

Cat® XGC1900 60 Hz Rental Generator Set



Image shown may not reflect actual configuration.

**Continuous
1900 kW (2375 kVA)
60 Hz
250 mg/Nm³ NO_x
0.5g/bHP-hr NO_x**

Specifications

Frequency Hz	Voltage	Continuous kW (kVA)	Speed (rpm)
60	400V	1515 (1893)	1500

Cat® G3516H High Altitude and Ambient, High Fuel Tolerant Gas Engine	Metric	Imperial (English)
Number of Cylinders	V16	
Bore	170 mm	6.7 in
Stroke	215 mm	8.5 in
Displacement	78 L	4,760 in ³
Aspiration	Turbocharged Separate Circuit Aftercooled	
Compression Ratio	11.1:1	
Engine Speed	1500 – 1800 rpm	
Aftercooler Inlet	52°C	125.6°F
Jacket Water Outlet	99°C	210.2°F
Exhaust Manifold	Dry	
Fuel System	Cat Low Pressure w/ Air Fuel Ratio Control	
Governor Type	ADEM™ A4 Control System	
Fuel	Natural Gas	
Fuel Pressure Range	0.103 – 0.345 Bar	1.5 – 5.0 PSI

Benefits & Features

Fuel/Emissions Strategy

- Class leading efficiency
- Meets most worldwide emissions requirements down to 250 mg/Nm³ (0.5g/bHP-hr) NO_x level without after treatment

Single-Source supplier

- Generator set manufactured in ISO 9001:2000 compliant facility
- Package factory designed and production tested

Worldwide Product Support

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

Cat® G3516H High Altitude and Ambient, High Fuel Tolerant Mode Gas Engine

- Compact, four-stroke-cycle gas engine provides class leading dependability, fuel economy, and power density for reduced total cost of ownership
- High altitude and ambient hardware improves engine's capability to handle electrical loading and unloading, as well as ambient and altitude capability
- High fuel tolerant hardware improves humidity tolerance and allows usage of lower MN fuel
- 1500 Hr oil change interval and reduced oil consumption for reduced owning and operating cost

Cat Generator

- Cat SR5 1866 frame generator designed to match the performance and output characteristics of the Cat gas engine
- Stator and Bearing temperature monitoring for preventive maintenance
- Anti-condensation heaters for increased reliability
- Generator air inlet filter for reduced cleaning
- Adjustable shims for ease of re-alignment and retention of factory alignment
- Class H insulation operating at Class F temperature rise and System 4 insulation protection for extended life

Reduced Environmental Impact

- 110% spill containment of onboard engine fluids
- Positive crankcase fumes ventilation

Cooling System

- Size compatible to rating with energy efficient electric drive fan and core
- Provides ambient capability with 500 mg/Nm³ (0.5g/bHP-hr) NO_x at 100% continuous rating before derate @ 500m:
 - o 38°C @ 100% load
 - o 50°C @ 90% load
- Variable frequency drive (VFD) fan speed controls for improved fuel consumption at partial load and/or lower ambient temperatures
- Direct drive fans eliminate belt service

On Package Control Panel System

- Externally accessible, package mounted control panel and power distribution panel improves operator access and serviceability
- EMCP 4.3 offers engine and generator monitoring and protection, voltage regulation with Cat IVR improves transient response performance
- Dedicated IVR status screens on EMCP 4.3
- IVR Fully supported by Cat ET service tool:
 - o Removes need for additional PC software
- AGC-4 provides paralleling, load sharing, VFD control, and primary generator protection for greater versatility, package utilization and monitoring
- 100 kAIC, 4000A, 3 Pole Breaker Panel with LSIG trip unit for greater electrical protection

Sound Attenuated Container

- Provides 9-high stack CSC rated enclosure for ease of transportation and protection
- Enclosure doors and access panels located for ease of serviceability to maintenance and service items
- External, critical grade, spark arresting, SST, exhaust silencer with vertical discharge for reduced package internal temperatures and service access
- Single SST, 2m (6.5 ft) stack for optimized site spacing and requirements management
- External silencer and stack are internally stowable for ease of transportation in one package

Standard Equipment

Engine

- Cat® G3516H High Altitude and Ambient Gas Engine Operates on 27.57 to 94.32 MJ/Nm³ (700 to 2395 btu/ft³) dry pipeline natural gas
- Cat Gas Engine Control Module (CGECM) includes electronic speed governor and provides transient richening and turbo bypass control
- Electronic Ignition System (controlled by ECM)
- Individual cylinder Detonation Sensitive Timing (DST)
- Engine installed electronic fuel metering valve
- Heavy duty, two element, single stage canister type air cleaner with service sensing and annunciation
- Dual 24V electric starting motors
- Integral lube oil cooler, pre-lube oil pump, oil filter, filler, and dipstick and oil drain lines routed to engine rail
- Pre-lube Pump, 230VAC continuous type
- Jacket Water Heater, 12 kW, 400/480V, 50/60 Hz, 3-phase with isolation valves
- Improved absolute humidity/dew point capability, consult factory for instructions on proper site ambient, altitude, and dew point evaluation
- SST engine aftercooler

Generator

- Double bearing, SR5, brushless, form wound
- Permanent magnet excited, three-phase with Cat IVR
- Class H insulation operating at Class F temperature and coastal insulation protection for extended life
- 4-lead design
- Re-Greaseable bearings

Quality

- Factory testing of standard generator set and complete power module
- NEMA, ISO and IEEE standards
- CSA & CE Certified gas train
- O&M, parts book and service manuals

Containerized Module

- 40' ISO high cube container, 9-high stack CSC certified
- Sound attenuated air intake louvers and 2 lockable personnel doors with panic release
- Interior walls and ceilings insulated with 100 mm of acoustic paneling
- Floor of container is undercoated for corrosion protection
- One (1) International – style convenience receptacle
- External emergency stop buttons on each side of unit
- Side external access load connection bus bars
- 3" ANSI flange customer fuel connection with cover to prevent vandalism
- Energized-to-run (ETR) shutoff valve (double solenoid, low/high pressure switch, CSA B149.3:20 listed)
- Wall mounted fuel filter, gas pressure regulator, and shutoff valve
- Sound attenuated 81 dB(A) @ 7m (23 ft)
- Four (4) 1400 CCA maintenance-free batteries, battery rack and 50-Amp, 400/480V battery charger
- Vibration isolators, corrosion resistant door hardware and fasteners, and stainless-steel hinges
- External drain access to standard fluids
- Standard Cat films and painted Cat power module white
- LH and RH engine service doors integrated into container side walls
- LH and RH service access panels for cleaning radiator cores
- Hinged container doors, both ends
- Remote cooling shunt tank for improved venting and positive suction head at pump inlets
- Re-Greaseable Fan motor bearings
- Motor grease lines plumbed for easy access
- Motor grease interval and grease type coincides with generator grease interval and grease type
- Fan modules are removable from above
- Methane sensor located near engine air filters detects gas leaks inside Power Module and causes alarm and shutdown

Standard Equipment (*continued*)

Lube Oil Make-Up System

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

EMCP 4.3 Engine Operator Interface

- Graphical display with positive image, transfective 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 coolant temperature
 - Overcrank
 - Emergency stop
- Display navigation keys including two shortcut keys for Engine Parameters or Generator Parameters

AGC-4/EMCP 4.3 Local Operator Interface Panel

- AGC-4 provides paralleling, voltage and frequency adjust, base load / PF / load sharing / synchronizer, auto start / stop control, generator CB control, SCADA Interface (Ethernet), package protection, power metering, and VFD control
- AGC-4 controls provide 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
- Manual and automatic paralleling capability
- EMCP 4.3 provides power metering, generator protective relaying, and engine and generator control and monitoring
- Convenient service access for Cat service tools (not included)
- 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, kW, kVA, kVAR, kWhr, % kW, PF, and synchroscope
- Emergency stop pushbutton

AGC-4/EMCP 4.3 Protective Relaying

- Generator protective features:
 - 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)

Standard Equipment (*continued*)

Voltage Regulation and 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 operator interface panel
- Configure IVR parameters directly from the EMCP screen or Cat® ET service tool
- Programmable stability settings
- Soft start control with an adjustable time setting in IVR control mode
- Dual Slope, Configurable Under Frequency (Volts/Hz) regulation
- Configurable line drop compensation

Circuit Breaker

- 4000A-frame, 3-pole, package-mounted, electrically operated, insulated IEC CB
- Solid state trip unit for overload (time overcurrent) and fault (instantaneous) overcurrent protection. LSIG is standard
- Ground fault sensing/trip (requires ground CT)
- Includes DC under voltage trip coil activated on any monitored engine or electrical fault
- Circuit breaker and VFD cabinet and components sized for 100 KAIC

Internal Lighting & Convenience Power

- Six (6) internal DC lights with 60-min timer located at one personnel door
- One (1) International-style convenience receptacle (110V, 3A) located on operator interface panel

Current transformers

- Metering class current transformers rated 4000:5 with secondaries wired to shorting terminal strips

UMR

- Basler UMR IPS-100 provides the following utility/ intertie protection features:
 - o Synch check (device 25)
 - o Phase undervoltage, 2-stage (device 27)
 - o Reverse power (device 32)
 - o Negative sequence overvoltage (device 47)
 - o Phase time overcurrent (device 51)
 - o Neutral overcurrent (device 51N)
 - o Phase overvoltage, 2-stage (device 59)

UMR (*continued*)

- Under frequency, 2-stage (device 81U)
- Over frequency (device 81O)
- Potential transformers 4:1 ratio with primary and secondary fuse protection
- CTs rated 1200:5 wired to shorting terminal strips

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

- Provides power from load side of generator breaker for generator anti-condensation heater, battery charger, jacket water heater, convenience receptacle, and engine pre-lube pump
- Shore power via distribution block connections for jacket water heater, battery charger, generator space heaters, and engine pre-lube
- 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:
 - o AGC-4 control allows single unit to connect to a dead bus
 - o Auto synchronization (voltage & phase matching)
 - o Load sharing (kW) analog signal (like units & legacy compatible)
 - o Load sharing (kVAR) analog signal (like units only)
- Utility mode paralleling features:
 - o Auto synchronization (voltage & phase matching)
 - o Base-load control

Technical Data

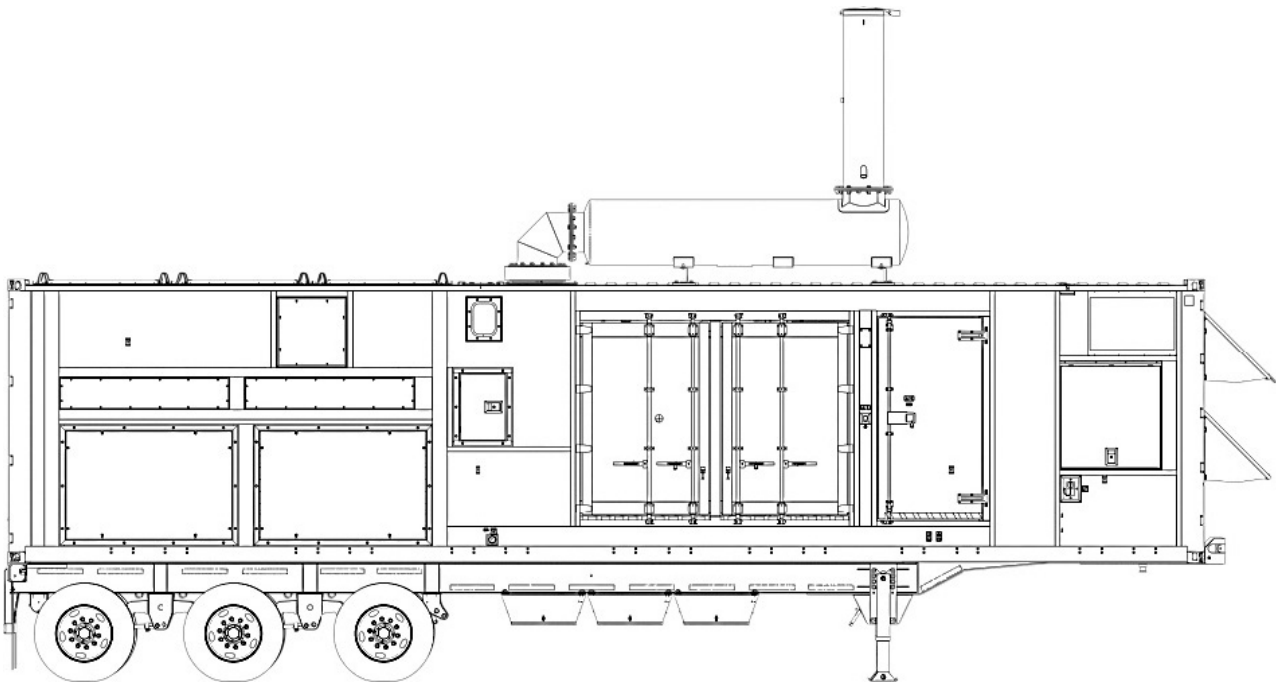
Cat Generator	
Frame size	1866
Pitch	0.6667
No. of poles	4
Insulation	Class H
Excitation	Static regulated brushless PM excited
Construction	Double bearing, close coupled
Enclosure	Drip proof IP22
Temperature rise	105 deg C
Alignment	Close Coupled
Overspeed capability – % of rated	125% of rated
Voltage regulator	3 phase sensing with Volts-per-Hertz
Voltage regulation	Less than $\pm 0.5\%$ voltage gain Adjustable to compensate for engine speed droop and line loss
Wave form deviation	Less than 3% deviation
Telephone Influence Factor (TIF)	Less than 50
Harmonic Distortion (THD)	Less than 5%

Cat Generator Set		
	TMI Performance No. Units	Continuous – 60 Hz EM4963
Power Rating	kW (kVA)	1900 (2375)
Performance Specification		
Lubricating System Lube oil refill volume with filter change for standard sump	L (gal)	462 (122)
Altitude Capability At 25° C (77°) ambient, above sea level	m (ft)	1000 (3281)
Cooling System Package ambient capability Jacket water temperature (max operation outlet) System coolant capacity System required airflow	°C (°F) °C (°F) L (gal) m³/min (ft³/min)	45 (113) 100 (212) 947 (253) 2711 (95,738)
Exhaust System Combustion air flow rate Exhaust stack gas temperature, 100% Exhaust gas flow rate	m³/min (ft³/min) °C (°F) Nm³/min	141.8 (5008) 411 (772) 150.4 (5311)
Sound Performance* Noise Rating @7 meters (per SAE J1074) *fan speed on 35C ambient	dB(A)	81
Emissions at 100% Load NOx (as NO ₂) (corr. 5% O ₂) CO (corr. 5% O ₂) THC (corr. 5% O ₂) NMHC (corr. To 5% O ₂) Exhaust O ₂	mg/Nm³ (dry) mg/Nm³ (dry) mg/Nm³ (dry) mg/Nm³ (dry) % (dry)	247 883 1306 222 9.8
Methane Number Without Derate With Derate	65 – 100 27 – 65	

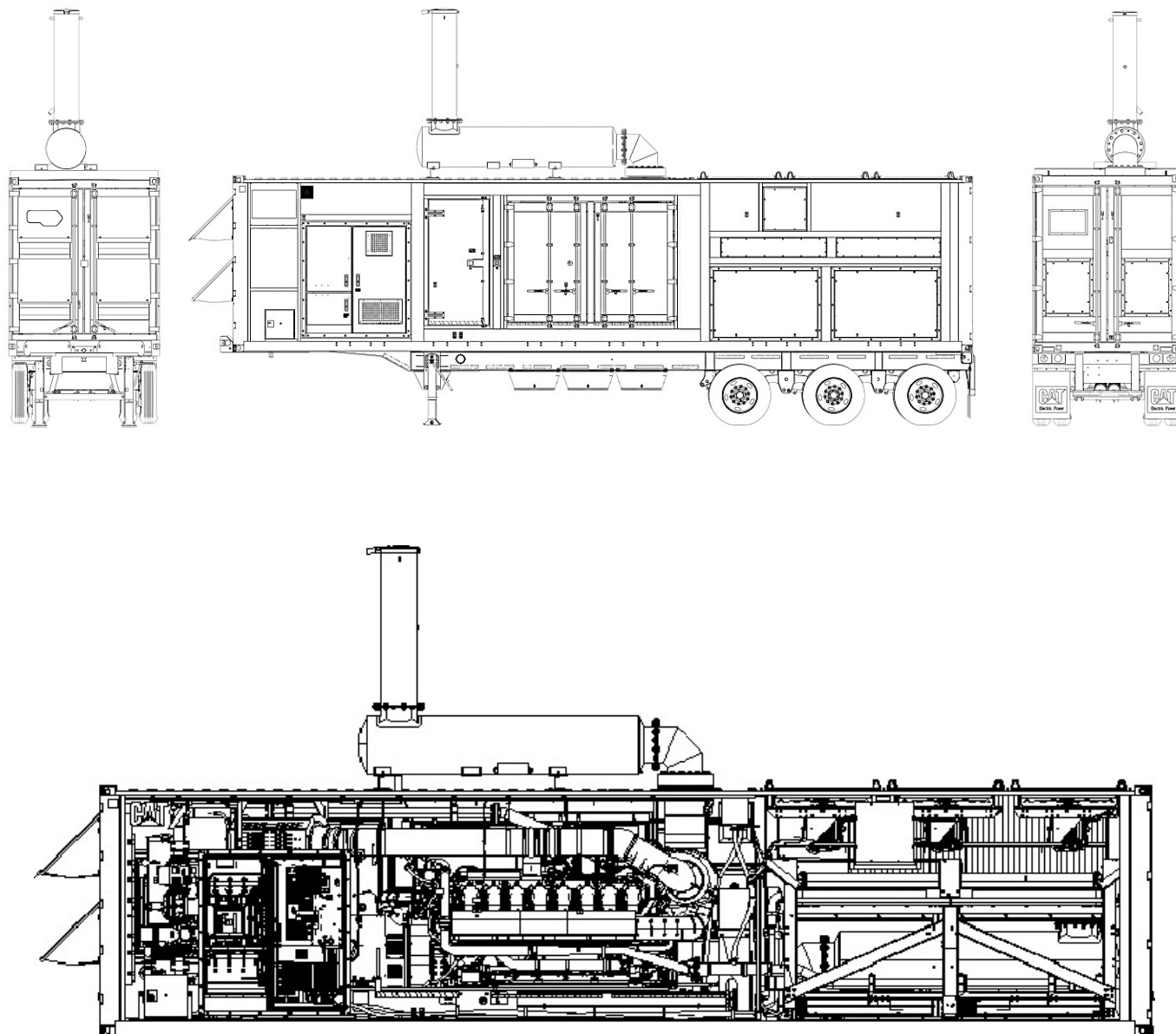
Dimensions and Weights

Model	Length (L) mm (in)	Width (W) mm (in)	Height (H) mm (in)	With Lube Oil & Coolant Kg (lb)
XGC1900 w/o Chassis	12,192 (480)	2,438 (96)	2,896 (114)	35,280 (77,780)
XGC1900 with Chassis	12,192 (480)	2,438 (96)	4,145 (163)	39,780 (87,700)

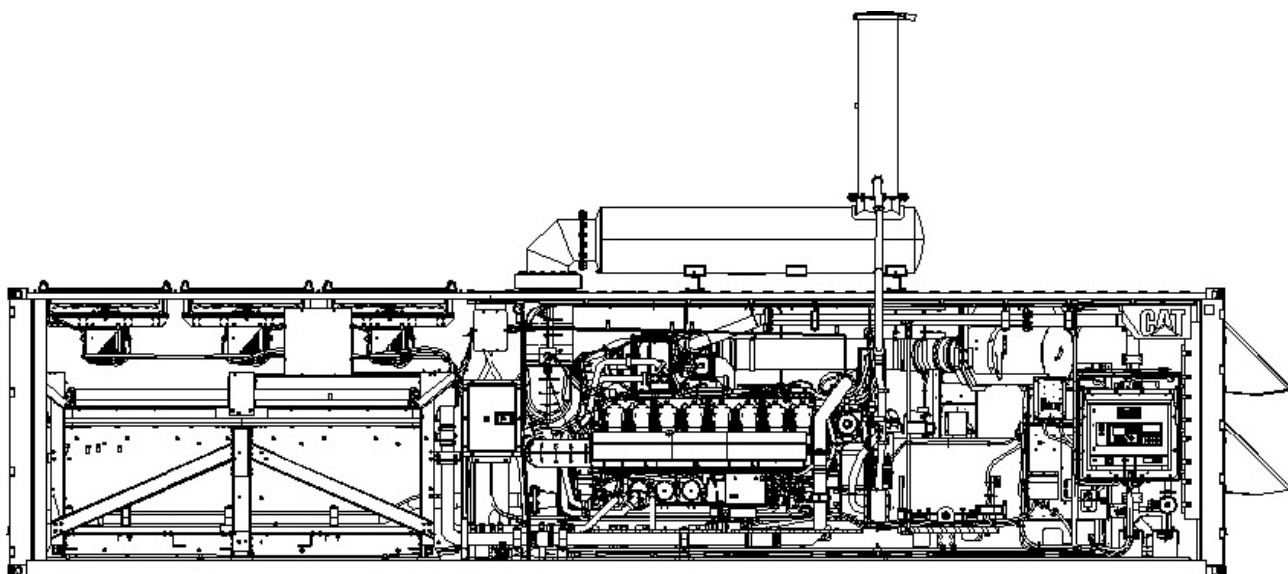
General Layout View



General Layout View (*continued*)



General Layout View (*continued*)



Ratings Definitions and Conditions

Conditions:

Power for gas engines is based on fuel having an LHV of 33.74 kJ/L (905 Btu/cu ft) at 101 kPa (29.91 in. Hg) and 15°C (59°F), and the air to turbo dew point temperature. Fuel rate is based on a cubic meter at 100 kPa (29.61 in. Hg) and 15.6°C (60.1°F). Air flow is based on a cubic foot at 100 kPa (29.91 in. Hg) and 25°C (77°F). Exhaust flow is based on a cubic foot at 100 kPa (29.61 in. Hg) and stack temperature.

Continuous — Output available without varying load for an unlimited time. Continuous power is in accordance with ISO8528, AS2789, and BS5514. Fuel stop power is in accordance with ISO 03036. Natural gas ratings have been established on natural gas with net calorific Low Heat Value (LHV) of approximately 35.6 MJ/Nm³ (905 Btu/cu ft) and 80 Methane Number (MN). For values in excess of altitude, ambient temperature, inlet/exhaust restriction, or different from the conditions listed, contact your local Cat dealer.

www.cat.com/electricpower

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