

XQC1600 Power Module



IPP Rated 1515 KW
IPP Overload 1590 KW

POWER MODULE

50/60Hz Switchable Rating

| Frequency | Voltage | IPP Rated kW (kVA) | IPP Overload kW (kVA) |
|-----------|---------|--------------------|-----------------------|
| 50 Hz | 400V | 1515 (1893) | 1590 (1987) |
| 60 Hz | 480V | 1705 (2131) | 1790 (2237) |

FEATURES

SINGLE SOURCE SUPPLIER

- Generator set manufactured in ISO 9001:2000 compliant facility
- Package factory designed and production tested
- Generator set and components meet or exceed the following specifications: AS1359, AS2789, BS4999, DIN6271, DIN6280, EGSA101P, JEM1359, IEC 34/1, ISO3046/1, ISO8528, NEMA MG1-22

WORLDWIDE PRODUCT SUPPORT

- Cat® dealers provide extensive post sale support including maintenance and repair agreements
- Supported 100% by your Cat dealer with warranty on parts and labor

RELIABLE, FUEL EFFICIENT DIESEL ENGINE

- The compact, four-cycle Cat 3516C-HD turbocharged-aftercooled (SCAC) diesel engine provides durability and dependability
- Best-in-class fuel economy
- Fuel system operates on a variety of fuels
- 50/60 Hz switchable with no software re-flashing nor iron changes required
- Electric fuel priming, individual cylinder temperature monitoring, and extended filter change intervals

CAT SR5 SERIES GENERATOR

- 1844-frame generator designed to match the performance and output of Cat diesel engines
- Double bearing, wye-connected, brushless, permanent magnet excited, form wound design
- Coastal insulation protection and anti-condensation space heaters
- Generator inlet air filters
- Stator winding and bearing temperature monitoring

REDUCED ENVIRONMENTAL IMPACT

- 110% spill containment of onboard engine fluids
- Positive crankcase fumes ventilation
- Low BSFC and Low Emissions* ratings, switchable via Cat Electronic Technician (ET)
- * Does not conform to EPA/EU emissions standards

SOUND-ATTENUATED ENCLOSURE

- Provides 9-high stackable, CSC enclosure for ease of transportation and protection
- Double personnel doors on both sides of the engine for service access, plus 1 additional personnel door for general access
- Double container doors on each end
- Externally-accessible controls behind hinged door
- Service access doors for engine air filters
- Foldable, stowable awnings on engine compartment air inlets
- Hinged, sound-attenuated radiator louvers for ease of cleaning and maintenance
- Externally-accessible, 100kA IC, 3-pole breaker (Optional 4-pole breaker)

CAT COOLING SYSTEM

- Vertical, non-stacked radiator cores with dimpled fins to minimize clogging
- Provides 49C (120F) ambient compatibility at 750m (2,460 ft) above sea level
- Energy efficient fans (4) and VFD fan drive

ON-PACKAGE PARALLELING CONTROLS

- Auto paralleling using package mounted controls
- EMCP 4.3 offers engine and generator monitoring and protection
- AGC-4 provides paralleling, load sharing, VFD control, and primary generator protection

OTHER FEATURES

- 946-L (250gal) fuel tank with solenoid fill valve
- 113-L (30gal) engine lube oil make-up system
- Oil evacuation system for faster, cleaner oil changes
- 1.8-m (6ft) stainless steel exhaust stack; stows inside container for transport
- Triple, primary fuel filters with water separators, service valves, and differential pressure monitoring

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FACTORY INSTALLED STANDARD EQUIPMENT

| SYSTEM | STANDARD EQUIPMENT |
|--|--|
| Engine | <p>Cat 3516C-HD heavy duty diesel engine Heavy duty, dual element, PowerCore air cleaners with service indicators Triple, primary fuel filters with water separators and bypass valves for on-the-fly filters changes Secondary fuel filters on engine Full flow oil filters with water-cooled oil cooler. Requires API CI-4 or higher lube oil. Lubricating oil system includes make-up system (113-L tank), oil drain lines routed to the engine rail, and quick evacuation system for faster, cleaner oil changes Jacket water heater (9 kW, 3-phase 480VAC) with electric pump Fuel cooler and electric fuel priming pump Electronic differential pressure monitoring of all filters Electronic ADEM™ A4 engine controls Dual 24V electric starting motors</p> |
| Generator | <p>Double-bearing, 1844-frame, SR-5 generator with anti-condensation space heaters (1.2 kW, 480V) Brushless, form-wound, permanent magnet excited, three-phase, 4-lead design Class H insulation operating at Class F temperature for extended life Cat Integrated Voltage Regulator (Cat IVR) Stator winding and bearing temperature detectors monitored by RTD module Metallic mesh generator air inlet filters (2) System 4 insulation protection</p> |
| Containerized Module | <p>40-ft ISO high-cube container, 9-High stackable, CSC certified Sound attenuated, hinged, radiator intake louvers Sound attenuated package air intake louvers with foldable awnings Five (5) lockable personnel doors with panic releases Interior walls and ceilings insulated with 100 mm of acoustic paneling Side bus bar access door with external access load cable connections Shore power via distribution block connections for jacket water heater, battery charger, space heaters, and generator anti-condensation heaters Six (6) DC lights with 60-min timer Single-wall, 946-L (250gal) fuel tank; certified to BS799-5 Solenoid fuel fill control valve for automated filling Sound attenuated to 75 dB(A) (50Hz) at 7m (23 ft) and 40C (104F) ambient Four (4) 1400-CCA, Group 4D, maintenance-free batteries, and 50A battery charger Insulated exhaust silencer with 1.8-m (6ft) stainless steel exhaust stack for increased site power density Engine vibration isolators Easy drain access to standard fluids Standard Cat decals (Optional) and painted Cat Power Module White</p> |
| Cooling | <p>Cooling package provides 49°C (120°F) ambient capability (50 & 60 Hz) at IPP Ratings @ 750m (2,460 ft) Vertical, non-stacked radiator cores with dimpled fins and vertical air discharge Variable frequency fan drive with smart fan control Cat Extended Life Coolant</p> |
| Generator Controls and Protection | <p>EMCP 4.3 generator set controller Automatic start/stop with cool down timer Generator Protection features: 25, 32, 40, 50/51, 27/59, 81 O/U AGC-4 provides voltage and frequency adjust, base load / PF / load sharing / synchronizer, auto start / stop control & generator CB control, SCADA Interface (Ethernet), fuel level indications & alarms, fuel tank fuel transfer control Reverse compatibility for interface to legacy power modules 100 kAIC, 4000A-frame generator circuit breaker with LSIG trip unit Multi-mode operation (Island (kW/kVAR sharing, Auto Mains Failure, Peak Shaving, Base Load Power, Export, zero power transfer, power management with multiple units) Manual and automatic paralleling capability Metering Display: voltage, current, frequency, power factor, kW, WHM, kVAR, and synchroscope</p> |
| Quality | <p>Factory testing of complete power module CE Certified, NEMA, ISO and IEEE standards O&M manuals</p> |

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SPECIFICATIONS

| GENERATOR | CAT 3516C-HD DIESEL ENGINE |
|---|--|
| Frame Size 1844 | 3516C-HD, 4-Stroke diesel |
| Pitch 0.6667 | Bore – mm (in) 170 (6.7) |
| No. of poles 4 | Stroke – mm (in) 215 (8.5) |
| No. of bearings 2 | Displacement – L (cu in) 78.08 (4,764) |
| Excitation Static regulated brushless PM excited | Compression ratio 14.7:1 |
| Insulation Class H | Aspiration TA |
| Enclosure Drip proof IP23 | Fuel system EUI |
| Alignment Close-coupled | Governor type Cat ADEM A4 Control System |
| Overspeed capability – % of rated 125% | |
| 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
 **Data represented is at standard conditions

| Generator Set Technical Data | Units | 50 Hz (60 Hz) | |
|--|-----------------------|---------------|-------------|
| | | Continuous | Overload |
| Power Rating | kW | 1515 (1705) | 1590 (1790) |
| | (kVA) | 1893 (2131) | 1987 (2237) |
| Lubricating System | L | 405 | |
| Total oil pan capacity | (US gal) | (107.0) | |
| Fuel System | | | |
| Generator set fuel consumption** | | | |
| 100% Load | L/hr | TBD | TBD |
| | (gal/hr) | (TBD) | (TBD) |
| 75% Load | L/hr | TBD | TBD |
| | (gal/hr) | (TBD) | (TBD) |
| 50% Load | L/hr | TBD | TBD |
| | (gal/hr) | (TBD) | (TBD) |
| Fuel Tank Capacity | L | 946 | |
| | (gal) | (250) | |
| Max Rated Running Time | hours | TBD | TBD |
| Cooling System | | | |
| Radiator Capacity | L (U.S. gal) | TBD (TBD) | |
| Air Requirements | | | |
| Combustion air flow | m ³ /min | TBD | TBD |
| | (cfm) | (TBD) | (TBD) |
| Maximum air cleaner restriction | kPa | TBD | |
| | (in H ₂ O) | (TBD) | |
| Exhaust System | | | |
| Exhaust Flow | m ³ /min | TBD | TBD |
| | (cfm) | (TBD) | (TBD) |
| Package Noise Rating @ 15m (50 ft.) | dBA | TBD | TBD |

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TECHNICAL DATA* (CONT.)

| Model | Length in (mm) | Width in (mm) | Height in (mm) | Weight without Lube oil and Coolant lb (kg) | Weight with fuel, lube oil and coolant (kg) |
|---------------------|---|------------------|-------------------|--|---|
| XQC1600 w/o chassis | 480 (12,192) | 97.5 (2,438) | 114 (2,896) | TBD (TBD) | 70,000 (31,818) |
| Center of gravity | x = + TBD +/- 300 mm (from rear of container); y = +TBD mm +/- 300 mm (from container floor); z = 0 +/- 150 mm (centerline) | | | | |

RATING DEFINITIONS

International Power Projects (IPP) – Output available without varying load for an unlimited time. Average power output is 70 – 100% of the continuous power Rating. Typical peak demand is 105% of continuous rated kW for a maximum of 1 hour in 12 hours, not to exceed 500 hours per year. Typical applications are IPP power plants. Continuous power is in accordance with ISO8528. Fuel stop power is in accordance with ISO3036.

STANDARD FEATURES

EMCP 4.3 LOCAL CONTROL PANEL

- Package-mounted EMCP 4.3 provides power metering, protective relaying and engine and generator control and monitoring.
- Convenient service access for Cat service tools (not included).
- Integration with the Cat Integrated Voltage Regulator (Cat IVR) provides enhanced system monitoring.
- Ability to view and reset diagnostics of all controls networked on J1939 data link 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, ekW, kVA, kVAR, kWhr, % kW, PF

EMCP 4.3 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 text for:
 - Low oil pressure
 - High oil temperature
 - Emergency stop
 - Overspeed
 - Overcrank
 - AGC-4
- Emergency stop pushbutton
- Display navigation keys including two shortcut keys for Engine Parameters or Generator Parameters

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)

AGC-4/EMCP 4.3 PROTECTIVE RELAYING

- Generator protective features
 - 25 sync-check (AGC-4)
 - 32 rev. power (EMCP 4.3 and AGC-4)
 - 40 loss of excitation (CDVR and AGC-4 impedance based)
 - 50/51 Inst. and time overcurrent (GCB trip unit and AGC-4)
 - 47 Negative Voltage Sequence (AGC-4)
 - 46 Negative Sequence Current (AGC-4)
 - 27/59 phase under/over voltage (EMCP 4.3 and AGC-4)
 - 81O/U under/over frequency (EMCP 4.3 and AGC-4)
- Package-mounted AGC-4 controls provide auto paralleling, CAN-bus, Ethernet communications, PWM and Analog outputs, and legacy analog load sharing (real and reactive)
- AGC-4 main display and Additional Operator Panel (AOP) secondary display

VOLTAGE REGULATION AND POWER FACTOR CONTROL CIRCUITRY

- Generator mounted automatic voltage regulator
- 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

- 4000A-frame (set to 3000A), 3-pole, package-mounted, electrically operated, insulated IEC CB (Optional 4-pole)
- Solid state trip unit for overload (time overcurrent) and fault (instantaneous) overcurrent protection. LSIG is standard.
- Includes DC shunt trip coil activated on any monitored engine or electrical fault, 100 kA-interrupting capacity at 480 VAC.
- Ground fault sensing/trip (requires optional ground CT)

CONTAINER

- 40-ft ISO, high cube container, 9-High Stack CSC Certified
- Painted standard Cat Power Module White, per Caterpillar Specifications
- Sound-attenuated, air intake louvers with foldable awnings on engine room inlets
- Sound-attenuated, hinged, radiator intake louvers for ease of maintenance and cleaning
- Five (5) lockable personnel doors with panic releases on each door

INTERNAL LIGHTING & CONVENIENCE POWER

- Six (6) internal DC lights with 60-min timer located at one personnel door
- One (1) International-style convenience receptacle

BATTERY CHARGER AND BATTERIES

- 24 VDC/50A battery charger with float/equalize modes and charging ammeter
- Four (4) 1400CCA, maintenance-free batteries

EMERGENCY STOP PUSHBUTTON

- Single emergency stop pushbutton (ESP) located on package-mounted controls area
- ESP located on each side of the container (2)

EXHAUST SILENCER

- Internally mounted, insulated, puck-style exhaust silencer suspended from container roof
- 1.8m (6-ft) vertical discharge exhaust stack, stows for shipping inside container

FUEL TANK

- 946-L single-wall fuel tank
- BS799-5 certified
- Solenoid fuel fill control valve
- Triple, primary fuel filters with water separators and bypass valves mounted to tank

SHORE POWER

- One (1) shore power connections for generator anti-condensation heater, battery charger, jacket water heater, and convenience receptacle

LUBE OIL MAKE-UP SYSTEM

Includes oil pan-mounted oil level regulator and personnel-door mounted, 114 L (30 gal) oil tank for maintaining oil pan levels in extended run applications. Tank can be remotely filled without shutting down engine.

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 2-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 and 480 VAC for module accessories
- Includes controls to de-energize jacket water heaters and generator anti-condensation heater when the engine is running.

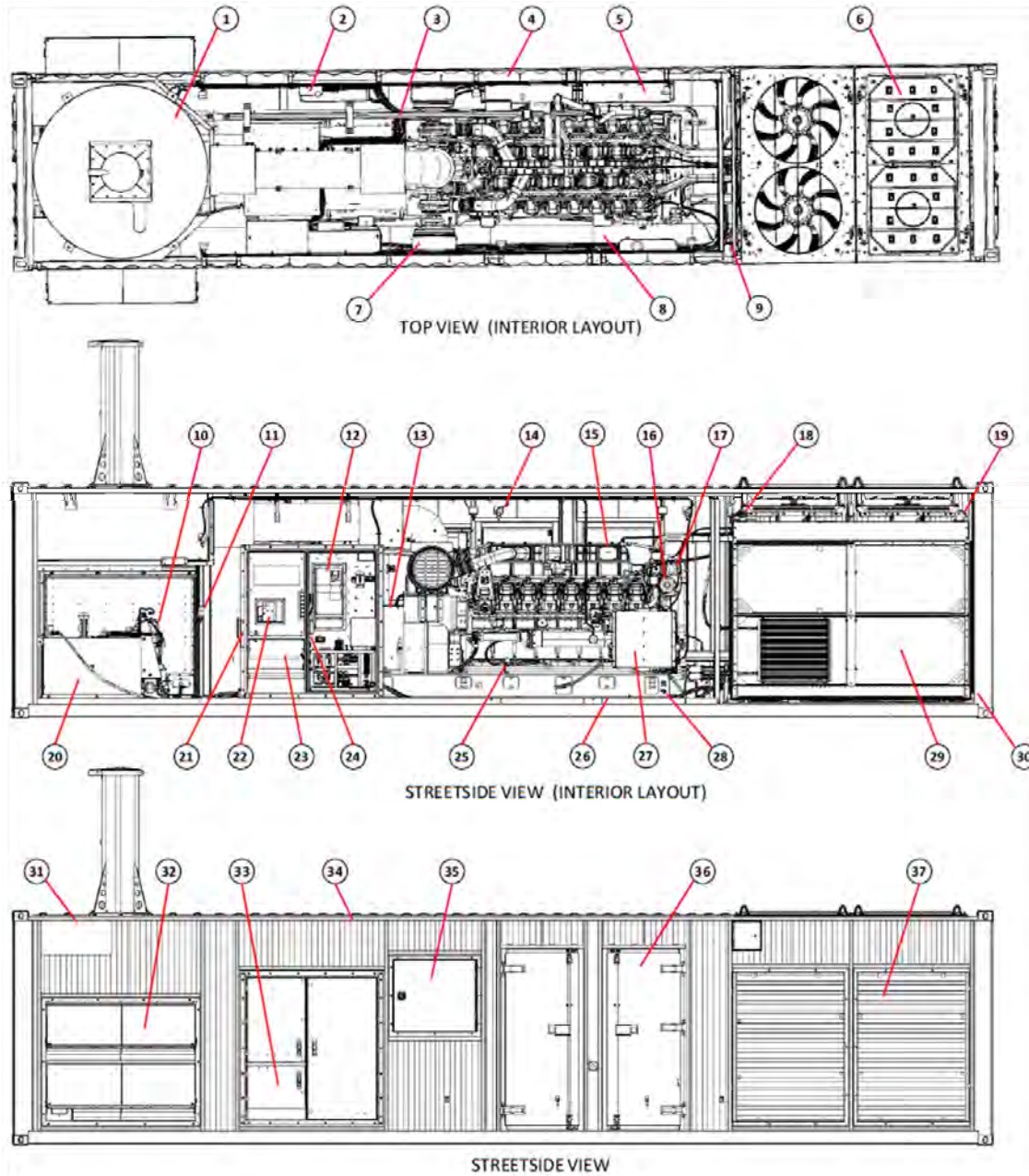
MODES OF OPERATION

- 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:
 - AGC-4 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)

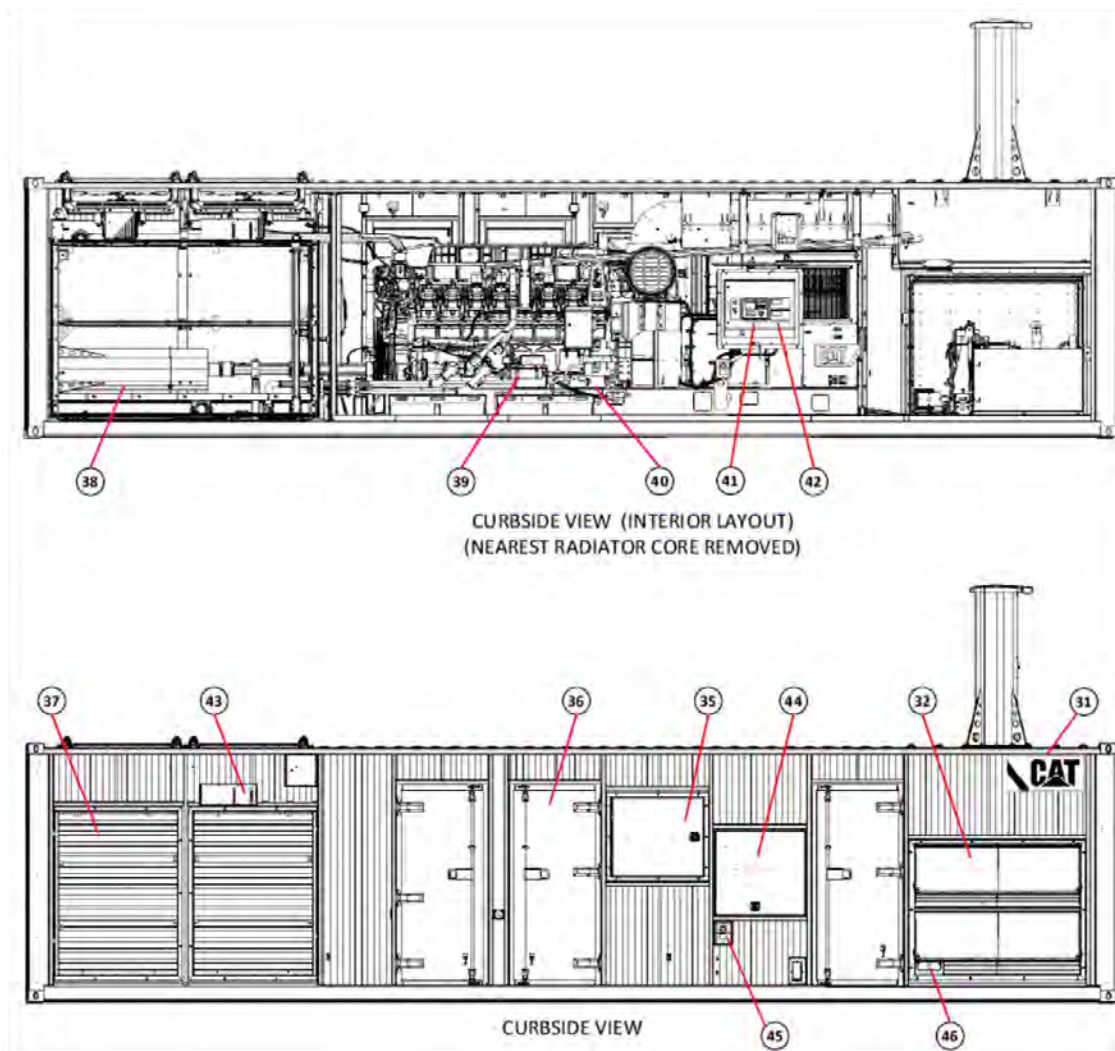
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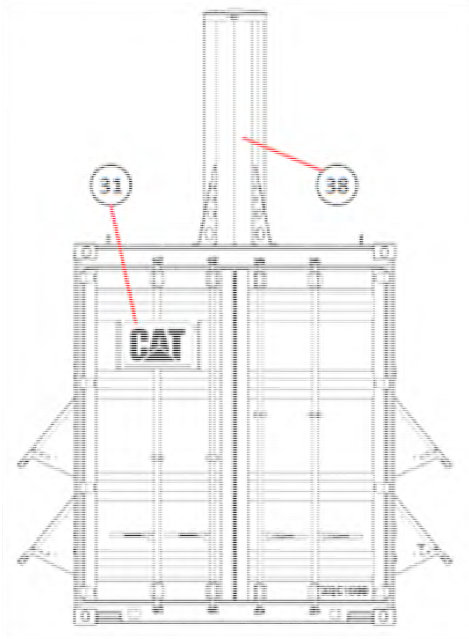
EQUIPMENT LAYOUT



XQC1600 Power Module



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| Item | Description |
|------|--|
| 1 | Internally-mounted, insulated, Puck-Style Silencer |
| 2 | Battery Charger (480VAC Input, 50A DC Output) |
| 3 | Crankcase Ventilation System (Plumbed to Exhaust) |
| 4 | Acoustic Paneling (100mm) |
| 5 | 24 VDC Batteries w/ Cover Grating (Qty 4) |
| 6 | Vertical Radiator Discharge |
| 7 | PowerCore Dual Element Air Cleaners (Qty 2) |
| 8 | Spill Containment System (110% Engine Fluids) |
| 9 | Partition Wall |
| 10 | Triple Fuel/Water Separators w/ Bypasses (Qty 3) |
| 11 | DC Lamp Time Switch |
| 12 | Variable Frequency Fan Drive Controller |
| 13 | 1844 Frame, Form Wound, SR5 Generator |
| 14 | DC Lamps (Qty 6) |
| 15 | 3516C-HD Engine (50/60 Hz) w/ Tubular Rails |
| 16 | Engine Lube Oil Filters |
| 17 | Engine Secondary Fuel Filters |
| 18 | Separate Circuit Aftercooler (SCAC) Fill Cap (Qty 2) |
| 19 | Jacket Water Circuit Fill Cap (Qty 2) |
| 20 | 946-L Fuel Tank w/ Solenoid Fill Valve |
| 21 | Literature Storage |
| 22 | 3 Pole, 100 kAIC Breaker |
| 23 | Customer Load Cable Connections |
| 24 | External Shore Power Connection Terminal Block |
| 25 | Lube Oil Quick Evacuation/Fill Valve |
| 26 | Generator Set Isolators (Qty 10) |
| 27 | Lube Oil Make-Up Tank (113-L) |
| 28 | Engine Oil Drain (Manual), Plumbed to Rail |
| 29 | Vertical Radiator Cores (1 per container side) |
| 30 | Radiator Drain Valves (Qty 2) |
| 31 | Standard CAT Trade Dress Decals |
| 32 | Engine Room Air Inlet Louvers w/ Awnings (Qty 4) |
| 33 | Customer Load Access Door |
| 34 | 40-ft Purpose Built, High-Cube, ISO Container |
| 35 | Air Cleaner Access Door (Qty 2) |
| 36 | Personnel Entrance Door (Qty 5) |
| 37 | Radiator Air Inlet Louvers (Hinged) (Qty 4) |
| 38 | Exhaust Stack w/ Rain Cap (1.8m, 457 mm Dia.) |
| 39 | Jacket Water Heater (9 kW) |
| 40 | Battery Disconnect Switch |
| 41 | EMCP 4.3 Generator Set Controller |
| 42 | AGC-4 Paralleling Controller |
| 43 | External Radiator Sight Glasses (1 per circuit) |
| 44 | Control Access Door |
| 45 | Customer Communications Wiring Access |
| 46 | External Fuel Supply Connection (1"-11 BSPP) |

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