1000 kVA POWER MODULE UTILITY SWITCHGEAR C32 ACERT TECHNOLOGY 50 / 60 Hz CONVERTIBLE SOUND ATTENUATED ISO 20 FT. CSC CERTIFIED

Prime Power
400 V, 50 Hz, 1000 KVA (800 eKW)
480 V, 60 Hz, 910 EKW

FEATURES

EMISSIONS AND NOISE

- Meets most worldwide emissions requirements without after treatment. Low noise to achieve a noise pressure of only **80 dB(A) at 7 meters**.

COMPLETE SOLUTION WITH OPTIONS

- Wide range of rugged features, system attachments, and factory designed, convertible and tested at 50 or 60 Hz.
- **Fully Prototype Tested** with certified torsional vibration analysis and actual noise measurements available. The prototype test report is certified by the German TUV, an independent certification agency.
- CSC certification is provided for convenient transport and stackable storage of the module.

ENGINE

- Reliable, durable Caterpillar C32 Diesel ACERT ® engine.
- V12, 4 stroke-cycle, turbocharged - Air to air Aftercooled.
- Designed for maximum performance and minimum fuel consumption.

GENERATOR

- Exclusive Caterpillar SR4B ® generator, performance and design matched to Caterpillar C32 engine.
- Two bearings, random wound, 693 Frame, 12 leads.
- Permanent magnet excitation with Caterpillar CDVR digital voltage regulator.
- 0.7222 pitch for least total harmonic distortion.
- Winding temperature detectors.

WORLDWIDE PRODUCT SUPPORT

- Worldwide parts availability through your Caterpillar dealer, with over 1800 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.
- EAME Solutions provided on complete system.

1000 kVA UTILITY POWER MODULE

CATERPILLAR®

GENERATOR SET & CONTAINER

- Cooling system 50°C ambient operating & horizontal discharge radiator during continuous operation.
- ISO high cube (2.896 m), 20 feet long (6 m), 2.438 m wide container. Interior walls and ceiling are insulated with 2 in (50 mm) of acoustic glass and covered with perforated metal sheet for a durable interior wall surface.
- Three lockable personnel (padlock) doors are provided with sound attenuation and double sealed. One door is located on each side of the engine for service and equipped with emergency stop buttons. One door is located on the container rear side to access the controls. Doors include 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, and space heater in generator, A/C lighting and sockets.
- Convenient external connections for fuel. (Fuel transfer system by others)
- Manual operated filling pump to radiator for external filling.
- Container is bunded to contain spills.
- 21 Gals (80 L) lube oil make up tank (gravity) with manual fill from interior, sight glass level indicator.
- 24 VDC interior lights with timer in switchgear room and in engine room.
- Delivered fully tested at 50 or 60 Hz , ready to operate. Test includes load and parallel operation.
- Lloyds CSC (Convention for Safe Containers) certified for convenient transport. Stackable, up to three high for transport and storage.
- Meets or exceeds specifications: ISO 3046, IEC 34, ISO 8528, EGSA101P, NEMA MG1-22
- Meets EU directives Low Voltage Safety, EMI & Machinery.

CONTROL SYSTEM

- 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
  - 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 1600A motorized generator 3 poles circuit breaker with 55kA interrupt capability, extensive protective relays and internal power distribution.
- 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 C32 Engine	**ENGINE CONFIGURATION** Air cleaner with service indicator Batteries Primary & secondary fuel filters with service indicators; lubricating oil pump, fuel priming pump Lube oil make-up system Critical Grade silencers recessed in roof of module and insulated Radiator; jacket water heater Service meter; standard eight-gauge instrument panel Electronic ADEM® IV Governing System The ADEM® IV is an integral part of the innovative ACERT® Technology that provides higher degree of control over a large number of combustion variables than ever before The ADEM® IV engine system is composed of the ADEM® IV ECM, control software, sensors, actuators, fuel injecyors and interface to the generator system. The prime benefit of an ADEM® IV engine system is to better control and maintain the particulate emissions, both steady state and transient, improving engine performance.
	ADVANCED FEATURES Isochronous or droop speed control Enhanced performance from fuel injection timing and limiting Adjustable monitoring of vital engine parameters Idle / rated speed setting Programmable speed acceleration ramp rate Adjustable cooldown duration
	SIMPLE SERVICING Each Adem IV system works in combination with the Caterpillar ET service tool software to keep the engine operating at peak performance. 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® IV ECM
	SELF DIAGNOSTICS Each ADEM IV 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, 693 frame, random wound. 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
Caterpillar CDVR Voltage Regulator	**Ten generator protective functions.** Generator Overvoltage Generator Undervoltage Loss of Excitation Instantaneous Field Overcurrent Over Excitation Loss of Sensing Diode Fault Monitor Internal Watchdog Failure Internal Memory Failure Fault Reset Closed Too Long
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. 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. Langauages: French, English, German, Dutch, Spanish
	OPERATOR INTERFACE - Graphical display with positive image, transflective 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.

FACTORY INSTALLED STANDARD EQUIPMENT (Continued)

Features	Benefits
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: - Single Unit Island Mode - Multiple Unit Island Mode (up to 18 modules per site) with ramp loading · 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. · 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 50 - 60 Hz selectable controls.
	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.
	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 cabes (provided with each module). Parallel operation includes both real kW and reactive KVAR load sharing and control.

FACTORY INSTALLED STANDARD EQUIPMENT (Continued)

Feature	Benefits	
Switchgear Monitoring	The monitoring system includes a mimic one line that shows the generator with it's respective circuit breaker in a one-line representation of the system. The graphic COLOR LED indicators display the following information: - Generator circuit breaker open/closed/tripped - Engine running - System summary alarm The monitoring system also includes an additional display conveniently monted 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-volitile 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. The control system monitors and manages various module functions. This includes the automatic lube oil make up system, alarms and emergency stop functions. The 693 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 synchrnonizing time out and reclose alarms, circuit breaker posistion feedback, phase rotation mismatch, network communication error alarms, sensor diagnostics, and multiple unit configuration checks.	
Switchgear Protection	**MONITOR AND PROTECTION FUNCTIONS**	
	- Generator over current	ANSI 50 / 51
	- Neutral earth current	ANSI 50 / 51 (requires optional CT)
	- Generator current imbalance	ANSI 46G
	- Generator under voltage	ANSI 27G
	- Generator over voltage	ANSI 59 G
	- Generator voltage imbalance	ANSI 18 G
	- Generator leading power factor	
	- Generator lagging power factor	
	- Generator under frequency	ANSI 81 U/G
	- Generator over frequency	ANSI 81 O/G
	- Generator reverse power	ANSI 32 G
	- Generator overload	ANSI 32 O / G
	- Busbar under voltage	ANSI 27G
	- Busbar over voltage	ANSI 59 G
	- Busbar voltage imbalance	ANSI 18
	- Busbar under frequency	ANSI 81 U
	- Busbar over frequency	ANSI 81 O
	- Loss of mains	Vector shift, rate Of Change Of Frequency

FACTORY INSTALLED STANDARD EQUIPMENT (Continued)

Feature	Benefits
Electrical Connections	**SHORE POWER CONNECTION** The module is provided with shore power connection for lighting, generator space heater, and battery charger. The control system provides a 20 Amp internal transfer switch that automatically transfers internal loads to the genset for autonomous operation.
	POWER OUTPUT CONNECTION The electrical power output connections are provided through a convenient door on the right hand side of the module. The paralleling circuit breaker is rated for 55 kA interrupt capability. The module features robust well braced busbars with easy customer access. These busbars are three phase plus full rated neutral. They include IEC standard hole pattern, fully rated for 0.8 power factor.

AVAILABLE OPTIONAL CONTROL EQUIPMENT

Feature	Benefits
Remote Software	Provides modem and software for off-site monitoring of installations C32 EAME power modules installations can be accessed via telephone connection. Operator can contact local installation from remote via telephone line, and monitor it as if in front of the local control panel. Depending on a password, operator has access to control functions. Local communications, via Internet Explorer located on customer PC, provided to interface with touchscreen. Server software and Windows compatible touchscreen provided.
Site Controller	Includes industrial PC and site software for EAME modules. Local communications, via internet Explorer located on PC, with touchscreen. Server software and Windows compatible This option is browser based with ability to view 1 to 18 individual units with Internet Explorer. From the customer PC you can launch a browser and look at each individual unit with same views displayed at each local unit. Plant controller includes overview screen.

AVAILABLE OPTIONAL MECHANICAL EQUIPMENT

Feature	Benefits
Exhaust Extension	Provides straight exhaust extension pipe totaling 4 meters in length. The standard exhaust outlet installs on top the exhaust extension pipe. Four adjustable guy wires are provided to be fastened between the corner castings and the top of the exhaust extension pipe.
Spark Arrestor	Provides spark arrestor that mounts on top of the module at muffler outlet The spark arrestor is certified by GL (Germanischer Lloyd) and German PTB. The exhaust extension option may be installed on top of the spark arrestor.
Sand Traps	Provides sand traps replacing the air inlet weather protection grids and sound louvers. Sand trap ships loose and installed on site, extending the module length by 80 mm The vertical louver design is self cleaning draining sand through holes in the bottom. Note the module sound level will incease to 90 dB(A) at 7 meters. (not compatible with additional weather protection option)
Additional Weather Protection	Provides additional shroud on air inlet end of module. This includes three sheet metal flaps that fold together for easy transport. (not compatible with sand trap option)
Fuel Service Tank	Provides 400 liter service fuel tank, floor mounted next to generator. Includes two level swiches wiried to the EMCP panel and the necessary piping, The vent is routed to the outside with same fill points as standard module.
Control Door Window	Includes a 400 X 400 mm window in the door in front of the control panel. Provides operator a view of the EMCP and graphic screens from outside the module.
Motorized Louvers Inlet and Outlet	These louvers are electrically operated opening automatically during genset operation. These louvers close when not operating to allow optional heaters to prewarm module. This also provides an improved environment for genset service work.
Electrical Heaters Two at 3 KW each	Provides two installed electrical heaters at 3 kW each. These are connected to shore power connection.

1000 kVA UTILITY POWER MODULE

CATERPILLAR®

SPECIFICATIONS for 50 Hz - 1000 kVA (800 EkW), 400 V -

CATERPILLAR SR4B GENERATOR (2628094)

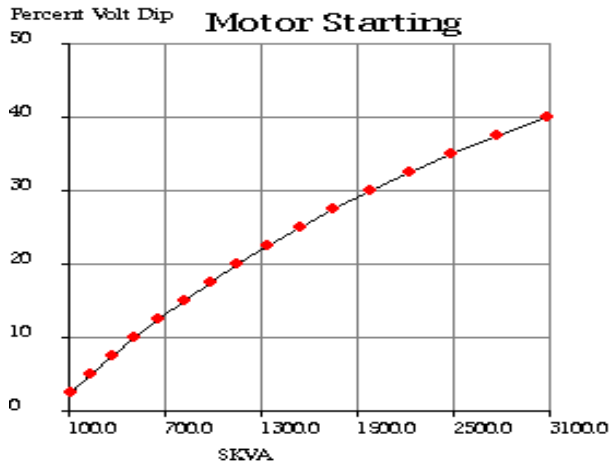
Voltage regulation	< ±0.5%
Voltage gain	Adjustable
Wave form	< 5% deviation
TIF	< 50
THD	< 3%
Enclosure	IP 23
Amperage	1443.4

Time Constants

T'do	3.841
T'd	0.2708
T"do	0.0054
T"d	0.0045
T"qo	0.01
T"q	0.0086
Ta	0.0451
Te	0.2225

Reactance Data

	per unit	Ohms
X"d	0.1475	0.0236
X'q	0.3188	0.051
X'd	0.2188	0.035
Xd	3.11	0.4976
Xq	1.5388	0.2462
X2	0.2331	0.0373
X0	0.0694	0.0111



CATERPILLAR C32 ENGINE

V-12, 4-stroke-cycle Diesel
Bore – mm (in)……..……...145 (5.7)
Stroke – mm (in)……..……162 (6.4)
Displacement – L (cu in)……..……..32.1 (1958)
Aspiration…….Turbocharged – Air to air Aftercooled

Fuel consumption (PF=0.8)

@100 %	1000 kVA	210.5 L/h
@ 75 %	750 kVA	163.2 L/h
@ 50 %	500 kVA	117.0 L/h
@ 25 %	250 kVA	71.5 L/h

kW Rating:	800	**Frequency**	50
Power Factor:	0.80	**Insulation**	H
kVA Rating:	1000	**Poles**	4
Duty (C):	105	**Excitation**	PM
Frame:	693	**Winding Type**	random
RPM:	1500	**Leads**	12
Volts:	400	**Pitch**	0.7222
Bearings:	2	**Phases**	3
Conn.	STAR	**Amperage**	1443.4
Regulation (V)	< 0.5 %	**TIF**	< 50
Enclosure	IP 23	**THF**	< 3 %

1000 kVA UTILITY POWER MODULE

CATERPILLAR®

SPECIFICATIONS for 60 Hz - 910 EkW, 480 V -

CATERPILLAR SR4B GENERATOR

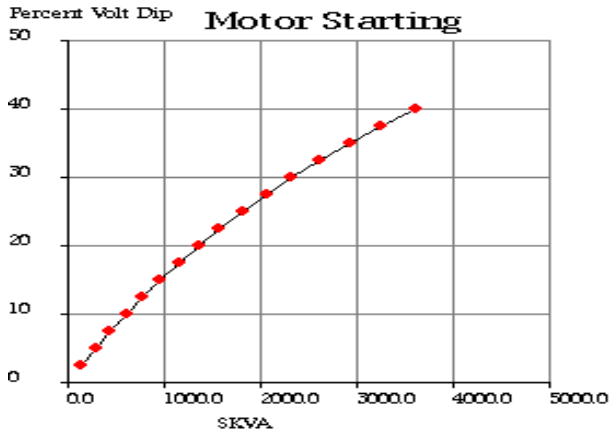
Voltage regulation	< ±0.5%
Voltage gain	Adjustable
Wave form	< 5% deviation
TIF	< 50
THD	< 3%
Enclosure	IP 23
Amperage	1367.6

Time Constants

	Seconds
T'do	3.841
T'd	0.2708
T"do	0.0054
T"d	0.0045
T"qo	0.01
T"q	0.0086
Ta	0.0451
Te	0.2225

Reactance Data

	per unit	Ohms
X"d	0.1397	0.0283
X'q	0.3021	0.0612
X'd	0.2074	0.042
Xd	2.9479	0.5971
Xq	1.4589	0.2955
X2	0.2212	0.0448
X0	0.0657	0.0133



CATERPILLAR C32 ENGINE

V-12, 4-stroke-cycle Diesel
Bore – mm (in)……..……...145 (5.7)
Stroke – mm (in)……1620 (6.4)
Displacement – L (cu in)……..……..32.0 (1959)
Aspiration…Turbocharged – air to air Aftercooled

Fuel consumption (PF=1)

@100 %	910 eKW	238.7 L/h
@ 75 %	682 eKW	180.0 L/h
@ 50 %	455 eKW	128.1 L/h
@ 25 %	227 eKW	78.9 L/h

kW Rating:	910	**Frequency**	60
Power Factor:	0.80	**Insulation**	H
kVA Rating:	1137	**Poles**	4
Duty (C):	105	**Excitation**	PM
Frame:	693	**Winding Type**	Random
RPM:	1800	**Leads**	12
Volts:	480	**Pitch**	0.7222
Bearings:	2	**Phases**	3
Conn.	STAR	**Amperage**	1367.6
Regulation (V)	< 0.5 %	**TIF**	< 50
Enclosure	IP 23	**THF**	< 3 %

DIMENSIONS & WEIGHTS

CONTAINER SHIPPING DIMENSIONS

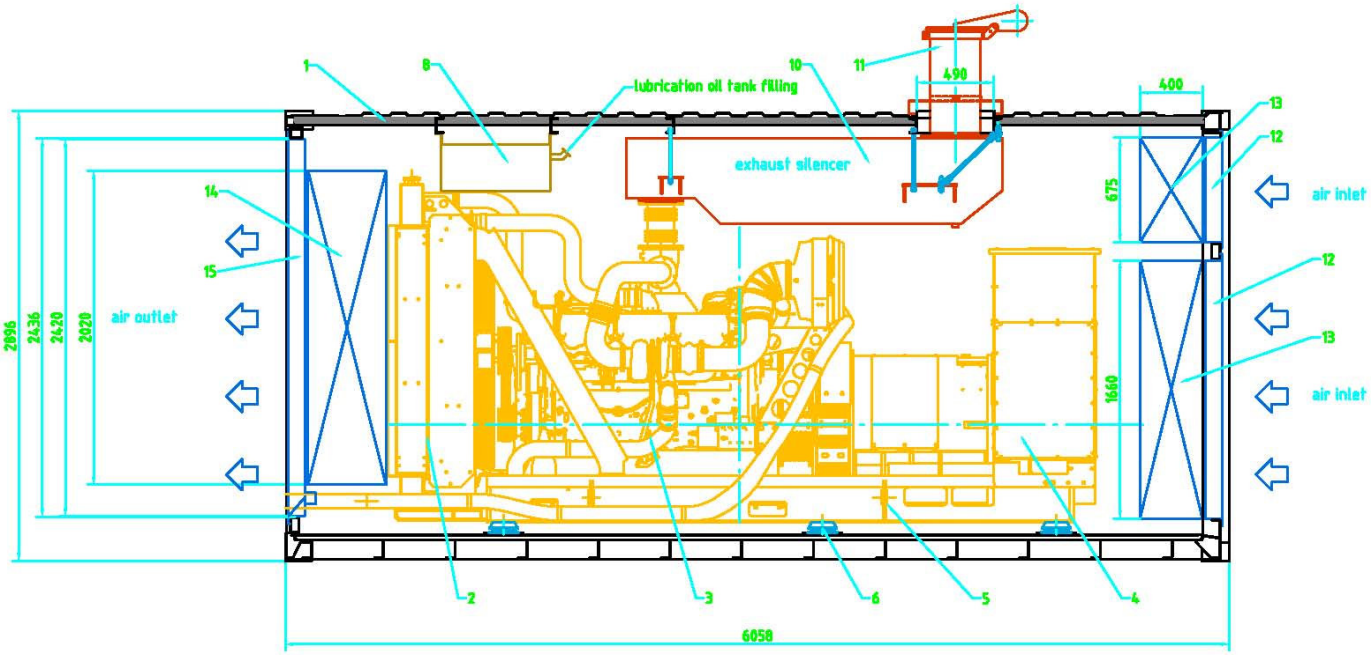
Length	6 058.0 mm	20 ft
Width	2 476.5 mm	97.5 in
Height	2 896.0mm	114.1 in

CONTAINER WEIGHT (WET):

15 240 Kg	33 640 lb

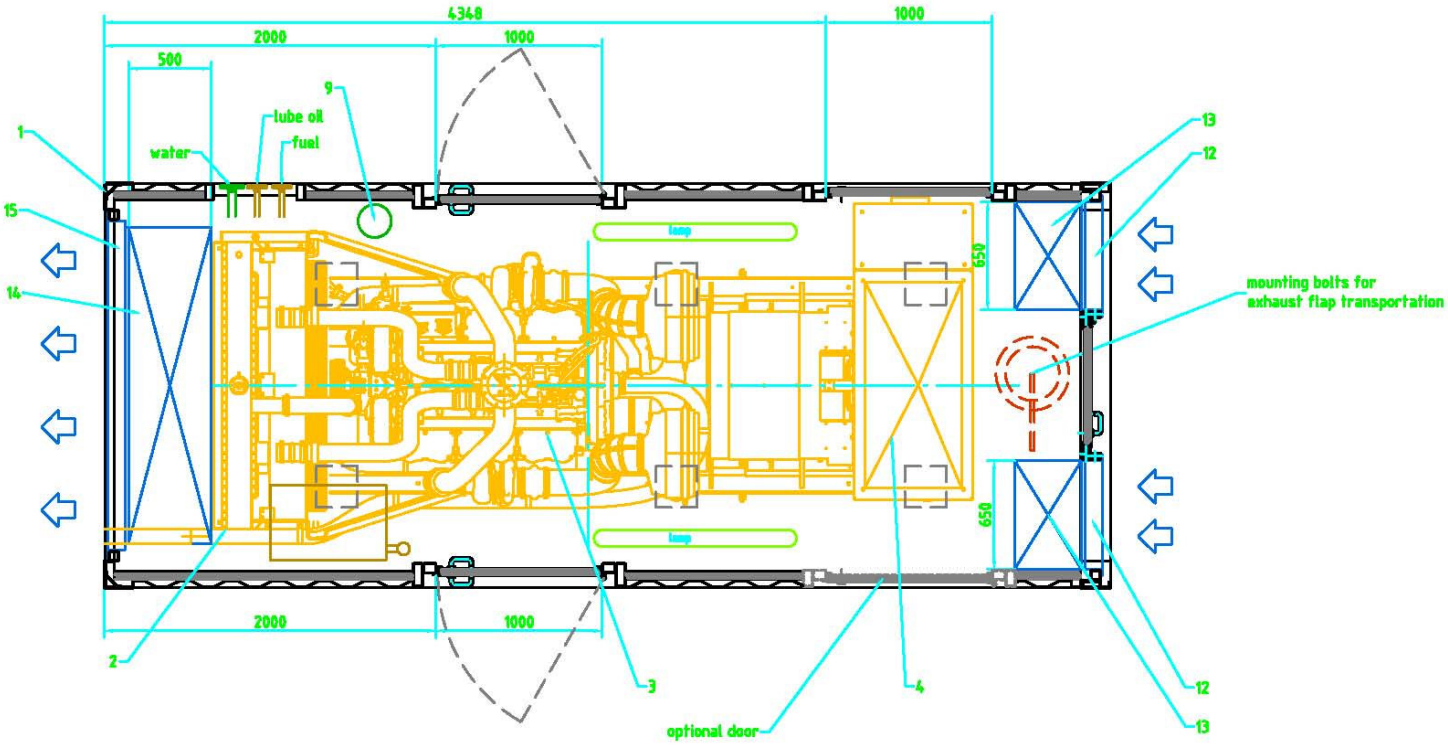
CONTAINER VIEWS:

Left Side View
(Left side wall removed to show interior components)

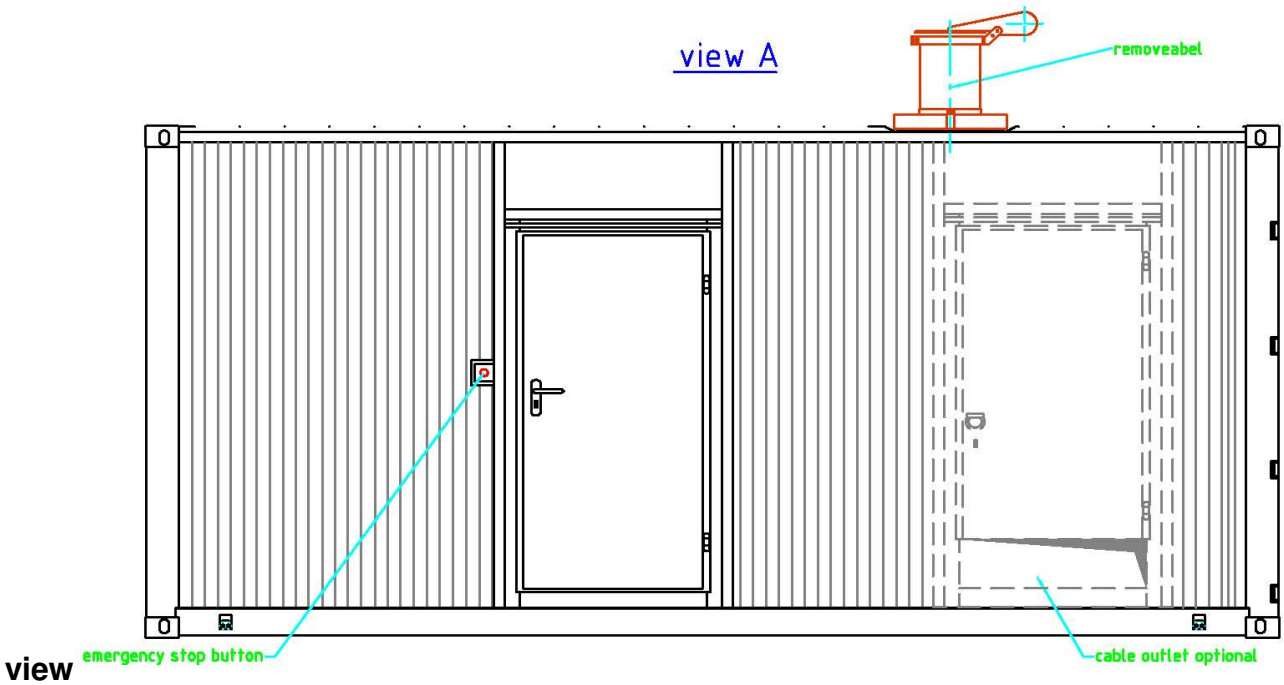


DIMENSIONS & WEIGHTS (Continued)

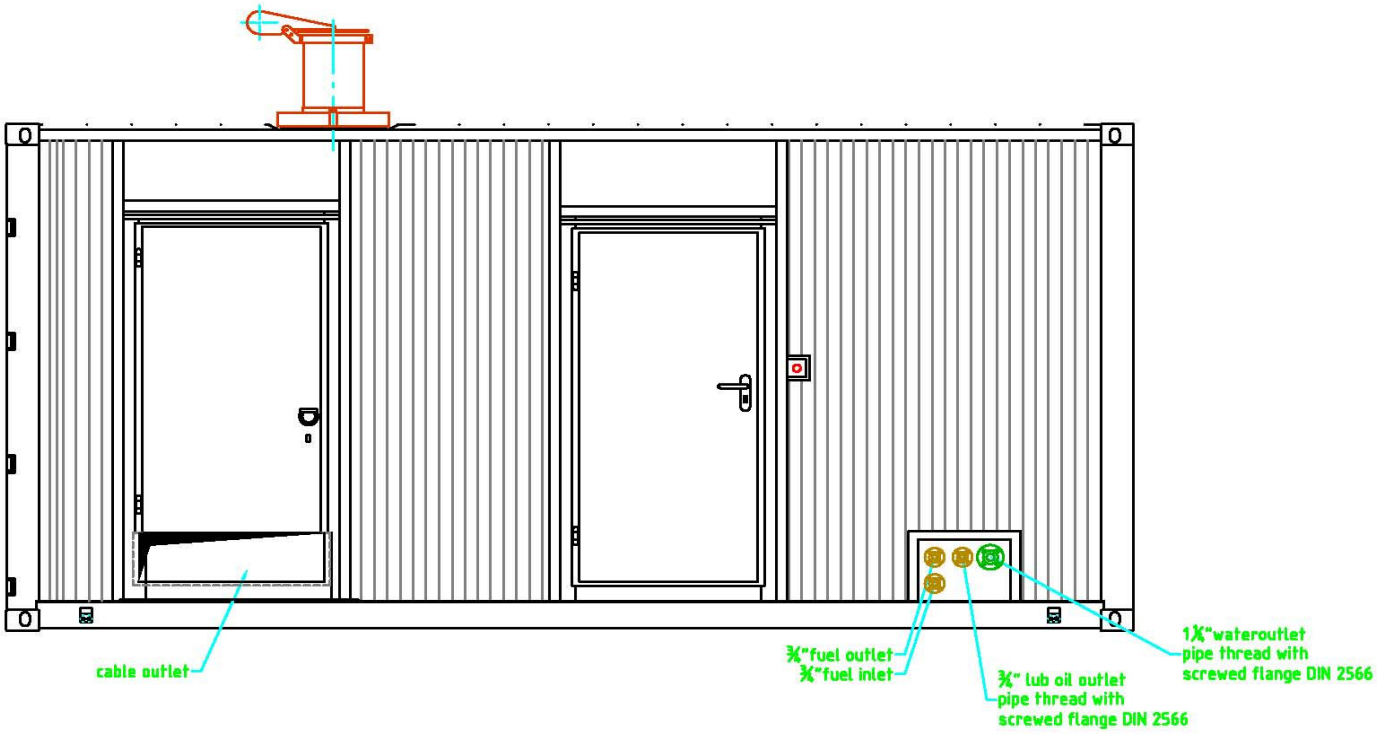
Top View



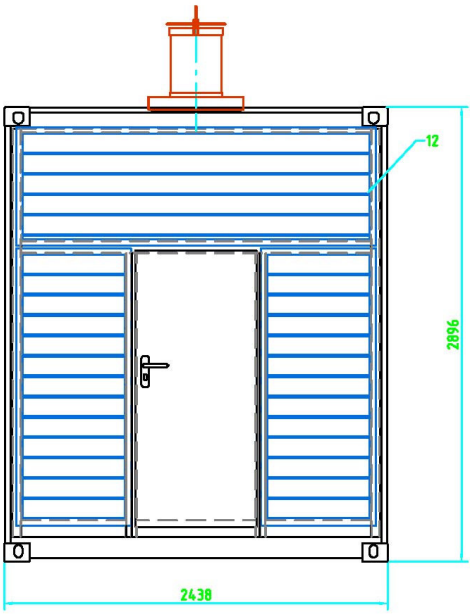
Left Side View



Right Side View



Rear View



Legend

COMPONENTS	
ITEM	DESCRIPTION
1	CONTAINER
2	RADIATOR
3	DIESEL ENGINE C32
4	ALTERNATOR SR4B-GD
5	BASE FRAME
6	VIBRATION ABSORBER
7	BATTERY
8	80 l LUBRICATION TANK
9	OIL PUMP
10	EXHAUST SILENCER
11	EXHAUST PIPE WITH FLAP
12	AIR INLET WEATHER PROTECTION SCREEN
13	AIR INLET ATTENUATOR
14	AIR OUTLET ATTENUATOR
15	AIR OUTLET WEATHER PROTECTION SCREEN

Turnkey Industries is an expert in the field of purchasing and selling pre-owned industrial generators. We offer many different brands, sizes, and capacities of generators. We fulfill orders across the country and beyond, and our elaborate preparatory processes ensure that our equipment is ready for immediate usage on arrival.

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- Low Hour Generator Sets

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