

# XQ2000 IPP



**POWER MODULE**  
**PRIME 1825 kW**  
**CONTINUOUS 1640 kW**  
**60 Hz Optimized**

Frequency (Hz)	Voltage (V)	Prime kW (kVA)	Continuous kW (kVA)
60	480/277	1825 (2281)	1640 (2050)

**With DEIF CONTROLLER**

## FEATURES

Incorporates a wide range of rugged features. Factory designed, certified prototype tested with torsional analysis. 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. Extended warranty available in some 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 3516B turbocharged-after cooled diesel engine combines durability with minimum weight while providing dependability and economy. The fuel system operates on a variety of fuels.

### CAT SR4B GENERATOR

Double bearing, wye-connected, static regulated, brushless, permanent magnet excited, Cat SR4B 826 frame generator designed to match the performance and output characteristics of the Cat diesel engine driving it.

### CAT COOLING SYSTEM

Sized compatible to rating with energy efficient fan and variable frequency fan drive. The cooling system provides 50C ambient operating capability at Continuous Rating with vertical discharge radiator for close proximity to buildings.

### ON-PACKAGE PARALLELING CONTROL SYSTEM

Provides auto paralleling using package mounted controls. The EMCP 4.2 provides offers engine and generator monitoring and protection. The AGC-4 provides paralleling, load sharing, VFD control, and primary generator protection

### EXCLUSIVE CAT DIGITAL VOLTAGE REGULATOR (Cat DVR)

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

### SOUND ATTENUATED CONTAINER

Provides 9-high stack CSC rated enclosure for ease of transportation and protection. Meets 77 dB(A) at 15 meters or below per SAE J1074 measurement procedure at prime rating.

## FACTORY INSTALLED STANDARD EQUIPMENT

SYSTEM	STANDARD EQUIPMENT
<b>Engine</b>	Cat 3516B 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 Spin on, full flow oil filters with water cooled oil cooler. Requires API CF-4 lube oil Lubricating oil system including make-up system and 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
<b>Generator</b>	Double bearing SR-4B brushless, form wound, permanent magnet excited, three-phase with Cat digital voltage regulator (Cat DVR), 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). Generator equipped with System 4 insulation protection.
<b>Containerized Module</b>	40' ISO high cube container, 9-High stack CSC certified Four (4) 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 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 Six (6) DC lights 1,250 gal fuel tank, UL listed, double wall, 10 hr runtime @ Continuous rating Solenoid fuel fill control valve External lockable connections for fuel Sound attenuated 77 dB(A) @ 15 m (50 ft) Four (4) oversized maintenance-free batteries, battery rack and 20-Amp battery charger Critical grade exhaust silencer with exhaust stacks for increased site power density Vibration isolators, stainless steel fastening hardware and hinges External drain access to standard fluids One 4.5 kg (10lb) carbon dioxide fire extinguisher Standard Cat rental decals and painted standard Cat power module white
<b>Cooling</b>	Standard cooling provides 50° deg C ambient capability (60 Hz) at Continuous Ratings with 45 deg C ambient capability at Prime Power Rating Horizontally mounted radiator with vertical air discharge Variable frequency fan drive with smart fan control
<b>Generator Controls and Protection</b>	EMCP 4.2 genset mounted controller Automatic start/stop with cool down timer Generator Protection features: 25, 32, 40, 50/51, 27/59, 81 O/U Deif 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 3000A UL rated 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
<b>Quality</b>	Factory testing of standard generator set and complete power module UL, NEMA, ISO and IEEE standards O&M manuals

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## SPECIFICATIONS

GENERATOR	CAT 3516B DIESEL ENGINE
Frame Size . . . . . 826	3516B, 4-Stroke diesel
Pitch . . . . . 0.6667	Bore – mm (in) . . . . . 170 (6.7)
No. of poles . . . . . 4	Stroke – mm (in) . . . . . 190 (7.5)
Excitation . . . . . Static regulated brushless PM excited	Displacement – L (cu in) . . . . . 69 (4,210)
Constructions . . . . . Double bearing, close coupled	Compression ratio. . . . . 15:1
Insulation. . . . . Class H	Aspiration. . . . . TA
Enclosure . . . . . Drip proof IP22	Fuel system . . . . . EUI
Alignment. . . . . Pilot shaft	Governor type . . . . . Cat ADEM A3 Control System
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  
 \*\*Data represented is at standard conditions

Generator Set Technical Data	Units	60 Hz	
		Prime	Continuous
Power Rating	kW	1825	1640
	(kVA)	(2281)	(2050)
Lubricating System	L	401.3	
Total oil pan capacity	(US gal)	(106.0)	
<b>Fuel System</b>			
Generator set fuel consumption**			
100% Load	L/hr	462.7	415.4
	(gal/hr)	(122.2)	(109.7)
75% Load	L/hr	345.9	313.1
	(gal/hr)	(91.4)	(82.7)
50% Load	L/hr	241.1	220.2
	(gal/hr)	(63.7)	(58.2)
Fuel Tank Capacity	L	4,731	
	(gal)	(1,250)	
Max Rated Running Time	hours	>9	>10
<b>Cooling System</b>			
Radiator Capacity	L (U.S. gal)	770 (203)	
<b>Air Requirements</b>			
Combustion air flow	m <sup>3</sup> /min	167.8	162.2
	(cfm)	(5,925.8)	(5,728.0)
Maximum air cleaner restriction	kPa	6.2	
	(in H <sub>2</sub> O)	(24.9)	
<b>Exhaust System</b>			
Exhaust Flow	m <sup>3</sup> /min	418.2	386.1
	(cfm)	(14,768.6)	(13,635.0)
Package Noise Rating @ 15m (50 ft.)	dBA	77	77

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## TECHNICAL DATA\* (CONT.)

Model	Length in (mm)	Width in (mm)	Height in (mm)	Weight with Lube oil and Coolant lb (kg)	Weight with fuel, lube oil and coolant (kg)
XQ2000 w/o chassis	480 (12,192)	97.5 (2,438)	114 (2,896)	64,000 (29,021)	73,000 (33,106)
XQ2000 w/ chassis	480 (12,192)	97.5 (2,438)	168 (4,267)	74,000 (33,638)	83,000 (37,641)
Center of gravity	x = +4,913 +/- 300 mm (from rear of container); y = +788 mm +/- 300 mm (from container floor); z = 0 +/- 150 mm (centerline)				

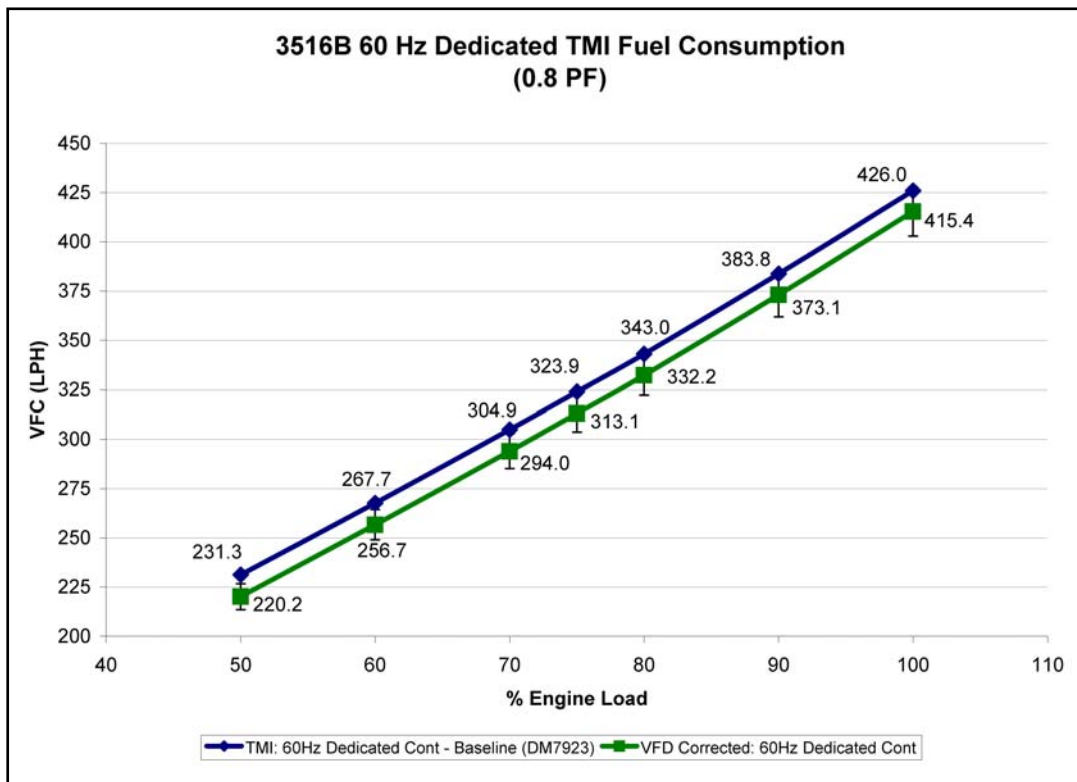
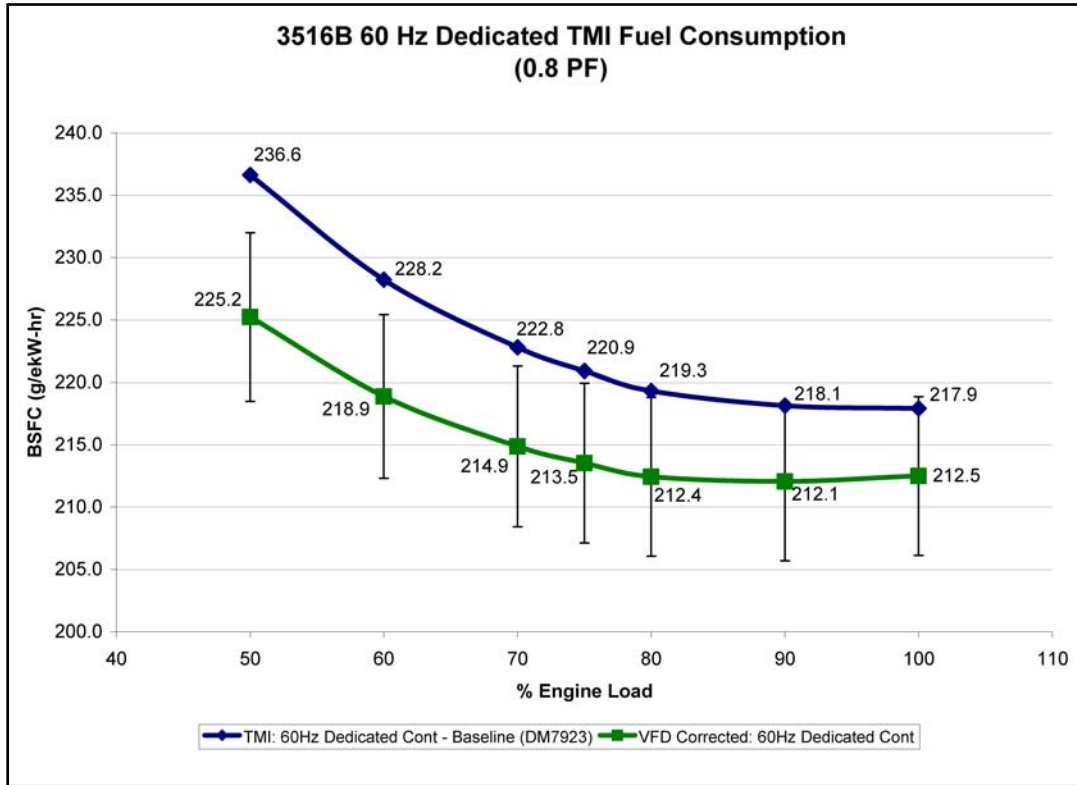
## RATING DEFINITIONS

**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. Fuel stop power in accordance with ISO3046.

**Prime** – Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand of 100% of 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 ISO8258. Fuel stop power in accordance with ISO3046.

**Continuous** – Output available without varying load for an unlimited time. Average power output is 70 – 100% of the continuous power Rating. Typical peak demand is 100% of continuous rated kW for 100% of the operating hours. Continuous power is in accordance with ISO8528. Fuel stop power is in accordance with ISO3036.

## TECHNICAL DATA\* (CONT.)



VFD Corrected data shows 3% error bars at each data point. All data normalized back to STP ambient temperature of 25 C (77 F).

## STANDARD FEATURES

### EMCP 4.2 LOCAL CONTROL PANEL

- Generator mounted EMCP 4.2 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 DVR 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 4.2 ENGINE OPERATOR INTERFACE

- Graphical display with positive image, transreflective 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

### 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 4.2 PROTECTIVE RELAYING

- Generator protective features
  - 25 sync-check ( AGC-4)
  - 32 rev. power (EMCP 4.2 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 4.2 and AGC-4)
  - 81O/U under/over frequency (EMCP 4.2 and AGC-4)
- 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/ AOP secondary display

### 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 UL489 CB.
- 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 (needs optional ground CT)

## CONTAINER

- 40' ISO high cube container, CSC 9-High Stack Certified
- Painted standard Cat Power Module White per Caterpillar Specifications
- Standard air intake louvers
- Three (3) lockable personnel doors with panic release
- Fire extinguisher

## INTERNAL LIGHTING

- Six (6) internal DC lights with timers located at each personnel door
- One (1) 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

- Single emergency stop pushbuttons (ESP) located on rear face of generator set controls area

## EXHAUST SILENCER

- Critical grade, internally mounted, dual cylindrical exhaust silencers
- 2 m high vertical discharging exhaust stack located in radiator discharge area

## FUEL TANK

- UL Listed 1250 gallon double walled tank
- Fuel solenoid valve system
- Triple fuel/water separators

## SHORE POWER

- One (1) shore power connection block for jacket water heaters
- One (1) shore power connections for generator space heater, battery charger, and duplex service receptacle

## LUBE OIL MAKE-UP SYSTEM

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

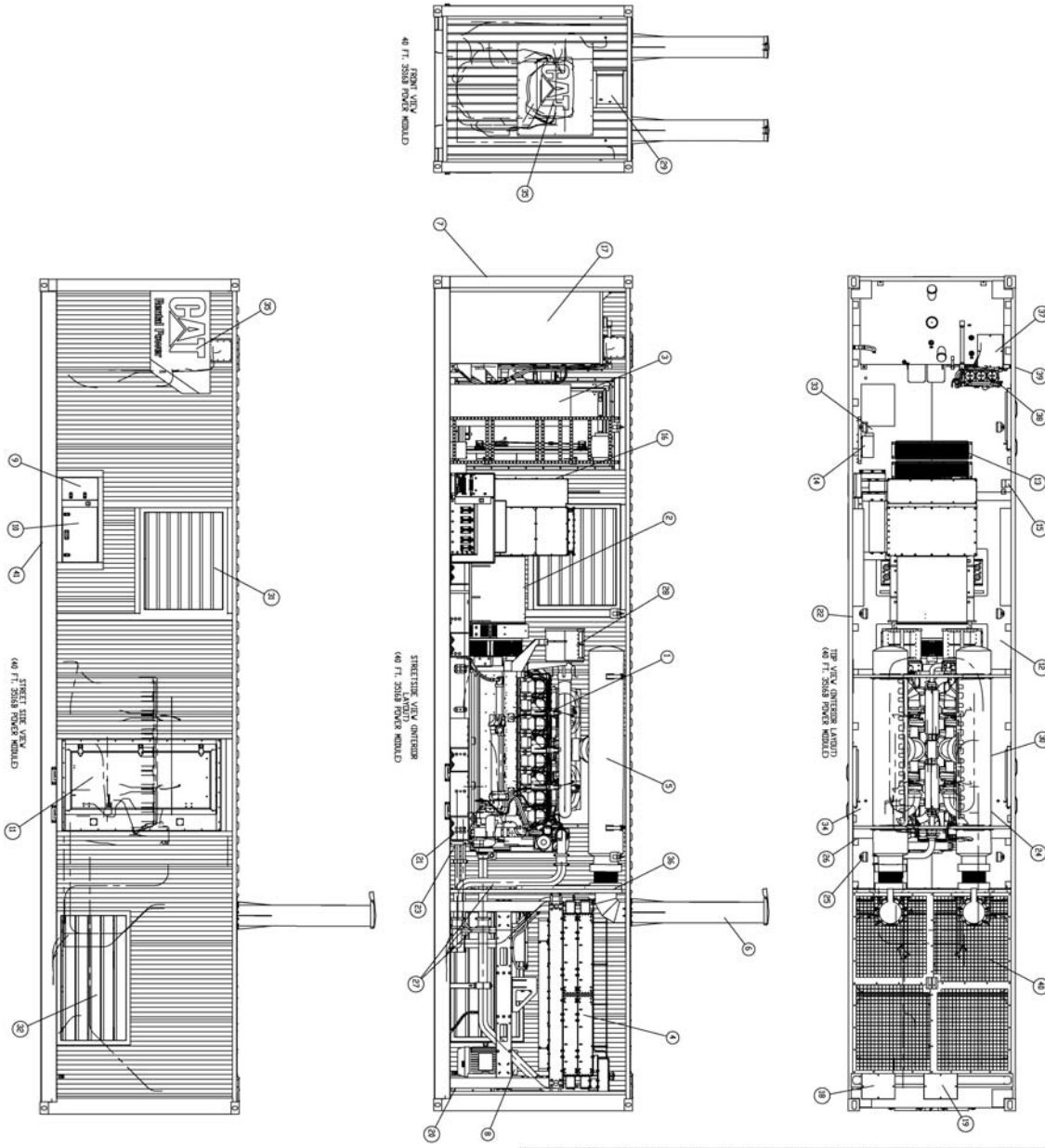
## MODES OF OPERATION

- 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)

# XQ2000 IPP



## EQUIPMENT LAYOUT



ID#	DESCRIPTION
1	20248 GENSET (20248 40 VOLTAGE STEEL BUILT)
2	1025 FANNE FLOW VALVE, SOLEIL, BEARING SHAFT CONNECTION
3	1025 FANNE FLOW VALVE, SOLEIL, BEARING SHAFT CONNECTION
4	1025 FANNE FLOW VALVE, SOLEIL, BEARING SHAFT CONNECTION
5	1025 FANNE FLOW VALVE, SOLEIL, BEARING SHAFT CONNECTION
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41	1025 FANNE FLOW VALVE, SOLEIL, BEARING SHAFT CONNECTION

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