Cat® XQC1600 Power Module

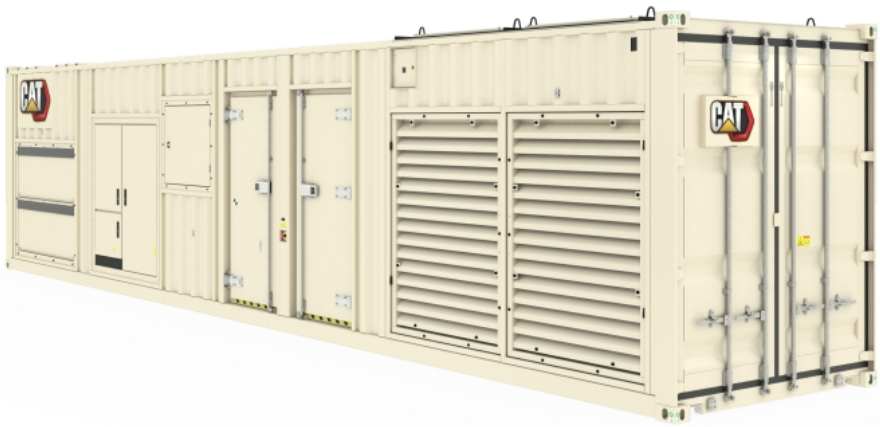


Image shown may not reflect actual configuration

IPP Rated 1515 kW
IPP Overload 1590 kW
50/60 Hz Switchable

Specifications

Frequency	Voltage	IPP Rated kW (kVA)	IPP Overload kW (kVA)	Speed (rpm)
50 Hz	400V	1515 (1893)	1590 (1987)	1500
60 Hz	480V	1705 (2131)	1790 (2237)	1800

Cat® 3516C Diesel Engine	Metric	Imperial (English)
Configuration	4-Stroke Diesel	
Bore	170 mm	6.7 in
Stroke	215 mm	8.5 in
Displacement	78.08 L	4,764 in^3
Aspiration	TA	
Compression Ratio	14.7:1	
Governor Type	ADEM™ A4	

Features & Benefits

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
- Extended Service Coverage (ESC) options available for coverage beyond the Standard Warranty period

Cat® 3516C Diesel Engine

- The compact, four-cycle Cat 3516C turbocharged-aftercooled (SCAC) diesel engine
- Reliable, Fuel Efficient
- Best-in-class fuel economy
- 50/60 Hz switchable for greater fleet utilization and versatility with neither software re-flashing, nor iron changes required
- Other engine features include: electric fuel priming, individual cylinder temperature monitoring, and extended filter change intervals
- Electronic differential pressure monitoring of all filters

Cat SR5 Series Generator

- Designed to match performance and output characteristics of Cat diesel engines
- Class H insulation operating at Class F temperature for extended life
- Stator winding and bearing temperature monitoring
- Coastal insulation protection and anti-condensation space heaters for extended life and increased reliability

Cat EMCP 4.3 Control Panel

- Provides full engine and generator monitoring and fault protection
- Graphical display (5.5 in.) denotes text alarm/ event descriptions, set points, engine and generator monitoring, and is visible in all lighting conditions
- Simple, user-friendly interface and navigation
- 50/60Hz toggle switch via terminal link
- Integrated Voltage Regulator (IVR) to provide precise steady state control and excellent transient response
  - Removes duplicate set points and wiring for simplified operation and troubleshooting
  - Dedicated IVR status screens in EMCP4.4
  - IVR fully supported by Cat ET (Electronic Technician) service tool
- Panel mounted emergency stop switch

* Does not conform to EPA/EU emissions standards

Power Distribution and Paralleling Controls

- Externally-accessible,100kAIC power distribution panel
- 3-pole, 4000A-frame (set to 3000A), electrically operated, insulated IEC Circuit Breaker (Optional 4-pole breaker)
- Externally-accessible, package mounted auto paralleling controls behind hinged door
- AGC-4 provides paralleling, load sharing, VFD control, and additional generator protection

Sound-attenuated Container

- Provides 9-high stackable CSC 40-ft high-cube container for ease of transportation and protection
- Personnel doors (2 total) on both sides of the engine for service access, plus 1 additional personnel door for general access
- Double container doors on each end for ease of service
- Service door for access to primary fuel filters
- Foldable, stowable awnings on engine room air inlets also serve as shipping covers
- Hinged, sound-attenuated radiator louvers for ease of cleaning and maintenance

Fuel System

- Fuel system operates on a variety of fuels
- Triple primary fuel filters with water separators, service valves, and differential pressure 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)

Asset Monitoring and Management

- Cat ConnectPLE601

Quality

- Single Source Supplier
- Factory designed and production tested to assure customer satisfaction.
- Package factory designed and production tested
- Manufactured in ISO 9001:2000 certified facility

Standard Equipment

Cat 3516C Heavy Duty Diesel Engine

- Turbocharged, air-to-water aftercooler
- Electronic ADEM™ A4 engine controls

Generator

- 1844-frame; SR-5 generator
- Double bearing, wye-connected, brushless, permanent magnet excited, form wound design
- Generator mounted Cat Integrated Voltage Regulator (Cat IVR)
- Stator winding and bearing temperature sensors and RTD module
- Metallic mesh generator air inlet filters (washable) with differential pressure monitoring

Air Filter

- Air cleaner - Heavy duty element, canister type air with service indicator

Cat Cooling System

- Cooling package provides 49°C (120F) ambient capability (50 Hz and 60 Hz) at the IPP Rating @ 750m (2,460 ft) above sea level
- Jacket water heater (9 kW, 3-phase 480VAC) with electric pump
- Energy efficient direct drive fans (4)
- Variable frequency fan drive with smart fan control
- Cat Extended Life Coolant (ELC)
- Vertical, non-stacked radiator cores and dimpled fins to minimize clogging

Starting/Charging System

- Dual 24-Volt Electric Starting Motors
- 24 VDC/50A battery charger with float/equalize modes and charging ammeter
- Four (4) 1400CCA, 24V-Maintenance

Fuel System

- 946-L (250 gal) single-wall fuel tank
- BS799-5 certified
- Solenoid fuel fill control valve
- Secondary fuel filters on engine
- Fuel cooler and electric priming pump

Exhaust System

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

Lube Oil System

- Full flow oil filters with water-cooled oil cooler (Requires API CI-4 or higher lube oil)
- Oil drain lines routed to the engine rail
- Includes engine-mounted oil level regulator and 114-L (30gal) oil tank for maintaining oil pan levels in extended run applications.
- Oil tank can be remotely filled without shutting down the engine
- Oil evacuation system for faster, cleaner oil changes

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
- Integration with the Cat Integrated Voltage Regulator (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
- Graphical display with positive image, transflective LCD, adjustable white backlight/contrast
- Digital indication for
  - RPM - DC Volts
  - Operating hours
  - Oil pressure
  - Coolant Temperature
  - 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
  - Overspeed
  - High Oil Temperature
  - Overcrank
  - Emergency stop
  - AGC-4
- Emergency stop pushbutton
- Display navigation keys including two shortcut keys for Engine Parameters or Generator Parameters

Standard Equipment (continued)

Container

- Sound attenuated to 75 dB(A) (50Hz) 81 dB(A) (60Hz) at 7m (23 ft)
- Five (5) lockable personnel doors with panic releases on each door
- Interior walls and ceilings insulated with 100 mm of acoustic paneling
- Side bus bar access door with external access load cable connections
- Six (6) DC lights with 60-min timer located at one personnel door
- Engine vibration isolators
- Easy drain access to standard fluids
- E-stops located on each side of the container (2)
- One (1) International-style convenience receptacle located on the front of the control panel

Distribution System

- 3000:5 Current Transformers with secondaries wired to shorting terminal strips
- 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
- Transformer 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
- One (1) shore power connections for generator anti-condensation heater, battery charger, jacket water heater, and convenience receptacle
- 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
- Ground fault sensing/trip (Requires Optional ground CT)

Power Factor Control Circuitry

- 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

Protective Relaying

- Generator protective relaying 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) (Cat IVR)
- Package mounted AGC-4 controls provides 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
- AGC-4/EMCP 4.3 protective relaying features
  - 25 sync-check (AGC-4)
  - 32 rev. power (EMCP 4.3 and AGC-4)
  - 40 loss of excitation (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)

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)

Technical Data*

Cat	
Frame size	1844
Pitch	2/3
No. of poles	4
Excitation	Static regulated, brushless, PM excited
Construction	Double bearing, close coupled
Insulation	Class H
Enclosure	Drip proof IP23
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%

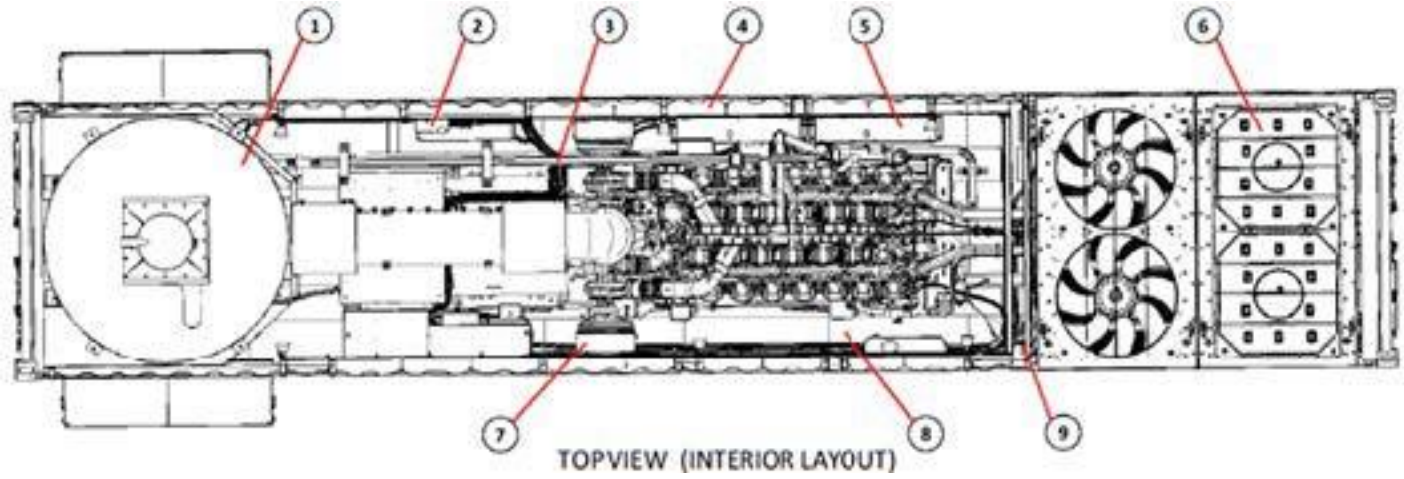
Cat Generator Set – 50/60 Hz			
	Units	**50 Hz EM0573**	**60 Hz EM0571**
IPP Power Rating	kW (kVA)	1515 (1893)	1705 (2131)
IPP Overload	kW (kVA)	**1590 (1987)**	**1790 (2237)**
Lubricating System Oil pan capacity	L (gal)	405 (107)	
Fuel System Fuel consumption @ 1.0 PF 105% Load 100% Load 75% Load 50% Load Fuel Tank Capacity Running time @ 75% rating	 L/hr L/hr L/hr L/hr L (gal) Hr	 382.0 356.3 282.4 200.5 946 (250) 2.5	 448.8 429.3 325.2 231.8 946 (250) 2.3
Cooling System Radiator and engine capacity	L (gal)	943 (249)	
Noise at 7m (23 feet)	dB(A)	75	81
Low Emissions Performance Number		EM0574	EM0572

*Materials and specifications are subject to change without notice
**Package fuel consumption and sound levels are for reference only

Technical Data (continued)

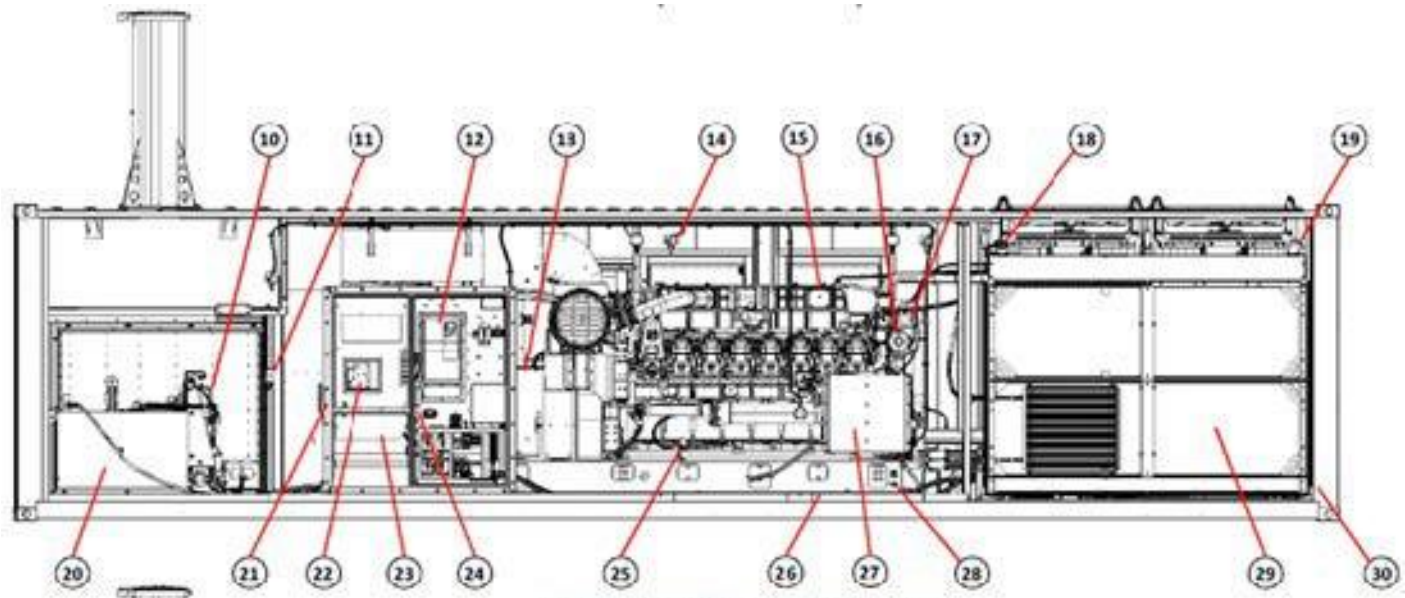
Dimensions and Weights					
Model	**Length mm (in)**	**Width mm (in)**	**Height mm (in)**	**With Lube Oil & Coolant Kg (lb)**	**With Fuel, Lube Oil & Coolant Kg (lb)**
XQC1600 w/o chassis	12,192 (480)	2,438 (97.5)	2,896 (114)	TBD	31,818 (70,000)
Center of gravity	x = + TBD +/- 300 mm (from rear of container); y = + TBD mm +/- 300 mm (from container floor); z = 0 +/- 150 mm (centerline)				

Equipment Layout



TOPVIEW (INTERIOR LAYOUT)

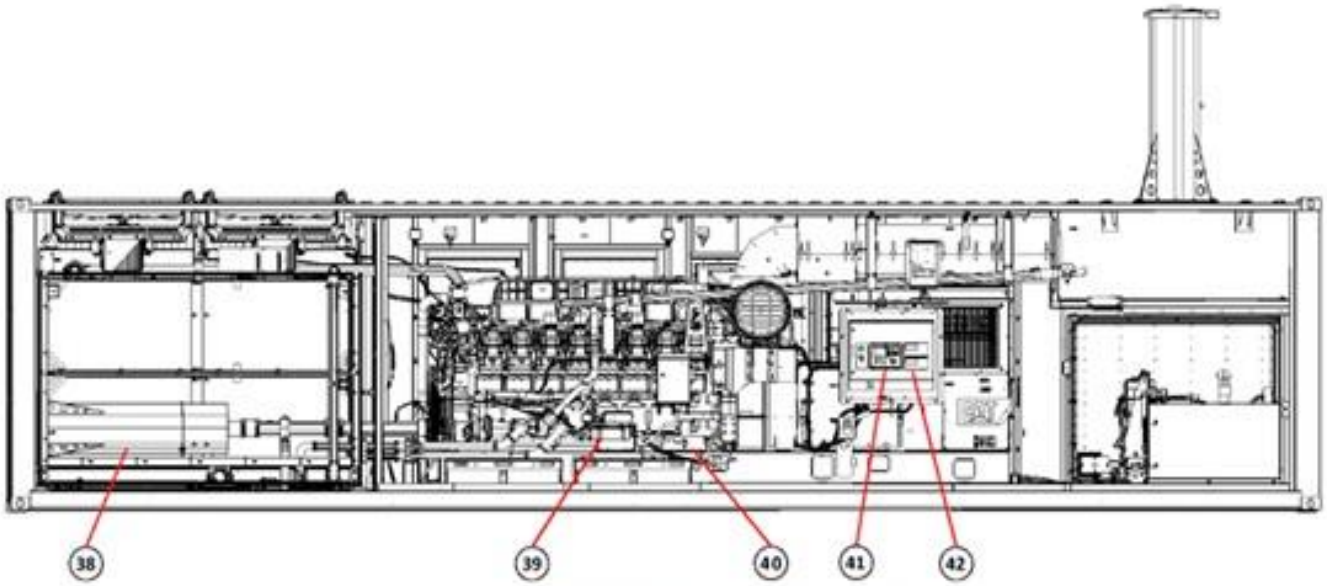
Equipment Layout



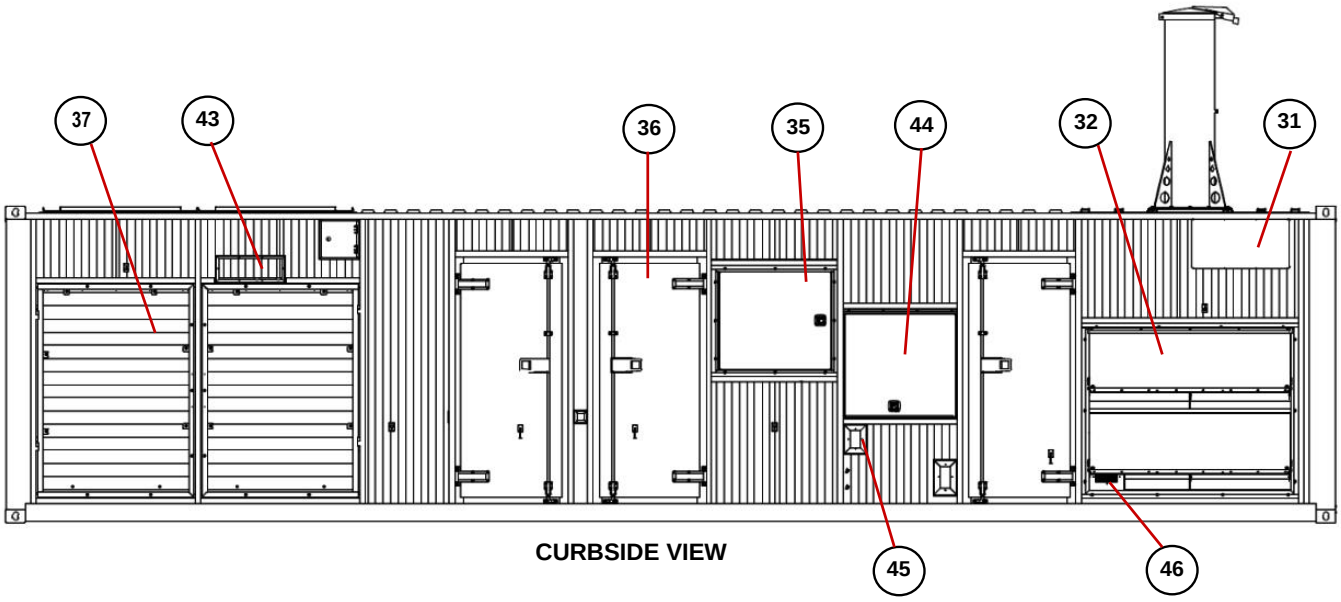
STREETSIDE VIEW (INTERIOR LAYOUT)

STREETSIDE VIEW

Equipment Layout

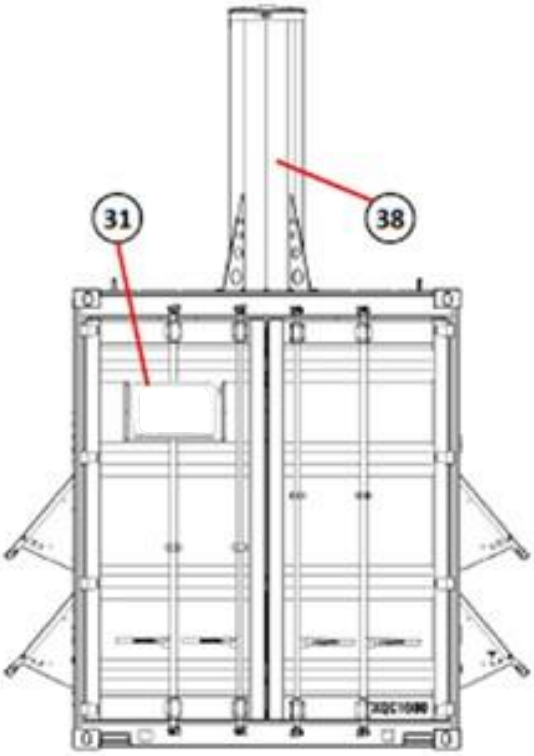


CURBSIDE VIEW (INTERIOR LAYOUT)
(NEAREST RADIATOR CORE REMOVED)



CURBSIDE VIEW

Equipment Layout



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	Acoutic 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)

Ratings Definitions and Conditions

Meets or Exceeds International Specifications: AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-33.

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 ekW 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.

Fuel rates are based on fuel oil of 35º API [16ºC (60ºF)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29ºC (85ºF) 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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