



UTILITY POWER MODULE 50 Hz OPTIMIZED SOUND ATTENUATED 400 V, 50 Hz, 2000 KVA (1600 EKW)

FEATURES



EMISSIONS AND NOISE

- Capable of meeting most emissions requirements imposed by national or local regulations without after treatment. Low noise to achieve a noise pressure of 85dB(A) at 1 meter at 50°C continuous rating.

COMPLETE SOLUTION WITH TTACHMENTS

- Wide range of rugged features, system attachments, factory designed, selected and tested at 50 Hz. **Fully Prototype Tested** with certified torsional vibration analysis and actual noise measurements available.



ENGINE

- Reliable, rugged, Caterpillar® 3516B Diesel Engine.
- V16, 4 stroke-cycle, turbocharged-Aftercooled.
- Worldwide industry leader.
- Designed for maximum performance and minimum fuel consumption.



GENERATOR

- Exclusive Caterpillar® includes an 827 2/3-pitch generator, performance and design matched to Caterpillar 3516B engine.
- Two bearings, Form Wound, 827 Frame, 6 lead.
- Permanent magnet excitation with Caterpillar CDVR digital voltage regulator.
- Optimum winding pitch for least total harmonic distortion.



WORLDWIDE PRODUCT SUPPORT

- Worldwide parts availability through your Caterpillar dealer, with over 1.800 dealer branch stores operating in 166 countries.
- Caterpillar dealer services technicians are trained to service every aspect of your electric power generation system.
- Customer Support Agreements offer back-to-back services from scheduled inspections and preventive maintenance to total maintenance and repair contracts.



GENERATOR SET & CONTAINER

- Cooling system 50°C ambient operating & vertical discharge radiator for close proximity to buildings.
- Industry standard 40-foot (12 m) container. Interior walls and ceiling are insulated with acoustic glass and covered with perforated metal sheet for a durable interior wall surface. Floor of container is insulated with acoustic glass and covered with galvanized steel.
- Four lockable personnel (padlock) doors are provided with sound attenuation and double sealed. Three doors are located on the side of the engine for service and one on the container left side to access the control room. Includes Stainless steel hardware & hinges and panic release.
- External access door provided for bus bars and auxiliary connections for external power source feeding (jacket water heater, battery charger, space heater in generator, switchgear space heater, A/C lighting and sockets, control room ventilation and optional loads).
- Convenient external lockable connections for fuel.
- Fuel transfer system by others.
- Separate control room with ventilation system.
- 24 VDC interior lights with 60 minutes timer in switchgear room and in engine room.
- fuel tank with cooler (part of the radiator), primary filter and water separator.
- 150 L lube oil make up tank (gravity) with manual fill from interior.
- Two 5 kg (10 lb) carbon dioxide fire extinguisher bottle mounted on wall.
- CSC certified for convenient transport. Stackable, up to four high for storage.
- Meets or exceeds specifications: ISO 3046, IEC 34, ISO 8528, EGSA101P, JEM1359, AS1359, AS2789, BS4999, NEMA MG1-22
- Meets EU directives Low Voltage Safety, EMI & Machinery

FEATURES (Continued)

SWITCHGEAR & CONTROLS

- Utility paralleling switchgear intended for automatic or manual synchronizing with a utility power source as a load management system, with provisions for standby operation feeding an isolated load network. Modes of operation are field configurable and include:
 - Single Unit Island Mode.
 - Multiple Unit Island Mode (up to 18 units).
 - Includes Load Sense / Load Demand control, ramp loading, bumpless transfer
 - Load sharing (kW and kVAR) capability is provided via network communication.
 - Single Unit Utility Parallel Mode.
 - Automatic paralleling.
 - Selectable for Import / Export control. (Requires 4-20 mA customer input.)
 - This product is intended for unmanned operation Automatic paralleling.
- Convenient operator interface
 - 5.7" Color touch screen
 - Graphical one-line diagrams with LED status indicators.
- Modules can operate in groups up to 18 with all communications synchronizing and load sharing between units by datalink for quick and convenient setup. (Max cumulative distance 450 m)
- Protection includes 3200A motorized generator 3 poles circuit breaker with 100kA interrupt capability, extensive protective relays and internal power distribution. Factory mounted and compliant with IEC947-2
- Convenient customer connections for power
- Request to run / stop signal (customer input)
- Can also be paralleled to Woodward compatible legacy modules in island operation.
- Languages available: English.

FACTORY INSTALLED STANDARD EQUIPMENT

Feature	Benefits
Caterpillar® 3516B Engine	Air cleaner with service indicator Batteries Primary & secondary fuel filters with service indicators; lubricating oil pump, fuel priming pump Lube oil make-up system Separate circuit cooling system Jacket water heater (two elements 4500 W) Service meter; standard eight-gauge instrument panel Electronic ADEM™ III Governing System The ADEM III control is designed to control/interface Electronic Unit Injector (EUI) equipped engines. The ADEM III controller is composed of the ADEM III ECM, control software, sensors, actuators, fuel injectors, and interface to the generator system. All ADEM III controllers are designed to survive the harshest environments. Environmentally sealed, die-cast aluminum housing isolates and protects electronic components from moisture and dirt contamination. Rigorous vibration testing ensures product reliability and durability. SIMPLE SERVICING - Each ADEM III system works in combination with the Caterpillar ET service tool software to keep the engine operating at peak performance. <ul style="list-style-type: none"> - Displays measured parameters. - Retrieves active and logged event codes documenting abnormal system operation. - Performs calibrations and diagnostic tests. - Supports flash programming of new software into the ADEM III ECM SELF DIAGNOSTICS - Each ADEM III ECM has a full compliment of self diagnostics. The ECM can detect faults in the electrical system and report those faults to the service technician for quick repair.

FACTORY INSTALLED STANDARD EQUIPMENT (Continued)

Feature	Benefits
Caterpillar® SR4B Generator	400/480 Volt SR4B brushless, 827 frame Permanent magnet excited, three-phase with digital voltage regulator Class H insulation operating at class F for extended life Two bearing, 6 lead star connected Three phase voltage sensing Space heater
Generator Set EMCP 3.3 Local control panel	Generator mounted EMCP 3.3 local panel Provides MODBUS datalink to engine and generator Convenient service access for Caterpillar service tools (not included) The Caterpillar EMCP 3.3 places fully featured power metering, protective relaying and engine and generator control and monitoring at your fingertips. Integration with the CDVR provides enhanced system performance. Ability to view and reset diagnostics on J1939 Network modules via the control panel removes the need for a separate service tool for troubleshooting. Fully featured power metering, protective relaying, engine and generator parameter viewing, and expanded AC metering are all integrated into this controller. Real-time clock allows for date and time stamping of diagnostics and events. OPERATOR INTERFACE <ul style="list-style-type: none"> - Graphical display with positive image, transfective LCD, adjustable white backlight/contrast. - Two LED status indicators (1 red, 1 amber). - Three Engine Control Keys and Status Indicators (Run/Auto/Stop). - Lamp Test Key. - Alarm Acknowledgement Key. - Display Navigation Keys - Two Shortcut Keys: Engine Operating Parameters and Generator Operating Parameters.
Switchgear controls	MODES of OPERATION Utility paralleling switchgear is included for automatic paralleling with a utility power source as a load management system, with provisions for standby operation feeding in an isolated load network. Modes of operation are field configurable and include: <ul style="list-style-type: none"> - Single Unit Island Mode - Multiple Unit Island Mode (up to 18 modules per site) with ramp loading <ul style="list-style-type: none"> · Includes Load Sense / Load Demand control · Each module displays system summary power level and summary alarms. · Load sharing capability is provided via CAN network communication - Single Unit Utility Parallel Mode. <ul style="list-style-type: none"> · Automatic paralleling · Selectable for Import / Export control · If Import control is selected a 4-20mA or 0 - 10 V signal is required and will be provided by others that is scalable to the utility contribution. · Provision for Manual Paralleling

FACTORY INSTALLED STANDARD EQUIPMENT (Continued)

Features	Benefits
<p>Switchgear controls (Continued)</p>	<p>AUTOMATIC LOAD DEMAND: Load demand operation includes sequencing of multiple units, with configurable start stops levels and timers. Although the modules are intended for prime power rental applications, they can also be configured for various stand-by scenarios as well. This includes strategies where the first module up to speed becomes the master and can close on a dead bus with the remaining packaging automatically paralleling to it.</p> <p>AUTOMATIC SYNCHRONIZING: The control system provides soft loading and unloading for bumpless transfer in parallel operation. The control system also works together with EMCP 3.3 to provide automatic cooldown feature. The control system provides data communication for 1 to 18 modules in a network. Communication is provided with a robust high speed CAN network. The CAN data link was selected for robust high speed deterministic data transfer. Modules are connected in series with a 15 m long high speed CAN cables (provided with each module). Parallel operation includes both real kW and reactive KVAR load sharing and control.</p>
<p>Switchgear monitoring</p>	<p>The monitoring system includes a mimic one line that shows the generator with its respective circuit breaker in a one-line representation of the system. The graphic COLOR LED indicators display the following information:</p> <ul style="list-style-type: none"> - Generator circuit breaker open/closed/tripped - Engine running - System summary alarm <p>The monitoring system also includes an additional display conveniently mounted in the EMCP 3.3 panel. This display is a 1/4 VGA color touchscreen with pushbuttons for controls. This display provides quick module set up with all parameters stored in non-volatile memory. In addition to individual module information, each module also provides overall plant information including: overall power production; and alarm / shutdown status of each MODULE.</p> <p>The control system monitors and manages various module functions. This includes the automatic lube oil make up system, alarms and emergency stop functions.</p> <p>The 827 frame generator is provided with winding temperature sensors as standard. The control system monitors and displays these values, providing alarm and shutdown. Various diagnostic features are provided including breaker synchronizing time out and reclose alarms, circuit breaker position feedback, phase rotation mismatch, network communication error alarms, sensor diagnostics, and multiple unit configuration checks.</p>
<p>Warning tower</p>	<p>Warning tower with green, amber, red colors and alarm sounder. Indicates operation status of Power Module to lower downtime. Installed inside the container for transport. For</p>

SPECIFICATIONS for 50 Hz - 2000 kVA (1600 EkW), 400 V -

CATERPILLAR SR4B GENERATOR

Voltage regulation	< ±0.5%
Voltage gain	Adjustable
Wave form	< 3% deviation
TIF	< 50
THD	< 3%
Enclosure	IP 22
Amperage	2886.8

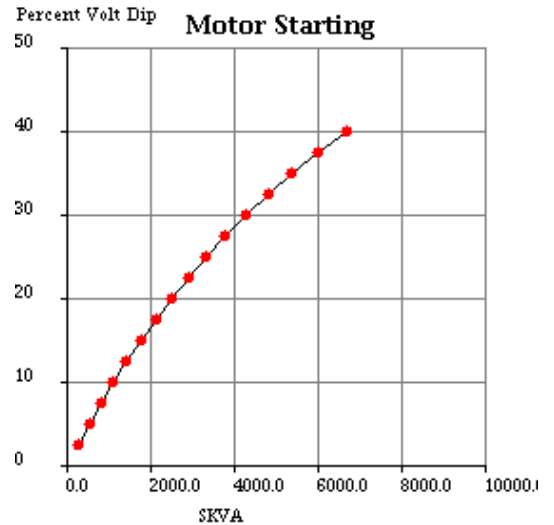
Time Constants

	Seconds
T'do	6.888
T'd	0.4864
T"do	0.0078
T"d	0.0069
T"qo	0.0062
T"q	0.0056
Ta	0.0573
Te	0.2225

Reactance Data

	per unit	Ohms
X"d	0.1325	0.0106
X'q	0.1238	0.0099
X"d	0.2113	0.0169
Xd	2.9913	0.2393
Xq	1.415	0.1132
X2	0.1275	0.0102
X0	0.0088	0.0007

kW Rating:	1600	Frequency	50
Power Factor:	0.80	Insulation	H
kVA Rating:	2000	Poles	4
Duty (C):	105	Excitation	PM
Frame:	827	Winding Type	Form wound
RPM:	1500	Leads	6
Volts:	400	Pitch	0.6667
Bearings:	2	Phases	3
Conn.	STAR	Amperage	2886.8
Regulation (V)	< 0.5 %	TIF	< 50
Enclosure	IP 22	THF	< 3 %



CATERPILLAR 3516B ENGINE

V-16, 4-stroke-cycle diesel

Bore – mm (in).....170 (6.7)
 Stroke – mm (in).....190 (7.5)
 Displacement – L (cu in).....69.0 (4210)
 Aspiration..... Turbocharged – Aftercooled
 Heater – kJ/kWh (Btu/kWh).....8977 (8509)

DIMENSIONS & WEIGHTS

CONTAINER SHIPPING DIMENSIONS

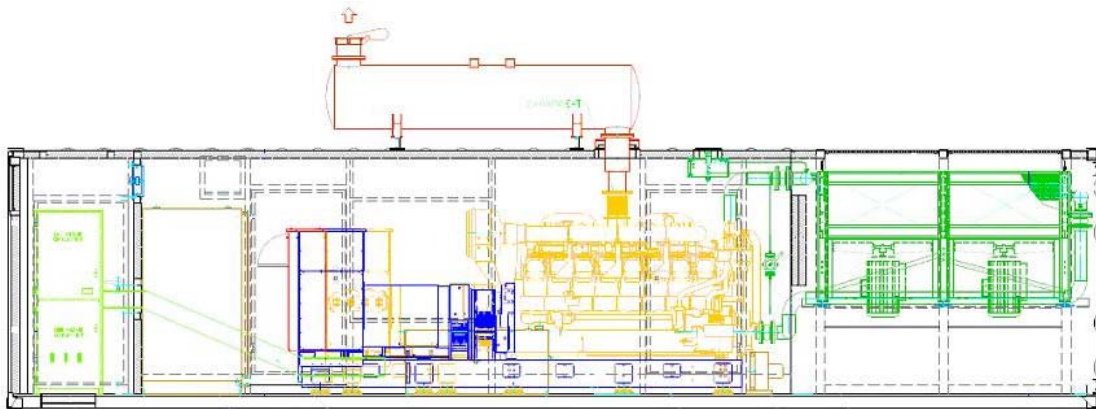
Length	12 192.0 mm
Width	2 438.0 mm
Height	2 896.0 mm

CONTAINER WEIGHT (WET):

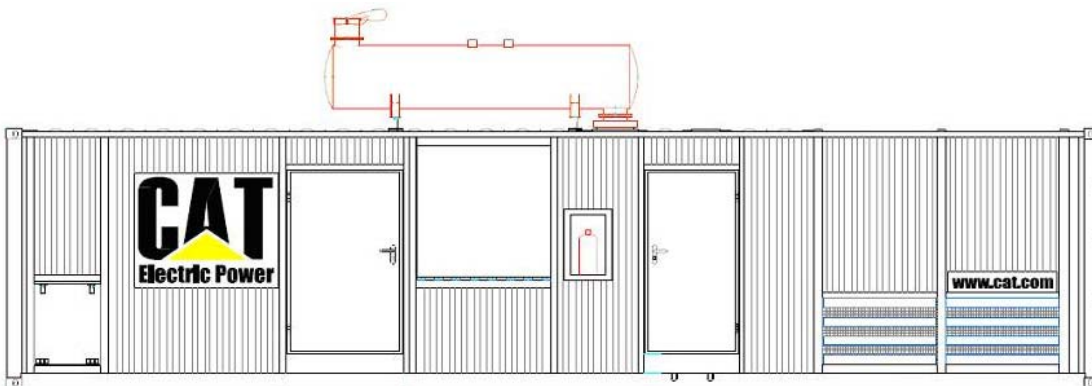
27 900 Kg

CONTAINER VIEWS:

Right side view
(Right side wall removed to show interior components)

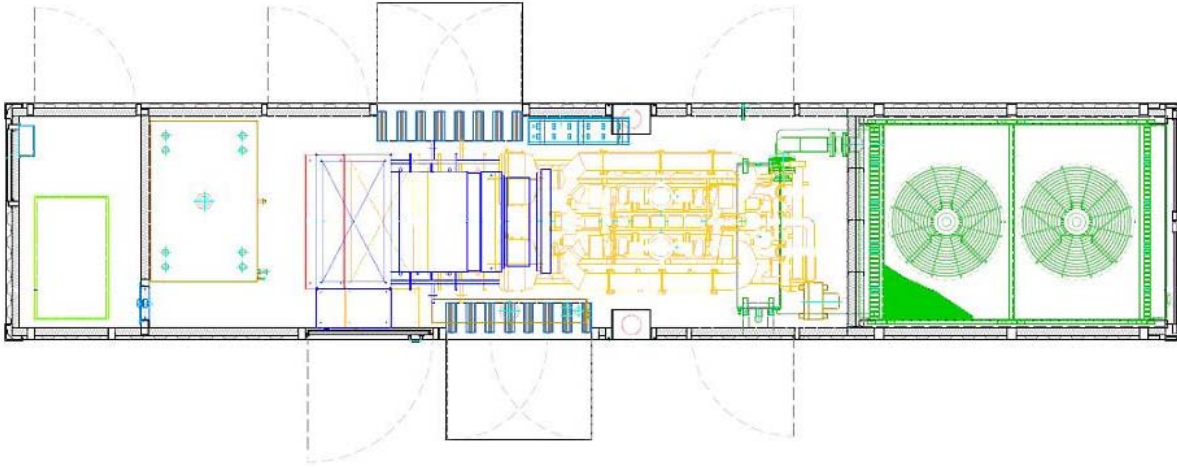


Right side view

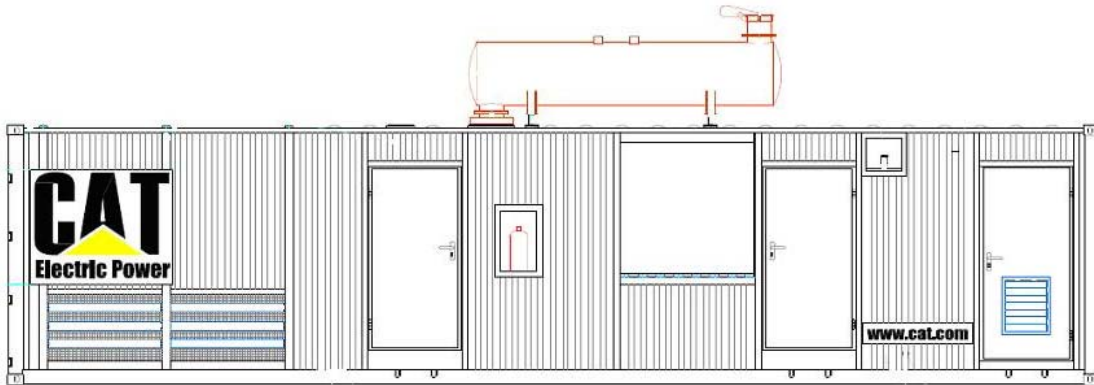


DIMENSIONS & WEIGHTS (Continued)

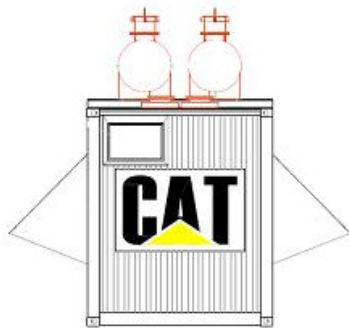
Top view
(Roof removed to show interior components)



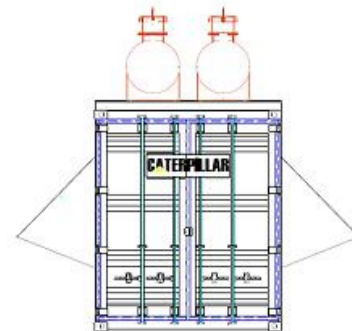
Left side view



Front view



Rear view



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