



## CHONGQING CUMMINS ENGINE COMPANY LTD. ENGINE PERFORMANCE CURVE

CONFIGURATION  
D283021DX02

ENGINE MODEL: KTA50-G16A

DATA SHEET: FR722

CPL No.: PP634

DATE: 2022/5/13

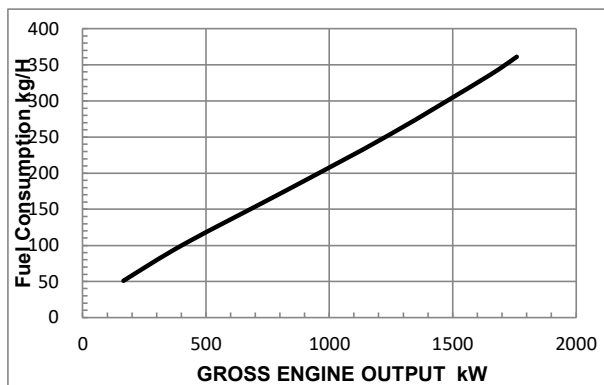
Displacement: 50.3L (3067) Aspiration: Turbocharged, LTA RATING  
BoreXStroke: 159X159mm (6.25X6.25 in.) Fuel System: Cummins PT STANDBY: 1760 kW(2360 HP)@1500 RPM  
Compress Ratio: 14.7:1 Emission: N.A. PRIME: 1650 kW(2213 HP)@1500 RPM

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler, and 20 in. H<sub>2</sub>O(4.98kPa) inlet air restriction with 5.8 in.(147mm) inner diameter, and with 2 in. Hg(7kPa) exhaust restriction with 8 in.(203mm) inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolant as 50% ethylene glycol/50% water. All data is subject to change without notice.

### GROSS ENGINE POWER OUTPUT

SPEED rpm	STANDBY POWER		PRIME POWER		CONTINUOUS POWER	
	BHP	kW	BHP	kW	BHP	kW
1500	2360	1760	2213	1650	1770	1320
-	-	-	-	-	-	-

### FUEL CONSUMPTION



OUTPUT POWER			CONSUMPTION		BFSC	
%	BHP	kW	Lb/h	kg/h	g/kW.h	Lb/BHP.h
1500RPM						
STANDBY						
100	2360	1760	796	361	205	0.337
PRIME						
100	2213	1650	741	336	204	0.335
75	1659	1238	556	252	204	0.335
50	1106	825	388	176	213	0.351
25	553	413	225	102	247	0.407
10	221	165	112	51	309	0.508
CONTINUOUS						
100	1770	1320	589	267	202	0.333

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO 3046 conditions of 29.61 in Hg(100 kPa) barometric pressure[361ft. (110 m) altitude], 77°F (25°C) inlet air temperature, and 30% relative humidity with No. 2 diesel fuel or a fuel corresponding to ASTM D2.

TECHNICAL DATA DEPT.

CERTIFIED WITHIN 5%

CHIEF ENGINEER

Cummins Confidential



## 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**

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 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 Prime Power rating should use the Continuous Power rating.

### **Reference Standards:**

BS-5514 and DIN-6271 standards are based on ISO-3046.

### **Operation At Elevated Temperature And Altitude:**

The engine may be operated at:

1800RPM up to 3,281 ft.(1000m) and 104°F (40°C) without power deration.

1500RPM up to 3,281 ft.1000m) and 104°F (40°C) without power deration.

For sustained operation above these conditions, derate by 4% per 1,000ft. (300m), and 1% per 10°F (2% per 11°C).



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ENGINE MODEL(S): **KTA50-G16A**

STAND\_BY: 1760 kW(2360 HP)@1500 RPM

Prime: 1650 kW(2213 HP)@1500 RPM

CONFIGURATION ..... D283021DX02

REFERENCE INFORMATION:

CPL NUMBER..... PP634

DATA SHEET ..... FR722

DATE..... 2022/5/13

## GENERAL ENGINE DATA

Type.....	4 Cycle , 60° Vee , 16 Cylinder
Aspiration.....	Turbocharged , LTA
Bore—in.(mm)×stroke—in.(mm).....	6.25×6.25 (159×159)
Displacement—in <sup>3</sup> (L).....	3067 (50)
Compression Ratio.....	14.7:1
Dry Weight	
Fan Hub to Flywheel Engine —lb(kg).....	11927 (5410)
Wet Weight	
Fan Hub to Flywheel Engine —lb(kg).....	12593 (5712)
Moment of Inertia of Rotating Components (Excluding Flywheel) —lb <sub>m</sub> .ft <sup>2</sup> (kg•m <sup>2</sup> )	
·With FW 6009 Flywheel —lb <sub>m</sub> .ft <sup>2</sup> (kg•m <sup>2</sup> ).....	301 (12.7)
C.G. Distance From Rear Face of Flywheel Housing (FH6024)—in.(mm).....	47.48 (1206)
C.G. Distance Above Crank Centerline—in.(mm).....	10.98 (279)
Maximum Static Loading at Rear Main Bearing—lb(kg).....	2000 (907)
Firing Order.....	1R-1L-3R-3L-2R-2L-5R-4L 8R-8L-6R-6L-7R-7L-4R-5L

## ENGINE MOUNTING

Maximum Allowable Bending Moment at Rear Face of Block —lb.ft(N•m).....	4499 (6100)
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## EXHAUST SYSTEM

Maximum Allowable Back Pressure for Standby —in.Hg(kPa).....	2 (6.8)
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## AIR INDUCTION SYSTEM

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner

Dirty Element —in.H <sub>2</sub> O(kPa).....	25 (6.2)
Clean Element —in.H <sub>2</sub> O(kPa).....	15 (3.7)

## COOLING SYSTEM

Coolant Capacity

Engine Only —U.S.Gal(L).....	37.0 (140.1)
Minimum Allowable Pressure Cap @ sea level— PSI(kPa).....	14 (97)
Maximum Static Head of Coolant Above Engine Crank Centerline —ft.(m).....	60 (18.3)
Maximum Allowable Top Tank Temperature-Stand_by —°F(°C).....	228/212 (109/100)
Thermostat (modulating) Range— °F(°C).....	180-200 (82-93)

### Water Jacket Circuit Requirements

Maximum Coolant Friction Heat External to Engine @1500 rpm —PSI(kPa).....	8 (55.2)
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### Aftercooler Requirements

Coolant Capacity —U.S.Gal(L).....	9 (34)
Maximum Coolant Friction Heat External to Engine @1500 rpm —PSI(kPa).....	5 (34.5)
Target Coolant Inlet Temperature to Aftercoolers @ 77 °F (25 °C) Ambient—°F(°C).....	120 (49)
Target Coolant Inlet Temperature to Aftercoolers @ Limiting Ambient Conditions for Standby—°F(°C).....	160/150 (71/66)
Thermostat (Modulating) Range — °F(°C).....	115-135 (46-57)

## LUBRICATION SYSTEM

Oil Pressure

@ Low Idle —PSI(kPa).....	20 (138)
@ Rated Speed —PSI(kPa).....	50-70 (350-485)
Oil Flow at Rated Speed —U.S.GPM(L/min).....	40 (151)
Maximum Allowable Oil Temperature —°F(°C).....	250 (121)
Maximum Oil Consumption —g/kw.h.....	0.2
Oil Pan Capacity (Option OP6014)	
High —U.S.Gal(L).....	54 (205.2)
Low —U.S.Gal(L).....	46 (174.8)
Total System Capacity (with Combo Filter) —U.S.Gal(L).....	62 (235)



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## FUEL SYSTEM

Fuel Injection System.....	Direct Injection Cummins PT
Maximum allowable Restriction to PT Fuel Pump	
With Clean Fuel Filter —in.Hg(kPa).....	4 (13.5)
With Dirty Fuel Filter —in.Hg(kPa).....	8 (27.1)
Maximum Fuel Supply at Rated Power and Speed —lb/h(kg/h).....	1171 (531)
Maximum Allowable Injector Return Line Restriction	
With Check Valves —in.Hg(kPa).....	6.5 (22.0)
Less Check Valves —in.Hg(kPa).....	2.5 (8.5)

## ELECTRICAL AND STARTING SYSTEM

Starter (Heavy, Anode)—Volt.....	24
Minimum Recommended Battery Capacity	
·Cold Soak at 50°F(10°C) and Above—0°F CCA.....	1800
·Cold Soak at 32~50°F(0~10°C) —0°F CCA.....	1800
·Cold Soak at 0~32°F(-18~0°C) —0°F CCA.....	1800
Maximum Allowable Resistance of Starting Circuit—Ω.....	0.002
Minimum Cranking Speed —RPM.....	150
Minimum Ambient Temperature for Unaided Cold Start —°F(°C).....	45 (7)

## PERFORMANCE DATA

Stability at Any Invariables Load —%.....	±0.25
Estimated Free Field Sound Pressure Level of a Typical Gengerator Set; Excludes Exhaust Noise; at Rated Load and 7.5 m(24.6 ft); @1500rpm—dBA.....	95 (est.)
Exhaust Noise at 1m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45° 1500rpm—dBA...	125 (est.)

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and muffler, not included are alternator, compressor, fan, optional equipment and driven components. Data represents gross engine performance capabilities obtained and corrected in accordance with ISO 3046, Part 1, Standard Reference Conditions of 29.61 in Hg(100 kPa) barometric pressure[361ft. (110 m) altitude], 77°F (25°C) inlet air temperature, and 30% relative humidity with No. 2 diesel fuel or a fuel corresponding to ASTM D2. All data is subject to change without notice.

	STAND_BY		PRIME	
	60 Hz	50 Hz	60 Hz	50 Hz
Engine Speed r/min.....		1500		1500
Idle Speed r/min.....		700-900		700-900
Gross Power Output BHP(kW).....		2360 (1760)		2213 (1650)
Brake Mean Effective Pressure PSI(kPa).....		408 (2816)		383 (2640)
Piston Speed ft/min(m/s).....		1565 (7.95)		1565 (7.95)
Friction Horsepower BHP(kW).....		156 (116)		156 (116)
Engine Jacket Coolant Flow at Stated Friction Head External to Engine: • 4 psi Friction Head U.S.GPM(L/s).....		448 (28)		448 (28)
<b>Engine Data</b>				
Intake Air Flow lb/min cfm( m <sup>3</sup> /min).....	N/A	4096.5 (116)	N/A	3990.6 (113)
Exhaust Gas Temperature °F(°C).....		986 (530)		932 (500)
Exhaust Gas Flow lb/min cfm( m <sup>3</sup> /min).....		12184 (345)		11195 (317)
Air to Fuel A/F.....		25:1		28:1
Heat Rejection to Ambient BTU/min(kW).....		9554 (168)		8246 (145)
Heat to be Rejected by Jacket Water Radiator*BTU/min(kW).....		38158 (671)		34917 (614)
Heat Rejection to Exhaust Gas BTU/min(kW).....		79501 (1398)		73417 (1291)
Heat Rejection to Fuel BTU/min(kW).....		250 (4.4)		227 (4.0)
<b>2 Pump / 2 Loop</b>				
Heat to be Rejected by Low Temperature Radiator*BTU/min(kW)...		23941 (421)		22292 (392)
Aftercooler Coolant Flow at Stated Friction Head External to Engine: • 2 psi Friction Head U.S.GPM(L/s).....		123 (7.8)		123 (7.8)

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