



Image shown may not reflect actual package.

## STANDBY

**2000 e kW 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.

## FEATURES

### FUEL/EMISSIONS STRATEGY

- Low fuel consumption

### UL 2200

- UL 2200 Listed configuration available

### FULL RANGE OF ATTACHMENTS

- Wide range of bolt-on system expansion attachments, factory designed and tested

### ENCLOSURES (optional)

- Weather protective and sound attenuated

### SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

### WORLDWIDE PRODUCT SUPPORT

- Caterpillar® dealers provide extensive post sale support including maintenance and repair agreements
- Caterpillar dealers fill 99.7% of parts orders within 24 hours
- Caterpillar dealers have over 1,844 dealer branch stores operating in 166 countries
- The 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 3516B TA DIESEL ENGINE

- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
- UL 2200 Listed packages are available. Certain restrictions may apply. Consult with your Caterpillar dealer

### CAT SR4B GENERATOR

- Matched to the performance and output characteristics of Caterpillar engines
- Optimum winding pitch for minimum total harmonic distortion and maximum efficiency
- Single point access to accessory connections
- UL 1446 recognized Class H insulation

### CAT CONTROL PANELS

- Controls designed to meet individual customer needs:
  - EMCP II+ offers full-featured power metering and protective relaying
- UL 508A Listed

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## FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	<ul style="list-style-type: none"> <li>• Single element canister type air cleaner</li> <li>• Service indicator</li> </ul>	<ul style="list-style-type: none"> <li>• Dual element &amp; heavy duty air cleaners</li> <li>• Air inlet adapters &amp; shutoff</li> </ul>
Cooling	<ul style="list-style-type: none"> <li>• Radiator with guard (43°C)</li> <li>• Coolant drain line with valve</li> <li>• Fan and belt guards</li> <li>• Caterpillar Extended Life Coolant*</li> <li>• Coolant level sensors</li> </ul> <p>*Not included with packages without radiators</p>	<ul style="list-style-type: none"> <li>• Radiator with 50°C ambient capability</li> <li>• Radiator removal</li> <li>• Heat exchanger and expansion tank</li> <li>• Radiator duct flange</li> <li>• Coolant level switch gauge</li> <li>• Jacket water heater</li> </ul>
Exhaust	<ul style="list-style-type: none"> <li>• Dry exhaust manifold</li> <li>• Flanged faced outlets</li> </ul>	<ul style="list-style-type: none"> <li>• Mufflers (15 dba)</li> <li>• Stainless steel exhaust flex fittings</li> <li>• Elbows, flanges, expanders &amp; Y adapters</li> </ul>
Fuel	<ul style="list-style-type: none"> <li>• Secondary fuel filters</li> <li>• Fuel priming pump</li> <li>• Flexible fuel lines</li> <li>• Fuel cooler*</li> </ul> <p>*Not included with packages without radiators</p>	<ul style="list-style-type: none"> <li>• Water separator</li> <li>• Duplex fuel filter</li> </ul>
Generator	<ul style="list-style-type: none"> <li>• Permanent magnet excited</li> <li>• Class H insulation</li> <li>• Class F temperature (105°C prime/130°C standby)</li> <li>• Reactive droop</li> <li>• Digital Voltage Regulator, 3-phase sensing</li> <li>• Bus bar connections</li> <li>• Winding temperature detectors</li> <li>• Anti-condensation space heaters</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Voltage Regulator with KVAR/PF control</li> <li>• Bearing temperature detectors</li> <li>• Oversize &amp; premium generators</li> <li>• Cable access box</li> <li>• European bus bars</li> <li>• Circuit breakers, UL listed, 3 pole with shunt trip (low &amp; medium voltage only)</li> <li>• Circuit breakers, IEC compliant, 3-pole with shunt trip (low &amp; medium voltage only)</li> </ul>
Governor	<ul style="list-style-type: none"> <li>• ADEM™ II</li> </ul>	<ul style="list-style-type: none"> <li>• Load share module</li> </ul>
Control Panels	<ul style="list-style-type: none"> <li>• EMCP II+ (package mounted, rear facing)</li> </ul>	<ul style="list-style-type: none"> <li>• Customer Communication Module</li> <li>• Local alarm modules</li> <li>• Remote annunciator modules</li> <li>• Auto starting aid &amp; switch*</li> </ul> <p>*Cannot be used with UL LIST</p>
Lube	<ul style="list-style-type: none"> <li>• Lubricating oil and filter</li> <li>• Oil drain line with valves</li> <li>• Fumes disposal</li> <li>• Gear type lube oil pump</li> </ul>	<ul style="list-style-type: none"> <li>• Oil level regulator</li> <li>• Deep sump oil pan</li> <li>• Electric &amp; air prelube pumps</li> <li>• Manual prelube with sump pump</li> <li>• Duplex oil filter</li> <li>• Oil level regulator</li> </ul>
Mounting	<ul style="list-style-type: none"> <li>• 330 mm (13 in) structural steel rails</li> <li>• Spring-type, anti-vibration mounts (shipped loose)</li> </ul>	<ul style="list-style-type: none"> <li>• Isolator removal</li> </ul>
Starting/Charging	<ul style="list-style-type: none"> <li>• 24 volt starting motor(s)</li> <li>• 45 amp charging alternator</li> <li>• Batteries with rack and cables</li> <li>• Battery disconnect switch</li> </ul>	<ul style="list-style-type: none"> <li>• Battery chargers (10 Amp)</li> <li>• Oversize batteries</li> <li>• Ether starting aids</li> <li>• Heavy duty starting motors</li> <li>• Barring device (manual)</li> <li>• Air starting motor with control &amp; silencer</li> </ul>
General	<ul style="list-style-type: none"> <li>• Right-hand service</li> <li>• Paint - Caterpillar Yellow except rails and radiators gloss black</li> <li>• SAE standard rotation</li> <li>• Flywheel and flywheel housing - SAE No. 00</li> </ul>	<ul style="list-style-type: none"> <li>• Enclosures</li> <li>• Front stub shaft</li> <li>• CSA certification</li> <li>• EU Certificate of Conformance</li> </ul>
Note	<p>Standard and optional equipment may vary for UL 2200 Listed Packages. UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics.</p>	

## SPECIFICATIONS

### CAT GENERATOR

SR4B Generator

Frame size.....	827
Excitation.....	Permanent Magnet
Pitch.....	0.6667
Number of poles.....	4
Number of bearings.....	002
Insulation.....	UL 1446 Recognized Class H with tropicalization and antiabrasion
IP rating.....	Drip Proof IP22
Alignment.....	Closed Coupled
Overspeed capability - % of rated.....	180
Wave form.....	003.00
Paralleling kit/Droop transformer.....	Standard
Voltage regulator.3 Phase sensing with selectable volts/Hz	
Voltage regulation.....	Less than +/- 1/2% (steady state)
	Less than +/- 1% (no load to full load)
Telephone Influence Factor.....	Less than 50
Harmonic Distortion.....	Less than 5%

### CAT DIESEL ENGINE

3516B TA, V-16, 4-stroke-cycle watercooled diesel

Bore - mm.....	170.00 mm (6.69 in)
Stroke - mm.....	215.00 mm (8.46 in)
Displacement - L.....	78.08 L (4764.73 in <sup>3</sup> )
Compression ratio.....	15.5:1
Aspiration.....	TA
Fuel system.....	Electronic unit injection

### CAT CONTROL PANELS

- EMCP II+
- 24 Volt DC Control
- NEMA 12, IP44 enclosure
- Electronically dead front
- Lockable hinged door
- Generator instruments meet ANSI C-39-1
- Generator terminal box mounted
- Single location for customer connection
- UL508A Listed
- Panel illuminating lights
- Auto start/stop control
- Voltage adjust potentiometer
- True RMS metering, 3-phase
- Digital indications for:
  - RPM
  - Operating hours
  - Oil pressure
  - Coolant temperature
  - System DC volts
  - L-L volts, L-N volts, Phase amps, Hz
- ekW, kVA, kVAR, kWhr, %kW, PF
- Shutdowns with indicating lights for:
  - Low oil pressure
  - High coolant temperature
  - Low coolant level
  - Overspeed
  - Emergency stop
  - Failure to start (overcrank)
- Programmable protective relaying functions:
  - Under and over voltage
  - Under and over frequency
  - Reverse power
- Overcurrent (phase and total)
- Programmable kW level relay
- 3 spare indicator LED's (programmable)
- 4 spare alarm/shutdown inputs

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## TECHNICAL DATA

Open Generator Set - - 1500 rpm/50 Hz/400 Volts	DM7097
<b>Package Performance</b> Genset Power rating @ 0.8 pf Genset Power rating with fan	2500 kVA 2000 ekW
<b>Low Fuel Consumption</b> Coolant to aftercooler temp max	30 ° C
<b>Fuel Consumption</b> 100% load with fan 75% load with fan 50% load with fan	501.5 L/hr 370.5 L/hr 251.1 L/hr
<b>Cooling System</b> Air flow restriction (system) Engine coolant capacity Radiator coolant capacity Engine Coolant capacity with radiator/exp. tank	0.12 kPa 233.0 L 223.3 L 456.3 L
<b>Exhaust System</b> Combustion air inlet flow rate Exhaust stack gas temperature Exhaust gas flow rate Exhaust flange size (internal diameter) Exhaust system backpressure (maximum allowable)	160.5 m <sup>3</sup> /min 480.8 ° C 425.9 m <sup>3</sup> /min 203.2 mm 6.7 kPa
<b>Heat Rejection</b> Heat rejection to coolant (total) Heat rejection to exhaust (total) Heat rejection to aftercooler Heat rejection to atmosphere from engine Heat rejection to atmosphere from generator	626 kW 1900 kW 525 kW 142 kW 66.1 kW
<b>Alternator</b> Motor starting capability @ 30% voltage dip Frame Temperature Rise	4287 skVA 827 125 ° C
<b>Lube System</b> Sump refill with filter	401.3 L

Ambient capability at 200 m (660 ft) above sea level. For ambient capability at other altitudes, consult your Caterpillar dealer.

UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40 degree C ambient per NEMA MG1-32.

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## RATING DEFINITIONS AND CONDITIONS

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**Meets or Exceeds International Specifications:** -ABGSM TM3, AS1359, AS2789, BS4999, BS5000, BS5514, DIN6271, DIN6280, EGSA101P, IEC34/1, ISO3046/1, ISO8528, JEM1359, NEMA MG 1-22, VDE0530, 89/392/EEC, 89/336/EEC

**Standby** - Output available with varying load for the duration of the interruption of the normal source power. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046/1, AS2789, DIN6271, and BS5514. Standby ambients shown indicate ambient temperature at 100 percent load which results in a coolant top tank temperature just below the shutdown temperature.

**Ratings** are based on SAE J1995 standard conditions. These ratings also apply at ISO3046/1, DIN6271, and BS5514 standard conditions.

**Fuel Rates** are based on fuel oil of 35° API (16° C or 60° F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

**Additional Ratings** may be available for specific customer requirements. Consult your Caterpillar representative for details.

**DIMENSIONS**

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<b>Package Dimensions</b>	
<b>Length</b>	<b>6356.2 mm</b>
<b>Width</b>	<b>2317.8 mm</b>
<b>Height</b>	<b>2545.1 mm</b>
<b>Weight</b>	<b>15 458 kg</b>

Note: Do not use for installation design.  
See general dimension drawings for  
detail (Drawing #2001184).

Performance No.: DM7097

Feature Code:: 516DE1L

Source:: U.S. Sourced

4 May 2005

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



## EMCP II ELECTRONIC MODULAR CONTROL PANEL

The Electronic Modular Control Panel (EMCP II) combines the engine control and AC metering into one, user-friendly control. The displays, along with enhanced self-diagnostic capabilities, take the guesswork out of generator set monitoring. Representative graphics and LCD readouts make engine status and AC metering easy to understand, even for untrained personnel. The advanced microprocessor-based EMCP II combined with the Caterpillar Customer Communication Module (CCM) give you the flexibility to remotely monitor and control your Caterpillar packaged generator set.

### FEATURES

#### UL 508A

- UL 508A Listed

#### RELIABLE, DURABLE, AND ACCURATE

- Environmentally sealed, die-cast aluminum housing isolates and protects electrical components against failure caused by moisture and dirt contamination.
- Rigorous vibration testing ensures panel dependability.
- Maintains metering accuracy from -40° C (-40° F) to 70° C (158° F)
- Electrical noise immunity of 100 volts/meter
- True RMS sensing ensures AC metering accuracy is 0.5% for AC volts and amps.
- The digital, microprocessor-based system eliminates the need for a number of switches, meters, and sensing units. That means less wiring and fewer opportunities for mechanical failures.

#### FULL-FEATURED, EASY-TO-READ METERING

- LCD digital readout for: engine oil pressure, coolant temperature, engine rpm, system DC volts, engine running hours, generator AC volts, generator AC amps, and generator frequency
- Eight LED alarms, two programmable to general fault shutdown or general fault alarm

### ADVANCED CONTROLS

- Cycle cranking, with adjustable crank/rest period of 1 – 60 seconds
- Three spare inputs/one spare output activate at customer programmed setpoints
- Expanded remote communication module supported by an open RS-232C architecture — easily interfaced with existing plant systems and equipment

### SIMPLIFIED SERVICING

- All high voltages have been removed from the generator set status control module for safer panel servicing.
- Self-diagnostic capability pinpoints operational problems in need of attention.
- Using an SAE format, the panel zeros in on the affected system and identifies the component responsible for the failure.
- Key-pad programmable setpoints

### REGULATORY APPROVALS

- U.S. sourced control panels meet CSA requirements.
- Larne sourced control panels meet CE requirements.



## STANDARD/OPTIONAL FEATURES

EMCP II	
STANDARD FEATURES	
<b>Digital (LCD) Indication</b>	AC voltage (L-L) AC amps System diagnostics Frequency DC voltage Coolant temperature Oil pressure rpm Hours run
<b>Controls</b>	Auto start/stop Purge cycle (gas packages only) Staged shutdown (gas packages only) Emergency stop Lamp test Cycle crank Voltage control Cooldown timer Phase selector switch
<b>Enclosure</b>	NEMA 1, IP22 Vandal door
<b>Indicating Lights with Shutdown</b>	Low oil pressure High coolant temperature Overspeed Overcrank Emergency stop High inlet air temp (gas TA engines only) Detonation sensitive timing (gas LE engines only) Fault shutdown* Fault alarm* *3 spare inputs — customer programmable *1 spare input — customer programmable (gas packages only)
OPTIONAL FEATURES	
<b>Protective Devices</b>	Low coolant level (standard on some packages) Fixed relays: Over/undervoltage (available on some packages)
<b>Miscellaneous Controls</b>	Electronic governor: Isochronous speed control Load share Alarm modules — local (with horn and silence switch) Frequency control Common alarm/shutdown volt free contact Generator running volt free contact Ether starting aid (not available on gas packages) Manual synchronizing modules Computer communications data link Panel lights Remote annunciator modules

## SETPOINT PROGRAMMING PROVIDES CUSTOMER FLEXIBILITY

### ENGINE/GENERATOR CONFIGURATION

- Setpoints affect proper operation and serviceability of the engine and accuracy of information shown on the display
- Factory set for optimum performance
- Twenty-four customer-programmable setpoints reflect changes in site condition — example: fuel solenoid type, ring gear teeth, crank termination speed, etc.

### SPARE INPUT/OUTPUT

- Designed for meeting the requirements of the customer or application
- Three spare inputs/one spare output accessed on auxiliary terminal strip
- Customer Programmable
  - Input active state
  - Input time delay
  - Input response:
  - Output trigger condition
  - shutdown/alarm

## EXPANDED SYSTEM FLEXIBILITY

### ALARMS AND ANNUNCIATORS

EMCP II Control Panel includes two slots for optional alarm or synchronizing modules. Each alarm module contains a block of eight LEDs. Customers select from the following:

- NFPA99/110 alarm modules
- Custom alarm module
- Manual synchronizing module

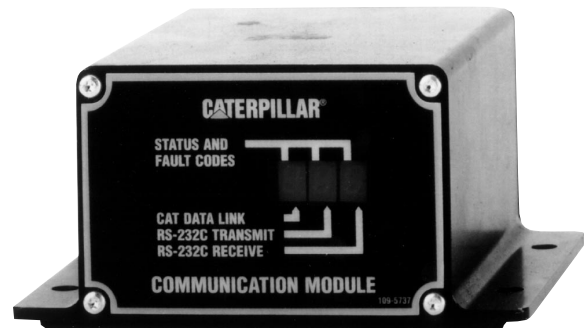


Customer Interface Module (CIM) is a relay board that provides nine contacts for custom remote annunciation.



### REMOTE COMMUNICATION

The Caterpillar Customer Communication Module (CCM) provides a means to remotely monitor and control single or multiple packaged generator sets at a common site. By accessing the CCM from a personal computer or other RS-232C device, each unit can be remotely started and stopped, and all engine and generator parameters can be monitored on a 'real time' basis. Published, open architecture enables you to connect the CCM to an existing plant information system.



### SYSTEM SOFTWARE

CCM PC is a user-friendly, IBM compatible, windows-based program. CCM PC interfaces with the CCM and the EMCP II. Remote control ability, parameter status display, diagnostic viewing/clearing options and parameter logging are among its standard tools. An on-line help system provides fingertip access to software questions and instructions. Integrated file management facility allows you to copy, move, delete, view, print, and rename documents and files from within CCM PC without the use of DOS file names or the Windows file manager.

## EMCP II SPECIFICATIONS

### EMI Immunity

IEC 801-2, IEC 801-3, IEC 801-4, EN 5082-2

### Enclosure

NEMA 1, IP22

### Humidity

0 to 100% relative humidity

### Impervious to:

salt spray, fuel, oil and oil additives, coolant, spray cleaners, chlorinated solvents, hydrogen sulfide and methane gas, and dust

### Input and output protection

all inputs and outputs are protected against short circuits to (+/-) battery

### Input voltage range (24 VDC nominal)

14 to 45 VDC

### Power requirements

10 watts (with generator set in standby mode — no alarms)

### Reverse polarity protected

### Shock, withstands 20 g

### Temperature range

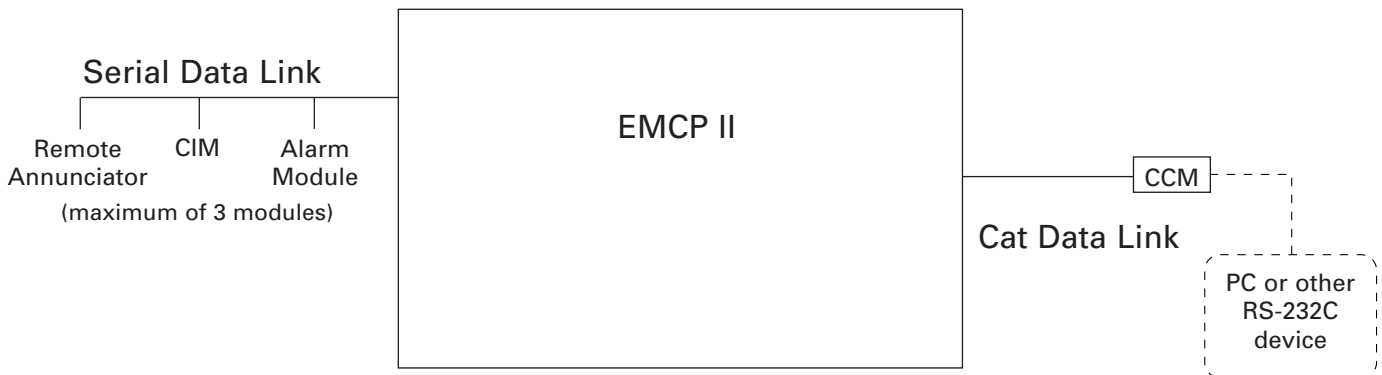
Operating: -40° C to 70° C (-40° F to 158° F)

Storage: -55° C to 85° C (-67° F to 185° F)

### Vibration

withstands 2.0 g @ 18 to 500 Hz

## EMCP II SYSTEM HIERARCHY DRAWING



[www.CAT-ElectricPower.com](http://www.CAT-ElectricPower.com)

U.S./European sourced

LEHX9589-02 (06-01)  
Supersedes LEHX9589-01

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