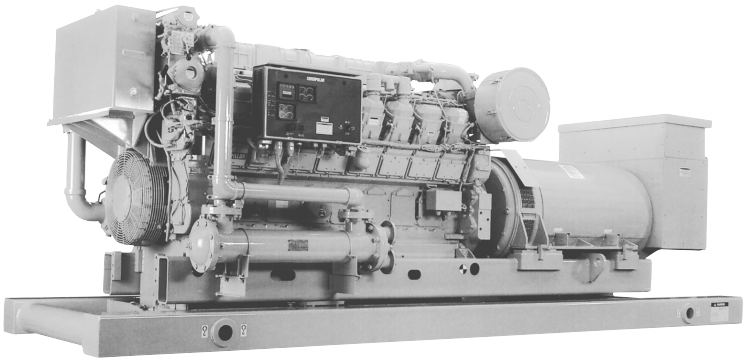
CATERPILLAR®

Offshore SCR Power Modules 3512B 3516B



Shown with Optional Equipment

The products briefly described here represent Caterpillar power modules for use as prime rig power on SCR electric drill rigs. These Cat® engines, generators, radiators, and bases are a result of years of experience in the oilfields and an extensive design and testing program aimed at developing oilfield power modules that meet the demands of the drilling contractor.

It is essential to have a properly designed base for diesel electric power modules used on drilling rigs. Misalignment between engine and generator can cause vibration and shorten the life of couplings and bearings. Caterpillar has recognized this fact and designed a base which provides a built-in three-point mounting system. The engine and generator are mounted by Caterpillar on this base and aligned to exacting tolerances at the factory.

The entire power module is manufactured and assembled by Caterpillar, providing single source responsibility.

FEATURES

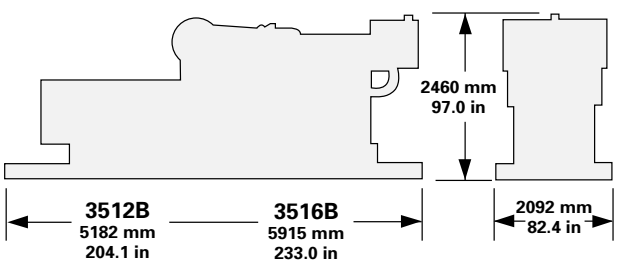
- **EXCELLENT FUEL ECONOMY**
  Highly efficient direct injection fuel system, low friction three-ring piston design
- **LONG ENGINE LIFE**
  Large cylinder displacement, exceptionally rigid high-strength block
- **EASY MAINTENANCE**
  Large inspection openings allow convenient access to internal components, long oil and fuel filter change intervals
- **COMPACT**
  Ease of installation and servicing even when machinery space is limited
- **MEETS OR EXCEEDS INTERNATIONAL SPECIFICATIONS:**
  ABGSM TM3, AS1359, AS2789, BS4999, BS5000, BS5514, DIN6271, DIN6280, EGSA101P, IEC34/1, ISO3046/1, ISO8528, JEM1359, NEMA MG1, VED0530, 89/392/EEC, 89/336/EEC

CATERPILLAR® ENGINE SPECIFICATIONS

CAT® 3512B, 3516B

Bore — mm (in)	170 (6.7)
Stroke — mm (in)	190 (7.5)
Displacement — L (cu in)	
3512B	51.8 (3158)
3516B	69 (4210)
Weight with Base — kg (lb)	
3512B	14 742 (32 500)
3516B	16 874 (37 200)

DIMENSIONS



ISO 9001 CERTIFIED

LEHW0101
Supersedes LEHW7470

TYPICAL EQUIPMENT

Air Inlet System

- Aftercooler core, corrosion resistant coating
- Air cleaners, regular duty, installed

Base Arrangement

- Engine and generator three-point mounted into outer base, oil drain extension, oil drip pan

Control System

- Advanced Diesel Engine Management II (ADEM II) modules with electronically controlled unit injectors (24 volt DC power from SCR control system)

Cooling System

- To ensure emissions compliance, optional or customer supplied heat exchangers or radiators must be capable of rejecting enough heat to allow proper operation at worst case site conditions and also must supply 60° C (140° F) SCAC cooling water to the aftercooler inlet, with an SCAC flow rate of at least 130 gpm with an ambient temperature of 30° C (86° F) and at site conditions.
- Heat exchanger cooled offshore: inlet controlled thermostats and housing, jacket water pump — gear driven, engine mounted expansion tank, aftercooler fresh water cooling pump — gear driven centrifugal, SCAC pump circuit contains a thermostat to keep the aftercooler coolant from falling below 30° C (85° F)
- Radiator cooled offshore: outlet controlled thermostat and housing, jacket water pump — gear driven, single outlet, aftercooler fresh water cooling pump — gear driven centrifugal, SCAC pump circuit contains a thermostat to keep the aftercooler coolant from falling below 30° C (85° F)

Exhaust System

- Dry gas-tight manifolds with thermo-laminated heat shields
- Dual turbochargers with thermo-laminated heat shields and watercooled bearing housing
- Flexible exhaust fitting/weldable exhaust flange

Flywheels and Flywheel Housings

- Flywheel, SAE No. 00, 183 teeth
- Flywheel housing, SAE No. 00, SAE standard rotation

Fuel System

- Electronically controlled unit injectors
- Fuel filter, LH
- Fuel transfer and priming pumps
- Flexible fuel lines

Generator

- SR4B, two-bearing, 600 V, 60 Hz, 3 phase, 0.7 pf, 10 wire, wye connected, brushless (voltage regulator is optional), space heater and 100 ohm platinum temperature detectors

Instrumentation

- Electronic instrument panel
  - LH with analog gauges for: oil and fuel pressure, oil and fuel filter differential, system DC voltage, exhaust and water temperature, fuel pressure, air inlet restriction
  - digital display for: tachometer, hours, fuel, service meter consumption — total and instantaneous

Lube System

- Crankcase breather, top mounted
- Deep sump oil pan
- Oil filler and dipstick
- Oil filter, cartridge type, LH
- Oil pump, gear type

TYPICAL EQUIPMENT continued

Protection System

- ADEM II monitoring system provides engine deration, alarm, or shutdown strategies to protect against adverse operating conditions. Selected parameters are customer programmable. Status available on engine mounted instrument panel and can be broadcast through the optional customer communications module or programmable relay control module(s). Initially set as follows:
  - Safety shutoff protection, electrical: oil pressure, water temperature, overspeed, crankcase pressure, aftercooler temperature, air inlet shutoff activated on overspeed or emergency stop included
  - Alarms, electrical: ECM voltage, oil pressure, water temperature (low and high), overspeed, crankcase pressure, aftercooler temperature (SCAC only), low water level (sensor shipped loose if no mounted expansion tank or radiator), air inlet restriction, exhaust stack temperature, filter differential pressure (oil and fuel)
  - Derate, electrical: high water temperature, crankcase pressure, aftercooler temperature, air inlet restriction, altitude, exhaust temperature
  - Emergency stop pushbutton (on instrument panel)
  - Alarm switches (oil pressure and water temperature), for connection to customer supplied alarm panel — unwired

Starting and Control

- Air-driven prelube pump (3516B), air silencer, air starting motor

General

- Lifting eyes, front and rear
- Paint, Caterpillar yellow
- Vibration damper and guard

ACCESSORY EQUIPMENT

- Crankcase explosion relief valves
- Customer communication module
- Duplex fuel and oil filters
- Jacket water heaters
- Mufflers
- Primary fuel filter
- Fuel cooler shell and tube
- Pyrometer and cylinder thermocouples
- Additional instrumentation: air cleaner restriction (2), intake manifold temperature, lubricating oil temperature, fuel filter differential
- Direct rack control interface
- Marine Society certificates
- Bypass centrifugal oil filters
- Metal particle detector

RATINGS (without fan)

Pumping and Drilling

Model	kW[1]	(hp)[1]	rpm	kV•A[2]	EPA[3]	IMO[4]
3512B	1101	(1476)	1200	1750	√	√
	1257	(1686)	1500	1900		√
3516B	1384	(1855)	1200	2150	√	√
	1717	(2302)	1500	2400		√

[1] Mechanical kW, 10% overload capability included above setting.

[2] Generators oversized to meet low power factor requirements.

[3] Emissions certified to 2000 nonroad USA EPA and CARB standards.

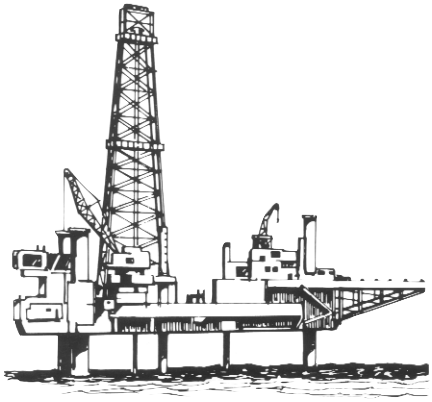
[4] Complies with the NO_x emissions limits of regulation 13 of ANNEX VI of MARPOL 73/78.

Caterpillar® SR4B Generator

- Designed, tested, and sized for SCR drill rig service
- 80° C over 40° C ambient temperature rise
- Form wound stator and rotor
- Class H insulated using Vacuum Pressure Impregnated (VPI) temperature-resistant materials
- Imbedded temperature detectors and generator space heater are standard
- Terminal box and copper bus bars for easy, dependable connections
- Two-bearing generators
- Optional bearing RTDs
- Rotors individually tested to 125% of rated speed; prototypes to 150% @ 170° C for two hours
- Anticondensation heaters standard

Offshore Rig Base

- For use with Caterpillar or customer supplied two-bearing generators
- Built-in three-point mounting system maintains alignment of engine-generator on uneven surface and from substructure flexing that can twist the base and cause engine-generator misalignment.



CATERPILLAR PARTS AND SERVICE

Caterpillar parts and service outlets are located in major oil producing areas worldwide. With the most comprehensive parts distribution system in the industry, most engine parts orders can be filled immediately over a dealer's counter. As a backup, dealers can quickly convey their parts needs to the nearest location in a network of Caterpillar parts facilities around the world. The dealer places an order with the Caterpillar parts depot and a computerized inventory control system helps fill that order, printing shipping instructions for any part in the system — wherever it might be.

While many oilfield contractors maintain a service department adept at handling repairs, they have the assurance that Caterpillar engine dependability is backed by a force of factory qualified dealer servicemen worldwide — men who are specially trained to keep Cat® engines operating at peak efficiency. For all engine repairs, from minor work to a major overhaul or rebuild, expert attention is as near as your phone or radio. Work is fast and accurate. Downtime is minimized.

Ask about installation and start-up procedures offered by Caterpillar.

RATING DEFINITIONS AND CONDITIONS

Ratings are based on SAE J1995 standard conditions of 100 kPa (29.61 in Hg) and 25° C (77° F). These ratings also apply at ISO3046/1, DIN6271, and BS5514 standard conditions of 100 kPa (29.61 in Hg), 27° C (81° F), and 60% relative humidity. Ratings are valid for air cleaner inlet temperatures up to and including 50° C (122° F).

Fuel consumption has a tolerance of +5% and is 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). Fuel consumption shown with all oil, fuel, and water pumps, engine driven.

Electric drive pumping and drilling: The power and speed capability of the engine which can be used to power mud pumps, rotary table, and drawworks on an electric drive drill rig.

Materials and specifications are subject to change without notice.

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

LEHW0101 (4-00)
Supersedes LEHW7470

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