240)
TurbochargerCompressor Outlet	deg F (deg C)	430 (221)	414 (212)	405 (207)	382 (194)

*This is the maximum heat rejection, not specified to the load listed.

End of Report