

SUCF Project 378A6-002 SUNY 350 kW Portable Generator

User's Reference Guide

SUNY System Administration

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Prepared for:

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Intent of Document

1.0 The intent of this User's Reference Guide is to provide information only on the characteristics, and requirements for transportation and operation of this portable generator set. This User's Reference Guide is not intended to be a comprehensive operations manual. This document should be used in conjunction with the Caterpillar equipment manuals provided with this equipment and available to each campus or other end user.

The transportation, setup, connection and operation of this machinery should only be performed by trained and qualified personnel. The required qualified personnel include drivers properly licensed for the class vehicle, diesel mechanics, and licensed electricians. Additionally, personnel familiar with the electrical systems, operations and other aspects of the facilities, where this generator set will be deployed, must be available to assist in the location, setup and operation of this equipment and connection to the electrical systems within the facility.

Generator Data

1.1 General

The generator is mounted on a flatbed trailer in a standard weatherproof enclosure. The generator enclosure includes the generator and associated support equipment, controller, batteries and charger, base fuel tank, air and fluid filters, muffler, and output circuit breaker and (4) access panels. Support components that require power including battery charger, and heaters are wired to individual connection cords with plugs for connection to standard 15 or 20 amp, 120 volt extension cords.

The generator output power can be connected to a 277/480 volt electrical system directly from the generator. If other voltages are required, a separate, appropriately sized and configured transformer, along with overcurrent protection, will need to be provided by the user.

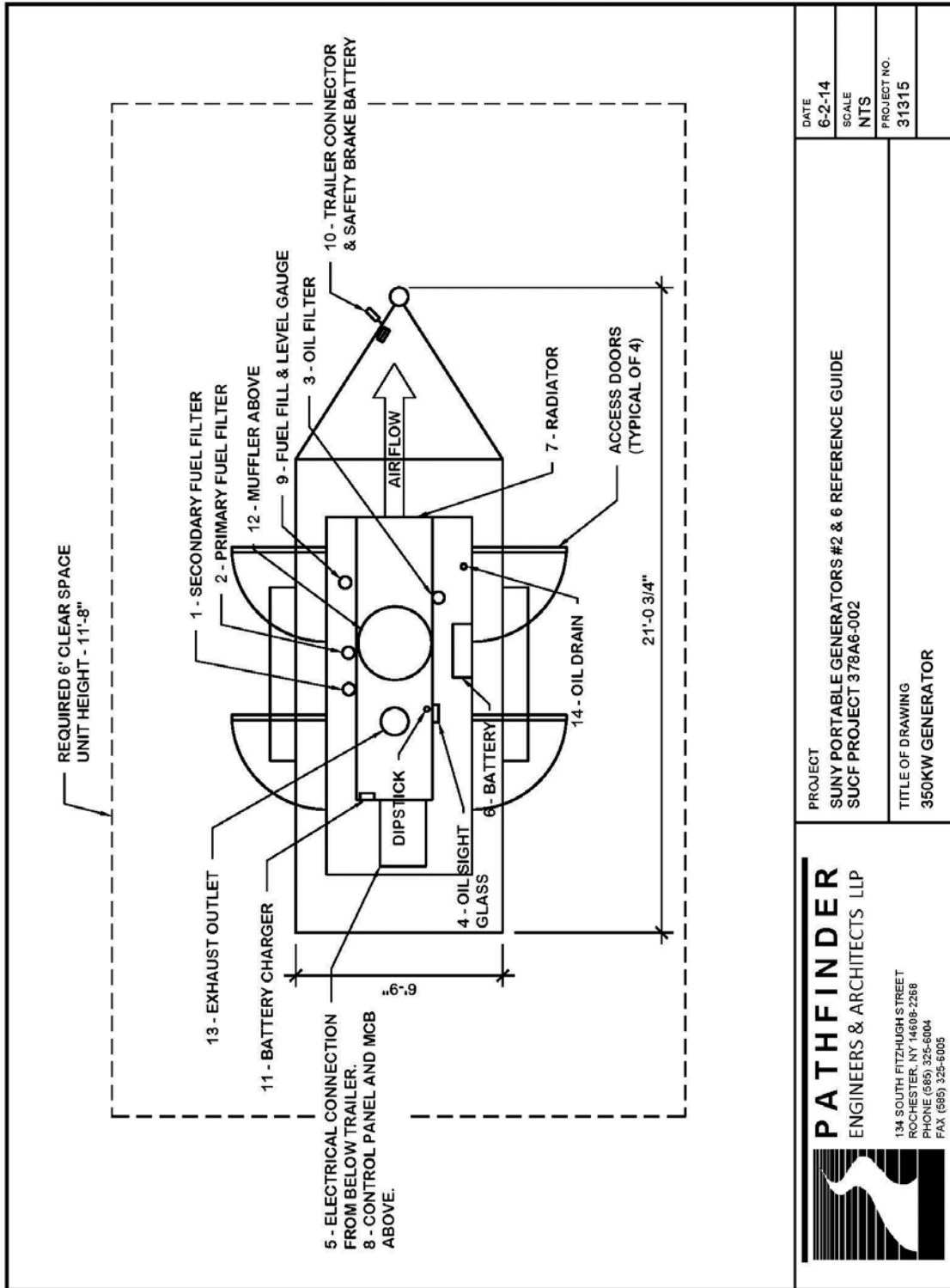
<u>Model</u>	<u>3406</u>
<u>Serial Nos.</u>	<u>4ZR05905; 4ZR05906</u>
<u>Year Built</u>	<u>1999</u>
<u>Capacity</u>	<u>350 kW, 435 kVA @ 0.8pf.</u>
<u>Winding Type</u>	<u>6 wire, Wye-Series</u>
<u>Voltage</u>	<u>277/480</u>
<u>Phase</u>	<u>3</u>
<u>Wire</u>	<u>4</u>
<u>Amps @ 277/480 volts</u>	<u>525</u>
<u>Frame</u>	<u>597</u>
<u>RPM</u>	<u>1800</u>
<u>Max. Temp.</u>	<u>130°C</u>
<u>Weight</u>	<u>11,750 lb.-weight with trailer</u>
<u>Fuel Type</u>	<u>No. 2 Diesel</u>
<u>Fuel Tank</u>	<u>Single Wall - 300 Gal.-useable volume.</u>
<u>Fuel Consumption</u>	<u>100% Load - 28.6 gal/hr = (10 hour run time)</u>
	<u>75% Load - 23.1 gal/hr = (13 hour run time)</u>
	<u>50% Load - 17.5 gal/hr = (17 hour run time).</u>
<u>Sound Level (Approximate)</u>	<u>88 dB@23'</u>
<u>Oil Capacity w/ filter</u>	<u>36 qts.</u>

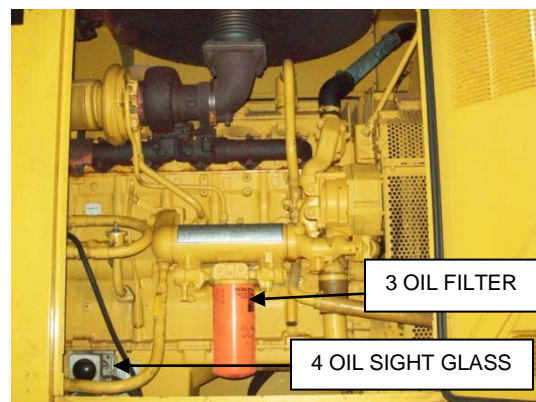
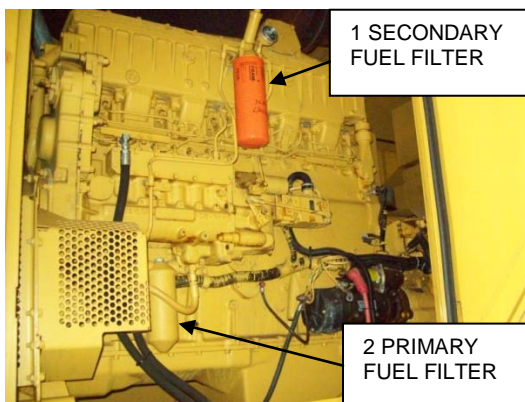
Oil Classification	API CG-4 preferred API CF-4 allowed
Oil Viscosity / Temperature	10W30 at -4°F(-20°C) to 104°F(40°) ambient 15W40 at 5°F(-15°C) to 122°F(50°) ambient
Generator Supplied With: (See 6.0 D for part numbers)	Type BC Fire Extinguisher (10 Lb) Fan Belts- 1 set Air Filter-1 set Primary Fuel Filter & Gasket - 6 Sets Secondary Fuel Filters- 6 set Engine Oil Filter-1 set Fluid Spill Kit

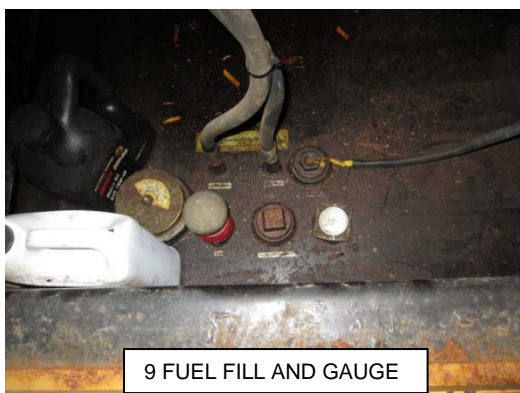
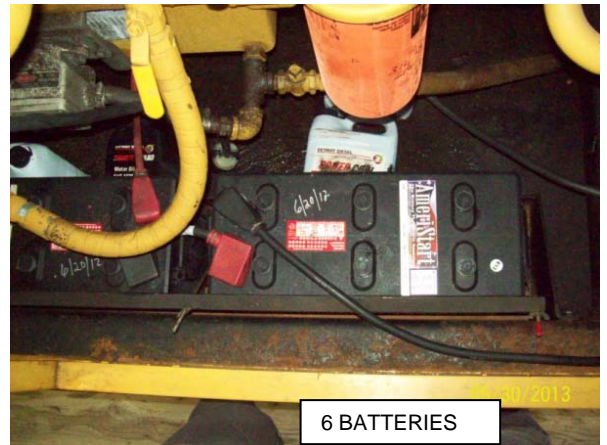
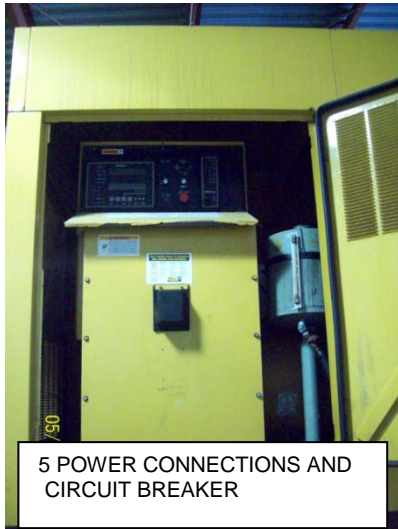
Needed Materials (NOT provided with generator):
Connection Wiring

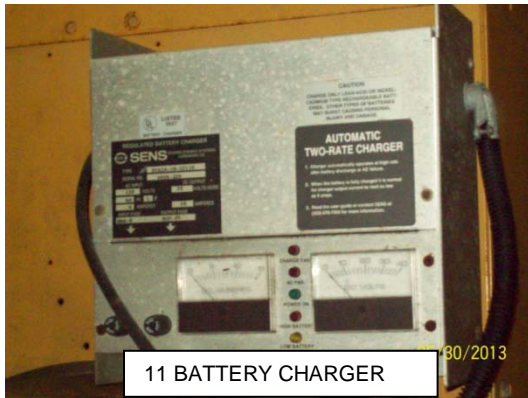
GENERATOR OPERATING VOLTAGE	CABLE TYPE SIZE AND # PER PHASE NEUTRAL AND GROUND	MAX CABLE LENGTH
277/480 Volt (525 AMPS)	Two Sets of the following: 3 - each 300 KCMIL (Phase) 1 - each 300 KCMIL (Neutral) 1 - each #2/0 (Ground)	250 ft. Increased cable length will require larger cable based on voltage drop calculation performed by the installer.

Note: Refer to Caterpillar Equipment Manuals for additional information and details.









11 BATTERY CHARGER



12 MUFFLER



13 EXHAUST OUTLET



14 OIL DRAIN

1.2 Transportation Requirements

The flatbed trailer with the 350 kW generator has an actual weight of 11,750 lb. and rating GVWR of 15,000 pounds, gross axle weight rating of 7,200 pounds, dual axle with single wheel, and overall dimensions of 21'L x 8'-6"W x 11'-8"H. These trailers are equipped with electric brakes complete with breakaway safety and battery. A truck with appropriate towing capacity and trailer connections is required to transport the 350 kW generators.

A medium duty Class 5 truck (GVWR 16,001 lb. to 19,500lb.) minimum, is required to transport the 350 kW generator. The truck must be equipped with an 8 ton rated pintle hitch, minimum, and heavy duty, 7-pole, pin-socket connector.

1.3 Electrical Cabling Requirement Chart (Provided or acquired by the Campus)

GENERATOR OPERATING VOLTAGE	CABLE TYPE SIZE AND # PER PHASE NEUTRAL AND GROUND	MAX CABLE LENGTH
277/480 Volt (525 AMPS)	Two Sets of the following: 3 - each 300 KCMIL (Phase) 1 - each 300 KCMIL (Neutral) 1 - each #2/0 (Ground)	250 ft. Increased cable length will require larger cable based on voltage drop calculation performed by the installer.

2.0 Safety & OSHA Requirements

Improper operation, lubrication, maintenance or repair of this equipment can be dangerous and could result in personal injury or death. Do not operate or perform any lubrication or maintenance on this equipment until the lubrication, maintenance and repair information in the Caterpillar equipment manual has been read and fully understood.

2.1 General

- A. Do not connect generator to a utility electrical distribution system without isolating the system equipment. Following approved Lock-Out / Tag-Out procedures, open and secure the electrical distribution system.**
- B. Never connect a generator directly to a building electrical system without isolating and locking-out the utility or distribution system supply.**
- C. Electrical connection / installation shall be made by a licensed electrician only. The Campus may need to secure the services of an electrical contractor.**
- D. Maintain and operate generator in accordance with the manufacturer's use and safety instructions. The Campus may need to secure the services of a qualified diesel mechanic.**
- E. Notify and coordinate power outages, shutdowns and re-energizations with the local electrical utility.**

2.2 Fire and Explosion Prevention

Fire may result from lubricating oil or fuel sprayed on hot surfaces resulting in personal injury and property damage. Inspect all lines and tubes for wear or deterioration. Verify all lines and tubes are routed, supported or clamped securely. Tighten all connections to the recommended torque.

2.3 Fire Extinguisher

A 10 pound, Type BC fire extinguisher is available on the trailer. Operators should be trained in proper usage. Inspect and have the fire extinguisher serviced as recommended on the instruction plate.

3.0 Spill Prevention Plan

Spill Prevention Plan shall meet or exceed existing Campus procedures and requirements.

4.0 Location Considerations and User's Responsibilities, Setup, Operation and Maintenance Checklist

A. Contact SUNY System Administration to schedule equipment needed and coordinate transportation requirements.

B. Location Considerations and Planning

- Confirm staff member to accept the delivery and will be responsible for the operation of the generator.
- Confirm voltage and capacity required.
- Assess and verify acceptable access path can accommodate the weight of the delivery vehicle. Recommend paved surface placement only for this unit.
- Can the approach path accommodate the weight of the delivery vehicle?
- Will the proposed site for the generator support the weight of the generator? (Paved surface is recommended.)
- Will the proposed location present impact to underground utilities?
- Is there a suitable path for fuel vehicle access?
- Has the proposed location been evaluated so the generator exhaust is not likely entrained in the building mechanical system, or likely to enter through doorways, windows, etc.?
- Will the proposed location provide 6 feet clearance on all sides and top?
- Has the site been chosen to minimize impact on vehicular and pedestrian traffic?
- Has fire department and other emergency access been compromised?
- Does proposed placement require any updated training for campus and local emergency responders?
- Will placement at the proposed site impact storm water run-off?
- Has the proposed site been evaluated to avoid overhead obstructions, including adjacent trees?
- Have the noise impacts of the proposed location been considered?

- Confirm from the Generator Data see 1.1 and site location, proper temporary cable type, routing and length of run from generator to bldg(s).
- Consider potential accident scenarios that may arise with EHS, UPD and others and establish plans and training to address if needed.

C. User's Responsibilities: Setup, Operation and Maintenance

- Confirm staff member to perform daily monitoring of the generator. Requirements provided in the generator Pre-Start (Form #1) and Daily (Form #2) Checklists.
- Verify type and location of additional fire extinguisher(s) needed with EHS, UPD or department(s) as required.
- Conduct periodic fire inspections of generator, cables and site required by facility, EHS, UPD or other or other department(s) as required.
- Protect generator, power cables and connection point from vehicular traffic, unauthorized persons and weather.
- Review generator fuel capacity and re-fueling recommendations on generator data sheet, make re-fueling arrangements with a local supplier.
- Provide a spill protection during fuel deliveries.
- Consider if temporary lighting will be required at generator and cabling areas.
- Secure generator against wind or falling and flying debris.
- Perform inspections and maintenance as indicated on generator Daily Checklist (Form #2) and detailed in the Caterpillar Manual. Campus may elect to have qualified staff or a diesel mechanic and/or a licensed electrician perform this.
- Coordinate downtime at recommended intervals indicated in the Caterpillar Manual to perform the recommended generator maintenance if possible. First maintenance is required at 250 hours of operation. **Contact local authorized Caterpillar service dealer for the listed maintenance and/or repairs if needed or required.**
- Establish a procedure for communication to building occupants for planned and unplanned shutdowns.

D. Electrical Preparation and Requirements

- ALL ELECTRICAL WORK SHALL BE PERFORMED BY LICENSED ELECTRICIAN ONLY.**
- Confirm utility connection is isolated. See Section 2.1A.
- Confirm and verify generator voltage and capacity matches distribution connection point and load requirements.
- Open distribution feeder switch or circuit breaker supplying connection point. Provide approved Lock-Out/Tag-Out device on the open distribution feeder switch or circuit breaker supplying connection point. Follow facility and EHS procedures.
- Check and coordinate generator phase rotation to match distribution system.

- Provide properly sized, protected and supported (strain-relief) temporary feeder for generator on site. Refer to Section 1.3 for minimum conductor size.

5.0 Refueling: Follow existing campus procedures, consider the following:

- A. Train employees on proper spill control and disposal procedures.
- B. Shut down generator prior to beginning refueling procedures.
- C. Perform inspection and preventative maintenance on fuel storage tanks to detect potential leaks before they occur.
- D. Use spill and overflow protection devices.
- E. Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections.
- F. Use fueling hoses with check valves to prevent hose drainage after filling.
- G. Limit "topping off" of fuel tanks.
- H. Use dry cleanup methods for fuel area rather than hosing down the fuel area.
- I. Spill kits are available with the genset/trailers. Clean up spills and leaks immediately. Legally dispose and manage materials generated during spill cleanup according to Facilities procedures.
- J. In the event of a reportable spill, contact NYS DEC spill hotline at (800) 457-7362 in New York, or (518) 457-7362 outside of New York.

6.0 Maintenance Records

- A. Accurate maintenance records shall be kept, forwarded to SUNY System Administration and a copy included in the generator document locker.
- B. Accurate maintenance records are required to show compliance with the required maintenance practices and intervals.
- C. Records to be kept are:
 - 1. Generator Pre-start Checklist (Form #1)
 - 2. Generator Daily Checklist (Form #2)
 - 3. Generator Maintenance Log (Form #3)
 - 4. Generator Demobilization Checklist (Form #4)

D. Spare Parts Included in each Genset/Caterpillar:

1. Refer to installed parts for exact part numbers.
 - a. Fan belts -1 set Part # 6N-6652
 - b. Alternator belt - 1 each Part # 4N-8216
 - c. Air filter - 1 each Part # 4N-0015
 - d. Primary fuel filter - 6 each Part # 9M-2342
 - e. Primary fuel filter gasket - 6 each Part # 8H-2778
 - f. Secondary fuel filters - 6 each Part # 1R-0749
 - g. Engine oil filter - 1 each Part # 1R-0716

7.0 Equipment Return Requirements

- Coordinate with SUNY System Administration.
- No need to top off or fill fuel tank for return.
- Review Generator Demobilization Checklist (Form #4) and indicate any deficiencies.
- Provide complete set of maintenance records performed while on site.
- Provide statement of deferred maintenance due to use while on site.

8.0 Checklists

Checklists on pages 13 thru 16

GENERATOR PRE-START CHECKLIST
FORM #1

SUNY ID Number 2 6

DATE: _____

LOCATION: _____

CHECKED BY: _____

SAFETY	Yes	No	Comments
Safety labels in place and legible?			
Emergency stop button accessible?			
Protective guards and covers securely in place?			
Operation area is clear of debris and trip hazards?			
Operation area is clear of mud, dirt, stones, etc.?			
All maintenance and repair tag-outs removed?			
ELECTRICAL			
Utility source is disconnected and isolated?			
Battery frozen? (Winter Only)			
Battery cables properly connected?			
Battery cables are in good condition, prevent arcing?			
Battery charger operational?			
Unit and associated equipment properly grounded?			
Output cables are properly sized?			
Output cables are properly connected?			
Output cables are properly protected mechanically?			
Control wiring not frayed or loose connections?			
Verify automatic shutoff circuits are operational			
MECHANICAL			
Any fluid leaks?			
Fuel			
Oil			
Coolant			
Battery			
Damage to fluid lines or connections?			
Radiator hoses in good condition?			
Fan belts in good condition with proper tension?			
Fuel level?			
Water in the fuel?			
Fuel lines in good condition?			
Fuel filter condition / change date, air in housing?			
Oil Level?			
Coolant level?			
Air filter condition / change date, dirt in housing?			
Radiator clear of obstructions?			
Governor linkage properly in place?			

GENERATOR DAILY CHECKLIST
FORM #2

SUNY ID Number 2 6

DATE: _____

LOCATION: _____

CHECKED BY: _____

SAFETY	Yes	No	Comments
Emergency stop button accessible?			
Protective guards and covers securly in place?			
Operation area is clear of debris and trip hazards?			
Opeartion area is clear of mud, dirt, stones, etc.?			
ELECTRICAL			
Battery frozen? (Winter Only)			
Battery changer operational?			
Output cables are properly protected mechanically?			
Control wiring not frayed or loose connections?			
Verify automatic shutoff circuits are operational			
Engine to frame ground condition and connection			
MECHANICAL			
Any fluid leaks?			
Fuel			
Oil			
Coolant			
Battery			
Fuel level?			
Raditor hoses in good condition?			
Radiator clear of obstructions?			
DAILY OPERATIONAL DATA			
Running hours			
Output current			
Output voltage			
Fuel consumption			
Engine temperature			

GENERATOR DEMOBILIZATION CHECKLIST
FORM #4

SUNY ID Number 2 6

DATE: _____

LOCATION: _____

CHECKED BY: _____

SAFETY	Yes	No	Comments
Safety labels in place and legible?			
Emergency stop button accessible?			
Protective guards and covers securely in place?			
Operation area is clear of debris and trip hazards?			
Operation area is clear of mud, dirt, stones, etc.?			
All maintenance and repair tag-outs removed?			
ELECTRICAL			
Utility source is disconnected and isolated?			
Battery frozen? (Winter Only)			
Battery cables properly connected?			
Battery cables are in good condition, prevent arcing?			
Battery charger operational?			
Unit and associated equipment properly grounded?			
Output cables are properly sized?			
Output cables are properly connected?			
Output cables are properly protected mechanically?			
Control wiring not frayed or loose connections?			
Verify automatic shutoff circuits are operational			
MECHANICAL			
Any fluid leaks?			
Fuel			
Oil			
Coolant			
Battery			
Damage to fluid lines or connections?			
Radiator hoses in good condition?			
Fan belts in good condition with proper tension?			
Fuel level?			
Water in the fuel?			
Fuel lines in good condition?			
Fuel filter condition / change date, air in housing?			
Oil Level?			
Coolant level?			
Air filter condition / change date, dirt in housing?			
Radiator clear of obstructions?			
Governor linkage properly in place?			