GAS GENERATOR SET

CATERPILLAR®

Image shown may not reflect actual package

NATURAL GAS
CONTINUOUS (For CHP Application)
1600 ekW 2000 kVA
50 HZ 1500 RPM 400 VOLTS

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability

BENEFITS

EMISSIONS
- Meets most worldwide emissions requirements down to 250 mg/Nm^3 NOx level without aftertreatment

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

PROVEN SYSTEM
- Fully protype tested
- Field proven in a wide range of applications worldwide
- Certified torsional vibration analysis available

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
- CAT® S.O.S ^{SM} program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT ® G3516E GAS ENGINE
- Robust high speed diesel block design provides prolonged life and lower owning 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
- One electronic control module handles all engine functions: ignition, governing, air/fuel ratio control and engine protection

CAT SR4B GENERATOR
- Designed to match performance and output characteristics of Caterpillar gas engines
- Industry leading mechanical and electrical design
- High efficiency

CAT EMCP II+ CONTROL PANEL
- Simple user friendly interface and navigation
- Digital monitoring, metering and protection setting
- Fully-featured power metering and protective relaying
- UL 508A Listed
- Remote control and monitor capability options

Factory Installed Standard & Optional Equipment

System	Standard	Optional
Gas Engine Control Module (GECM)	Fuel/air ratio control; Start/stop logic: gas purge cycle, staged shutdown; Engine Protection System: detonation sensitive timing, high exhaust temperature shutdown; Governor: Transient richening and turbo bypass control; Ignition. Island Mode Feature -- addiitonal engine control module , new software and engine sensores	
Air Inlet	Two element, single-stage air cleaner with enclosure and service indicator	Air cleaner with precleaner; Mounting stand
Control Panel	EMCP II+	Local alarm module; Remote annuciator; Communications Module (PL1000T, PL1000E) Synchronizing module; Engine failure relay
Cooling	Engine driven water pumps for jacket water and aftercooler; Jacket water and SCAC thermostats; ANSI/DN customer flange connections for JW inlet and outlet Cat flanges on SCAC circuit	coolant level drain line with valves, fan with guard; Inlet/Outlet connections.
Exhaust	Dry exhaust manifolds, insulated and shielded; Center section cooled turbocharger with Cat flanged outlet; Individual exhaust port and turbocharger outlet wired to Integrated Temperature Sensing Module (ITSM) with GECM providing alarms and shutdowns.	Flange; Exhaust expander; Elbow; Flexible fitting; Muffler and spark-arresting muffler with companion flanges.
Fuel	Electronic fuel metering valve; Throttle plate, 24V DC actuator, controlled by GECM; Fuel system is sized for 31.5 to 47.2 MJ/NM3 (800 to 1200 Btu/cu ft) dry pipeline natural gas with pressure of 10.2 to 34.5 kPa (1.5 to 5 psi) to the engine fuel control valve.	Fuel filter; Gas pressure regulator; Gas shutoff valve, 24V, ETR (Energized-To-Run)
Generator	SR4B generator, includes: Caterpillar's Digital Voltage Regulator (CDVR) with 3-phase sensing and KVAR/PF control; Reactive droop; Bus bar connections; Winding temperature detectors; Anti-condensation space heater.	Medium and high voltage generators and attachments; Low voltage extension box; Cable access box; Air filter for generator; Bearing temperature detectors; Manual voltage control; European bus bar.
Governing	Electronic speed governor as part of GECM; Electronically-controlled 24V DC actuator connected to throttle shaft.	Woodward load sharing module
Ignition	Electronic Ignition System controlled by GECM; Individual cylinder Detonation Sensitive Timing (DST)	
Lubrication	Lubricating oil; Gear type lube oil pump; Oil filter, filler and dipstick; Integral lube oil cooler; Oil drain valve; Crankcase breather.	Oil level regualtor; Prelube pump; Positive crankcase ventilation system
Mounting	330 mm structural steel base (for low and medium voltage units); Spring-type anti-vibration mounts (shipped loose)	
Starting / Charging	24V starting motors; Battery with cables and rack (shipped loose); Battery disconnect switch; 60A, 24V charging alternator (standard on 60Hz 1800rpm only)	Charging alternator; Battery charger; Oversized battery; Lacket water heater;
General	Paint -- Caterpillar Yellow except rails & radiators; Damper guard. Operation and Maintenance Manuals; Parts Book.	Crankcase explosion relief valve; Engine barring group; EEC D.O.I and other certifications

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50 Hz 1500 rpm 400 Volts

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SPECIFICATIONS

CAT GAS ENGINE

G3516E SCAC 4-stroke-cycle watercooled gas engine

Number of Cylinders	V16
Bore --- mm (in)	170 (6.7)
Stroke --- mm (in)	190 (7.5)
Displacement --- L (cu in)	69 (4210)
Compression Ratio	11.6:1
Aspiration	Turbocharged Separate Circuit Aftercooled
Cooling Type	Two stage aftercooler, JW + O/C + A/C 1 combined
Fuel System	Low Pressure
Governor Type	Electronic (ADEM ™ III)

CAT SR4B GENERATOR

Frame size	826
Excitation	Permanent Magnet
Pitch	0.7143
Number of poles	4
Number of bearings	2
Number of leads	6
Insulation	Class H
IP rating	Drip proof IP22
Alignment	Pilot shaft
Overspeed capability -- % of rated	125%
Waveform deviation line to line, no load	less than 3.0%
Paralleling kit droop transformer	Standard
Voltage regulator	CDVR
Voltage level adjustment	+/- 5.0%
Voltage regulation, steady state	+/- 0.5%
Voltage regulation with 3% speed change	+/- 0.5%
Telephone Influence Factor (TIF)	less than 50

Consult your Caterpillar dealer for available voltage

CAT EMCPII+ CONTROL PANEL

- Power by 24 volts DC
- NEMA 12, IP44 dust-proof enclosure
- Lockable hinged door
- Single-location customer connection
- Auto start/stop control switch
- Voltage adjustment potentiomenter
- True RMS AC metering, 3 phase
- Purge cycle and staged shutdown logic
- Digital indication for:
  - RPM
  - Operating hours
  - Oil pressure
  - Coolant temperature
  - DC voltage
  - L-L volts, L-N volts, phase amps, Hz, ekW, kVA, kVAR, kWhr, %kW, pf
  - System diagnostic codes
- Shutdown with indicating lights;
  - Low oil pressure
  - High coolant temperature
  - High oil temperature
  - Overspeed
  - Overcrank
  - Emergency stop
  - High inlet air temperature (for TA engine only)
  - Detonation sensitive timing (for LE engine only)
- Programmable protective relaying functions:
  - Under / Over voltage
  - Under / Over frequency
  - Overcurrent
  - Reverse power
- Spare indicator LEDs
- Spare alarm/shutdown inputs

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

TECHNICAL DATA

G3516E Gas Generator Set			DM 5790	DM 5791
Emission level (NOx)	mg/Nm^3		500	250
Aftercooler SCAC (Stage 2)	Deg C		43	43
Package Performance (1)				
Power Rating @ 0.8 pf (w/o water pumps and w/o fan)	ekW	Continuous	1600	1600
Power Rating @ 0.8 pf (w/o water pumps and w/o fan)	kVA	Continuous	2000	2000
Power Rating @ 1.0 pf (w/o water pumps and w/o fan)	ekW	Continuous	1615	1615
Electric Efficiency @ 1.0 pf (ISO 3046/1) **(2)**	%		41.9	41.0
Mechanical Power (w/o water pumps and w/o fan)	bkW	bhp	1656	1656
Fuel Consumption (3)				
100% load w/o fan	Nm^3/hr	scf/hr	389	399
75% load w/o fan	Nm^3/hr	scf/hr	302	309
50% load w/o fan	Nm^3/hr	scf/hr	215	220
Altitude Capability (4)				
At 25 Deg C (77 Deg F) ambient, above sea level	M	ft	460	380
Cooling System				
Ambient air temperature	Deg C	Deg F	25	25
Jacket water temperature (Maximum outlet)	Deg C	Deg F	94	94
Exhaust System				
Combustion air inlet flow rate	Nm^3/min	SCFM	110	115
Exhaust stack gas temperature	Deg C	Deg F	410	405
Exhaust gas flow rate	Nm^3/min	CFM	117	121
Exhaust flange size (internal diameter)	mm	in	360	360
Heat Rejection (5)				
Heat rejection to jacket water and oil cooler and AC - S	kW	Btu/min	838	875
Heat rejection to AC - Stage 2	kW	Btu/min	144	152
Heat rejection to exhaust (LHV to 25 Deg C)	kW	Btu/min	1198	1247
Heat rejection to exhaust (LHV to 120 Deg C)	kW	Btu/min	795	808
Heat rejection to atmosphere from engine	kW	Btu/min	109	109
Heat rejection to atmosphere from generator	kW	Btu/min	51.2	51.2
Generator				
Frame			826	826
Temperature rise	Deg C	Deg F	105	105
Motor starting capability @ 30% voltage dip **(6)**	skVA		4225	4225
Lubrication System				
Standard sump refill with filter change	L	gal	401	401
Emissions (7)				
NOx @ 5% O2 (dry)	mg/Nm^3	g/bhp-hr	500	250
CO @ 5% O2 (dry)	mg/Nm^3	g/bhp-hr	995	1044
THC @ 5% O2 (dry)	mg/Nm^3	g/bhp-hr	3356	3846
NMHC @ 5% O2 (dry)	mg/Nm^3	g/bhp-hr	504	577
Exhaust O2 (dry)	%		9.4	9.6

DEFINITIONS AND CONDITIONS

(1) **Continuous** --- Maximum output available for an unlimited time

Ratings are based on pipeline natural gas having a Low Heat Value (LHV) of 18 MJ/NM3 (456 Btu/ft3) and 120 Caterpillar Methane Number. For values in excess of altitude, ambient temperature, inlet/exhaust restriction, or different from the conditions listed, contact your local Caterpillar dealer.

(2) **Efficiency** of standard generator is used. For higher efficiency generators, contact your local Caterpillar dealer.

(3) **Ratings and fuel consumption** are based on ISO3046/1 standard reference conditions of 25 deg C (77 deg F) of ambient temperature and 100 kPa (29.61 in Hg) of total barometic pressure, 30% relative humidity with 0, +5% fuel tolerance.

(4) **Altitude** capability is based on 2.5 kPa air filter and 5.0 kPa exhaust stack restrictions.

(5) **Heat Rejection** --- Values based on nominal data with fuel tolerence of +/-2.5% and 2.5 kPa inlet and 5.0 kPa exhaust restrictions.

(6) Assume synchronous driver

(7) **Emissions data** measurements are consistent with those described in EPA CFR 40 Part 89 Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state engine operating conditions of 25 deg C (77 deg F), 96.28 kPa (28.43 in Hg) and fuel having a LHV of 35.6 MJ/NM3 (905 Btu/cu ft) and 80 Caterpillar Methane Number at 101.60 kPa (30.00 in Hg) absolute and 0 deg C (32 deg F). Emission darta shown is subject to instrumentation, measurement, facility, and engine fuel system adjustment.

CONTINUOUS 1600 ekW 2000 kVA

50 Hz 1500 rpm 400 Volts

DIMENSIONS

Package Dimensions		
Length	5523.1 mm	217.45 in
Width	1827.5 mm	71.95 in
Height	2340.0 mm	92.13 in
Approx. Shipping Weight	15 640 kg	34 480 lb

Note: Do not use for installation design.
See general dimension drawings
for detail (Drawing # 255-1318).

Performance Number: DM5790, DM5791
Feature Codes 516GE48
Generator Argt 144-1826