Dynamic Gas Blending Kit for use with 3512C Generator Set

1045 ekW (1492 kVA)
1101 bkW (1476 bhp)
1200 rpm
60 Hz

CAT® GENERATOR SET SPECIFICATIONS

V-12, 4-Stroke-Cycle-Diesel
Emissions ........................................ Non-regulated
Bore ........................................ 170 mm (6.69 in)
Stroke ........................................ 190 mm (7.48 in)
Displacement .................................. 52 L (3158 in³)
Aspiration ..................................... Turbocharged-Aftercooled
Fuel System .................................... EUI™
Engine Control and Protection ............ ADEM™ A4
Generator ..................................... SR4B
Voltage ........................................ 600V
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•SSM™ 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 drop 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

LEHW0194-00
## TECHNICAL DATA AND SPECIFICATIONS

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<thead>
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<th>Generator Set Data</th>
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<tr>
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<td>1200</td>
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<td>BMEP</td>
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Note: Reference the A&I guide for specific gaseous fuel requirements

*At rated load and maximum substitution

**Maximum 32MN-85MN gas at rated

***Represents reference generator set configuration
3512C DYNAMIC GAS BLENDING KIT FOR USE WITH 3512C GENERATOR SET

1045 ekW  60 Hz

ALTITUDE AND AMBIENT CAPABILITY

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<thead>
<tr>
<th></th>
<th>0°C</th>
<th>10°C</th>
<th>20°C</th>
<th>30°C</th>
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<tr>
<td>0 m</td>
<td>1.00</td>
<td>1.00</td>
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<td>1.00</td>
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<tr>
<td>500 m</td>
<td>1.00</td>
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<tr>
<td>1000 m</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<td>1.00</td>
<td>1.00</td>
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<td>0.94</td>
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<td>2500 m</td>
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<td>0.97</td>
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<td>0.94</td>
<td>0.91</td>
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<td>0.93</td>
<td>0.91</td>
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<td>0.85</td>
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<td>4000 m</td>
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ENGINE HEAT REJECTION (32 – 85 MN GAS)

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<tr>
<th>PERCENT LOAD</th>
<th>Engine Power</th>
<th>Jacket Water</th>
<th>Aftercooler</th>
<th>Exhaust</th>
<th>Atmosphere</th>
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<tr>
<td></td>
<td>bkW</td>
<td>bhp</td>
<td>kW</td>
<td>Btu/min</td>
<td>kW</td>
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<tr>
<td>100</td>
<td>1101</td>
<td>1476</td>
<td>414</td>
<td>23,544</td>
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<tr>
<td>75</td>
<td>826</td>
<td>1108</td>
<td>336</td>
<td>19,108</td>
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<tr>
<td>50</td>
<td>550</td>
<td>738</td>
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<td>25</td>
<td>330</td>
<td>443</td>
<td>188</td>
<td>10,691</td>
<td>19</td>
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</table>

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
### Generator Set Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Weight</th>
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<tbody>
<tr>
<td></td>
<td>6051 mm</td>
<td>2318 mm</td>
<td>2659 mm</td>
<td>14,453 kg</td>
</tr>
</tbody>
</table>

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.