GAS GENERATOR SET

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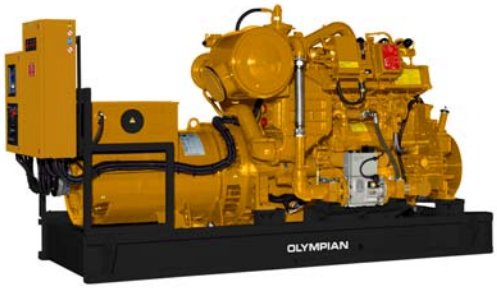

Image shown may not reflect actual package

LANDFILL GAS/BIOGAS CONTINUOUS

360 ekW 450 kVA
342 ekW 428 kVA
50 HZ 1500 RPM 400 VOLTS

Caterpillar is leading the power generation marketplace with power solutions engineered to deliver unmatched flexibility, expandability, reliability and cost-effectiveness.

FEATURES

EMISSIONS
- Meets most worldwide emissions requirements down to 500 mg/Nm^3 NO_x level without after-treatment

FULL RANGE OF ATTACHMENT
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

PROVEN SYSTEM
- Developed and tested using the latest techniques.
- Fully prototype tested
- Field proven in a wide range of applications worldwide

WORLDWIDE PRODUCT SUPPORT
- Caterpillar dealers provide extensive post sales support including maintenance and repair agreements
- Caterpillar dealers have over 1,600 dealer branch stores operating in 200 countries
- The CAT® S.O.S^{sm} program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

PERKINS 4006-23TRS2 GAS ENGINE
- Robust high speed engine design provides prolonged life and lower owning and operating costs
- Designed for maximum performance on low pressure gaseous fuel supply
- Simple open chamber combustion system for reliability and fuel flexibility
- Leading edge technology in ignition system and air/fuel ratio control for lower emission and engine efficiency
- Electronic control modules handle all engine functions: ignition, governing, air/fuel ratio control and engine protection

LL6114F GENERATOR
- Designed to match performance and output characteristics of Perkins gas engines
- Industry leading mechanical and electrical design
- High efficiency

POWERWIZARD 2-0 CONTROL PANEL
- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customers needs
- Integrated Control System and Communication Gateway

SPECIFICATIONS

PERKINS GAS ENGINE

4006-23TRS2	SCAC, 4 stroke, spark ignition engine
Number of Cylinders	In-line 6
Bore --- mm (in)	160 (6.3)
Stroke --- mm (in)	190 (7.5)
Displacement --- L (cu in)	22.92 (1399)
Compression Ratio	12:1 nominal
Aspiration	TA
Cooling Type	1 Stage A/C, JW & O/C combined
Fuel System	Low Pressure
Governor Type	Digital governing system

LL6114F GENERATOR

Excitation	AREP
Pitch	2/3
Number of poles	4
Number of bearings	Single
Number of leads	6
Insulation	Class H
IP rating	IP23
Overspeed capability -- % of rated	150%
Wave form NEMA = TIF	less than 50
Wave form IEC = THF	less than 2%
Total harmonic content LL/LN	less than 2%
Radio interference	EN61000
Voltage regulator	R448
Voltage regulation, steady state	+/- 0.5%

POWERWIZARD 2-0 CONTROL PANEL

- Package mounted
- Emergency stop button
- 24V DC control
- Environmental sealed front face
- Text alarm / event descriptions
- Warning / Shutdowns with indicating lights for:
  - Low oil pressure
  - High coolant temperature
  - Overspeed
  - Emergency stop
  - Failure to start (Overcrank)
- Controls
  - Speed adjust
  - Auto start/stop control
  - Engine cool-down timer
  - Alarm acknowledgement
  - Lamp test
- True RMS AC metering, 3-phase
- Digital indications for:
  - RPM
  - Operating hours
  - Oil pressure
  - Coolant temperature
  - System DC volts
  - L-L volts, L-N volts, phase amps, Hz, ekW, kVA, kVAR, kWhr, %kW, pf
- Programmable digital inputs (4) and outputs (4)
- MODBUS communication (RS485 half duplex) for remote monitoring

PACKAGE DEFINITION

PACKAGE GENSET WITH RADIATOR (STANDARD)

- Engine driven JW pump and thermostat
- Engine driven SCAC pump and thermostat
- Set-mounted electrical driven radiator

PACKAGE GENSET WITH HEAT EXCHANGERS (OPTIONAL)

- Engine driven JW pump and thermostat
- Engine driven SCAC pump and thermostat
- Set-mounted heat exchangers

CHP GENSET (OPTIONAL)

- Genset without engine driven water pumps and thermostats for JW and SCAC
- Ship-loose electrical driven water pumps and thermostats for JW and SCAC under special pricing

Additional information may be available, consult your Caterpillar dealer for details

FACTORY SUPPLIED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Control Panel	POWERWIZARD 2.0	Control panel for parallel operation
Air Intake	Air filter(s) with restriction indicator Exhaust gas driven turbocharger(s)	
Gas / Ignition	Closed loop air / fuel mixer and regulator specified to suit application Detonation sensing Individual cylinder HV ignition coils with leads Ignition system and wiring harness Gas train with station (0.5-2.5 bar) (shipped loose)	Gas train with station (2.5-4 bar or 4-6 bar) (shipped loose)
Lubrication	Lubricating oil pump Spin on, canister type lubricating oil filters Oil cooler, jacket water cooled	Lube oil drain pump Lube oil temperature shutdown and panel circuitry Lube oil level regulator (excludes tank)
Cooling	Two circuit radiator - baseframe mounted Centrifugal type, gear driven jacket water pump Jacket water thermostat - engine mounted (JW pump and thermostat for Package Genset only) Aftercooler, seperated circuit (SCAC) Centrifugal type, gear driven SCAC water pump SCAC thermostat - Package mounted (SCAC pump and thermostat for Package Genset only) Low coolant level shutdown	Heat exchanger - base mounted for Package Genset Coolant heater 220/240 VAC Radiator transition flange 50% anti freeze CHP Genset with or without ship-loose electrical-driven JW and/or SCAC water pump and thermostat
Exhaust	Cast iron, dry manifold Exhaust outlet elbow with flange (for Package Genset only)	Industrial silencer Residential silencer with mounting kit Critical silencer with mounting kit Stainless steel bellows
Governing	Heinzmann Pandaros Digital Governor	
Electrical	Single 24V DC starter motor Battery charging alternator (for Package Genset only)	Static battery charger (for CHP Genset only)
Drive	Cast flywheel housing: SAE 0 Cast iron flywheel: SAE 14 Viscous type torsional vibration damper(s)	
Engine Protection	High coolant temperature switch and sensor Low lubricating oil pressure switch and sensor Overspeed switch and pickup Emergency stop button - grounding ignition system High manifold pressure switch Low and high gas pressure shutdown	
Engine Mountings	Engine / generator / radiator rigidly mounted to baseframe (Package Genset) Anti-vibration mounts (rubber type)	Engine / generator / heat exchanger rigidly mounted to baseframe (Package Genset) Baseframe - engine / generator (CHP Genset) (with rigid mount)
Generator	AREP winding R448 regulator Set-mounted circuit breaker	Floor standing circuit breaker Anti-condensation heater Permanent Magnet + R448 regulator Permanent Magnet + R448 regulator + R731 3 phase sensing Quadrature droop kit
Miscellaneous	Operation manual	Additional Operation Manual CE Certification Special engine/generator color

TECHNICAL DATA (LANDFILL GAS / BIOGAS)

GEPG450-2 Gas Generator Set		**CHP Genset**			
Methane content	**%**	**70**	**60**	**50**	**40**
Emission level (NO_x)		TA Luft	TA Luft	TA Luft	TA Luft
Package Performance (1)					
Power Rating @ 0.8 pf	ekW Cont.	360	360	360	342
Power Rating @ 0.8 pf	kVA Cont.	450	450	450	428
Power Rating @ 1.0 pf	ekW Cont.	375	375	375	356
Electric Efficiency @ 1.0 pf (ISO 3046/1) **(2)**	%	38.3	38	37.6	36.7
Mechanical Power	bkW	393	393	393	373
Fuel Consumption (3)					
100% load w/o fan	Nm^3/hr	140.3	165.2	200.2	236.7
75% load w/o fan	Nm^3/hr	108.6	128	155	183.7
50% load w/o fan	Nm^3/hr	76.8	90.3	109.3	129.6
Altitude Capability (4)					
At 27 Deg C (80 Deg F) ambient temperature	M (ASL)	152.4	152.4	152.4	152.4
Cooling System					
Jacket water maximum outlet temperature	Deg C	96	96	96	96
Inlet manifold mixture maximum temperature	Deg C	50	50	50	50
Exhaust System					
Combustion air inlet flow rate (25 Deg C)	M^3/min	29.7	27.1	26.8	25.7
Exhaust stack gas temperature	Deg C	485	505	508	512
Exhaust gas flow rate (at turbo exit temperature)	M^3/min	78.9	121.4	144.9	170.2
Maximum system back pressure	mm H_2O	400	400	400	400
Heat Rejection (5)					
Heat rejection to jacket water and oil cooler	kW	162	162	162	159
Heat rejection to AC	kW	57	57	57	52
Heat rejection to exhaust (LHV to 25 Deg C)	kW	301	309	319	322
Heat rejection to atmosphere from engine	kW	65	67	67	65
Heat rejection to atmosphere from generator	kW	20.3	20.3		
Generator					
Temperature rise	Deg C	105	105	105	105
Motor starting capability @ 30% voltage dip **(6)**	skVA	1213	1213	1213	1213
Lubrication System					
Sump maximum oil capacity	L	113.4	113.4	113.4	113.4

DEFINITIONS AND CONDITIONS

(1) **Continuous Baseload Rating**

These ratings are applicable for supplying continuous electrical power for full load operation. There is no overload available. The ratings represent the engine performance in accordance with the reference conditions equivalent to those specified in ISO 8528-1 2005 based on the use of natural gas having a lower calorific value of 34.71 MJ/m^3.

Landfill gas / biogas ratings are based on lower calorific values of:
70% methane content: 25.150 MJ/m^3
60% methane content: 21.543 MJ/m^3
50% methane content: 17.965 MJ/m^3
40% methane content: 14.768 MJ/m^3

Standard Reference Conditions
Air ambient temperature: 25 Deg C
Total barometric pressure: 100 kPa
Relative humidity: 30%

(2) **Efficiency** of standard generator is used.

(3) **Fuel consumption** data is based on ISO3046/1 standard reference conditions of 25 deg C of ambient temperature, 100 kPa of total barometic pressure and 30% relative humidity with 0, +5% fuel tolerance. Fuel consumption data uses gas fuels as specified above.

(4) **Altitude** capability is based on 380 mm H_2O max air intake restriction and 400 mm H_2O max exhaust back pressure.

(5) **Heat Rejection** --- data based on nominal data with tolerence of +/-3% and 380 mm H_2O max air intake restriction and 400 mm H_2O max exhaust back pressure.

(6) Assume synchronous driver

(7) **Emissions data**

Ambient temperature of 25 deg C.
Emissions at continuous baseload rating.
If the engine is to operate in ambient conditions other than test conditions then suitable adjustments may be necessary for any change in inlet air temperature or barometric pressure.

CONTINUOUS 360ekW / 342 ekW (450 kVA / 428 kVA)
50 Hz 1500 rpm 400 Volts

OLYMPIAN™

DIMENSIONS & WEIGHTS

Package Dimensions & Weight (CHP Genset w/o cooling system opt.)		
Length	3328 mm	131.0 in
Width	1567 mm	61.7 in
Height	1905 mm	75.0 in
Est. Package Weight (wet)	4640 kg	10 229 lb

Note: Do not use for installation design. See general dimension drawings MGA7533 for detail.

Package Dimensions & Weight (Package Genset with Heat Exchangers)		
Length	4020 mm	158.3 in
Width	1634 mm	64.3 in
Height	2167 mm	85.3 in
Est. Package Weight (wet)	5210 kg	11 486 lb

Note: See general dimension drawings MGA7536 for detail.

Package Dimensions & Weight (Package Genset with radiator)		
Length	4746 mm	186.8 in
Width	1992 mm	78.4 in
Height	2189 mm	86.2 in
Est. Package Weight (wet)	6056 kg	13 351 lb

Note: Do not use for installation design. See general dimension drawings MGA7660 for detail.

Source: Europe Sourced
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