FDK ENERGY
SHENZHEN FUDIANKANG ENERGY CO., LTD
GUANGZHOU SANQ DIESEL GENERATOR SET CO., LTD
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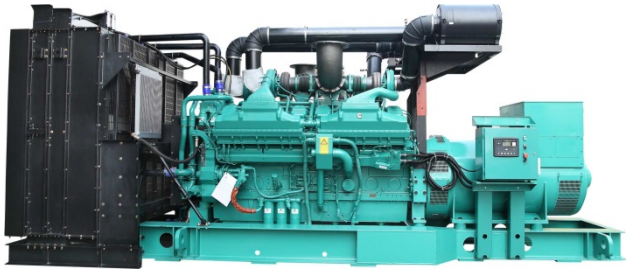
DATA SHEET

DIESEL GENERATOR 550KW
MODEL#FDK-CG550/H1
50HZ/1500RPM
CUMMINS MODEL: VTA28-G5



General Features:

- All qualified generator sets are subjected to a comprehensive performance test which includes 50% load, 70% load, 100% load, 110% load and to check, verify that all control systems, alarm and shut-down protection.
- Equipped with battery charger and 24V high performance maintenance-free lead-acid starting batteries and connecting cables.
- Stainless galvanized zinc plates with strong corrosion-proof.
- Vibration isolators between the engine/alternator and base frame.
- Equipped with industrial silencer and flexible exhaust hose.
- Designed to comply with ISO8528/GB2820.
- Powered by Cummins engine and coupled with Stamford alternator.
- Water jacket preheater, oil heater and double air cleaner, etc. are available.

FDK Diesel Generator Set Data

Genset Model	FDK-CG550/H1	Engine Make	Cummins INDIA
Prime Power	500KW/625KVA	Engine Model	VTA28-G5
Standby Power	550KW/688KVA	Alternator model	Stamford HCI544FS
Output Frequency / Rated speed	50Hz/1500rpm	Control System	DSE7320
Rated Voltage	230V/400V	Phase	Three

(1) **Prime power**: The rating is available for an unlimited of annual operating hours in variable load applications, in accordance with ISO8528-1.A 10% overload is available for a period of 1 hour within 12-hour period of operation, in accordance with ISO 3046-1.

(2) **Standby power**: The rating is applicable for supplying emergency power in variable load applications for up to 200 hours per year in accordance with ISO8528-1. Overload is not allowed.

(3) **Rated voltage**: available with customer requirement.

Engine Specifications (DETAILED in APPENDIX)

Engine Model	VTA28-G5	Aspiration	Turbo-charged
Engine Manufacturer	Cummins (Onan INDIA)	Bore x Stroke (mm x mm)	140×152
		Displacement	28L
Cylinder quantity	12	Compression Ratio	13.1:1
Cylinder Arrangement	40° Vee	Prime power / Speed (KW/RPM)	560kw/1500
Cycle	4	Standby power/ Speed (KW/RPM)	612kw/1500

CE ISO9001:2008 FDK reserves the right to change the specifications and designs without noice.

Type Injection System	Direct Injection Cummins PT	Fuel Consumption at 100% load (g/KWh)	213 at 1500rpm
Piston Speed	7.6m/s	Starter motor	DC24V
Friction Energy Output	56kw	Low idle	575-650pm
Total Lubrication System Capacity (L)	83	Coolant Capacity (L)	80

Alternator Specifications

Alternator model	HCI544FS	Number of phase	3
Alternator manufacturer	STAMFORD	Rated voltage	400V (Available with custom requirements)
Exciter type	Single bearing, Brushless, Self-excited	Power factor	0.8
Rated output prime power	625KVA	Voltage regulation NL-FL	≤±1%
Rated speed	1500 rpm	Insulation grade	H
Rated frequency	50Hz	Protection grade	IP23

Alternator option: Leroy Somer, MECC, Marathon, Engga, Faraday

Control System DSE7320 (DETAILED in INSTRUCTION)

DSE7320 is an advanced control module based on micro-processor, containing all necessary functions for protection of the genset and the breaker control. It can monitor the mains supply, breaker control and automatically start the engine when the mains are abnormal. Accurately measure various operational parameters and display all values and alarms information on the LCD. In addition, the control module can automatically shut down the engine and indicate the engine failure.

FEATURES

- Microprocessor control, with high stability and credibility.
- Monitoring and measuring operational parameters of the mains supply and genset.
- Indicating operation status, fault conditions, all parameters and alarms.
- Multiple protections; multiple parameters display, like pressure, temp. etc.
- Manual, automatic and remote work mode selectable.
- Real time clock for time and date display, overall runtime display, 250 log entries.
- Overall power output display.
- Integral speed/frequency detecting, telling status of start, rated operation, overspeed etc.
- Communication with PC via RS485 OR RS232 interface, using MODBUS protocol.

Soundproof Enclosure Specification

FDK silent generator is designed by professional acoustic engineers based on years of experience. Now we can make the noise of the generator less than 80-85dB(A) at 1m, or 70-75dB(A) at 7m, 60-65dB(A) at 15m.

FEATURES

- Multi-way air intake and exhaust guarantee the power performance of the generator.
- Large-scale impedance combined type silencer effectively reduce noise of the generator.
- Internal high performance rubber damper and flexible materials reduce vibration.
- Base mounted fuel tank supports the generator running for 8 hours.

CE ISO9001:2008

Optional

Generator set	Alternator	Low environment Temp	ATS
☐ Open generator set	☐ Stamford	☐ Water heater	☐ CHINT
☐ Silent generator set	☐ Marathon	☐ Oil heater	☐ SCHNEIDER
☐ Trailer generator set	☐ Mecc Alte	☐ Battery heater	☐ ABB
☐ ABB MCCB circuit breaker	☐ Leroy Somer		
	☐ Farady		
	☐ Engga		
Fuel system	**Control system**	**Voltage**	**Synchronized system**
☐ 12hrs base tank	☐ AMF function	☐ 415/240V	☐ CHINT Cabinet
☐ 24hrs base tank	☐ ATS control cabinet	☐ 400/230V	☐ SCHNEIDER Cabinet
☐ Dual wall base fuel tank	☐ DSE7320	☐ 380/220V	☐ DSE8610 Module
☐ Outside fuel tank	☐ DSE7510	☐ 220/127V	☐ COMAQ Module
	☐ GU620A	☐ 200/115V	☐ DEIF Module

Dimension & Weight

Open

Overall Size: L×W×H (mm)	3450×1620×1950
Weight (kg)	5100

Soundproof Version

Overall Size: L×W×H (mm)	5000×1900×2250
Weight (kg)	5600

Sales Promises

- FDK provides a full line of brand new and high quality products. Each and every unit is strictly factory tested before shipment.
- Quality warranty is according to our standard conditions: 12 months from BL date or 1000 running hours, whichever comes first.
- Service and parts are available from FDK or distributors in your location.
- FDK guarantee use **BRAND NEW & GENUINE MACHINE.**

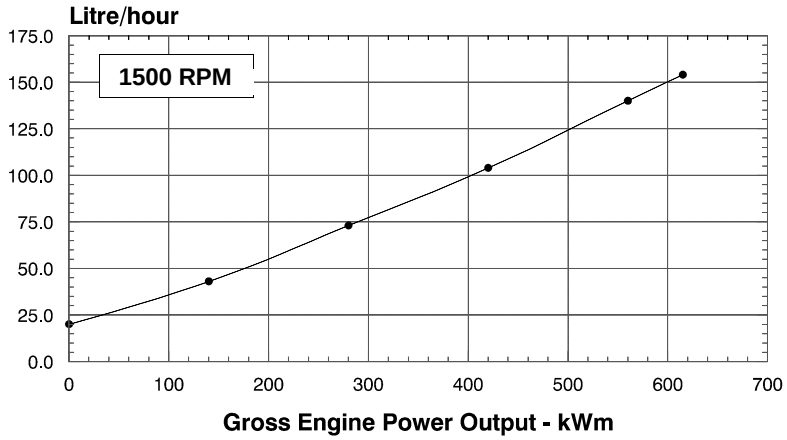
Cummins Inc.	Basic Engine Model: VTA28-G5	Curve Number: FR-5212	G-DRIVE V28 1
Columbus, Indiana 47201	Engine Critical Parts List: CPL: 8154	Date: 7May04	
ENGINE PERFORMANCE CURVE			

Displacement : **28.0** litre (**1710** in^3)	Bore : **140** mm (**5.5** in.) Stroke : **152** mm (**6.0** in.)
No. of Cylinders : **12**	Aspiration : **Turbocharged and Aftercooled**

Engine Speed	Standby Power		Prime Power		Continuous Power	
RPM	kWm	BHP	kWm	BHP	kWm	BHP
1500	612	820	560	750	492	660

Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	612	820	0.213	0.351	154	40.8
PRIME POWER						
100	560	750	0.213	0.350	140	37.0
75	420	563	0.211	0.347	104	27.5
50	280	375	0.222	0.365	73	19.3
25	140	188	0.260	0.427	43	11.3
CONTINUOUS POWER						
100	492	660	0.211	0.345	122	32.1



CONVERSIONS: (Litres = U.S. Gal x 3.785) (Engine kWm = BHP x 0.746) (U.S. Gal = Litres x 0.2642) (Engine BHP = Engine kWm x 1.34)

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.

See reverse side for application rating guidelines.

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.

D K. Trueblood

TECHNICAL DATA DEPT. **CERTIFIED WITHIN 5%** **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 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.

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:

1500 RPM up to 4,000 ft (1220 m) and 104^{o} F (40^{o} C) without power deration.

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

Cummins Inc.
Engine Data Sheet

ENGINE MODEL : **VTA28-G5** **CONFIGURATION NUMBER :** D153103DX02

DATA SHEET : DS-5212
DATE : 7May04
PERFORMANCE CURVE : FR-5212

INSTALLATION DIAGRAM
- Fan to Flywheel : 3626364
- Heat Exchanger Cooled : N.A.

CPL NUMBER
- Engine Critical Parts List : 8154

GENERAL ENGINE DATA

Type		4-Cycle; 40° Vee; 12-Cylinder Diesel	
Aspiration		Turbocharged and Aftercooled	
Bore x Stroke	— in x in (mm x mm)	5.5 x 6.0 (140 x 152)	
Displacement	— in^3 (litre)	1710 (28.0)	
Compression Ratio		13.1 : 1	
Dry Weight			
Fan to Flywheel Engine	— lb (kg)	6395	(2900)
Heat Exchanger Cooled Engine	— lb (kg)	6571	(2980)
Wet Weight			
Fan to Flywheel Engine	— lb (kg)	6725	(3050)
Heat Exchanger Cooled Engine	— lb (kg)	7012	(3180)
Moment of Inertia of Rotating Components			
• with FW 5013 Flywheel	— $lb_m \cdot ft^2$ ($kg \cdot m^2$)	238	(9.98)
• with FW —— Flywheel	— $lb_m \cdot ft^2$ ($kg \cdot m^2$)		
Center of Gravity from Rear Face of Flywheel Housing (FH 5020)	— in (mm)	33.7	(856)
Center of Gravity Above Crankshaft Centerline	— in (mm)	14.0	(356)
Maximum Static Loading at Rear Main Bearing	— lb (kg)	1950	(885)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— lb • ft (N • m)	1000	(1356)

EXHAUST SYSTEM

Maximum Back Pressure	— in Hg (mm Hg)	3	(76)

AIR INDUCTION SYSTEM

Maximum Intake Air Restriction			
• with Dirty Filter Element	— in H_2O (mm H_2O)	25	(635)
• with Normal Duty Air Cleaner and Clean Filter Element	— in H_2O (mm H_2O)	10	(254)
• with Heavy Duty Air Cleaner and Clean Filter Element	— in H_2O (mm H_2O)	15	(381)

COOLING SYSTEM

Coolant Capacity — Engine Only	— US gal (litre)	21.2	(80)
— with HX 5149 Heat Exchanger	— US gal (litre)	35.0	(132)
Maximum Coolant Friction Head External to Engine — 1500 rpm	— psi (kPa)	8	(55)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft (m)	60	(18.3)
Standard Thermostat (Modulating) Range	— °F (°C)	180 - 200	(82 - 93)
Minimum Pressure Cap	— psi (kPa)	10	(69)
Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C)	220 / 212	(104 / 100)
Minimum Raw Water Flow @ 90°F to HX 5149 Heat Exchanger	— US gpm (litre / min)	61	(231)
Maximum Raw Water Inlet Pressure at HX 5149 Heat Exchanger	— psi (kPa)	150	(1034)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed	— psi (kPa)	20	(138)
@ Governed Speed	— psi (kPa)	50 - 90	(345 - 621)
Maximum Oil Temperature	— °F (°C)	250	(121)
Oil Capacity with OP 5127 Oil Pan : High - Low	— US gal (litre)	18 - 16	(68 - 61)
Total System Capacity (including Bypass Filter)	— US gal (litre)	21.9	(83)
Angularity of OP 5127 Oil Pan — Front Down		30°	
— Front Up		35°	
— Side to Side		35°	

G-DRIVE

V28

4

FUEL SYSTEM

Type Injection System		Direct Injection Cummins PT	
Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter	— in Hg (mm Hg)	4.0	(102)
— with Dirty Fuel Filter	— in Hg (mm Hg)	8.0	(203)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)	— in Hg (mm Hg)	6.5	(165)
Maximum Fuel Flow to Injection Pump	— US gph (litre / hr)	89	(337)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)	— volt	24	
Battery Charging System, Negative Ground	— ampere	35	
Maximum Allowable Resistance of Cranking Circuit	— ohm	0.002	
Minimum Recommended Battery Capacity			
• Cold Soak @ 50 °F (10 °C) and Above	— 0°F CCA	1200	
• Cold Soak @ 32 °F to 50 °F (0 °C to 10 °C)	— 0°F CCA	1280	
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)	— 0°F CCA	1800	

COLD START CAPABILITY

Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds	— °F (°C)	50	(10)
Minimum Ambient Temperature for Unaided Cold Start	— °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%

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 / 1500 RPM]	— dBA	90 / 90
Exhaust Noise at 1 m Horizontally from C_L of Exhaust Pipe Outlet Upwards at 45° [1800 / 1500 RPM]	— dBA	112 / 112

	STANDBY				PRIME POWER			
	60 hz		*50 hz*		*60 hz*		*50 hz*	
Governed Engine Speed			1500				1500	
Engine Idle Speed			575 - 650				575 - 650	
Gross Engine Power Output — BHP (kW_m)			820	(612)			750	(560)
Brake Mean Effective Pressure — psi (kPa)			254	(1751)			232	(1599)
Piston Speed — ft / min (m / s)			1500	(7.6)			1500	(7.6)
Friction Horsepower — HP (kW_m)			75	(56)			75	(56)
Engine Water Flow at Stated Friction Head External to Engine:	**Not Applicable for 1800 RPM Operation**				**Not Applicable for 1800 RPM Operation**			
• 3 psi Friction Head — US gpm (litre / s)			194	(12.2)			194	(12.2)
• Maximum Friction Head — US gpm (litre / s)			173	(10.9)			173	(10.9)
Engine Data with Dry Type Exhaust Manifold								
Intake Air Flow — cfm (litre / s)			1860	(878)			1750	(826)
Exhaust Gas Temperature — °F (°C)			945	(507)			920	(493)
Exhaust Gas Flow — cfm (litre / s)			4340	(2048)			4210	(1987)
Radiated Heat to Ambient — BTU / min (kW_m)			5325	(94)			4795	(84)
Heat Rejection to Coolant — BTU / min (kW_m)			21610	(380)			19310	(339)
Heat Rejection to Exhaust — BTU / min (kW_m)			26805	(471)			24015	(422)

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

ENGINE MODEL : **VTA28-G5**
DATA SHEET : DS-5212
DATE : 7May04
CURVE NO. : FR-5212

Cummins Inc. Columbus, Indiana 47202-3005