3500 Kw, 60 Hz Gas Genset Technical Specification

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Section1. Genset

1.1 Genset brief introduction

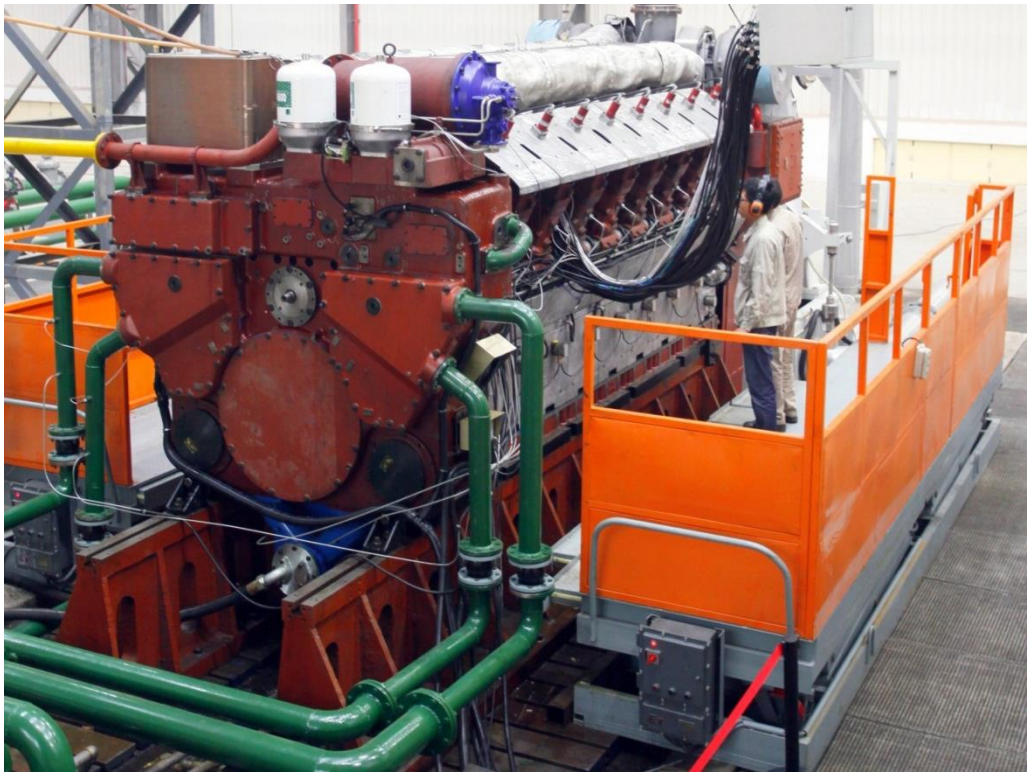
3500kW natural gas generating sets (3500GF-T) are powered by model 16V26/32T gas engine produced by our company.

This 3500kW genset have the features of accurate voltage regulating, good dynamic performance, less voltage waveform distortion, high efficiency, compact structure, easy to maintain, low speed, good reliability, long life operation and cost-effective.

1.2 Genset technical parameters

Model of genset	3500GF-T
Model of engine	16V26/32T
Coupling method	Flexible coupling
Rated speed	900 (r/min)
Rated power	3500/4375 (kw/kva)
Rated voltage	6300/11000 (v)
Rated frequency	60 (hz)
Rated power factor	0.8 lagging
Voltage regulation	Automatic
Supply connecting	3 phase 3wire
Governor	HEINZMANN(GERMANY)
Control model	Remote electric control, Hand control
Starting method	Pneumatic starting motor
Cooling method	Water cooling system with upstanding radiator
Overall dimension L×B×H	9400×2900×3700 (mm)
Net weight	70000 (kg)

Section2. Gas engine



2.1 Engine brief introduction

The 26/32 series natural gas engine provided by our company is heavy duty designed, four-stroke cycle, stationary type, water cooled and of the manufacturer‘s qualified design for continuous operation required. The 26/32 series natural gas engine is exhaust turbine, 16-cylinders, V-type engine.

The crankshaft, flywheel, piston connecting rod and other related reciprocating parts are balanced and the engines provide counterweights to ensure minimum practical unbalanced forces and moments.

The engines assembly includes parts, accessories and auxiliary equipment required for installation and satisfactory operation, under specified operating conditions. All designed and constructed of materials are suitable for the service requirements and arrangements could minimize fire hazards and vibration damage.

The 26/32 series natural gas engine features high power density, high efficiency, light weight, compact structure, long overhaul period, and maintenance-friendly design. The engine adopts multi-point injection technology, and the combustion organization method is injected into the main combustion chamber after being ignited by the pre-chamber gas to increase the ignition energy, and the Miller cycle and air-fuel ratio are precisely controlled to achieve lean combustion.

Through the mechanical check valve, the pre-chamber inlet air is controlled and the check valve opening pressure is 130 mbar. With the new engine control system, the engine's air-fuel ratio control, knock detection and misfire detection, and engine operating parameter detection and safety are achieved, and could meet HSE requirements.

2.2 Technical parameters of gas engine

Model of engine	16V26/32T
Rated Power	3780 (kw)
Rated Speed	900 (r/min)
No. and layout of cylinders	16-cylinder, V-type
Type	Four stroke, water cooled, turbocharged and after-cooled, pre-combustion chamber, spark plug ignition, mix before compressor, multi-point injection
Type of combustion	Lean burn
Brand of turbocharger	ABB
Gas inlet pressure	4~6 (bar)
Heat rate	<8500kj/kwh (about 0.23 nm3/kwh)
Specific oil consumption	≤0.5 (g/kwh)
Thermal efficiency	44%
Type of lube-oil	KCN 7805 (sulfur content<=200mg/m^3) KCN 7810 (sulfur content <=460mg/m^3)
Oil sump capacity	1760 (L)
Idle speed	400 (r/min)
Bore	260 (mm)
Stroke	320 (mm)
BMEP	16.5 (bar)
Total displacement	272 (L)
Noise	115 (db)
Exhaust temperature(before turbine)	≤620 (℃)
Direction of rotation	Counter-clockwise(facing to flywheel)
Emission	0.5@5%O_2 (g/nm3)
Lubrication method	Pressure and splash lubrication
Overhauling	≥40000 (h)
Manufacturer	CNPC Jichai Power Company Limited

According to the standard of GB/T 6072 (idt ISO 3046), The standard environment conditions are: atmospheric pressure: 100kPa, relative humidity: 30%, ambient temperature: 25 degrees Celsius, low heat value of gas: 36MJ/Nm3, max. load,. Otherwise, the engine power shall be corrected through conversion.

Section3. Alternator

3.1 Alternator brief introduction

Our generator use JFG series high voltage alternator，the alternator conform to applicable IEC 60034-1 requirements, GB755 standards.

JFG series generator has degree of protection IP23 and adopts IMB20 installation type.

The generator comprises the main machine（revolving-field machine with cylindrical rotor and damper windings）,exciter(revolving armature machine)and excitation equipment. The excitation system mainly adopts currently the world's most advanced DECS100 or UNITROL 1000 digital automatic voltage regulator which is produced by BASLER company or Switzerland ABB company, By using the permanent-magnet auxiliary exciter system, the main generator, the permanent-magnet auxiliary exciter and digital automatic voltage regulator perfectly matched that constitutes the high quality and excellent-performance generator.

3.2 Technical parameters of alternator

Main technical parameter	
Type	JFG series (SIEMENS Technology)

Rated power	3500/4375 (kw/kva)
Rated voltage	6300/11000 (v)
Rated frequency	50 (hz)
Power factor	0.8 (lagging)
Excitation model	Brushless
Wiring method	3 wire, 3 phase, star type
Number of pole	8
Rated speed	900 (r/min)
Voltage regulator	ABB, Unitrol series
Excitation mode	Brushless excitation, PMG
Insulation class	Class F
Protection class	IP23
Cooling	Fan cooling(IC01)
Duty	Continuous work(S1)
Bearing type, No.	Rolling bearing, 2 Pcs
Installation method	IM B3
Moment of inertia	360 (kg.m^2)
Efficiency	97%
Machine weight	12100 (kg)
Winding temperature measurement	PT100, 2 units per phase, one use and one standby
Bearing temperature measurement	PT100, 1 unit for front and rear bearing
Anti-condensation heater	AC220V/315W, 1 pc
Main performance index	
Stable voltage regulating rate	Single running: ±1% Parallel running: ±2.5%
Instantaneous voltage regulating rate	-15%~+20% UN
Waveform distortion rate	＜2%
Over load	1 hour operation time at 110% rated power (6 hours as a cycle)
Unbalance load	0.2
Over current multiple	1.5IN, 2 minutes
Ability of maintain short-circuit current	The excitation system can provide continuous current of two times of rated current, duration 5s,

	the alternator must be unloaded.
Short circuit calculation parameters	
Direct-axis synchronous reactance	Xd=2.52
Quadrature-axis synchronous reactance	Xq=2.50
Direct-axis transient reactance	Xd'=0.187
Direct-axis subtransient reactance	Xd''=0.094
Quadrature-axis subtransient reactance	Xq''=0.113
Negative sequence reactance	X2=0.103
Zero sequence reactance	X0=0.052
Stator winding resistance	r1=0.009
Direct current component time constant	Ta=0.036s
Transient component time constant	Td'=0.148s
Subtransient current time constant	Td''=0.003s
Short circuit ratio	KC=0.45