

XQ800 GENERATOR



STANDBY 795 kW

POWER MODULE

Frequency	Voltage	Standby kW (kVA)
60Hz	480/277V	795 (994)
60Hz	240/139V	795 (994)
60Hz	208/120V	740 (925)
50Hz	400	660 (825)

SPECIFICATIONS

GENERATOR

Frame Size 598
Pitch 0.6667
No. of poles 4
Excitation Static regulated brushless PM excited
Number of bearings Single bearing, close coupled
Insulation Class H
Enclosure Drip proof IP23
Alignment Pilot shaft
Overspeed capability – % of rated 125% of rated
Voltage regulator 3 phase sensing with Volts-per-Hertz
Voltage regulation Less than $\pm 1/2\%$ voltage gain
Adjustable to compensate for engine speed droop and line loss
Wave form deviation 3%
Telephone Influence Factor (TIF) Less than 50
Harmonic Distortion (THD) Less than 5%

ENGINE

C27 ATAAC, V-12 4-stroke water cooled diesel
Bore – mm (in) 137.2 mm (5.4 in)
Stroke – mm (in) 152.4 mm (6.0 in)
Displacement – L (cu in) 27.03 L (1958.9 in³)
Compression ratio 16:1
Aspiration TA
Fuel system MEUIC
Governor type ADEM™ A4

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TECHNICAL DATA

XQ800

Generator Set Technical Data		50Hz		60Hz	
	Units	Standby		Standby	
Power Rating	kW (kVA)	660	(825)	795	(994)
Performance Specification					-
Lubricating System Oil pan capacity with filter change	L (U.S. gal)	99	(26)	99	(26)
Fuel System Fuel Consumption					
100% load	L/hr (gal/hr)	178	(47.1)	223	(58.8)
75% load	L/hr (gal/hr)	135	(35.7)	167	(44.2)
50% load	L/hr (gal/hr)	92	(24.4)	118	(31.1)
Fuel tank capacity Running time @ 75% rating	L (gal) Hr	4730 (1250)	35	4730 (1250)	28
Cooling System Ambient Capability	°C (°F)	43	(109)	43	(109)
Engine & Radiator coolant capacity	L (gal)	100.7	(26.6)	100.7	(26.6)
Engine coolant capacity	L (gal)	70	(18.5)	70	(18.5)
Air Requirements Combustion air flow	m³/min (cfm)	45.3	(1600)	57.9	(2044)
Maximum dirty air cleaner restriction	kPa (in H ₂ O)	2.5	(10)	2.5	(10)
Exhaust System Exhaust flow at rated kW	m³/min (cfm)	116	(4097)	148	(5224)
Exhaust temperature at rated kW - dry exhaust	°C (°F)	493	(919)	485	(905)
Noise Rating (with enclosure)* @ 7 meters (23 feet)	dBA	76		76	
Emissions (Tier 4 interim regulation) NO _x CO HC PM	g/hp-hr g/hp-hr g/hp-hr g/hp-hr	2.6 0.11 0.03 0.075		2.6 0.11 0.03 0.075	
Weight					
Model	Length mm (in)	Width mm (in)	Height mm (in)	With Lube Oil and Coolant kg (lb)	With Fuel, Lube Oil and Coolant kg (lb)
XQ800 w/o chassis	9144 (360)	2438 (96)	2896 (114)	16129 (35500)	16810 (37000)
XQ800 w/ chassis	9144 (360)	2438 (96)	4267 (168)	19763 (43500)	20454 (45000)

RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications:

AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, UL508A, 72/23/EEC, 98/37/EC, 2004/108/EC

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 representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your dealer.

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

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STANDARD CONTROLS

FEATURES

FUEL/EMISSIONS STRATEGY

- EPA Tier 4 Interim

DESIGN CRITERIA

- Accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response
- CSA Approved

SINGLE-SOURCE SUPPLIER

- Factory designed and fully prototype tested with certified torsional vibration analysis available
- ISO 9001:2000 compliant facility

WORLDWIDE PRODUCT SUPPORT

- Cat dealers provide extensive post sale support including maintenance and repair agreements
- Cat dealers have over 1600 dealer branch stores operating in 200 countries
- The Cat S-O-SSM program effectively detects internal engine component condition, even the presence of unwanted fluids and combustion byproducts

CAT C27 ATAAC DIESEL ENGINE

- Utilizes ACERTTM Technology
- Reliable, rugged, durable design
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic engine control

CAT GENERATOR

- Matched to the performance and output characteristics of Cat engines
- Single point access to accessory connections
- UL 1446 Recognized Class H insulation

CAT EMCP 4.4 CONTROL PANEL

- Simple user friendly interface and navigation
- Integrated, automatic genset paralleling facilitates multi-unit systems meeting a wide range of customer applications
- Integrated Control System and Communications Gateway

CAT DIGITAL VOLTAGE REGULATOR (CDVR)

- Three-phase sensing
- Adjustable volts-per-hertz regulation
- Provides precise control, excellent block loading, and constant voltage in the normal operating range

SOUND ATTENUATED CONTAINER

- Provides ease of transportation and protection
- Meets 75 dB(A) at 7 meters or below per SAE J1074 measurement procedure at 110% prime load

ENVIRONMENTALLY FRIENDLY

- 110% spill containment of onboard engine fluids

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FACTORY INSTALLED STANDARD AND OPTIONAL FEATURES

System	Standard Features
Engine	• EPA approved Tier 4 interim Cat C27 heavy duty diesel engine • Heavy duty air cleaner with service indicator • 65-Amp charging alternator • Fuel filters – Duplex primary with integral water separator and change-over valve, engine mounted secondary filter • Fuel cooler and electric priming pump • Lubricating oil system including pump, integral oil cooler, lube oil, filter, filtered crankcase breather system and oil drain line with internal valve routed to connection point accessible from exterior • 500 hour oil change intervals • Jacket water heater • Electronic ADEM™ A4 controls • 24V electric starting motors with battery rack and cables
Generator	• Three-phase, brushless, salient pole, 0.6667 pitch, permanent magnet excited, Class H insulation Anti-condensation heaters (120V1.2 kW) • 12-lead design, with voltage changeover link board • Cat Digital Voltage Regulator (CDVR) with VAR/PF control
Containerized Module	• 30' ISO high cube container • 2-axle, 30' ISO container chassis • Sound attenuated air intake louvers and 3 lockable personnel doors with panic release • Interior walls and ceilings insulated with 100 mm of acoustic paneling • Floor of container insulated with acoustic glass and covered with galvanized steel • Sound attenuated 75 dB(A) @ 7m • 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 • Lighting 3 DC, one single duplex service receptacle, 2 external emergency stop push buttons • 1,250 gal fuel tank, UL listed, double wall, 24 hr runtime @ 75% prime +10% rating • External lockable connections for fuel • Spill containment 110% of all engine fluids • Fuel transfer system and controls • Two oversized maintenance-free batteries, battery rack and 20-Amp battery charger, and solar powered battery maintainer • Hospital grade, internally insulated, disc shaped 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 • Standard Cat rental decals and painted standard Cat power module white
Cooling	• Standard cooling provides 43° C ambient capability (60 Hz) at prime +10% rating Vertically mounted radiator, with vertical air discharge from the container Coolant drain line with internal valve • Coolant sight gauge, level switch and shutdown • 50/50 Ethylene Extended Life Glycol
Genset Controls and Protection	• EMCP 4.4 genset mounted controller • Automatic start/stop with cool down timer • Generator Protection features: 25, 32, 32RV, 40, 46, 50/51, 27/59, 81 O/U • Utility multi-function relay (UMR) protection features: 25, 27/59, 32, 47, 51, 51N, 81O, 81U (Optional) Reverse compatible for interface to legacy power modules • 3000A electrically operated generator circuit breaker • Multi-mode operation (island, multi-unit island and utility parallel (requires optional UMR)) • Manual and automatic paralleling capability, with load sharing (multi-unit only) • 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, IEEE, CSA standards • O&M manuals

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STANDARD FEATURES

EMCP 4.4 LOCAL CONTROL PANEL

- Generator mounted EMCP 4.4 provides power metering, protective relaying and engine and generator control and monitoring
- NEMA 12, IP44 Dust Proof Enclosure
- UL508A Listed
- 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 primary CAN datalink eliminates need for separate service tools for troubleshooting
- True RMS AC metering, 3 phase
- Multiple stored setpoint group selection via switched input eliminates need to reprogram control when switching voltages and frequencies

EMCP 4.4 ENGINE OPERATOR INTERFACE

- Controls
 - Run/Auto/Stop
 - Speed Adjust
 - Voltage Adjust
 - Emergency Stop
 - Cycle Crank
 - Cool-down timer
- Digital indication for
 - Run/Auto/Stop
 - RPM
 - Operating hours
 - Coolant Temperature
 - L-L volts, L-N volts, phase amps, Hz
 - kW, kVA, kVAR, kW-hr, %kW, PF
 - DC Volts
 - Oil pressure
 - Oil Temperature
- Shutdowns with common indicating light for:
 - Low oil pressure
 - High Coolant Temp
 - Failure to Start (Overcrank)
 - Low Coolant level
 - Overspeed
 - High Oil Temperature
 - Emergency stop
- Emergency stop pushbutton
- Panel illuminating lights
- Display navigation keys including two shortcut keys for Engine Parameters or Generator Parameters
- Fuel level monitoring and control

EMCP 4.4 LOCAL CONTROL PANEL

- Generator protective features provided by EMCP 4.4
 - Phase over/under voltage (Device 27/59)
 - Over/Under frequency (Device 81 O/U)
 - Reverse Power (Device 32/32RV)
 - Current Balance (46)
 - Overcurrent (Device 50/51) (GCB trip unit)
 - Loss of Excitation (Device 40) (CDVR)
 - Bus Phase Sequence

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 case circuit breaker
- 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
- Under-voltage release

CURRENT TRANSFORMERS

- CT's rated 3000:5 with 200:5 secondaries wired to shorting terminal strips

POTENTIAL TRANSFORMERS

- 4:1 ratio with primary and secondary fuse Protection (with optional UMR)

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

LINK BOARD ASSEMBLY

- 3000A link board for 208/240/400/480 wye operation
- Reconnection via movable link board
- Includes switch to determine the mode of operation

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STANDARD FEATURES

CONTAINER

- 30' 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
- Three lockable personnel doors with panic release
- Two fire extinguishers
- External drain access to standard fluids

EXHAUST SILENCER

- Hospital grade, internally insulated, disc shaped exhaust silencer with vertical discharge

FUEL TANK

- UL Listed 1250 gallon double walled tank provides 24 hr runtime at 75% prime +10% rating
- AC Fuel transfer system connected to shore and generator power with automatic switchover

SHORE POWER Three

- Two shore power connections for jacket water heaters and fuel transfer pump
- One for generator space and battery charger

INTERNAL LIGHTING

- Three internal DC lights with one timer and two switches installed at each side of the container door
- One single duplex service receptacle connected to shore and generator power with automatic switchover

BATTERY CHARGER AND BATTERIES

- 24 VDC/20A battery charger with float/equalize modes and charging ammeter
- Two oversized maintenance free batteries
- Solar power battery maintainer

EMERGENCY STOP PUSHBUTTON

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

TRAILER

- Two axle with Anti-lock brake system
- Goodyear G314 295/75R225 Load Range G
- Air suspension chassis (optional)

AC DISTRIBUTION

- Provides 120 VAC for all module accessories
- Includes controls to de-energize jacket water heaters and generator space heater when the engine is running

UTILITY MULTI-FUNCTION RELAY (UMR) (OPTIONAL)

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)

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STANDARD FEATURES (CONT'D)

MODES OF OPERATION

- 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 or HWDBA Hard Wired Dead Bus Arbitration to allow first unit up to voltage and speed to be first 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 (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 first PM generator to reach rated to voltage and frequency is closed to the bus.
 - 4) In Multi-Unit Island Mode, the remaining PM Generators are paralleled to the bus as they reach rated voltage and frequency. This function is performed via the lead unit select jumper and interconnect wiring connected between the Power Modules.

- 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.
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 setpoint at programmed ramp time.
 - e. Unit continues to run until remote run request is removed or unit is stopped at control panel.

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