3516B Generator Set with Dynamic Gas Blending

1600 ekW (2000 kVA)
1710 bkW (2293 bhp)
1500 rpm
50 Hz

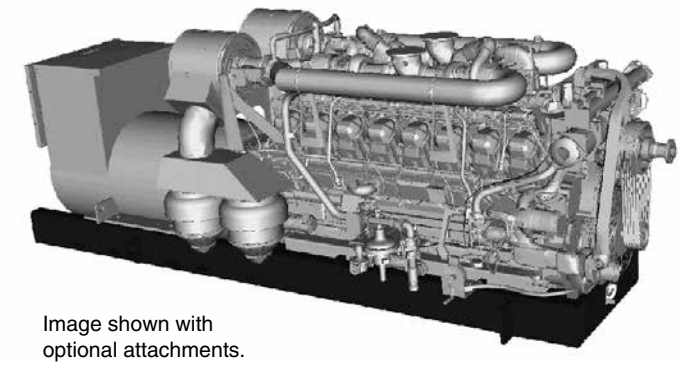


Image shown with optional attachments.

CAT® GENERATOR SET SPECIFICATIONS

V-16, 4-Stroke-Cycle-Diesel

Emissions	Non-certified
Bore	170 mm (6.69 in)
Stroke	190 mm (7.48 in)
Displacement	69 L (4211 in^3)
Aspiration	Turbocharged-Aftercooled
Fuel System	EUI™
Engine Control and Protection	ADEM™ A4
Generator	SR4B
Voltage	400V
Generator Set Control	EMCP 4.4

FEATURES

Dynamic Gas Blending System
- Achieves up to 70% substitution while maintaining diesel performance and safe engine operation
- Closed loop control system enables maximum substitution over the widest load range in the industry
- Maintains traditional diesel generator set power and transient response performance
- Accepts a wide range of gas quality and automatically adjusts to fuel quality changes, eliminating the need for field calibration
- EMCP 4.4 control panel features simplified rig integration, remote monitoring capabilities, and single point interface for the engine, generator, and Dynamic Gas Blending functions
- Leverages current hardware from G3516 product line while minimizing change to core diesel engine
- Maintains existing diesel maintenance and overhaul intervals proven in oilfield applications

Engine Design
- Market-leading power density
- Proven reliability and durability
- Robust design prolongs life and lowers owning and operating costs
- Long overhaul life proven in oilfield applications
- Core engine components designed for reconditioning and reuse at overhaul

Safety
- E-stop pushbutton on instrument panel
- Air shutoff and explosion relief valves
- Configurable alarm and shutdown features
- Extra alarm switches available for customer-supplied inputs
- Flame arrestors

Ease of Installation and Packaging
- EMCP 4.4 control panel uses standard communication protocols to integrate easily with rig monitoring equipment to track engine health and substitution performance
- Paralleling and load sharing capability
- Fully integrated diesel and gas controls into single engine control unit
- Single point operation for generator set and Dynamic Gas Blending system
- Dynamic Gas Blending system automatically activates when gas supply is detected

Custom Packaging

For any petroleum application, trust Caterpillar to meet your project needs with custom factory generator sets and mechanical packages. Cat® engines, generators, controls, radiators, and transmissions can be custom designed and matched in collaboration with our local dealers to create unique solutions. Custom packages are globally supported and are covered by a one-year warranty after startup.

Testing

Every unit is full-load tested to ensure proper performance

Product Support Offered Through Global Cat Dealer Network
- More than 2,200 dealer outlets
- Cat factory-trained dealer technicians service every aspect of your Cat product
- Worldwide parts availability, service, and warranty
- Preventive maintenance agreements available for repair-before-failure options
- S•O•S℠ program matches your oil and coolant samples against Caterpillar set standards to determine:
  - Internal engine component condition
  - Presence of unwanted fluids and combustion by-products
  - Site-specific oil change interval

Over 80 Years of Engine Manufacturing Experience

The Caterpillar Production System enables manufacturing of products with the highest quality standards for long and dependable operation.

Web Site

For all your petroleum power requirements, visit www.catoilandgasinfo.com

STANDARD EQUIPMENT

Air Inlet System
Aftercooler core — corrosion resistant
Air cleaner — regular duty with soot filter
Service indicators
Flame arrestors

Control System
ADEM A4 ECU
ISM (integrated sensor module) for combustion feedback sensors
Exhaust gas temperature sensors

Cooling System
Radiator cooled land based
Outlet controlled thermostat and housing
Jacket water pump — gear-driven
Dual outlet
Aftercooler cooling pump (SCAC) — gear-driven centrifugal

Diesel Fuel System
Fuel filter
Fuel transfer pump
Flexible fuel lines
Fuel priming pump
Electronically controlled unit injectors

Exhaust System
Exhaust flexible fitting, adapter and flanges
Dual turbochargers with w/c bearings

Flywheels and Flywheel Housings
SAE No. 00
SAE standard rotation

Gaseous Fuel System
Low pressure regulator
Electronically actuated fuel control valve
Gaseous fuel heater
Electronically controlled gas shut-off valve
Gas induction nozzles
CSA certified gas electronic components

Instrumentation
EMCP 4.4 control panel – See full specifications on page 4
Analog gauges with digital display data for: engine oil pressure gauge, engine water temperature gauge, fuel pressure gauge, system DC voltage gauge, air inlet restriction gauge, exhaust temperature (prior to turbochargers) gauge, fuel filter differential pressure gauge, oil filter differential pressure gauge, service meter (digital display only), tachometer (digital display only), instantaneous fuel consumption (digital display only), total fuel consumed (digital display only), engine start/stop (off, auto start, manual start, cooldown timer)

Lube System
Crankcase breather
Oil cooler, oil filter
Shallow oil pan
Oil pan drain valve, 2" NPT female connection

Mounting System
Oilfield base
Heavy-duty land rig inner baseframe — three-point mount to oilfield base

Power Take-Offs
Accessory drive

Protection System
ADEM A4 ECU monitoring system provides engine protection strategies to protect against adverse operating conditions. Selected parameters are customer programmable.

Starting System
Air starting motor, air silencer

General
Paint — Cat yellow
Vibration damper and guard
Lifting eyes
Lift and cable tow provisions

OPTIONAL EQUIPMENT

Air Inlet System
Heavy-duty air cleaners and precleaners
Remote air inlet adapters

Charging Systems
Battery chargers, charging alternators

Control System
Load sharing modules
Cat digital voltage regulator
Governor conversion
2301A load sharing governors

Cooling Systems
High gloss black folded core radiators and conventional core radiator
Coolant regulator conversions
Belt guard, radiator guard
Blower fan – engine mounted
Fan drive and fan pulley
Radiator mounting
Water level switch gauge
Coolant level sensors

European Union Certifications

Exhaust System
Elbows
Mufflers
Flange and exhaust expanders

Fuel System
Primary fuel filter
Fuel cooler

Generator
Oilfield spec twin-bearing, close-coupled
Factory aligned

Generator Attachments
Air filter
Low voltage extension box
Potential transformer
Manual voltage control
Current droop transformers
Cable access box
Bearing temperature detectors

Instrumentation
Customer programmable annunciator
Gauges and instrument panels
Switches, relays, and contractors

Lube System
Fumes disposal
Oil filter, oil pan accessories
Sump pumps

Mounting System
Oilfield outer base with three-point mount

Power Take-Offs
Front stub shaft
Pulleys

Protection System
Explosion relieve valve, shutoffs
Switches and contacts/relays
Oil pressure monitors, sensors

Starting System
Air pressure regulator
Starting aids

General
Tool set
Cat data link wire

TECHNICAL DATA AND SPECIFICATIONS

Generator Set Data	Units	EM0420 EM0800-01
Rated power	ekW	1600
KVA rating	kVA	2000
Rated power factor		0.8
Frequency	Hz	50
Engine Data		
Engine power	bkW (bhp)	1710 (2293)
Engine speed	rpm	1500
Max. altitude without derate (@ 25C)	m (ft)	1250 (4,101)
BMEP	kPa (psi)	1982 (287)
Gas fuel pressure	kPag (psig)	83-241 (12-35)
Gas fuel flow, maximum (@ 32MN)*	MJ/hr (BTU/min)	5114 (80,840)
Gas fuel flow, maximum (@ 45MN)*	MJ/hr (BTU/min)	6408 (101,295)
Gas fuel flow, maximum (@ 65MN)*	MJ/hr (BTU/min)	7042 (111,317)
Gas fuel flow, maximum (@ 85MN)*	MJ/hr (BTU/min)	10 186 (161,015)
Max BSFC (diesel mode @ 100% load)	g/bkW-hr	195 (0.32)
Air flow rate	m^3/min (ft^3/min)	122 (4323)
Inlet manifold pressure	kPa (psi)	213 (31)
Inlet manifold temperature	°C (°F)	72 (161)
Aftercooler water temperature	°C (°F)	60 (140)
Jacket water temperature	°C (°F)	99 (210)
Exhaust stack temperature**	°C (°F)	528 (982)
Exhaust mass flow rate**	kg/hr (lb/hr)	9448 (20,829)
Engine coolant capacity	L (gal)	233 (62)
Lube oil system capacity	L (gal)	405 (107)
Oil change interval	Hours	500
Generator Data		
Generator Model		SR4B
Frame size		826
Efficiency @ rated		97%
Voltage (L-L)	Volts	400
Insulation class		H
Temperature rise (@ 40°C ambient temp)	°C	105
Excitation		PM
Number of poles		4
Winding		Form wound
Pitch		0.7143
Number of leads		6
Number of bearings		2
Ingress protection (IP) rating		23
Alignment		Close coupled

*At rated load and maximum substitution
**Maximum 32MN-85MN gas at rated

ALTITUDE AND AMBIENT CAPABILITY

	0°C	10°C	20°C	30°C	40°C	50°C	60°C
0 m	1.00	1.00	1.00	1.00	1.00	1.00	0.95
500 m	1.00	1.00	1.00	1.00	1.00	1.00	0.93
1000 m	1.00	1.00	1.00	1.00	1.00	0.96	0.89
1500 m	1.00	1.00	1.00	0.97	0.94	0.91	0.80
2000 m	0.95	0.95	0.94	0.91	0.88	0.85	0.68
2500 m	0.90	0.90	0.89	0.86	0.83	0.80	0.57
3000 m	0.85	0.85	0.83	0.80	0.78	0.75	0.48
3500 m	0.81	0.81	0.73	0.64	0.57	0.50	0.41
4000 m	0.77	0.70	0.62	0.54	0.48	0.42	0.36
4500 m	0.67	0.59	0.52	0.46	0.41	0.37	0.31

ENGINE HEAT REJECTION (32 – 85 MN GAS)

PERCENT LOAD	Engine Power		Jacket Water		Aftercooler		Exhaust		Atmosphere	
	bkW	bhp	kW	Btu/min	kW	Btu/min	kW	Btu/min	kW	Btu/min
100	1709	2292	692	39,353	395	22,463	1851	105,265	149	8473
75	1294	1735	542	30,823	246	13,990	1443	82,062	113	6426
50	881	1181	423	24,056	133	7564	1029	58,518	79	4493
25	472	633	317	18,027	14	796	633	35,998	46	2616

EMCP 4.4 FEATURES

140 mm (5.5 in) Graphic Display
- Generator AC voltage
  - 3 phase (L-L & L-N)
  - ± 0.25% Accuracy
- rpm and battery voltage
- Gen. AC current (per phase and average)
- Generator frequency
- Power metering (kW, kVA, kVAr, pf)
- Hour meters (kW-Hour, kVAr-Hour)
- Engine oil pressure (psi, kPa or bar)
- Engine oil temperature (°C or °F)
- Engine coolant temperature (°C or °F)
- Multiple language support
- Engine start and crank attempt counter
- Real-time clock

Communication
- Accessory CAN data link
- RS-485 annunciator data link
- RS-485 SCADA (Modbus RTU)
- Ethernet SCADA (Modbus TCP)

Controls
- Auto/start/stop
- Engine cool-down timer
- Emergency stop
- Engine cycle crank
- Programmable cycle timer
- Paralleling up to eight units

Generator Set Protection
- Over/under voltage
- Over/under frequency
- Generator phase sequence
- Over current (timed and inverse)
- Reverse kW, kVA
- Current balance
- Bus phase sequence
- Low oil pressure
- High coolant temp
- Low coolant level
- Fail to start
- Overspeed

Outputs
- 17 programmable digital outputs
- 3 programmable (4-20mA or ±10V)
- 2 programmable (PWM)

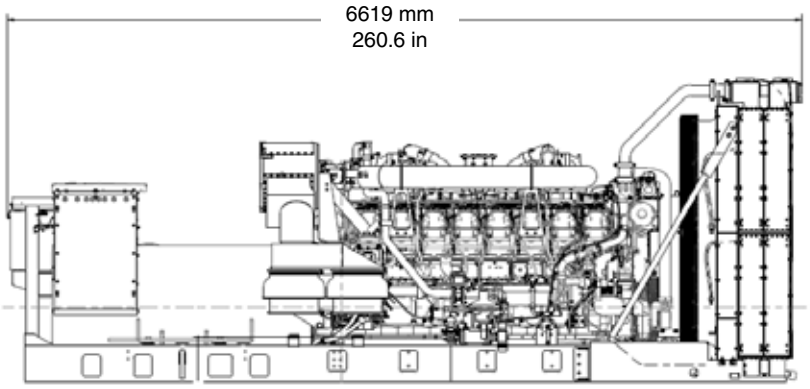
Inputs
- Emergency stop
- Remote start
- 12 programmable digital inputs
- Oil pressure and water temperature
- 4 programmable inputs (±10V, PWM, current, or resistive)
- Oil temperature, fuel level

Other Features
- 16 languages supported: Arabic, Chinese, Danish, Dutch, English, Finnish, French, German, Greek, Italian, Japanese, Portuguese, Russian, Spanish, Swedish, and Turkish
- Programmable security levels
- Reduced power mode
- Programmable kW relay
- Cat switchgear integration
- Status event log

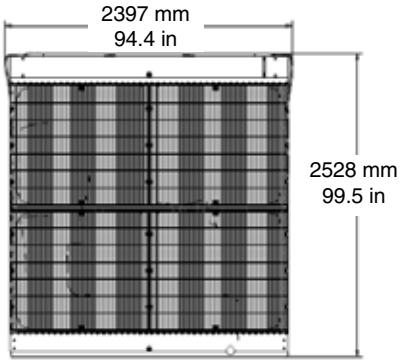
3516B GENERATOR SET WITH DYNAMIC GAS BLENDING

2000 kVA 50 Hz

GENERATOR SET



Right Side View



Front View

Generator Set Dimensions		
Length	6619 mm	260.6 in
Width	2397 mm	94.4 in
Height	2528 mm	99.5 in
Weight	19 000 kg	41,888 lb

Generator set weight is dry and includes engine, generator, and base.

Note: Do not use for installation design. See installation drawing for details.

RATING DEFINITIONS AND CONDITIONS

Prime rating – Output available with varying load for an unlimited time. Prime power in accordance with ISO8528. Typical load factor 60-70%.

Conditions – Performance is obtained and corrected in accordance with ISO 3046/1. Reference atmospheric inlet air: 100 kPa (29.61 in Hg), 25°C (77°F), 30% relative humidity at stated aftercooler temperature. Performance is also in accordance with SAE J1995, BS5514/1, and DIN6271/1 standard reference conditions.

Diesel fuel – Reference fuel is #2 distillate diesel with a 35 degree API gravity, lower heating value is 42 780 kJ/kg (18,390 Btu/lb) when used at 29°C (84.2°F), where the density is 838.9 g/L (7.001 lb/gal).

Gaseous fuel – Reference natural gas has a lower heating value of 33.74 kJ/L (905 BTU/cu. ft.). Low energy ratings are based on 18.64 kW/L (500 BTU/cu. ft.) lower heating value gas. High energy gas ratings are based on 87.56 kJ/L (2350 BTU/cu. ft.) lower heating value gas.

Performance Number: DM7937-00
LEHW0154-02 (7-13)