



Image shown may not reflect actual package

# NATURAL GAS CONTINUOUS 2022 ekW 2528 kVA 50 HZ 1500 RPM 10.5-11 kV

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 emission Levels down to 250 mg/Nm<sup>3</sup> Nox 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**

- Fully prototype tested.
- Field proven in a wide range of applications worldwide.
- Certified torsional vibration analysis available

#### WORLDWIDE PRODUCT SUPPORT

- Cat<sup>®</sup> dealers provide extensive post sales support including maintenance and repair agreements
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- The Cat S•O•S SM program cost effectively detects internal engine component conditions, even the presence of unwanted fluids and combustion by-products

#### Cat G3520E GAS ENGINE

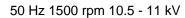
- Robust high speed diesel block design provides prolonged life and lower owning and operating costs
- Designed for maximum performance on low pressure gaseous fuel supply.
- Simple open chamber combustion system for reliability and fuel flexibility.
- Leading edge technology in ignition system and air/fuel 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 Cat 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 protection relayin
- Remote control and monitor capability options





# **FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT**

	Standard	Optional
Gas Engine Control		
Module (GECM)	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	
Air Inlet		Single element air cleaner
		Two element air cleaner with enclosure,
		precleaner and service indicator
Control Panel		EMCP II+
		Kilowatt transducer (ship loose)
		Local alarm module
		Remote annunciator
		Communication Module (PL1000T, PL1000E)
		Synchronizing module
		Engine failure relay
Cooling	Jacket water and SCAC thermostats	Coolant level drain line with valves, fan with guard
	ANSI/DN customer flange connections for JW inlet and outlet	Inlet/Outlet connections
	Cat flanges on SCAC circuit	Engine driven water pumps for jacket water
		and aftercooler
Exhaust	Dry exhaust manifolds, insulated and shielded	Flange
	Center section cooled turbocharger with Cat flanged outlet	Exhaust expander
	Individual exhaust port and turbocharged outlet wired to Integrated	Elbow
	Sensing Module (ITSM) with GECM providing alarms and shutdowns	Flexible fitting
		Muffler and spark-arresting muffler w/companion flanges
Fuel	Electronic fuel metering valve	Fuel Filter
	Water cooled throttle, 24V DC actuator, controlled by GECM	Gas pressure regulator
	Fuel system is sized for 31.5 to 47.2 MJ/Nm <sup>3</sup> (800 to 1200 Btu/cu ft)	Gas shutoff valve, 24V, ETR (Energize-To-Run)
	dry pipeline natural gas with pressure of 10.2 to 34.5 kPa	Corrosion resistant aftercooler
	(1.5 to 5 psi) to the engine fuel control valve	
Generator	SR4B generator, includes:	Low voltage generators and attachments
	Cat Digital Voltage Regulator (Cat DVR) with 3-phase sensing and	Low voltage extension box
	kVAR / PF control	European bus bar
	Reactive droop	Cable access box
	Bus bar connections	Air filter ffor generator
	Bearing temperature detectors	Manual voltage control
		European bus bar
Governing	Electronic speed governor as part of GECM	Woodward load sharing module
	Electronically-controlled 24V DC actuator connected to throttle shaft	-
Ignition	Electronic Ignition System controlled by GECM	
	Individual cylinder Detonation Sensitive Timing (DST)	
Lubrication	Gear type lube oil pump	Oil level regulator
	Oil filter, filler and dip stick	Preluble pump
	Integral lube oil cooler	Positive crankcase ventilation system
	Oil drain valve	Lubricating oil
	Crankcase breather	J
Mounting	330 mm structural steel base	Spring-type anti-vibration mounts (shipped loose)
Starting / Charging		Battery (24V), rack and cables
	Battery disconnect switch	Battery charger
İ	Jacob Moor Officer	Oversized battery
		· ·
		Llacket water heater
General	Paint - Caternillar Yellow excent rails	Jacket water heater  Crankcase explosion relief valve
General	Paint - Caterpillar Yellow except rails	Crankcase explosion relief valve
General	Paint - Caterpillar Yellow except rails Damper guard Operation & Maintenance Manuals	

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50 Hz 1500 rpm 10.5 - 11 kV



#### **SPECIFICATIONS**

#### **GAS ENGINE**

G3520E 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 (5248) Compression Ratio 21:36 Turbocharged Separate Circuit Aftercooled Aspiration Cooling Type JW, Oil Cooler and Stage 1 of SCAC Combine Fuel System Low Pressure

#### **SR4B GENERATOR**

Governor Type

Frame size 2650 Excitation Permanent Magnet Pitch 0.6667 Number of poles 4 Number of bearings 2 Number of leads 6 Insulation Class F IP rating Drip proof IP22 Alignment Pilot shaft Overspeed capability -- % of rated 125% Waveform deviation line to line, no load less than 2.0% **CDVR** Voltage regulator 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 Cat dealer for available voltages

#### **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** 

Electronic (ADEM III)

3

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

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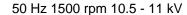
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# **TECHNICAL DATA**

Cosses on Constitution	Ref.	Feature Code 520GE63			
G3520E Gas Generator Set		DM8918	DM8922	DM8916	DM8920
Emission level (NO <sub>x</sub> )	nission level (NO <sub>x</sub> ) mg/Nm³		250 500		00
Aftercooler SCAC (Stage 2)	Deg C	54	43	54	43
Package Performance (1)					
Power Rating @ 0.8 pf (w/o water pumps and w/o fan)	ekW Continuous	2029			
Power Rating @ 1.0 pf (w/o water pumps and w/o fan)	ekW Continuous	2043			
Mechanical Power (w/ 2 water pumps and w/o fan)	bkW Continuous	2100			
Electric Efficiency @ 1.0 pf (ISO 3046/1) (2)	%	41.2%	40.9%	42.6%	42.3%
Fuel Consumption (3)					
100% load w/o fan	Nm <sup>3</sup> /hr	501	505	485	489
75% load w/o fan	Nm <sup>3</sup> /hr	387	505	376	377
50% load w/o fan	Nm³/hr	270	271	265	265
Altitude Capability (4)					
At 25 Deg C (77 Deg F) ambient, above sea level	m	500	500	750	950
Cooling System					
Ambient air temperature	Deg C	25	25	25	25
Jacket water temperature ( Maximum outlet )	Deg C	99	94	99	94
Exhaust System					
Combustion air inlet flow rate	Nm³/min	143.9	143.9	137.2	137.2
Exhaust stack gas temperature	Deg C	441	443	440	443
Exhaust gas flow rate	Nm³/min	146.9	145.6	140.2	138.8
Heat Rejection (5)					
Heat rejection to Jacket Water+Oil Cooler+AC-Stage	kW	1151	1171	1068	1078
Heat rejection to AC-Stage 2	kW	177	189	162	179
Heat rejection to exhaust (LHV to 120 Deg C)	kW	1148	1147	1096	1094
Heat rejection to atmosphere from engine	kW	138	131	138	131
Heat rejection to atmosphere from generator	kW	70	70	70	70
Generator					
Frame		2650	2650	2650	2650
Temperature rise	Deg C	105	105	105	105
Motor starting capability @ 30% voltage dip (6)	skVA	4113	4113	4113	4113
Lubrication System					
Standard sump refill with filter change	L	541	541	541	541
Emissions <sup>(7)</sup>					
NO <sub>x</sub> @ 5% O <sub>2</sub> (dry)	mg/Nm <sup>3</sup>	250	250	500	500
CO @ 5% O <sub>2</sub> (dry)	mg/Nm³	1101	1060	1074	1051
THC @ 5% O <sub>2</sub> (dry)	mg/Nm <sup>3</sup>	3555	3429	3032	2945
NMHC @ 5% O <sub>2</sub> (dry)	mg/Nm³	533	514	455	442
Exhaust O <sub>2</sub> (dry)	%	9.8%	9.6%	9.6%	9.3%

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## **RATING 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 35.6 MJ/Nm³ (905 Btu/ft³) and 80 Cat Methane Number. For values in excess of altitude, ambient temperature, inlet / exhaust restriction, or different from the conditions listed, contact your local Cat dealer.

- (2) **Efficiency** of standard generator is used. For higher efficiency generators, contact your local Cat 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 pressue, 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 nomial data with fuel tolerance of ±2.5% and 2.5 kPa inlet and 5.0 kPa exhaust restrictions.
- (6) Assumed 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, NO<sub>x</sub>.

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 $^3$  (905 Btu/ft $^3$ ) and 80 Cat 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.

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50 Hz 1500 rpm 10.5 - 11 kV



# **DIMENSIONS**

Package Dimensions		
Length	6274 mm	247 in
Width	1829 mm	72 in
Height	2362 mm	93 in
Approx. Shipping Weight	19,686 kg	42,000 lb

Note: Do not use for installation design.

See general dimension drawings
for details

(Drawing #366-9962)

## www.Cat-ElectricPower.com

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Materials and specifications are subject to change without notice.

The International System of Units (SI) is used in this publication

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Performance Number: DM8918, DM8916, DM8922, DM8920

Feature Codes: 520GE63
Generator Arr:: 276-0476
Source: US Sourced

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