

Dongfeng Cummins

Technical

Operations



ENGINE MODEL: 4B3.9-G11
CURVE & DATASHEET: FR96597

REV 00 15MAY2018



Generator Engine Performance Data

DONGFENG CUMMINS ENGINE Co.,LTD

Xiangfan, Hubei Province, China
<http://www.dcec.com.cn>

Basic Engine Model:

4B3.9-G11

FR96597

FR96597 @ 1500 RPM &1800RPM

Configuration
D381004GX02

CPL Code
CPL: 5357

Revision
2018/5/15

Compression Ratio:	18.0:1	Aspiration:	Naturally Aspirated
Bore:	102 mm	Displacement:	3.9 L
Stroke:	120 mm	No. of Cylinders:	4
Emission Certification:		Fuel System:	WF A/RSV
Governor Regulation:	≤6%		

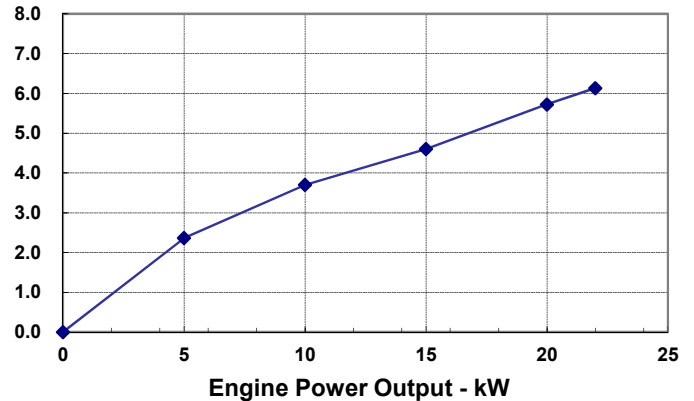
All data is based on the engine operating with fuel system, water pump, and 14.8 in H₂O (3.7 kPa) inlet air restriction with 5.98 in (152mm) inner diameter, and with 2.95 in Hg (10 kPa) exhaust restriction with 4.02 in (102 mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolants as 50% ethylene glycol/50% water. All data is subject to change without notice.

Engine Speed RPM	Standby Power		Prime Power		Continuous Power	
	kW	HP	kW	HP	kW	HP
1500	22	29	20	27	TBD	TBD
1800	26	35	23	31	TBD	TBD

Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION	
%	kW	HP	g/kW.h	L/h
STANDBY POWER				
100	22	29	230	6.1
PRIME POWER				
100	20	27	236	5.7
75	15	20	253	4.6
50	10	14	305	3.7
25	5	7	390	2.4
CONTINUOUS POWER				
TBD	TBD	TBD	TBD	TBD

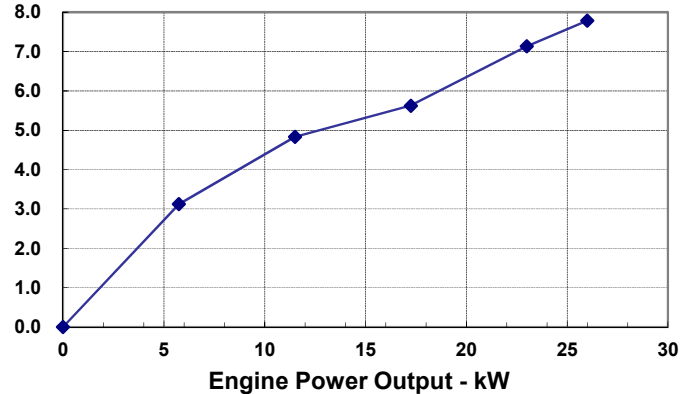
Litre/hour



Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION	
%	kW	HP	g/kW.h	L/h
STANDBY POWER				
100	26	35	247	7.8
PRIME POWER				
100	23	31	256	7.1
75	17	23	273	5.6
50	12	16	332	4.8
25	6	8	430	3.1
CONTINUOUS POWER				
TBD	TBD	TBD	TBD	TBD

Litre/hour



Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with GB/T18297 conditions of 100kPa (29.61 in. Hg) barometric pressure [80 m (263 ft.) altitude], 25°C (77°F) inlet air temperature, and 1 kPa (0.30 in. Hg) water vapor pressure with No.0 diesel fuel.

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

STANDBY POWER RATING is 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.

CONTINUOUS POWER RATING is 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.

PRIME POWER RATING is 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

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.

Above Source From CUMMINS AEB 26.02

GENERAL ENGINE DATA

Approximate Engine Weight (wet).....	-kg	308
Mass Moment of Inertia of Rotating Components (No Flywheel).....	-kg·m ²	0.143
Center of Gravity from Rear Face of Block.....	-mm	373
Center of Gravity above Crankshaft Centerline.....	-mm	163
Engine Idle Speed.....	-RPM	700-900
Fire Order.....		1-3-4-2

ENGINE MOUNTING

Maximum (Static) Bending Moment at Rear Face of Block.....	-N.m	1356
--	------	------

EXHAUST SYSTEM

Maximum Back Pressure.....	-kPa	10
----------------------------	------	----

AIR INTAKE SYSTEM

Maximum Intake Air Restriction with Heavy Duty Air Cleaner		
— Dirty Element.....	-kPa	6.2
— Clean Element.....	-kPa	3.7

LUBRICATION SYSTEM

Engine Oil Pressure for Engine Protection Devices:		
— Idle Speed(Minimum).....	-kPa	207
— Governed Speed(Maximum).....	-kPa	345
Maximum Oil Temperature.....	-°C	121
Minimum Required Lube System Capacity - Sump plus Filters.....	-litre	10.9

FUEL SYSTEM

Type Injection System.....		WF A Direct Injection
Maximum Restriction at Lift Pump.....	-kPa	13.6
Maximum Fuel Inlet Temperature.....	-°C	70
Total Drain Flow (constant for all loads).....	-litre/hr	30

COOLING SYSTEM

Coolant Capacity - Engine Only.....	-litre	7.2
Maximum Coolant Friction Head External to Engine...-1800 rpm.....	-kPa	35
— -1500 rpm.....	-kPa	28
Maximum Static Head of Coolant Above Engine Crank Centerline.....	-m	14
Standard Thermostat (Modulating) Range.....	-°C	83 - 95
Minimum Pressure Cap.....	-kPa	69
Maximum Top Tank Temperature for Standby / Prime Power.....	-°C	110 / 104

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement).....	-volt	12V	24V
Battery Charging System, Negative Ground.....	-ampere	63	40
Maximum Allowable Resistance of Cranking Circuit.....	-ohm	0.00075	0.002
Minimum Recommended Battery Capacity			
—Cold Soak @ 0 to 32-F (-18 to 0-C).....	-0°F CCA	625	(312)

Fuel Rating Option used for these Data: FR96597

Governed Engine Speed.....	-rpm
Engine Idle Speed.....	-rpm
Gross Engine Power Output.....	-kW
Piston Speed.....	-m/s
Friction Horsepower.....	-kW
Engine Water Flow to Engine:.....	-litre/sec.
Intake Air Flow.....	-litre/sec.
Exhaust Gas Flow.....	-litre/sec.
Exhaust Gas Temperature.....	-°C
Radiated Heat to Ambient.....	-kW
Heat Rejection to Coolant.....	-kW
Heat Rejection to Fuel.....	-kW

STANDBY POWER		PRIME POWER	
1800	1500	1800	1500
700-900	700-900	700-900	700-900
26	22	23	20
7.2	6.0	7.2	6.0
8.2	8.2	8.2	8.2
2.8	2.2	2.8	2.2
36.0	32.9	36.0	32.9
73	74.5	69	70
352	410	326	380
TBD	TBD	TBD	TBD
35	29	32	25.9
TBD	TBD	TBD	TBD

ALL DATA CERTIFIED WITHIN 5%

TBD = To Be Decided

N/A = Not Applicable

N.A. = Not Available

All data is subject to change without notice, sorry for inform.

Dongfeng Cummins Engine Co., Ltd.

东风康明斯发动机 性能参数表



发动机型号： 4B3.9-G11
性能曲线号： FR96597



发电机组用发动机性能数据表
东风康明斯发动机有限公司
中国 湖北 襄樊
http://www.dcec.com.cn

发动机型号
4B3.9-G11
FR96597

FR96597 @ 1500 RPM & 1800RPM

发动机配置号
D381004GX02

性能控制部件号
CPL: 5357

发布日期
2018/5/15

压缩比: **18.0:1**
缸径: **102 mm**
冲程: **120 mm**
排放控制:
调速率: **≤6%**

吸气方式: **自然吸气**
排量: **3.9 L**
缸数: **4**
燃油系统: **威孚A泵/RSV**

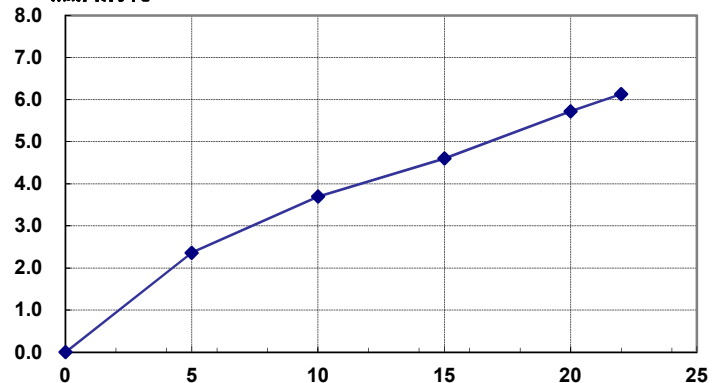
发动机在试验时带燃油系统、水泵、机油泵，不带空气压缩机、发电机、风扇、选装件及驱动件；
试验条件为进气阻力3.4kPa, 排气阻力10kPa。

发动机转速 RPM	备用功率		基本输出功率		持续功率	
	kW	HP	kW	HP	kW	HP
1500	22	29	20	27	待定	待定
1800	26	35	23	31	待定	待定

1500rpm 发动机性能数据

输出功率			燃油消耗	
%	kW	HP	g/kW.h	L/h
备用功率				
100	22	29	230	6.1
基本输出功率				
100	20	27	236	5.7
75	15	20	253	4.6
50	10	14	305	3.7
25	5	7	390	2.4
持续功率				
待定	待定	待定	待定	待定

燃油消耗 L/h

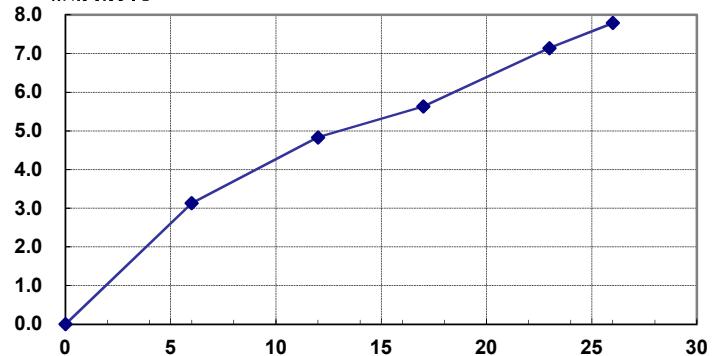


发动机功率 kW

1800rpm 发动机性能数据

输出功率			燃油消耗	
%	kW	HP	g/kW.h	L/h
备用功率				
100	26	35	247	7.8
基本输出功率				
100	23	31	256	7.1
75	17	23	273	5.6
50	12	16	332	4.8
25	6	8	430	3.1
持续功率				
待定	待定	待定	待定	待定

燃油消耗 L/h



发动机功率 kW

性能数据在大气压力为100kPa, 进气温度为25摄氏度, 海拔高度为80m, 水蒸气分压为1kPa, 使用标准0#柴油下, 按照GB/T18297试验条件获得。

发电机组用发动机功率应用指南

该指南用于指导交流发电机组选择安装合适功率应用的发电机组用发动机。本指南中的发电机组用发动机不适用于变转速直流发电机组应用。

备用功率 (STANDBY POWER RATING) ——

仅用于应急电站，提供紧急电源。不具备超负载能力。每年累计运行时间不超过200小时且平均负荷不超过备用功率的80%。其中在备用功率点运行每年不超过25小时。

持续功率 (CONTINUOUS POWER RATING) ——

用于提供公用电源。每年在恒定的100%持续功率负荷上不限时运行。不具备超负荷能力。

基本功率 (PRIME POWER RATING) ——

用于提供电力来替代商业电力。应用于以下两种类别：

不限时运行常用功率 (UNLIMITED TIME RUNNING PRIME POWER)

每年在可变负载的情况下无时间限制的运行。在任意连续的250小时运行周期内，可变负载的平均负荷不超过常用功率的70%。

每年在100%常用功率工况运行时间不超过500小时。

在任意连续的12小时运行周期内允许超负荷10%运行1小时。每年在超负荷10%功率运行时间不得超过25小时。

限时运行常用功率 (LIMITED TIME RUNNING PRIME POWER)

每年在恒定负载的情况下有限时间内的运行。发动机在不超过常用功率的负荷下每年可能运行750小时。任何发动机的使用寿命在恒定的高负荷下运行都将会减少。每年超过750小时的恒定负载运行都应该使用持续功率机型。

上述信息来源于CUMMINS AEB26.02

典型发动机数据

干重 (带飞轮和交流发电机, 不带起动机和空气压缩机)	-kg	308
旋转零件瞬时惯性 (无飞轮)	-kg·m ²	0.143
重心距缸体后端面距离	-mm	373
重心距曲轴中心线距离 (曲轴之上)	-mm	163
低怠速	-RPM	700-900
点火顺序		1-3-4-2

发动机安装

缸体后端面允许最大 (静态) 弯矩	-N.m	1356
-------------------	------	------

排气系统

最大排气背压	-kPa	10
--------	------	----

进气系统

最大允许进气阻力 (使用重型空气滤清器)		
-洁净的滤芯	-kPa	3.7
-肮脏的滤芯	-kPa	6.2

燃油系统

燃油泵系统类型		威孚 A直列泵
最大输油泵进油阻力	-kPa	13.6
喷油器回油管最大回油阻力	-kPa	67.7
最大燃油回油流量	-litre/hr	30

润滑系统

正常运行机油压力范围		
-低怠速最小机油压力	-kPa	207
-额定点最大机油压力	-kPa	345
最大油底壳机油温度	-°C	121
润滑系统最小容量 (油底壳+机油滤清器)	-litre	10.9

冷却系统

发动机冷却液容积 (仅发动机)	-litre	7.2	
发动机曲轴中心线上方冷却液静态最大高度	-m	14	
节温器标准调节温度 (范围)	-°C	83 - 95	
最小压力盖压力	-kPa	69	
备用/额定功率时发动机最高冷却液温度	-°C	110/ 104	
最大发动机外部冷却循环阻力	-1800 rpm	-kPa	35
	-1500 rpm	-kPa	28

电器系统

起动机	-volt	12V	24V
电池充电系统 (负极接地)	-ampere	63	40
最大起动回路电阻	-ohm	0.00075	0.002
最小电瓶容量			
-12°C冷透到0°C	-°F CCA	625	(312)

各数据应用标准供油率: **FR96597**

发动机转速.....	-rpm
低怠速转速.....	-rpm
输出功率.....	-kW
活塞速度.....	-m/s
摩擦损失功率.....	-kW
发动机冷却液流量.....	-litre/sec.
进气流量.....	-litre/sec.
排气流量.....	-litre/sec.
排气温度.....	-°C
环境热损失功 (干式歧管)	-kW
冷却液热损失功 (干式歧管)	-kW
排气热损失功.....	-kW

备用功率		额定功率	
1800	1500	1800	1500
700- 900	700- 900	700- 900	700- 900
26	22	23	20
7.2	6.0	7.2	6.0
8.2	8.2	8.2	8.2
2.8	2.2	2.8	2.2
36	32.9	36	32.9
73	74.5	69	70
352	410	326	380
待定	待定	待定	待定
35	29	32	25.9
待定	待定	待定	待定

所有数据的波动范围为±5%
 数据如有更改, 恕不另行通知
 东风康明斯发动机有限公司