



## CHONGQING CUMMINS ENGINE COMPANY LTD. ENGINE PERFORMANCE CURVE

CONFIGURATION:  
D283022DX02

ENGINE MODEL: KTA50-G8E

CURVE NUMBER: FR727T

CPL No.: 4635

DATE: 2021/6/21

Displacement: 50.3L (3067 in3)

Aspiration: Turbocharged and Aftercooled

RATING

BoreXStroke: 159X159mm (6.25X6.25 in.)

Fuel System: Cummins PT

Stand by: 1430 kW(1916 HP)@1500 RPM

Compress Ratio: 14.7:1

Emission: N.A.

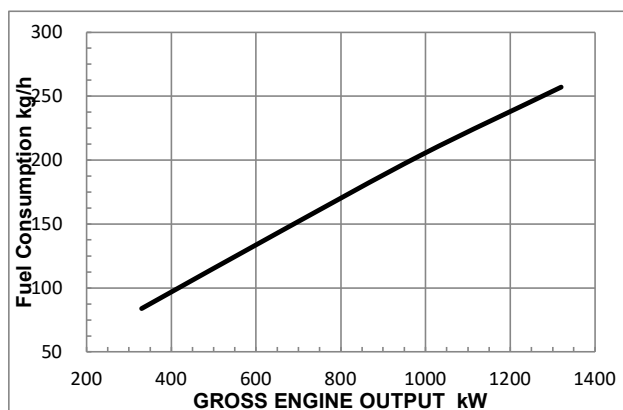
Prime: 1320 kW(1769 HP)@1500 RPM

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. 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<br>rpm | STANDBY POWER |      | PRIME POWER |      | CONTINUOUS POWER |      |
|--------------|---------------|------|-------------|------|------------------|------|
|              | BHP           | kW   | BHP         | kW   | BHP              | kW   |
| 1500         | 1916          | 1430 | 1769        | 1320 | 1621             | 1210 |

### FUEL CONSUMPTION



| OUTPUT POWER |      |      | CONSUMPTION |      | BFSC   |          |
|--------------|------|------|-------------|------|--------|----------|
| %            | BHP  | kW   | Lb/h        | kg/h | g/kW.h | Lb/BHP.h |
| 1500RPM      |      |      |             |      |        |          |
| STNADBY      |      |      |             |      |        |          |
| 100          | 1916 | 1430 | 640         | 290  | 203    | 0.334    |
| PRIME        |      |      |             |      |        |          |
| 100          | 1769 | 1320 | 567         | 257  | 195    | 0.320    |
| 75           | 1327 | 990  | 450         | 204  | 206    | 0.339    |
| 50           | 884  | 660  | 319         | 145  | 219    | 0.361    |
| 25           | 442  | 330  | 185         | 84   | 255    | 0.419    |
| CONTINUOUS   |      |      |             |      |        |          |
| 100          | 1621 | 1210 | 543         | 246  | 204    | 0.335    |

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with SAE J1995 conditions of 29.61 in. Hg(100kPa) barometric pressure [300ft.(91m) altitude] 77deg F (25 deg C) inlet temperature, and 0.30 in. Hg(1kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2.

TECHNICAL DATA DEPT.

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CHIEF ENGINEER



# 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 5,000 ft.(1,500m) and 104°F (40°C) without power deration.

1500RPM up to 5,000 ft.(1,500m) 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 DATA SHEET

**ENGINE MODEL(S): KTA50-G8E****STAND\_BY: 1430 kW(1916 HP)@1500 RPM****PRIME: 1320 kW(1769 HP)@1500 RPM****CONFIGURATION ..... D283022DX02****REFERENCE INFORMATION:****CPL CODE ..... 4635****DATA SHEET NUMBER..... FR727T****DATE..... 2021/6/21****GENERAL ENGINE DATA**

|                                                                                    |                                                    |
|------------------------------------------------------------------------------------|----------------------------------------------------|
| Type.....                                                                          | 4 Cycle ,60° Vee , 16 Cylinder                     |
| Aspiration.....                                                                    | Turbocharged and Aftercooled                       |
| 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).....                                            | 11820 (5361)                                       |
| Wet Weight                                                                         |                                                    |
| Fan Hub to Flywheel Engine —lb(kg).....                                            | 12485 (5663)                                       |
| Moment of Inertia of Rotating Components (Excluding Flywheel)                      |                                                    |
| ·With FW 6009 Flywheel —lb <sub>m</sub> .ft <sup>2</sup> (kg•m <sup>2</sup> )..... | 301 (12.7)                                         |
| ·With FW 6017 Flywheel —lb <sub>m</sub> .ft <sup>2</sup> (kg•m <sup>2</sup> )..... | 515 (21.7)                                         |
| C.G. Distance From Rear Face of Flywheel Housing (FH6024)—in(mm).....              | 47.5 (1207)                                        |
| C.G. Distance Above Crank Centerline—in(mm).....                                   | 11 (279)                                           |
| Maximum Static Load Allowable for Rear Main Bearing—kg(lb).....                    | 2000 (907)                                         |
| Firing Order.....                                                                  | 1R-1L-3R-3L-2R-2L-5R-4L<br>8R-8L-6R-6L-7R-7L-4R-5L |

**ENGINE MOUNTING**

|                                                                         |             |
|-------------------------------------------------------------------------|-------------|
| Maximum Allowable Bending Moment at Rear Face of Block —lb.ft(N•m)..... | 4500 (6101) |
|-------------------------------------------------------------------------|-------------|

**EXHAUST SYSTEM**

|                                                  |       |
|--------------------------------------------------|-------|
| Maximum Allowable Back Pressure —in.Hg(kPa)..... | 2 (5) |
|--------------------------------------------------|-------|

**AIR INDUCTION SYSTEM**

Maximum Allowable Intake Air Restriction With Heavy Duty Air Cleaner

|                                              |           |
|----------------------------------------------|-----------|
| Dirty Element —in.H <sub>2</sub> O(kPa)..... | 25 (6.23) |
| Clean Element —in.H <sub>2</sub> O(kPa)..... | 15 (3.73) |

**COOLING SYSTEM**

Coolant Capacity

|                                                                                 |                   |
|---------------------------------------------------------------------------------|-------------------|
| Engine Only —U.S.Gal(L).....                                                    | 42.5 (161.0)      |
| Minimum Allowable Pressure Cap @ sea level— PSI(kPa).....                       | 7 (48)            |
| Maximum Coolant Friction Head External to Engine @1500 rpm —PSI(kPa).....       | 10 (69)           |
| Maximum Pressure Drop Across Any External Cooling System Circuit —PSI(kPa)..... | 5.0 (34.5)        |
| Maximum Allowable Top Tank Temperature (Stand_by/Prime) —°F(°C).....            | 220/212 (104/100) |
| Standard Thermostat (modulating) Range— °F(°C).....                             | 180-200 (82-93)   |
| Maximum Coolant Pressure (Exclusive of Pressure Cap) —PSI(kPa).....             | 15 (103)          |
| Maximum Allowable Coolant Temperature —°F(°C).....                              | 205 (96.1)        |
| Minimum Allowable Fill Rate —U.S.GPM(L/min).....                                | 5 (18.9)          |
| Minimum Allowable Coolant Expansion Space —% of System Capacity.....            | 5                 |
| Maximum Allowable Deaeration Time —min.....                                     | 25                |
| Maximum Static Head of Coolant Above Engine Crank Centerline—ft.(m).....        | 18.3 (60)         |



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## LUBRICATION SYSTEM

### Oil Pressure

|                                                                   |         |           |
|-------------------------------------------------------------------|---------|-----------|
| @ Idle —PSI(kPa).....                                             | 20      | (138)     |
| @ Rated Speed —PSI(kPa).....                                      | 50-70   | (345-483) |
| Oil Flow at Rated Speed —U.S.GPM(L/min).....                      | 40      | (151)     |
| Maximum Allowable Oil Temperature —°F(°C).....                    | 250     | (121)     |
| By-Pass Filter Capacity                                           |         |           |
| Spin-on Cartridge Type —U.S.Gal(L).....                           | 2 X 0.7 | (2 X 2.6) |
| Oil Pan Capacity (Option OP6024)                                  |         |           |
| High —U.S.Gal(L).....                                             | 40.0    | (151.4)   |
| Low —U.S.Gal(L).....                                              | 32.0    | (121.1)   |
| Total System Capacity (Excluding By-Pass Filter) —U.S.Gal(L)..... | 46.7    | (176.8)   |

## FUEL SYSTEM

Fuel Injection System..... Cummins PT

### Maximum allowable Restriction to PT Fuel Pump

|                                                                             |      |         |
|-----------------------------------------------------------------------------|------|---------|
| With Clean Fuel Filter —in.Hg(kPa).....                                     | 4    | (13.55) |
| With Dirty Fuel Filter —in.Hg(kPa).....                                     | 8    | (27.09) |
| Maximum Fuel Supply at Rated Power and Speed —lb/h(kg/h).....               | 1186 | (538)   |
| 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)   |
| Minimum Allowable Fuel Tank Vent Capability —ft <sup>3</sup> /h (L/h) ..... | 15   | (425)   |

(With 2.5 in. Hg (8.4kPa) or Less Back Pressure)

(With 2.5 in. Hg (63 mm Hg) or Less Back Pressure)

## ELECTRICAL SYSTEM AND START SYSTEM

Minimum Recommended Battery Capacity (Cold Soak at 0°F(-18°C) or Above V..... 24

### Engine Only (De-clutched Load)

|                                                         |       |
|---------------------------------------------------------|-------|
| Cold Cranking Amperes —CCA.....                         | 1800  |
| Reserve Capacity min.....                               | 640   |
| Starter (Heavy, Anode)—Volt.....                        | 24    |
| Battery Recharge System,Negative ground—A.....          | 35    |
| Maximum Allowable Resistance of Starting Circuit—Ω..... | 0.002 |
| Minimum Recommended Battery Capacity                    |       |
| ·Cold Soak at 50°F(10°C) or Above—0°F CCA.....          | 1280  |
| ·Cold Soak at 32~50°F(0~10°C) or Above—0°F CCA.....     | 1800  |
| ·Cold Soak at 0~32°F(-18~0°C) or Above—0°F CCA.....     | 1800  |

## PERFORMANCE DATA

Stability at Any Invariablenes Load —%..... ±0.25

Minimum Ambient Temperature For Unaided Cold Start —°F(°C)..... 40 (4)

Minimum Cranking Speed Required For Unaided Cold Start —°F(°C)..... 150



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|                                                   | STAND_BY |             | PRIME |             |
|---------------------------------------------------|----------|-------------|-------|-------------|
|                                                   | 60 Hz    | 50 Hz       | 60 Hz | 50Hz        |
| Engine Speed r/min.....                           |          | 1500        |       | 1500        |
| Idle Speed r/min.....                             |          | 700 ~ 800   |       | 700 ~ 800   |
| Gross Power Output BHP(kW).....                   |          | 1916 (1430) |       | 1769 (1320) |
| Nominal Rail Pressure PSI(kPa).....               |          | 139 (960)   |       | 125 (862)   |
| Intake Manifold Pressure in.Hg(kPa).....          |          | 78 (263)    |       | 73 (246)    |
| Brake Mean Effective Pressure PSI(kPa).....       |          | 332 (2288)  |       | 306 (2112)  |
| Piston Speed ft/min(m/s).....                     | N/A      | 1565 (7.95) | N/A   | 1565 (7.95) |
| Friction Horsepower BHP(kW).....                  |          | 156 (116)   |       | 156 (116)   |
| Intake Air Flow lb/min(kg/h).....                 |          | 280 (7622)  |       | 268 (7305)  |
| Exhaust Gas Flow lb/min(kg/h).....                |          | 291 (7912)  |       | 278 (7573)  |
| Exhaust Gas Temperature °F(°C).....               |          | 890 (477)   |       | 867 (464)   |
| Heat Rejection to Ambient BTU/min(kW).....        |          | 3970 (70)   |       | 3759 (66)   |
| Heat Rejection to Jacket Coolant BTU/min(kW)..... |          | 32157 (565) |       | 30108 (529) |
| Heat Rejection to LTA BTU/min(kW).....            |          | 18144 (319) |       | 16216 (285) |

Engine Model: KTA50-G8E

Data sheet: FR727T

Date: 2021/6/21

CHONGQING CUMMINS ENGINE CO., LTD.

CHONGQING, CHINA, 400031