



Image shown may not reflect actual package

## NATURAL GAS CONTINUOUS (FOR CHP APPLICATION) 2000 ekW 2500 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.

### BENEFITS

#### EMISSIONS

- Meets most worldwide emissions requirements down to 250 mg/Nm<sup>3</sup> NO<sub>x</sub> level without after treatment

#### 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 prototype 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 agreement
- Caterpillar dealers have over 1,600 dealer branch stores operating in 200 countries
- Cat® S•O•S<sup>SM</sup> program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

#### CAT® G3520C GAS ENGINE

- Robust high speed diesel block 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
- 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
<b>Gas Engine Control Module (GECM)</b>	<ul style="list-style-type: none"> <li>Fuel/air ratio control</li> <li>Start/stop logic: gas purge cycle, staged shutdown</li> <li>Engine Protection System: detonation sensitive timing, high exhaust temperature shutdown</li> <li>Governor: Transient richening and turbo bypass control</li> <li>Ignition</li> <li>Island Mode Feature — additional engine control module, new software and engine sensors</li> </ul>	
<b>Air Inlet</b>	<ul style="list-style-type: none"> <li>Two element, single-stage air cleaner with enclosure and service indicator</li> </ul>	<ul style="list-style-type: none"> <li>Air cleaner with precleaner</li> <li>Mounting stand</li> </ul>
<b>Control Panel</b>		<ul style="list-style-type: none"> <li>EMCP II+</li> <li>Local alarm module</li> <li>Remote annunciator</li> <li>Communications Module (PL1000T, PL1000E)</li> <li>Synchronizing module</li> <li>Engine failure relay</li> </ul>
<b>Cooling</b>	<ul style="list-style-type: none"> <li>ANSI/DN customer flange connections for JW inlet and outlet Cat flanges on SCAC circuit</li> </ul>	<ul style="list-style-type: none"> <li>Coolant level drain line with valves</li> <li>Fan with guard</li> <li>Inlet/Outlet connections</li> </ul>
<b>Exhaust</b>	<ul style="list-style-type: none"> <li>Dry exhaust manifolds, insulated and shielded</li> <li>Center section cooled turbocharger with Cat flanged outlet</li> <li>Individual exhaust port and turbocharger outlet wired to Integrated Temperature Sensing Module with GECM providing alarms and shutdowns</li> </ul>	<ul style="list-style-type: none"> <li>Flange</li> <li>Exhaust expander</li> <li>Elbow</li> <li>Flexible fitting</li> <li>Muffler and spark-arresting muffler with companion flanges</li> </ul>
<b>Fuel</b>	<ul style="list-style-type: none"> <li>Electronic fuel metering valve</li> <li>Throttle plate, 24V DC actuator, controlled by GECM</li> <li>Fuel system is sized for 31.5 to 47.2 MJ/Nm<sup>3</sup> (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</li> </ul>	<ul style="list-style-type: none"> <li>Fuel filter</li> <li>Gas pressure regulator</li> <li>Gas shutoff valve, 24V, ETR (Energized-To-Run)</li> </ul>
<b>Generator</b>	<ul style="list-style-type: none"> <li>SR4B generator, includes:                             <ul style="list-style-type: none"> <li>attachments Caterpillar's Digital Voltage Regulator (CDVR) with 3-phase sensing and KVAR/PF control</li> <li>Reactive droop</li> <li>Bus bar connections</li> <li>Winding temperature detectors</li> <li>Anti-condensation space heater</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Medium and high voltage generators and</li> <li>Low voltage extension box</li> <li>Cable access box</li> <li>Air filter for generator</li> <li>Bearing temperature detectors</li> <li>Manual voltage control</li> <li>European bus bars</li> </ul>
<b>Governor</b>	<ul style="list-style-type: none"> <li>Electronic speed governor as part of GECM</li> <li>Electronically-controlled 24V DC actuator connected to throttle shaft</li> </ul>	<ul style="list-style-type: none"> <li>Woodward load sharing module</li> </ul>
<b>Ignition</b>	<ul style="list-style-type: none"> <li>Electronic Ignition System controlled by GECM</li> <li>Individual cylinder Detonation Sensitive Timing (DST)</li> </ul>	
<b>Lubrication</b>	<ul style="list-style-type: none"> <li>Lubricating oil</li> <li>Gear type lube oil pump</li> <li>Oil filter, filler and dipstick</li> <li>Integral lube oil cooler</li> <li>Oil drain valve</li> <li>Crankcase breather</li> </ul>	<ul style="list-style-type: none"> <li>Oil level regulator</li> <li>Prelube pump</li> <li>Positive crankcase ventilation system</li> </ul>
<b>Mounting</b>	<ul style="list-style-type: none"> <li>330 mm structural steel base (for low and medium voltage units)</li> <li>Spring-type anti-vibration mounts (shipped loose)</li> </ul>	
<b>Starting/Charging</b>	<ul style="list-style-type: none"> <li>24V starting motors</li> <li>Battery with cables and rack (shipped loose)</li> <li>Battery disconnect switch</li> <li>60A, 24V charging alternator (standard on 60 Hz 1,800 rpm only)</li> </ul>	<ul style="list-style-type: none"> <li>Charging alternator</li> <li>Battery charger</li> <li>Oversized battery</li> <li>Jacket water heater</li> </ul>
<b>General</b>	<ul style="list-style-type: none"> <li>Paint — Caterpillar Yellow except rails and radiators</li> <li>Damper guard</li> <li>Operation and Maintenance Manuals</li> <li>Parts Book</li> </ul>	<ul style="list-style-type: none"> <li>Crankcase explosion relief valve</li> <li>Engine barring group</li> <li>EEC D.O.I and other certifications</li> </ul>

**SPECIFICATIONS**

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**CAT GAS ENGINE**

G3520C SCAC 4-stroke-cycle watercooled gas engine  
 Number of cylinders ..... V20  
 Bore — mm (in) ..... 170 (6.7)  
 Stroke — mm (in)..... 190 (7.5)  
 Displacement — L (cu in)..... 86.3 (5,266)  
 Compression ratio ..... 11.3:1  
 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 ..... 828  
 Excitation ..... Permanent Magnet  
 Pitch..... 0.7777  
 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..... ± 5.0%  
 Voltage level adjustment..... ± 0.5%  
 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 EMCP II+ CONTROL PANEL**

- Powered by 24 volts DC
- NEMA 12, IP44 dust-proof enclosure
- Lockable hinged door
- Single-location customer connection
- Auto start/stop control switch
- Voltage adjustment potentiometer
- 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

**TECHNICAL DATA**

<b>G3520C Gas Generator Set</b>		<b>DM 5844</b>	<b>DM 5847</b>	<b>DM 5849</b>	<b>DM 5838</b>	<b>DM 5840</b>	<b>DM 5842</b>
Emission level (NOx)	mg/Nm <sup>3</sup>	500	350	250	500	350	250
Aftercooler SCAC (Stage 2)	Deg C	32	32	32	54	54	54
<b>Package Performance (1)</b>							
Power rating @ 0.8 pf (without water pumps and without fan)	ekW	2000	2000	2000	2000	2000	2000
Power rating @ 0.8 pf (without water pumps and without fan)	Continuous ekW	2500	2500	2500	2500	2500	2500
Power rating @ 1.0 pf (without water pumps and without fan)	Continuous ekW	2020	2020	2020	2020	2020	2020
Electrical efficiency @ 1.0 pf (ISO 3046/1) (2)	%	40.5	39.8	39.4	40.5	39.9	39.6
Mechanical power (without water pumps and without fan)	bkW	2070	2070	2070	2070	2070	2070
<b>Fuel Consumption (3)</b>							
100% load without fan	Nm <sup>3</sup> /hr	505	513	518	504	512	516
75% load without fan	Nm <sup>3</sup> /hr	389	396	400	387	393	396
50% load without fan	Nm <sup>3</sup> /hr	271	276	279	269	273	276
<b>Altitude Capability (4)</b>							
At 25° C (77° F) ambient, above sea level	M	390	298	238	250	250	250
<b>Cooling System</b>							
Ambient air temperature	Deg C	25	25	25	25	25	25
Jacket water temperature (Maximum outlet)	Deg C	90	90	90	90	90	90
<b>Exhaust System</b>							
Combustion air inlet flow rate	Nm <sup>3</sup> /min	145	149	151	147	150	152
Exhaust stack gas temperature	Deg C	449	449	457	453	456	458
Exhaust gas flow rate	Nm <sup>3</sup> /min	154	154	160	156	159	161
Exhaust flange size — (internal diameter)	mm	326	328	328	328	328	328
<b>Heat Rejection (5)</b>							
Heat rejection JW, oil cooler and AC — Stage 1	kW	1040	1050	1055	1074	1094	1108
Heat rejection to AC — Stage 2	kW	197	200	202	126	131	134
Heat rejection to exhaust (LHV to 25° C)	kW	1679	1750	1797	1712	1762	1793
Heat rejection to exhaust (LHV to 120° C)	kW	1190	1239	1270	1219	1254	1274
Heat rejection to atmosphere from engine	kW	125	125	125	125	125	125
Heat rejection to atmosphere from generator	kW	64	64	64	64	64	64
<b>Generator</b>							
Frame		828	828	828	828	828	828
Temperature rise	Deg C	105	105	105	105	105	105
Motor starting capability @ 30% voltage dip (6)	skVA	4557	4557	4557	4557	4557	4557
<b>Lubrication System</b>							
Standard sump refill with filter change	L	541	541	541	541	541	541
<b>Emissions (7)</b>							
NOx @ 5% O <sub>2</sub> (dry)	mg/Nm <sup>3</sup>	500	350	250	500	350	250
CO @ 5% O <sub>2</sub>	mg/Nm <sup>3</sup>	971	962	957	1043	998	968
THC (total) @ 5% O <sub>2</sub>	mg/Nm <sup>3</sup>	2675	2899	3048	2643	2768	2851
HC (non-methane) @ 5% O <sub>2</sub>	mg/Nm <sup>3</sup>	402	435	458	397	416	428
Exhaust O <sub>2</sub> (dry)	%	9.3	9.6	9.7	9.4	9.5	9.5

**TECHNICAL DATA**

<b>G3520C Gas Generator Set</b>		<b>DM 5845</b>	<b>DM 5848</b>	<b>DM 5850</b>	<b>DM 5839</b>	<b>DM 5841</b>	<b>DM 5843</b>
Emission level (NOx)	mg/Nm <sup>3</sup>	500	350	250	500	350	250
Aftercooler SCAC (Stage 2)	Deg C	32	32	32	54	54	54
<b>Package Performance (1)</b>							
Power rating @ 0.8 pf (without water pumps and without fan)	ekW	2000	2000	2000	2000	2000	2000
Power rating @ 0.8 pf (without water pumps and without fan)	Continuous ekW	2500	2500	2500	2500	2500	2500
Power rating @ 1.0 pf (without water pumps and without fan)	Continuous ekW	2020	2020	2020	2020	2020	2020
Electrical efficiency @ 1.0 pf (ISO 3046/1) (2)	%	40.6	39.9	39.5	40.5	39.9	39.6
Mechanical power (without water pumps and without fan)	bkW	2070	2070	2070	2070	2070	2070
<b>Fuel Consumption (3)</b>							
100% load without fan	Nm <sup>3</sup> /hr	504	512	518	504	512	516
75% load without fan	Nm <sup>3</sup> /hr	389	395	400	387	393	396
50% load without fan	Nm <sup>3</sup> /hr	271	275	278	269	273	276
<b>Altitude Capability (4)</b>							
At 25° C (77° F) ambient, above sea level	M	390	298	238	350	350	350
<b>Cooling System</b>							
Ambient air temperature	Deg C	25	25	25	25	25	25
Jacket water temperature (Maximum outlet)	Deg C	99	99	99	99	99	99
<b>Exhaust System</b>							
Combustion air inlet flow rate	Nm <sup>3</sup> /min	146	149	152	147	149	156
Exhaust stack gas temperature	Deg C	450	456	459	446	468	469
Exhaust gas flow rate	Nm <sup>3</sup> /min	155	158	161	155	158	160
Exhaust flange size — (internal diameter)	mm	328	328	328	328	328	328
<b>Heat Rejection (5)</b>							
Heat rejection JW, oil cooler and AC — Stage 1	kW	985	994	999	1011	1030	1042
Heat rejection to AC — Stage 2	kW	227	230	232	155	160	184
Heat rejection to exhaust (LHV to 25° C)	kW	1684	1756	1802	1733	1784	1815
Heat rejection to exhaust (LHV to 120° C)	kW	1198	1247	1279	1257	1293	1314
Heat rejection to atmosphere from engine	kW	138	138	138	138	138	138
Heat rejection to atmosphere from generator	kW	64	64	64	64	64	64
<b>Generator</b>							
Frame		828	828	828	828	828	828
Temperature rise	Deg C	105	105	105	105	105	105
Motor starting capability @ 30% voltage dip (6)	skVA	4557	4557	4557	4557	4557	4557
<b>Lubrication System</b>							
Standard sump refill with filter change	L	541	541	541	541	541	541
<b>Emissions (7)</b>							
NOx @ 5% O <sub>2</sub> (dry)	mg/Nm <sup>3</sup>	500	350	250	500	350	250
CO @ 5% O <sub>2</sub>	mg/Nm <sup>3</sup>	981	973	968	1035	990	960
THC (total) @ 5% O <sub>2</sub>	mg/Nm <sup>3</sup>	2633	2855	3002	2381	2493	2567
HC (non-methane) @ 5% O <sub>2</sub>	mg/Nm <sup>3</sup>	395	429	451	358	374	386
Exhaust O <sub>2</sub> (dry)	%	9.4	9.7	9.8	9.2	9.3	9.4

## DEFINITIONS AND CONDITIONS

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

**Ratings** are based on pipeline natural gas having an Low Heat Value (LHV) of 35.6 MJ/Nm<sup>3</sup> (905 Btu/cu ft) and 80 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° C (77° F) of ambient temperature and 100 kPa (29.61 in Hg) of total barometric pressure, 30% relative humidity with 0,+5% fuel tolerance.

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

**(5) Heat Rejection** — Values based on nominal data with fuel tolerance 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° C (77° F), 96.28 kPa (28.43 in Hg) and fuel having a LHV of 35.6 MJ/Nm<sup>3</sup> (905 Btu/cu ft) and 80 Caterpillar Methane Number at 101.60 kPa (30.00 in Hg) absolute and 0° C (32° F). Emission data shown is subject to instrumentation, measurement, facility, and engine fuel system adjustment.

# CONTINUOUS 2000 ekW 2500 kVA

50 Hz 1500 rpm 400 Volts



## DIMENSIONS

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Package Dimensions		
Length	6259.0 mm	246.42 in
Width	1827.5 mm	71.95 in
Height	2254.0 mm	88.74 in
Approx. Shipping Weight	18 350 kg	40,455 lb

Note: Do not use for installation design.  
See general dimension drawings  
for detail (Drawing # 234-3560).

Performance Numbers: DM5838  
DM5839  
DM5840  
DM5841  
DM5842  
DM5843  
DM5844  
DM5845  
DM5847  
DM5848  
DM5849  
DM5850

Feature Codes: 520GE24  
520GE25  
520GE26  
520GE27

Generator Arrangement: 144-1830

Source: U.S. Sourced

LEHE2833-01 (11-08)

[www.cat-electricpower.com](http://www.cat-electricpower.com)

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