



STANDBY 2000 kW
PRIME 1825 kW
POWER MODULE

50/60 Hz with On-package
 Auto Paralleling Control System

Voltage	Standby kW (kVA)	Prime kW (kVA)
480/277V	2000 (2500)	1825 (2281)
400V	1440 (1800)	1310 (1638)

FEATURES

The XQ2000 incorporates a wide range of rugged features into a package EPA Tier 2 and CARB certified for non-road mobile applications. The unit is factory designed, and certified prototype tested with torsional analysis. Each unit is production tested and delivered in a package ready to be connected to your fuel and power lines. Supported 100% by your Cat® dealer with warranty on parts and labor with Extended Warranty available in most areas. The generator set is designed and manufactured in an ISO 9001:2000 compliant facility. Generator set and components meet or exceed the following specifications:
 AS1359, AS2789, ABGSM TM3, BS4999, DIN6271, DIN6280, EGSA101P, JEM1359, IEC 34/1, ISO3046/1, ISO8528, NEMA MG1-22

RELIABLE, FUEL EFFICIENT DIESEL ENGINE

The compact, four-stroke-cycle Cat 3516C turbocharged-aftercooled diesel engine combines durability with minimum weight while providing dependability and economy. The fuel system operates on a variety of fuels.

CAT SR4B GENERATOR

Single bearing, wye-connected, static regulated, brushless, permanent magnet excited, the Cat SR4B 825 frame generator is designed to match the performance and output characteristics of the Caterpillar diesel engine driving it.

CAT ON-PACKAGE AUTO PARALLELING CONTROL SYSTEM

Provides single unit stand alone, island mode paralleling with other units, and single unit-to-utility paralleling capability. Operational modes are standby or base load control with soft load/unload and power factor control. Utility/intertie protection features provided by the standard Utility Multi-function Relay (UMR).

CATCOOLING SYSTEM

Engine mounted charge air radiator and remote mounted jacket water coolant radiator with electric motor. Sized compatible to rating with energy efficient fan and core. The cooling system provides 43C ambient capability & vertical discharge radiator for close proximity to buildings.

EXCLUSIVE CAT DIGITAL VOLTAGE REGULATOR (CDVR)

Three-phase sensing and adjustable Volts-per-Hertz regulation give precise control, excellent block loading, and constant voltage in the normal operating range.

ENVIRONMENTALLY FRIENDLY

110% spill containment of onboard engine fluids.

SOUND ATTENUATED CONTAINER

Provides ease of transportation and protection. Meets 75 dB(A) at 15 meters or below per SAE J1074 measurement procedure at 110% prime load.

FACTORY INSTALLED STANDARD EQUIPMENT

SYSTEM	STANDARD EQUIPMENT
Engine	EPA approved Caterpillar 3516C heavy duty diesel engine Heavy duty air cleaner with service indicator 60-Amp charging alternator Fuel filters – primary and duplex secondary with integral water separator and change-over valve Lubricating oil system including oil drain lines routed to engine rail Jacket water heater Fuel cooler and priming pump Electronic ADEM™ A3 controls 24V electric starting motors with battery rack and cables
Generator	SR4B brushless, permanent magnet excited, three-phase with Cat digital voltage regulator (CDVR), space heater, 6-lead design, Class H insulation operating at Class F temperature for extended life, winding temperature detectors and anti-condensation space heaters (120/240V 1.2 kW)
Containerized Module	40' ISO high cube container, CSC certified 3-axle, 40' ISO container chassis Seven (7) sound attenuated air intake louvers and 3 lockable personnel doors with panic release Side bus bar access door, external access load connection bus bars Shore power connection via distribution block connections for jacket water heater, battery charger, space heaters, and generator condensate heaters Standard lighting 3 AC/4 DC, one (1) single duplex service receptacle, 2 external break-glass emergency stop push buttons 1,250 gal fuel tank, UL listed, double wall, 9 hr runtime @ prime rating External lockable connections for fuel Sound attenuated 75 dB(A) @ 50 ft Spill containment 110% of all engine fluids Four (4) oversized maintenance-free batteries, battery rack and 20-Amp battery charger Hospital grade, internally insulated, rectangular exhaust silencer with vertical discharge Vibration isolators, corrosion resistant hardware and hinges External drain access to standard fluids Two 4.5 kg (10lb) carbon dioxide fire extinguishers (Qty 2) Standard Cat rental decals and painted standard Cat power module white Interior walls and ceilings insulated with 100 mm of acoustic paneling Floor of container insulated with acoustic glass and covered with galvanized steel
Cooling	Standard cooling provides 43° C ambient capability (60 Hz) at prime +10% rating Vertically mounted radiator, separate ATAAC and JW cores with vertical air discharge
Generator Controls and Protection	EMCP 3.3 genset mounted controller and wall-mounted auto paralleling controls Automatic start/stop with cool down timer Generator Protection features: 25, 32, 40, 50/51, 27/59, 81 O/U Utility multi-function relay protection features: 25, 27/59, 32, 47, 51, 51N, 81O/U UMR is IEEE1547 compliant in most application Reverse compatibility for interface to legacy power modules 3000A generator circuit breaker Multi-mode operation (island, multi-island and utility parallel), load sharing (multi-unit only) Manual and automatic paralleling capability Metering display: voltage, current, frequency, power factor, kW, WHM, kVAR, and synchroscope
Quality	Factory testing of standard generator set and complete power module UL, NEMA, ISO and IEEE standards O&M manuals

SPECIFICATIONS

Frame Size	825	CAT 3516C DIESEL ENGINE 3516C, 4-Stroke diesel Bore – mm (in) 170 (6.7) Stroke – mm (in) 190 (7.5) Displacement – L (cu in) 69 (4,210) Compression ratio 15:1 Aspiration TA Fuel system EU1 Governor type ADEM™ A3
Pitch	0.6667	
No. of poles	4	
Excitation	Static regulated brushless PM excited	
Constructions	Single bearing, close coupled	
Insulation	Class H	
Enclosure	Drip proof IP22	
Alignment	Pilot shaft	
Overspeed capability – % of rated	125% of rated	
Voltage regulator	3 phase sensing with Volts-per-Hertz	
Voltage regulation	Less than ± 0.5% voltage gain Adjustable to compensate for engine speed droop and line loss	
Wave form deviation	Less than 5% deviation	
Telephone Influence Factor (TIF)	Less than 50	
Harmonic Distortion (THD)	Less than 5%	

TECHNICAL DATA

Materials and specifications are subject to change without notice.

Generator Set Technical Data	Units	50Hz		60Hz	
		Prime	Standby	Prime	Standby
Power Rating	kW (KVA)	1310 (1637)	1440 (1800)	1825 (2281)	2000 (2500)
Performance Specification (Prime only)		DM8754	NA	DM8454	DM8264
Lubricating System Oil pan capacity	L (gal)	401.3 (106)		401.3 (106)	
Fuel System Fuel consumption 100% Load 75% Load 50% Load Fuel Tank Capacity Running time @ 75% rating	L/hr (gal/hr) L/hr (gal/hr) L/hr (gal/hr) L (gal) HR	350.1 (92.5) 281.9 (74.5) 205.5 (54.3) 4731 (1250) 16.7	372.9 (98.5) 302.8 (80.0) 195.8 (51.7) 15.6	483.2 (127.6) 380 (100.4) 270.5 (71.5) 4731 (1250) 12.5	525.7 (138.9) 408.2 (107.8) 294.2 (77.7) 11.5
Cooling System Radiator coolant capacity including engine	L (gal)	630 (166)		630 (166)	
Air Requirements Combustion air flow Maximum air cleaner restriction Generator cooling air	m ³ /min (cfm) kPa (in H ₂ O) m ³ /min (cfm)	114.8 (4052) 6.2 (24.9) 140 (5933)	118.1 (4173)	174.7 (6169) 6.2 (24.9) 140 (5933)	180.3(6367)
Exhaust System Exhaust flow at rated Exhaust temperature at rated kW – dry exhaust	m ³ /min (cfm) °C (°F)	311.3 (10993) 502.1 (935.8)	320.8 (11335) 513.1 (955.6)	404 (14260) 387 (728)	428.6 (15137) 405 (762)
Noise Rating (with enclosure)* @ 7 meters (23 feet) @ 15 meters (50 feet)	dB(A) dB(A)	77 73	78 74	78 74	79 75

Model	Length mm (in)	Width mm (in)	Height mm (in)	Weight with Lube oil and Coolant kg (lb)	Weight with fuel, lube oil and coolant Kg (lb)
XQ2000 w/o chassis	12192 (480)	2438 (96)	2896 (114)	75000 (34019)	84000 (38102)
XQ2000 w/ Chassis	12192 (480)	2438 (96)	4267 (168)	84000 (38102)	93000 (42184)

RATING DEFINITIONS

Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046. Standby ambients shown indicate ambient temperature at 100% load which results in a coolant top tank temperature just below the shutdown temperature.

Prime – Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of the prime rated kW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year. Prime power in accordance with ISO 3046. Prime ambients shown indicate ambient temperature at 100% load which results in a coolant top tank temperature just below the alarm temperature.

STANDARD FEATURES

EMCP 3.3 LOCAL CONTROL PANEL

- Generator mounted EMCP 3.3 provides power metering, protective relaying and engine and generator control and monitoring.
- Convenient service access for Caterpillar service tools (not included).
- Integration with the CDVR provides enhanced system monitoring.
- Ability to view and reset diagnostics of all controls networked on J1939 datalink eliminates need for separate service tools for troubleshooting.
- Real-time clock allows for date and time-stamping of diagnostics and events.
- True RMS AC metering, 3 phase: L-L volts, L-N volts, Phase, Amps, Hz, kW, kVA kVAR, kWhr, % kW, PF

EMCP 3.3 ENGINE OPERATOR INTERFACE

- Graphical display with positive image, transfective LCD, adjustable white backlight/contrast.
- Digital indication for:
 - RPM
 - Operating hours
 - Coolant Temperature
 - DC Volts
 - Oil pressure
 - Oil Temperature
- Two LED status indicators (1 red, 1 amber).
- Engine cool-down timer
- Engine cycle crank
- Three engine control keys and status indicators (Run/Auto/Stop).
- Lamp test and Alarm acknowledgement keys
- Warnings/shutdowns with indicating lights for:
 - Low oil pressure
 - High Oil Temperature
 - Emergency stop
 - Overspeed
 - Failure to Start
 - Low Coolant level
- Emergency stop pushbutton
- Display navigation keys including two shortcut keys for Engine Parameters or Generator Parameters
- Fuel level monitoring and control.

GENERATOR PROTECTIVE RELAYING

- Generator protective features
 - Phase over/under voltage (Device 27/59)
 - Over/Under frequency (Device 81 O/U)

- Reverse Power (Device 32)
- Overcurrent (Device 50/51) (GCB trip unit)
- Loss of Excitation (Device 40) (CDVR)

VOLTAGE REGULATION AND POWER FACTOR CONTROL CIRCUITRY

- Generator mounted automatic voltage regulator, microprocessor based.
- Manual raise/lower voltage adjust capability and VAR/power factor control circuitry for maintaining constant generator power factor while paralleled with the utility. Voltage and power factor adjustments are performed on the Generator Paralleling Control
- Includes RFI suppression, exciter limiter and exciter diode monitoring.

CIRCUIT BREAKER

- 3000A fixed type, 3 poles, genset mounted, electrically operated, insulated CB.
- Solid state trip unit for overload (time overcurrent) and fault (instantaneous) overcurrent protection.
- Includes DC shunt trip coil activated on any monitored engine or electrical fault, 100 KA-interrupting capacity at 480 VAC.

CURRENT TRANSFORMERS

- CT's rated 3000:5 with secondaries wired to shorting terminal strips.

POTENTIAL TRANSFORMERS

- 4:1 ratio with primary and secondary fuse protection.

BUS BARS

- Three phase, plus full rated neutral, bus bars are tin-plated copper with NEMA standard hole pattern for connection of customer load cables and generator cables.
- Bus bars are sized for full load capacity of the generator set at 0.8 power factor.
- Includes ground bus, tin-plated copper, for connection to the generator frame ground and field ground cable.

AC DISTRIBUTION

- Transformer distributes utility voltage for the 16 spaces (minimum) Power Module AC panel board.
- Provides 240 VAC for all module accessories.
- Includes controls to de-energize jacket water heaters and generator space heater when the engine is running.

CONTAINER

- 40' ISO high cube container, CSC certified
- Painted standard Cat Power Module white
- Sound attenuated air intake louvers
- Floor insulated with acoustic glass and covered by galvanized steel
- Four lockable personnel doors with panic release
- Two fire extinguishers
- External drain access to standard fluids

EXHAUST SILENCER

- Hospital grade, internally insulated, rectangular exhaust silencer with vertical discharge

FUEL TANK

- UL Listed 1250 gallon double walled tank provides 9 hr runtime at prime rating.
- Fuel transfer system

SHORE POWER TWO (2)

- One (1) shore power connection distribution block for jacket water heaters.
- One (1) for generator space, battery charger, and fuel pump.

INTERNAL LIGHTING

- Four (4) internal DC lights with one (1) timer and two switches installed at each side of the container door.
- Three (3) internal AC lights.
- One (1) single duplex service receptacle.

BATTERY CHARGER AND BATTERIES

- 24 VDC/20A battery charger with float/equalize modes and charging ammeter.
- Four oversized maintenance free batteries.

EMERGENCY STOP PUSHBUTTON

- Two external, glass break, emergency stop pushbuttons (ESP) located near each access door.

TRAILER

- Three axle with Anti-lock brake system
- Goodyear G314 295/75R225 Load Range G

ON-PACKAGE PARALLELING CONTROL SYSTEM

- Cat On-Package Paralleling controls are intended for automatic or manual paralleling with a utility power source as a load management system, with provisions for standby operation feeding an isolated load network. For Standby operation, the generator operates as an isochronous machine isolated from the utility supply. The controls allow for automatic operation, initiated locally or remotely by the customer's SCADA system.
- Operator controls are conveniently mounted on the generator doghouse next to the EMCP 3.3 while the Generator Paralleling Control (GPC) and Utility Multi-Function Relay (UMR) are wall-mounted nearby
- GPC provides Generator/Bus metering display and LED synchroscope
- GPC performs all the necessary functions for paralleling: auto synchronization, load sharing, utility baseload control w/ soft load & soft unload, and utility PF control.
- The simple to use Operator Controls include:
 - Local start/stop control switch (for auto mode)
 - Generator voltage and frequency adjust
 - Generator Breaker control switch
 - Lockout Relay (86), manual reset type
 - Base-load Select Switch and Potentiometer
 - Indicating lights for:
 - Auto start
 - Dead bus close permissive
 - Utility Transfer Trip
 - Utility breaker closed
- Fail to parallel circuit with (field adjustable) timer delay causes shutdown if the breaker fails to close automatically
- Allows for customer utility-transfer-trip signal (dry contact) and utility breaker status signal (dry contact)
- Basler Utility Multi-function Relay (UMR) IPS-100 provides the following utility/intertie protection features:
 - Synch Check (Device 25)
 - Phase under voltage, 2 stage (Device 27)
 - Reverse Power (Device 32)
 - Negative sequence overvoltage (Device 47)
 - Phase time overcurrent (Device 51)
 - Neutral overcurrent (Device 51N)
 - Phase overvoltage, 2 stage (Device 59)
 - Under frequency, 2 stage (Device 81U)
 - Over frequency (Device 81O)

MODES OF OPERATION

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- Provides for single unit stand-alone operation, island mode paralleling and load sharing with other power modules, and single unit-to-utility mode paralleling for base load control (with open transition between paralleling modes)
- Island mode paralleling features:
 - Lead unit select control allows single unit to connect to a dead bus
 - Auto synchronization (voltage & phase matching)
 - Load sharing (kW) analog signal (like units & legacy compatible)
 - Load sharing (kVAR) analog signal (like units only)
- Utility mode paralleling features:
 - Auto synchronization (voltage & phase matching)
 - Base-load control (selectable: programmable set-point or potentiometer adjust)
 - Soft load/unload (programmable, shared set-point)
 - Power Factor control (programmable set-point)

SINGLE UNIT STAND-ALONE AND MULTI-UNIT ISLAND OPERATION

1. Utility Standby Mode (Normal)
 - a. The utility is providing power for the plant loads.
 - b. The PM Generator breaker is open.
 - c. The PM is in automatic standby mode to respond to a utility failure.
2. Emergency Mode (Emergency)
 - a. Utility Failure
 - 1) The customer protective relaying senses a utility abnormal condition.
 - 2) A run request is sent to the PM Generator plant.
 - 3) The lead unit reaches rated voltage and frequency and is closed to the bus. This function is performed via the lead unit select jumper and interconnect wiring between the Power Modules.
 - 4) In Multi-Unit Island Mode, the remaining PM Generators are paralleled to the bus as they reach rated voltage and frequency.
 - 5) Plant load is transferred to the Power Modules, which share load equally via load share lines.

SINGLE UNIT BASE LOAD OPERATION

1. Utility Mode (Normal)
 - a. The utility is providing power for the plant loads.
 - b. The PM is in auto mode and the generator breaker is open.
 - c. The PM is interconnected to the utility breaker aux contact, lead unit jumper is not installed and load share lines are not connected
 - d. The Paralleling controls automatically detect utility parallel mode when the utility aux contact is closed.
 - e. GPC is programmed to the desired Base-load level, ramp times, and PF control
2. Base Load Mode
 - a) Unit receives remote run request and starts
 - b) Unit reaches rated voltage and frequency.
 - c) UMR performs sync-check to permit generator breaker to close.
 - d) Unit ramps to Base-Load set-point at programmed ramp time.
 - 5) Unit continues to run until either a remote run request is removed, the unit is stopped at control panel, or a utility failure is detected.

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