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# Diesel Generator Set

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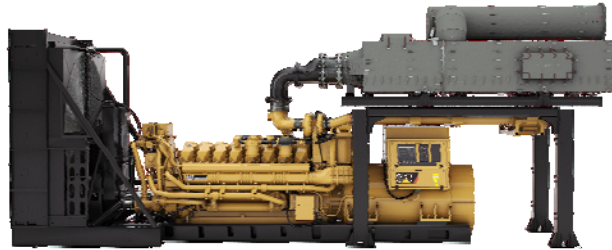


Image shown may not reflect actual package

## Mission Critical 3100 ekW 2825 kVA 60 Hz 1800 rpm 4160 Volts

Caterpillar is leading the power generation Market place with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

### FUEL/EMISSIONS STRATEGY

- US EPA Tier 4 Final

### DESIGN CRITERIA

- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

### 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

### SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

### WORLDWIDE PRODUCT SUPPORT

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

### CAT C175-16 DIESEL ENGINE

- Reliable, rugged, durable design
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Engine performance optimized for use with Cat clean emissions module (CEM)

### CAT CLEAN EMISSIONS MODULE (CEM)

- Diesel oxidation catalyst for particulate matter (PM) and hydrocarbon (HC) control
- Selective catalytic reduction (SCR) with integrated sound attenuation
- Integrated electronics for monitoring, protection, and closed loop NO<sub>x</sub> control.
- Reliable, compact, and lightweight system gives maximum installation flexibility

### CAT GENERATOR

- Matched to the performance and output characteristics of Cat engines
- Single point access to accessory connections

### CAT EMCP 4 CONTROL PANELS

- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

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## Factory Installed Standard & Optional Equipment

System	Standard	Optional
Air Inlet	<ul style="list-style-type: none"> <li>Air cleaner; 4 x single element canister with service indicator(s)</li> <li>Plug group for air inlet shut-off</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Air cleaner; 4 x dual element with service indicator(s)</li> <li><input type="checkbox"/> Air inlet adapters</li> </ul>
Cooling	<ul style="list-style-type: none"> <li>SCAC cooling</li> <li>Jacket water and AC inlet/outlet flanges</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Remote horizontal SCAC radiator</li> <li><input type="checkbox"/> Remote fuel cooler</li> </ul>
Exhaust	<ul style="list-style-type: none"> <li>Exhaust manifold - dry - dual</li> <li>Bolted flange (ANSI 6" &amp; SIN 150) with bellow for each turbo (qty 4)</li> <li>Clean Emissions Module (CEM)</li> <li>CEM control cabinet</li> <li>Flanged CEM outlet</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Stainless steel exhaust flex fittings</li> <li><input type="checkbox"/> CEM installation package including support, exhaust connection kit, harness, and heated urea lines.</li> </ul>
Fuel	<ul style="list-style-type: none"> <li>Primary fuel filter with water separator</li> <li>Secondary fuel filters</li> </ul>	
Generator	<ul style="list-style-type: none"> <li>3 Phase brushless, Salient pole</li> <li>Cat digital voltage regulator (CDVR) with VAR/PF control, 3-phase sensing</li> <li>Winding temperature detectors</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Oversize generators</li> <li><input type="checkbox"/> Anti-condensation space heaters</li> </ul>
Power Termination	<ul style="list-style-type: none"> <li>Bus bar (NEMA mechanical lug holes)</li> <li>Top cable entry</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Bottom cable entry</li> <li><input type="checkbox"/> Right or left power termination</li> </ul>
Governor	<ul style="list-style-type: none"> <li>ADEM™ A4</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Load share module</li> </ul>
Control Panel	<ul style="list-style-type: none"> <li>EMCP 4</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> EMCP 4.2</li> <li><input type="checkbox"/> EMCP 4.3</li> <li><input type="checkbox"/> Local &amp; remote annunciator modules</li> <li><input type="checkbox"/> Digital I/O Module</li> <li><input type="checkbox"/> Generator temperature monitoring &amp; protection</li> </ul>
Lube	<ul style="list-style-type: none"> <li>Lubricating oil</li> <li>Gear type lube oil pump</li> <li>Integral lube oil cooler</li> <li>Oil filter, filler and dipstick</li> <li>Oil drain line and valve</li> <li>Pre-lube pump</li> <li>Closed crankcase ventilation (CCV) system</li> </ul>	
Mounting	<ul style="list-style-type: none"> <li>Rails - engine / generator / radiator mounting</li> <li>Rubber anti-vibration mounts (shipped loose)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Spring type vibration isolator</li> </ul>
Starting / Charging	<ul style="list-style-type: none"> <li>24 volt starting motor(s)</li> <li>Batteries with rack and cables</li> <li>Battery disconnect switch</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Battery chargers (20, 35, &amp; 50 Amp)</li> <li><input type="checkbox"/> Oversize batteries</li> <li><input type="checkbox"/> Heavy duty starting motors</li> <li><input type="checkbox"/> Barring device (manual)</li> <li><input type="checkbox"/> 75A charging alternator</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>	

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## SPECIFICATIONS

### CAT GENERATOR

Frame ..... 1848  
Excitation ..... Permanent Magnet  
Pitch.....0.6667  
Number of poles.....4  
Number of leads.....6  
Number of bearings .....Two Bearing  
Insulation .....Class H  
IP rating .....Drip proof IP23  
Over speed capability - % of rated.....125%  
Wave form deviation.....2 %  
Voltage regulator.....3 phase sensing with  
selectable V/Hz regulation  
Voltage regulation....Less than  $\pm 1/2\%$  (steady state)  
Less than  $\pm 1/2\%$  (3% speed change)

### CAT DIESEL ENGINE

C175, SCAC, V-16, 4 stroke, water-cooled diesel

Bore .....175.00 mm (6.89 in)  
Stroke .....220.00 mm (8.66 in)  
Displacement .....84.67 L (5166.88 in<sup>3</sup>)  
Compression ratio.....15.3:1  
Aspiration.....TA  
Fuel system.....Common Rail  
Governor Type.....ADEM™ A4

### CAT EMCP 4 CONTROL PANELS

EMCP 4 controls including:

- Run / Auto / Stop Control
- Speed & Voltage Adjust
- Engine Cycle Crank
- Emergency stop pushbutton

EMCP 4.2 controller features:

- 24-volt DC operation
- Environmental sealed front face
- Text alarm/event descriptions

Digital indication for:

- RPM
- DC volts
- Operating hours
- Oil pressure (psi, kPa or bar)
- Coolant temperature
- Volts (L-L & L-N), frequency (Hz)
- Amps (per phase & average)
- Power Factor (per phase & average)
- kW (per phase, average & percent)
- kVA (per phase, average & percent)
- kVAr (per phase, average & percent)
- kW-hr & kVAr-hr (total)

Warning/shutdown with common LED indication of shutdowns for:

- Low oil pressure
- High coolant temperature
- Overspeed
- Emergency stop
- Failure to start (overcrank)
- Low coolant temperature
- Low coolant level

Programmable protective relaying functions:

- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under Frequency (81 o/u)
- Reverse Power (kW) (32)
- Reverse Reactive Power (kVAr) (32RV)
- Overcurrent (50/51)

Communications

- Customer data link (Modbus RTU)
- Accessory module data link
- Serial annunciator module data link

- 6 programmable digital inputs
- 4 programmable relay outputs (Form A)
- 2 programmable relay outputs (Form C)
- 2 programmable digital outputs

Compatible with the following optional modules:

- Digital I/O module
- Local Annunciator
- Remote annunciator
- RTD module
- Thermocouple module

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## Technical Data

Open Generator Set - 1800 rpm/60 Hz/4160 Volts	EM0314-02	
<b>Generator Set Package Performance</b>		
Genset Power rating @ 0.8 pf	3875 kVA	
Genset Power Rating without fan	3100 ekW	
<b>Fuel Consumption<sup>1</sup></b>		
100% Load without fan	790.3 L/hr	208.8 Gal/hr
75% Load without fan	616.2 L/hr	162.8 Gal/hr
50% Load without fan	500.0 L/hr	132.1 Gal/hr
<b>Diesel Exhaust Fluid (DEF) Consumption<sup>2</sup></b>		
100% Load without fan	50.7 L/hr	13.4 Gal/hr
75% Load without fan	29.5 L/hr	7.8 Gal/hr
50% Load without fan	15.1 L/hr	4.0 Gal/hr
<b>Cooling System<sup>3</sup></b>		
Engine coolant capacity	303.5 L	80.2 gal
<b>Inlet Air</b>		
Combustion air inlet flow rate	259.3 mm <sup>3</sup> /min	9156 cfm
<b>Exhaust System<sup>4</sup></b>		
Exhaust stack gas temperature	472 °C	882.2 °F
Exhaust gas flow rate	667 mm <sup>3</sup> /min	23559 cfm
Exhaust system backpressure (maximum allowable)	6.7 kPA	26.9 in water
<b>Heat Rejection</b>		
Heat rejection to coolant	1373 kW	78082 Btu/min
Heat rejection to exhaust (total)	3113 kW	176978 Btu/min
Heat rejection to aftercooler	379 kW	21577 Btu/min
Heat rejection to atmosphere from engine	175 kW	9978 Btu/min
Heat rejection to atmosphere from CEM	53 kW	3026 Btu/min
Heat rejection to atmosphere from generator	116 kW	6591 Btu/min
<b>Alternator<sup>5</sup></b>		
Motor starting capability @30% voltage dip	1949 skVA	
Frame	1848	
Temperature Rise	150 °C	270 °F
<b>Emissions (Nominal)<sup>7</sup></b>		
NOx g/hp-hr	0.53 g/hp-hr	
CO g/hp-hr	0.01 g/hp-hr	
HC g/hp-hr	0.00 g/hp-hr	
PM g/hp-hr	0.01 g/hp-hr	

<sup>1</sup> US EPA Tier 4 Final diesel engines required the use of Ultra Low Sulfur Diesel (ULSD) fuel in order to protect emissions control systems, help comply with emissions standards, and meet published maintenance intervals. ULSD fuel will have ≤ 15 ppm (0.0015%) sulfur using the ASTM D5453, ASTM 2622, or SIN 51400 test methods.

<sup>2</sup> Diesel Exhaust Fluid (DEF) is 32.5% urea in de-ionized water and shall meet ISO-22241

<sup>3</sup> For ambient and altitude capabilities consult your Caterpillar dealer. Air flow restriction (system) is added to existing restriction from factory.

<sup>4</sup> Backpressure allowance is total backpressure available for the customer excluding the clean emissions module (CEM). Does not include optional factory exhaust piping.

<sup>5</sup> Some 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.

<sup>6</sup> Requires the use of CJ4 oil in order to meet published maintenance intervals.

<sup>7</sup> Emissions data measurement procedures 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 operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle. Emissions values are tailpipe out with aftertreatment installed. Values shown as zero may be greater than zero but were below the detection level of the equipment used at the time of measurement.

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## RATING DEFINITIONS AND CONDITIONS

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### **Applicable Codes, Regulations, and Standards:**

AS1359, CSAC22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 72/23/EEC, 98/37/EC, 2004/108/EC

**Mission Critical** - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 85% of the mission critical power rating. Typical peak demand up to 100% of the mission critical rated ekW for 5% of the operating type. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

**Ratings** are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions

**Fuel Rates** are based on fuel oil of 35° API [16° C (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, contact your Cat representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

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## Dimensions

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Package Dimensions		
Length	6492 mm	255.6 in
Width	2098 mm	82.6 in
Height	2208 mm	87.0 in

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions.

CEM Dimensions		
Length	4580 mm	180.3 in
Width	2361 mm	92.9 in
Height	1714 mm	67.5 in

Performance No: EM0314-02

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

Feature Code: 175DR49

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Sourced: U.S. Sourced

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