OPERATION AND PARTS MANUAL

MULTIQUIP®

MQ POWER®

MODEL DCA125USI3CAN

60 HZ GENERATOR

(ISUZU 4HK1X DIESEL ENGINE)

PARTS LIST NO. M3874400004, M3874400014

Revision #3 (12/19/14)

To find the latest revision of this publication, visit our website at: www.multiquip.com

THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

⚠ WARNING ⚠

Diesel engine exhaust and some of its constituents are know to cause cancer, birth defects and other reproductive harm.

If you believe that your vehicle has a defect that could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Multiquip Inc. at 1-800-421-1244.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Multiquip Inc.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153), go to *http://www.safercar.gov*; or write to:

Administrator
NHTSA
400 Seventh Street, SW.,
Washington, DC 20590

You can also obtain information about motor vehicle safety from *http://www.safercar.gov.*

DCA125USI3CAN 60 Hz Generator

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NOTICE

All orders are treated as *Standard Orders* and will ship the same day if received prior to 3PM PST.

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Do not operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the safety messages and operating instructions could result in injury to yourself and others.

SAFETY MESSAGES

The four safety messages shown below will inform you about potential hazards that could injure you or others. The safety messages specifically address the level of exposure to the operator and are preceded by one of four words: **DANGER, WARNING, CAUTION** or **NOTICE.**

SAFETY SYMBOLS

DANGER

Indicates a hazardous situation which, if not avoided, **WILL** result in **DEATH** or **SERIOUS INJURY.**

WARNING

Indicates a hazardous situation which, if not avoided, **COULD** result in **DEATH** or **SERIOUS INJURY.**

CAUTION

Indicates a hazardous situation which, if not avoided, **COULD** result in **MINOR** or **MODERATE INJURY.**

NOTICE

Addresses practices not related to personal injury.

Potential hazards associated with the operation of this equipment will be referenced with hazard symbols which may appear throughout this manual in conjunction with safety messages.

Symbol	Safety Hazard
	Lethal exhaust gas hazards
	Explosive fuel hazards
	Burn hazards
	Overspeed hazards
	Rotating parts hazards
	Pressurized fluid hazards
	Electric shock hazards

GENERAL SAFETY

⚠ CAUTION

- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.

- **NEVER** operate this equipment when not feeling well due to fatigue, illness or when under medication.

- **NEVER** operate this equipment under the influence of drugs or alcohol.

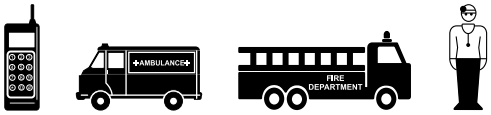
- **ALWAYS** check the equipment for loosened threads or bolts before starting.
- **DO NOT** use the equipment for any purpose other than its intended purposes or applications.

NOTICE

- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.
- **NEVER** use accessories or attachments that are not recommended by MQ Power for this equipment. Damage to the equipment and/or injury to user may result.
- **ALWAYS** know the location of the nearest **fire extinguisher.**

- **ALWAYS** know the location of the nearest **first aid kit.**

- **ALWAYS** know the location of the nearest phone or **keep a phone on the job site.** Also, know the phone numbers of the nearest **ambulance, doctor** and **fire department.** This information will be invaluable in the case of an emergency.



GENERATOR SAFETY

⚠ DANGER

- **NEVER** operate the equipment in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe **bodily harm or even death.**

⚠ WARNING

- **NEVER** disconnect any **emergency or safety devices.** These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.

⚠ CAUTION

- **NEVER** lubricate components or attempt service on a running machine.

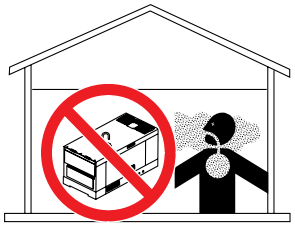
NOTICE

- **ALWAYS** ensure generator is on level ground before use.
- **ALWAYS** keep the machine in proper running condition.
- Fix damage to machine and replace any broken parts immediately.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel

ENGINE SAFETY

⚠ DANGER

- The engine fuel exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled.
- The engine of this equipment requires an adequate free flow of cooling air. **NEVER** operate this equipment in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause injury to people and property and serious damage to the equipment or engine.



⚠ WARNING

- **DO NOT** place hands or fingers inside engine compartment when engine is running.
- **NEVER** operate the engine with heat shields or guards removed.
- Keep fingers, hands hair and clothing away from all moving parts to prevent injury.

- **DO NOT** remove the radiator cap while the engine is hot. High pressure boiling water will gush out of the radiator and severely scald any persons in the general area of the generator.

- **DO NOT** remove the coolant drain plug while the engine is hot. Hot coolant will gush out of the coolant tank and severely scald any persons in the general area of the generator.
- **DO NOT** remove the engine oil drain plug while the engine is hot. Hot oil will gush out of the oil tank and severely scald any persons in the general area of the generator.

⚠ CAUTION

- **NEVER** touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing equipment.

NOTICE

- **NEVER** run engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service air filter frequently to prevent engine malfunction.
- **NEVER** tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if operating in speed ranges above the maximum allowable.

- Wet stacking is a common problem with diesel engines which are operated for extended periods with light or no load applied. When a diesel engine operates without sufficient load (less than 40% of the rated output), it will not operate at its optimum temperature. This will allow unburned fuel to accumulate in the exhaust system, which can foul the fuel injectors, engine valves and exhaust system, including turbochargers, and reduce the operating performance.

  In order for a diesel engine to operate at peak efficiency, it must be able to provide fuel and air in the proper ratio and at a high enough engine temperature for the engine to completely burn all of the fuel.

  Wet stacking does not usually cause any permanent damage and can be alleviated if additional load is applied to relieve the condition. It can reduce the system performance and increase maintenance. Applying an increasing load over a period of time until the excess fuel is burned off and the system capacity is reached usually can repair the condition. This can take several hours to burn off the accumulated unburned fuel.
- State Health Safety Codes and Public Resources Codes specify that in certain locations, spark arresters must be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose. In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

FUEL SAFETY

⚠ DANGER

- **DO NOT** start the engine near spilled fuel or combustible fluids. Diesel fuel is extremely flammable and its vapors can cause an explosion if ignited.
- **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.
- **ALWAYS** use extreme caution when working with **flammable** liquids.
- **DO NOT** fill the fuel tank while the engine is running or hot.
- **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system.
- Store fuel in appropriate containers, in well-ventilated areas and away from sparks and flames.
- **NEVER** use fuel as a cleaning agent.
- **DO NOT** smoke around or near the equipment. Fire or explosion could result from fuel vapors or if fuel is spilled on a hot engine.

TOWING SAFETY

⚠ CAUTION

- Check with your local county or state safety towing regulations, in addition to meeting ***Department of Transportation (DOT) Safety Towing Regulations,*** before towing your generator.

- Refer to MQ Power trailer manual for additional safety information.
- In order to reduce the possibility of an accident while transporting the generator on public roads, **ALWAYS** make sure the trailer that supports the generator and the towing vehicle are mechanically sound and in good operating condition.
- **ALWAYS** shutdown engine before transporting
- Make sure the hitch and coupling of the towing vehicle are rated equal to, or greater than the trailer "gross vehicle weight rating."
- **ALWAYS** inspect the hitch and coupling for wear. **NEVER** tow a trailer with defective hitches, couplings, chains, etc.
- Check the tire air pressure on both towing vehicle and trailer. ***Trailer tires should be inflated to 50 psi cold.*** Also check the tire tread wear on both vehicles.
- **ALWAYS** make sure the trailer is equipped with a **safety chain.**
- **ALWAYS** properly attach trailer's safety chains to towing vehicle.
- **ALWAYS** make sure the vehicle and trailer directional, backup, brake and trailer lights are connected and working properly.
- DOT Requirements include the following:
  - Connect and test electric brake operation.
  - Secure portable power cables in cable tray with tie wraps.
- The maximum speed for highway towing is **55 MPH** unless posted otherwise. Recommended off-road towing is not to exceed **15 MPH** or less depending on type of terrain.
- Avoid sudden stops and starts. This can cause skidding, or jack-knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns to prevent rolling.
- Trailer should be adjusted to a level position at all times when towing.
- Raise and lock trailer wheel stand in up position when towing.
- Place ***chock blocks*** underneath wheel to prevent **rolling** while parked.
- Place **support blocks** underneath the trailer's bumper to prevent **tipping** while parked.
- Use the trailer's swivel jack to adjust the trailer height to a level position while parked.

ELECTRICAL SAFETY

⚠ DANGER

- **DO NOT** touch output terminals during operation. Contact with output terminals during operation can cause **electrocution, electrical shock or burn.**

- The electrical voltage required to operate the generator can cause severe injury or even death through physical contact with live circuits. Turn generator and all circuit breakers **OFF** before performing maintenance on the generator or making contact with output terminals.

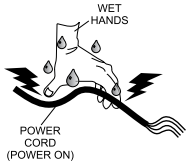
- **NEVER** insert any objects into the output receptacles during operation. This is extremely dangerous. The possibility exists of **electrical shock, electrocution or death.**

- Backfeed to a utility system can cause **electrocution** and/or property damage. **NEVER** connect the generator to a building's electrical system without a transfer switch or other approved device. All installations should be performed by a **licensed electrician** in accordance with all applicable laws and electrical codes. Failure to do so could result in electrical shock or burn, causing **serious injury or even death.**

Power Cord/Cable Safety

⚠ DANGER

- **NEVER** let power cords or cables **lay in water.**
- **NEVER stand in water** while AC power from the generator is being transferred to a load.
- **NEVER** use **damaged** or **worn** cables or cords when connecting equipment to generator. Inspect for cuts in the insulation.
- **NEVER** grab or touch a live power cord or cable with wet hands. The possibility exists of **electrical shock, electrocution or death.**



- Make sure power cables are securely connected to the generator's output receptacles. Incorrect connections may cause electrical shock and damage to the generator.

NOTICE

- **ALWAYS** make certain that proper power or extension cord has been selected for the job. See Cable Selection Chart in this manual.

Grounding Safety

⚠ DANGER

- **ALWAYS** make sure that electrical circuits are properly grounded to a suitable earth ground (ground rod) per the National Electrical Code (NEC) and local codes before operating generator. **Severe injury or death by electrocution** can result from operating an ungrounded generator.
- **NEVER** use gas piping as an electrical ground.

BATTERY SAFETY

⚠ DANGER

- **DO NOT** drop the battery. There is a possibility that the battery will explode.
- **DO NOT** expose the battery to open flames, sparks, cigarettes, etc. The battery contains combustible gases and liquids. If these gases and liquids come into contact with a flame or spark, an explosion could occur.

⚠ WARNING

- **ALWAYS** wear safety glasses when handling the battery to avoid eye irritation. The battery contains acids that can cause injury to the eyes and skin.

- Use well-insulated gloves when picking up the battery.
- **ALWAYS** keep the battery charged. If the battery is not charged, combustible gas will build up.
- **ALWAYS** recharge the battery in a well-ventilated environment to avoid the risk of a dangerous concentration of combustible gasses.
- If the battery liquid (dilute sulfuric acid) comes into contact with **clothing or skin**, rinse skin or clothing immediately with plenty of water.
- If the battery liquid (dilute sulfuric acid) comes into contact with **eyes**, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

⚠ CAUTION

- **ALWAYS** disconnect the **NEGATIVE battery terminal** before performing service on the generator.
- **ALWAYS** keep battery cables in good working condition. Repair or replace all worn cables.

ENVIRONMENTAL SAFETY

NOTICE

- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, fuel and fuel filters.

- **DO NOT** use food or plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil or fuel directly onto the ground, down a drain or into any water source.

Table 1. Generator Specifications		
Model	DCA125USI3CAN	
Type	Revolving field, self ventilated, open protected type synchronous generator	
Armature Connection	**Star with Neutral**	**Zigzag**
Phase	3	1
Standby Output	110 kW (137.5 kVA)	79 kW
Prime Output	100 kW (100 kVA)	72 kW
3Ø Voltage (L-L/L-N) Voltage Selector Switch at 3Ø 240/139	208Y/120, 220Y/127, 240Y/139	N/A
3Ø Voltage (L-L/L-N) Voltage Selector Switch at 3Ø 480/277	416Y/240, 440Y/254, 480Y/277	N/A
1Ø Voltage (L-L/L-N) Voltage Selector Switch at 1Ø 240/120	N/A	240/120
Power Factor	0.8	1.0
Frequency	60 Hz	
Speed	1800 rpm	
Aux. AC Power	Single Phase, 60 Hz	
Aux. Voltage/Output	120V/4.8 Kw (2.4 kW x 2)	
Sound Level dB (A) Full Load at 23 ft. (7.0 Meters)	65	
Dry Weight	5,689 lbs. (2,580 kg)	
Wet Weight	7,012 lbs. (3,180 kg)	

Table 2. Engine Specifications		
Model	ISUZU 4HK1XYGD-03 Tier 3	
Type	4 cycle, water-cooled, direct injection, turbocharged, air to air intercooled	
No. of Cylinders	4 cylinders	
Bore x Stroke	4.53 in. x 4.92 in. (115 mm x 125 mm)	
Displacement	317 cu. in. (5193 cc)	
Rated Output	152 HP/1800 RPM	
Starting	Electric	
Coolant Capacity	5.2 gal. (19.7 liters)	
Lube Oil Capacity	6.1 gal. (23.4 liters)	
Fuel Type	#2 Diesel Fuel	
Fuel Leak Warning Capacity	42.3gal. (160 liters)	
Fuel Tank Capacity	169 gal. (640 liters)	
Fuel Consumption	7.3 gal. (27.6 L)/hr at **full load**	5.7 gal. (21.7 L)/hr at **3/4 load**
	4.0 gal. (15.1 L)/hr at **1/2 load**	2.4 gal. (9.1 L)/hr at **1/4 load**
Battery	12V-128 Ah x 1	

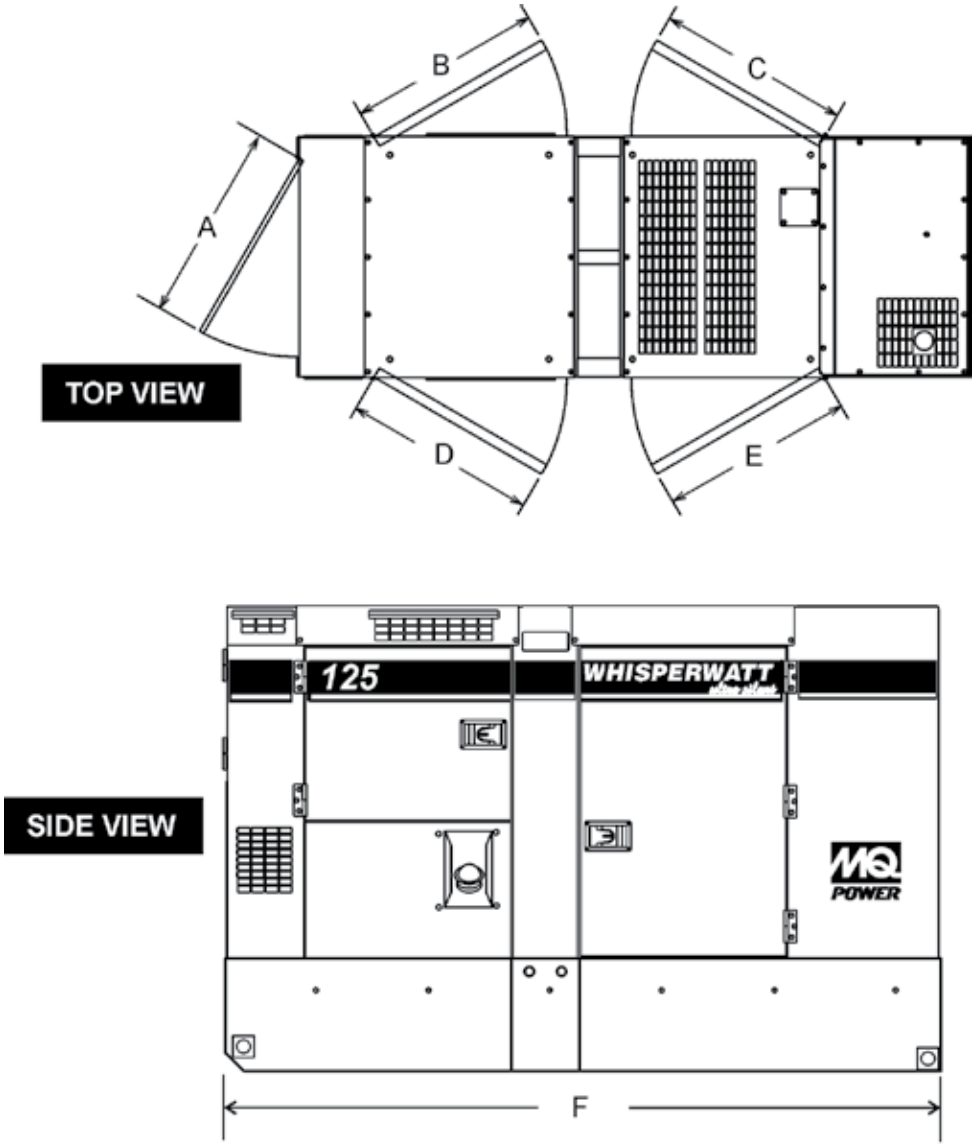


Figure 1. Dimensions

Table 3. Dimensions			
Reference Letter	Dimension in. (mm)	Reference Letter	Dimension in. (mm)
A	38.20 in. (970 mm.)	F	120.10 in. (3,050 mm.)
B	37.00 in. (940 mm.)	G	73.00 in. (1,855 mm.)
C	36.20 in. (920 mm.)	H	48.80 in. (1,200 mm.)
D	37.00 in. (940 mm.)		
E	3620 in. (920 mm.)		

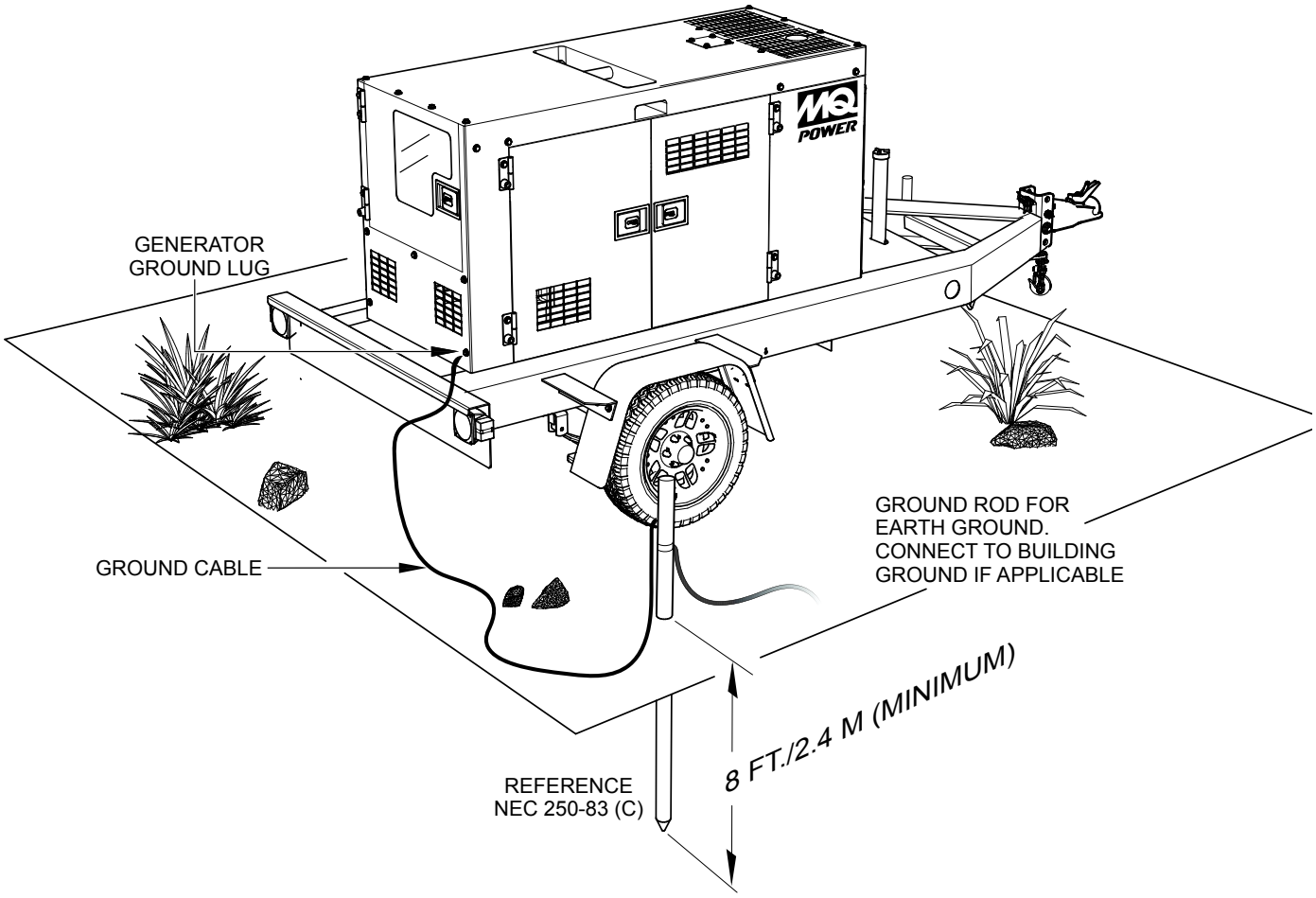


Figure 2. Typical Generator Grounding Application

OUTDOOR INSTALLATION

Install the generator in a area that is free of debris, bystanders, and overhead obstructions. Make sure the generator is on secure level ground so that it cannot slide or shift around. Also install the generator in a manner so that the exhaust will not be discharged in the direction of nearby homes.

The installation site must be relatively free from moisture and dust. All electrical equipment should be protected from excessive moisture. Failure to do will result in deterioration of the insulation and will result in short circuits and grounding.

Foreign materials such as dust, sand, lint and abrasive materials have a tendency to cause excessive wear to engine and alternator parts.

⚠ CAUTION

Pay close attention to ventilation when operating the generator inside tunnels and caves. The engine exhaust contains noxious elements. Engine exhaust must be routed to a ventilated area.

INDOOR INSTALLATION

Exhaust gases from diesel engines are extremely poisonous. Whenever an engine is installed indoors the exhaust fumes must be vented to the outside. The engine should be installed at least two feet from any outside wall. Using an exhaust pipe which is too long or too small can cause excessive back pressure which will cause the engine to heat excessively and possibly burn the valves.

MOUNTING

The generator must be mounted on a solid foundation (such as concrete) and set firmly on the foundation to isolate vibration of the generator when it is running. The generator must set at least 6 inches above the floor or grade level (in accordance to NFPA 110, Chapter 5-4.1). **DO NOT** remove the metal skids on the bottom of the generator. They are to resist damage to the bottom of the generator and to maintain alignment.

GENERATOR GROUNDING

To guard against electrical shock and possible damage to the equipment, it is important to provide a good **EARTH** ground.

Article 250 (Grounding) of the National Electrical Code (NEC) provides guide lines for proper grounding and specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.

NEC articles 250-64(b) and 250-66 set the following grounding requirements:

1. Use one of the following wire types to connect the generator to earth ground.
   a. Copper - 10 AWG (5.3 mm^2)
   b. Aluminum - 8 AWG (8.4 mm^2)
2. When grounding the generator (Figure 2) connect the ground cable between the lock washer and the nut on the generator and tighten the nut fully. Connect the other end of the ground cable to earth ground.
3. NEC article 250-52(c) specifies that the earth ground rod should be buried a minimum of 8 ft. into the ground.

NOTICE

When connecting the generator to any buildings electrical system **ALWAYS** consult with a licensed electrician.

GENERATOR

This MQ Power Model generator (Figure 3) is a high quality portable (requires a trailer for transport) power source for telecom sites, lighting facilities, power tools, submersible pumps and other industrial and construction machinery.

ENGINE OPERATING PANEL

The "Engine Operating Panel" is provided with the following:

- Tachometer
- Water Temperature Gauge
- Warning Lamp
- Pre-Heat Lamp
- Oil Pressure Gauge
- Charging Ammeter Gauge
- Fuel Level Gauge
- Fuel Leak Detection Lamp
- Panel Light/Panel Light Switch
- ECU Controller
- Engine Speed Switch
- Warning Lamp (Diagnostic Lamp)

GENERATOR CONTROL PANEL

The "Generator Control Panel" is provided with the following:

- Frequency Meter (Hz)
- AC Ammeter (Amps)
- AC Voltmeter (Volts)
- Ammeter Change-Over Switch
- Voltmeter Change-Over Switch
- Voltage Regulator
- 3-Pole, 350 amp Main Circuit Breaker
- "Control Box" (located behind the Gen. Control Panel)
  - Automatic Voltage Regulator
  - Current Transformer
  - Over-Current Relay
  - Starter Relay
  - Voltage Selector Switch
  - Diagnostic Switch

OUTPUT TERMINAL PANEL

The "Output Terminal Panel" is provided with the following:

- Three 120/240V output receptacles (CS-6369), 50A
- Three auxiliary circuit breakers, 50A
- Two 120V output receptacles (GFCI), 20A
- Two GFCI circuit breakers, 20A
- Five output terminal lugs (3Ø power)
- Low Coolant Level Switch
- Battery Charger (Optional)
- Jacket Water Heater
- Camlock Connector (Option)
- 600 VAC Output Auto-Transformer (Option)

OPEN DELTA EXCITATION SYSTEM

This generator is equipped with the state of the art **"Open-Delta"** excitation system. The open delta system consist of an electrically independent winding wound among stationary windings of the AC output section.

There are four connections of the open delta A, B, C and D. During steady state loads, the power from the voltage regulator is supplied from the parallel connections of A to B, A to D, and C to D. These three phases of the voltage input to the voltage regulator are then rectified and are the excitation current for the exciter section.

When a heavy load, such as a motor starting or a short circuit occurs, the automatic voltage regulator (AVR) switches the configuration of the open delta to the series connection of B to C. This has the effect of adding the voltages of each phase to provide higher excitation to the exciter section and thus better voltage response during the application of heavy loads.

The connections of the AVR to the AC output windings are for sensing only. No power is required from these windings.

The open-delta design provides virtually unlimited excitation current, offering maximum motor starting capabilities. The excitation does not have a **"fixed ceiling"** and responds according the demands of the required load.

ENGINE

This generator is powered by a 4 cylinder, water cooled, direct injection, turbocharged ISUZU 4HK1X diesel engine. This engine is designed to meet every performance requirement for the generator. Reference Table 2 for engine specifications.

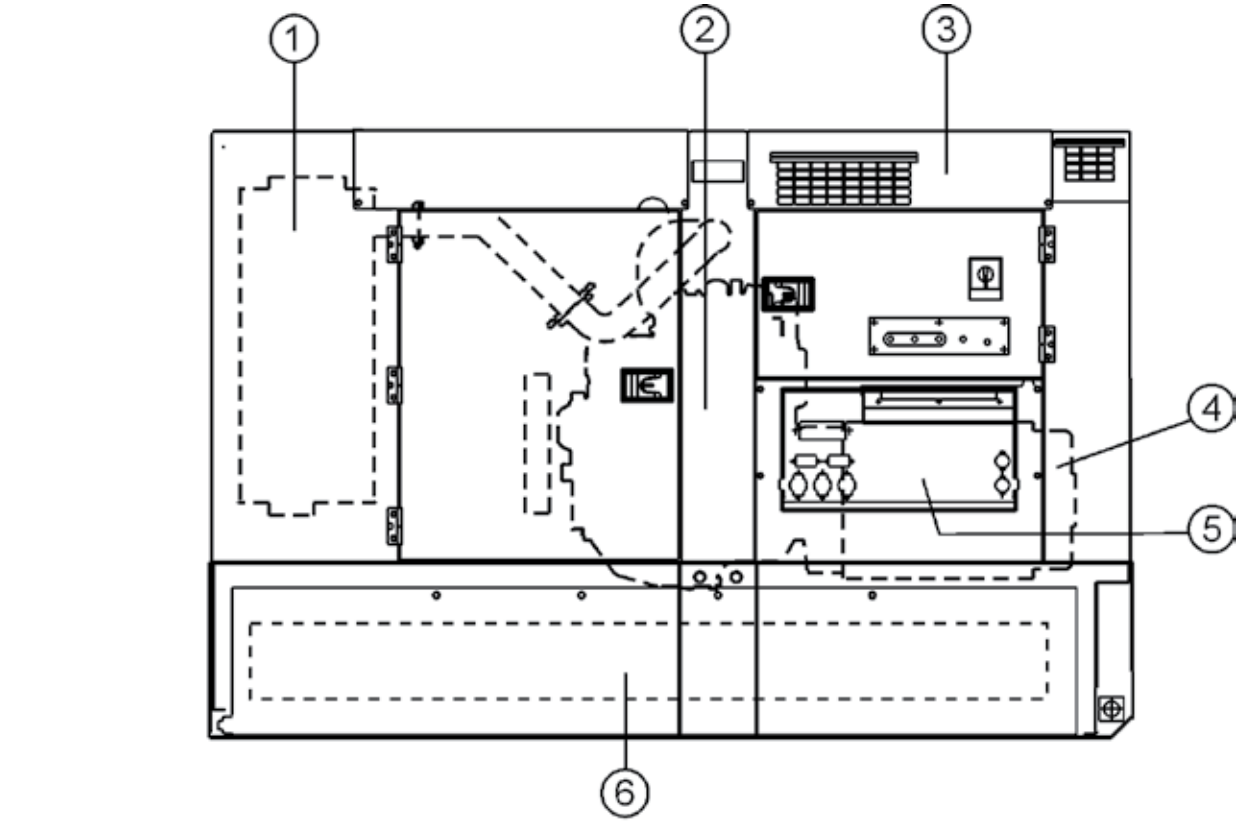
In keeping with MQ Power's policy of constantly improving its products, the specifications quoted herein are subject to change without prior notice.

ELECTRIC GOVERNOR SYSTEM

The electric governor system controls the RPMs of the engine. When the engine demand increases or decreases, the governor system regulates the frequency variation to ±.25%.

EXTENSION CABLES

When electric power is to be provided to various tools or loads at some distance from the generator, extension cords are normally used. Cables should be sized to allow for distance in length and amperage so that the voltage drop between the generator and point of use (load) is held to a minimum. Use the cable selection chart (Table 6) as a guide for selecting proper extension cable size.



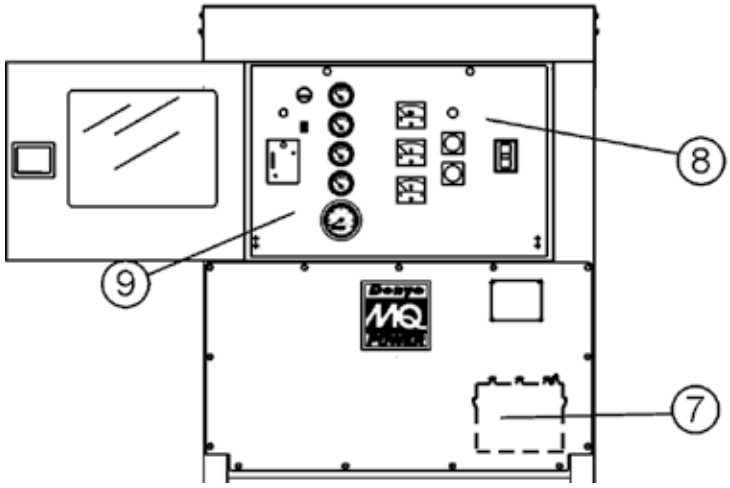


Figure 3. Major Components

Table 4. Generator Major Components	
ITEM NO.	**DESCRIPTION**
1	Muffler Assembly
2	Engine Assembly
3	Enclosure Assembly
4	Generator Assembly
5	Output Terminal Assembly
6	Fuel Tank Assembly
7	Battery Assembly
8	Generator Operating Panel Assembly
9	Engine Control Panel Assembly

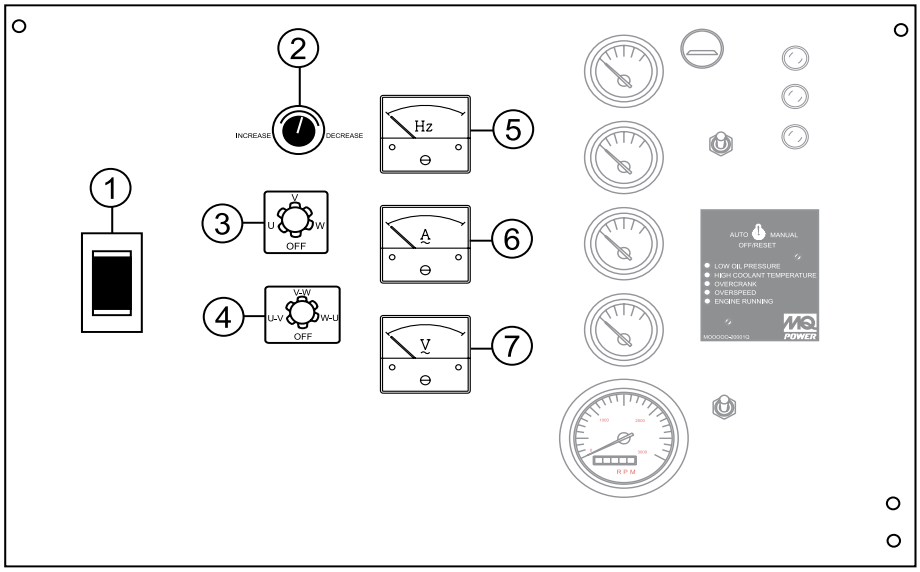


Figure 4. Generator Control Panel

The definitions below describe the controls and functions of the Generator Control Panel (Figure 4).

1. **Main Circuit Breaker**—This three-pole, 350A main breaker is provided to protect the U,V, and W Output Terminal Lugs from overload.
2. **Voltage Regulator Control** — Allows ±15% manual adjustment of the generator's output voltage.
3. **Ammeter Change-Over Switch** — This switch allows the AC ammeter to indicate the current flowing to the load connected to any phase of the output terminals, or to be switched off. This switch does not effect the generator output in any fashion, it is for current reading only.
4. **Voltmeter Change-Over Switch** — This switch allows the AC voltmeter to indicate phase to phase voltage between any two phases of the output terminals or to be switched off.
5. **Frequency Meter** — Indicates the output frequency in hertz (Hz). Normally 60 Hz.
6. **AC Ammeter** — Indicates the amount of current the load is drawing from the generator per leg selected by the ammeter phase-selector switch.
7. **AC Voltmeter** — Indicates the output voltage present at the U,V, and W Output Terminal Lugs.

Located behind the generator control panel is the Generator Control Box. This box contains some of the necessary electronic components required to make the generator function.

The Control Box is equipped with the following major components:

- Over-Current Relay
- Automatic Voltage Regulator (AVR)
- Starter Relay
- Current Transformer
- Voltage Selector Switch
- Main Circuit Breaker

NOTICE

Remember the **overcurrent relay** monitors the current flowing from the **U,V, and W Output Terminal Lugs** to the load.

In the event of a short circuit or over current condition, it will automatically trip the 350 amp main breaker.

To restore power to the **Output Terminal Panel**, press the reset button on the overcurrent relay and place the **main** circuit breaker in the **closed** position (**ON**).

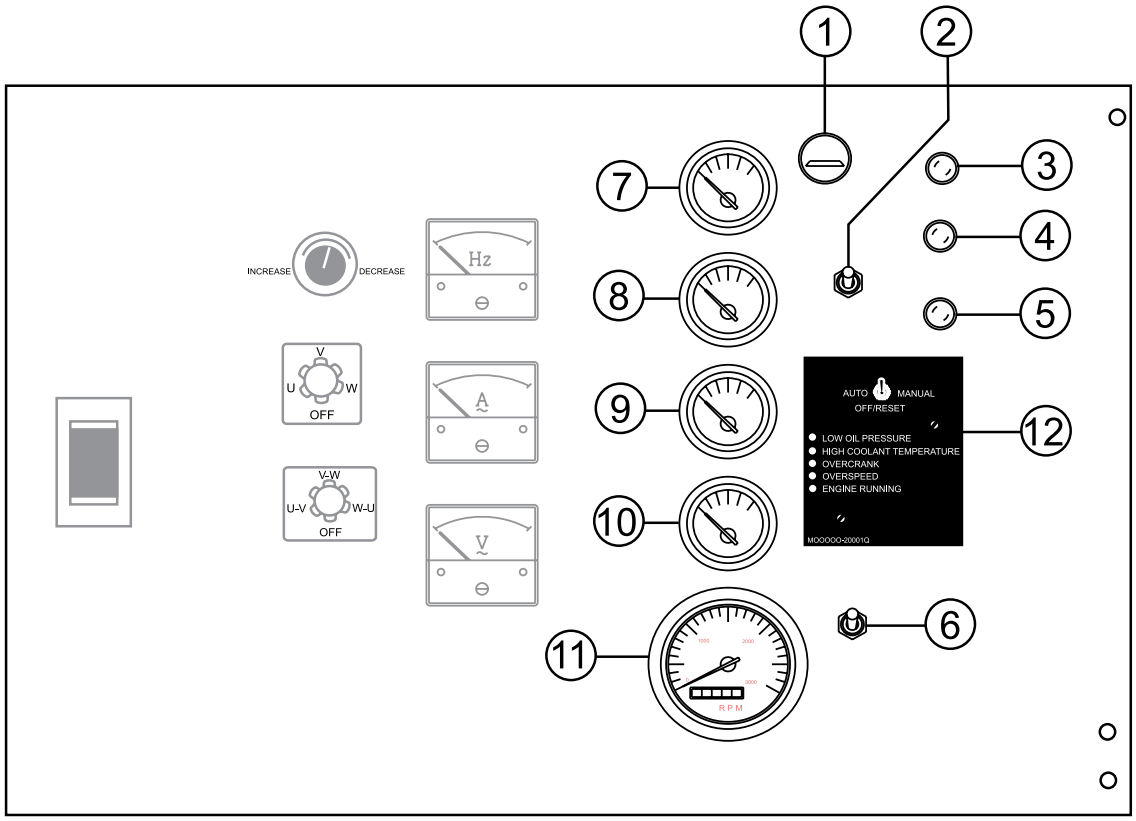


Figure 5. Engine Operating Panel

The definitions below describe the controls and functions of the Engine Operating Panel (Figure 5).

1. **Panel Light** — Normally used in dark areas or at night time. When activated, panel lights will illuminate. When the generator is not in use be sure to turn the panel light switch to the OFF position.
2. **Panel Light Switch** — When activated will turn on control panel light.
3. **Preheat Lamp** — As the engine cranks, this lamp will illuminate to indicate automatic preheating of the engine glow plugs. When the lamp turns off, this indicates that the preheat cycle is complete and the engine will start automatically.
4. **Warning Lamp (Diagnostic Lamp)** — When lit indicates a that a failure has occurred in the engine control system.
5. **Fuel Leak Detection Lamp** — This lamp will illuminate when a leak in the fuel tank containment enclosure is detected.
6. **Engine Speed Switch** — This switch controls the speed of the engine (low/high).
7. **Oil Pressure Gauge** — During normal operation this gauge should read between 42 ~71 psi. (290~490 kPa). When starting the generator the oil pressure may read a little higher, but after the engine warms up the oil pressure should return to the correct pressure range.
8. **Water Temperature Gauge** — During normal operation this gauge be should read between 167°~203°F (75° ~95°C).
9. **Charging Ammeter Gauge** — Indicates the current being supplied by the engine's alternator which provides current for generator's control circuits and battery charging system.
10. **Fuel Gauge** — Indicates amount of diesel fuel available.
11. **Tachometer** — Indicates engine speed in RPM's for 60 Hz operation. This meter should indicate 1800 RPM's when the rated load is applied. In addition a built in hour meter will record the number of operational hours that the generator has been in use.
12. **Auto START/STOP Engine Controller (ECU)** — This controller has a vertical row of status LED's (inset), that when lit, indicate that an engine malfunction (fault) has been detected. When a fault has been detected the engine controller will evaluate the fault and all major faults will shutdown the generator. During cranking cycle, the ECU will attempt to crank the engine for 10 seconds before disengaging.

If the engine does not engage (start) by the third attempt, the engine will be shutdown by the engine controller's Over Crank Protection mode. If the engine engages at a speed (RPM's) that is not safe, the controller will shutdown the engine by initializing the Over Speed Protection mode.

Also the engine controller will shut down the engine in the event of low oil pressure, high coolant temperature, low coolant level, and loss of magnetic pickup. These conditions can be observed by monitoring the LED status indicators on the front of the controller module.

A. **MPEC Control Switch** — This switch controls the running of the unit. If this switch is set to the OFF/ RESET position, the unit will not run. When this switch is set to the manual position, the generator will start immediately.

If the generator is to be connected to a building's AC power source via an automatic transfer switch (isolation), place the switch in the AUTO position. In this position, should an outage occur, the automatic transfer switch (ATS) will start the generator automatically via the generator's auto-start contacts connected to the ATS's start contacts. Please refer to your ATS installation manual for further instructions for the correct installation of the auto-start contacts of the generator to the ATS.

B. **Low Oil Pressure** — Indicates the engine pressure has fallen below 15 psi (103 kPa). The oil pressure is detected using variable resistive values from the oil pressure sending unit. This is considered a major fault.

C. **High Coolant Temperature** — Indicates the engine temperature has exceeded 230°F (110°C). The engine temperature is detected using variable resistive values from the temperature sending unit. This is considered a major fault.

D. **Overcrank Shutdown** — Indicates the unit has attempted to start a pre- programmed number of times, and has failed to start. The number of cycles and duration are programmable. It is pre-set at 3 cycles with a 10 second duration. This is considered a major fault.

E. **Overspeed Shutdown** — Indicates the engine is running at an unsafe speed. This is considered a major fault.

F. **Engine Running** — Indicates that engine is running at a safe operating speed.

OUTPUT TERMINAL PANEL

The Output Terminal Panel (Figure 6) shown below is located on the right-hand side (left from control panel) of the generator. Lift up on the cover to gain access to receptacles and terminal lugs.

NOTICE

Terminal legs "O" and "Ground" are considered bonded grounds.

OUTPUT TERMINAL FAMILIARIZATION

The "Output Terminal Panel " (Figure 6) is provided with the following:

- Three 120/240V output receptacles @ 50 amp
- Three Circuit Breakers @ 50 amps
- Two 120V GFCI receptacles @ 20 amp
- Two GFCI Circuit Breakers @ 20 amps
- Five Output Terminal Lugs (U, V, W, O, Ground)

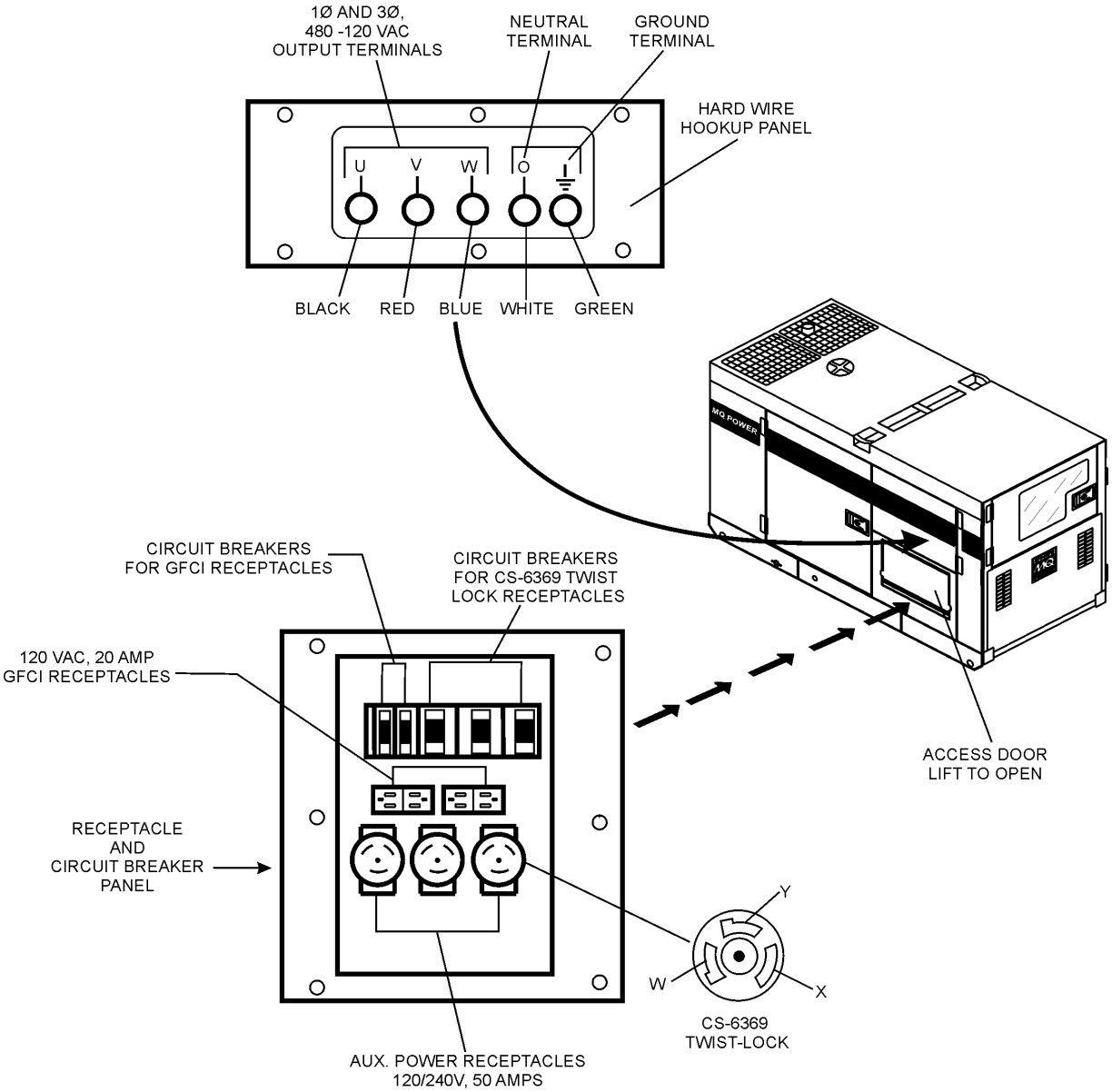


Figure 6. Output Terminal Panel

120 VAC GFCI Receptacles

There are two 120 VAC, 20 amp GFCI (Duplex Nema 5-20R) receptacles provided on the output terminal panel. These receptacles can be accessed in **any voltage selector switch** position. Each receptacle is protected by a 20 amp circuit breaker. These breakers are located directly above the GFCI receptacles. Remember the load output (current) of both GFCI receptacles is dependent on the load requirements of the U, V, and W output terminal lugs.

Pressing the **reset** button resets the GFCI receptacle after being tripped. Pressing the **test button** (Figure 7) in the center of the receptacle will check the GFCI function. Both receptacles should be tested at least once a month.

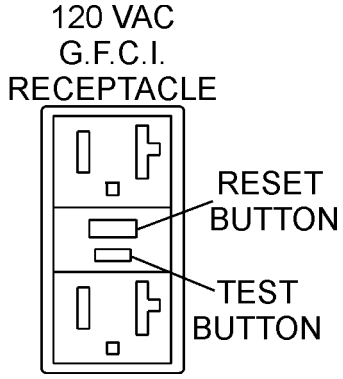


Figure 7. G.F.C.I. Receptacle

Twist Lock Dual Voltage 120/240 VAC Receptacles

There are three 120/240V, 50 amp auxiliary twist-lock (CS-6369) receptacles (Figure 8) provided on the output terminal panel. These receptacles can **only** be accessed when the voltage selector switch is placed in the **single-phase 240/120 position.**

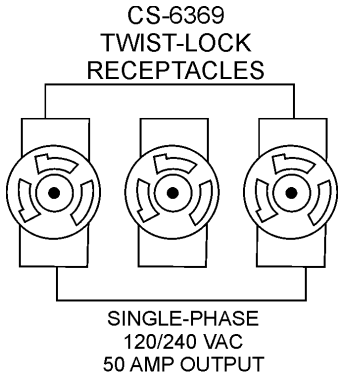


Figure 8. 120/240V Twist-Lock Auxiliary Receptacles

Each auxiliary receptacle is protected by a 50 amp circuit breaker. These breakers are located directly above the GFCI receptacles. Remember the load output (current) on all three receptacles is dependent on the load requirements of the ***output terminal lugs***.

Turn the **voltage regulator control knob** (Figure 9) on the control panel to obtain the desired voltage. Turning the knob clockwise will **increase** the voltage, turning the knob counter-clockwise will **decrease** the voltage.

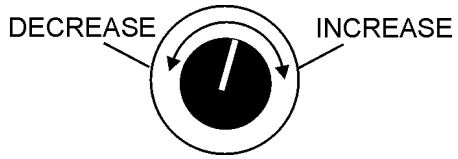


Figure 9. Voltage Regulator Control Knob

Removing the Plastic Face Plate (Hard Wire Hookup Panel)

The ***output terminal lugs*** are protected by a plastic face plate cover (Figure 10). Unscrew the securing bolts and lift the plastic terminal cover to gain access to the terminal enclosure.

After the load wires have been securely attached to the terminal lugs, reinstall the plastic face plate.

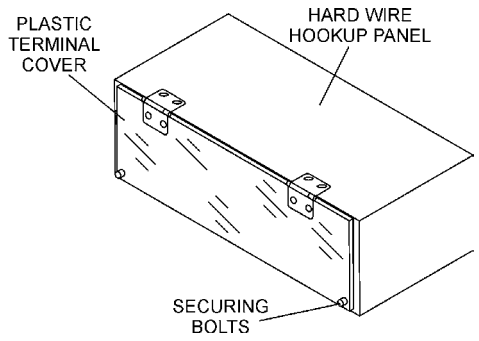


Figure 10. Plastic Face Plate (Output Terminal Lugs)

Connecting Loads

Loads can be connected to the generator by the ***output terminal lugs*** or the convenience receptacles (Figure 11). Make sure to read the operation manual before attempting to connect a load to the generator.

To protect the output terminals from overload, a 3-pole, 350 amp **main** circuit breaker is provided. Make sure to switch **ALL** circuit breakers to the **OFF** position prior to starting the engine.

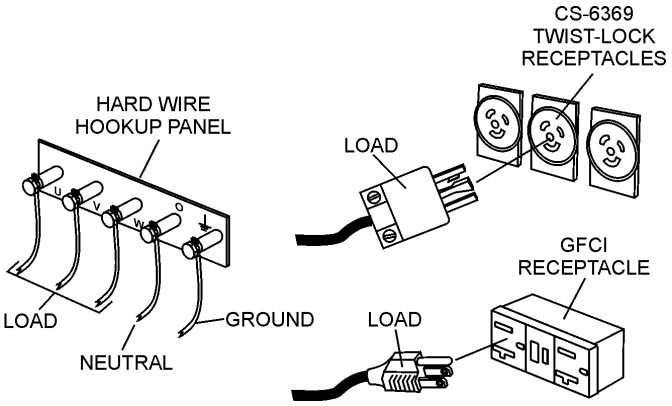


Figure 11. Connecting Loads

Over Current Relay

An **over current relay** (Figure 12) is connected to the main circuit breaker. In the event of an overload, both the circuit breaker and the over current relay may trip. If the circuit breaker can not be reset, the **reset button** on the over current relay must be pressed. The over current relay is located in the control box.

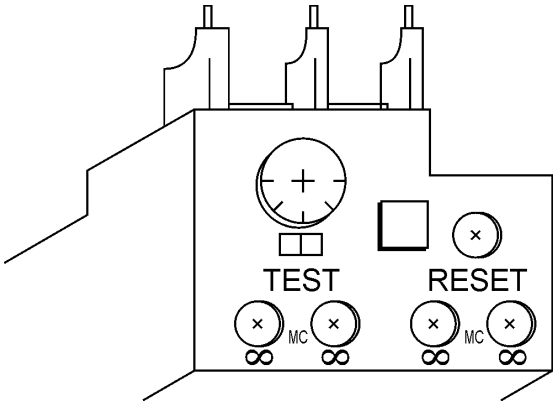


Figure 12. Over Current Relay

SINGLE PHASE LOAD

Always be sure to check the nameplate on the generator and equipment to insure the wattage, amperage, frequency, and voltage requirements are satisfactorily supplied by the generator for operating the equipment.

Generally, the wattage listed on the nameplate of the equipment is its rated output. Equipment may require 130—150% more wattage than the rating on the nameplate, as the wattage is influenced by the efficiency, power factor and starting system of the equipment.

NOTICE

If wattage is not given on the equipment's name plate, approximate wattage may be determined by multiplying nameplate voltage by the nameplate amperage.

WATTS = VOLTAGE x AMPERAGE

The power factor of this generator is 0.8. See Table 5 below when connecting loads.

Table 5. Power Factor By Load

Type of Load	Power Factor
Single-phase induction motors	0.4-0.75
Electric heaters, incandescent lamps	1.0
Fluorescent lamps, mercury lamps	0.4-0.9
Electronic devices, communication equipment	1.0
Common power tools	0.8

Table 6. Cable Selection (60 Hz, Single Phase Operation)

Current in Amperes	Load in Watts		Maximum Allowable Cable Length			
	At 100 Volts	At 200 Volts	#10 Wire	#12 Wire	#14 Wire	#16 Wire
2.5	300	600	1000 ft.	600 ft.	375 ft.	250 ft.
5	600	1200	500 ft.	300 ft.	200 ft.	125 ft.
7.5	900	1800	350 ft.	200 ft.	125 ft.	100 ft.
10	1200	2400	250 ft.	150 ft.	100 ft.	
15	1800	3600	150 ft.	100 ft.	65 ft.	
20	2400	4800	125 ft.	75 ft.	50 ft.	
CAUTION: Equipment damage can result from low voltage						

THREE PHASE LOAD

When calculating the power requirements for 3-phase power use the following equation:

$$KVA = \frac{VOLTAGE \times AMPERAGE \times 1.732}{1000}$$

NOTICE

If 3Ø load (kVA) is not given on the equipment nameplate, approximate 3Ø load may be determined by multiplying voltage by amperage by 1.732.

NOTICE

Motors and motor-driven equipment draw much greater current for starting than during operation.

An inadequate size connecting cable which cannot carry the required load can cause a voltage drop which can burn out the appliance or tool and overheat the cable. See Table 6.

- When connecting a resistance load such as an incandescent lamp or electric heater, a capacity of up to the generating set's rated output (kW) can be used.
- When connecting a fluorescent or mercury lamp, a capacity of up to the generating set's rated output (kW) multiplied by 0.6 can be used.
- When connecting an electric drill or other power tools, pay close attention to the required starting current capacity.

When connecting ordinary power tools, a capacity of up to the generating set's rated output (kW) multiplied by 0.8 can be used.

DANGER

Before connecting this generator to any building's electrical system, a **licensed electrician** must install an **isolation (transfer) switch**. Serious damage to the building's electrical system may occur without this transfer switch.

GENERATOR OUTPUT VOLTAGES

A wide range of voltages are available to supply voltage for many different applications. Voltages are selected by using the **voltage selector** switch (Figure 13). To obtain some of the voltages as listed in Table 7 (see below) will require a fine adjustment using the **voltage regulator** (VR) **control knob** located on the control panel.

Voltage Selector Switch

The voltage selector switch (Figure 13) is located above the output terminal panel's Hard Wire Hook-up Panel. It has been provided for ease of voltage selection.

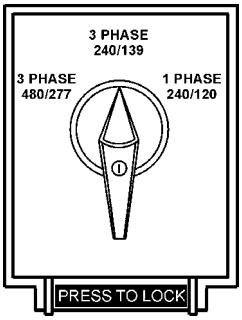


Figure 13. Voltage Selector Switch

Voltage Selector Switch Locking Button

To lock the voltage selector switch, ***press and hold the red button*** located at the bottom of the switch. While holding the red button down, insert a pad lock into the hole next to the button to retain it in the inward locked position. When the lock is removed, the red button is spring loaded and will return to its normal outward unlocked position.

⚠ CAUTION

NEVER change the position of the **voltage selector switch** while the engine is running. **ALWAYS** place circuit breaker in the **OFF** position before selecting voltage**.**

Table 7. Voltages Available

UVWO Output Terminal Lugs	Voltage Selector Switch 3-Phase 240/139V Position			Voltage Selector Switch 3-Phase 480/270V Position		
3Ø **Line-Line**	208V	220V	240V	416V	440V	480V
1Ø **Line-Neutral**	120V	127V	139V	240V	254V	277V
Voltage Selector Switch Single-Phase 240/120V Position						
1Ø **Line-Neutral/ Line-Line**	120V Line-Neutral	N/A	N/A	240V Line-Line	N/A	N/A

Generator Amperage

Table 8 shows the **maximum** amps the generator can provide. **DO NOT** exceed the maximum amps as listed..

Table 8. Generator Maximum Amps

Rated Voltage	Maximum Amps
1Ø 120 Volt	277.8 amps (4 wire) 301A x 2 (Zigzag)
1Ø 240 Volt	138.9 amps (4 wire) 301A (Zigzag)
3Ø 240 Volt	301 amps
3Ø 480 Volt	150 amps

GFCI Receptacle Load Capability

The load capability of the GFCI receptacles is directly related to the voltage being supplied at either the output terminals or the 2 twist lock auxiliary receptacles.

Table 9 and Table 10 show what amount of current is available at the GFCI receptacles when the output terminals and twist lock receptacles are in use. Be careful that your load does not to exceed the available current capability at the receptacles.

Table 9. 1Ø GFCI Receptacle Load Capacity

KW in Use Twist Lock (C6369)	Available Load Current (Amps)
1Ø 240/120V	GFCI Duplex 5-20R 120V
72.0	0 amps/receptacle
70.8	5 amps/receptacle
69.6	10 amps/receptacle
68.4	15 amps/receptacle
67.2	20 amps/receptacle

Table 10. 3Ø GFCI Receptacle Load Capacity

KVA in Use (UVWO Terminals)	Available Load Current (Amps)
3Ø 240/480V	GFCI Duplex 5-20R 120V
125	0 amps/receptacle
121	5 amps/receptacle
117	10 amps/receptacle
113	15 amps/receptacle
108	20 amps/receptacle

HOW TO READ THE AC AMMETER AND AC VOLTAGE GAUGES

The AC ammeter and AC voltmeter gauges are controlled by the AC ammeter and AC voltmeter change-over switches.

Both of these switches are located on the control panel and **DO NOT** effect the generator output. They are provided to help observe how much power is being supplied, produced at the UVWO terminals lugs.

Before taking a reading from either gauge, set the ***Voltage Selector Switch*** (Figure 14) to the position which produces the required voltage (For example, for 3Ø 240V, choose the center 3Ø 240/139V position on the voltage selector switch

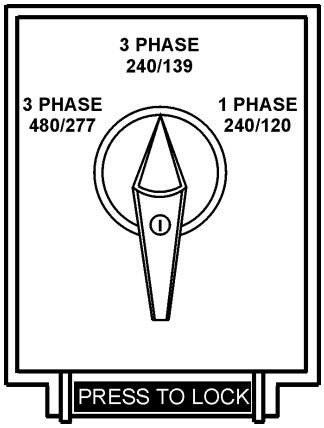


Figure 14. Voltage Selector Switch-240/3Ø Position

AC Voltmeter Gauge Reading

Place the ***AC Voltmeter Change-Over Switch*** (Figure 15) in the W-U position and observe the phase to phase voltage reading between the W and U terminals as indicated on the ***AC Voltmeter Gauge*** (Figure 16).

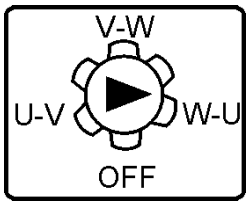


Figure 15. AC Voltmeter Change-Over Switch

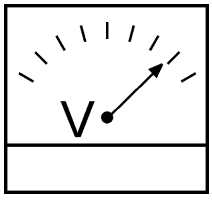


Figure 16. AC Voltmeter Gauge (Volt reading on W-U Lug)

AC Ammeter Gauge Reading

Place the ***AC Ammeter Change-Over Switch*** (Figure 17) in the U position and observe the current reading (load drain) on the U terminal as indicated on the ***AC Ammeter Gauge*** (Figure 18). This process can be repeated for terminals V and W.

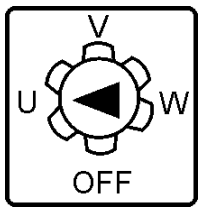


Figure 17. AC Ammeter Change-Over Switch

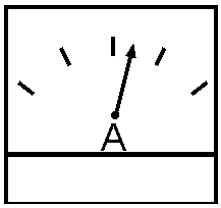


Figure 18. AC Ammeter (Amp reading on U Lug)

NOTICE

The ***ammeter*** gauge will only show a reading when the ***Output Terminal Lugs*** are connected to a load and in use.

UVWO TERMINAL OUTPUT VOLTAGES

Various output voltages can be obtained using the UVWO output terminal lugs. The voltages at the terminals are dependent on the position of the **Voltage Selector Switch** and the adjustment of the **Voltage Regulator Control Knob**.

Remember the voltage selector switch determines the **range** of the output voltage. The voltage regulator (VR) allows the user to increase or decrease the selected voltage.

3Ø-240/139 UVWO Terminal Output Voltages

1. Place the voltage selector switch in the 3Ø 240/139 position as shown in Figure 19.

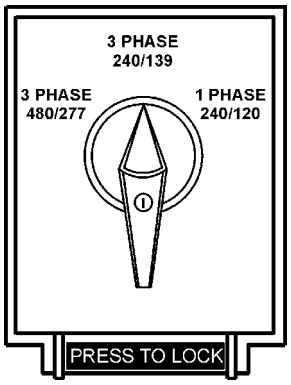


Figure 19. Voltage Selector Switch 3Ø-240/139V Position

2. Connect the load wires to the UVWO terminals as shown in Figure 20.

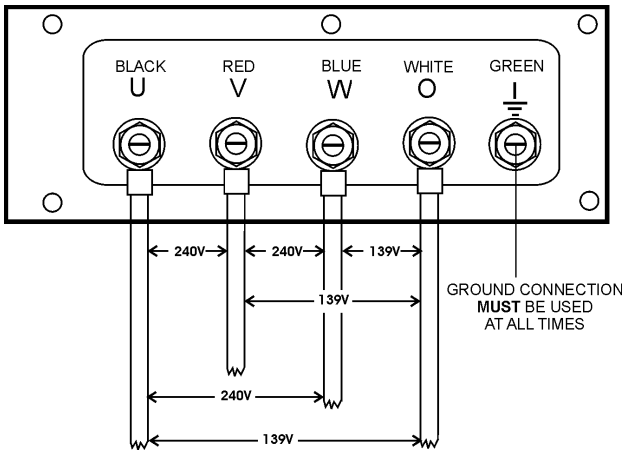


Figure 20. UVWO Terminal Lugs 3Ø-240/139V Connections

3. Turn the voltage regulator knob (Figure 21) clockwise to increase voltage output, turn counterclockwise to decrease voltage output. Use voltage regulator adjustment knob whenever fine tuning of the output voltage is required.

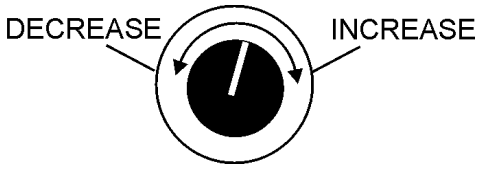


Figure 21. Voltage Regulator Knob

3Ø-208V/1Ø-120V UVWO Terminal Output Voltages

1. Place the voltage selector switch in the 3Ø 240/139 position as shown in Figure 22.

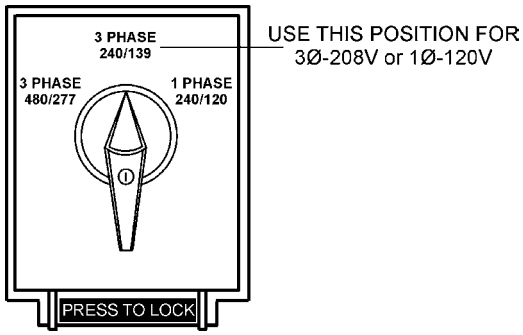


Figure 22. Voltage Selector Switch 3Ø-240/139V Position

2. Connect the load wires to the UVWO terminals as shown in Figure 23.

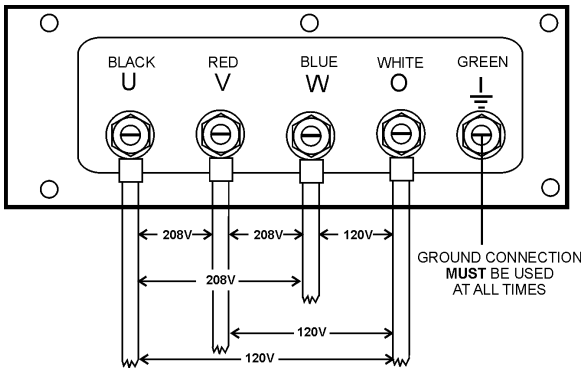


Figure 23. UVWO Terminal Lugs 3Ø-208/1Ø-120V Connections

NOTICE

To achieve a 3Ø 208V output the voltage selector switch must be in the 3Ø-240/139 position and the voltage regulator must be adjusted to 208V.

3Ø-480/277V UVWO Terminal Output Voltages

1. Place the voltage selector switch in the 3Ø 480/277 position as shown in Figure 24.

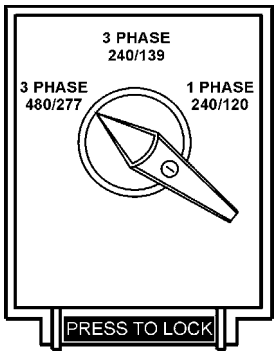


Figure 24. Voltage Selector Switch 3Ø-480/277V Position

2. Connect the load wires to the UVWO terminals as shown in Figure 25.

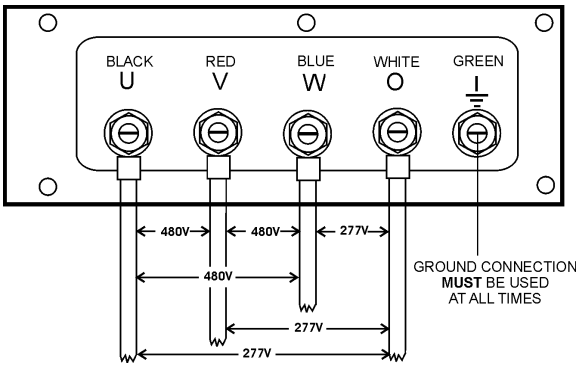


Figure 25. UVWO Terminal Lugs 3Ø-480/277V Connections

3. Turn the voltage regulator knob (Figure 21) clockwise to increase voltage output, turn counterclockwise to decrease voltage output. Use voltage regulator adjustment knob whenever fine tuning of the output voltage is required.

1Ø-240/120V UVWO Terminal Output Voltages

1. Place the voltage selector switch in the 1Ø 240/120 position as shown in Figure 26.

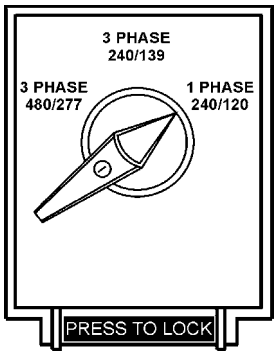


Figure 26. Voltage Selector Switch 1Ø-240/120V Position

2. Connect the load wires to the UVWO terminals as shown in Figure 27.

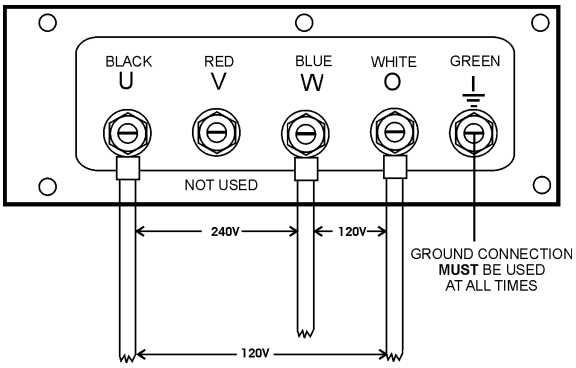


Figure 27. UVWO Terminal Lugs 1Ø-240/120V Connections

3. Turn the voltage regulator knob (Figure 21) clockwise to increase voltage output, turn counterclockwise to decrease voltage output. Use voltage regulator adjustment knob whenever fine tuning of the output voltage is required.

NOTICE

ALWAYS make sure that the connections to the UVWO terminals are **secure** and **tight**. The possibility of arcing exists, that could cause a fire.

3Ø-600V Auto-Transformer

3Ø, 600 VAC can be achieved via the auto-transformer module. This module provides the necessary electronics to convert the 3Ø, 480 VAC inut voltage to a 3Ø, 600 VAC output voltage.

The 3Ø, 600 VAC ouput voltage cannot be achieved unless the voltage selector switch (Figure 28) is placed in the 3Ø, 480/277 position.

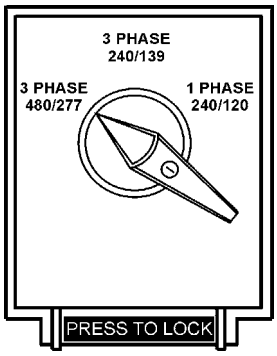


Figure 28. Voltage Selector Switch 3Ø-480/277V Position (600 VAC Auto-Transformer)

3Ø-600VAC Load Connections

DANGER

When connecting the load wires make sure the generator is **OFF.** The possibility of electrocution exists causing severe bodily harm even death!

1. Loosen the latches on the control box enclosure and open the door.
2. Drill a 1-1/2 inch hole at the bottom of the control box enclosure as shown in Figure 29.

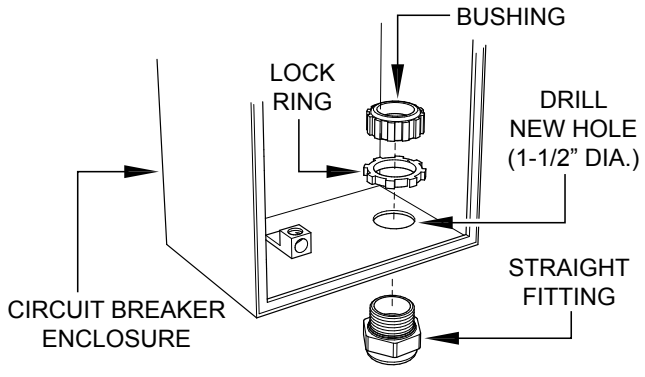


Figure 29. Control Box Enclosure (Drilling

3. After drilling, make sure all shavings and debris have been removed from the enclosure.
4. Install customer supplied conduit, fittings and bushing through enclosure hole opening.
5. Next, route the customer supplied 5 wires through the straight conduit fitting.
6. Connect the 3 load wires (**RED**, **BLACK** and **BLUE**) to the load side (bottom) of the circuit breaker, **T1**, **T2** and **T3** respectively. Reference Figure 30

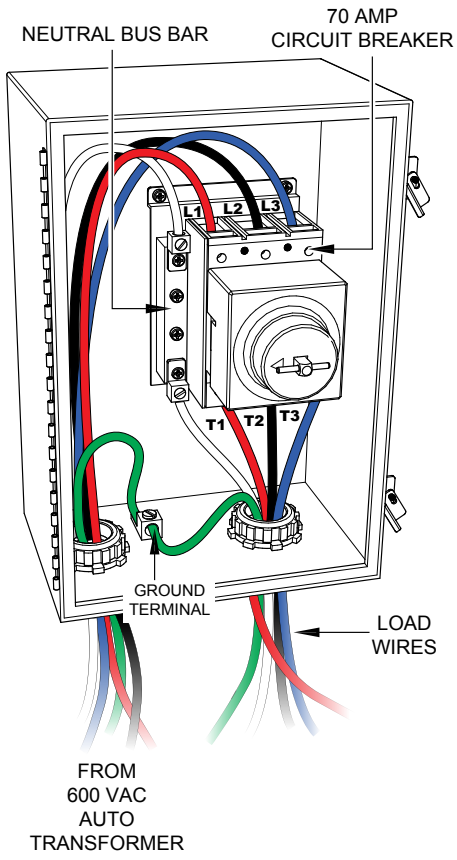


Figure 30. Control Box Enclosure Load Connections

7. Connect the neutral wire (**WHITE)** to the neutral bus bar.
8. Connect the ground wire (**GREEN**) to the ground terminal.
9. Torque all wires to 45 lbf-in (5 N·m).
10. Once all wires have been securely tighten, close control box enclosure door and securely tighten the control box door latches.

CIRCUIT BREAKERS

To protect the generator from an overload, a 3-pole, 350 amp, main circuit breaker is provided to protect the **U,V, and W Output Terminals** from overload. In addition two single-pole, 20 amp **GFCI** circuit breakers are provided to protect the GFCI receptacles from overload. Three 50 amp **load** circuit breakers have also been provided to protect the auxiliary receptacles from overload. Make sure to switch **ALL** circuit breakers to the **OFF** position prior to starting the engine.

LUBRICATION OIL

Fill the engine crankcase with lubricating oil through the filler hole, but **DO NOT** overfill. Make sure the generator is level and verify that the oil level is maintained between the two notches (Figure 31) on the dipstick. See Table 11 for proper selection of engine oil.

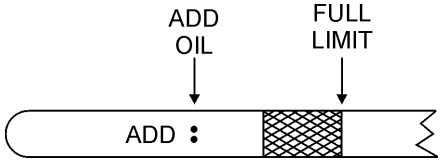


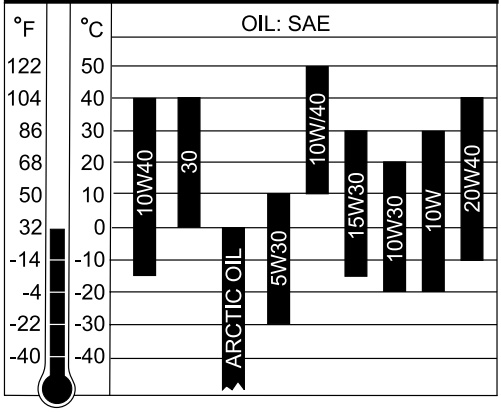
Figure 31. Engine Oil Dipstick

When checking the engine oil, be sure to check if the oil is clean. If the oil is not clean, drain the oil by removing the oil drain plug, and refill with the specified amount of oil as outlined in the **ISUZU Engine Owner's Manual**. Oil should be warm before draining.

Other types of motor oils may be substituted if they meet the following requirements:

- API Service Classification CC/SC
- API Service Classification CC/SD
- API Service Classification CC/SE
- API Service Classification CC/SF

Table 11. Recommended Motor Oil



FUEL CHECK

DANGER

Fuel spillage on a **hot** engine can cause a **fire** or **explosion**. If fuel spillage occurs, wipe up the spilled fuel completely to prevent fire hazards. **NEVER** smoke around or near the generator.

Refilling the Fuel System

CAUTION

ONLY properly trained personnel who have read and understand this section should refill the fuel tank system.

This generator has an internal fuel tank (Figure 32) located inside the enclosure base and may also be equipped with an additional trailer mounted fuel tank (option). **ALWAYS** fill the fuel tanks with clean fresh **#2 diesel fuel. DO NOT** fill the fuel tanks beyond their capacities.

Pay attention to the fuel tank capacity when replenishing fuel. The fuel tank cap must be closed tightly after filling. Handle fuel in a safety container. If the container does not have a spout, use a funnel. Wipe up any spilled fuel immediately.

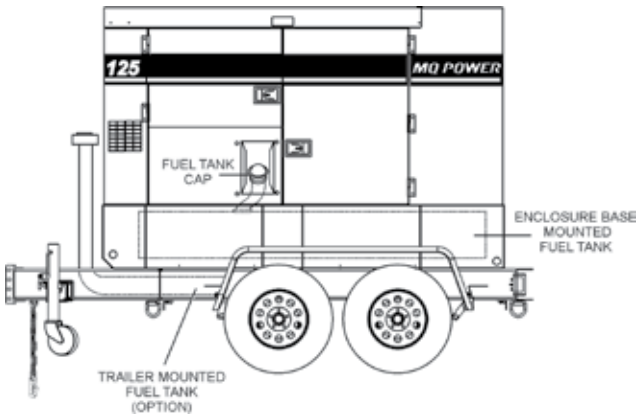


Figure 32. Internal Fuel Tank System

Refueling Procedure:

WARNING

Diesel fuel and its vapors are dangerous to your health and the surrounding environment. Avoid skin contact and/or inhaling fumes.

1. **Level Tanks** — Make sure fuel cells are level with the ground. Failure to do so will cause fuel to spill from the tank before reaching full capacity (Figure 33).

CAUTION

ALWAYS place trailer on firm level ground before refueling to prevent spilling and maximize the amount of fuel that can be pumped into the tank.

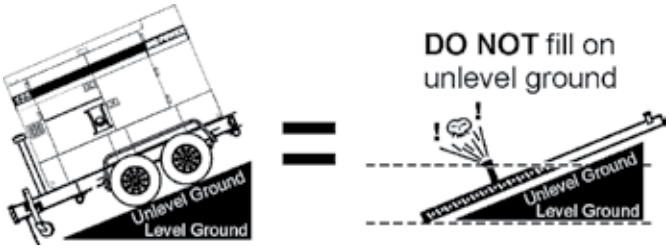


Figure 33. Only Fill on Level Ground

NOTICE

ONLY use **#2 diesel fuel** when refueling.

2. Remove fuel cap (internal fuel tank) and fill tank as shown in (Figure 34).

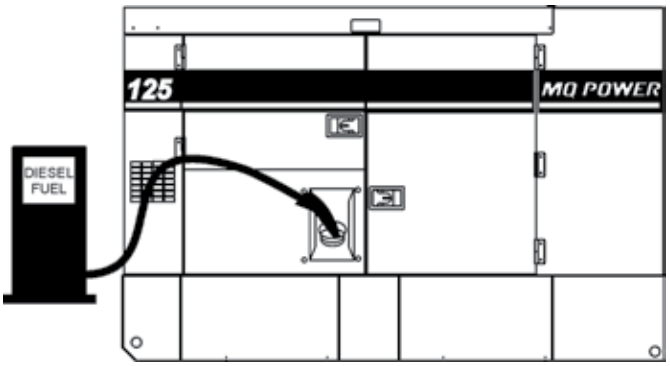


Figure 34. Fueling the Generator

3. **NEVER overfill fuel tank** — It is important to read the fuel gauge when filling trailer fuel tank. **DO NOT** wait for fuel to rise in filler neck (Figure 35).

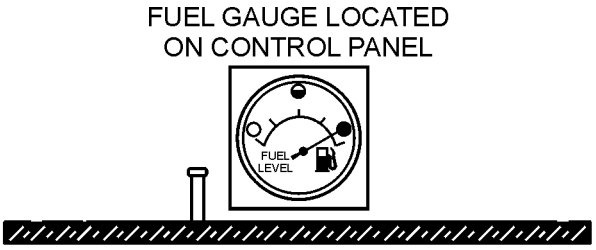


Figure 35. Full Fuel Tank

CAUTION

DO NOT OVERFILL fuel system. Leave room for fuel expansion. Fuel expands when heated (Figure 36).

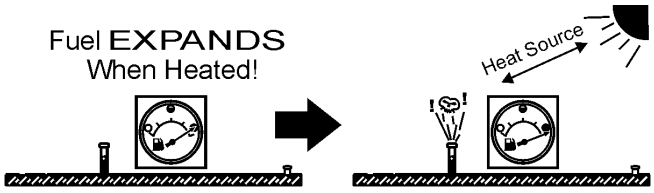


Figure 36. Fuel Expansion

COOLANT (ANTIFREEZE/SUMMER COOLANT/ WATER)

ISUZU recommends ISUZU antifreeze/summer coolant for use in their engines, which can be purchased in concentrate (and mixed with 50% demineralized water) or pre-diluted. See the **ISUZU Engine Owner's Manual** for further details.

⚠ WARNING

If adding coolant/antifreeze mix to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. The possibility of **hot!** coolant exists which can cause severe burns.

Day-to-day addition of coolant is done from the recovery tank. When adding coolant to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. See Table 12 for engine, radiator, and recovery tank coolant capacities. Make sure the coolant level in the recovery tank is always between the "H" and the "L" markings.

Table 12. Coolant Capacity

Engine and Radiator	5.2 gal (19.7 liters)
Reserve Tank	TBD

Operation in Freezing Weather

When operating in freezing weather, be certain the proper amount of antifreeze (Table 13) has been added.

Table 13. Anti-Freeze Operating Temperatures

Vol % Anti-Freeze	Freezing Point	
	°C	°F
50	-37	-34

NOTICE

When the antifreeze is mixed with water, the antifreeze mixing ratio **must be** less than 50%.

CLEANING THE RADIATOR

The engine may overheat if the radiator fins become overloaded with dust or debris. Periodically clean the radiator fins with compressed air. Cleaning inside the machine is dangerous, so clean only with the engine turned off and the **negative** battery terminal disconnected.

AIR CLEANER

Periodic cleaning/replacement is necessary. Inspect it in accordance with the **ISUZU Engine Owner's Manual**.

FAN BELT TENSION

A slack fan belt may contribute to overheating, or to insufficient charging of the battery. Inspect the fan belt for damage and wear and adjust it in accordance with the **ISUZU Engine Owner's Manual.**

The fan belt tension is proper if the fan belt bends 10 to 15 mm (Figure 37) when depressed with the thumb as shown below.

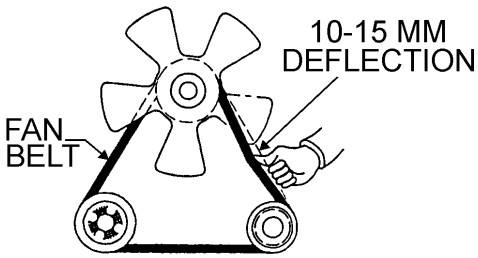


Figure 37. Fan Belt Tension

⚠ CAUTION

NEVER place hands near the belts or fan while the generator set is running.

BATTERY

This unit is of negative ground **DO NOT** connect in reverse. Always maintain battery fluid level between the specified marks. Battery life will be shortened, if the fluid level are not properly maintained. Add only distilled water when replenishment is necessary.

DO NOT over fill. Check to see whether the battery cables are loose. Poor contact may result in poor starting or malfunctions. **Always** keep the terminals firmly tightened. Coating the terminals with an approved battery terminal treatment compound. Replace battery with only recommended type battery.

The battery is sufficiently charged if the specific gravity of the battery fluid is 1.28 (at 68° F). If the specific gravity should fall to 1.245 or lower, it indicates that the battery is dead and needs to be recharged or replaced.

Before charging the battery with an external electric source, be sure to disconnect the battery cables.

Battery Cable Installation

ALWAYS be sure the battery cables (Figure 38) are properly connected to the battery terminals as shown below. The **red cable** is connected to the positive terminal of the battery, and the **black cable** is connected to the negative terminal of the battery.

⚠ CAUTION

ALWAYS disconnect the negative terminal **FIRST** and reconnect negative terminal **LAST**.

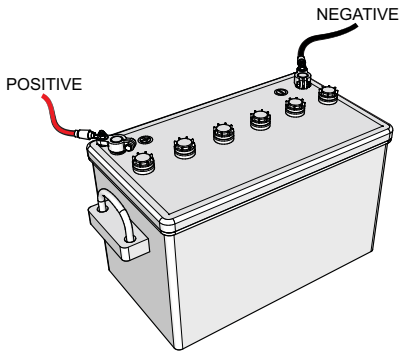


Figure 38. Battery Connections

When connecting battery do the following:

1. **NEVER** connect the battery cables to the battery terminals when the **MPEC Control Switch** is in either the **MANUAL** position. **ALWAYS** make sure that the **MPEC Control Switch** is in the **OFF/RESET** position when connecting the battery.
2. Place a small amount of battery terminal treatment compound around both battery terminals. This will ensure a good connection and will help prevent corrosion around the battery terminals.

NOTICE

If the battery cable is connected incorrectly, electrical damage to the generator will occur. Pay close attention to the polarity of the battery when connecting the battery.

⚠ CAUTION

Inadequate battery connections may cause poor starting of the generator, and create other malfunctions.

ALTERNATOR

The polarity of the alternator is negative grounding type. When an inverted circuit connection takes place, the circuit will be in short circuit instantaneously resulting the alternator failure.

DO NOT put water directly on the alternator. Entry of water into the alternator can cause corrosion and damage the alternator.

WIRING

Inspect the entire generator for bad or worn electrical wiring or connections. If any wiring or connections are exposed (insulation missing) replace wiring immediately.

PIPING AND HOSE CONNECTION

Inspect all piping, oil hose, and fuel hose connections for wear and tightness. Tighten all hose clamps and check hoses for leaks.

If any hose (**fuel or oil**) lines are defective replace them immediately.

BEFORE STARTING

⚠ CAUTION

The engine's exhaust contains harmful emissions. **ALWAYS have adequate ventilation when operating.** Direct exhaust away from nearby personnel.

⚠ WARNING

NEVER manually start the engine with the **main, GFCI or auxiliary** circuit breakers in the **ON** (closed) position.

1. Place the **main, G.F.C.I., and aux.** circuit breakers (Figure 39) in the **OFF** position prior to starting the engine.

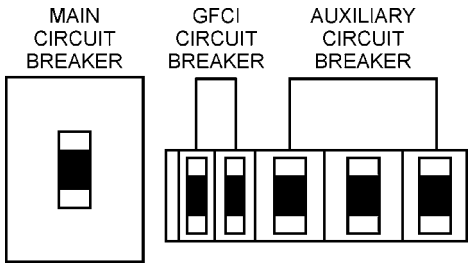


Figure 39. Main, Aux. and GFCI Circuit Breakers (OFF)

2. Make sure the **voltage change-over board** has been configured for the desired output voltage.
3. Connect the load to the **receptacles** or the **output terminal lugs** as shown in Figure 10. These load connection points can be found on the output terminal panel and the output terminal panel's hard wire hookup panel.
4. Tighten terminal nuts securely to prevent load wires from slipping out.
5. Close all engine enclosure doors (Figure 40).

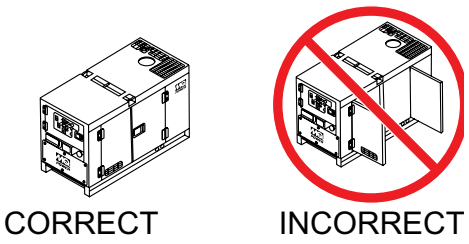


Figure 40. Engine Enclosure Doors

STARTING

1. Place the ***voltage selector switch*** in the desired voltage position (Figure 41)..

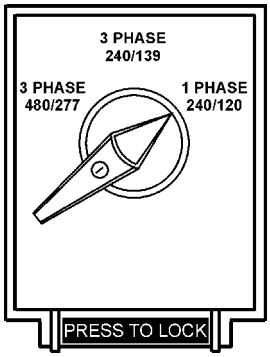


Figure 41. Voltage Selector Switch

STARTING (MANUAL)

1. Place the engine speed switch (Figure 42) in the **LOW** (down) position.

Figure 42. Engine Speed Switch (Low)

2. Located in the control box is the engine controller ***diagnostic switch*** (Figure 43). Verify that this switch has been placed in the **OFF** position (down).

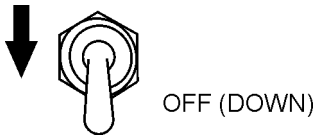


Figure 43. Diagnostic Switch

3. Place the **MPEC control switch** in the **MANUAL** position to start the engine (Figure 44).

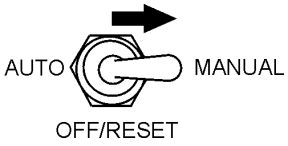


Figure 44. MPEC Control Switch (Manual Position)

4. Depending on the temperature of the coolant (cold weather conditions), the pre-heat lamp (Figure 45) will light (**ON**) and remain on until the pre-heating cycle has been completed. After completion of the pre-heating cycle, the light will go **OFF** and the engine will start up automatically.

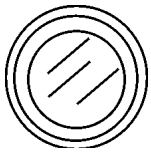


Figure 45. Pre-Heat Lamp

5. Once the engine starts, let the engine run for 1-2 minutes. Listen for any abnormal noises. If any abnormalities exist, shut down the engine and correct the problem. If the engine is running smoothly, place the engine speed switch (Figure 46) in the **HIGH** (up) position.

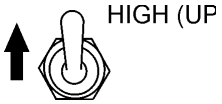


Figure 46. Engine Speed Switch (High)

6. Verify that the Engine Running status LED on the MPEC unit (Figure 47) in ON (lit) after the engine has been started

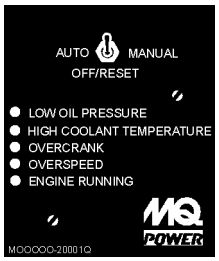


Figure 47. Engine Running LED (ON)

7. The generator's frequency meter (Figure 48) should be displaying the 60 cycle output frequency in **HERTZ.**

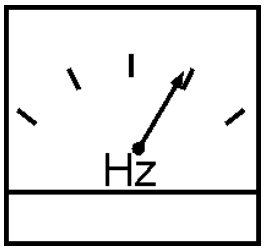


Figure 48. Frequency Meter

8. The generator's AC-voltmeter (Figure 49) will display the generator's output in **VOLTS**.

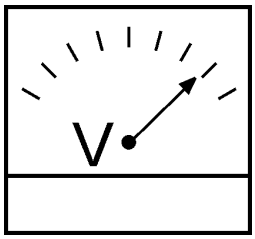


Figure 49. Voltmeter

9. If the voltage is not within the specified tolerance, use the voltage adjustment control knob (Figure 50) to increase or decrease the desired voltage.

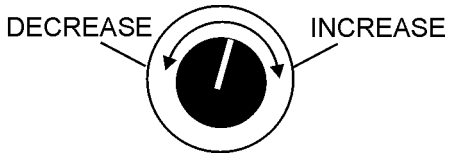


Figure 50. Voltage Adjust Control Knob

10. The ammeter (Figure 51) will indicate **zero amps** with no load applied. When a load is applied, the ammeter will indicate the amount of current that the load is drawing from the generator.

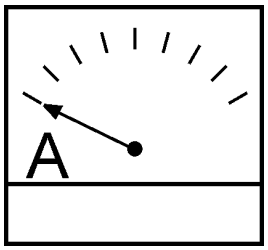


Figure 51. Ammeter (No Load)

11. The engine oil pressure gauge (Figure 52) will indicate the oil pressure of the engine. Under normal operating conditions the oil pressure is approximately 42 to 71 psi. (290~490 kPa).

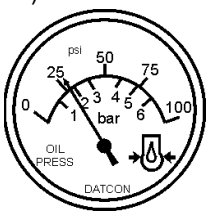


Figure 52. Oil Pressure Gauge

12. The **coolant temperature gauge** (Figure 53) will indicate the coolant temperature. Under normal operating conditions the coolant temperature should be between 167°~203°F (75°~95°C) (**Green Zone**).

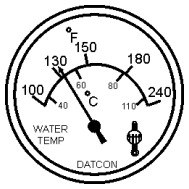


Figure 53. Coolant Temperature Gauge

13. The **tachometer gauge** (Figure 54) will indicate the speed of the engine when the generator is operating. Under normal operating conditions this speed is approximately 1800 RPM's.

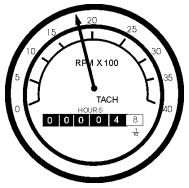


Figure 54. Engine Tachometer Gauge

14. Place the **main, GFCI, and aux.** circuit breakers in the **ON** position (Figure 55).

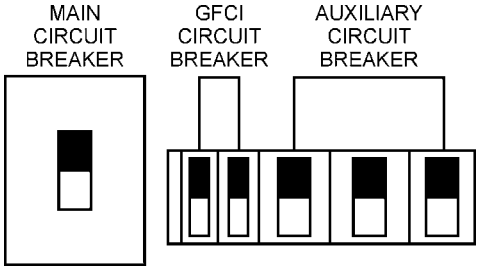


Figure 55. Main, Aux. and GFCI Circuit Breakers (ON)

15. Observe the generator's ammeter (Figure 56) and verify it reads the anticipated amount of current with respect to the load. The ammeter will only display a current reading if a load is in use.

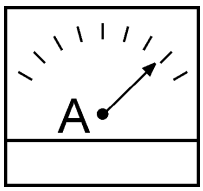


Figure 56. Ammeter (Load)

16. The generator will run until manually stopped or an abnormal condition occurs.

⚠ WARNING

NEVER stop the engine suddenly except in an emergency.

NORMAL SHUTDOWN PROCEDURE

To shutdown the generator, use the following procedure:

1. Place both the **MAIN, GFCI and LOAD** circuit breakers as shown in Figure 57 to the **OFF** position..

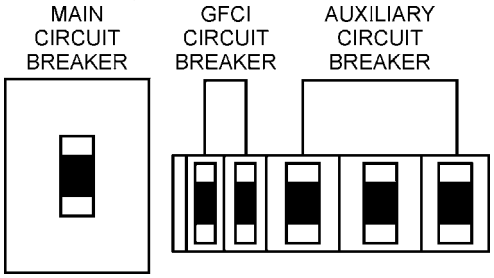


Figure 57. Main, GFCI and Load Circuit Breakers Off

2. Place the engine speed switch (Figure 58) in the "**LOW**" (down) position..

Figure 58. Ignition Switch (Normal)

3. Let the engine cool by running it at low speed for 3-5 minutes with no load applied.
4. Place the **MPEC Control Switch** (Figure 59) to the **OFF/RESET** position.

Figure 59. MPEC Control Switch (Off/Reset)

5. Verify that **all** status LEDs on the MPEC display are **OFF** (not lit).
6. Remove all loads from the generator.
7. Inspect entire generator for any damage or loosening of components that may have occurred during operation.

EMERGENCY SHUTDOWN PROCEDURE

1. Place the **MPEC Control Switch** (Figure 59) in the **OFF/RESET** position.

	Table 14. Inspection/Maintenance	10 Hrs DAILY	250 Hrs	500 Hrs	1000 Hrs
Engine	Check Engine Fluid Levels	X			
	Check Air Cleaner	X			
	Check Battery Acid Level	X			
	Check Fan Belt Condition	X			
	Check for Leaks	X			
	Check for Loosening of Parts	X			
	Replace Engine Oil and Filter * [1]		X		
	Clean Air Filter		X		
	Check Fuel Filter/Water Separator Bowl	X			
	Clean Unit, Inside and Outside		X		
	Change Fuel Filter			X	
	Clean Radiator and Check Coolant Protection Level*[2]			X	
	Replace Air Filter Element * [3]			X	
	Check all Hoses and Clamps * [4]				X
	Clean Inside of Fuel Tank				X
Generator	Measure Insulation Resistance Over 3M ohms		X		
	Check Rotor Rear Support Bearing			X	

*[1] Replace engine oil and filter at 100 hours, first time only.

*[2] Add "Supplemental Coolant Additives (SCA'S)" to recharge the engine coolant.

*[3] Replace primary air filter element when restriction indicator shows a vacuum of 625 mm (25 in. H20).

*[4] If blowby hose needs to be replaced, ensure that the slope of the blowby hose is at least a 1/2 inch per foot, with no sags or dips that could collect moisture and/or oil.

GENERAL INSPECTION

Prior to each use, the generator should be cleaned and inspected for deficiencies. Check for loose, missing or damaged nuts, bolts or other fasteners. Also check for fuel, oil, and coolant leaks. Use Table 14 as a general maintenance guideline. **Engine Side**, refer to the Engine Instruction Manual.

AIR CLEANER

Every 250 hours: Remove air cleaner element (Figure 60) and clean the heavy duty paper element with light spray of compressed air. Replace the air cleaner as needed.

Air Cleaner with Dust Indicator

This indicator (Figure 60) is attached to the air cleaner. When the air cleaner element is clogged, air intake restriction becomes greater and the dust indicator signal shows **RED** meaning the element needs changing or service. After changing the air element, press the dust indicator button to reset the indicator.

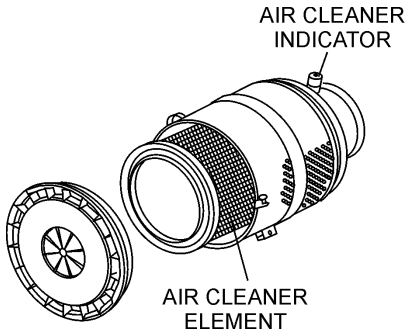


Figure 60. Air Cleaner/Indicator

NOTICE

The air filter should not be changed until the indicator reads **"RED"**. Dispose of old air filter. It may not be cleaned or reused.

If the engine is operating in very **dusty** or **dry grass** conditions, a clogged air cleaner will result. This can lead to a loss of power, excessive carbon buildup in the combustion chamber and high fuel consumption. Change air cleaner more **frequently** if these conditions exists.

FUEL ADDITION

Add diesel fuel (the grade may vary according to season and locations).

Removing Water from the Fuel Tank

After prolonged use, water and other impurities accumulate in the bottom of the tank. Occasionally inspect the fuel tank for water contamination and drain the contents if required.

During cold weather, the more empty volume inside the tank, the easier it is for water to condense. This can be reduced by keeping the tank full with diesel fuel.

Cleaning Inside the Fuel Tank

If necessary, drain the fuel inside the fuel tank completely. Using a spray washer (Figure 61) wash out any deposits or debris that have accumulated inside the fuel tank.

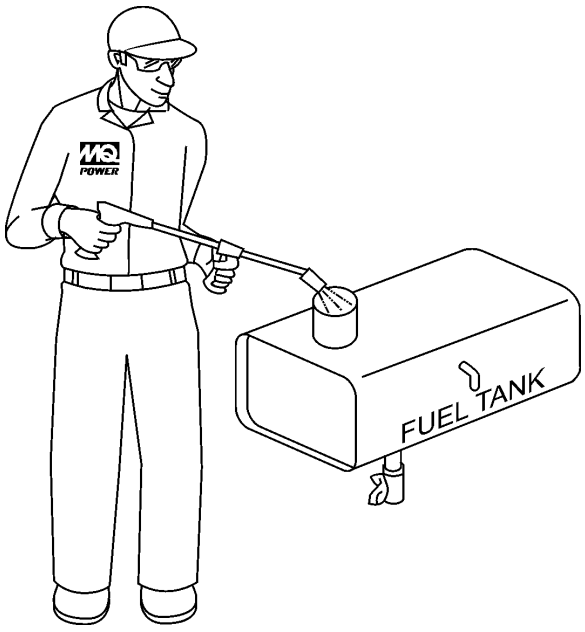


Figure 61. Fuel Tank Cleaning

FUEL TANK INSPECTION

In addition to cleaning the fuel tank, the following components should be inspected for wear:

- **Rubber Suspension** — look for signs of wear or deformity due to contact with oil. Replace the rubber suspension if necessary.
- **Fuel Hoses** — inspect nylon and rubber hoses for signs of wear, deterioration and hardening.
- **Fuel Tank Lining** — inspect the fuel tank lining for signs of excessive amounts of oil or other foreign matter.

Replacing Fuel Filter

- Replace the fuel filter cartridge with new one every 500 hours or so.
- Loosen the drain plug at the lower top of the fuel filter. Drain the fuel in the fuel body together with the mixed water. **DO NOT** spill the fuel during disassembly.
- Vent any air

AIR REMOVAL

If air enters the fuel injection system of a diesel engine, starting becomes impossible. After running out of fuel, or after disassembling the fuel system, bleed the system according to the following procedure. See the **ISUZU Engine Manual** for details.

To restart after running out of fuel, turn the switch to the "ON" position for 15-30 seconds. Try again, if needed.

CHECK OIL LEVEL

Check the crankcase oil level prior to each use, or when the fuel tank is filled. Insufficient oil may cause severe damage to the engine. Make sure the generator is level. The oil level must be between the two notches on the dipstick as shown in Figure 31.

Replacing Oil Filter

- Remove the old oil filter.
- Apply a film of oil to the gasket on the new oil filter.
- Install the new oil filter.
- After the oil cartridge has been replaced, the engine oil will drop slightly. Run the engine for a while and check for leaks before adding more oil if needed. Clean excessive oil from engine.

FLUSHING OUT RADIATOR AND REPLACING COOLANT

- Open both cocks located at the crankcase side and at the lower part of the radiator and drain coolant. Open the radiator cap while draining. Remove the overflow tank and drain.
- Check hoses for softening and kinks. Check clamps for signs of leakage.
- Tighten both cocks and replace the overflow tank.
- Replace with coolant as recommended by the engine manufacturer.
- Close radiator cap tightly.
- Flush the radiator by running clean tap water through radiator until signs of rust and dirt are removed. **DO NOT** clean radiator core with any objects, such as a screwdriver.

⚠ WARNING

Allow engine to **cool** when flushing out radiator. Flushing the radiator while hot could cause serious burns from water or steam.

RADIATOR CLEANING

The radiator (Figure 62) should be sprayed (cleaned) with a high pressure washer when excessive amounts of dirt and debris have accumulated on the cooling fins or tube. When using a high pressure washer, stand at least 5 feet (1.5 meters) away from the radiator to prevent damage to the fins and tube.

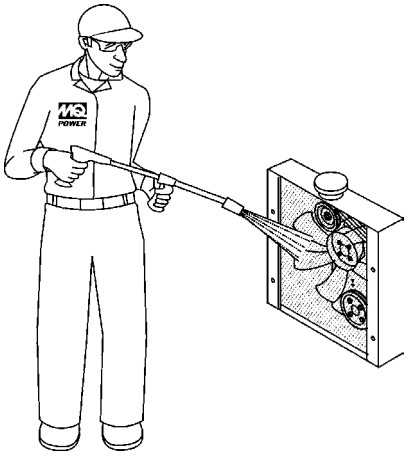


Figure 62. Radiator Cleaning

GENERATOR STORAGE

For long term storage of the generator the following is recommended:

- Drain the fuel tank completely. Treat with a fuel stabilizer if necessary.
- Completely drain the oil from the crankcase and refill if necessary with fresh oil.
- Clean the entire generator, internal and external.
- Cover the generating set and store in a clean, dry place.
- Disconnect the battery.
- Make sure engine coolant is at proper level.
- If generator is mounted on a trailer, jack trailer up and place on blocks so tires do not touch the ground or block and completely remove the tires.

JACKET WATER HEATER AND INTERNAL BATTERY CHARGER 120 VAC INPUT RECEPTACLES (OPTIONAL)

This generator can be optionally equipped with two 120 VAC, 20 amp input receptacles located on the output terminal panel.

The purpose of these receptacles is to provide power via commercial power to the jacket water heater and internal battery charger.

These receptacles will ONLY function when commercial power has been supplied to them (Figure 63). To apply commercial power to these receptacles, a power cord of adequate size will be required (See Table 6).

When using the generator in hot climates there is no reason to apply power to jacket water heater. However, if the generator will be used in cold climates it is always a good idea to apply power to the jacket water heater at all times. To apply power to the jacket water heater simply apply power to the jacket water heater receptacle via commercial power using an power cord of adequate size.

If the generator will be used daily, the battery should normally not require charging. If the generator will be idle (not used) for long periods of time, apply power to the battery charger receptacle via commercial power using an power cord of adequate size.

NOTICE

To ensure adequate starting capability, always have power applied to the generator's internal battery charger..

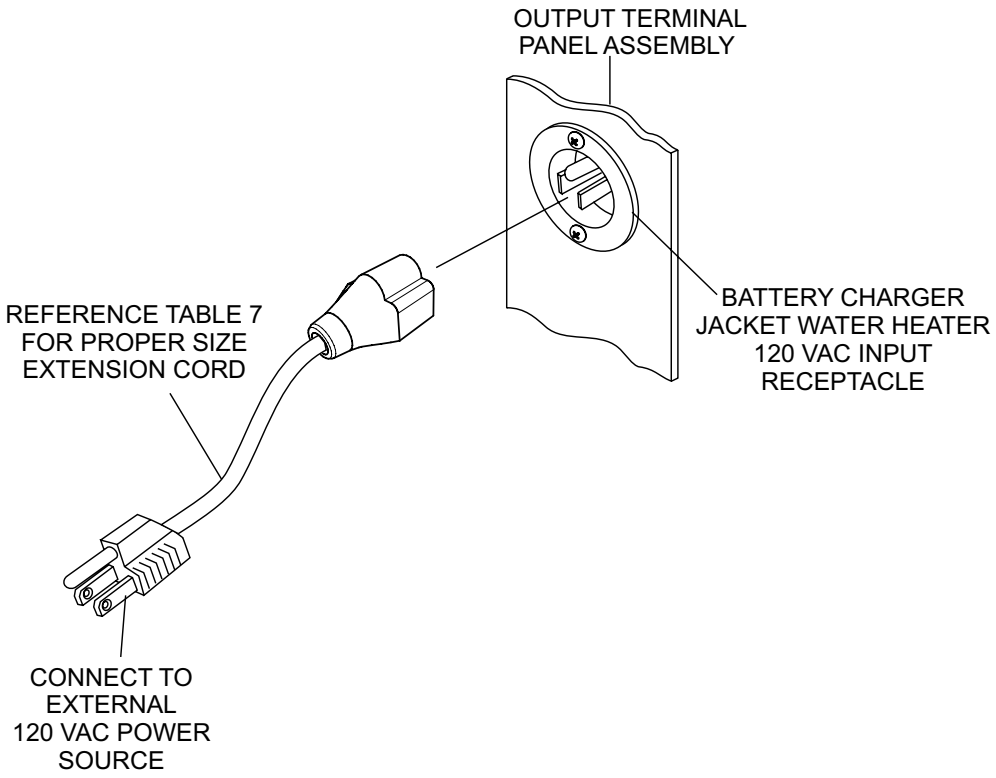


Figure 63. Battery Charger & Jacket Water Heater Power Connections

The following trailer maintenance guidelines are intended to assist the operator in preventive maintenance.

TRAILER BRAKES

Properly functioning brake shoes and drums are essential to ensure safety. The brakes should be inspected the first 200 miles of operation. This will allow the brake shoes and drums to seat properly. After the first 200 mile interval, inspect the brakes every 3,000 miles. If driving over rough terrain, inspect the brakes more frequently.

HYDRAULIC BRAKES

If your trailer has hydraulic brakes, they function the same way the surge brakes do on your tow vehicle. The hydraulic braking system must be inspected at least as often as the brakes on the tow vehicle, but no less than once per year. This inspection includes an assessment of the condition and proper operation of the wheel cylinders, brake shoes, brake drums and hubs.

MANUALLY ADJUSTING THE BRAKES

Most axles are fitted with a brake mechanism that will adjust the brakes during a hard stop. However, some braking systems are not automatically adjusted by hard stopping. These brakes require manual adjustment. The following steps apply to adjust most manually adjustable brakes.

1. Jack up the trailer and secure it on adequate capacity jackstands.
2. Be sure the wheel and brake drum rotate freely.
3. Remove the adjusting-hole cover from the adjusting slot on the bottom of the brake backing plate.
4. With a screwdriver or standard adjusting tool, rotate the starwheel of the adjuster assembly to expand the brake shoes. Adjust the brake shoes out until the pressure of the linings against the drum makes the wheel very difficult to turn. Note: Your trailer maybe equipped with drop spindle axles. See axle manual for your axle type. You will need a modified adjusting tool for adjusting the brakes in these axles. With drop spindle axles, a modified adjusting tool with about an 80 degree angle should be used.
5. Rotate the starwheel in the opposite direction until the wheel turns freely with a slight drag.
6. Replace the adjusting-hole cover.
7. Repeat the above procedure on all brakes.
8. Lower the trailer to the ground.

Check the fluid level in the master cylinder reservoir at least every three months. If you tow your trailer an average of 1,000 miles per month in a hot and dry environment, you must check the brake fluid level once a month. The brake fluid reservoir is located on the tongue of the trailer. Always fill with clean, uncontaminated DOT 4 brake fluid.

Figure 64 below displays the major hydraulic brake components that will require inspection and maintenance. Please inspect these components as required using steps 1 through 6 as referenced in the “Manually Adjusting The Brakes” section on this page. See Table 1 for Hydraulic Brake Troubleshooting.

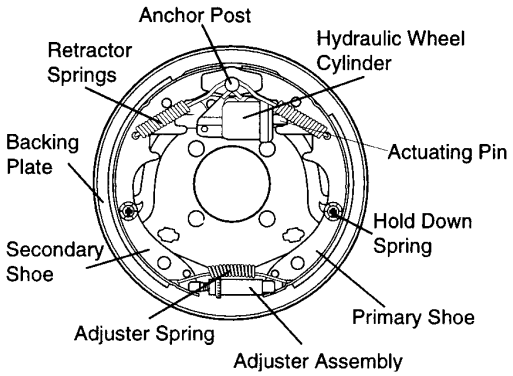


Figure 64. Hydraulic Brake Components

HYDRAULIC BRAKE ACTUATOR

The hydraulic brake actuator (Figure 65) is the mechanism that activates the trailer’s brake system. This actuator changes fluid power into mechanical power. Therefore, the fluid level must be checked frequently to assure that the brakes function properly.

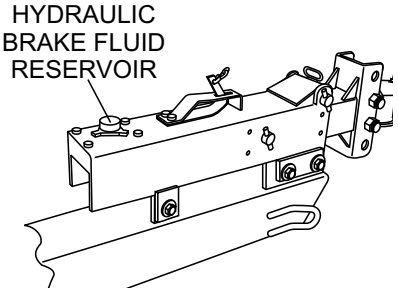


Figure 65. Hydraulic Brake Actuator

⚠ WARNING

Failure to maintain proper fluid level in the actuator may result in loss of braking action which could cause severe property damage, injury or death.

Periodically check the actuator mounting fasteners for damage or loosening. Inspect the actuator for worn or damaged parts. As you are towing your trailer, be aware of any changes in braking quality. This could be an early warning of brake or actuator malfunction and requires immediate attention. Consult a certified brake specialist to make necessary adjustment or repairs.

Table 15. Hydraulic Brake Troubleshooting

Symptom	Possible Cause	Solution
No Brakes	Brake line broken or kinked?	Repair or replace.
Weak Brakes or Brakes Pull to One Side	Brake lining glazed?	Reburnish or replace.
	Trailer overloaded?	Correct weight.
	Brake drums scored or grooved?	Machine or replace.
	Tire pressure correct?	Inflate all tires equally.
	Tires unmatched on the same axle?	Match tires.
Locking Brakes	Brake components loose, bent or broken?	Replace components.
	Brake drums out-of-round?	Replace.
Noisy Brakes	System lubricated?	Lubricate.
	Brake components correct?	Replace and correct.
Dragging Brakes	Brake lining thickness incorrect or not adjusted correctly?	Install new shoes and linings.
	Enough brake fluid or correct fluid?	Replace rubber parts fill with dot 4 fluid.

ADJUSTABLE CHANNEL

Your trailer may be equipped with an adjustable channel (Figure 66) that allows the coupler to be raised or lowered to a desired height. Periodically check the channel bolts for damage or loosening.

NOTICE

When replacing channel mounting hardware (nuts, bolts and washers), **NEVER** substitute substandard hardware. Pay close attention to ***bolt length*** and ***grade***. **ALWAYS** use manufacturer's recommended parts when replacing channel mounting hardware.

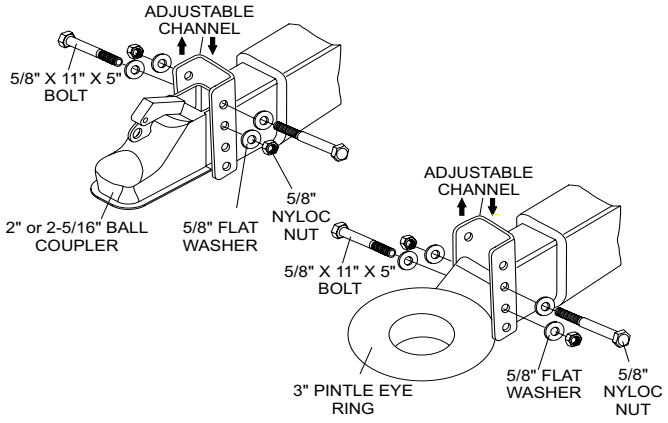


Figure 66. Adjustable Channel

Wheel Bearings

Wheel bearings (Figure 67) must be inspected and lubricated once a year or 12,000 miles to insure safe operation of your trailer.

If trailer wheel bearings are immersed in water, they must be replaced.

⚠ DANGER

If trailer wheels are under water for a long period of time, wheel bearings may fail. If this is the case, service wheel bearings immediately.

The possibility exists of the wheels falling off causing equipment damage and severe bodily harm even death!

If the trailer has not been used for an extended amount of time, have the bearings inspected and packed more frequently, at least every six months and prior to use.

Follow the steps below to disassemble the wheel hub and service the wheel bearings. See Figure 67.

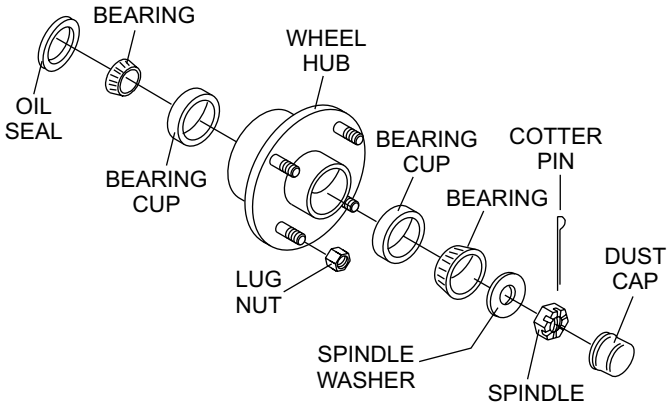


Figure 67. Wheel Hub Components

- After removing the dust cap, cotter pin, spindle nut and spindle washer, remove the hub to inspect the bearings for wear and damage.
- Replace bearings that have flat spots on rollers, broken roller cages, rust or pitting. Always replace bearings and cups in sets. The inner and outer bearings are to be replaced at the same time.
- Replace seals that have nicks, tears or wear.
- Lubricate the bearings with a high quality EP-2 automotive wheel bearing grease.

WHEEL HUB ADJUSTMENT

Every time the wheel hub is removed and the bearings are reassembled, follow the steps below to check the wheel bearings for free running and adjust.

- Turn the hub slowly, by hand, while tightening the spindle nut until you can no longer turn the hub by hand.
- Loosen the spindle nut just until you are able to turn it (the spindle nut) by hand. Do not turn the hub while the spindle nut is loose.
- Install a new cotter pin through the spindle nut and axle.
- Check the adjustments. Both the hub and the spindle nut should be able to move freely (the spindle nut motion will be limited by the cotter pin).

DANGER

NEVER crawl under the trailer unless it is on firm and level ground and resting on properly placed and secured jackstands.

The possibility exists of the trailer falling thus causing equipment damage and severe bodily harm even death!

DANGER

When performing trailer inspection and maintenance activities, you must jack up the trailer using jacks and jackstands.

When jacking and using jackstands, place them so as to clear wiring, brake lines, and suspension parts (i.e., springs, torsion bars). Place jacks and jackstands inside of the perimeter strip on the supporting structure to which the axles are attached.

DANGER

Improper weld repair will lead to early failure of the trailer structure and can cause serious injury or death.

DO NOT repair cracked or broken welds unless you have a certified welder perform the repair. If not, have the welds repaired by your dealer.

WARNING

If the trailer is involved in an accident, have it inspected immediately by qualified personnel. In addition, the trailer should be inspected annually for signs of wear or deformations.

LEAF SUSPENSION

The leaf suspension springs and associated components (Figure 68) should be visually inspected every 6,000 miles for signs of excessive wear, elongation of bolt holes, and loosening of fasteners. Replace all damaged parts (suspension) immediately.

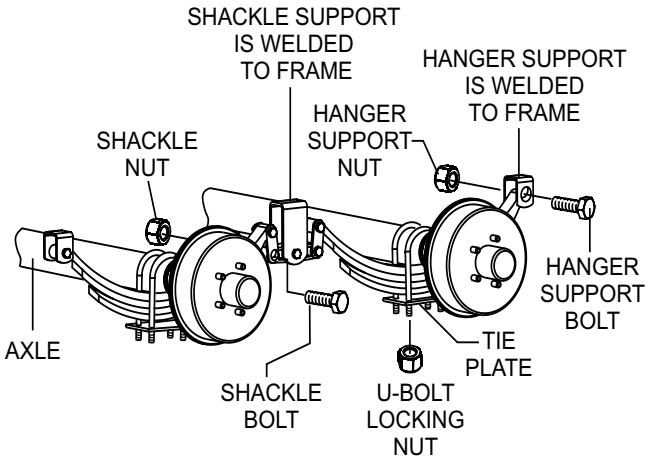


Figure 68. Leaf Suspension Components

DANGER

Worn or broken suspension parts can cause loss of control, damage to equipment and severe bodily injury, even death!

Check suspension regularly.

The following guidelines are intended to assist the operator in the operation and handling of a trailer.

Safety precautions should be followed at all times when operating a trailer. Failure to read, understand and follow the safety guidelines could result in injury to yourself and others. Loss of control of the trailer or tow vehicle can result in death or serious injury.

COMMON CAUSES FOR LOSS OF TRAILER

- Driving too fast for the conditions (maximum speed when towing a trailer is 55 mph).
- Overloading the trailer or loading the trailer unevenly.
- Trailer improperly coupled to the hitch.
- No braking on trailer.
- Not maintaining proper tire pressure.
- Not keeping lug nuts tight.
- Not properly maintaining the trailer structure.
- Ensure machine is towed level to tow vehicle.

TRAILER TOWING GUIDELINES

- Recheck the load tiedowns to make sure the load will not shift during towing.
- Before towing, check coupling, safety chain, safety brake, tires, wheels and lights.
- Check the lug nuts or bolts for tightness.
- Check coupler tightness after towing 50 miles.
- Use your mirrors to verify that you have room to change lanes or pull into traffic.
- Use your turn signals well in advance. Allow plenty of stopping space for your trailer and tow vehicle.
- Allow plenty of stopping space for your trailer and tow vehicle.
- **DO NOT** drive so fast that the trailer begins to sway due to speed.
- Allow plenty of room for passing. A rule of thumb is that the passing distance with a trailer is 4 times the passing distance without the trailer.
- Shift your automatic transmission into a lower gear for city driving.
- **ALWAYS** use lower gears for climbing and descending grades.
- **DO NOT** ride the brakes while descending grades, they may get so hot that they stop working. Then you will potentially have a runaway tow vehicle and trailer.
- To conserve fuel, don't use full throttle to climb a hill. Instead, build speed on the approach.
- Slow down for bumps in the road. Take your foot off the brake when crossing the bump.
- **DO NOT** brake while in a curve unless absolutely necessary. Instead, slow down before you enter the curve and power through the curve. This way, the towing vehicle remains in charge.
- **DO NOT** apply the brakes to correct extreme trailer swaying. Continued pulling of the trailer, and even slight acceleration, will provide a stabilizing force.
- Anticipate the trailer "swaying." Swaying is the trailer reaction to the air pressure wave caused by passing trucks and buses. Continued pulling of the trailer provides a stabilizing force to correct swaying. DO NOT apply the brakes to correct trailer swaying.
- Use lower gear when driving down steep or long grades. Use the engine and transmission as a brake. Do not ride the brakes, as they can overheat and become ineffective.
- Be aware of your trailer height, especially when approaching roofed areas and around trees.
- Make regular stops, about once each hour. Confirm that:
  - Coupler is secure to the hitch and is locked.
  - Electrical connectors are secure.
  - There is appropriate slack in the safety chains.
  - There is appropriate slack in the breakaway switch pullpin cable.
  - Tires are not visibly low on pressure.

DRIVING CONDITIONS

When towing a trailer, you will have decreased acceleration, increased stopping distance, and increased turning radius (which means you must make wider turns to keep from hitting curbs, vehicles, and anything else that is on the inside corner). In addition, you will need a longer distance to pass, due to slower acceleration and increased length.

- Be alert for slippery conditions. You are more likely to be affected by slippery road surfaces when driving a tow vehicle with a trailer, than driving a tow vehicle without a trailer.
- Check rearview mirrors frequently to observe the trailer and traffic.
- **NEVER** drive faster than what is safe.

WARNING

Driving too fast for severe road conditions can result in loss of control and cause death or serious injury.

Decrease your speed as road, weather, and lighting conditions deteriorate.

Always check for local trailer tow speed limits in your area.

WARNING

Do not transport people on the trailer. The transport of people puts their lives at risk and may be illegal.

COUPLING TO THE TOW VEHICLE

Follow all of the safety precautions and instructions in this manual to ensure safety of persons, equipment, and satisfactory life of the trailer. Always use an adequate tow vehicle and hitch. If the vehicle or hitch is not properly selected and matched to the Gross Vehicle Weight Rating (GVWR) of your trailer, you can cause an accident that could lead to death or serious injury.

If you already have a tow vehicle, know your vehicle tow rating and make certain the trailer's rated capacity is less than or equal to the tow vehicle's rated towing capacity. If you already have (or plan to buy) a trailer, make certain that the tow rating of the tow vehicle is equal to or greater than that of the trailer.

The trailer VIN tag contains the critical safetyinformation for the use of your trailer. Again, be sure your hitch and tow vehicle are rated for the Gross Vehicle Weight Rating of your trailer.

WARNING

Proper selection and condition of the coupler and hitch are essential to safely towing your trailer. A loss of coupling may result in death or serious injury.

- Be sure the hitch load rating is equal to or greater than the load rating of the coupler.
- Be sure the hitch size matches the coupler size.
- Observe the hitch for wear, corrosion and cracks before coupling. Replace worn, corroded or cracked hitch components before coupling the trailer to the tow vehicle.
- Be sure the hitch components are tight before coupling the trailer to the tow vehicle.

WARNING

An improperly coupled trailer can result in death or serious injury.

DO NOT move the trailer until:

- The coupler is secured and locked to hitch.
- The safety chains are secured to the tow vehicle.
- The trailer jack(s) are fully retracted.

DO NOT tow the trailer on the road until:

- Tires and wheels are checked.
- The trailer brakes are checked.
- The breakaway switch is connected to the tow vehicle.
- The load is secured to the trailer.
- The trailer lights are connected and checked.

WARNING

Use of a hitch with a load rating less than the load rating of the trailer can result in loss of control and may lead to death or serious injury.

Use of a tow vehicle with a towing capacity less than the load rating of the trailer can result in loss of control, and may lead to death or serious injury.

Be sure your hitch and tow vehicle are rated for the Gross Vehicle Weight Rating of your trailer.

INOPERABLE BRAKES, LIGHTS OR MIRRORS

Be sure that the brakes and all of the lights on your trailer are functioning properly before towing your trailer. Check the trailer taillights by turning on your tow vehicle headlights. Check the trailer brake lights by having someone step on the tow vehicle brake pedal while you look at trailer lights. Do the same thing to check the turn signal lights. See Trailer Wiring Diagram section in this manual.

Standard mirrors usually do not provide adequate visibility for viewing traffic to the sides and rear of a towed trailer. You must provide mirrors that allow you to safely observe approaching traffic.

⚠ WARNING

Improper electrical connection between the tow vehicle and the trailer will result in inoperable lights and can lead to collision.

Before each tow, check that the tail lights, brake lights and turn signals work.

TRAILER TOWING TIPS

Driving a vehicle with a trailer in tow is vastly different from driving the same vehicle without a trailer in tow. Acceleration, maneuverability and braking are all diminished with a trailer in tow.

It takes longer to get up to speed, you need more room to turn and pass, and more distance to stop when towing a trailer. You will need to spend time adjusting to the different feel and maneuverability of the tow vehicle with a loaded trailer.

Because of the significant differences in all aspects of maneuverability when towing a trailer, the hazards and risks of injury are also much greater than when driving without a trailer. You are responsible for keeping your vehicle and trailer in control, and for all the damage that is caused if you lose control of your vehicle and trailer.

As you did when learning to drive an automobile, find an open area with little or no traffic for your first practice trailering. Of course, before you start towing the trailer, you must follow all of the instructions for inspection, testing, loading and coupling. Also, before you start towing, adjust the mirrors so you can see the trailer as well as the area to the rear of it.

Drive slowly at first, 5 mph or so, and turn the wheel to get the feel of how the tow vehicle and trailer combination responds. Next, make some right and left hand turns. Watch in your side mirrors to see how the trailer follows the tow vehicle. Turning with a trailer attached requires more room.

Stop the rig a few times from speeds no greater than 10 mph. If your trailer is equipped with brakes, try using different combinations of trailer brake and tow vehicle brake. Note the effect that the trailer brakes have when they are the only brakes used. When properly adjusted, the trailer brakes will come on just before the tow vehicle brakes.

It will take practice to learn how to back up a tow vehicle with a trailer attached. Take it slow. Before backing up, get out of the tow vehicle and look behind the trailer to make sure that there are no obstacles.

Some drivers place their hands at the bottom of the steering wheel, and while the tow vehicle is in reverse, “think” of the hands as being on the top of the wheel. When the hands move to the right (counterclockwise, as you would do to turn the tow vehicle to the left when moving forward), the rear of the trailer moves to the right. Conversely, rotating the steering wheel clockwise with your hands at the bottom of the wheel will move the rear of the trailer to the left while backing up.

If you are towing a bumper hitch rig, be careful not to allow the trailer to turn too much because it will hit the rear of the tow vehicle. To straighten the rig, either pull forward or turn the steering wheel in the opposite direction.

TRAILER VIN TAG

Figure A below is a sample of the Vehicle Identification Number (VIN) Tag which is typically located on the left front of the trailer. See Figure B for location.

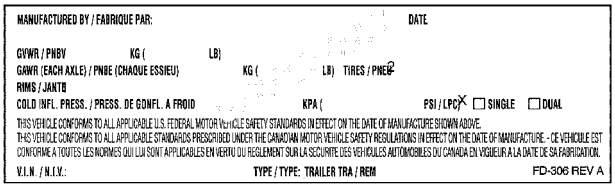


Figure A. Vehicle VIN Tag

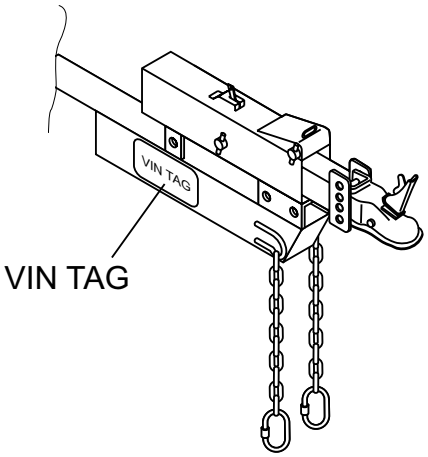


Figure B. Typical VIN Tag Location

The trailer VIN Tag contains the following critical safety information for the use of your trailer.

GAWR: The maximum gross weight that an axle cansupport. It is the lowest of axle, wheel, or tire rating.

Usually, the tire or wheel rating is lower than the axle rating, and determines GAWR.

GVWR: The maximum allowable gross weight of the trailer and its contents. The gross weight of the trailer includes the weight of the trailer and all of the items within it. GVWR is sometimes referred to as GTWR (Gross Trailer Weight Rating), or MGTW (Maximum Gross Trailer Weight). GVWR, GTWR and MGTW are all the same rating.

The sum total of the GAWR for all trailer axles may be less than the GVWR for the trailer, because some of the trailer load is to be carried by the tow vehicle, rather than by the trailer axle(s). The total weight of the cargo and trailer must not exceed the GVWR, and the load on an axle must not exceed its GAWR.

PSIC: The tire pressure (psi) measured when cold.

VIN: The Vehicle Identification Number.

EMPTY WEIGHT: Some information that comes with the trailer (such as the Manufacturer's Statement of Origin) is not a reliable source for "empty" or "net" weight. The shipping documents list average or standard weights and your trailer may be equipped with options.

To determine the "empty" or "net" weight of your trailer, weigh it on an axle scale. To find the weight of the trailer using an axle scale, you must know the axle weights of your tow vehicle without the trailer coupled. Some of the trailer weight will be transferred from the trailer to the tow vehicle axles, and an axle scale weighs all axles, including the tow vehicle axles.

TOW VEHICLE

The towing hitch attached to your tow vehicle must have a capacity equal to or greater than the load rating of the trailer you intend to tow. The hitch capacity must also be matched to the tow vehicle capacity. Your vehicle dealer can provide and install the proper hitch on your tow vehicle.

SUSPENSION SYSTEM

Sway bars, shock absorbers, heavy duty springs, heavy duty tires and other suspension components may be required to sufficiently tow the trailer and pump.

BRAKE CONTROLLER

For trailers equipped with electric brakes, the electric brake controller is part of the tow vehicle and is essential in the operation of the electric brakes on the trailer. The brake controller is not the same as the safety breakaway brake system that may be equipped on the trailer.

SIDE VIEW MIRRORS

The size of the trailer that is being towed and your state law regulations determine the size of the mirrors. However, some states prohibit extended mirrors on a tow vehicle, except while a trailer is actually being towed. In this situation, detachable extended mirrors are necessary. Check with your dealer or the appropriate state agency for mirror requirements.

HEAVY DUTY FLASHER

A Heavy Duty Flasher is an electrical component that may be required when your trailer turn signal lights are attached to the tow vehicle flasher circuit.

ELECTRICAL CONNECTOR

An Electrical Connector connects the light and brake systems on the trailer to the light and brake controls on the towing vehicle.

EMERGENCY FLARES AND TRIANGLE REFLECTORS

It is wise to carry these warning devices even if you are not towing a trailer. It is particularly important to have these when towing a trailer because the hazard flashers of your towing vehicle will not operate for as long a period of time when the battery is running both the trailer lights and tow vehicle lights.

SAFETY CHAINS

If the coupler connection comes loose, the safety chains can keep the trailer attached to the tow vehicle. With properly rigged safety chains, it is possible to keep the tongue of the trailer from digging into the road pavement, even if the coupler-to-hitch connection comes apart.

TRAILER LIGHTING AND BRAKING CONNECTOR

A device that connects electrical power from the tow vehicle to the trailer. Electricity is used to turn on brake lights, running lights, and turn signals as required. In addition, if your trailer has a separate braking system, the electrical connector will also supply power to the brakes from the tow vehicle.

BREAKAWAY SYSTEM

If the trailer coupler connection comes loose, the breakaway system can actuate emergency hydraulic brakes depending on the type of actuator on the trailer. The breakaway cable must be rigged to the tow vehicle with appropriate slack that will activate the system if the coupler connection comes loose.

JACKSTAND

A device on the trailer that is used to raise and lower the coupler. The jack is sometimes called the “landing gear” or the “tongue jack”.

COUPLER TYPES

Two types of coupler used wit the trailer are discussed below.

- Ball Hitch Coupler
- Pintel Eye Coupler

BALL HITCH COUPLER

A ball hitch coupler (Figure C) connects to a ball that is located on or under the rear bumper of tow vehicle. This system of coupling a trailer to a tow vehicle is sometimes referred to as “bumper pull.”

A ball hitch trailer may be fitted with a tongue jack that can raise and lower the coupler. The tongue jack is mounted to the A-frame (front or tongue) part of the trailer. By rotating the jack handle clockwise, the jack will extend and raise the tongue of the trailer.

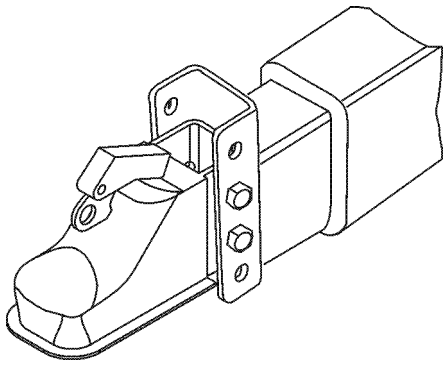


Figure C. Ball Hitch Coupler

Before each tow, coat the ball with a thin layer of automotive bearing grease to reduce wear and ensure proper operation. Check the locking device that secures the coupler to the ball for proper operation.

If you see or feel evidence of wear, such as flat spots, deformations, pitting or corrosion, on the ball or coupler, immediately have your dealer inspect them to determine the proper action to prevent possible failure of the ball and coupler system. All bent or broken coupler parts must be replaced before towing the trailer.

The coupler handle lever must be able to rotate freely and automatically snap into the latched position. Oil the pivot points, sliding surfaces, and spring ends with SAE 30W motor oil. Keep the ball socket and latch mechanism clean. Dirt or contamination can prevent proper operation of the latching mechanism.

The load rating of the coupler and the necessary ball size are listed on the trailer tongue. You must provide a hitch and ball for your tow vehicle where the load rating of the hitch and ball is equal to or greater than that of your trailer.

Also, the ball size must be the same as the coupler size. If the hitch ball is too small, too large, is underrated, is loose

or is worn, the trailer can come loose from the tow vehicle and may cause death or serious injury.

THE TOW VEHICLE, HITCH AND BALL MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN THE TRAILER **Gross Vehicle Weight Rating (GVWR)**. IT IS ESSENTIAL THAT THE HITCH BALL BE OF THE SAME SIZE AS THE COUPLER.

The ball size and load rating (capacity) are marked on the ball. Hitch capacity is marked on the hitch.

⚠ WARNING

Coupler-to-hitch mismatch can result in uncoupling, leading to death or serious injury.

Be sure the LOAD RATING of the hitch ball is equal or greater than the load rating of the coupler.

Be sure the SIZE of the hitch ball matches the size of the ball coupler.

⚠ WARNING

A worn, cracked or corroded hitch ball can fail while towing and may result in death or serious injury.

Before coupling trailer, inspect the hitch ball for wear, corrosion and cracks.

Replace worn or damaged hitch ball.

⚠ WARNING

A loose hitchball nut can result in uncoupling, leading to death or serious injury.

Be sure the hitch ball is tight to the hitch before coupling the trailer.

- Rock the ball to make sure it is tightened to the hitch, and visually check that the hitch ball nut is solid against the lock washer and hitch frame.
- Wipe the inside and outside of the coupler. Clean and visually inspect it for cracks and deformations. Feel the inside of the coupler for worn spots and pits.
- Be sure the coupler is secured tightly to the tongue of the trailer. All coupler fasteners must be visibly solid against the trailer frame.
- The bottom surface of the coupler must be above the top of the hitch ball. Use the tongue jackstand to support the trailer tongue. Wood or concrete blocks may also be used.

Coupling the Trailer to the Tow Vehicle (Ball Coupler)

- Lubricate the hitch ball and the inside of the coupler with a thin layer of automotive bearing grease.
- Slowly back up the tow vehicle so that the hitch ball is near or aligned under the coupler.
- Using the jackstand at the front of trailer (tongue), turn the jackstand crank handle to raise the trailer. If the ball coupler does not line up with the hitch ball, adjust the position of the tow vehicle.
- Open the coupler locking mechanism. Ball couplers have a locking mechanism with an internal moving piece and an outside handle. In the open position, the coupler is able to drop fully onto the hitch ball.
- Lower the trailer (Figure D) until the coupler fully engages the hitch ball.

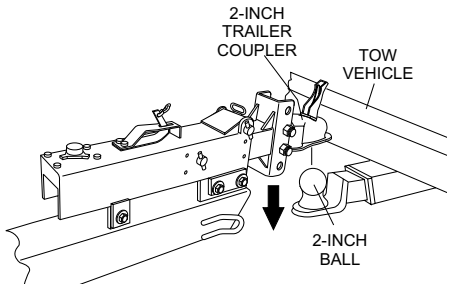


Figure D. Ball Hitch Coupling Mechanism

- Engage the coupler locking mechanism. In the engaged position, the locking mechanism securely holds the coupler to the hitch ball.
- Insert a pin or lock through the hole in the locking mechanism.
- Be sure the coupler is all the way on the hitch ball and the locking mechanism is engaged. A properly engaged locking mechanism will allow the coupler to raise the rear of the tow vehicle. Using the trailer jackstand, verify that you can raise the rear of the tow vehicle by 1 inch after the coupler is locked to the hitch.
- Lower the trailer so that its entire tongue weight is held by the hitch.
- Raise the jackstand to a height where it will not interfere with the road.

NOTICE

Overloading can damage the tongue jack. **DO NOT** use the tongue jack to raise the tow vehicle more than one inch.

If the coupler cannot be secured to the hitch ball, do not tow the trailer. Call your dealer for assistance. Lower the trailer so that its entire tongue weight is held by the hitch and continue retracting the jack to its fully retracted position.

Attaching Safety Chain

Visually inspect the safety chains and hooks for wear or damage. Replace worn or damaged safety chains and hooks before towing.

Attach the safety chains so that they:

- Cross underneath the coupler. See Figure E.

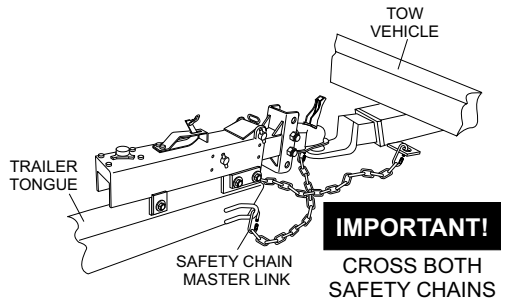


Figure E. Attaching Safety Chain (Ball Hitch)

- Loop around a frame member of the tow vehicle or holes provided in the hitch system (DO NOT attach them to an interchangeable part of the hitch assembly).
- Have enough slack to permit tight turns, but not be close to the road surface, so if the trailer uncouples, the safety chains can hold the tongue up above the road

WARNING

Improper rigging of the safety chains can result in loss of control of the trailer and tow vehicle, leading to death or serious injury, if the trailer uncouples from the tow vehicle.

- Fasten chains to frame of tow vehicle. DO NOT fasten chains to any part of the hitch unless the hitch has holes or loops specifically for that purpose.
- Cross chains underneath hitch and coupler with enough slack to permit turning and to hold tongue up, if the trailer comes loose.

Breakaway Brake System

If the coupler or hitch fails, a properly connected and working breakaway brake system (Figure F) will apply the hydraulic brakes on the trailer. The safety chains will keep the tow vehicle attached and as the brakes are applied at the trailer's axles, the trailer/tow vehicle combination will come to a controlled stop.

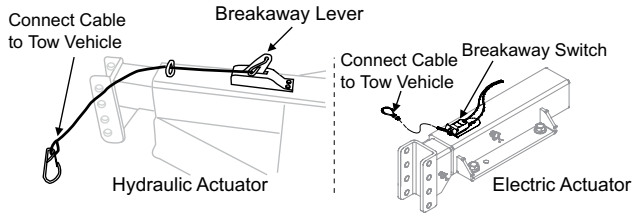


Figure F. Breakaway Brake System

Breakaway Cable Surge Brake System

The breakaway brake system includes a brake cable connected to the tow vehicle on one end and to the emergency brake lever located on the hydraulic actuator on the other end.

WARNING

- An ineffective breakaway brake system can result in a runaway trailer, leading to death or serious injury, if the coupler or ball hitch fails.
- Connect the breakaway cable to the tow vehicle and NOT to the hitch, ball or support.
- Before towing the trailer, test the function of the breakaway brake system. If the breakaway brake system is not working, DO NOT tow the trailer. Have it serviced or repaired.

NOTICE

DO NOT tow the trailer with the breakaway brake system ON because the brakes will overheat which can result in permanent brake failure.

NOTICE

Replace the breakaway brake battery (if equipped) at intervals specified by manufacturer.

Connecting Trailer Lights

Connect the trailer lights to the tow vehicle's electrical system using the electric connectors at the front of the trailer (tongue). Refer to the wiring diagram shown in the trailer wiring diagram section of this manual. Before towing the trailer check for the following:

- Running lights (turn on tow vehicle headlights).
- Brake Lights (step on tow vehicle brake pedal).
- Backup Lights (place tow vehicle gear shift in reverse).
- Turn Signals (activate tow vehicle directional signal lever).

⚠ WARNING

Improper electrical connection between the tow vehicle and the trailer will result in inoperable lights and electric brakes, and can lead to collision.

Before each tow:

- Check that the taillights, brake lights and turn signals work.
- Check that the electric brakes work by operating the brake controller inside the tow vehicle.

Uncoupling the Ball Hitch

Follow these steps to uncouple ball hitch from tow vehicle:

- Block trailer tires to prevent the trailer from rolling, before jacking the trailer up.
- Disconnect the electrical connector.
- Disconnect the breakaway brake switch cable. Promptly replace the pullpin in the switchbox.
- Before extending jackstand, make certain the ground surface below the jackstand foot will support the tongue load.
- Rotate the jackstand handle (or crank) clockwise. This will slowly extend the jack and transfer the weight of the trailer tongue to the jack.

PINTLE HITCH COUPLER

A pintle eye coupler (Figure G) connects to a pintle-hook hitch that is located on or under the rear bumper of the tow vehicle. This system of coupling a trailer to a tow vehicle is sometimes referred to as a "lunette eye, tow ring or G.I. hitch."

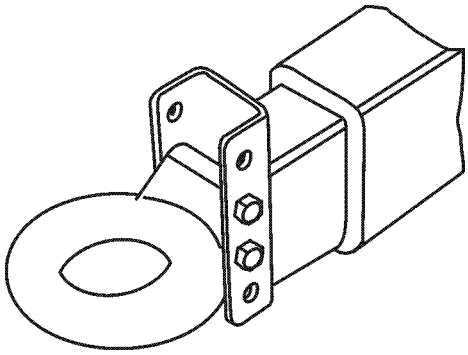


Figure G. Pintle Hitch Coupler

A pintle hitch trailer may be fitted with a tongue jackstand that can raise and lower the coupler. The tongue jack is mounted to the A-frame (front or tongue) part of the trailer. By rotating the jack handle clockwise, the jack will extend and raise the tongue of the trailer.

The load rating of the coupler and the necessary pintle hitch size are listed on the trailer tongue. You must provide a pintle hitch and pintle coupler for your tow vehicle, where the load rating of the pintle hitch and pintle coupler is equal to or greater than that of your trailer.

Also, the pintle hitch size must be the same as the pintle coupler size. If the hitch is too small, too large, underrated, loose or worn, the trailer can come loose from the tow vehicle, and may cause death or serious injury.

Pintle Coupler and Pintle Hook

Before each tow, check the locking device that secures the coupler to the pintle hook assembly.

The pintle hook lever must be able to operate freely and automatically snap into place into the latched position. Lightly oil the pivot points and sliding surfaces with SAE30W motor oil to prevent rust and help ensure proper operation of the latching mechanism.

If you see or feel evidence of wear, such as flat spots, deformations, pitting or corrosion, on the pintle hook or coupler, immediately have your dealer inspect them to determine the proper action to prevent possible failure of

the ball andcoupler system. All bent or broken coupler parts must be replaced before towing the trailer.

THE TOW VEHICLE, PINTLE HITCH AND PINTLE COUPLER MUST HAVE A RATED TOWING CAPACITY EQUAL TO OR GREATER THAN THE TRAILER **Gross Vehicle Weight Rating (GVWR)**.

IT IS ESSENTIAL THAT THE PINTLE HITCH BE OF THE SAME SIZE AS THE PINTLE COUPLER.

The coupler size and load rating (capacity) are marked on the coupler. Hitch capacity is marked on the hitch.

⚠ WARNING

Coupler-to-hitch mismatch can result in uncoupling, leading to death or serious injury.

Be sure the LOAD RATING of the pintle hitch hook is equal or greater than the load rating of the pintle eye coupler.

Be sure the SIZE of the pintle hitch hook matches the size of the pintle eye coupler.

⚠ WARNING

A worn, cracked or corroded pintle hitch hook can fail while towing, and may result in death or serious injury.

Before coupling trailer, inspect the pintle hitch hook for wear, corrosion and cracks.

Replace worn or damaged pintle hitch hook.

- Rock the pintle eye coupler to make sure it is secured tightly to the hitch.
- Wipe the inside and outside of the pintle coupler. Clean and inspect it visually for cracks and deformations. Feel the inside of the coupler for worn spots and pits.
- Be sure the coupler is secured tightly to the tongue of the trailer. All coupler fasteners must be visibly solid against the trailer frame.
- Raise the bottom surface of the coupler to be above the top of the pintle hitch hook. Use the tongue jackstand to support the trailer tongue. Wood or concrete blocks may also be used.

⚠ WARNING

A defective pintle hitch not properly fastened can result in uncoupling, leading to death or serious injury.

Be sure the pintle hook is securly tighten to the tow vehicle before coupling the trailer.

Coupling Trailer to Tow Vehicle (Pintle Coupler)

- Slowly back up the tow vehicle so that the pintle hitch hook is near or aligned under the pintle eye ring coupler.
- Using the jackstand at the front of trailer (tongue), turn the jackstand crank handle to raise the trailer. If the pintle eye coupler does not line up with the pintle hitch hook, adjust the position of the tow vehicle.
- OPEN the pintle hook locking mechanism (Figure H). Place the hook inside the eye coupler. CLOSE the pintle hook mechanism.

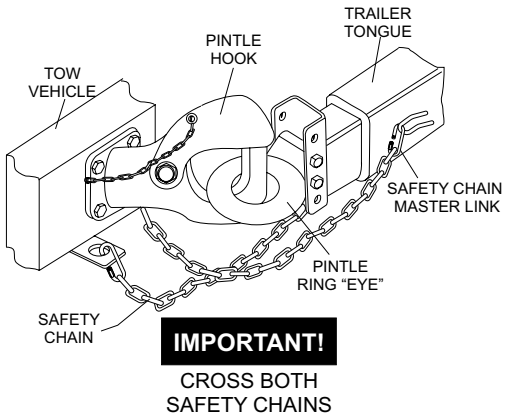


Figure H. Attaching Safety Chain (Pintle Hitch)

- Insert a pin or lock through the hole in the locking mechanism.
- Be sure the pintle hook is inserted completely through the eye ring and the locking mechanism is engaged. A properly engaged locking mechanism will allow the coupler to raise the rear of the tow vehicle. Using the trailer jack, test to see that you can raise the rear of the tow vehicle by1-inch after the coupler is locked to the hitch.
- Lower the trailer so that its entire tongue weight is held by the hitch.
- Raise the jackstand to a height where it will not interfere with the road.

TIRE SAFETY

Unsafe Tires, Lug Nuts or Wheels

Trailer tires and wheels are more likely to fail than car tires and wheels because they carry a heavier load. Therefore, it is essential to inspect the trailer tires before each tow.

If a tire has a bald spot, bulge, cuts, is showing any cords, or is cracked, replace the tire before towing. If a tire has uneven tread wear, take the trailer to a dealer service center for diagnosis.

Uneven tread wear can be caused by tire imbalance, axle misalignment or incorrect inflation.

Tires with too little tread will not provide adequate tracking on wet roadways and can result in loss of control, leading to death or serious injury.

Improper tire pressure causes an unstable trailer and can result in a tire blowout and loss of control. Therefore, before each tow you must also check the tire pressure. Tire pressure must be checked when tires are cold.

Allow 3 hours cool-down after driving as much as 1 mile at 40 mph before checking tire pressure. Trailer tires will be inflated to higher pressures than passenger vehicle tires.

Since trailer wheels and lug nuts (or bolts) are subjected to greater side loads than automobile wheels, they are more prone to loosen. Before each tow, check to make sure they are tight.

The proper tightness (torque) for lug nuts is listed in the lug nut tightening section of this manual. Use a torque wrench to tighten the lug nuts. If you do not have a torque wrench, use a lug wrench (from your tow vehicle) and tighten the nuts as much as you can. Then have a service garage or trailer dealer tighten the lug nuts to the proper torque.

⚠ WARNING

Metal creep between the wheel rim and lug nuts will cause rim to loosen and could result in a wheel coming off, leading to death or serious injury.

Tighten lug nuts before each tow.

Lug nuts are also prone to loosen after first being assembled. When driving a new trailer (or after wheels have been remounted), check to make sure they are tight after the first 10, 25 and 50 miles of driving and before each tow thereafter.

Failure to perform this check can result in a wheel parting from the trailer and a crash, leading to death or serious injury.

⚠ WARNING

Lug nuts are prone to loosen after initial installation, which can lead to death or serious injury.

Check lug nuts for tightness on a new trailer or when wheel(s) have been remounted after the first 10, 25 and 50 miles of driving.

⚠ WARNING

Improper lug nut torque can cause a wheel parting from the trailer, leading to death or serious injury.

Be sure lug nuts are tight before each tow.

⚠ WARNING

Improper tire pressure can result in a blowout and loss of control, which can lead to death or serious injury.

Be sure tires are inflated to pressure indicated on side wall before towing trailer.

Determining Load Limit of Trailer

Determining the load limits of a trailer includes more than understanding the load limits of the tires alone. On all trailers there is a Federal certification/VIN label that is located on the forward half of the left (road) side of the unit. This certification/VIN label will indicate the trailer's Gross Vehicle Weight Rating (GVWR). This is the most weight the fully loaded trailer can weigh. It will also provide the Gross Axle Weight Rating (GAWR). This is the most a the axle can weigh.

There is a vehicle placard (Figure I) located in the same location as the certification label described above. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity.

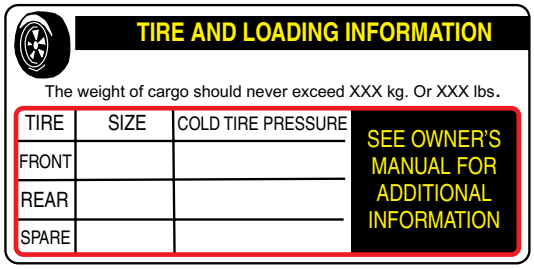


Figure I. Trailer Tire Placard

If additional work items (hoses, tools, clamps etc.) are going to be added to the trailer, be sure they are distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire.

Excessive loads and/or underinflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. The proper air pressure may be found on the certification/VIN label and/or on the Tire and Loading Information placard. This value should never exceed the maximum cold inflation pressure stamped on the tire.

Perform the following steps to determine the load limit of your trailer.

Step 1.

Locate the statement, "The weight of cargo should never exceed XXX kg or XXX lbs.," on your vehicle's Tire and Loading Information placard (Figure I). This value equals the available amount of equipment load capacity.

Step 2.

Determine the weight of the equipment being loaded on the tow vehicle. That weight may not safely exceed the available equipment load capacity. The trailer's Tire Information Placard is attached adjacent to or near the trailer's VIN (Certification) label at the left front of the trailer (See Figure I).

Determining Load Limit of Tow Vehicle

Step 1.

Locate the statement, "The combined weight of occupants and cargo should never exceed XXX lbs.," on your vehicle's placard.

Step 2.

Determine the combined weight of the driver and passengers who will be riding in your vehicle.

Step 3.

Subtract the combined weight of the driver and passengers from XXX kilograms or XXX pounds.

Step 4.

The resulting figure equals the available amount of cargo and luggage capacity. For example, if the "XXX" amount equals 1400 lbs. and there will be five 150 lb. passengers in your vehicle, the amount of available cargo and luggage capacity is 650 lbs. (1400-750 (5 x 150) = 650 lbs.).

Step 5.

Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage capacity calculated in Step 4.

If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult the tow vehicle's manual to determine how this weight transfer reduces the available cargo and luggage capacity of your vehicle.

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards and inspecting tires for cuts, slashes and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires. These actions, along with other care and maintenance activities, can also:

- Improve vehicle handling.
- Help protect you and others from avoidable breakdowns and accidents.
- Improve fuel economy.
- Increase the tire life.

Use the information contained in this section to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

TIRE FUNDAMENTALS

Federal law requires tire manufacturers to place standardized information on the sidewall of all tires (Figure J). This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

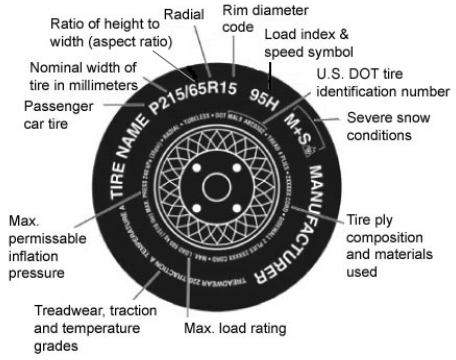


Figure J. Standard Tire Sidewall Information

P: The "P" indicates the tire is for passenger vehicles.

Next number: This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

Next number: This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width. Numbers of 70 or lower indicate a short sidewall for improved steering response and better overall handling on dry pavement.

P: The "R" stands for radial. Radial ply construction of tires has been the industry standard for the past 20 years.

Next number: This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

Next number: This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. *Note*: You may not find this information on all tires because it is not required by law.

M+S: The "M+S" or "M/S" indicates that the tire has some mud and snow capability. Most radial tires have these markings; hence, they have some mud and snow capability.

Speed Rating: The speed rating denotes the speed at which a tire is designed to be driven for extended periods of time. The ratings range from 99 miles per hour (mph) to 186 mph. These ratings are listed in Table A. Note: You may not find this information on all tires because it is not required by law.

Table A. Speed Rating

Letter Rating	Speed Rating
Q	99 mph
R	106 mph
S	112 mph
T	118 mph
U	124 mph
H	130 mph
V	149 mph
W	168* mph
Y	186* mph

U.S. DOT Tire Identification Number: This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

Tire Ply Composition and Materials Used: The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

Maximum Load Rating: This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

Maximum Permissible Inflation Pressure: This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Uniform Tire Quality Grading Standards (UTQGS)

Treadwear Number: This number indicates the tire's wear rate. The higher the treadwear number is, the longer it should take for the tread to wear down. For example, a tire graded 400 should last twice as long as a tire graded 200.

Traction Letter: This letter indicates a tire's ability to stop on wet pavement. A higher graded tire should allow you to stop your car on wet roads in a shorter distance than a tire with a lower grade. Traction is graded from highest to lowest as "AA","A", "B", and "C".

Temperature Letter: This letter indicates a tire's resistance to heat. The temperature grade is for a tire that is inflated properly and not overloaded. Excessive speed, underinflation or excessive loading, either separately or in combination, can cause heat build-up and possible tire failure. From highest to lowest, a tire's resistance to heat is graded as "A", "B", or "C".

Refer to Figure K for additional tire information for light trucks.

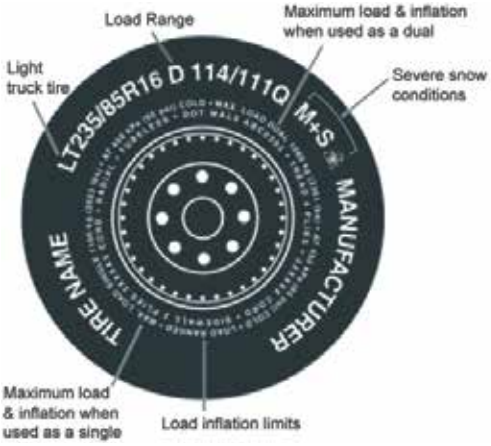


Figure K. UTQGS Tire Information

Tires for light trucks have other markings besides those found on the sidewalls of passenger tires.

LT: The "LT" indicates the tire is for light trucks or trailers.

ST: An "ST" is an indication the tire is for trailer use only.

Max. Load Dual kg (lbs) at kPa (psi) Cold: This information indicates the maximum load and tire pressure when the tire is used as a dual, that is, when four tires are put on each rear axle (a total of six or more tires on the vehicle).

Max. Load Single kg (lbs) at kPa (psi) Cold: This information indicates the maximum load and tire pressure when the tire is used as a single.

Load Range: This information identifies the tire's load-carrying capabilities and its inflation limits.

Tire Safety Tips

- Slow down if you have to go over a pothole or other object in the road.
- **DO NOT** run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.
- Check tire inflation pressure weekly during use to insure the maximum tire life and tread wear.
- **DO NOT** bleed air from tires when they are hot.
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Make sure your tire valves have valve caps.
- **ALWAYS** check tire pressure on tow vehicle and trailer before towing. Check tire pressure at least once a month.
- **DO NOT** overload tow vehicle. Check the tire information and loading placard for safe allowable tire loading conditions.

Tire Repair

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

Replacing Worn or Damaged Tires

Replace the tire before towing the trailer if the tire treads have less than 1/16 inch depth or the telltale bands are visible. Check inflation pressure weekly during use to insure the maximum tire life and tread wear. A bubble, cut or bulge in a side wall can result in a tire blowout. Inspect both side walls of each tire for any bubble, cut or bulge; and replace a damaged tire before towing the trailer.

Table B below will help pinpoint the causes and solutions of tire wear problems.

Table B. Tire Wear Troubleshooting

Wear Pattern		Cause	Solution
	Center Wear	Over inflation.	Adjust pressure to particular load per tire manufacturer.
	Edge Wear	Under inflation.	Adjust pressure to particular load per tire manufacturer.
	Side Wear	Loss of camber or overloading.	Make sure load does not exceed axle rating. Align wheels.
	Toe Wear	Incorrect toe-in.	Align wheels.
	Cupping	Out-of-balance.	Check bearing adjustment and balance tires.
	Flat Spots	Wheel lockup and tire skidding.	Avoid sudden stops when possible and adjust brakes.

WARNING

ALWAYS wear safety glasses when removing or installing force fitted parts. **DO NOT** attempt to repair or modify a wheel. DO NOT install an inner-tube to correct a leak through through the rim. If the rim is cracked, the air pressure in the inner tube may cause pieces of the rim to explode (break off) with great force and cause serious eye or bodily injury.

Wheel Rims

If the trailer has been struck, or impacted, on or near the wheels, or if the trailer has struck a curb, inspect the rims for damage (i.e. being out of round); and replace any damaged wheel. Inspect the wheels for damage every year, even if no obvious impact has occurred.

Wheels, Bearings and Lug Nuts

A loose, worn or damaged wheel bearing is the most common cause of brakes that grab.

To check wheel bearings, jack trailer and check wheels for side-to-side looseness. If the wheels are loose, or spin with a wobble, the bearings must be serviced or replaced. Check inflation pressure weekly during use to insure the maximum tire life and tread wear. Most trailer axles are built with sealed bearings that are not serviceable. Sealed bearings must be replaced as complete units.

NOTICE

NEVER use an pneumatic air gun to tighten wheel lug nuts.

Over-tightening lug nuts will result in breaking the studs or permanently deforming the mounting stud holes in the wheels.

WARNING

Lug nuts are prone to loosen after initial installation, which can lead to death or serious injury. Check all wheel lug nuts periodically.

Lug Nut Torque Requirements

It is extremely important to apply and maintain proper wheel mounting torque on the trailer. Be sure to use only the fasteners matched to the cone angle of the wheel. Proper procedure for attachment of the wheels is as follows:

1. Start all wheel lug nuts by hand.
2. Torque all lug nuts in sequence. See Figure L. DO NOT torque the wheel lug nuts all the way down. Tighten each lug nut in 3 separate passes as defined by Table C.
3. Check to see if the lug nuts are tight after the first 10, 25 and 50 miles of driving and before each tow thereafter

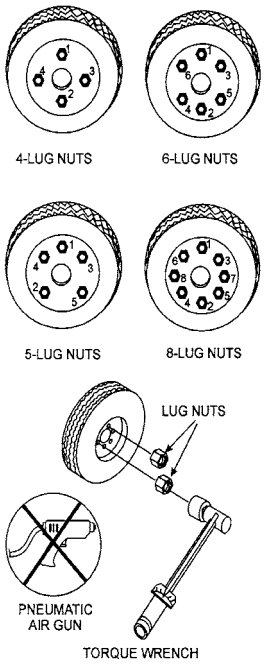


Figure L. Wheel Lug Nuts Tightening Sequence

Table C. Tire Torque Requirements			
Wheel Size	First Pass FT-LBS	Second Pass FT-LBS	Third Pass FT-LBS
12"	20-25	35-40	50-65
13"	20-25	35-40	50-65
14"	20-25	50-60	90-120
15"	20-25	50-60	90-120
16"	20-25	50-60	90-120

Lights and Signals

Before each tow, check the trailer taillights, stoplights, turn signals and any clearance lights for proper operation.

Replace any broken or burned-out lamps as necessary. Check the wire harness for cuts, fraying or other damage. If it needs replacing, contact your dealer.

WARNING

Improper operating taillights, stoplights and turn signals can cause collisions.

Check all lights before each tow.

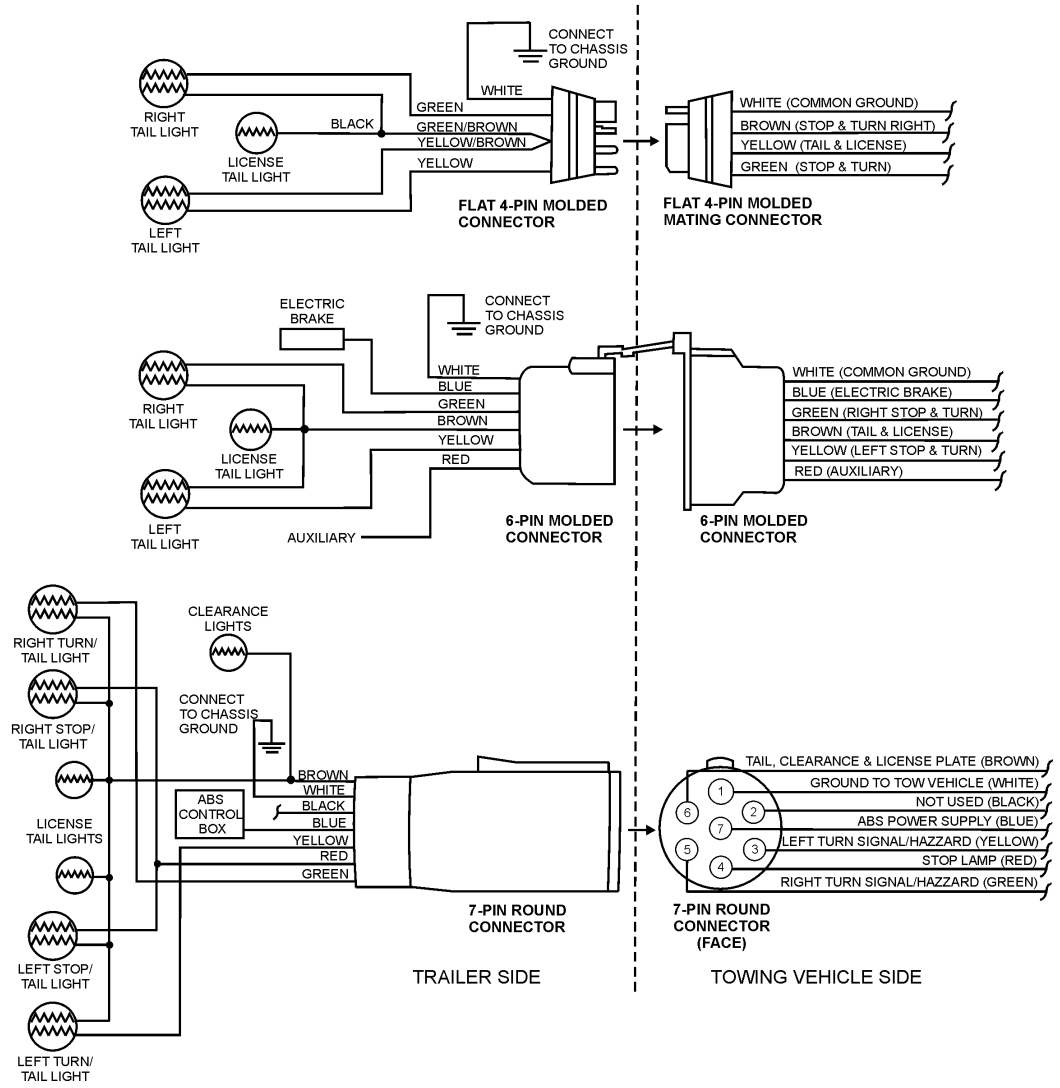
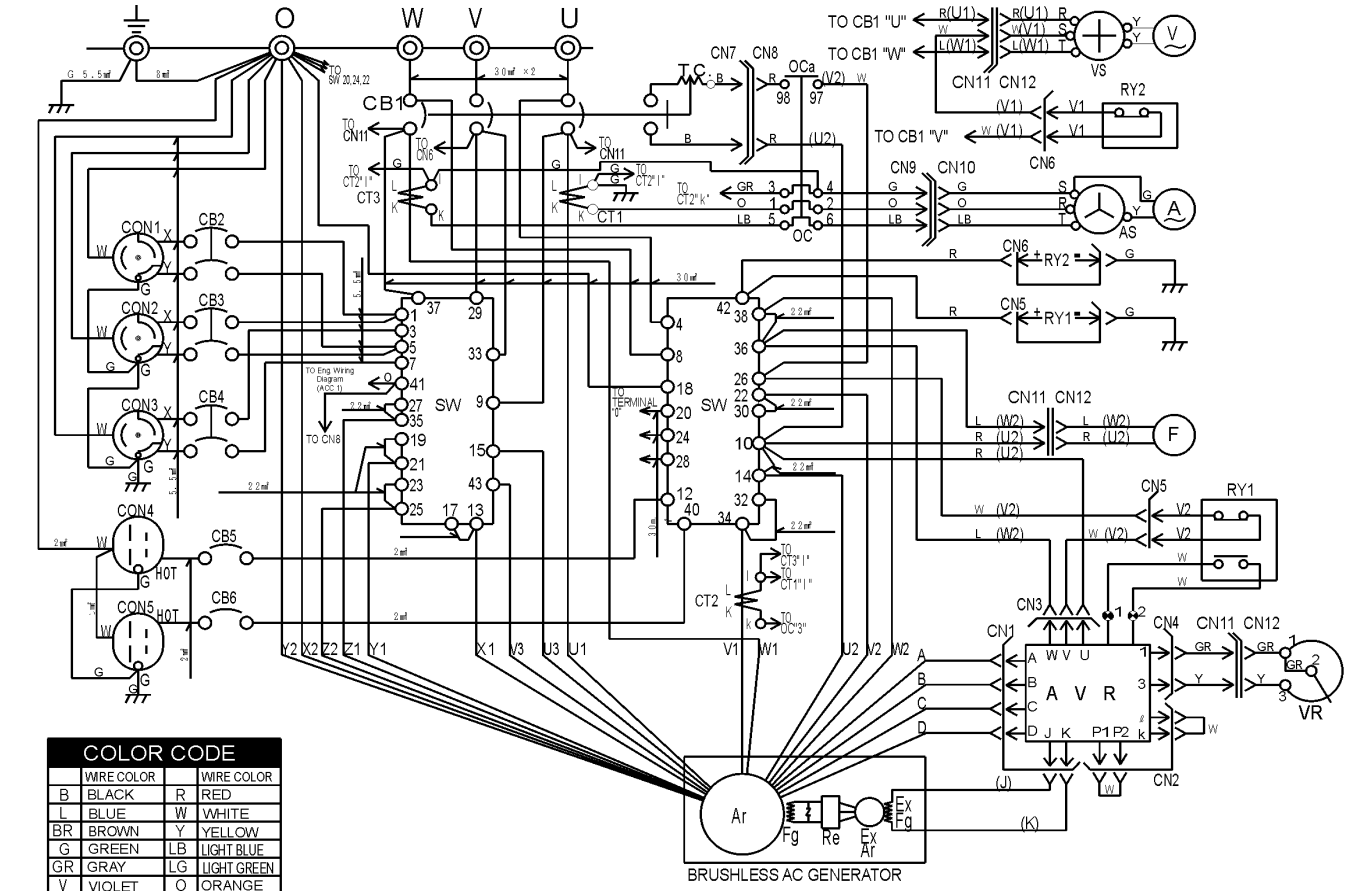
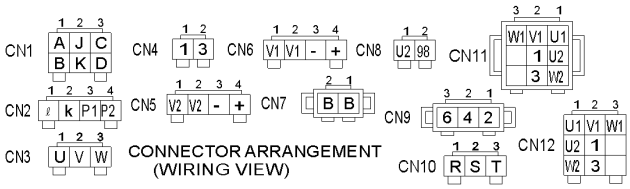


Figure M. Trailer to Tow Vehicle Wiring Diagram



COLOR CODE			
	WIRE COLOR		WIRE COLOR
B	BLACK	R	RED
L	BLUE	W	WHITE
BR	BROWN	Y	YELLOW
G	GREEN	LB	LIGHT BLUE
GR	GRAY	LG	LIGHT GREEN
V	VIOLET	O	ORANGE
P	PINK		



SYMBOL	DESIGNATION
Ar	MAIN GENERATOR ARMATURE WINDING
Fg	MAIN GENERATOR FIELD WINDING
ExAr	EXCITER ARMATURE WINDING
ExFg	EXCITER FIELD WINDING
Re	RECTIFIER
AVR	AUTOMATIC VOLTAGE REGULATOR
VR	VOLTAGE REGULATOR (RHEOSTAT)
CT 1,2,3	CURRENT TRANSFORMER
AS	CHANGE-OVER SWITCH, AMMETER
A~	AC. AMMETER
VS	CHANGE-OVER SWITCH, VOLTMETER
V	AC. VOLTMETER
F	FREQUENCY METER
OC	OVER CURRENT RELAY
CB 1,2,3,4,5,6	CIRCUIT BREAKERS
CON 1,2,3,4, 5,6	RECEPTACLES
SW	SELECTOR SWITCH
FAN 1,2	FAN MOTOR
RY1, 2	RHEOSTAT
F	FUSE

Notice :
1. No designation lead size : 1.25

Figure 69. Generator Wiring Diagram

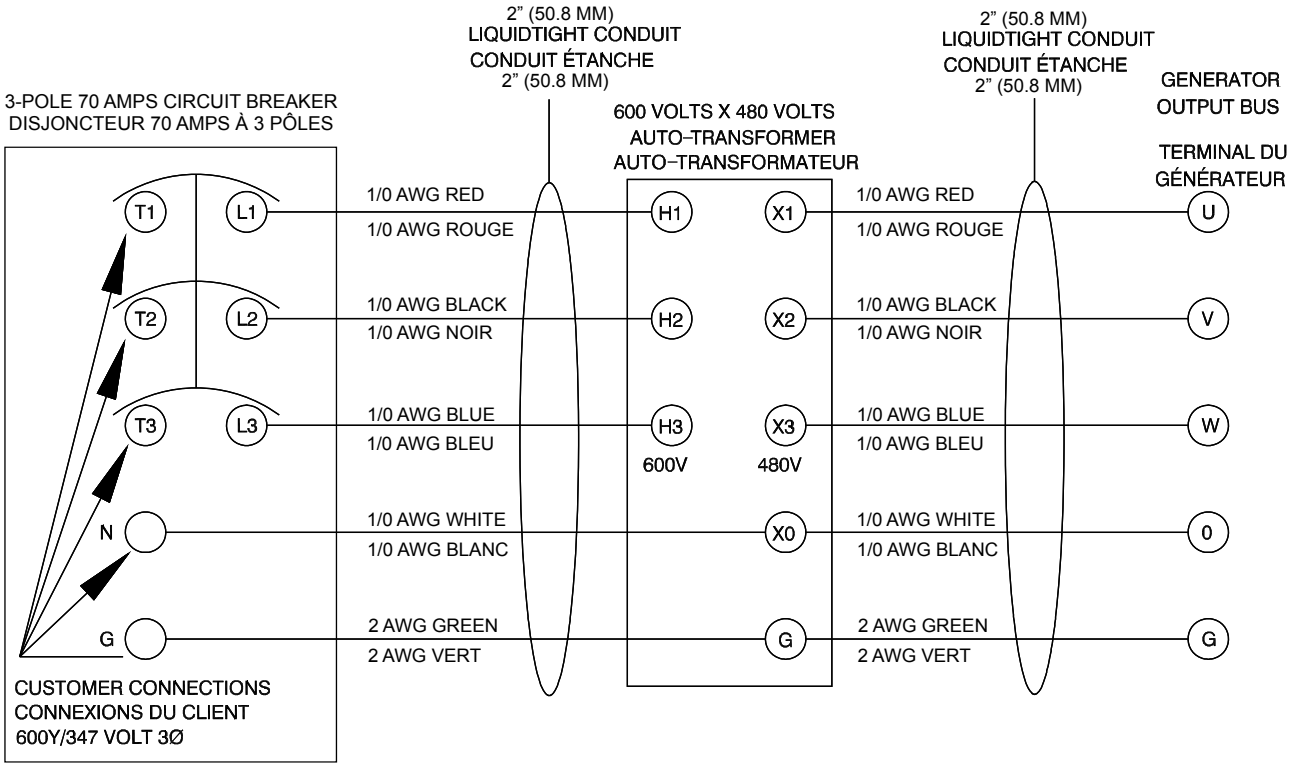


Figure 70. 600 VAC Auto Transformer Wiring Diagram

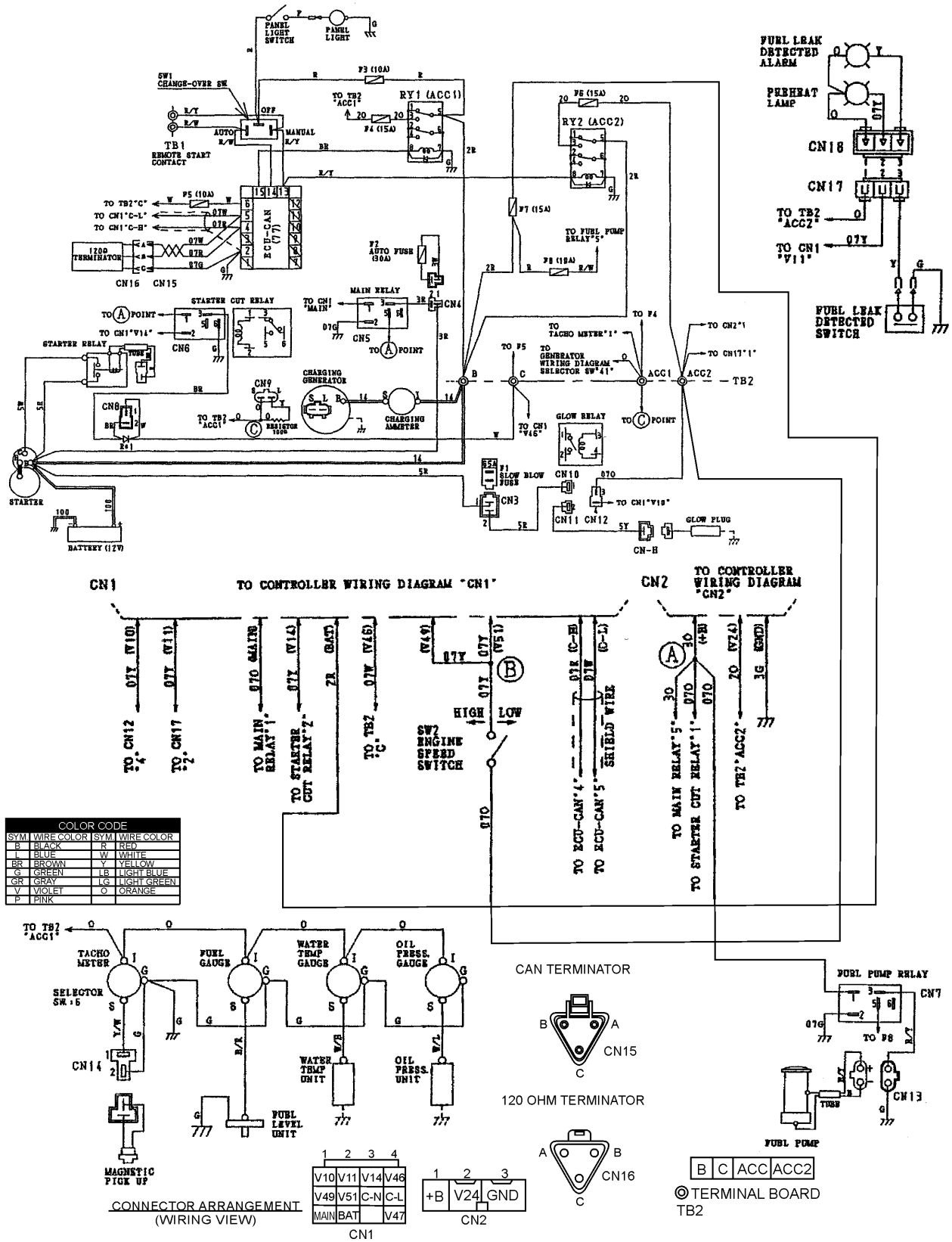


Figure 71. Engine Wiring Diagram

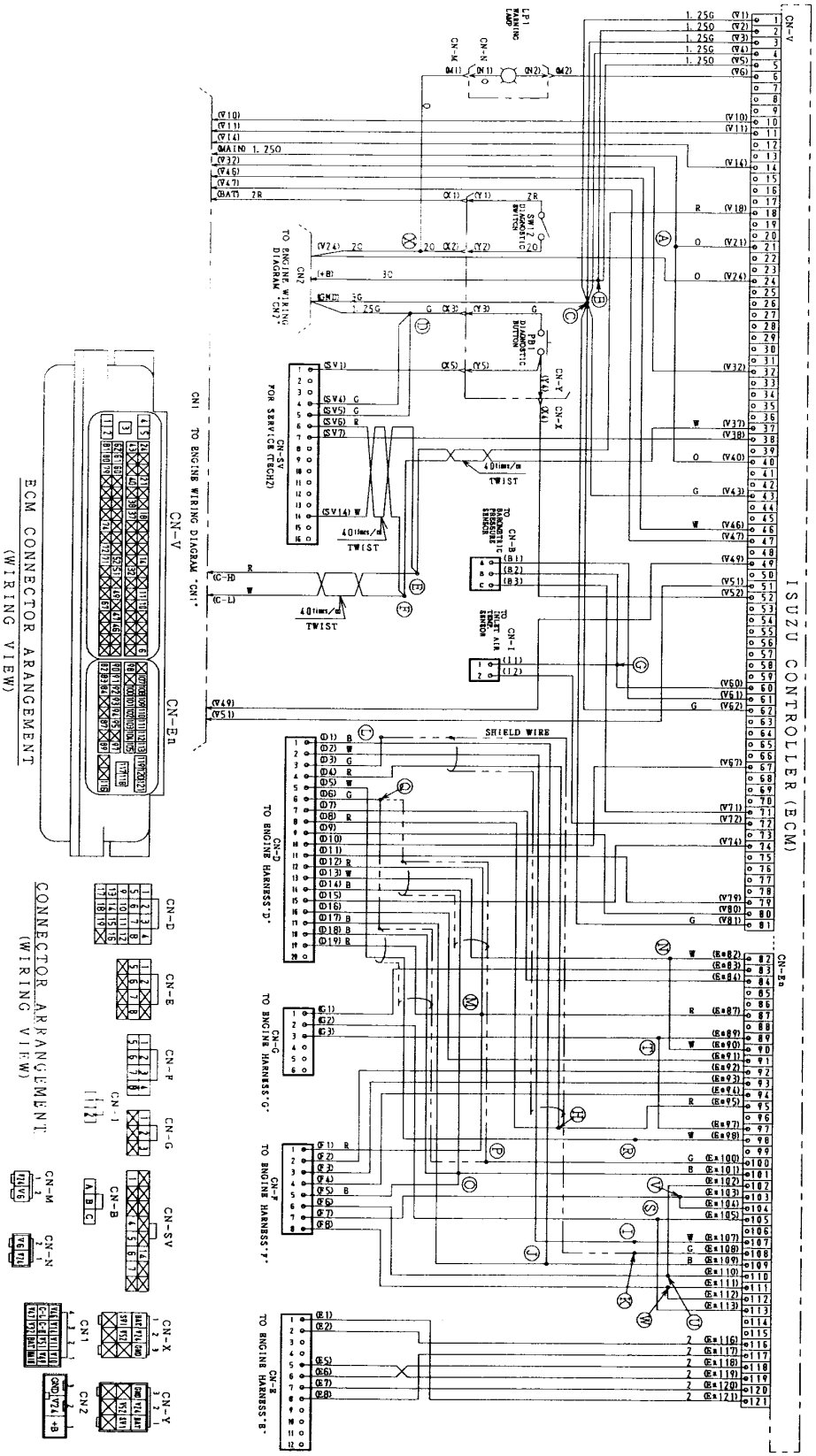
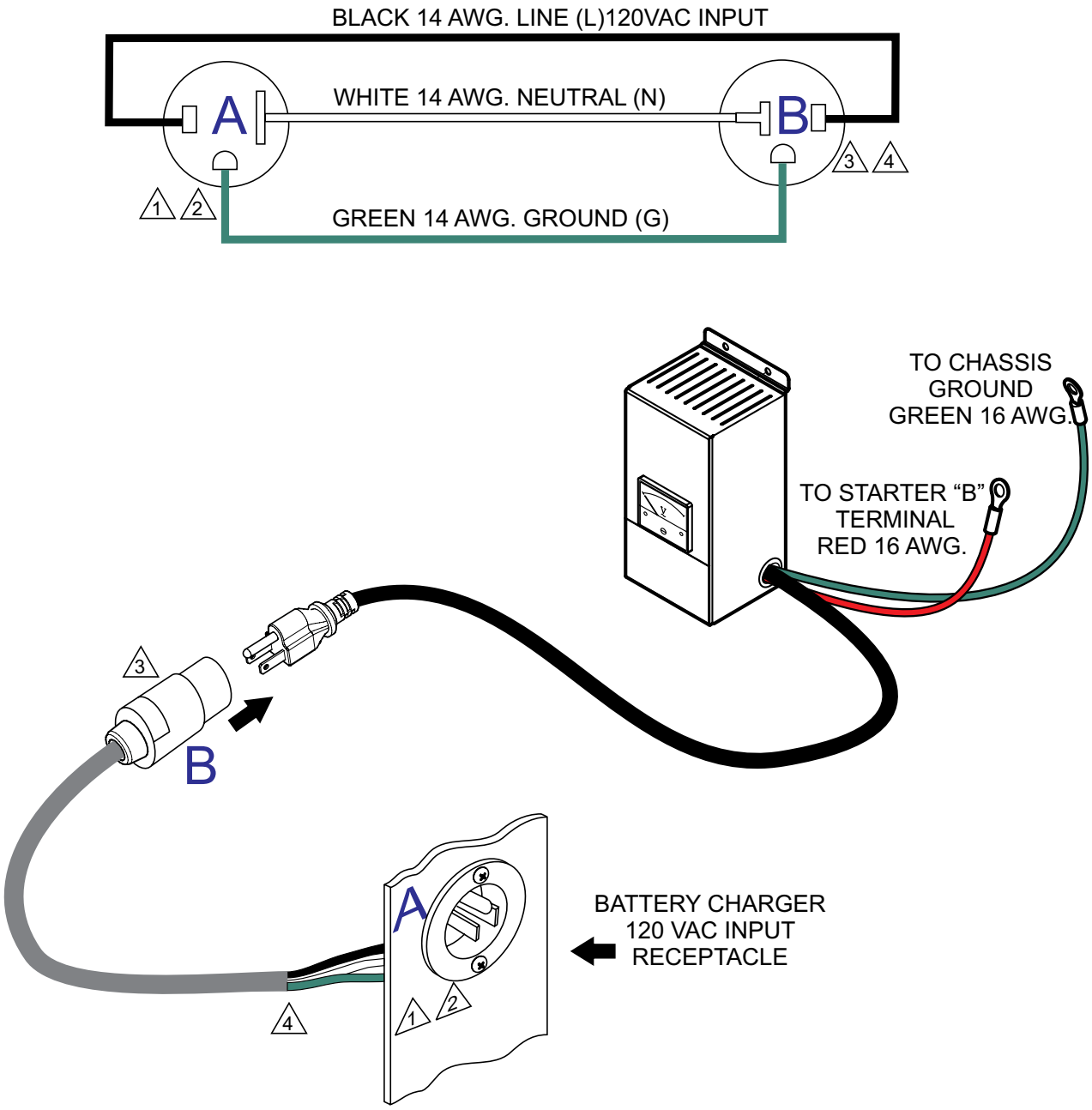


Figure 72. Controller Wiring Diagram

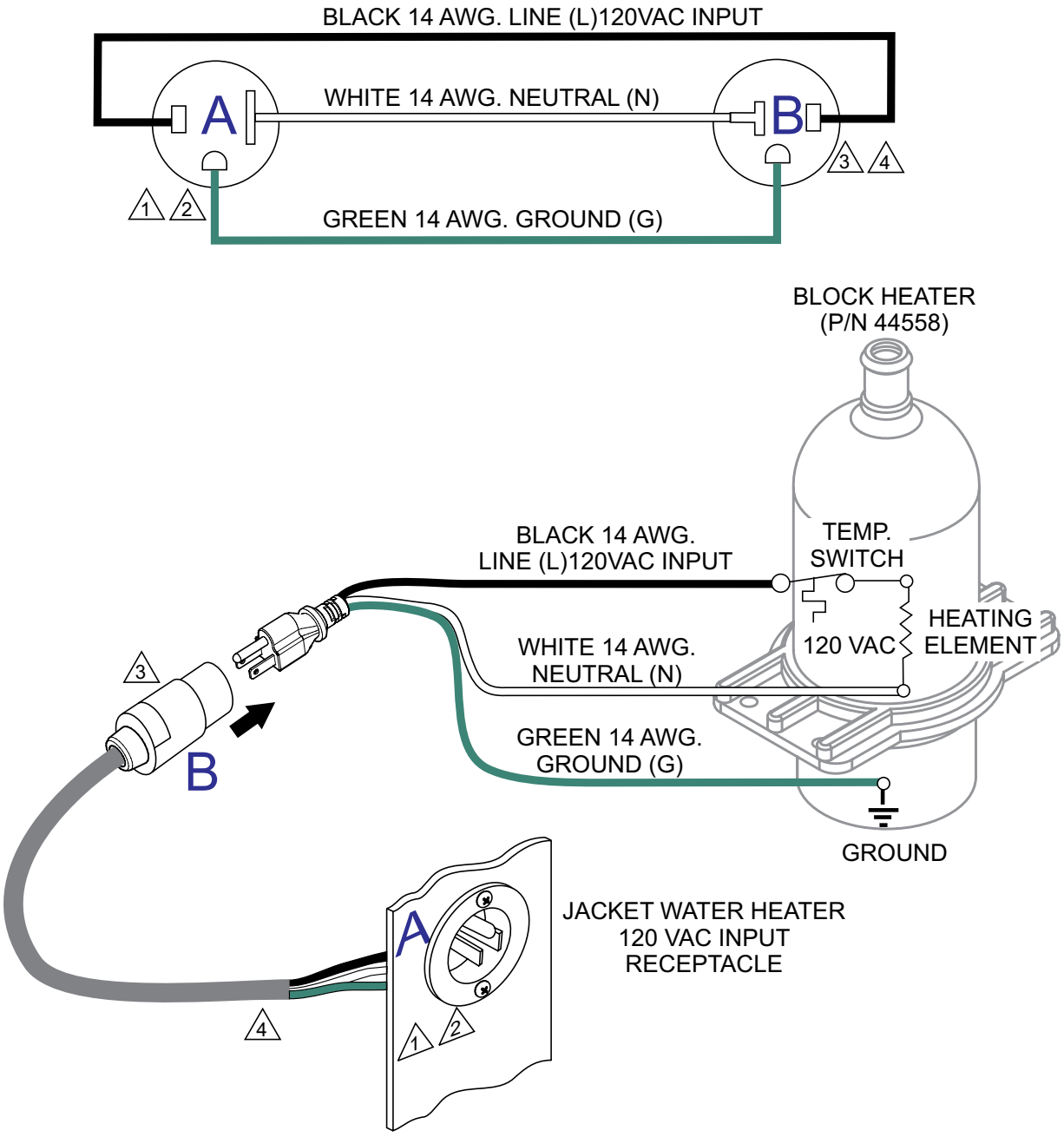
BATTERY CHARGER WIRING DIAGRAM



NOTES:

1. NEMA 5-15, 15A, 120 VAC, P/N EE6176 (HBL5278C/HUBBLE RECEPTACLE).
2. RECEPTACLE IS MOUNTED ON OUTPUT TERMINAL PANEL ASSY.
3. 20 AMP, 5-20R RECEPTACLE, P/N EE6131 (HBL5369C/HUBBLE RECEPTACLE).
4. CORD, CAROL 3/C 14 AWG., P/N EE56557.

JACKET WATER HEATER WIRING DIAGRAM



NOTES:

1. NEMA 5-15, 15A, 120 VAC, P/N EE6176 (HBL5278C/HUBBLE RECEPTACLE).
2. RECEPTACLE IS MOUNTED ON OUTPUT TERMINAL PANEL ASSY.
3. 20 AMP, 5-20R RECEPTACLE, P/N EE6131 (HBL5369C/HUBBLE RECEPTACLE).
4. CORD, CAROL 3/C 14 AWG., P/N EE56557.

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, use Table 16 shown below for diagnosis of the Generator. If the problem cannot be remedied, consult our company's business office or service plant.

Table 16. Generator Troubleshooting

Symptom	Possible Problem	Solution
No Voltage Output	AC Voltmeter defective?	Check output voltage using a voltmeter.
	Is wiring connection loose?	Check wiring and repair.
	Is AVR defective?	Replace if necessary.
	Defective Rotating Rectifier?	Check and replace.
	Defective Exciter Field?	Check for approximately 17.3 ohms across J & K on CN1
Low Voltage Output	Is engine speed correct?	Turn engine throttle lever to "High".
	Is wiring connections loose?	Check wiring and repair.
	Defective AVR?	Replace if necessary.
High Voltage Output	Is wiring connections loose?	Check wiring and repair.
	Defective AVR?	Replace if necessary.
Circuit Breaker Tripped	Short Circuit in load?	Check load and repair.
	Over current?	Confirm load requirements and reduce.
	Defective circuit breaker?	Check and replace.
	Over current Relay actuated?	Confirm load requirement and replace.

The engine controller of this generator diagnoses problems that arise from the engine control system and the engine itself. Press the diagnostic button (Figure 73) on the diagnostic panel to determine if an engine malfunction has occurred.

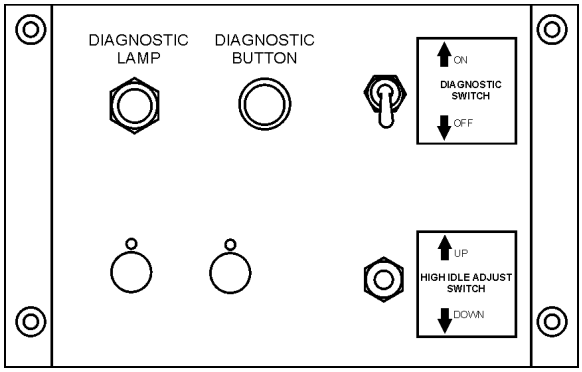


Figure 73. Diagnostic Panel

METHOD OF OPERATION

1. Normally, the diagnostic lamp will be **dimly** lit when the **MPEC Control Switch** is placed in the **MANUAL** position.
2. If engine trouble occurs, the diagnostic lamp will be **brightly** lit as long as the control switch is left in the manual position.
3. The diagnostic lamp will indicate that an engine malfunction has occurred.

NOTICE

For a complete understanding of error codes and troubleshooting procedures, refer to the enclosed engine instruction manual.

NOTICE

If the engine is cranked while the diagnostic switch is in the "**ON**" position, the engine will not be stopped even if the starter switch is turned to the "**OFF**" position. In such case, turn the diagnostic switch to the "**OFF**" position.

EXPLANATION OF CODE IN REMARKS COLUMN

The following section explains the different symbols and remarks used in the Parts section of this manual. Use the help numbers found on the back page of the manual if there are any questions.

NOTICE

The contents and part numbers listed in the parts section are subject to change **without notice**. Multiquip does not guarantee the availability of the parts listed.

SAMPLE PARTS LIST

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	12345	BOLT	1	INCLUDES ITEMS W/%
2%		WASHER, 1/4 IN		NOT SOLD SEPARATELY
2%	12347	WASHER, 3/8 IN	1	MQ-45T ONLY
3	12348	HOSE	A/R	MAKE LOCALLY
4	12349	BEARING	1	S/N 2345B AND ABOVE

NO. Column

Unique Symbols — All items with same unique symbol

(@, #, +, %, or >) in the number column belong to the same assembly or kit, which is indicated by a note in the "Remarks" column.

Duplicate Item Numbers — Duplicate numbers indicate multiple part numbers, which are in effect for the same general item, such as different size saw blade guards in use or a part that has been updated on newer versions of the same machine.

NOTICE

When ordering a part that has more than one item number listed, check the remarks column for help in determining the proper part to order.

PART NO. Column

Numbers Used — Part numbers can be indicated by a number, a blank entry, or TBD.

TBD (To Be Determined) is generally used to show a part that has not been assigned a formal part number at the time of publication.

A blank entry generally indicates that the item is not sold separately or is not sold by Multiquip. Other entries will be clarified in the "Remarks" Column.

QTY. Column

Numbers Used — Item quantity can be indicated by a number, a blank entry, or A/R.

A/R (As Required) is generally used for hoses or other parts that are sold in bulk and cut to length.

A blank entry generally indicates that the item is not sold separately. Other entries will be clarified in the "Remarks" Column.

REMARKS Column

Some of the most common notes found in the "Remarks" Column are listed below. Other additional notes needed to describe the item can also be shown.

Assembly/Kit — All items on the parts list with the same unique symbol will be included when this item is purchased.

Indicated by:

"INCLUDES ITEMS W/(unique symbol)"

Serial Number Break — Used to list an effective serial number range where a particular part is used.

Indicated by:

"S/N XXXXX AND BELOW"
"S/N XXXX AND ABOVE"
"S/N XXXX TO S/N XXX"

Specific Model Number Use — Indicates that the part is used only with the specific model number or model number variant listed. It can also be used to show a part is NOT used on a specific model or model number variant.

Indicated by:

"XXXXX ONLY"
"NOT USED ON XXXX"

"Make/Obtain Locally" — Indicates that the part can be purchased at any hardware shop or made out of available items. Examples include battery cables, shims, and certain washers and nuts.

"Not Sold Separately" — Indicates that an item cannot be purchased as a separate item and is either part of an assembly/kit that can be purchased, or is not available for sale through Multiquip.

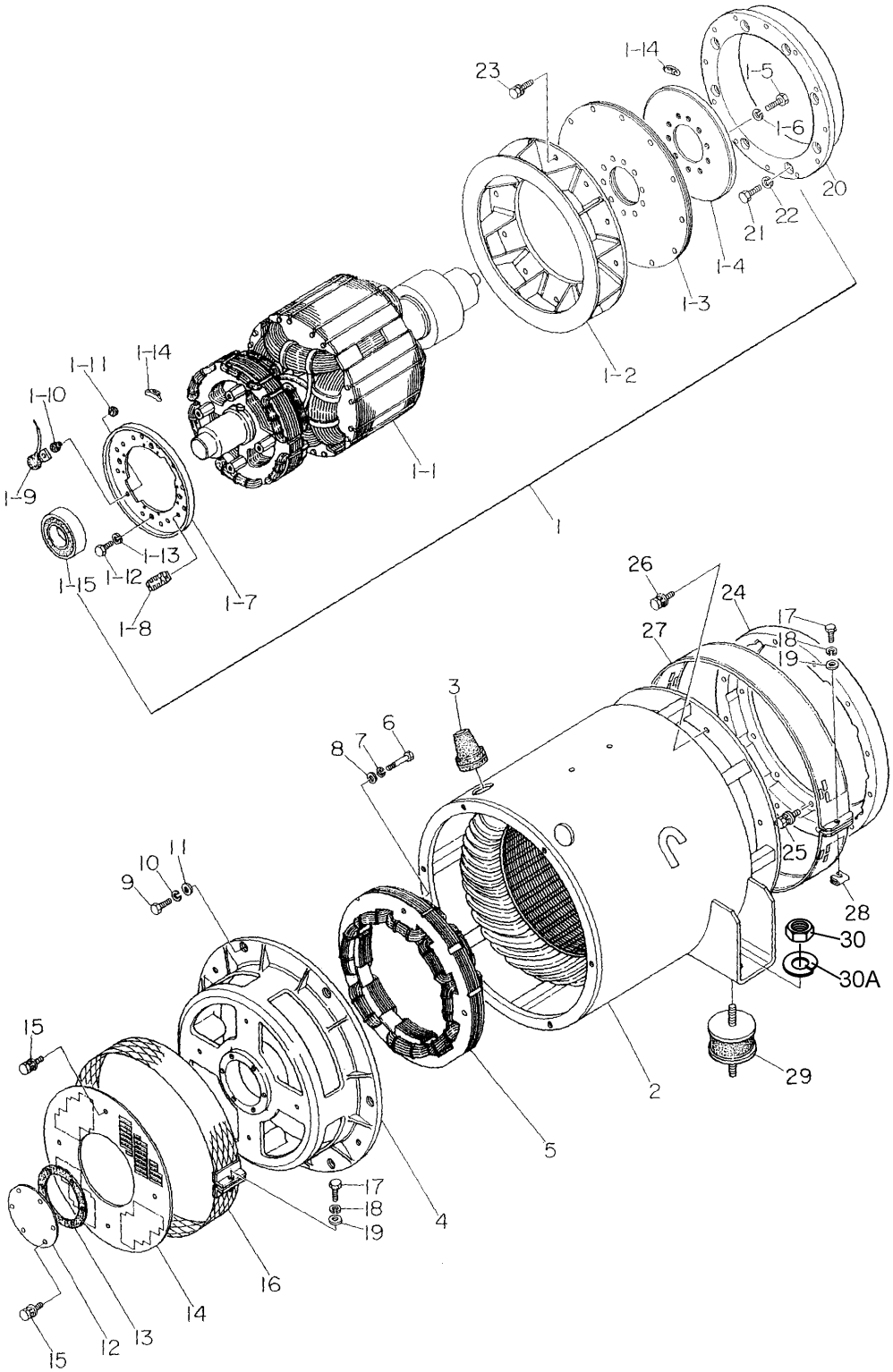
DCA125USI3CAN WHISPERWATT GENERATOR WITH ISUZU 4HK1X DIESEL ENGINE

1 to 3 units

Qty.	P/N	Description
5	1132402322	CARTRIDGE, OIL FILTER
3	0602046684	ELEMENT, AIR (OUTER)
3	P777639	ELEMENT, AIR (INNER)
1	8980627130	BELT, FAN
3	M3310502603	RADIATOR HOSE, UPPER
3	M3310502703	RADIATOR HOSE, LOWER
3	8980714010	FUEL FILTER, FEED PUMP
3	8981430410	FILTER FUEL, ELEMENT MAIN
3	8980742880	FILTER FUEL, ELEMENT PRE
1	0602122272	UNIT, OIL PRESSURE
1	0602123260	UNIT, WATER TEMPERATURE
1	9095720140	PACKING, WATER TEMPERATURE
1	8121468300	SENSOR, WATER TEMPERATURE
1	8980274560	SENSOR, OIL PRESSURE
1	1096300850	GASKET, OIL PRESSURE SENSOR
1	8971256011	SWITCH, OVERHEAT
1	0601870440	CIRCUIT BREAKER, 1P, 20 AMP
1	0601870441	CIRCUIT BREAKER 2P, 50 AMP
1	0601820608	AUTOMATIC VOLTAGE REGULATOR
3	0601806671	FUSE, 15 AMP
1	0601806644	FUSE, 30 AMP
1	0601806640	FUSE, 65 AMP
2	LY2DUS12VDC	RELAY

NOTICE

Part number on this Suggested Spare Parts list may supersede/replace the P/N shown in the text pages of this book.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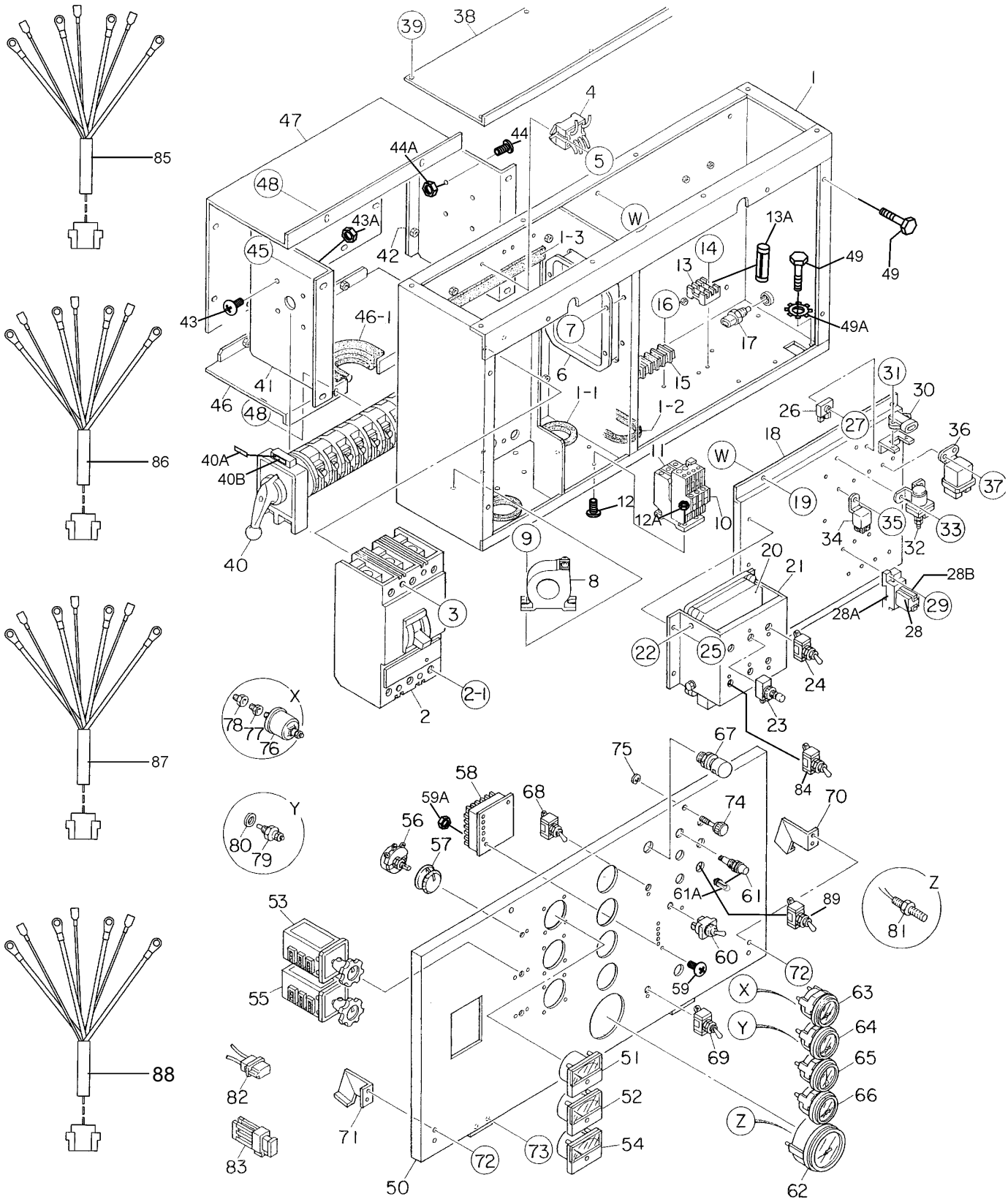
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	C0110001002	ROTOR ASSY	1	INCLUDES ITEMS W/#
1-1#		FIELD ASSY	1	
1-2#	8131070013	FAN	1	
1-3#	8131611014	COUPLING DISK	8	
1-4#	8131015003	BALANCING PLATE	1	PURCHASE ITEM 1-14 AS A SET
1-5#	0012112035	HEX HEAD BOLT	10	
1-6#	0042612000	WASHER, LOCK	10	
1-7#	8101026013	SET PLATE, RECTIFIER	1	PURCHASE ITEM 1-14 AS A SET
1-8#	0601821349	RECTIFIER	2	
1-9#	0601822601	SURGE ABSORBER	1	
1-10#	8001020004	WASHER, INSULATOR	1	
1-11#	8001020504	WASHER, INSULATOR	1	
1-12#	012210020	HEX HEAD BOLT	4	REPLACES P/N 0010110020
1-13#	0040010000	WASHER, LOCK	4	
1-14#	0601000209	BALANCING WEIGHT KIT	1	
1-15#	0071906312	BEARING	1	
2	C0130000503	STATER ASSY	1	
3	0845041804	GROMMET	2	
4	8131315202	END BRACKET	1	
5	8101350013	FIELD ASSY, EXCITER	1	
6	0012110060	HEX HEAD BOLT	4	
7	0042610000	WASHER, LOCK	4	
8	031110160	WASHER, FLAT	4	REPLACES P/N 0041210000
9	0010112035	HEX HEAD BOLT	6	
10	0040012000	WASHER, LOCK	6	
11	031112230	WASHER, FLAT	6	REPLACES P/N 0041212000
12	8131310104	COVER,BEARING	1	
13	8131312204	GASKET, BEARING	1	
14	8131331003	COVER, END BRACKET	1	
15	0105050616	HEX HEAD BOLT	10	REPLACES P/N 0017106012
16	8101333003	COVER, END BRACKET	1	
17	0010006030	HEX HEAD BOLT	2	REPLACES P/N 0010106030
18	0040006000	WASHER, LOCK	2	
19	952404470	WASHER, FLAT	2	REPLACES P/N 0041206000
20	M3163400503	COUPLING RING	1	
21	0010310075	HEX HEAD BOLT	8	
22	030210250	WASHER, LOCK	8	REPLACES P/N 004251000
23	012010030	HEX HEAD BOLT	12	REPLACES P/N 0012810030
24	M3163600003	COUPLING ADAPTER	1	
25	012010030	HEX HEAD BOLT	12	REPLACES P/N 0012810030
26	012010030	HEX HEAD BOLT	12	REPLACES P/N 0012810030
27	8131332014	COVER, FAN	1	
28	0600815000	NUT	1	
29	0605000063	RUBBER SUSPENSION	2	
30	0030016000	HEX NUT	2	
30A	0040016000	WASHER, LOCK	2	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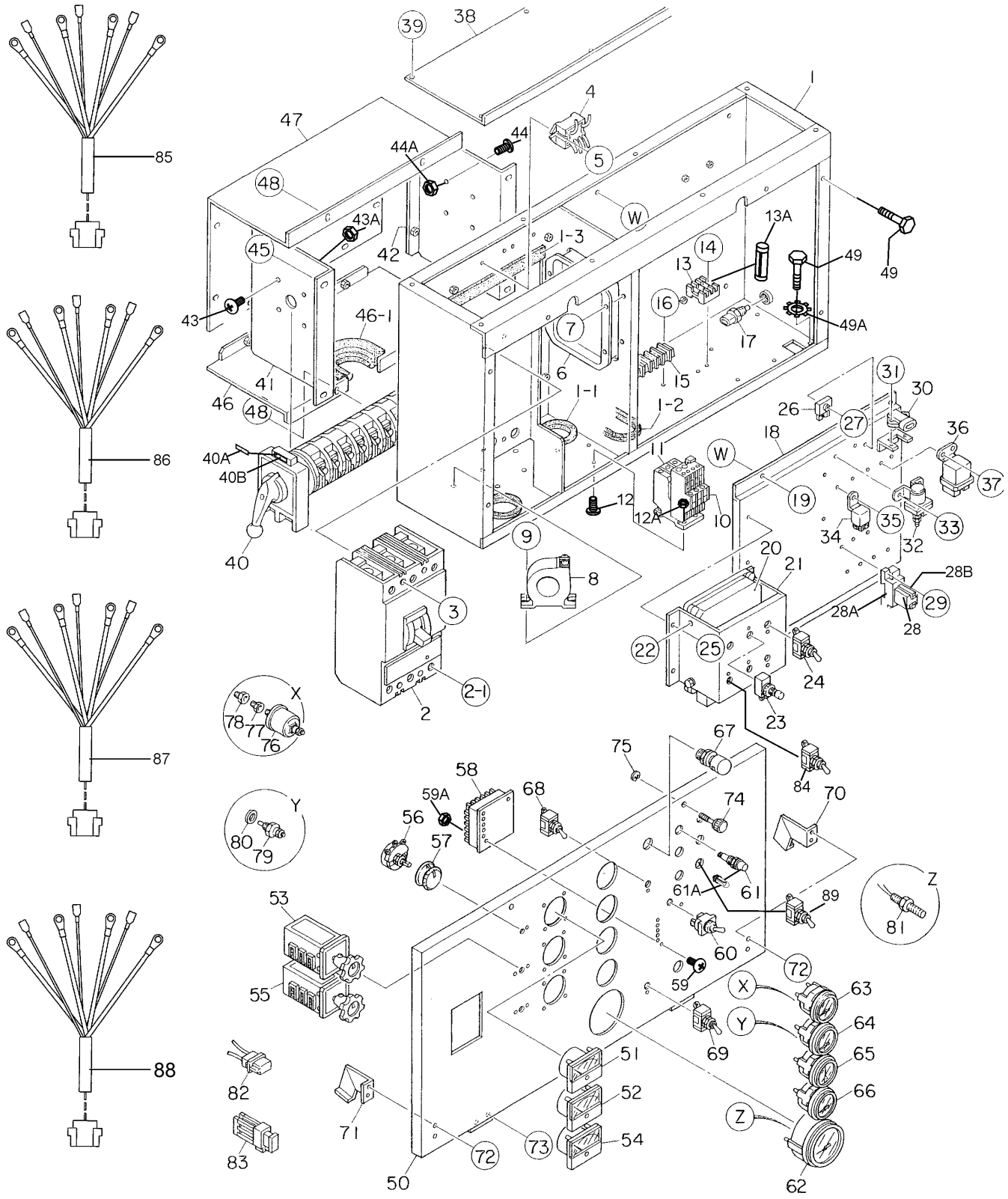
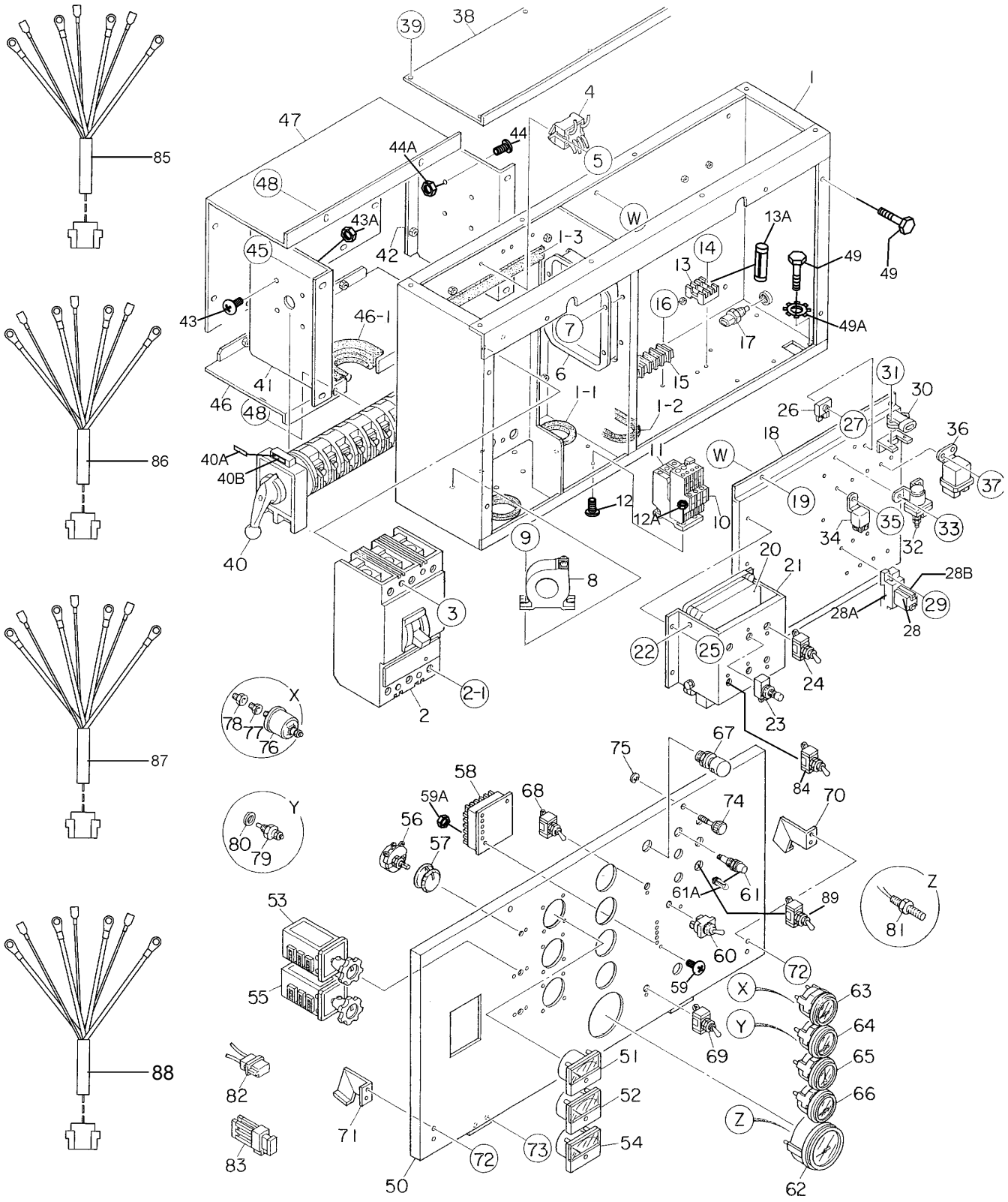
CONTROL BOX ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3213001802	CONTROL BOX	1	S/N 9980000 AND BELOW
1	M3214000202	CONTROL BOX	1	S/N 9980001 AND ABOVE
1-1	0330000210	EDGING	2	
1-2	0330000280	EDGING	1	
1-3	0330000340	EDGING	2	
2	0601808827	CIRCUIT BREAKER, 3P 350A	1	
2-1	0342604120	HEX SOCKET HEAD CAP SCREW	6	
3	0021006080	MACHINE SCREW	4	
4	0601823863	RELAY UNIT	2	
5	7538070	MACHINE SCREW	4	REPLACES P/N 0027104016
6	0601820608	AUTOMATIC VOLTAGE REGULATOR	1	
7	0027105016	MACHINE SCREW	4	
8	0601801124	CURRENT TRANSFORMER	3	
9	011206020	HEX HEAD BOLT 6X20	6	REPLACES P/N 0027106020
10	0601820847	OVER CURRENT RELAY	1	
11	0601820848	OVER CURRENT RELAY	1	
12	0027104020	MACHINE SCREW	2	
12A	OEMAA8	HEX NUT	2	REPLACES P/N 0207004000
13	0601802218	HOLDER, FUSE	1	
13A	0601806671	FUSE, 15A	3	
14	0027103020	MACHINE SCREW	2	
15	0601815153	TERMINAL	1	
16	0027104020	MACHINE SCREW	2	
17	8121468300	SENSOR, INLET AIR TEMP	1	REPLACES P/N 0603210240
18	M3260500503	SET PANEL, ELECTRIC PARTS	1	
19	0016906016	HEX HEAD BOLT	4	
20	8980710280	CONTROLLER	1	REPLACES P/N 0602202686
21	M3260500604	BRACKET	1	
22	0016906016	HEX HEAD BOLT	4	
23	0601831205	PUSH BUTTON SWITCH	1	
24	0601831330	DIAGNOSTIC SWITCH	1	
25	0016906016	HEX HEAD BOLT	4	
26	0601821370	RECTIFIER	1	REPLACES P/N 0601823240
27	0027104020	MACHINE SCREW	1	
28	LY2DUS12VDC	RELAY	2	REPLACES P/N 0601827656
28A	PTF08A	BASE	2	REPLACES P/N 0601823109
28B	PYCA1	CLIP	4	REPLACES P/N 0601824400
29	0027104020	MACHINE SCREW	4	
30	8972177780	SENSOR, BAROMETRIC PRESSURE	1	REPLACES P/N 0602130220
31	7538070	MACHINE SCREW	2	REPLACES P/N 0027104016
32	5825530444	RELAY, STARTER	1	REPLACES P/N 0602201402
33	0027106016	MACHINE SCREW	2	
34	5825500290	RELAY	3	REPLACES P/N 0602201400
35	0027105016	MACHINE SCREW	3	
36	8970119490	RELAY, GLOW PLUG	1	REPLACES P/N 0602202685
37	0027105016	MACHINE SCREW	2	
38	M3213500704	CONTROL BOX COVER	1	
39	0016906016	HEX HEAD BOLT	8	

CONTROL BOX ASSY. (CONTINUED)



NO.	PART NO.	PART NAME	QTY.	REMARKS
40	M3270100504	SELECTOR SWITCH	1	
40A	M3550002504	DECAL: SELECTOR SWITCH NUMBER	1	
40B	M3550002604	DECAL: SELECTOR SWITCH NUMBER	1	
41	M3213602704	SWITCH BRACKET	1	
42	M3213602804	SWITCH BRACKET	1	
43	0027104035	MACHINE SCREW	4	
43A	OEMAA8	HEX NUT	4	
44	7538070	MACHINE SCREW	4	REPLACES P/N 0027104016
44A	OEMAA8	HEX NUT	4	REPLACES P/N 0207004000
45	0016906016	HEX HEAD BOLT	4	
46	M3213602604	SWITCH COVER	1	
46-1	0317700180	WEATHER STRIP	1	
47	M3213602504	SWITCH COVER	1	
48	0016906016	HEX HEAD BOLT	10	
49	011008020	HEX HEAD BOLT	10	REPLACES P/N 0016908020
49A	0040508000	TOOTHED WASHER	1	
50	M3223001203	CONTROL PANEL	1	
51	0601807641	FREQUENCY METER, 45~65Hz 240V	1	
52	0601808988	AC AMMETER, 0~200A/400A:5A	1	
53	0601801040	CHANGE OVER SWITCH, AMMETER	1	
54	0601806859	AC VOLTMETER, 0~600V	1	
55	0601801041	CHANGE OVER SWITCH, VOLTMETER	1	
56	0601840073	RHEOSTAT (VR), 2W 1K OHM	1	
57	0601840100	KNOB	1	REPLACES P/N 0601840121
58	0602202641	CONTROLLER, ECU (CAN77)	1	
59	0021004040	MACHINE SCREW	2	
59A	OEMAA8	HEX NUT	2	REPLACES P/N 020700400
60	82608	SWITCH	1	REPLACES P/N 0601831340
61	0602103092	ALARM LAMP	3	
61A	0601810245	BULB, DC 18V	3	
62	0602120095	TACHOMETER	1	
63	0602122093	OIL PRESSURE GAUGE	1	
64	0602123099	WATER TEMPERATURE GAUGE	1	
65	0602121081	CHARGING AMMETER	1	
66	0602125090	FUEL GAUGE	1	
67	9826800370	PANEL LIGHT	1	REPLACES P/N 0601810141
68	0601831330	SWITCH, PANEL LIGHT	1	
69	0601830710	SWITCH, ENGINE SPEED	1	
70	M1223100004	STOPPER	1	
71	M3223100004	STOPPER	1	
72	0027105010	MACHINE SCREW	4	
73	0027105010	MACHINE SCREW	4	
74	M9220100004	SET SCREW	2	
75	0080200007	SNAP RING	2	
76	0602122272	UNIT, OIL PRESSURE	1	
77	M9200100004	ADAPTER	1	
78	8943998582	ADAPTER	1	REPLACES P/N 0602020220
79	0602123267	UNIT, WATER TEMPERATURE	1	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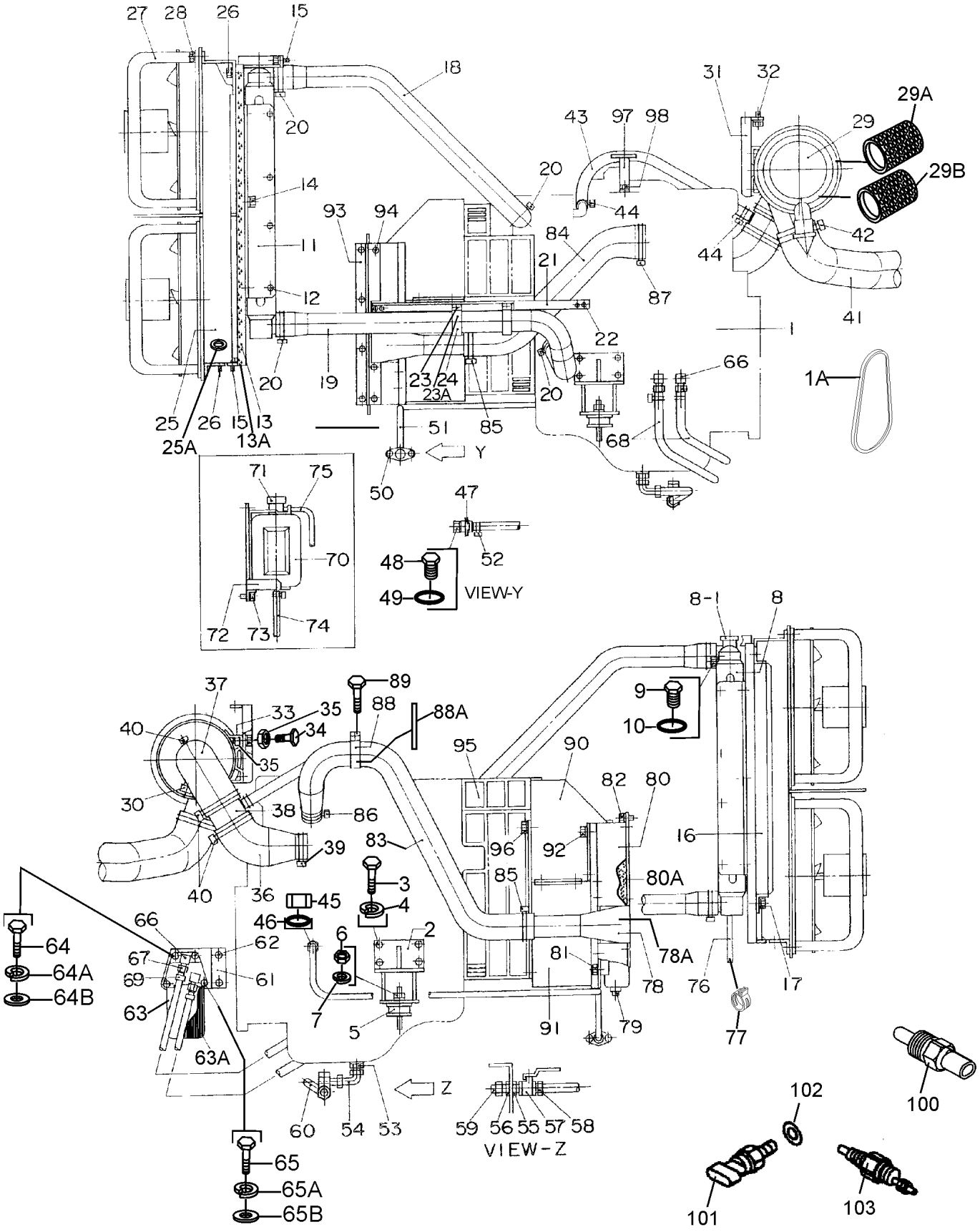
NO.	PART NO.	PART NAME	QTY.	REMARKS
80	9095720140	PACKING	1	REPLACES P/N 0602021109
81	0602120465	PICK UP, TACHOMETER	1	
82	0601806644	FUSE, 30A	1	
83	0601806640	FUSE, 65A	1	
84	0601830762	SWITCH, FUEL PUMP	1	
85	M3246703004	WIRE HARNESS. GENERATOR	1	
86	M3357202002	WIRE HARNESS, ENGINE	1	
87	M3357201802	WIRE HARNESS, CONTROLLER	1	
88	M3358200303	WIRE HARNESS, COLD WEATHER KIT	1	
89	0601831331	SWITCH, COLD WEATHER KIT	1	

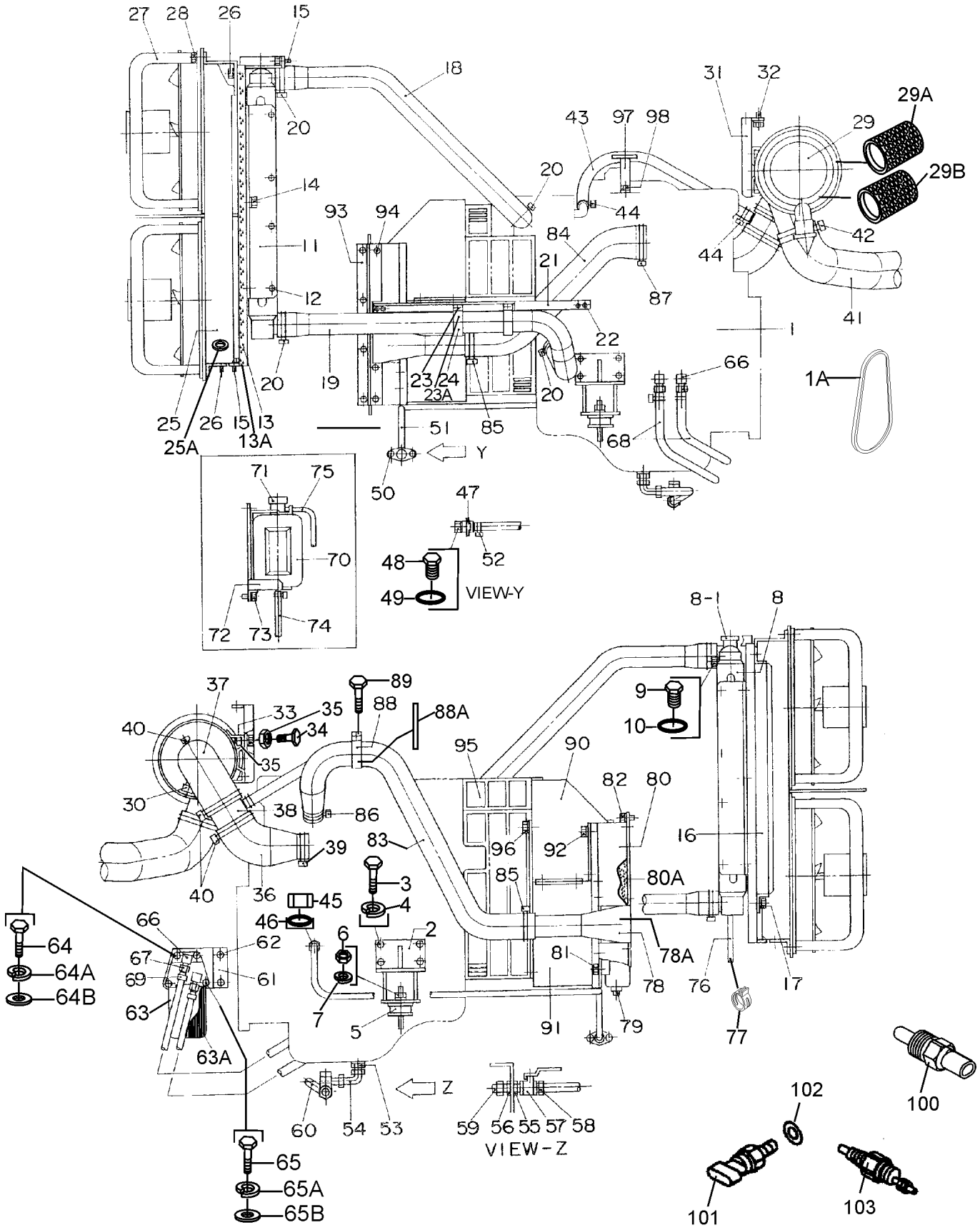
ENGINE AND RADIATOR ASSY.



ENGINE AND RADIATOR ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3924200054	ENGINE, ISUZU 4HK1X	1	
1A	8980627130	FAN BELT	1	REPLACES P/N 0602015253
2	M3303200603	ENGINE FOOT	2	
3	0105091025	HEX HEAD BOLT	8	REPLACES P/N 001031025
4	030210250	WASHER, LOCK	8	REPLACES P/N 0042510000
5	0605000060	RUBBER SUSPENSION	2	
6	0030012000	HEX NUT	2	
7	0040012000	WASHER, LOCK	2	
8	M3923200114	RADIATOR	1	
8-1	0602011029	CAP	1	
9	M9200100904	PLUG	1	
10	0150000016	O-RING	1	
11	M3310202904	RADIATOR BRACKET	2	
12	011008020	HEX HEAD BOLT	8	REPLACES P/N 0016908020
13	M3310202803	RADIATOR BRACKET	1	
13A	M3493114104	ACOUSTIC SHEET	1	
14	0016910025	HEX HEAD BOLT	6	
15	0016910025	HEX HEAD BOLT	4	
16	M3310202104	RADIATOR BRACKET	1	
17	011008020	HEX HEAD BOLT	2	REPLACES P/N 0016908020
18	M3310502603	RADIATOR HOSE, UPPER	1	
19	M3310502703	RADIATOR HOSE, LOWER	1	
20	0605515148	HOSE BAND	1	
21	M3310600303	HOSE SUPPORT	1	
22	0016906016	HEX HEAD BOLT	4	
23	M3310600204	HOSE BRACKET	2	
23A	0222100260	RUBBER SEAL	2	
24	011206020	HEX HEAD BOLT	2	REPLACES P/N 0016906020
25	M3310203003	FAN BRACKET	1	
25A	0601850239	GROMMET	1	
26	0016910025	HEX HEAD BOLT	4	
27	0601822968	FAN MOTOR	2	
28	0016910025	HEX HEAD BOLT	8	
29	0602046258	AIR CLEANER	1	
29A	0602046684	ELEMENT, AIR CLEANER, OUTER	1	
29B	P777639	ELEMENT, AIR CLEANER, INNER	1	REPLACES P/N 0602046685
30	0602040650	INDICATOR, AIR CLEANER	1	
31	M3373200204	BRACKET AIR CLEANER	1	
32	011008020	HEX HEAD BOLT	2	REPLACES P/N 0016908020
33	0602040596	BAND, AIR CLEANER	2	
34	011008020	HEX HEAD BOLT	4	REPLACES P/N 0016908020
35	020108060	HEX NUT	4	REPLACES P/N 0207008000
36	M3373101203	HOSE, AIR CLEANER	1	
37	M3373101103	HOSE, AIR CLEANER	1	
38	M3326100104	BLOW BY PIPE	1	
39	0605515146	HOSE BAND	1	

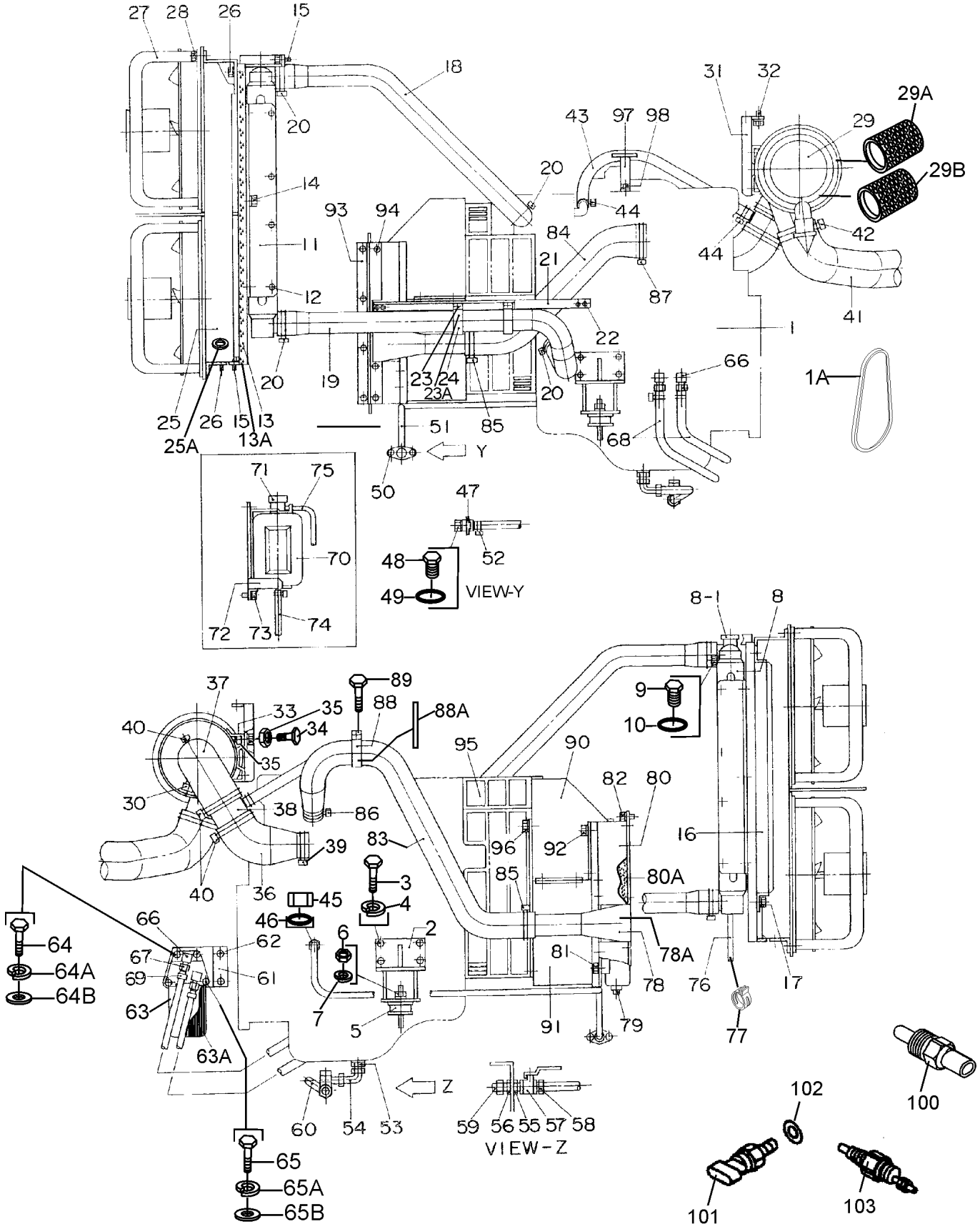
ENGINE AND RADIATOR ASSY. (CONTINUED)



ENGINE AND RADIATOR ASSY. (CONTINUED)

NO.	PART NO.	PART NAME	QTY.	REMARKS
40	0605515197	HOSE BAND	3	
41	M3373100903	AIR DUCT HOSE	1	
42	0605515231	HOSE BAND	1	
43	0191701050	BLOW BY HOSE	1	
44	0605515149	HOSE BAND	2	
45	M9100000204	HOSE JOINT	1	
46	0602021731	SEAL WASHER	1	
47	7812014003B	DRAIN JOINT	1	REPLACES P/N M2320300103
48	0802011104	PLUG	1	REPLACES P/N M9200200004
49	0150000018	O-RING	1	
50	011206020	HEX HEAD BOLT	2	REPLACES P/N 0016906020
51	0199102250	DRAIN HOSE	1	
52	0605515170	HOSE BAND	2	REPLACES P/N 0605515106
53	0602022581	ADAPTER	1	
54	0602022561	90° ELBOW	1	
55	0603306590	CONNECTOR	1	
56	0603300285	LOCK NUT	1	
57	0605511395	VALVE	1	
58	0603306395	HOSE JOINT	1	
59	0602021070	CAP	1	
60	0269200800	DRAIN HOSE	1	
61	M3323500004	BRACKET, OIL FILTER	1	
62	0016910025	HEX HEAD BOLT	2	
63	8973243861	OIL FILTER	1	REPLACES P/N 0602041007
63A	1132402322	CARTRIDGE, OIL FILTER	1	REPLACES P/N 0602041221
64	0010110120	HEX HEAD BOLT	2	
64A	0040010000	WASHER, LOCK	2	
64B	031110160	WASHER, FLAT	2	REPLACES P/N 0041210000
65	0010110150	HEX HEAD BOLT	2	
65A	0040010000	WASHER, LOCK	2	
65B	031110160	WASHER, FLAT	2	REPLACES P/N 0041210000
66	0602022530	ADAPTER	4	
68	0192101100	HOSE ASSY.	2	S/N 8510246 AND BELOW
68	M3323300004	HOSE ASSY.	2	S/N 8510247 AND ABOVE
70	0802081003C	RESERVE TANK, 5 LITERS	1	REPLACES P/N M9300000203
71	0802010900	CAP, RESERVE TANK	1	REPLACES P/N 0602010900
72	M3316100303	BRACKET, RESERVE TANK	1	
73	011008020	HEX HEAD BOLT	3	REPLACES P/N 0016908020
74	0199102100	HOSE	1	
75	0193600700	HOSE	1	
76	0193601000	HOSE	1	
77	0605515170	HOSE BAND	3	REPLACES P/N 0605515106
78	M3923200124	INTERCOOLER	1	
78A	M3490202004	ACOUSTIC SHEET	1	
79	0132004000	PLUG, 3/8"	1	

ENGINE AND RADIATOR ASSY. (CONTINUED)



ENGINE AND RADIATOR ASSY. (CONTINUED)

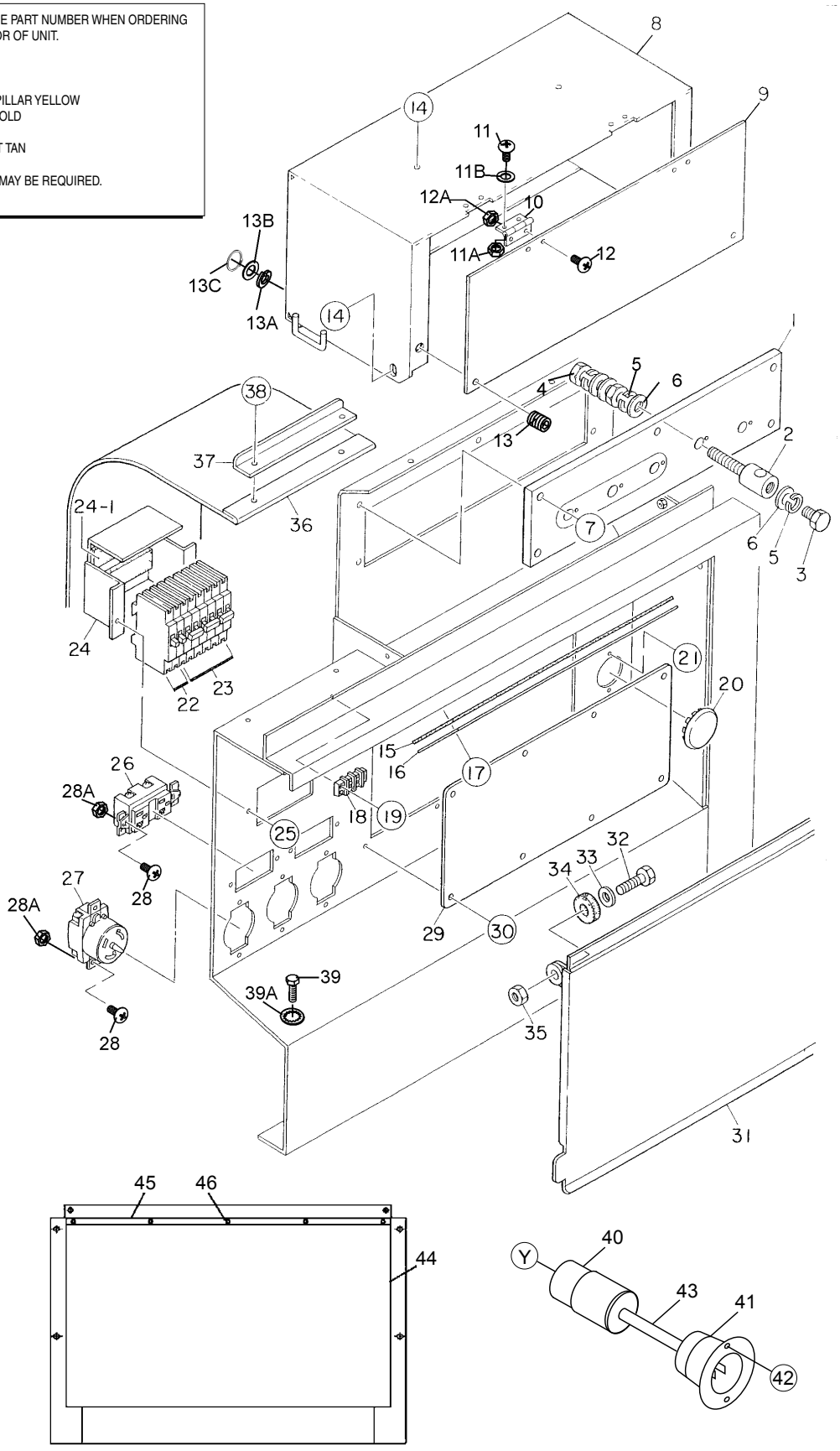
NO.	PART NO.	PART NAME	QTY.	REMARKS
80	M3310202603	BRACKET, INTER COOLER	1	
80A	M3493114504	ACOUSTIC SHEET	2	
81	012210020	HEX HEAD BOLT	8	REPLACES P/N 0017110020
82	0016906016	HEX HEAD BOLT	12	
83	M3310502803	COOLER HOSE	1	
84	M3310502903	COOLER HOSE	1	
85	0605515208	HOSE BAND	2	
86	0605515204	HOSE BAND	1	
87	0605515207	HOSE BAND	1	
88	M3310600404	HOSE BRACKET	1	
88A	0228900320	RUBBER SEAL	1	
89	011206020	HEX HEAD BOLT	1	REPLACES P/N 0016906020
90	M3310303803	FAN SHROUD	1	
91	M3310303903	FAN SHROUD	1	
92	011206020	HEX HEAD BOLT	8	REPLACES P/N 0016906020
93	M3310304104	BRACKET, FAN SHROUD	1	
94	0016906016	HEX HEAD BOLT	8	
95	M3310304003	FAN GUARD	1	
96	011206020	HEX HEAD BOLT	6	REPLACES P/N 0016906020
97	M3326200204	BLOWBY HOSE BRACKET	1	
98	011008020	HEX HEAD BOLT	1	REPLACES P/N 0016908020
100	8121468300	SENSOR, WATER TEMPERATURE	1	
101	8980274560	SENSOR, OIL PRESSURE	1	
102	1096300850	GASKET, SENSOR OIL PRESSURE	1	
103	8971256011	SWITCH, OVERHEAT	1	

OUTPUT TERMINAL ASSY.

ADD THE FOLLOWING DIGITS AFTER THE PART NUMBER WHEN ORDERING ANY PAINTED PANEL TO INDICATE COLOR OF UNIT.

1-ORANGE	
2-WHITE	6-CATERPILLAR YELLOW
3-SPECTRUM GREY	7-CATO GOLD
4-SUNBELT GREEN	8-RED
5-BLACK	9-DESERT TAN

THE SERIAL NUMBER MAY BE REQUIRED.



OUTPUT TERMINAL ASSY.

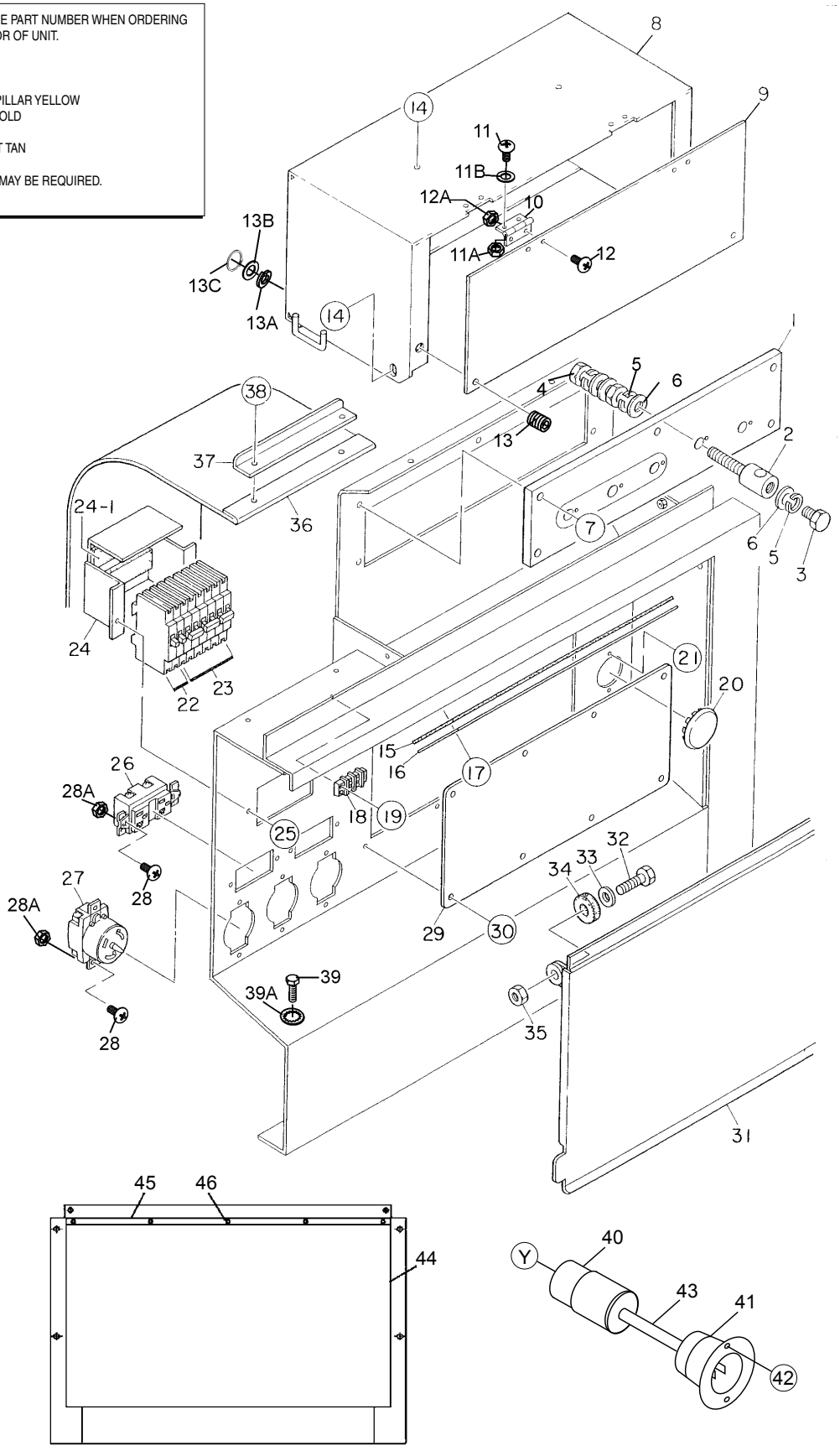
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3230700003	TERMINAL BOARD	1	
2	M9220100304	OUTPUT TERMINAL BOLT	5	
3	0801830804	TIE BOLT	5	REPLACES P/N M9220100404
4	0039316000	HEX NUT	10	
5	0040016000	WASHER, LOCK	15	
6	0401450160	WASHER, FLAT	20	REPLACES P/N 0041416000
7	0012108035	HEX HEAD BOLT	5	REPLACES P/N 0016908035
8	M3236101003	TERMINAL COVER	1	
9	M3236100404	OUTPUT WINDOW	1	
10	0605010040	HINGE	2	
11	0027103010	MACHINE SCREW	4	
11A	0207003000	HEX NUT	4	REPLACES P/N 0030003000
11B	58413	WASHER, FLAT	4	REPLACES P/N 0041203000
12	0027103010	MACHINE SCREW	4	
12A	0207003000	HEX NUT	4	REPLACES P/N 0030003000
13	M9220100804	SET SCREW	2	
13A	0040006000	WASHER, LOCK	2	
13B	952404470	WASHER, FLAT	2	REPLACES P/N 0041206000
13C	0080200005	RETAINING RING	2	
14	0016906016	HEX HEAD BOLT	4	
15	M3236400004	CABLE, OUTLET COVER	1	
16	M3236300004	SUPPORTER, CABLE OUTLET COVER	1	
17	011206020	HEX HEAD BOLT	6	REPLACES P/N 0016906020
18	0601815194	TERMINAL BLOCK	1	
19	7538070	MACHINE SCREW	2	REPLACES P/N 0027104016
20	0603306775	BLIND PLUG	2	
21	7538070	MACHINE SCREW	4	REPLACES P/N 0027104016
22	0601870440	CIRCUIT BREAKER, 1P 20A	2	S/N 9880110 AND BELOW
22	0601808803	CIRCUIT BREAKER, 1P 20A	2	S/N 9880111 AND ABOVE
23	0601870441	CIRCUIT BREAKER, 2P 50A	3	S/N 9880110 AND BELOW
23	0601808804	CIRCUIT BREAKER, 2P 50A	3	S/N 9880111 AND ABOVE
24	M1260700504	BREAKER, FITTING COVER	1	S/N 9980110 AND BELOW
24	M1260700304	BREAKER, FITTING COVER	1	S/N 9980111 AND ABOVE
24-1	0222100100	CUSHION RUBBER	2	S/N 9980110 AND BE;OW
24-1	0222100150	CUSHION RUBBER	2	S/N 9980111 AND ABOVE
25	011206020	HEX HEAD BOLT	2	REPLACES P/N 0016906020
26	0601814013	RECEPTACLE, GF530EM, 125V 20Ax2	2	
27	0601814014	RECEPTACLE, CS6369L, 250V 50A	3	
28	7538070	MACHINE SCREW	10	REPLACES P/N 0027104016
28A	OEMAA8	HEX NUT	10	REPLACES P/N 0207004000
29	M3236400204	COVER	1	
30	0016906016	HEX HEAD BOLT	8	
31	M3236100213	TERMINAL COVER	1	
32	012212045	HEX HEAD BOLT	2	REPLACES P/N 0010112045
33	031112230	WASHER, FLAT	2	REPLACES P/N 0041212000
34	0805009804	STAY RUBBER	2	REPLACES P/N M9310200004
35	0030012000	HEX NUT	2	

OUTPUT TERMINAL ASSY.

ADD THE FOLLOWING DIGITS AFTER THE PART NUMBER WHEN ORDERING ANY PAINTED PANEL TO INDICATE COLOR OF UNIT.

1-ORANGE	
2-WHITE	6-CATERPILLAR YELLOW
3-SPECTRUM GREY	7-CATO GOLD
4-SUNBELT GREEN	8-RED
5-BLACK	9-DESERT TAN

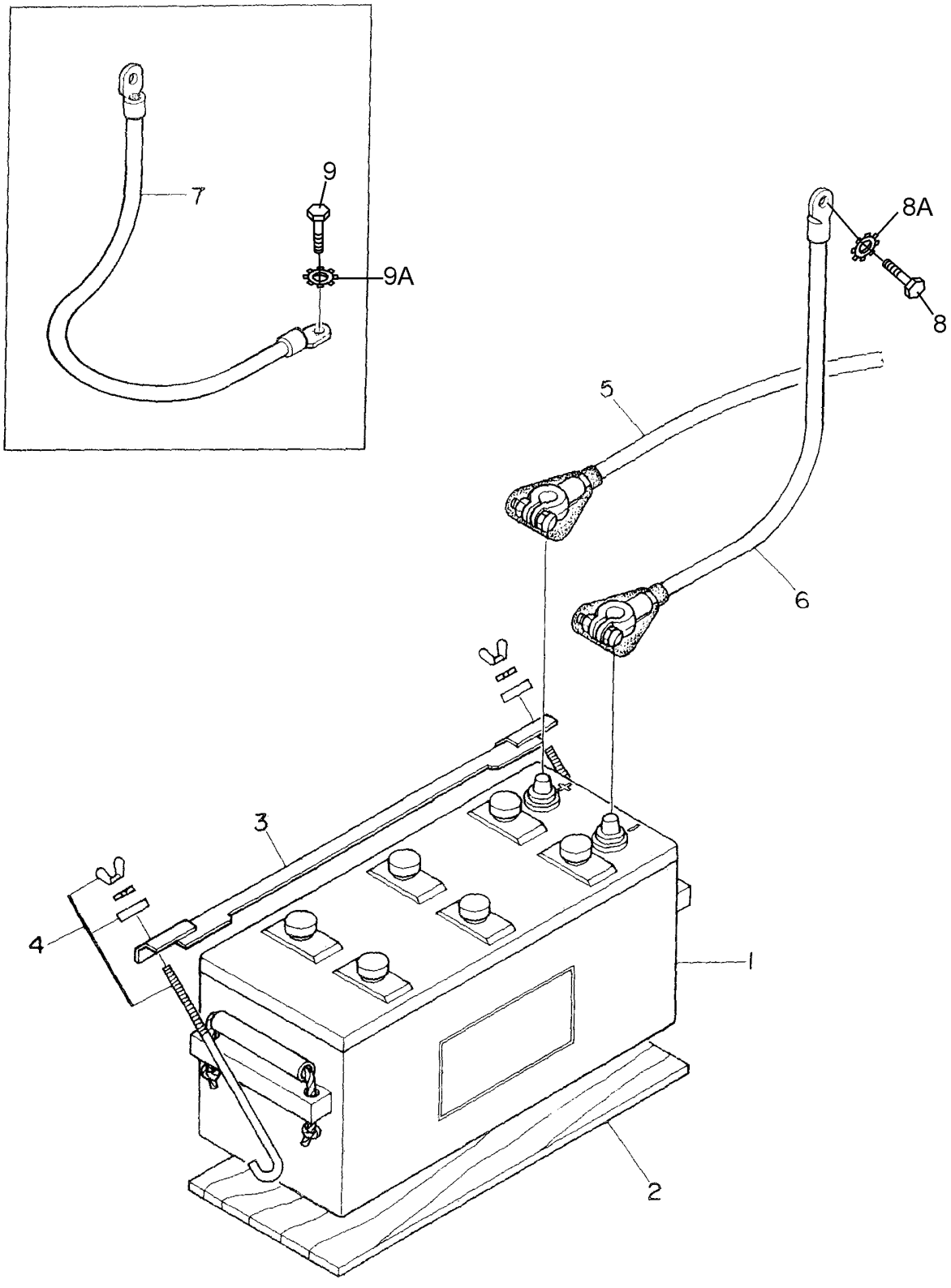
THE SERIAL NUMBER MAY BE REQUIRED.



OUTPUT TERMINAL ASSY.

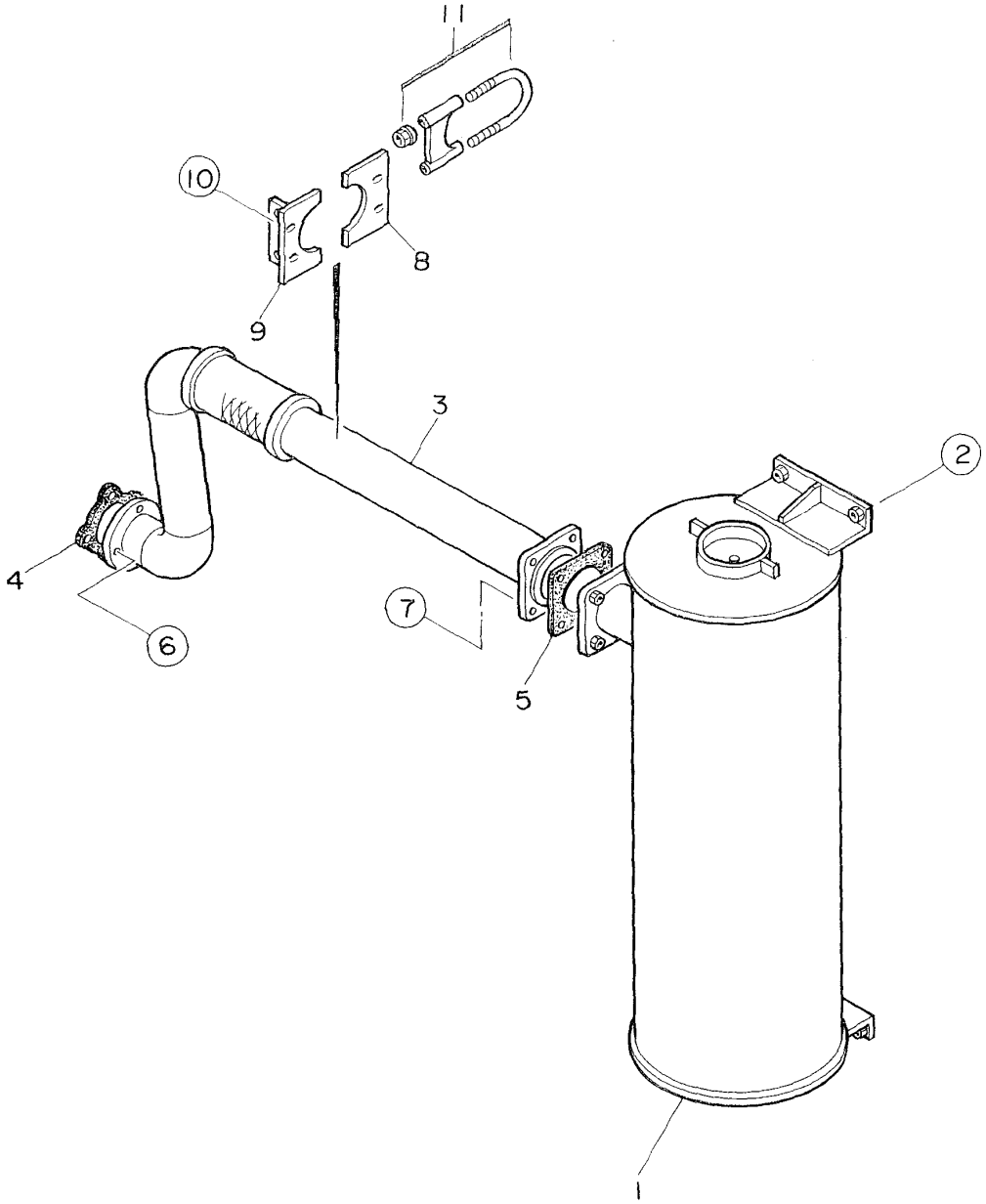
NO.	PART NO.	PART NAME	QTY.	REMARKS
36	M4236100604	COVER	1	
37	M4236400304	BRACKET	1	
38	0016906016	HEX HEAD BOLT	2	
39	0019208020	HEX HEAD BOLT	1	
39A	0040508000	TOOTHED WASHER	2	
40	0601812527	CONNECTOR	1	
41	0601811177	RECEPTACLE	1	
42	0027104015	MACHINE SCREW	2	
43	M1358200804	WIRE HARNESS, WATER HEATER	1	
44	M3454700004	RUBBER SHEET	1	
45	M3454700104	RUBBER SHEET HOLDER	1	
46	0605053010	SELF DRILLING SCREW	5	

BATTERY ASSY.



NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0602220198	BATTERY	1	
2	M9310500404	BATTERY SHEET	1	
3	M9103000504	BATTERY BAND	1	
4	0602220921	BATTERY BOLT SET	2	
5	M3346901604	BATTERY CABLE	1	
6	M3346901504	BATTERY CABLE	1	
7		CABLE	1	MAKE LOCALLY
8	0016910025	HEX HEAD BOLT	1	
8A	0040510000	TOOTHED WASHER	1	
9	0016910025	HEX HEAD BOLT	1	
9A	0040508000	TOOTHED WASHER114	1	

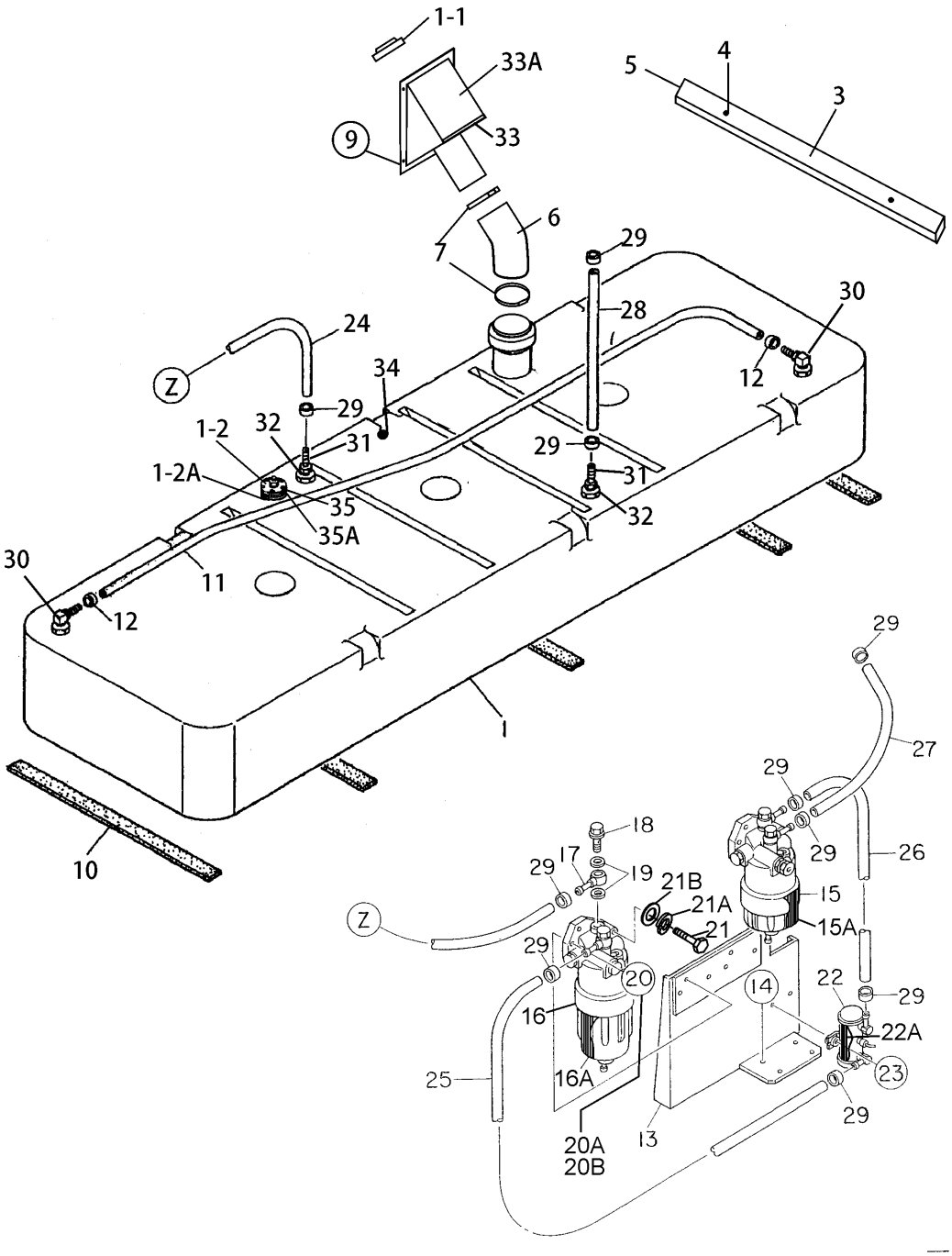
MUFFLER ASSY.



MUFFLER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3330101002	MUFFLER	1	
2	012212030	HEX HEAD BOLT	4	REPLACES P/N 0017112030
3	M3333001603	EXHAUST PIPE	1	
4	1141451840	GASKET	1	REPLACES P/N 0602320108
5	M3333200304	GASKET	1	
6	0039308000	HEX NUT	8	
7	0017110050	HEX HEAD BOLT	4	
8	M3330401104	COVER	1	
9	M3330401003	BRACKET	1	
10	011008020	HEX HEAD BOLT	4	REPLACES P/N 0016908020
11	0602326061	U-BOLT SET	1	

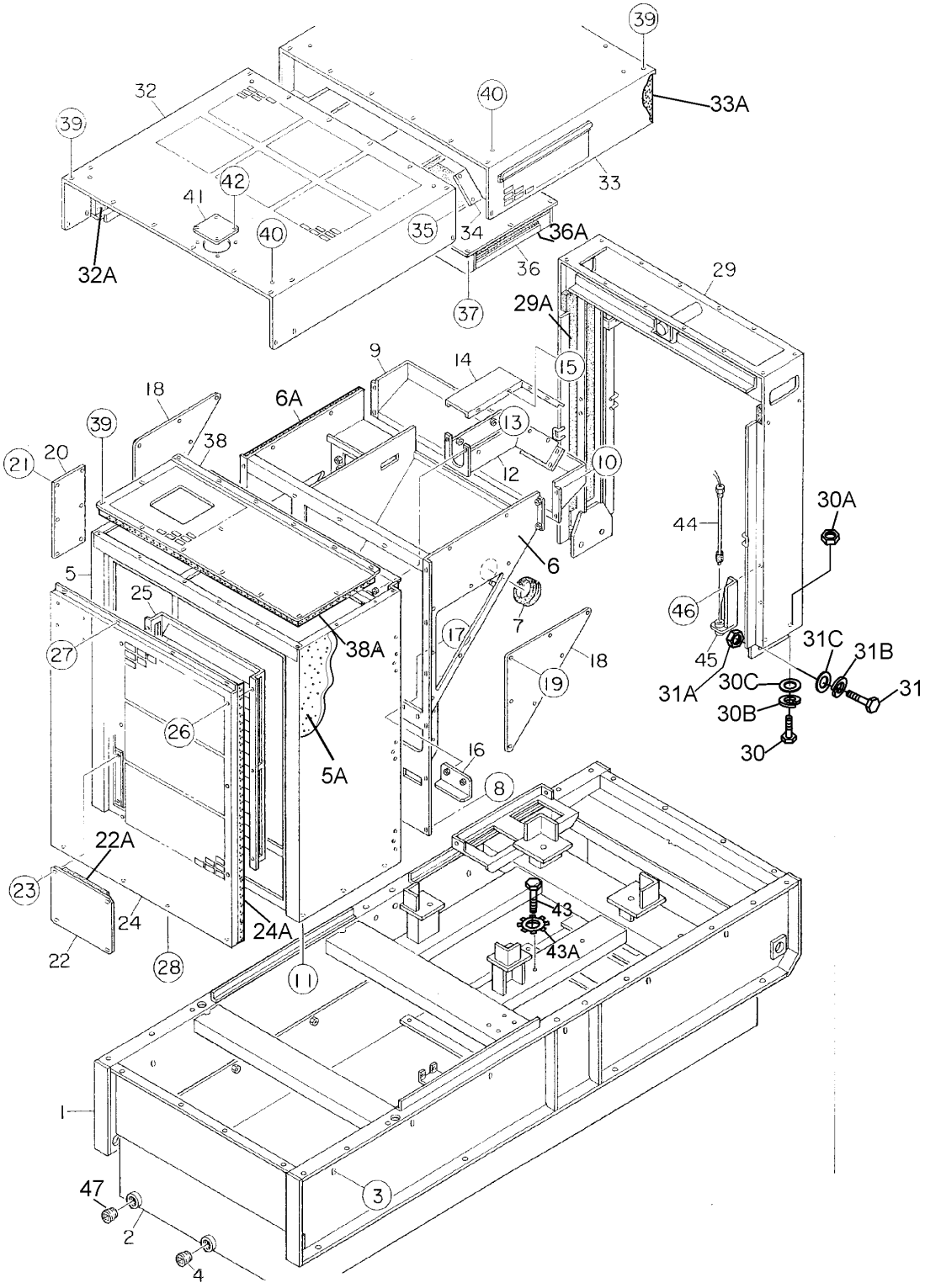
FUEL TANK ASSY.



FUEL TANK ASSY.

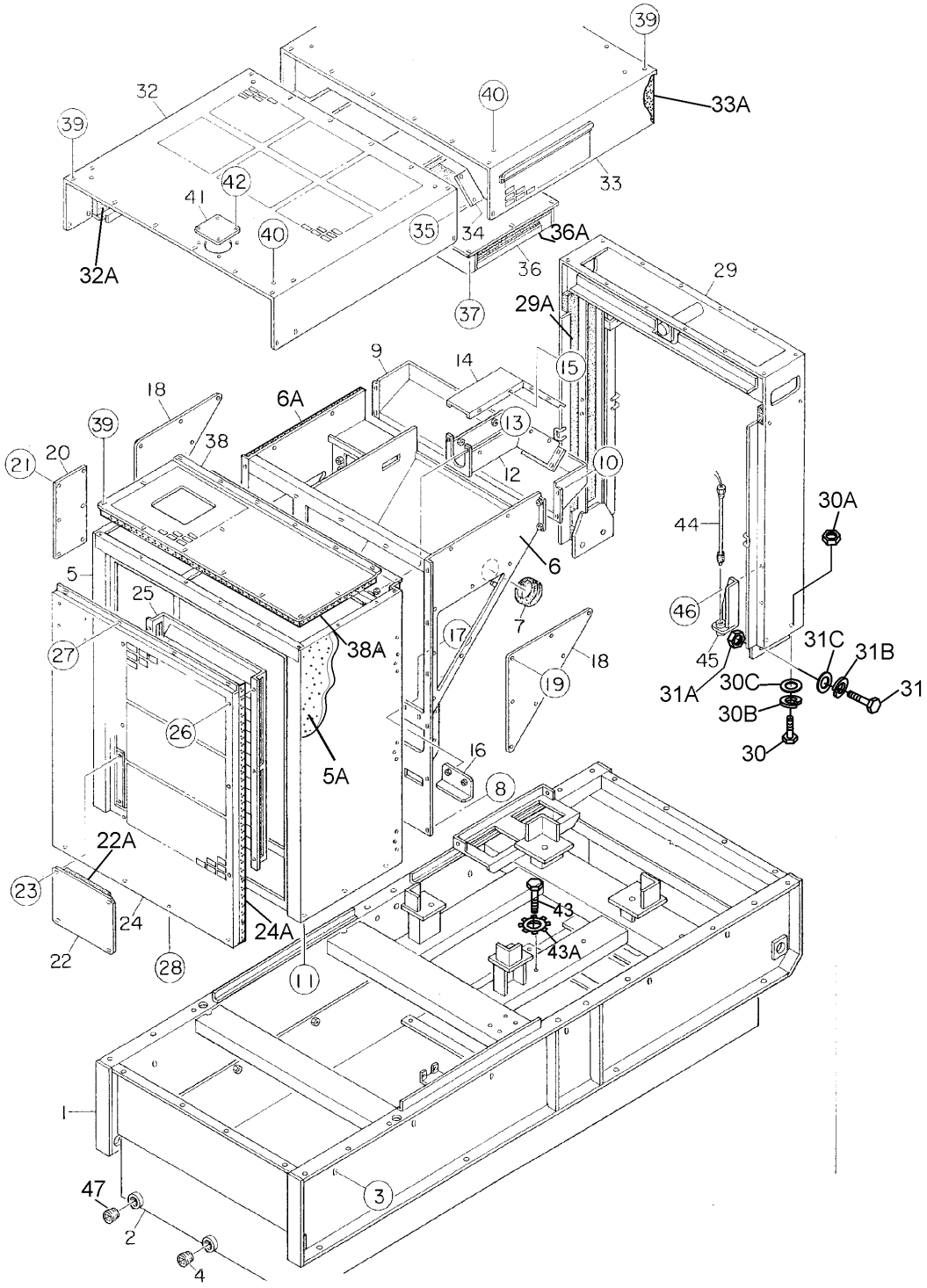
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3364000203	FUEL TANK	1	
1-1	0605505072	FUEL TANK CAP	1	
1-2	0605501074	FUEL SENDER UNIT	1	
1-2A	0605516090	GASKET	1	
3	M3364200003	FUEL TANK BRACKET	2	
4	0016910025	HEX HEAD BOLT	4	
5	0016910030	HEX HEAD BOLT	4	
6	M2367700003	FUEL FILLER HOSE	1	
7	0605515225	HOSE BAND	2	
9	011008020	HEX HEAD BOLT	8	REPLACES P/N 0019208020
10	0222101000	TANK SHEET	6	
11	0191302200	VENT HOSE	1	
12	0605515109	HOSE BAND	2	
13	M3366700203	FUEL FILTER BRACKET	1	
14	011008020	HEX HEAD BOLT	4	REPLACES P/N 0016908020
15	8980139861	FUEL FILTER ASSY.(MAIN)	1	REPLACES P/N 0602042426
15A	8981430410	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042515
16	8980758551	FUEL FILTER ASSY.(PRE.)	1	REPLACES P/N 0602042405
16A	8980742880	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042516
17	8973834270	JOINT PIPE	4	REPLACES P/N 0602042661
18	1096750951	JOINT BOLT	4	REPLACES P/N 0602042621
19	1096300860	PACKING	8	REPLACES P/N 0602042641
20	0015310045	HEX HEAD BOLT	4	
20A	004001000	SPRING WASHER	4	
20B	031110160	PLAIN WASHER	4	REPLACES P/N 004121000
21	0010110080	HEX HEAD BOLT	2	
21A	0040010000	WASHER, LOCK	2	
21B	031110160	WASHER, FLAT	2	REPLACES P/N 0041210000
22	8980682750	FUEL FEED PUMP	1	REPLACES P/N 0602023240
22A	8980714010	FUEL FILTER	1	REPLACES P/N 0602042517
23	011606025	HEX HEAD BOLT	2	REPLACES P/N 0016906025
24	0191301790	SUCTION HOSE	1	
25	0191300800	SUCTION HOSE	1	
26	0191300230	SUCTION HOSE	1	
27	0191300850	SUCTION HOSE	1	
28	0191300750	RETURN HOSE	1	
29	0605515109	HOSE BAND	10	
30	0602022791	HOSE JOINT	2	
31	0602022778	HOSE JOINT	2	
32	M3364400004	PICKUP TUBE	2	
33	M2484600003	FUEL FILLER BRACKET	1	
33A	M2494600004	ACOUSTIC SHEET	1	
34	0603306792	PLUG	1	
35	0343708008	HEX HEAD BOLT	5	
35A	0605516091	SEALING WASHER	5	

ENCLOSURE ASSY. PART 1.



ENCLOSURE ASSY. PART1.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3414000102	BASE	1	
2	M3364300003	ENVIRONMENTAL TANK	1	
3	0016910030	HEX HEAD BOLT	12	
4	0603306797	PLUG, 1-1/2"	1	
5	M3423002802	FRONT FRAME	1	
5A	M3493114403	ACOUSTIC SHEET	1	
6	M3423002902	FRONT FRAME	1	
6A	M3493114403	ACOUSTIC SHEET	1	
7	0601851765	GROMMET	1	
8	011008020	HEX HEAD BOLT	27	REPLACES P/N 0016908020
9	M3423003003	FRONT FRAME	1	
10	011008020	HEX HEAD BOLT	8	REPLACES P/N 0016908020
11	0016910025	HEX HEAD BOLT	6	
12	M3310400403	HOSE COVER	1	
13	011206020	HEX HEAD BOLT	7	REPLACES P/N 0016906020
14	M3310400304	HOSE COVER	1	
15	011206020	HEX HEAD BOLT	8	REPLACES P/N 0016906020
16	M3423500204	BRACKET	1	
17	011008020	HEX HEAD BOLT	2	REPLACES P/N 0016906020
18	M3423200704	DUCT COVER	2	
19	011206020	HEX HEAD BOLT	14	REPLACES P/N 0016906020
20	M3310302704	SHROUD BRACKET	1	
21	0016906016	HEX HEAD BOLT	6	
22	M3423300304	DISCHARGE GUIDE	1	
22A	M3493113704	ACOUSTIC SHEET	1	
23	011008020	HEX HEAD BOLT	4	REPLACES P/N 0019208020
24	M3423202603	COVER FRONT FRAME	1	
24A	M3493111803	ACOUSTIC SHEET	1	
25	M3423202403	FRONT LOUVER	1	
26	0019206016	HEX HEAD BOLT	6	
27	011008020	HEX HEAD BOLT	4	REPLACES P/N 0019208020
28	011008020	HEX HEAD BOLT	4	REPLACES P/N 0016908020
29	M3434000102	CENTER FRAME	1	
29A	M3493201304	ACOUSTIC SHEET	1	
30	0010114040	HEX HEAD BOLT	4	
30A	515455840	HEX NUT	4	REPLACES P/N 0030014000
30B	030214350	WASHER, LOCK	4	REPLACES P/N 0040014000
30C	0041220000	WASHER, FLAT	8	
31	0010120050	HEX HEAD BOLT	4	
31A	0030020000	HEX NUT	4	
31B	030220510	WASHER, LOCK	4	REPLACES P/N 0040020000
31C	0041220000	WASHER, FLAT	8	
32	M3463101503	ROOF PANEL	1	
32A	M3493509204	ACOUSTIC SHEET	1	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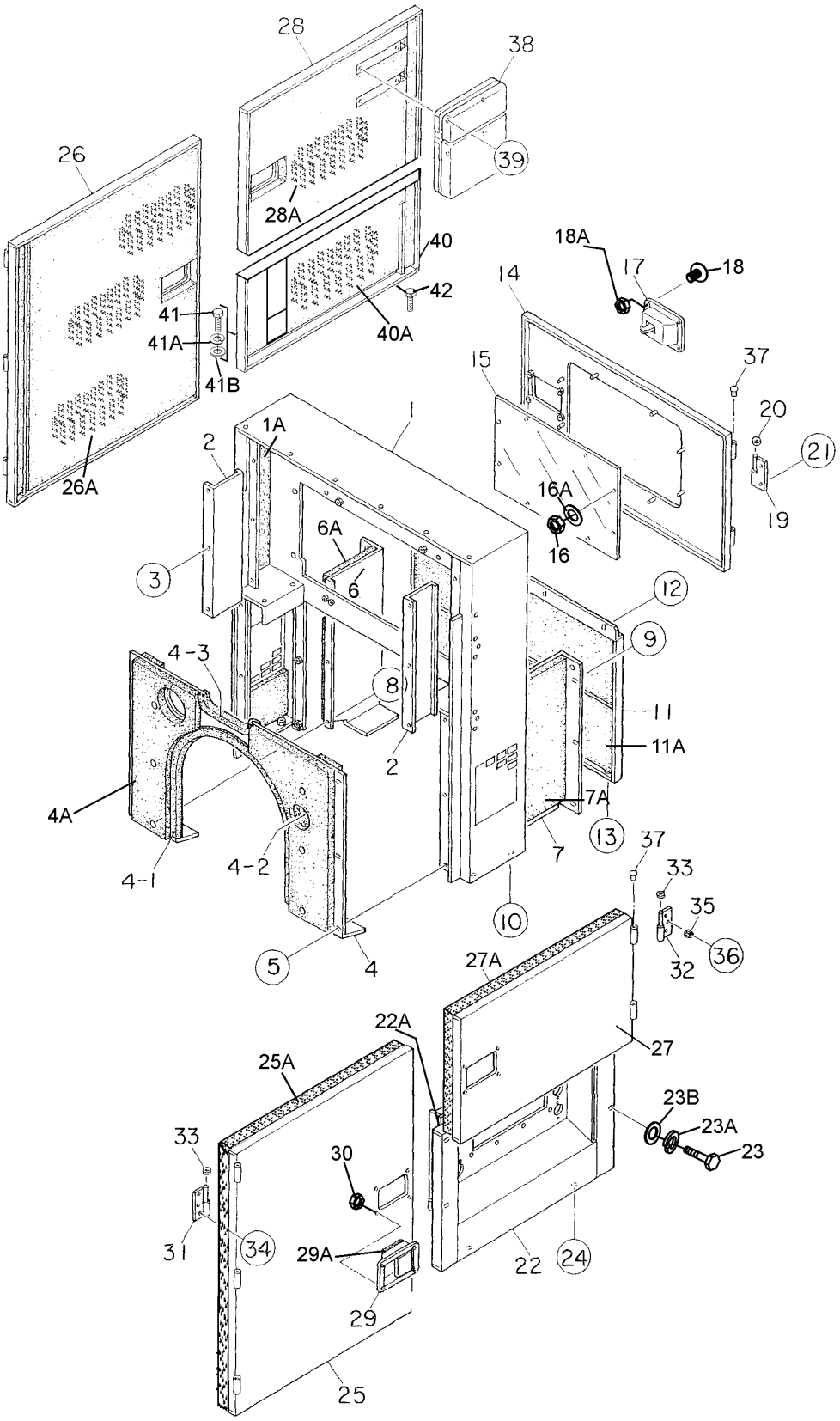
ENCLOSURE ASSY. PART 1 (CONTINUED)

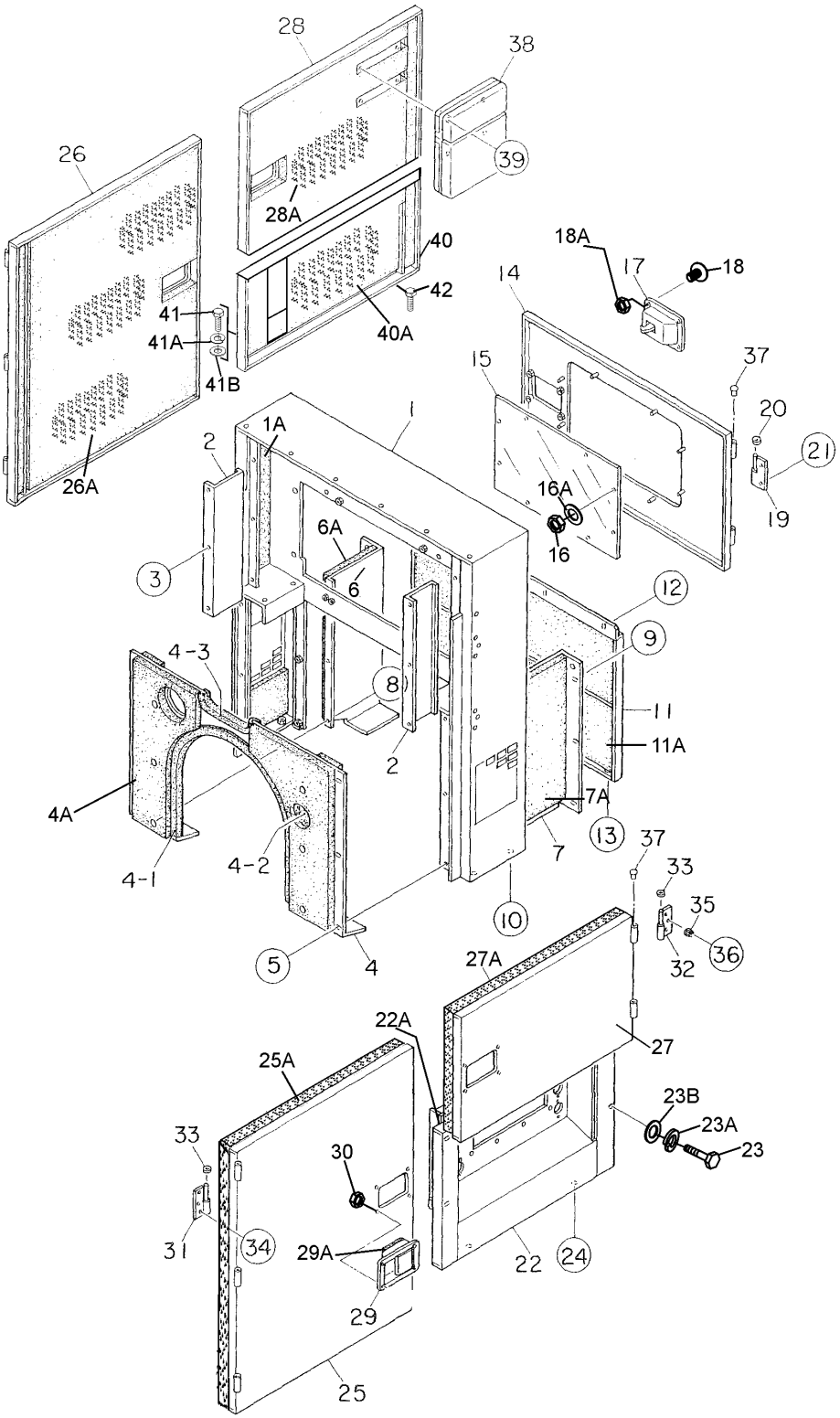
NO.	PART NO.	PART NAME	QTY.	REMARKS
33	M3463202202	ROOF PANEL	1	
33A	M3493509303	ACOUSTIC SHEET	1	
34	M3463201104	BACK PLATE	2	
35	0016906016	HEX HEAD BOLT	12	
36	M3463202303	DUCT	1	
36A	M3493506004	ACOUSTIC SHEET	1	
37	011008020	HEX HEAD BOLT	8	REPLACES P/N 0016908020
38	M3423202704	OVER COVER, FRONT FRAME	1	
38A	M3493108004	ACOUSTIC SHEET	1	
39	011008020	HEX HEAD BOLT	51	REPLACES P/N 0019208020
40	0017110025	HEX HEAD BOLT	8	REPLACES P/N 0019210025
41	M3310600004	COVER, RADIATOR CAP	1	
42	011008020	HEX HEAD BOLT	4	REPLACES P/N 0019208020
43	011008020	HEX HEAD BOLT	1	REPLACES P/N 0019698020
43A	0040508000	TOOTHED WASHER	1	
44	0605503062	FUEL LEAK DETECTED SWITCH	1	
45	M1414800104	BRACKET	1	
46	011008020	HEX HEAD BOLT	2	REPLACES P/N 0016908020
47	0603306793	PLUG	1	

ENCLOSURE ASSY. PART 2.



ENCLOSURE ASSY. PART 2.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3444000102	REAR FRAME	1	
1A	M3493308603	ACOUSTIC SHEET	1	
2	M3443002004	DUCT	2	
3	011008020	HEX HEAD BOLT	6	REPLACES P/N 0016908020
4	M3443400103	PANEL, REAR FRAME	1	
4A	M3493308904	ACOUSTIC SHEET	1	
4-1	0314501550	RUBBER SEAL	1	
4-2	0330000250	EDGING	1	
4-3	0330000325	EDGING	1	
5	011008020	HEX HEAD BOLT	6	REPLACES P/N 0016908020
6	M3443002103	DUCT	1	
6A	M3493308804	ACOUSTIC SHEET	1	
7	M3443002203	DUCT	1	
7A	M3443008804	ACOUSTIC SHEET	1	
8	011008020	HEX HEAD BOLT	6	REPLACES P/N 0016908020
9	011008020	HEX HEAD BOLT	6	REPLACES P/N 0016908020
10	0016910025	HEX HEAD BOLT	4	
11	M3444300203	COVER, REAR FRAME	1	
11A	M3493308704	ACOUSTIC SHEET	2	
12	011008020	HEX HEAD BOLT	4	REPLACES P/N 0019208020
13	011008020	HEX HEAD BOLT	4	REPLACES P/N 0019208020
14	M3444200103	DOOR, REAR FRAME	1	
15	M3443600304	WINDOW PLATE	1	
16	0207306000	HEX NUT	8	
16A	952404470	WASHER, FLAT	8	REPLACES P/N 0041206000
17	0605012309	DOOR HANDLE ASSY	1	
18	0176060030	HEX NUT	4	REPLACES P/N 0207006000
19	M9110100204	HINGE	2	
20	M9116100004	WASHER	2	
21	011008020	HEX HEAD BOLT	3	REPLACES P/N 0019208020
22	M3454200202	SPLASHER PANEL	1	S/N 9980110 AND BELOW
22	M3454200212	SPLASHER PANEL	1	S/N 9980111 AND ABOVE
22A	M3493426704	ACOUSTIC SHEET	1	
23	0019108065	HEX HEAD BOLT	4	
23A	0042308000	WASHER, LOCK	4	
23B	0042408000	WASHER, FLAT	4	
24	0016910025	HEX HEAD BOLT	2	
25	M3454000503	SIDE DOOR	1	
25A	M3493426504	ACOUSTIC SHEET	1	
26	M3454000603	SIDE DOOR	1	
26A	M3493426504	ACOUSTIC SHEET	1	
27	M3454000703	SIDE DOOR	1	
27A	M3493417204	ACOUSTIC SHEET	1	
28	M3454000403	SIDE DOOR	1	
28A	M3494405804	ACOUSTIC SHEET	1	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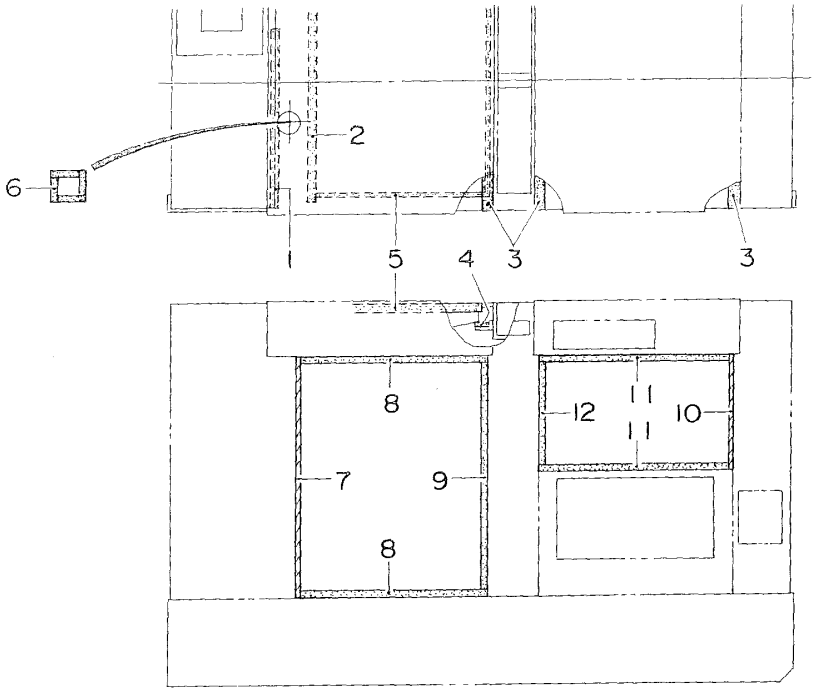
ENCLOSURE ASSY. PART 2 (CONTINUED)

NO.	PART NO.	PART NAME	QTY.	REMARKS
29	0605012309	DOOR HANDLE ASSY	4	
29A	C9312500004	SEAL RUBBER	4	
30	00176060030	HEX NUT	16	REPLACES P/N 0207006000
30A	020106050	HEX NUT	16	REPLACES P/N 0030006000
31	0845046904	HINGE	6	REPLACES P/N M9110100804
32	0845047004	HINGE	5	REPLACES P/N M9110100904
33	M9116100004	WASHER	11	
34	011008020	HEX HEAD BOLT	26	REPLACES P/N 0019208020
35	0601850097	STOPPER	8	
36	0027208025	MACHINE SCREW	8	
37	M9310000004	CAP	13	
38	0600800320	MANUAL PACK	1	
39	0021806016	MACHINE SCREW	4	
40	M3454100003	SIDE PANEL	1	
40A	M3494405904	ACOUSTIC SHEET	1	
41	0019108065	HEX HEAD BOLT	4	
41A	0042308000	WASHER, LOCK	4	
41B	031108160	WASHER, FLAT	4	
42	0016910025	HEX HEAD BOLT	2	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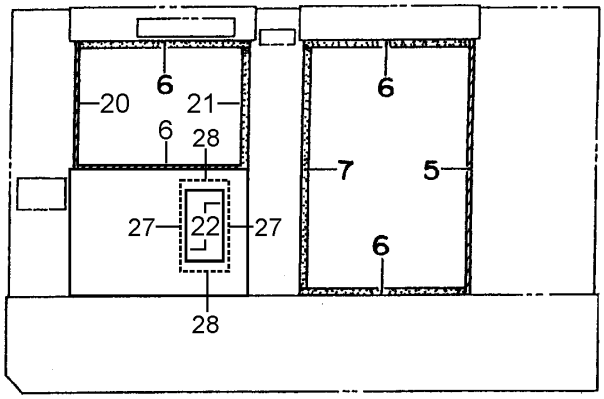
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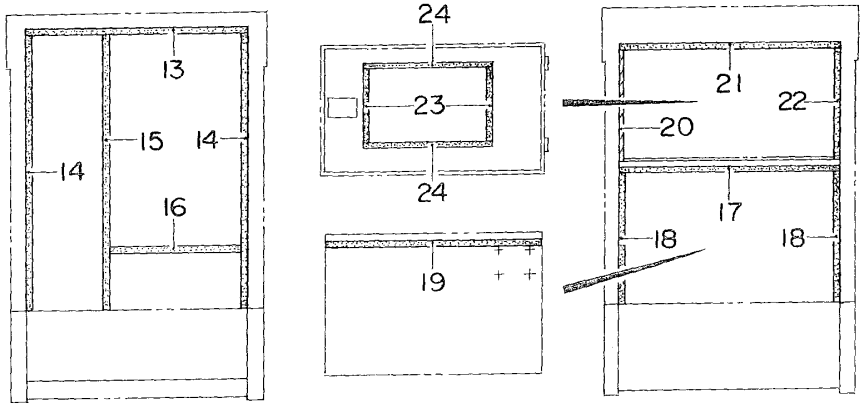
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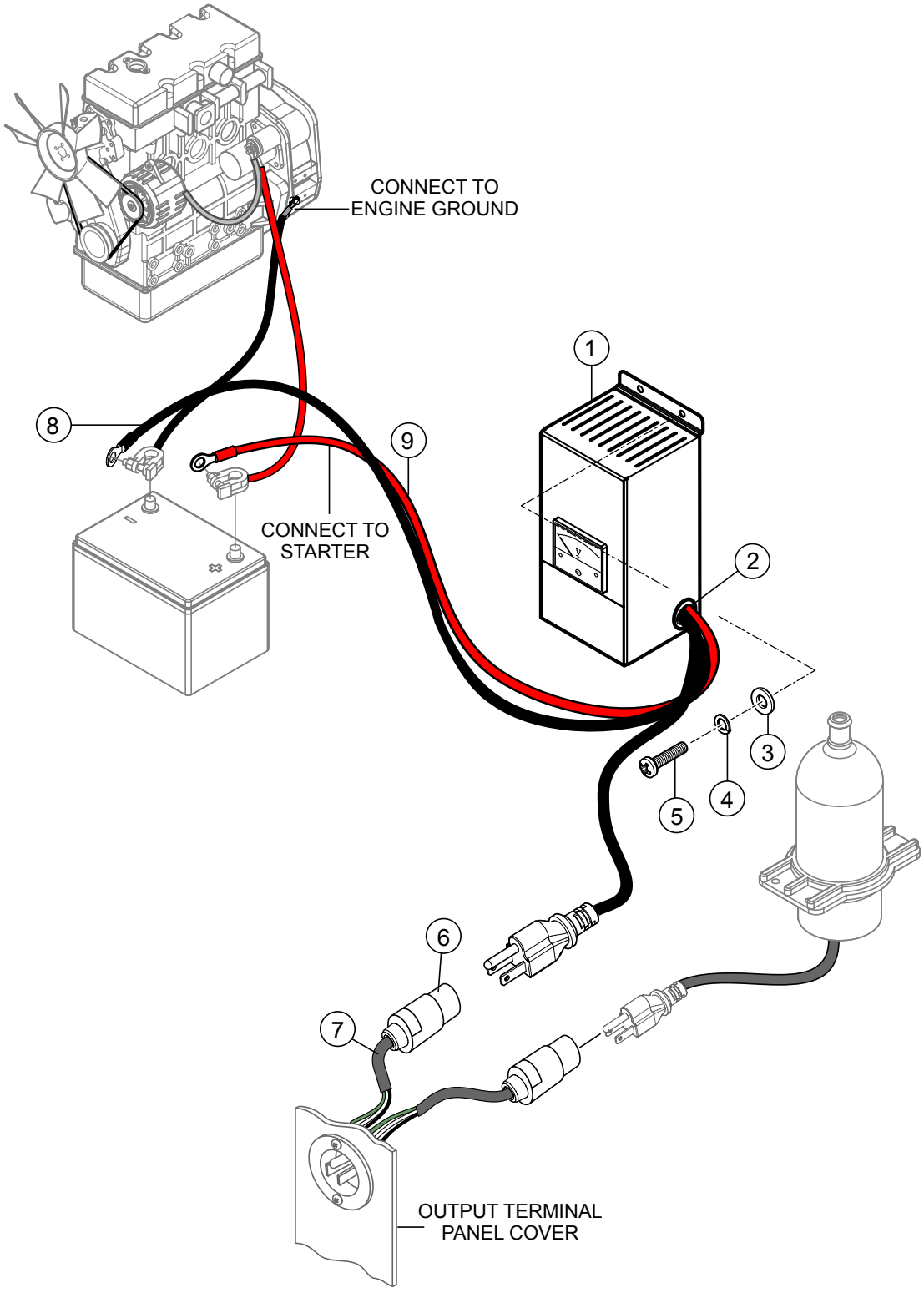
RUBBER SEALS ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0229200870	RUBBER SEAL	1	
2	0229201130	RUBBER SEAL	1	
3	0229201240	RUBBER SEAL	3	
4	0228901070	RUBBER SEAL	1	
5	0314502700	RUBBER SEAL	1	
6	0229200125	RUBBER SEAL	4	
7	0228901165	RUBBER SEAL	3	
8	0228900925	RUBBER SEAL	4	
9	0228901105	RUBBER SEAL	3	
10	0228900565	RUBBER SEAL	1	
11	0228900945	RUBBER SEAL	4	
12	0228900505	RUBBER SEAL	1	
13	0229201090	RUBBER SEAL	1	
14	0229201335	RUBBER SEAL	2	
15	0228901335	RUBBER SEAL	1	
16	0228900655	RUBBER SEAL	1	
17	0229201090	RUBBER SEAL	1	
18	0228100630	RUBBER SEAL	2	
19	0229401080	RUBBER SEAL	1	
20	0228800565	RUBBER SEAL	1	
21	0228801080	RUBBER SEAL	1	
22	0228800545	RUBBER SEAL	1	
23	0228100370	RUBBER SEAL	2	
24	0228100640	RUBBER SEAL	2	
25	0228900700	RUBBER SEAL	1	
26	0228900640	RUBBER SEAL	1	
27	0229200295	RUBBER SEAL	2	
28	0229200220	RUBBER SEAL	2	


CONNECT TO
ENGINE GROUND
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CONNECT TO
STARTER
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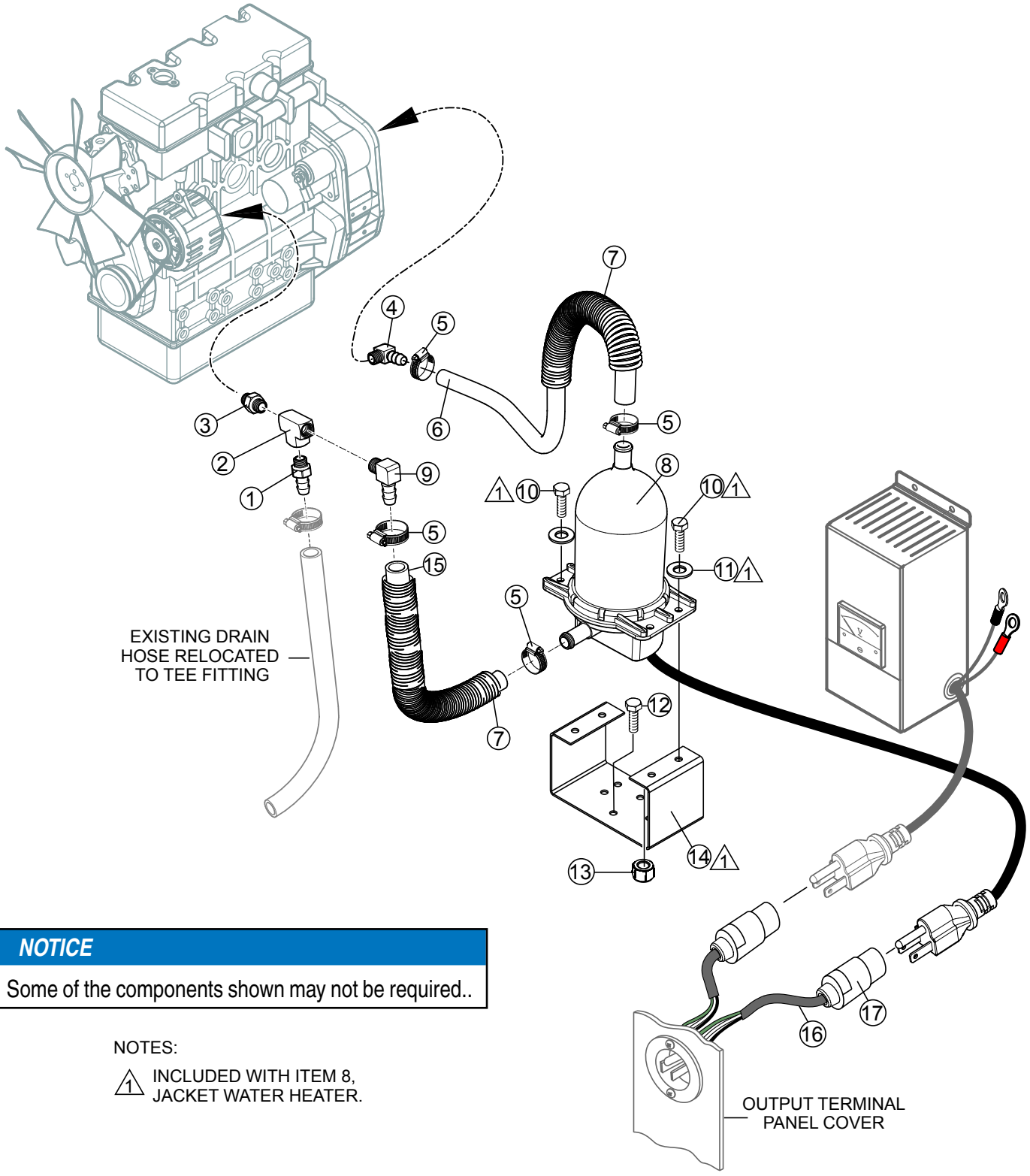
OUTPUT TERMINAL
PANEL COVER

BATTERY CHARGER ASSY. (OPTION)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	LC125002	CHARGER BATTERY, 3 AMP 12V	1	
2		GROMMENT, 7/8" HOLE SIZE	1	OBTAIN LOCALLY
3		WASHER, FLAT M4	4	OBTAIN LOCALLY
4		WASHER, LOCK M4	4	OBTAIN LOCALLY
5		SCREW, M4X10	4	OBTAIN LOCALLY
6	HBL5369C	CONNECTOR, 20 AMP ,125V	1	
7	EE56557	CORD, 3-CONDUCTOR, 14 AWG, 10 FT.	1	
8		WIRE, 16GA, GREEN	9 FT.	OBTAIN LOCALLY
9		WIRE, 16GA, RED	9 FT.	OBTAIN LOCALL



NOTICE

Some of the components shown may not be required..

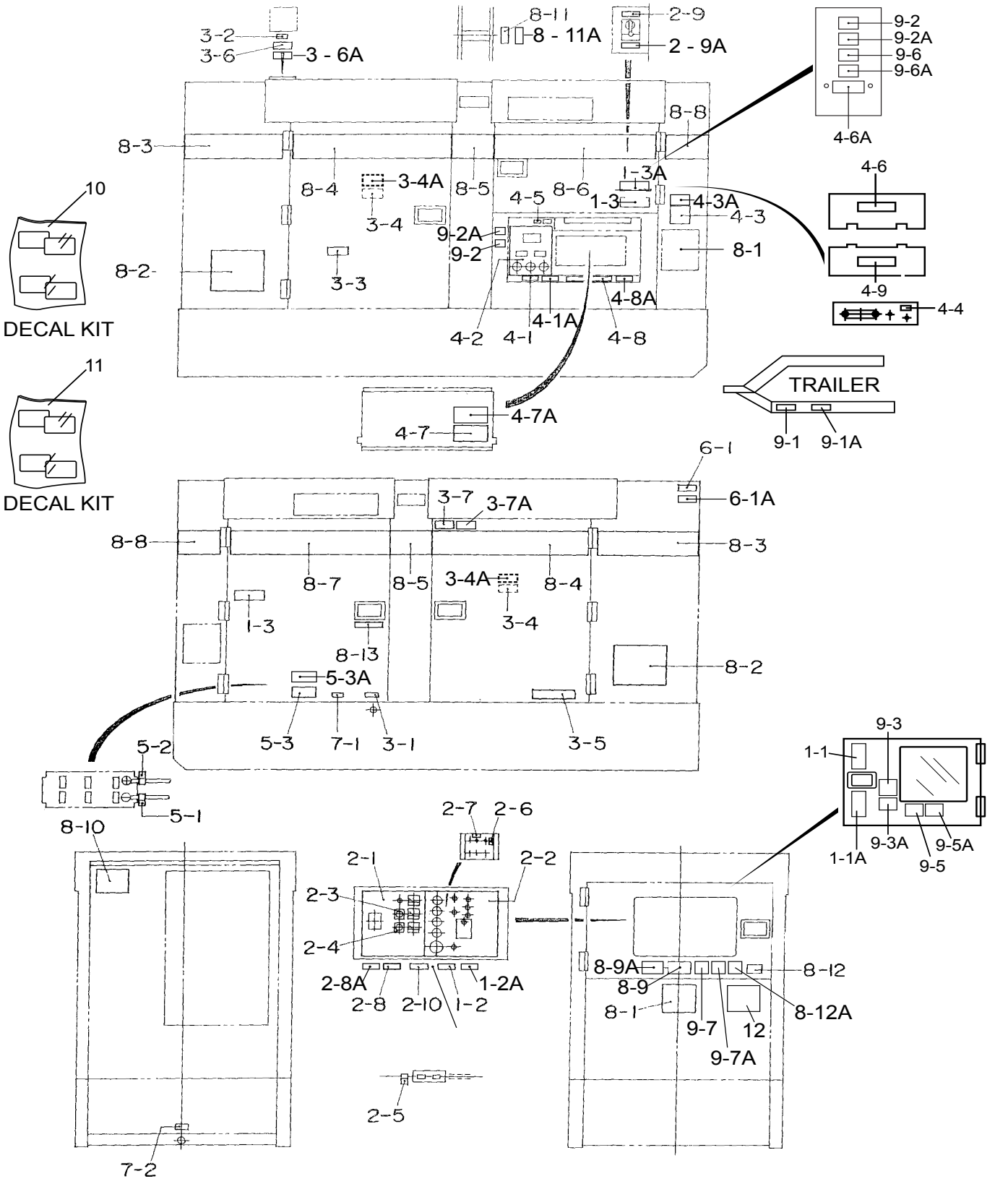
NOTES:

1 INCLUDED WITH ITEM 8, JACKET WATER HEATER.

JACKET WATER HEATER ASSY.

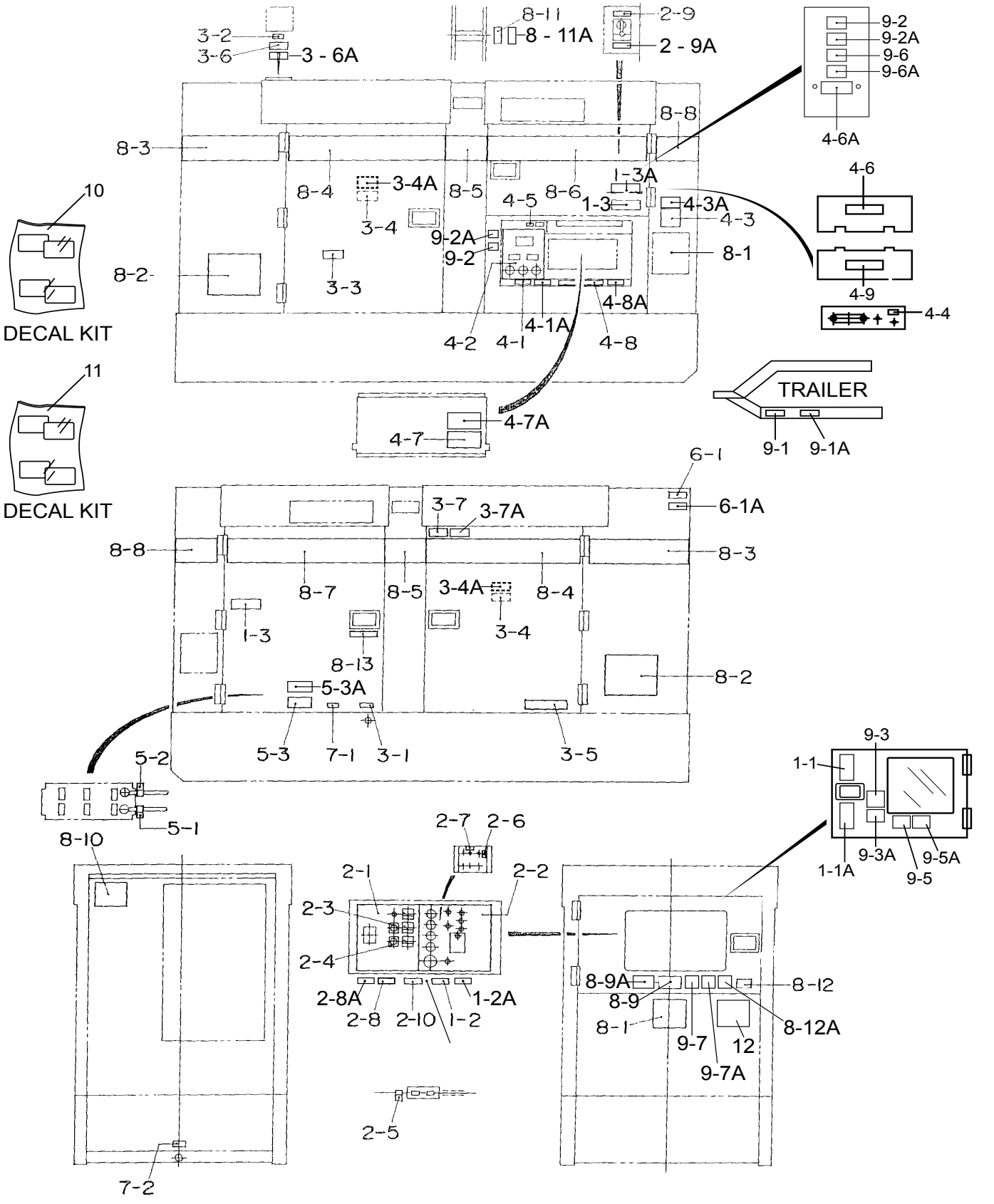
NO.	PART NO.	PART NAME	QTY.	REMARKS
1		1/4" MP X 5/16 HB NIPPLE	1	OBTAIN LOCALLY
2		1/4 X 1/4 1/4" FEMALE PIPE TEE	1	OBTAIN LOCALLY
3		1/4 X 1/4 MALE TO MALE PIPE NIPPLE	1	OBTAIN LOCALLY
4		3/8" MP X 5/8 HB 90° ELBOW	1	OBTAIN LOCALLY
5	0605515198	HOSE CLAMP	4	
6	0269301000	HEATER HOSE (TOP)	1	
7		SPLIT LOOM, 1" X 20"	2	OBTAIN LOCALLY
8	TPS101GT10000	HEATER, 1000W, 120 VAC	1	INCLUDES ITEMS W/#
9		1/4" MP X 5/8" HB 90° ELBOW	1	OBTAIN LOCALLY
10#		BOLT, 1/4"-20 X 1"	4	
11#		WASHER, FLAT 1"	4	
12	0011206020	HEX HEAD BOLT	2	REPLACES P/N 0019206020
13	0176060030	HEX NUT	2	REPLACES P/N 0207006000
14#	EE1266	BRACKET, HOT START	1	
15	0269301100	HEATER HOSE (BOTTOM)	1	
16	EE56557	CORD, 3-CONDUCTOR, 14 AWG, 2 FT.	1	
17	HBL5369C	CONNECTOR, 20 AMP ,125V	1	

NAMEPLATE AND DECALS ASSY.



NO.	PART NO.	PART NAME	QTY.	REMARKS
1-1	M3550003003	DECAL: OPERATING PROCEDURES (ENGLISH)	1	M35000300A
1-1A	EE57081	DECAL: OPERATING PROCEDURES (FRENCH)	1	
1-2	M9520100304	DECAL: SAFETY INSTRUCTIONS (ENGLISH)	1	M92010030
1-2A#		DECAL: SAFETY INSTRUCTIONS (FRENCH)	1	B92110040CE
1-3	M9520100603	DECAL: CAUTION, START/STOP (ENGLISH)	2	M92010060
1-3A#		DECAL: CAUTION, START/STOP (FRENCH)	1	MQC92210000CE
2-1	M3550003503	DECAL: CONTROL PANEL	1	M35000350
2-2	M3550003603	DECAL: OPERATING PANEL	1	M35000360
2-3	M9520000104	PLATE: AMMETER CHANGE- OVER SWITCH	1	M92000010
2-4	M9520000204	PLATE: VOLTMETER CHANGE- OVER SWITCH	1	M92000020
2-5	M9520000804	DECAL: AC	1	M92000080
2-6	M9520000904	DECAL: DIAGNOSTIC SWITCH	1	M92000090
2-7	M9520001104	DECAL: DIAGNOSTIC BUTTON	1	M92000110
2-8	M9520100004	DECAL: WARNING, ELECTRIC SHOCK HAZ. (ENGLISH)	1	M92010000
2-8A#		DECAL: WARNING, ELECTRICAL SHOCK HAZ.(FRENCH)	1	MQB9310050CE
2-9	M9520100204	DECAL: CAUTION, STOP ENGINE (ENGLISH)	1	M92010020A
2-9A#		DECAL: CAUTION, STOP ENGINE (FRENCH)	1	M92010020CE
2-10	M9520200404	DECAL: OVER CURRENT RELAY	1	M92020040
2-11	M9520002104	DECAL:FUEL PUMP SWITCH	1	M92000210
2-12	M9531000004	DECAL:NOTICE, TEMPERATURE GUAGE	1	M93100000
3-1	M9500000004	DECAL : OIL DRAIN PLUG	1	M90000000
3-2	M9500100004	DECAL : WATER	1	M90010000
3-3	M9500100304	DECAL : INTER-COOLER DRAIN	1	M90010030
3-4	M9503000004	DECAL : WARNING, MOVING PARTS (ENGLISH)	2	M90300000
3-4A#		DECAL : WARNING, MOVING PARTS (FRENCH)	2	M90300000CE
3-5	M9503000103	DECAL : WATER - OIL CHECK	1	M90300010
3-6	M9503100004	DECAL : WARNING, HOT COOLANT (ENGLISH)	1	M90310000
3-6A#		DECAL : WARNING, HOT COOLANT (FRENCH)	1	M9031000CE
3-7	M9510100004	DECAL : CAUTION, HOT PARTS (ENGLISH)	1	M91010000
3-7A#		DECAL : CAUTION, HOT PARTS (FRENCH)	1	MQB90400030CE
4-1	EE57066	DECAL : NOTICE, 50 AMP RECEPTACLES (ENGLISH)	1	REP.P/N M1550000204
4-1A	EE57067	DECAL : NOTICE, 50 AMP RECEPTACLES (FRENCH)	1	
4-2	M1550002203	DECAL : RECEPT. AND CIRCUIT BREAKER,	1	M15000220
4-3	EE57082	DECAL : NOTICE, LOAD SHARING (ENGLISH)	1	M35000000
4-3A	EE57083	DECAL : NOTICE, LOAD SHARING (FRENCH)	1	EE57083
4-4	M9520000004	DECAL : GROUND	1	M92000000
4-5	M9520000504	DECAL : START CONTACT	1	M92000050
4-6	M9520100004	DECAL : WARNING, ELECTRIC SHOCK HAZ. (ENGLISH)	1	M92010000
4-6A#		DECAL : WARNING, ELECTRICAL SHOCK HAZ.(FRENCH)	1	MQB9310050CE
4-7	M9520100404	DECAL : DANGER, HIGH VOLTAGE (ENGLISH)	1	M92010040
4-7A#	EE58330	DECAL : DANGER, HIGH VOLTAGE (FRENCH)	1	MQS-2731CE
4-8	M9520100503	DECAL : WARNING, ELECTRICAL (ENGLISH)	1	M92010050
4-8A#		DECAL : WARNING, ELECTRICAL (FRENCH)	1	M92010050CE
4-9	M9520200003	DECAL : OUTPUT TERMINAL	1	M92020000

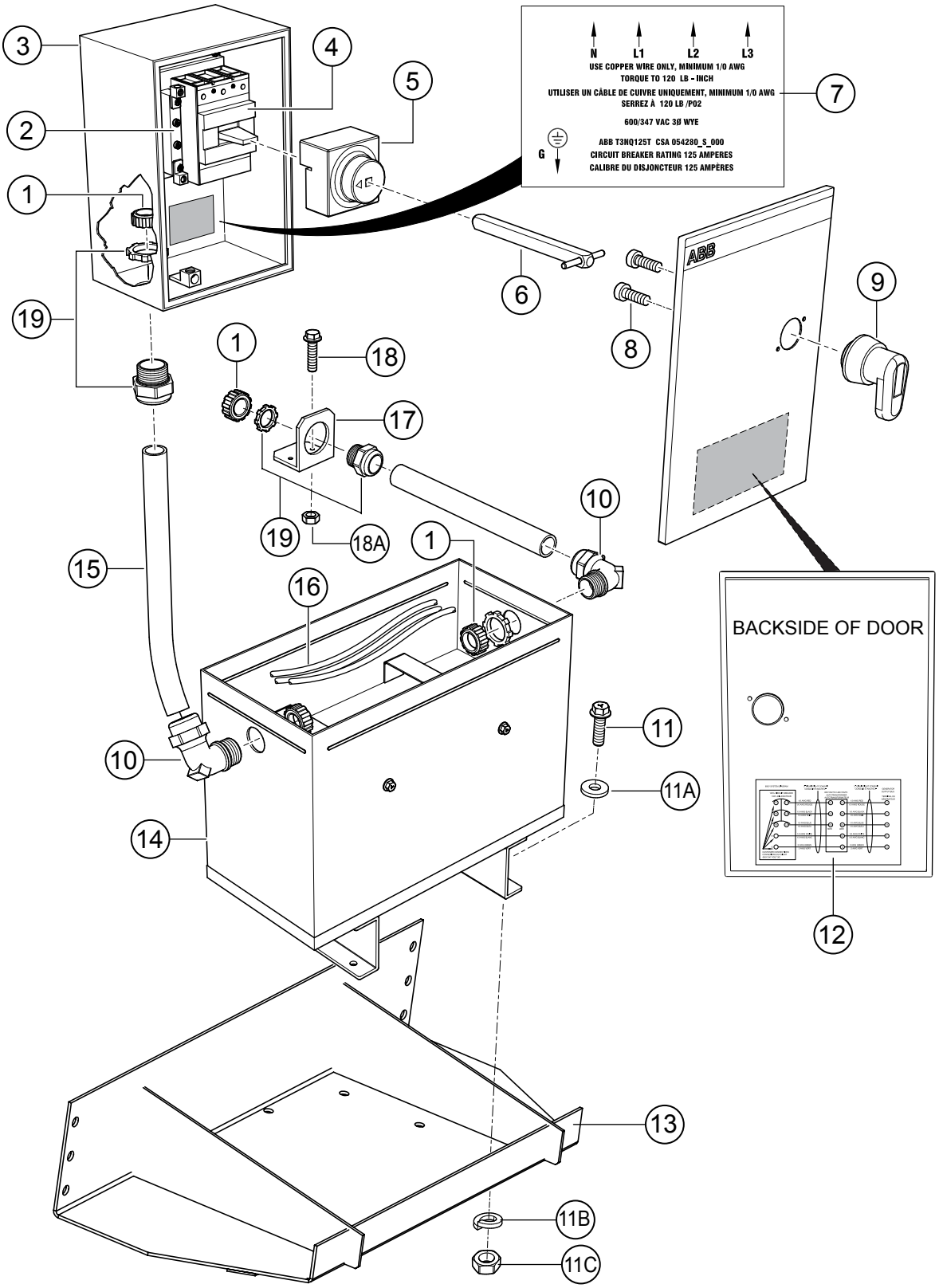
NAMEPLATE AND DECALS ASSY. (CONTINUED)



NAMEPLATE AND DECALS ASSY. (CONTINUED)

NO.	PART NO.	PART NAME	QTY.	REMARKS
5-1	M9500300004	DECAL : -	1	M90030000
5-2	M9500300104	DECAL : +	1	M90030010
5-3	M9510100403	DECAL : CAUTION, OFF/RESET SW (ENGLISH)	1	M91010040
5-3A#		DECAL : CAUTION, OFF/RESET SW (FRENCH)	1	MQC90530000CE
6-1	M9503200004	DECAL : WARNING, ENGINE EXHAUST (ENGLISH)	1	M90320000
6-1A#		DECAL : WARNING, ENGINE EXHAUST (FRENCH)	1	MQB90420000CE
7-1	M9500500004	DECAL : DIESEL FUEL	1	M90050000
7-2	M9510000004	DECAL : FUEL DRAIN PLUG	1	M91000000
8-1	M9512200004	DECAL : MQ	1	M91220000
8-2	M9510200304	DECAL : MQ POWER	2	
8-3	M3560102004	STRIPE	2	
8-4	M3560102103	STRIPE : WHISPERWATT	2	
8-5	M3560102204	STRIPE	2	
8-6	M3560102303	STRIPE : 125	1	
8-7	M3560102403	STRIPE : 125	1	
8-8	M3560102504	STRIPE	2	
8-9	EE57068	DECAL: NOTICE, ENVIRONMENTAL WARNING (ENGLISH)	1	REP. P/NM9510100304
8-9A	EE57069	DECAL: NOTICE, ENVIRONMENTAL WARNING (FRENCH)	1	EE57069
8-10	0600500092	PLATE : MQ POWER	1	
8-10A	0021106016	MACHINE SCREW	4	
8-11	M3550002204	DECAL : CAUTION, BAIL MAX CAPACITY (ENGLISH)	1	M35000220
8-11A#		DECAL : CAUTION, BAIL MAX CAPACITY (FRENCH)	1	
8-12	M9503200104	DECAL : DANGER, EXHAUST GAS (ENGLISH)	1	M90320010
8-12A#		DECAL : DANGER, EXHAUST GAS (FRENCH)	1	M90320010CE
8-13	M9510000104	DECAL : DOCUMENT BOX LOCATED	1	M91000010
9-1	49002	DECAL: WARNING, TRAILER (ENGLISH)	1	
9-1A#		DECAL: WARNING, TRAILER (FRENCH)	1	490002CE
9-2$	EE57072	DECAL: NOTICE, BONDED TO FRAME (ENGLISH)	2	
9-2A$	EE57073	DECAL: NOTICE, BONDED TO FRAME (FRENCH)	2	
9-3$	EE57075	DECAL: NOTICE, CLASS F (ENGLISH)	1	
9-3A$	EE57076	DECAL: NOTICE, CLASS F (FRENCH)	1	
9-5$	EE57070	DECAL: NOTICE, OVERLOAD (ENGLISH)	1	
9-5A$	EE57071	DECAL: NOTICE, OVERLOAD (FRENCH)	1	
9-6$	EE57079	DECAL: NOTICE, SUPPLY WIRES (ENGLISH)	1	
9-6A$	EE57080	DECAL: NOTICE, SUPPLY WIRES (FRENCH)	1	
9-7	920214100	DECAL: WARNING, SPARKS (ENGLISH)	1	
9-7A#		DECAL: WARNING, SPARKS (FRENCH)	1	M9042000CE
10	EE52657	DECAL KIT (FRENCH)	1	INCLUDES ITEMS W/ #
11	EE57074	DECAL KIT (ENGLISH & FRENCH)	1	INCLUDES ITEMS W/ $
12	EE57090	NAME PLATE, EMISSION CONTROL (ENGLISH & FRENCH)	1	

3Ø 600 VAC TRANSFORMER ASSY. (OPTION)



3Ø 600 VAC TRANSFORMER ASSY. (OPTION)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	EE5981	BUSHING, PLASTIC, 2"	4	
2	EE57551	KIT, NEUTRAL, T3NK2525	1	
3	EE57550	ENCLOSURE, NEMA 3R CIRCUIT BREAKER	1	
4	EE52422	CIRCUIT BREAKER, T3N0125TW	1	
5	EE57532	MECHANISM, CIRCUIT BREAKER OPERATION	1	
6	EE57533	SHAFT	1	
7	EE57770	LABEL, VINYL, 600V	1	
8$		SCREW	2	
9	EE57534	HANDLE, EXTERIOR	1	INCLUDES ITEM W/ $
10	EE50115	CONNECTOR, 90°, LIQUID TIGHT FITTING 2"	2	
11		BOLT, 1/2" X 1-3/4" GRD 8	4	OBTAIN LOCALLY
11A		WASHER, FLAT, 1/2"	4	OBTAIN LOCALLY
11B		WASHER, LOCK, 1/2"	4	OBTAIN LOCALLY
11C		NUT, HEX 1/2"	4	OBTAIN LOCALLY
12	EE57768	LABEL, VINYL, DIAGRAM	1	
13	EE57424	TRAY TRANSFORMER	1	
14	EE57387	TRANSFORMER, 600V, 3-PHASE, 125 KVA	1	
15	EE16322	CONDUIT, LIQUID TIGHT FLEXIBLE 2"	10	1PC = 1FT
16	EE57546	CABLE, 1/0 AWG SIM PULL THHN/90 BLACK	112	1PC = 1FT
17	EE57608	BRACKET, MTG. FOR CONDUIT, ALUMINUM	1	
18		BOLT, M6 X 20	1	OBTAIN LOCALLY
18A		NUT, M6	2	OBTAIN LOCALLY
19	EE57549	STRAIGHT, LIQUID TIGHT FITTING	2	

PAYMENT TERMS

Terms of payment for parts are net 30 days.

FREIGHT POLICY

All parts orders will be shipped collect or prepaid with the charges added to the invoice. All shipments are F.O.B. point of origin. Multiquip's responsibility ceases when a signed manifest has been obtained from the carrier, and any claim for shortage or damage must be settled between the consignee and the carrier.

MINIMUM ORDER

The minimum charge for orders from Multiquip is $15.00 net. Customers will be asked for instructions regarding handling of orders not meeting this requirement.

RETURNED GOODS POLICY

Return shipments will be accepted and credit will be allowed, subject to the following provisions:

1. A Returned Material Authorization must be approved by Multiquip prior to shipment.
2. To obtain a Return Material Authorization, a list must be provided to Multiquip Parts Sales that defines item numbers, quantities, and descriptions of the items to be returned.
    a. The parts numbers and descriptions must match the current parts price list.
    b. The list must be typed or computer generated.
    c. The list must state the reason(s) for the return.
    d. The list must reference the sales order(s) or invoice(s) under which the items were originally purchased.
    e. The list must include the name and phone number of the person requesting the RMA.
3. A copy of the Return Material Authorization must accompany the return shipment.
4. Freight is at the sender's expense. All parts must be returned freight prepaid to Multiquip's designated receiving point.
5. Parts must be in new and resalable condition, in the original Multiquip package (if any), and with Multiquip part numbers clearly marked.
6. The following items are not returnable:
    a. Obsolete parts. (If an item is in the price book and shows as being replaced by another item, it is obsolete.)
    b. Any parts with a limited shelf life (such as gaskets, seals, "O" rings, and other rubber parts) that were purchased more than six months prior to the return date.
    c. Any line item with an extended dealer net price of less than $5.00.
    d. Special order items.
    e. Electrical components.
    f. Paint, chemicals, and lubricants.
    g. Decals and paper products.
    h. Items purchased in kits.
7. The sender will be notified of any material received that is not acceptable.
8. Such material will be held for five working days from notification, pending instructions. If a reply is not received within five days, the material will be returned to the sender at his expense.
9. Credit on returned parts will be issued at dealer net price at time of the original purchase, less a 15% restocking charge.
10. In cases where an item is accepted, for which the original purchase document can not be determined, the price will be based on the list price that was effective twelve months prior to the RMA date.
11. Credit issued will be applied to future purchases only.

PRICING AND REBATES

Prices are subject to change without prior notice. Price changes are effective on a specific date and all orders received on or after that date will be billed at the revised price. Rebates for price declines and added charges for price increases will not be made for stock on hand at the time of any price change.

Multiquip reserves the right to quote and sell direct to Government agencies, and to Original Equipment Manufacturer accounts who use our products as integral parts of their own products.

SPECIAL EXPEDITING SERVICE

A $35.00 surcharge will be added to the invoice for special handling including bus shipments, insured parcel post or in cases where Multiquip must personally deliver the parts to the carrier.

LIMITATIONS OF SELLER'S LIABILITY

Multiquip shall not be liable hereunder for damages in excess of the purchase price of the item with respect to which damages are claimed, and in no event shall Multiquip be liable for loss of profit or good will or for any other special, consequential or incidental damages.

LIMITATION OF WARRANTIES

No warranties, express or implied, are made in connection with the sale of parts or trade accessories nor as to any engine not manufactured by Multiquip. Such warranties made in connection with the sale of new, complete units are made exclusively by a statement of warranty packaged with such units, and Multiquip neither assumes nor authorizes any person to assume for it any other obligation or liability whatever in connection with the sale of its products. Apart from such written statement of warranty, there are no warranties, express, implied or statutory, which extend beyond the description of the products on the face hereof.

Effective: February 22, 2006

OPERATION AND PARTS MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

UNITED STATES

Multiquip Corporate Office

18910 Wilmington Ave.
Carson, CA 90746
Contact: mq@multiquip.com

Tel. (800) 421-1244
Fax (310) 537-3927

MQ Parts Department

800-427-1244
310-537-3700

Fax: 800-672-7877
Fax: 310-637-3284

Service Department

800-421-1244
310-537-3700

Fax: 310-537-4259

Warranty Department

800-421-1244
310-537-3700

Fax: 310-943-2249

Technical Assistance

800-478-1244

Fax: 310-943-2238

CANADA

Multiquip

4110 Industriel Boul.
Laval, Quebec, Canada H7L 6V3
Contact: jmartin@multiquip.com

Tel: (450) 625-2244
Tel: (877) 963-4411
Fax: (450) 625-8664

UNITED KINGDOM

Multiquip (UK) Limited Head Office

Unit 2, Northpoint Industrial Estate,
Globe Lane,
Dukinfield, Cheshire SK16 4UJ
Contact: sales@multiquip.co.uk

Tel: 0161 339 2223
Fax: 0161 339 3226

This manual MUST accompany the equipment at all times. This manual is considered a permanent part of the equipment and should remain with the unit if resold.

The information and specifications included in this publication were in effect at the time of approval for printing. Illustrations, descriptions, references and technical data contained in this manual are for guidance only and may not be considered as binding. Multiquip Inc. reserves the right to discontinue or change specifications, design or the information published in this publication at any time without notice and without incurring any obligations.

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MULTIQUIP®