OPERATION AND PARTS MANUAL

MQ POWER®

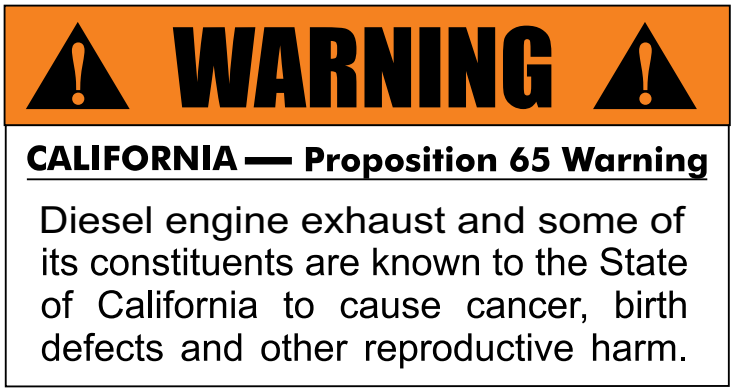
WHISPERWATT™ SERIES
MODEL DCA180SSI
MODEL DCA180SSIU
60HZ GENERATORS
(ISUZU 6HK1X DIESEL ENGINE)

PARTS LIST NO. C0870301604 DCA180SSSI
PARTS LIST NO. M3870301404 DCA180SSIU

Revision #1 (08/02/10)

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

THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.


WARNING
CALIFORNIA — Proposition 65 Warning
Diesel engine exhaust and some of its constituents are known to the State of California 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 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.

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.nhtsa.dot.gov; or write to:

Administrator
NHTSA
1200 New Jersey Avenue S.E.
Washington, DC 20590

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

DCA180SSI/DCA180SSIU 60 Hz Generators

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Note: Discounts Are Subject To Change

Order via Fax (Dealers Only):
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Note: Discounts Are Subject To Change

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When ordering parts, please supply:

- ❒ **Dealer Account Number**
- ❒ **Dealer Name and Address**
- ❒ **Shipping Address (if different than billing address)**
- ❒ **Return Fax Number**
- ❒ **Applicable Model Number**
- ❒ **Quantity, Part Number and Description of Each Part**
- ❒ **Specify Preferred Method of Shipment:**
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  - ✓ Truck

NOTICE

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

WE ACCEPT ALL MAJOR CREDIT CARDS!

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.

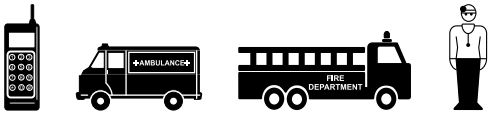
- **ALWAYS** check the equipment for loosened threads or bolts before starting.
- **DO NOT** use the equipment for any purpose other than its intended purposes or applications.

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.

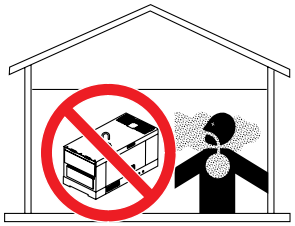
NOTICE

- **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.

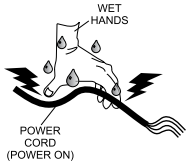
- **NEVER** insert any objects into the output receptacles during operation. This is extremely dangerous. The possibility exists of **electrical shock, electrocution or death.**

- 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

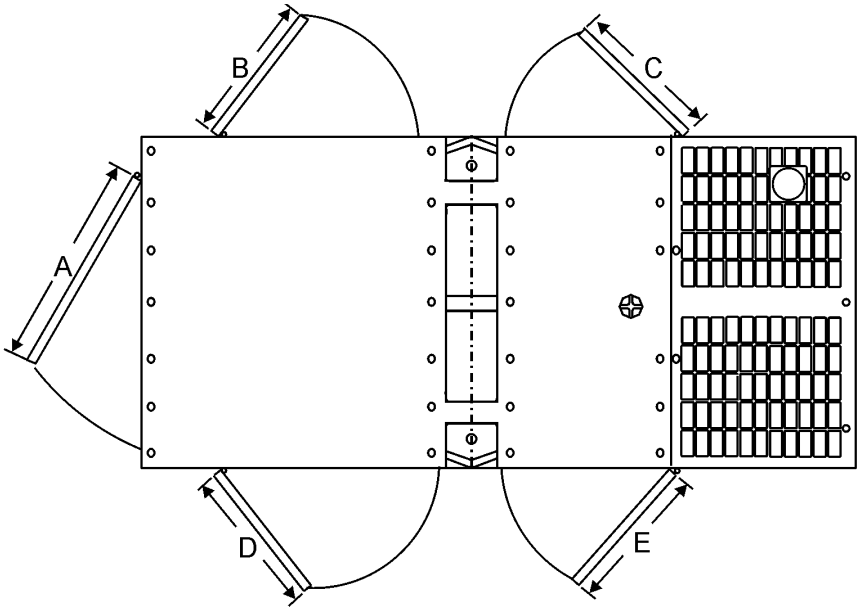
NOTICE

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

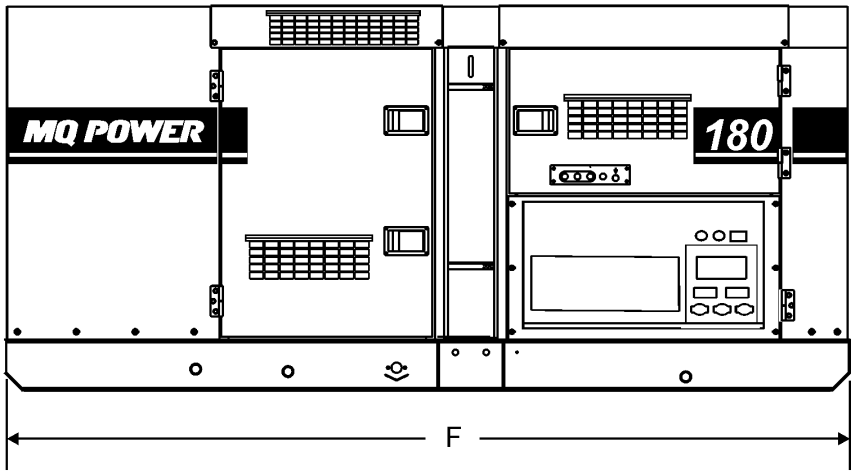
- **DO NOT** use food or plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil or fuel directly onto the ground, down a drain or into any water source.

Table 1. Generator Specifications		
Model	**DCA-180SSI/DCA-180SSIU**	
Type	Revolving field, self ventilated, open protected type synchronous generator	
Armature Connection	**Star with Neutral**	
Phase	3	
Standby Output	198 KVA (158 kW)	
Prime Output	180 kVA (144 KW)	
Voltage - 1 Ø	120, 127, 139, 240, 254, 277V Adjustable	
Voltage - 3 Ø	208, 220, 240, 415, 440, 480V Reconnectable	
Frequency	60 Hz	
Speed	1800 rpm	
Power Factor	0.8	
Aux. AC Power	Single Phase, 60 Hz	
Aux. Voltage/Output	4.8 Kw (2.4 kW x 2)	
Dry Weight	6,373 lbs. (2890 kg.)	
Wet Weight	7211 lbs. (3270 kg.)	
Table 2. Engine Specifications		
Model	ISUZU 6HK1X	
Type	4 cycle, water-cooled, direct injection, turbo-charged	
No. of Cylinders	6 cylinders	
Bore x Stroke	4.53in. x 4.92 in. (115 mm x 125 mm)	
Displacement	475.25 cu. in. (7,790 cc)	
Rated Output	219 HP/1800 RPM	
Starting	Electric	
Coolant Capacity	6.6 gal. (25 liters)	
Lube Oil Capacity	10.6 gal. (40.0 liters)	
Fuel Type	#2 Diesel Fuel	
Fuel Tank Capacity	100 gal. (380 liters)	
Fuel Consumption	10.6 gal. (40.0 L)/hr at **full load**	8.0 gal. (30.1 L)/hr at **75% load**
	6.1 gal. (23.1 L)/hr at **50% load**	3.7 gal. (14.0 L)/hr at **25% load**
Battery	27(CCA O degF -800A) X 2	

TOP VIEW



SIDE VIEW



FRONT VIEW

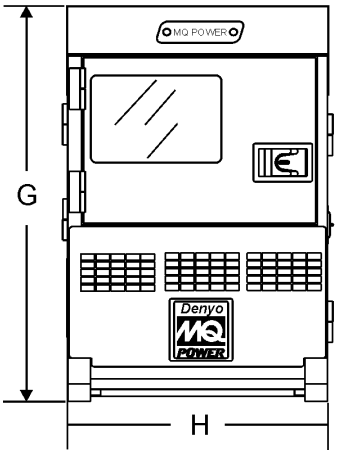


Figure 1. Dimensions

Table 3. Dimensions			
Reference Letter	Dimension in. (mm)	Reference Letter	Dimension in. (mm)
A	41.33 in. (1,050 mm.)	F	137.8 in. (3,500 mm.)
B	41.33 in. (1050 mm.)	G	67 in. (1,700 mm.)
C	37.00 in. (940 mm.)	H	48.8 in. (1,240 mm.)
D	41.33 in. (1050 mm.)		
E	37.00 in. (940 mm.)		

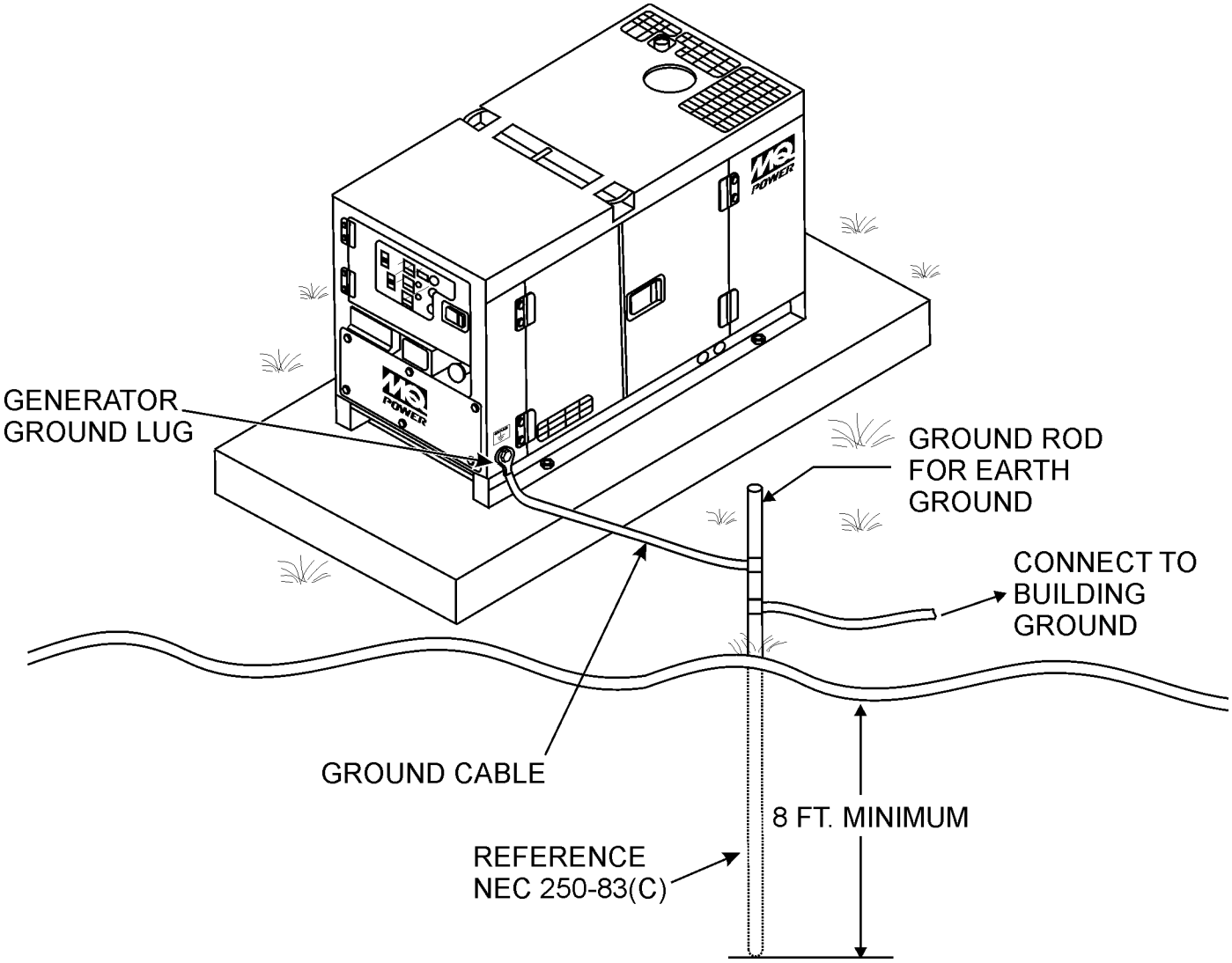


Figure 2. Typical Generator Grounding Application

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 mm2) or larger.
   b. Aluminum - 8 AWG (8.4 mm2) or larger.
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

These MQ Power generators (Figure 3) are 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
- Panel Light/Panel Light Switch
- ECU Controller
- Engine Speed Switch

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, 500 amp Main Circuit Breaker
- "Control Box" (located behind the Gen. Control Panel)
  - Automatic Voltage Regulator
  - Current Transformer
  - Over-Current Relay
  - Voltage Rectifier
  - Starter Relay
  - Engine Controller (Computer Controlled)
  - Voltage Change-over Board

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)
- Battery Charger (Optional)
- Water Heater (Optional)

OPEN DELTA EXCITATION SYSTEM

Each 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

These generators are powered by a 6 cylinder, water cooled, direct injection, turbocharged ISUZU 6JK1X diesel engine. This engine is designed to meet every performance requirement for the generator. Reference Table 2 for engine specifications.

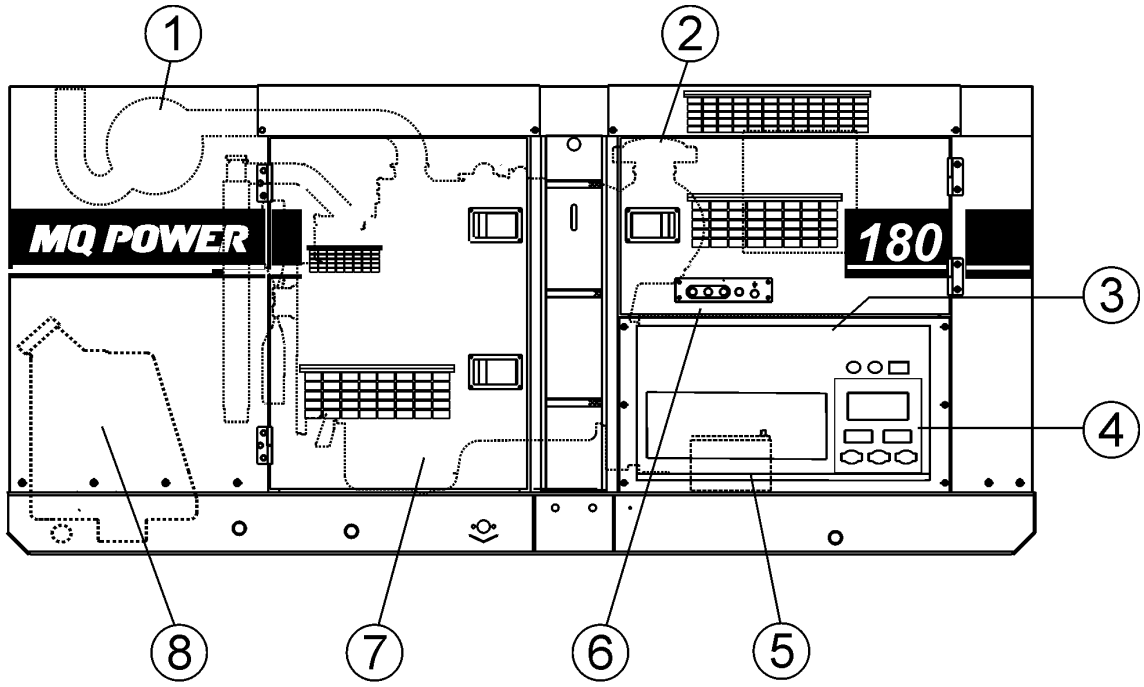
In keeping with MQ Power's policy of constantly improving its products, the specifications quoted herein are subject to change without prior notice.

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.



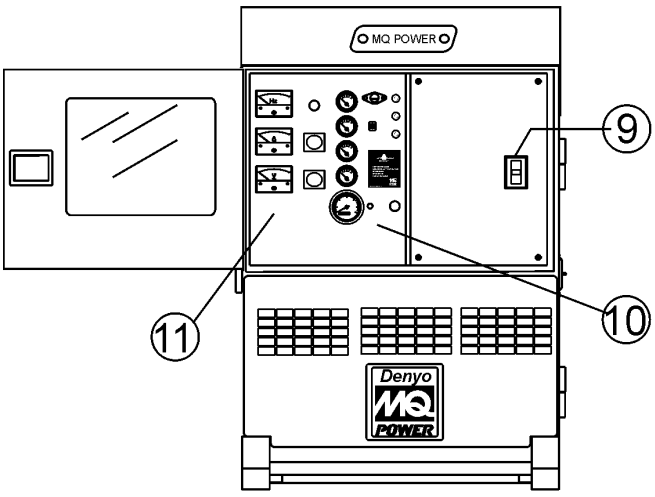


Table 4. Generator Major Components	
ITEM NO.	**DESCRIPTION**
1	Muffler Assembly
2	Air Filter Assembly
3	Generator Assembly
4	Output Terminal Panel Assembly
5	Battery Assembly
6	Output Receptacles Assembly
7	Engine and Radiator Assembly
8	Fuel Tank Assembly
9	Circuit Breaker Assembly
10	Engine Operating Panel Assembly
11	Generator Control Panel Assembly

Figure 3. Major Components

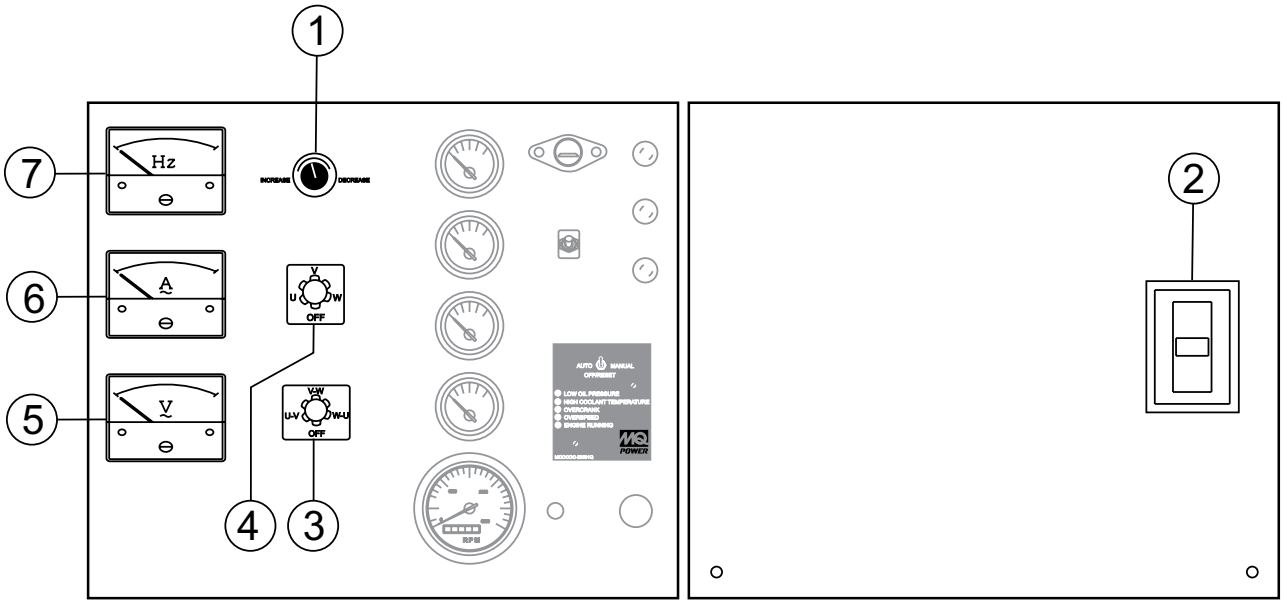


Figure 4. Generator Control Panel

The definitions below describe the controls and functions of the DCA180SSIU Generator Control Panel (Figure 4).

1. **Voltage Regulator Control** — Allows ±15% manual adjustment of the generator's output voltage.
2. **Main Circuit Breaker** — This three-pole, 500A main breaker is provided to protect the the U,V, and W Output Terminal Lugs from overload.
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. **AC Voltmeter** — Indicates the output voltage present at the U,V, and W Output Terminal Lugs.
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. **Frequency Meter** — Indicates the output frequency in hertz (Hz). Normally 60 Hz.

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
- Three Phase 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 500 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**).

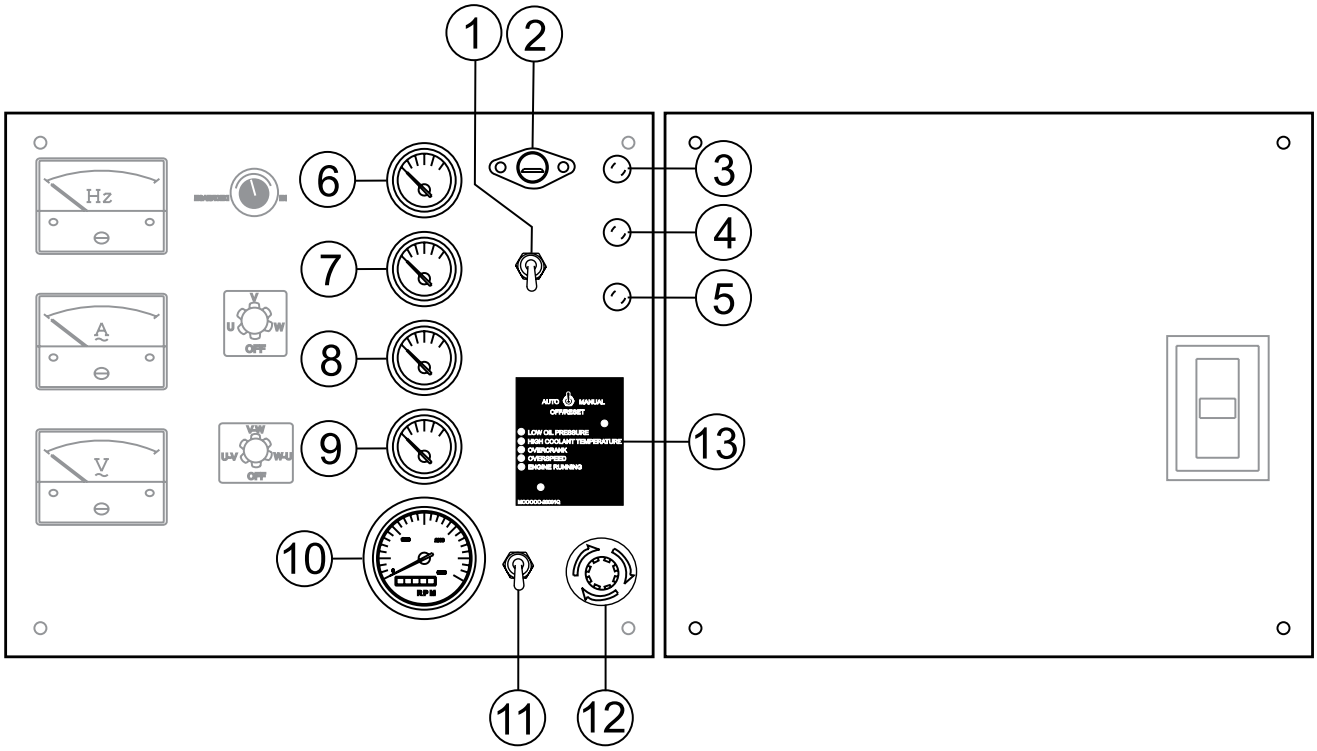


Figure 5. Engine Operating Panel

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

1. **Panel Light Switch** — When activated will turn on control panel light
2. **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.
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** — This lamp will illuminate whe a critical engine fault has occured.
5. **Coolant Alarm Lamp** — This lamp will illuminate when the coolant level falls below a safe operating level and the engine will stop.
6. **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.
7. **Water Temperature Gauge** — During normal operation this gauge be should read between 167°~203°F (75°~95°C).
8. **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.
9. **Fuel Gauge** — Indicates amount of diesel fuel available.
10. **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.
11. **Engine Speed Switch** — This switch controls the speed of the engine (low/high).
12. **Emergency Stop Button** — Push this button inward to stop the engine in the event of an emergency. **DO NOT** use this button as a means of stopping the engine.
13. **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)

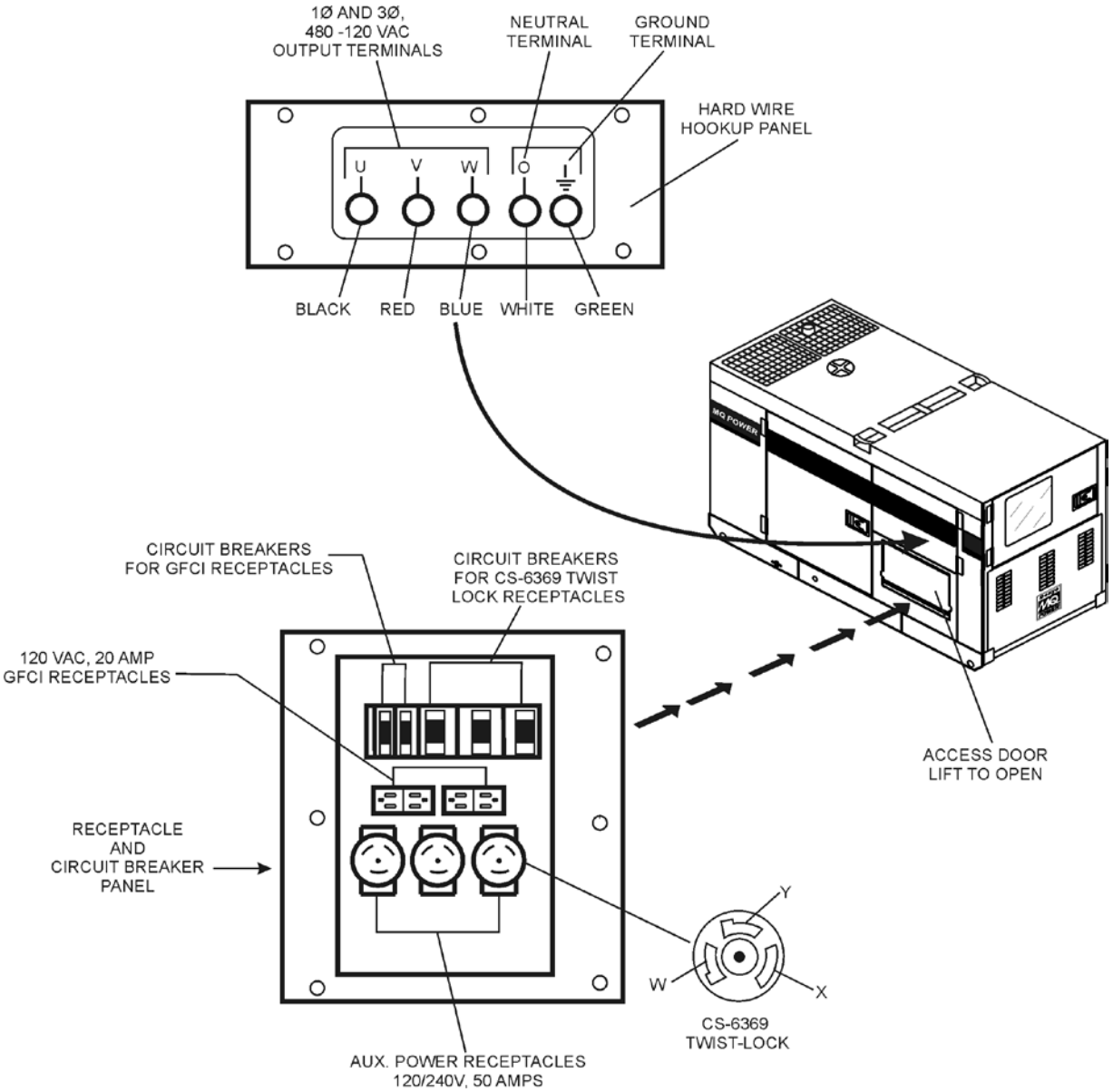


Figure 6. Output Terminal Panel

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** (See Figure 7) in the center of the receptacle will check the GFCI function. Both receptacles should be tested at least once a month.

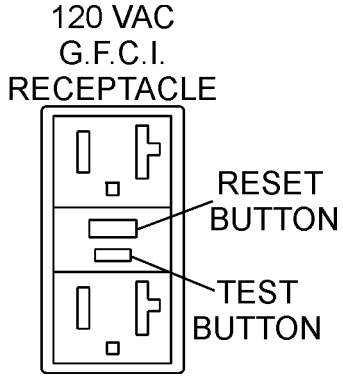


Figure 7. G.F.C.I. Receptacle

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 be accessed in **<u>any</u>** ***voltage change-over board*** position.

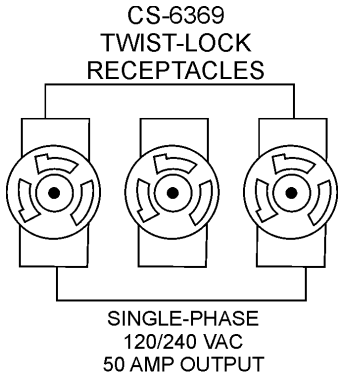


Figure 8. 120/240V Twist-Lock Auxiliary Receptacles

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.

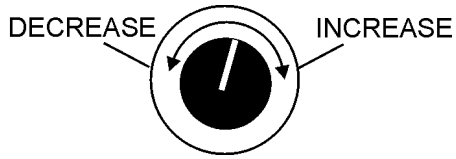


Figure 9. Voltage Regulator Control Knob

Removing the Plastic Face Plate (Hard Wire Hookup Panel)

The ***Output Terminal Lugs*** are protected by a plastic face plate cover (Figure 10). Un-screw 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.

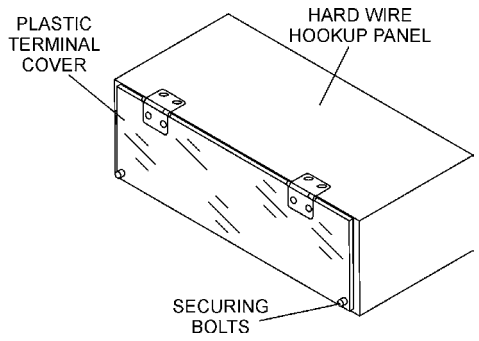


Figure 10. Plastic Face Plate (Output Terminal Lugs)

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, 500A **main** circuit breaker is provided. Make sure to switch **ALL** circuit breakers to the **OFF** position prior to starting the engine.

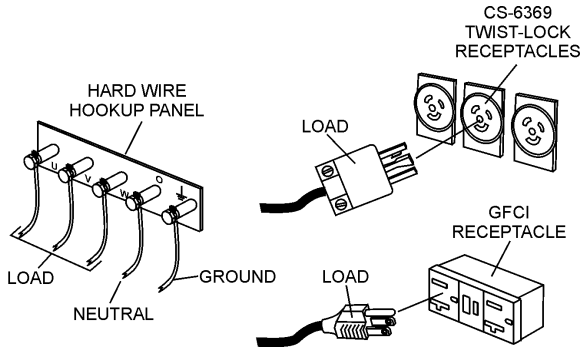


Figure 11. Connecting Loads

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.

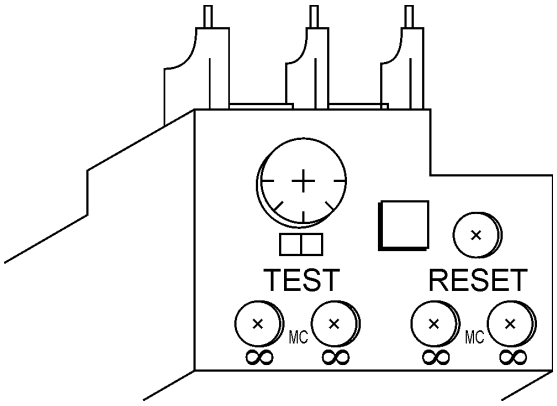


Figure 12. Over Current Relay

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

The power factor of this generator is 0.8. See Table 5 below for approximate wattages.

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

NOTICE

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

$$KVA = \frac{Volts \times Amperes \times 1.732}{1000}$$

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 applying jumpers (6) to the **voltage change-over board (**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 Change-Over Board

The voltage change-over board (Figure 13) is located on the control box, behind the generator control panel. This board has been provided for eae of voltage selection.

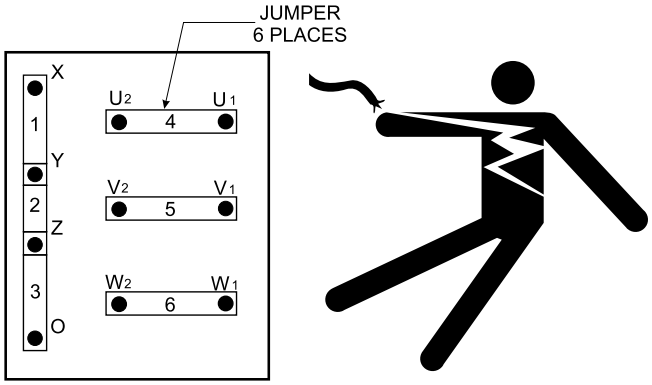


Figure 13. Voltage Change-Over Board.

CAUTION

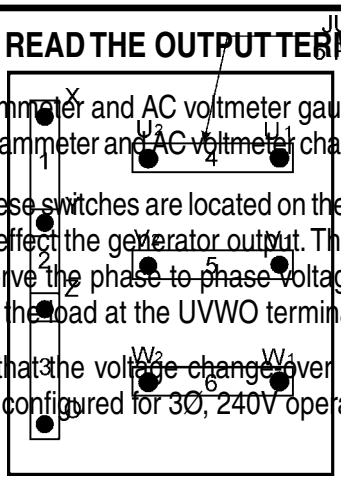
Table 7. Voltages Available

Three Phase (Switchable)	208V	220V	240V	416V	440V	480V
Single Phase (Switchable)	120V	1127V	139V	240V	254V	277V

Table 8. Generator Maximum Amps

Rated Voltage	Maximum Amps
1Ø 120 Volt	400 amps (4 wire)
1Ø 240 Volt	200 amps (4 wire)
3Ø 240 Volt	433 amps
3Ø 480 Volt	216 amps

HOW TO READ THE OUTPUT TERMINAL GAUGE



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 the phase to phase voltage and the current flowing to the load at the UVWO terminals lugs.

Observe that the voltage change-over board (Figure 14) has been configured for 3Ø, 240V operation.

Figure 14. Voltage Change-Over Board 3Ø 240V Configuration

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)

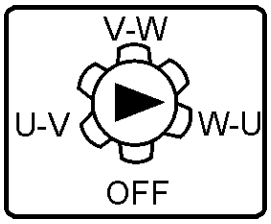


Figure 15. AC Voltmeter Change-Over Switch

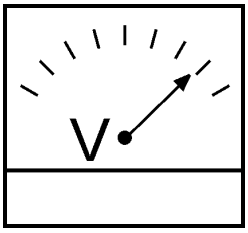


Figure 16. AC Voltmeter Gauge

AC Ammeter Gauge Reading

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

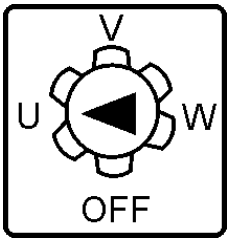


Figure 17. AC Ammeter Change-Over Switch

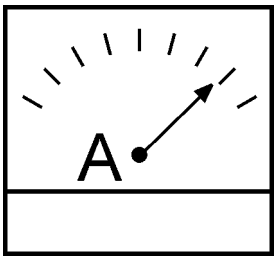


Figure 18. AC Ammeter (Amp Reading on U Lug)

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 placement of the jumpers plates (6) on the **Voltage Change-Over Board** and the adjustment of the **Voltage Regulator Control Knob**.

Remember the voltage change-over board determines the **range** of the output voltage and can be configured in two different positions that provide 6 different output voltages at the UVWO output terminals. The generator is shipped from the factory in the 240V configuration. The voltage regulator (VR) allows the user to increase or decrease the selected voltage.

3Ø-240V UVWO Terminal Output Voltages

1. Jumper the voltage change-over board for 240V operation as shown in Figure 19.

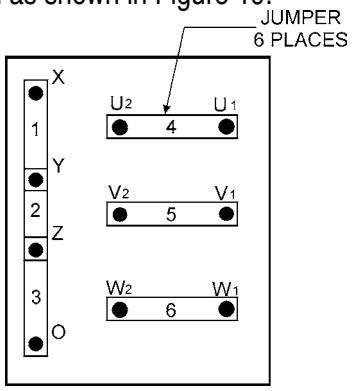


Figure 19. Voltage Change-Over Board 240V Configuration

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

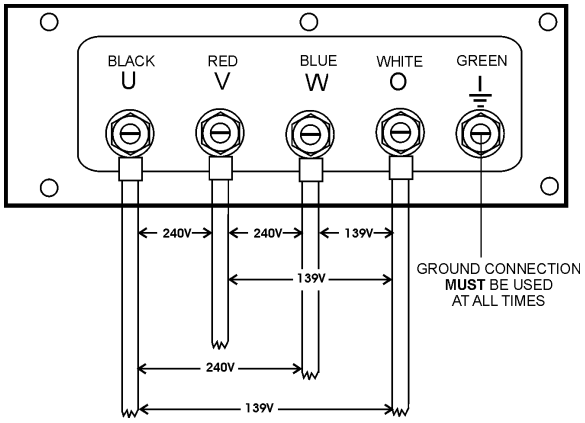


Figure 20. UVWO Terminal Lugs 3Ø-240/139V Connections

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

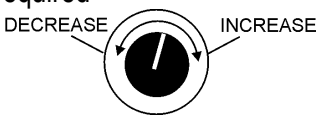


Figure 21. Voltage Regulator Knob

1Ø-240V UVWO Terminal Output Voltages

1. Make sure the voltage change-over board is jumpered for 240V operation as shown in Figure 19.
2. Connect the load wires to the UVWO terminals as shown in Figure 22.

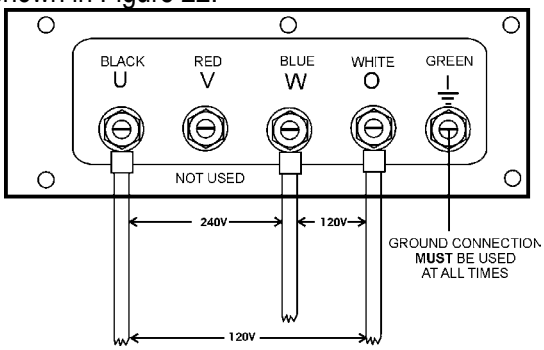


Figure 22. UVWO Terminal Lugs 1Ø-240V Connections

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

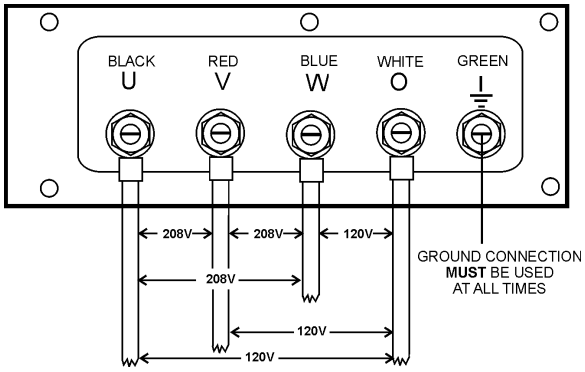


Figure 23. UVWO Terminal Lugs 3Ø-208/1Ø-120V Connections Connections

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-480V UVWO Terminal Output Voltages

1. Jumper the voltage change-over board for 480V operation as shown in Figure 24. This configuration uses 6 jumper plates in 3 different positions. Remember there are 2 jumper plates at every position. Every jumper plate **must** be used.

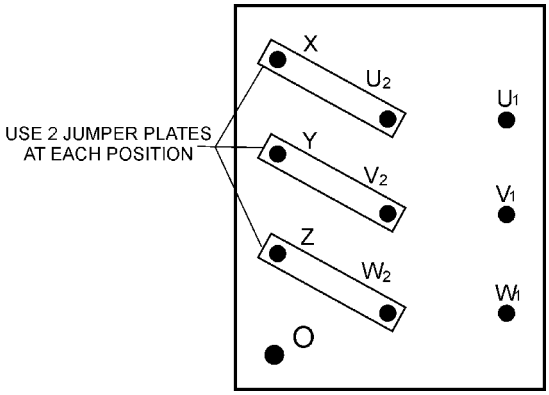


Figure 24. Voltage Change-Over Board 480V Configuration

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

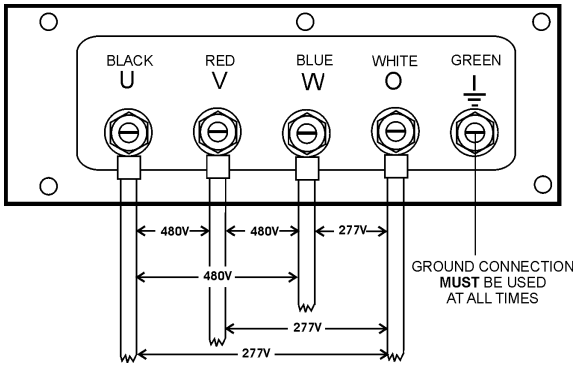


Figure 25. UVWO Terminal Lugs 3Ø-480V Connections

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.

1Ø-480V UVWO Terminal Output Voltages

1. Make sure the voltage change-over board is jumpered for 480V operation as shown in Figure 24.
2. Connect the load wires to the UVWO terminals as shown in Figure 26.

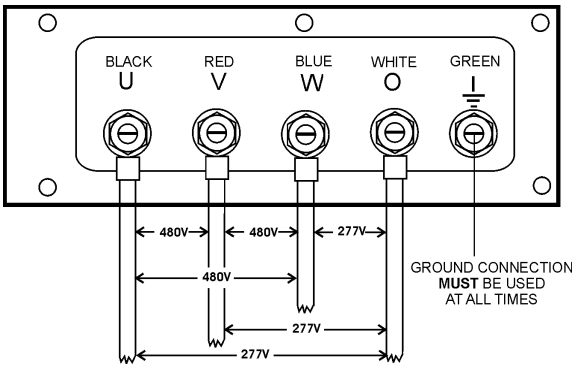


Figure 26. UVWO Terminal Lugs 1Ø-480V Connections

1Ø-277V UVWO Terminal Output Voltages

1. Make sure the voltage change-over board is jumpered for 480V operation as shown in Figure 24.
2. Connect the load wires to the UVWO terminals as shown in Figure 27.

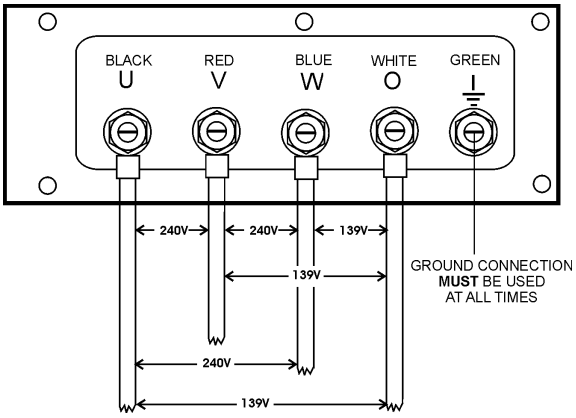


Figure 27. UVWO Terminal Lugs 1Ø-277V Connections

CIRCUIT BREAKERS

To protect the generator from an overload, a 3-pole, 500 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 28) on the dipstick. See Table 9 for proper selection of engine oil.

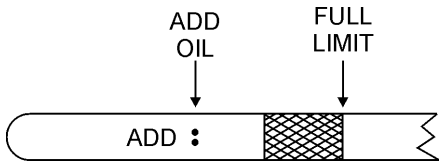


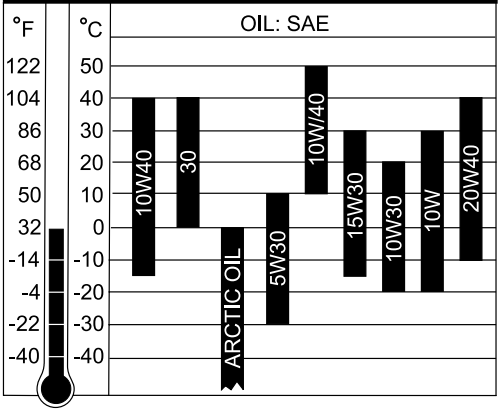
Figure 28. Engine Oil Dipstick

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 9. 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 located inside the trailer frame and may also be equipped with an environmental fuel tank (Figure 29). **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.

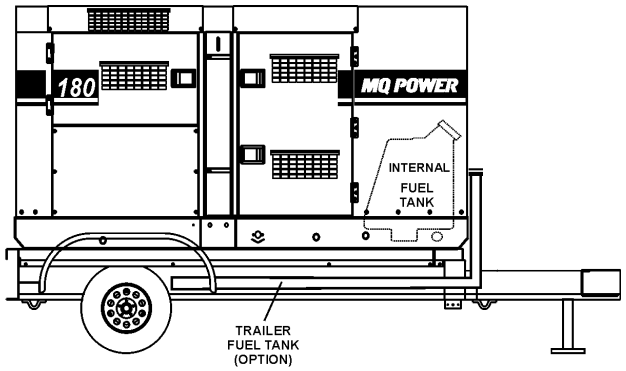


Figure 29. Internal Fuel Tank System

Refueling Procedure:

WARNING

Diesel fuel and its vapors are dangerous to your health and the surrounding inhaling fumes.

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.

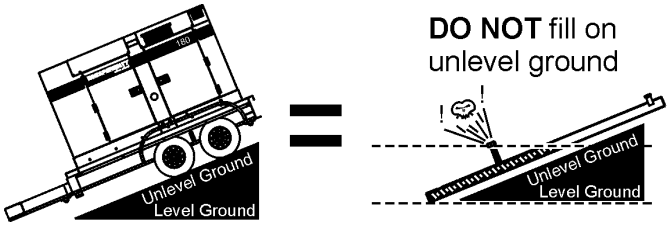


Figure 30. Only Fill on Level Ground

NOTICE

ONLY use #2 [illegible] fuel for [illegible].

2. Open cabinet doors on the "right side" of the generator (from generator control panel position). Remove fuel fill cap and fill tank (Figure 31).

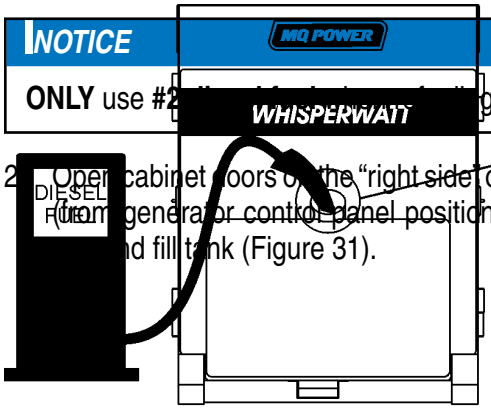


Figure 31. Fueling the Generator

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 32).

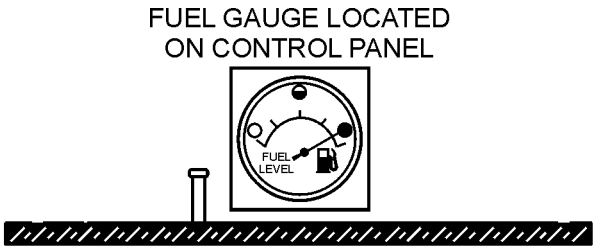


Figure 32. Full Fuel Tank

CAUTION

DO NOT OVERFILL fuel system. Leave room for fuel expansion. Fuel expands when heated (Figure 33).

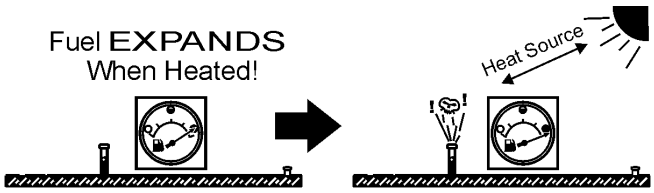


Figure 33. Fuel Expansion

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 10 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 10. Coolant Capacity	
Engine and Radiator	2.88 gal (10.9 liters)
Reserve Tank	2 quarts (1.9 liters)

Operation in Freezing Weather

When operating in freezing weather, be certain the proper amount of antifreeze (Table 11) has been added.

Table 11. 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 34) when depressed with the thumb as shown below.

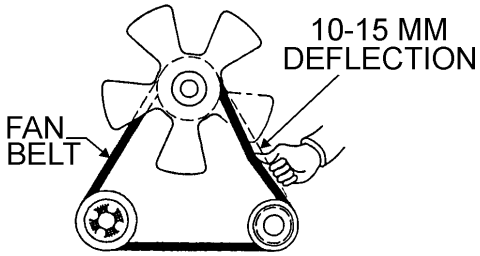


Figure 34. Fan Belt Tension

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 35) 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**.

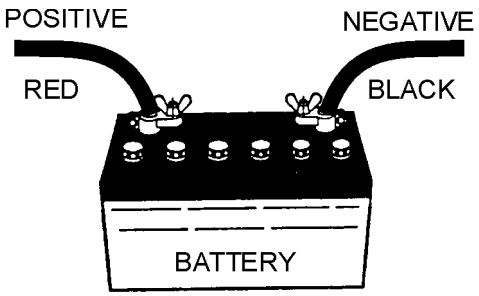


Figure 35. Battery Connections

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

NOTICE

CAUTION

If the battery cable is connected incorrectly, electrical damage to the generator will occur. Always observe proper polarity of the battery and generator when installing the battery.

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.

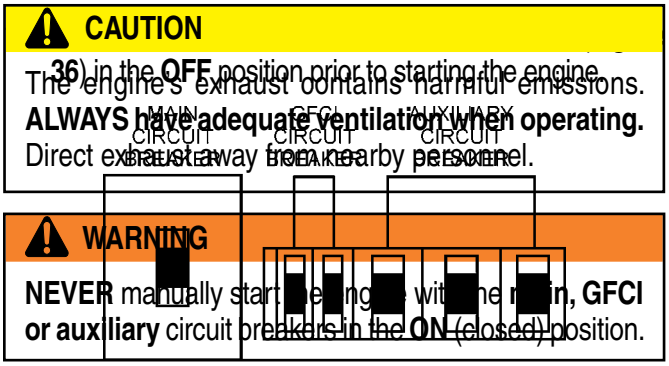


Figure 36. Main, Aux. and GFCI Circuit Breakers (OFF)

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 37).

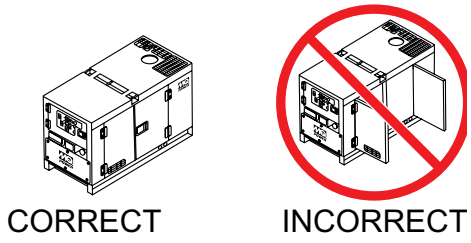


Figure 37. Engine Enclosure Doors

STARTING (MANUAL)

1. Place the engine speed switch (Figure 38) in the LOW (down) position.

Figure 38. Engine Speed Switch (Low)

2. Place the **MPEC control switch** in the **MANUAL** position to start the engine (Figure 39).

Figure 39. MPEC Control Switch (Manual Position)

3. Depending on the temperature of the coolant (cold weather conditions), the pre-heat lamp (Figure 40) 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.

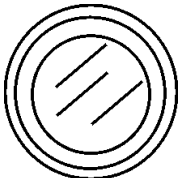


Figure 40. Pre-Heat Lamp

4. 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 41) in the **HIGH** (up) position.

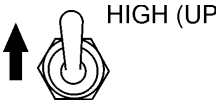


Figure 41. Engine Speed Switch (High)

5. Verify that the ***engine running*** status LED on the MPEC module (Figgure 42) is lit (ON) after the engine has started.

Figure 42. Engine Running LED (ON)

6. The generator's frequency meter (Figure 43) should be displaying the 60 cycle output frequency in **HERTZ.**

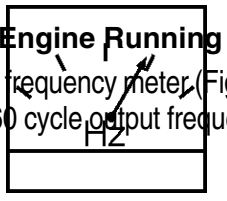


Figure 43. Frequency Meter

7. The generator's AC-voltmeter (Figure 44) will display the generator's output in **VOLTS**.

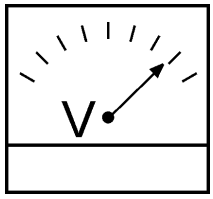


Figure 44. Voltmeter

8. If the voltage is not within the specified tolerance, use the voltage adjustment control knob (Figure 45) to increase or decrease the desired voltage.

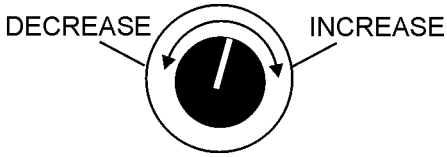


Figure 45. Voltage Adjust Control Knob

9. The ammeter (Figure 46) 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.

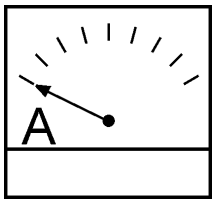


Figure 46. Ammeter (No Load)

10. The engine oil pressure gauge (Figure 47) will indicate the oil pressure of the engine. Under normal operating conditions the oil pressure is approximately 42 to 71 psi. (290~490 kPa).

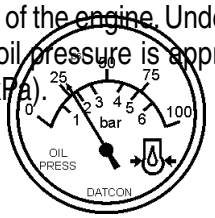


Figure 47. Oil Pressure Gauge

11. The **coolant temperature gauge** (Figure 48) will indicate the coolant temperature. Under normal operating conditions the coolant temperature should be between 167°~203°F (75°~95°C) (**Green Zone**).

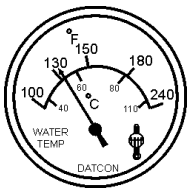


Figure 48. Coolant Temperature Gauge

12. The **tachometer gauge** (Figure 49) will indicate the speed of the engine when the generator is operating. Under normal operating conditions this speed is approximately 1800 RPM's.

Figure 49. Engine Tachometer Gauge

13. Place the **main, GFCI, and aux.** circuit breakers in the **ON** position (Figure 50).

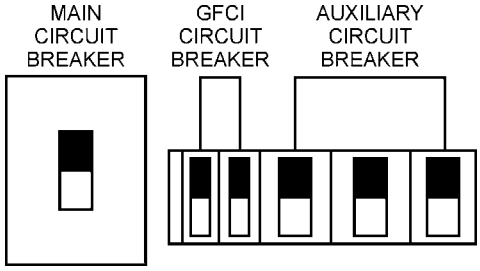


Figure 50. Main, Aux. and GFCI Circuit Breakers (ON)

14. Observe the generator's ammeter (Figure 51) 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.

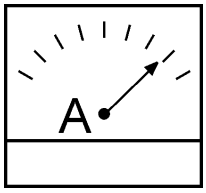


Figure 51. Ammeter (Load)

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

STARTING (AUTO MODE)

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.

CAUTION

When connecting the generator to a isolation (transfer) switch, **ALWAYS** have power applied to the generator's internal battery charger. This will ensure that the engine

NOTICE

CAUTION

NOTICE

When turning the generator off in the **AUTO** mode, commercial power, falling below a prescribed level, will signal the generator to start. Remember the generator can start operation at any time without warning. **NEVER** perform any maintenance on the generator or its attached equipment without first disconnecting power by means of a contact closure that is generated automatically by a transfer switch.

When starting generator in **AUTO** mode use the "Manual Start-up" procedure except where noted (see below).

1. Perform steps 1 through 5 in the Before Starting section as outlined in the Manual Starting Procedure.
2. Place the **engine speed switch** (Figure 52) in the **HIGH** position

Figure 52. Engine Speed Switch (High)

3. Place the **MPEC Control Switch** (Figure 53) in the **AUTO** position.

Figure 53. MPEC Control Switch (AUTO)

4. Continue operating the generator as outlined in the Manual Start-up procedure (start at step 5).

⚠ 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 54 to the **OFF** position..

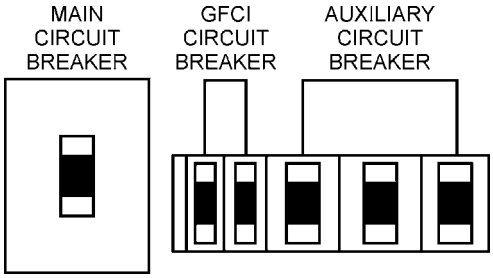


Figure 54. Main, GFCI and Load Circuit Breakers Off

2. Place the engine speed switch (Figure 55) in the "LOW" (down) position.

Figure 55. Engine Speed Switch (Low)

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 56) to the **OFF/RESET** position.

Figure 56. MPEC Control Switch (Off/Reset)

5. Verify that **all** the 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. To stop the engine in the event of an emergency, **PUSH** the emergency stop button (Figure 57) inward. This button is located on the engine operating panel, see Figure 5.

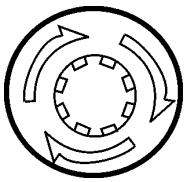


Figure 57. Emergency Stop Button

	Table 12. 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 12 as a general maintenance guideline. **Engine Side**, refer to the Engine Instruction Manual.

AIR CLEANER

Every 250 hours: Remove air cleaner element (Figure 58) 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 58) 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.

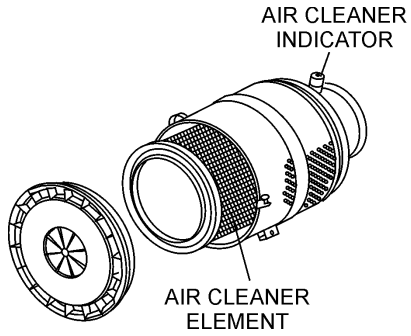


Figure 58. Air Cleaner/Indicator

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 59) wash out any deposits or debris that have accumulated inside the fuel tank.

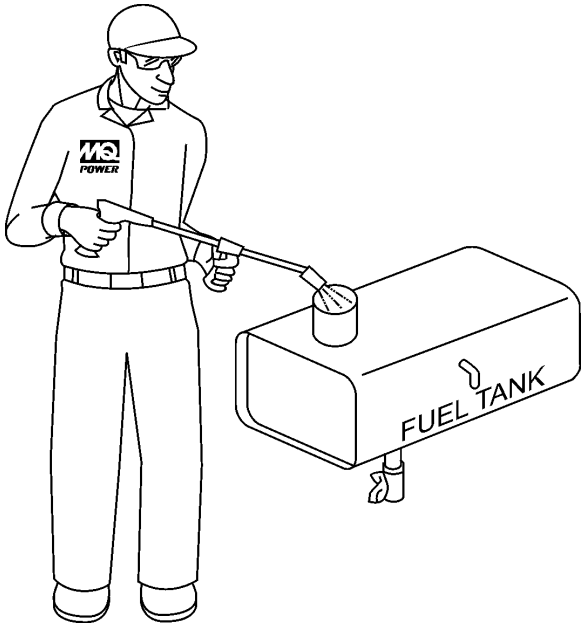


Figure 59. Fuel Tank Cleaning

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 28.

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 60) 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.

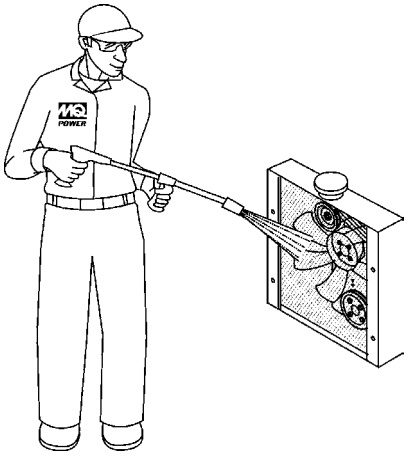


Figure 60. Radiator Cleaning

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.

JACKETWATER 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 61). 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.

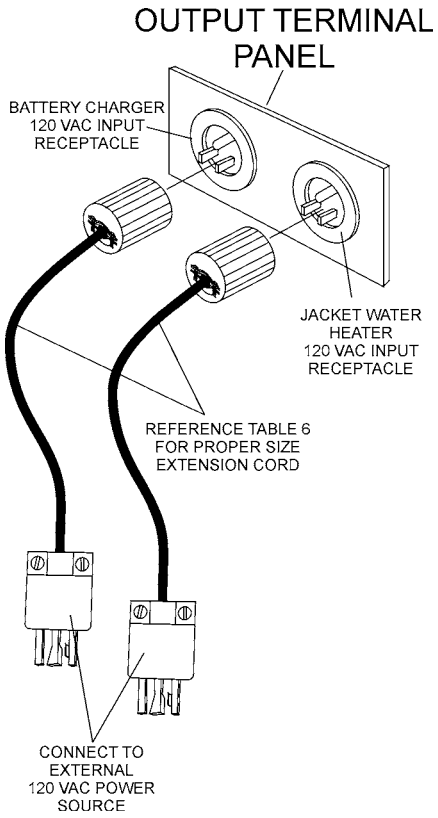


Figure 61. Battery Charger and Jacket Water Heater Power Connections

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 a power cord of adequate size.

NOTICE

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

TRAILER MAINTENANCE

This section is intended to provide the user with generic trailer service and maintenance information. The service and maintenance guidelines referenced in this section refer to a wide range of trailers.

Remember periodic inspection of the trailer will ensure safe towing of the generator and will prevent personal injury and damage to the equipment.

The definitions below describe some of the major components of a typical trailer that would be used with generator.

1. **Fuel Cell** — Provides an adequate amount of fuel for the equipment in use. Fuel cells must be empty when transporting equipment.
2. **Braking System** — System employed in stopping the trailer. Typical braking systems are electric, surge, hydraulic, hydraulic-surge and air.
3. **GVWR** — Gross Vehicle Weight Rating (GVWR) is the maximum number of pounds the trailer can carry, including the fuel cell (empty).
4. **Frame Length** — Measurement is from the ball hitch to the rear bumper (reflector).
5. **Frame Width** — Measurement is from fender to fender
6. **Jack Stand** — Trailer support device with maximum pound requirement from the tongue of the trailer.
7. **Coupler** — Type of hitch used on the trailer for towing.
8. **Tire Size** — Indicates the diameter of the tire in inches (10,12,14, etc.), and the width in millimeters (175,185,205, etc.). The tire diameter must match the diameter of the tire rim.
9. **Tire Ply** — The tire ply (layers) number is rated in letters; 2-ply,4-ply,6-ply, etc.
10. **Wheel Hub** — The wheel hub is connected to the trailer's axle.
11. **Tire Rim** — Tires mounted on a tire rim. The tire rim must match the size of the tire.
12. **Lug Nuts** — Used to secure the wheel to the wheel hub. Always use a torque wrench to tighten down the lug nuts. See Table 16 and Figure 64 for lug nut tightening and sequence.
13. **Axle** — Indicates the maximum weight the axle can support in pounds, and the diameter of the axle expressed in inches. Please note that some trailers have a double axle. This will be shown as 2-6000 lbs., meaning two axles with a total weight capacity of 6000 pounds.
14. **Suspension** — Protects the trailer chassis from shocks transmitted through the wheels. Types of suspension used are leaf, Q-flex, and air ride.
15. **Electrical** — Electrical connectors (looms) are provided with the trailer so the brake lights and turn signals can be connected to the towing vehicle.
16. **Application** — Indicates which units can be employed on a particular trailer.

BRAKES

Trailer 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.

Figure 62 displays the major hydraulic surge brake components that will require inspection and maintenance. Please inspect these components as required using steps 1 through 8 and Table 13 as listed below:

Brake Adjustment

1. Place the trailer on jack stands. Make sure the jack stands are placed on secure level ground.
2. Check the wheel and drum for free rotation.
3. Remove the adjusting hole cover from the adjusting slot at the bottom brake backing plate.
4. With a screwdriver or standard adjusting tool, rotate the star wheel of the adjuster assembly to expand the brake shoes.
5. Adjust the brake shoes outward until the pressure of the lining against the wheel drum makes the wheel difficult to turn.
6. Adjust, rotate the star wheel in the opposite direction until the wheel rotates freely with slight lining drag.
7. Replace the adjusting hole cover and lower the trailer to the ground.
8. Repeat steps 1 through 7 on the remaining brakes.

Hydraulic Surge Brakes

Hydraulic surge brakes (Figure 62) should not require any special attention with the exception of routine maintenance such as shoe and lining replacement. Brake lines should be periodically checked for cracks, kinks, or blockage.

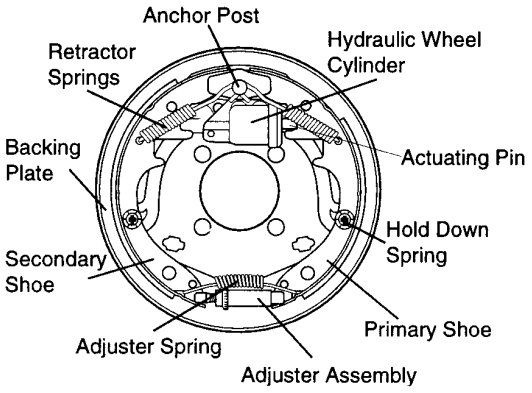


Figure 62. Hydraulic Brake Components

Actuator

Hydraulic surge braking requires the installation of an actuator at the tongue of the trailer. Remember the **surge or push** of the trailer toward the tow vehicle automatically synchronizes the trailer brakes with the tow vehicle brakes. As the trailer pushes against the tow vehicle the actuator telescopes together and applies force to the master cylinder, supplying hydraulic pressure to the trailer brakes.

Periodically check and test the surge "actuator" to make sure that it is functioning correctly. Never use an undersize actuator.

Table 13. 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.

TIRES/WHEELS/LUG NUTS

Tires and wheels are a very important and critical components of the trailer. When specifying or replacing the trailer wheels it is important the wheels, tires, and axle are properly matched.

CAUTION

Tire inflation pressure is the most important factor in tire life. Pressure should be checked cold before operation. **DO NOT** bleed air from tires when they are **hot**. Check inflation pressure weekly during use to insure the maximum tire life and tread wear.

ALWAYS wear safety glasses when removing or installing force fitted parts. Failure to comply may result in serious injury.

CAUTION

DO NOT attempt to repair or modify a wheel. **DO NOT** install in inner tube to correct a leak 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.

Table 14 (Tire Wear Troubleshooting) will help pinpoint the causes and solutions of tire wear problems.

Table 14. 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.

Suspension

The **leaf suspension** springs and associated components (Figure 63) 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. Torqued suspension components as detailed in Table 15.

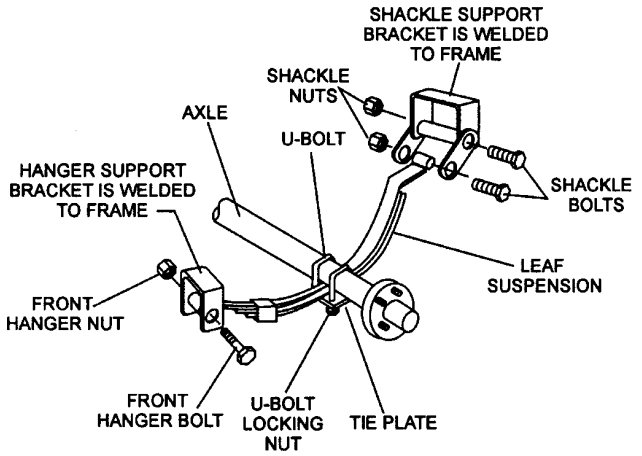


Figure 63. Major Suspension Components

Table 15. Suspension Torque Requirements

Item	Torque (Ft.-Lbs.)
3/8" U-Bolt	Min-30 Max-35
7/16" U-Bolt	Min-45 Max-60
1/2" U-Bolt	Min-45 Max-60
Shackle Bolt Spring Eye Bolt	Snug fit only. Parts must rotate freely. Locking nuts or cotter pins are provided to retain nut-bolt assembly.
Shoulder Type Shackle Bolt	Min-30 Max-50

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:

4-LUG NUTS 6-LUG NUTS

1. Start all wheel lug nuts by hand.
2. Torque all lug nuts in sequence (see Figure 64). **DO NOT** torque the wheel lug nuts all the way down. Tighten each lug nut in 3 separate passes as defined by Table 16.
3. After first road use, retorque all lug nuts in sequence. Check all wheel lug nuts periodically.

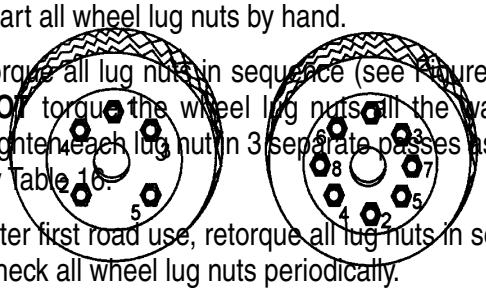
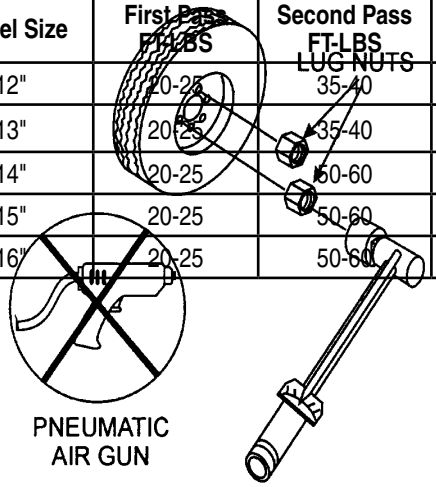


Figure 64. Wheel Lug Nuts Tightening Sequence

Table 16. 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



PNEUMATIC AIR GUN

TORQUE WRENCH

NOTICE

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

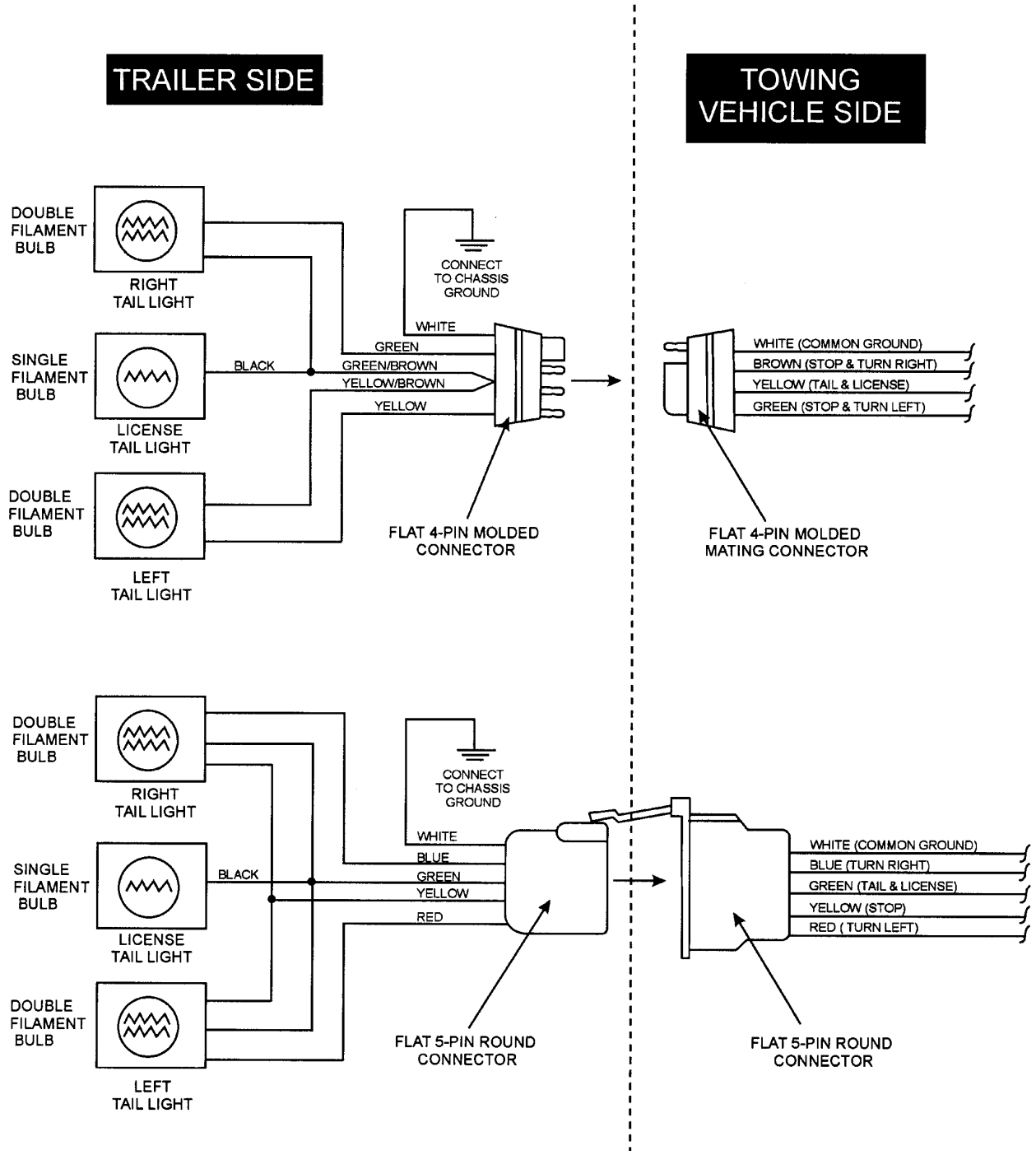
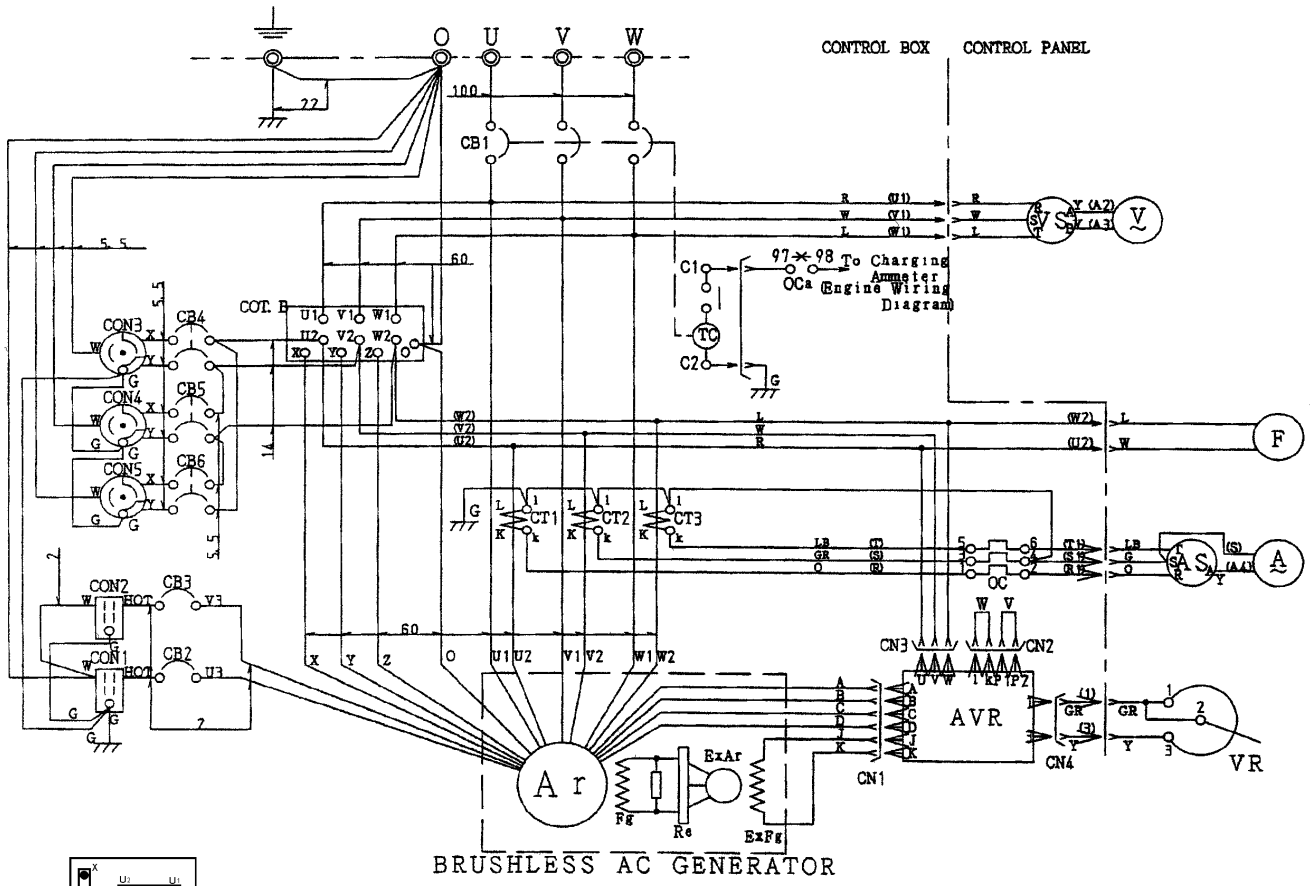
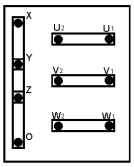
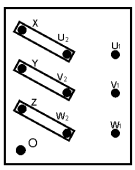


Figure 65. Trailer/Towing Vehicle Wiring Diagram

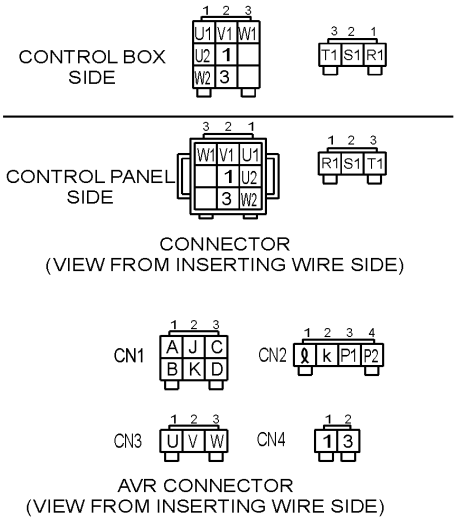




Voltage Change-Over Board-240V Set



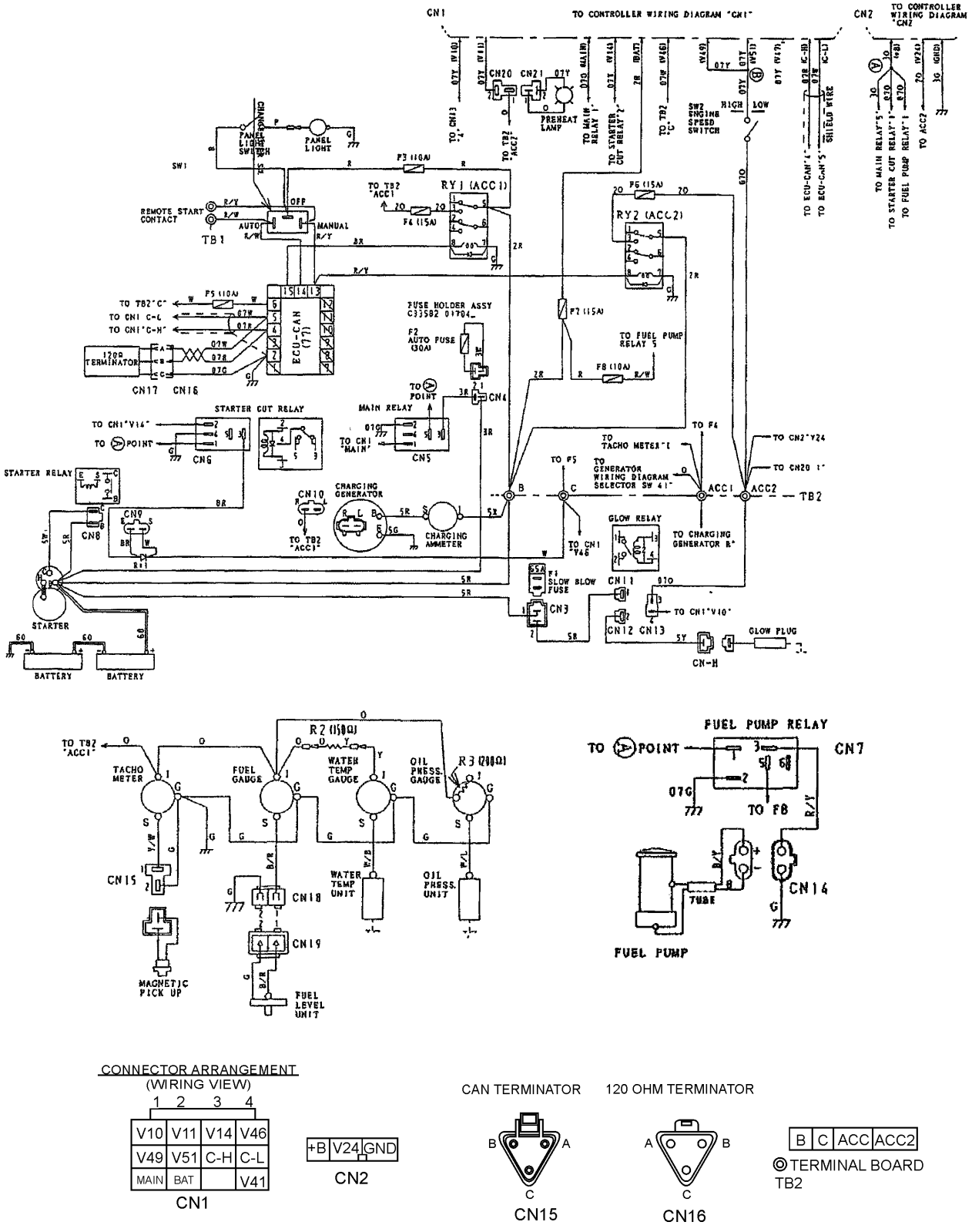
Voltage Change-Over Board-480V Set



SYM	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	Current Transformer (CT1 thru CT3
AS	Change-Over Switch, Ammeter
A	Ammeter
VS	Change-Over Switch, Voltmeter
V	Voltmeter
F	Frequency Meter
CB	Circuit Breakers (CB1 thru CB6)
CON	Receptacle (CON 1 thru 6)
OC	Over Current Relay
SW1	Panel Light Switch
IL	Panel Light
COT B	Voltage Change-Over Board

COLOR CODE			
SYM.	WIRE COLOR	SYM.	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		

Figure 66. Generator Wiring Diagram



CONNECTOR ARRANGEMENT
(WIRING VIEW)

CN1

1	2	3	4
V10	V11	V14	V46
V49	V51	C-H	C-L
MAIN	BAT		V41

CN2

+B	V24	GND

CAN TERMINATOR

CN15

120 OHM TERMINATOR

CN16

B	C	ACC	ACC2

◎ TERMINAL BOARD
TB2

Figure 67. Engine Wiring Diagram

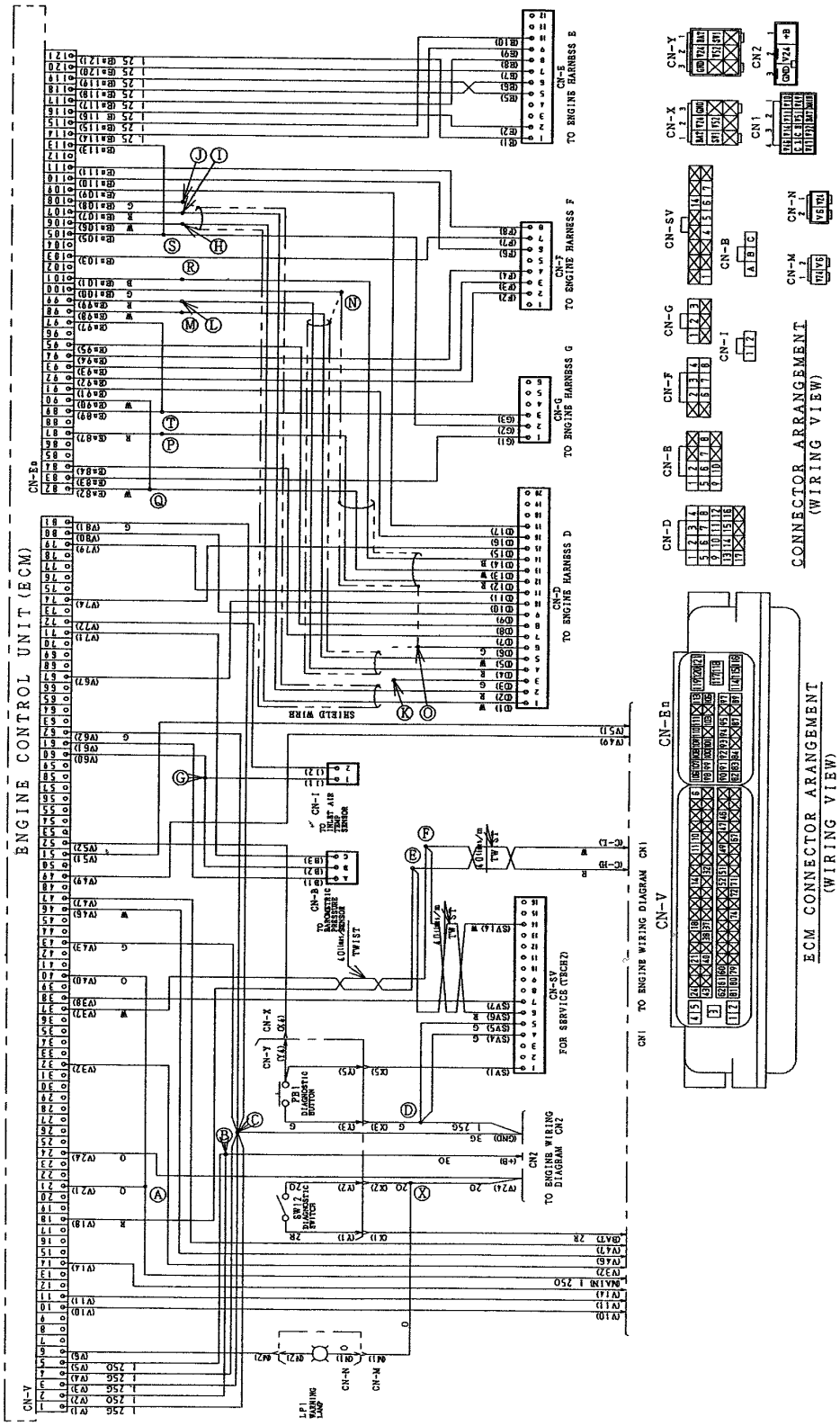


Figure 68. Controller Wiring Diagram

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, use Table 17 shown below for diagnosis of the Generator. If the problem cannot be remedied, consult our company's business office or service plant.

Table 17. 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.

Practically all breakdowns can be prevented by proper handling and maintenance inspections, but in the event of a breakdown, use Table 18 (Engine Controller Troubleshooting) as a basic guideline for troubleshooting the Microprocessor Engine Controller unit (MPEC). If the problem cannot be remedied, consult our company's business office or service plant.

Table 18. Engine Controller Troubleshooting (MPEC)

Symptom	Possible Problem	Solution
Low oil pressure light is on.	Low oil level?	Fill oil level.
	Oil pressure sending unit failure?	Replace oil pressure sending unit.
	Time delay malfunction in controller?	Refer to dealer.
	Wire shorted?	Inspect/repair wire.
Low coolant level light is on. (Optionally installed)	Low coolant level?	Fill coolant level.
	Sending unit failure?	Replace sending unit.
	Low battery voltage?	Replace/charge battery.
High coolant temperature light is on.	Fan belt tension incorrect?	Tighten/replace fan belt.
	Air flow is not circulating through radiator?	Clean/repair radiator grill.
	Doors open?	Close doors.
	Exhaust leaking?	Replace/repair gaskets or faulty part.
	Generator being overloaded?	Check/reduce load.
	Thermostat failure?	Replace thermostat.
	Air intake blocked?	Clean all air intakes.
	Temperature switch failure	Replace temperature switch.
Overcrank light is on.	No or low fuel?	Fill fuel level.
	Controller needs to be calibrated?	Refer to dealer.
Overspeed light is on.	RPM engine speed too high?	Adjust RPM.
	Governor actuator needs to be adjusted?	Adjust governor actuator.
	Governor controller needs to be adjusted?	Adjust governor controller.
	Engine controller needs to be calibrated?	Refer to dealer.
Loss of MPU light(s) or on.	Magnetic pick up out of adjustment?	Adjust magnetic pick up.
	Magnetic pick up dirty?	Clean magnetic pick up.

The engine controller of this generator diagnoses problems that arise from the engine control system and the engine itself. Press the diagnostic button (Figure 69) on the diagnostic panel to determine if an engine malfunction has occurred.

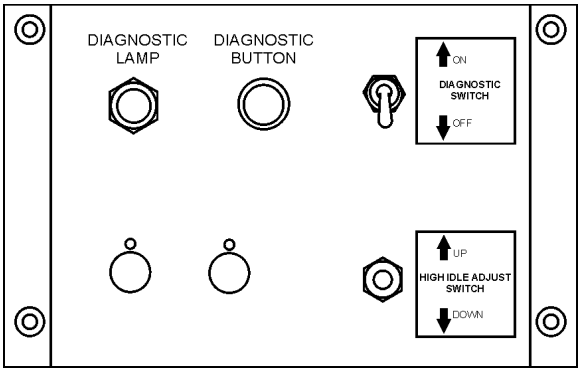


Figure 69. Diagnostic Panel

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.

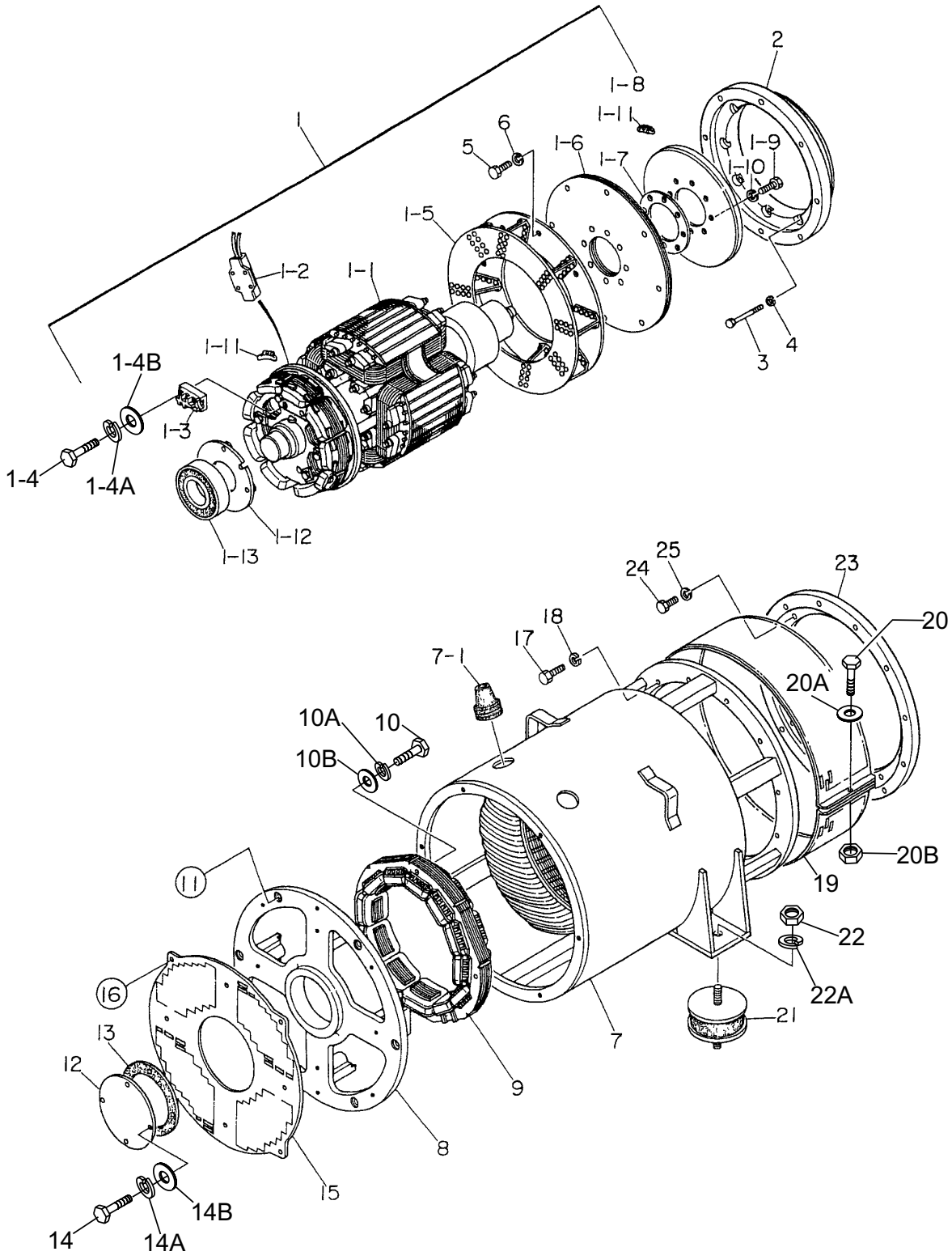
DCA180SSI/DCA180SSIU WHISPERWATT GENERATORS WITH ISUZU 6HK1X DIESEL ENGINE

1 to 3 units

QTY.	P/N	DESCRIPTION
5	1132402322	OIL FILTER, CARTRIDGE
3	0602046682	ELEMENT, AIR (OUTER)
3	0602046683	ELEMENT, AIR (INNER)
1	1136715160	BELT, FAN
1	M3310503903	RADIATOR HOSE, UPPER
1	M3310503703	RADIATOR HOSE, LOWER
1	0810105400	FUEL FILTER, TANK (DCA180SSI)
3	8980714010	FUEL FILTER, FEED PUMP
3	8980088400	FILTER FUEL, ELEMENT MAIN
3	8980758540	FILTER FUEL, ELEMENT PRE
1	0602122272	UNIT, OIL PRESSURE
1	0602123260	UNIT, WATER TEMPERATURE
1	0601808803	CIRCUIT BREAKER, 1P, 20 AMP
1	0601808804	CIRCUIT BREAKER, 2P 50 AMP
1	0601820601	AUTOMATIC VOLTAGE REGULATOR
1	LY2DUS24VDC	RELAY
1	0601806644	FUSE, 30 AMP
1	0601806640	FUSE, 65 AMP

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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1-3
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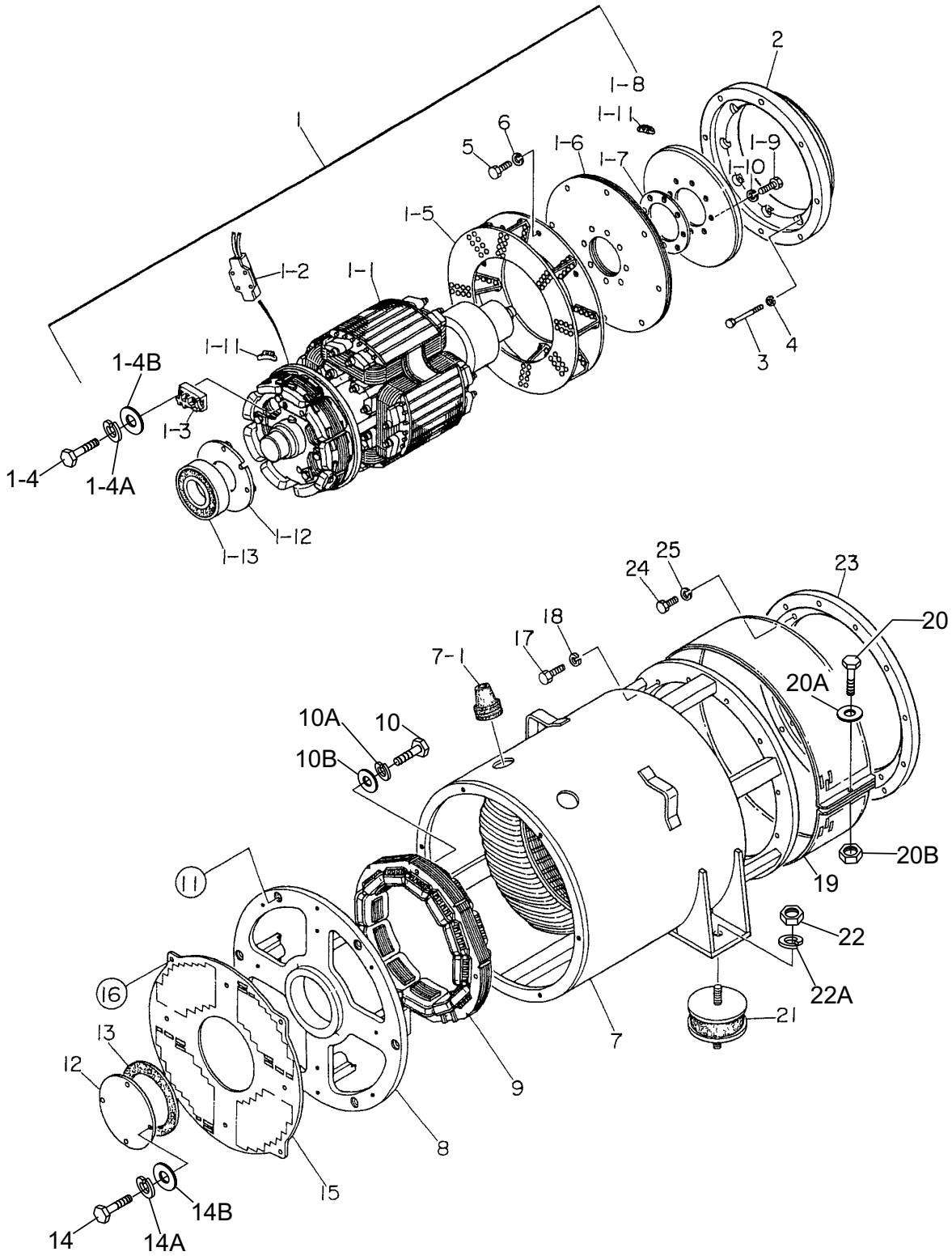
1-4A
1-12
1-13
3
4
25
24
23
18
17
20
7-1
20A
10A
10
10B
20B
19
11
22
22A
16
21
13
12
7
9
8
15
14B
14
14A

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	C0110100902	ROTOR ASSY	1	
1-1		FIELD ASSY	1	
1-2	0601842334	RESISTOR, 80W 100K Ω	1	
1-3	0601823282	RECTIFIER	1	
1-4	0018205020	HEX SOCKET HEAD CAP SCREW	2	
1-4A	0040005000	WASHER, LOCK	2	
1-4B	0041205000	WASHER, FLAT	2	
1-5	8171070002	FAN	1	
1-6	8171611003	COUPLING DISK	9	
1-7	C1164200004	WASHER, COUPLING HUB	1	
1-8	8171015003	BALANCING PLATE	1	PURCHASE 1 - 11 AS A SET
1-9	0012116045	HEX HEAD BOLT	8	
1-10	0042616000	WASHER, LOCK	8	
1-11	0601000209	BALANCING WEIGHT KIT	1	
1-12	C1112500004	BEARING FLANGE	1	
1-13	0071906314	BEARING	1	
2	C0164400503	COUPLING RING	1	DCA180SSI
2	M3163400603	COUPLING RING	1	DCA180SSIU
3	0010310050	HEX HEAD BOLT	8	
4	0042510000	WASHER, LOCK	8	
5	0010312040	HEX HEAD BOLT	8	
6	0042512000	WASHER, LOCK	8	
7	C0130000903	STATOR ASSY	1	
7-1	0845041804	GROMMET	2	
8	C1154000002	END BRACKET	1	
9	C1138000003	FIELD ASSY EXCITER	1	
10	0012110065	HEX HEAD BOLT	4	
10A	0042610000	WASHER, LOCK	4	
10B	0041210000	WASHER,FLAT	4	
11	0017112045	HEX HEAD BOLT	6	
12	C1154400004	COVER, BEARING	1	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10A
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10B
20B
19
11
22
22A
16
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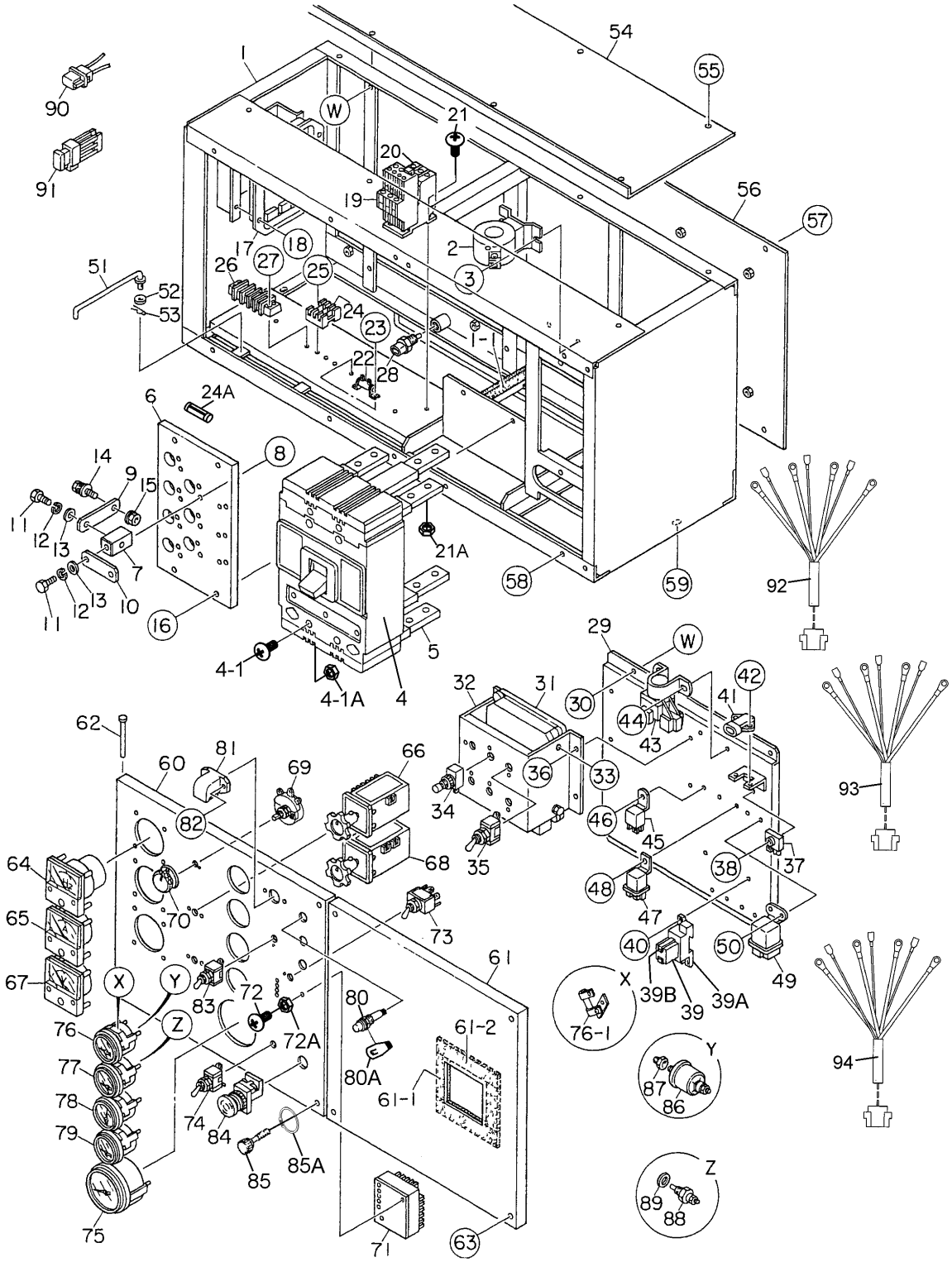
NO.	PART NO.	PART NAME	QTY.	REMARKS
13	C1154300004	GASKET, BEARING	1	
14	0010106060	HEX HEAD BOLT	4	
14A	0040006000	WASHER, LOCK	4	
14B	0041206000	WASHER,FLAT	4	
15	C1154400103	SUCTION COVER	1	
16	0017106016	HEX HEAD BOLT	8	
17	0010312040	HEX HEAD BOLT	12	
18	0042512000	WASHER, LOCK	12	
19	C1132300114	COVER, FAN	1	
20	0010106030	HEX HEAD BOLT	1	
20A	0041206000	WASHER, FLAT	1	
20B	0600815000	NUT	1	
21	0605000012	RUBBER SUSPENSION	2	DCA180SSI
21	0605000013	RUBBER SUSPENSION	2	DCA180SSIU
22	0030020000	HEX NUT	4	DCA180SSI
22	0030016000	HEX NUT	4	DCA180SSIU
22A	0040020000	WASHER, LOCK	4	DCA180SSI
22A	0040016000	WASHER, LOCK	4	DCA180SSIU
23	C0164600003	COUPLING ADAPTER	1	DCA180SSI
23	M3163600103	COUPLING ADAPTER	1	DCA180SSIU
24	0010310030	HEX HEAD BOLT	12	
25	0042510000	WASHER, LOCK	12	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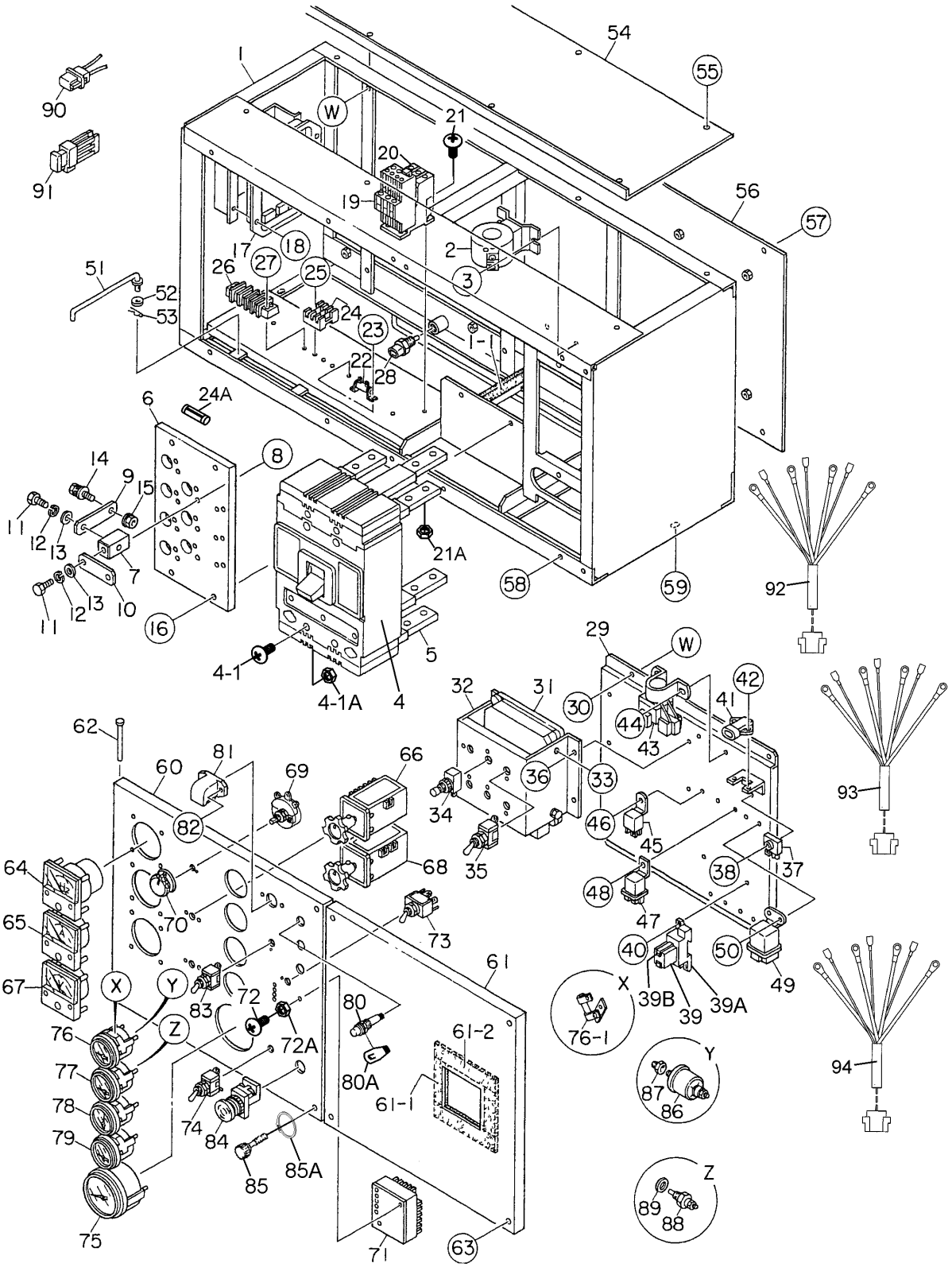
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3213002002	CONTROL BOX	1	
1-1	0330000215	EDGING	1	
2	0601809666	CURRENT TRANSFORMER, 300/5A	3	
3	0027106016	MACHINE SCREW	6	
4	0601870423	CIRCUIT BREAKER, 500A	1	
4-1	0021006045	MACHINE SCREW	4	
4-1A	0207006000	HEX NUT	4	
5	0601815168	REAR CONNECTOR KIT	1	
6	C0274000003	TER. BOARD, VOLT. CHANGE- OVER	1	DCA180SSI
6	M3273000003	TER. BOARD, VOLT. CHANGE- OVER	1	DCA180SSIU
7	8131852104	CHANGE TERMINAL	10	DCA180SSI
7	M3276400004	CHANGE TERMINAL	10	DCA180SSIU
8	0017106025	HEX HEAD BOLT	20	
9	C0277200004	TERMINAL PLATE	3	DCA180SSI
9	M4276200004	TERMINAL PLATE	3	DCA180SSIU
10	8131853104	CHANGE-OVER PLATE	6	DCA180SSI
10	M3276300004	CHANGE-OVER PLATE	6	DCA180SSIU
11	8131852504	TIE BOLT	20	DCA180SSI
11	M4276100004	TIE BOLT	20	DCA180SSIU
12	0040010000	WASHER, LOCK	20	
13	0041410000	WASHER,FLAT	20	
14	0017110040	HEX HEAD BOLT	3	
15	0207010000	HEX NUT	3	
16	0016908030	HEX HEAD BOLT	4	
17	0601820601	AUTOMATIC VOLTAGE REGULATOR	1	
18	0027105016	MACHINE SCREW	4	
19	0601820847	OVER CURRENT RELAY	1	
20	0601820848	OVER CURRENT RELAY, 25A	1	
21	0027104020	MACHINE SCREW	2	DCA180SSI
21	0027104016	MACHINE SCREW	2	DCA180SSIU
21A	0207004000	HEX NUT	2	
22	0601842468	RESISTOR	1	
23	0027103010	MACHINE SCREW	2	
24	0601802218	HOLDER, FUSE 3P	1	
24A	0601806671	FUSE, 15A	3	
25	0027103020	MACHINE SCREW	2	
26	0601815153	TERMINAL	1	
27	0027104016	MACHINE SCREW	2	
28	812146-8300	SENSOR, INLET AIR TEMP.	1	REPLACES P/N 0603210240
29	M3260500703	SET PANEL, ELECTRIC PARTS	1	
30	0016906016	HEX HEAD BOLT	4	
31	8981264350	CONTROLLER	1	REPLACES P/N 0602202678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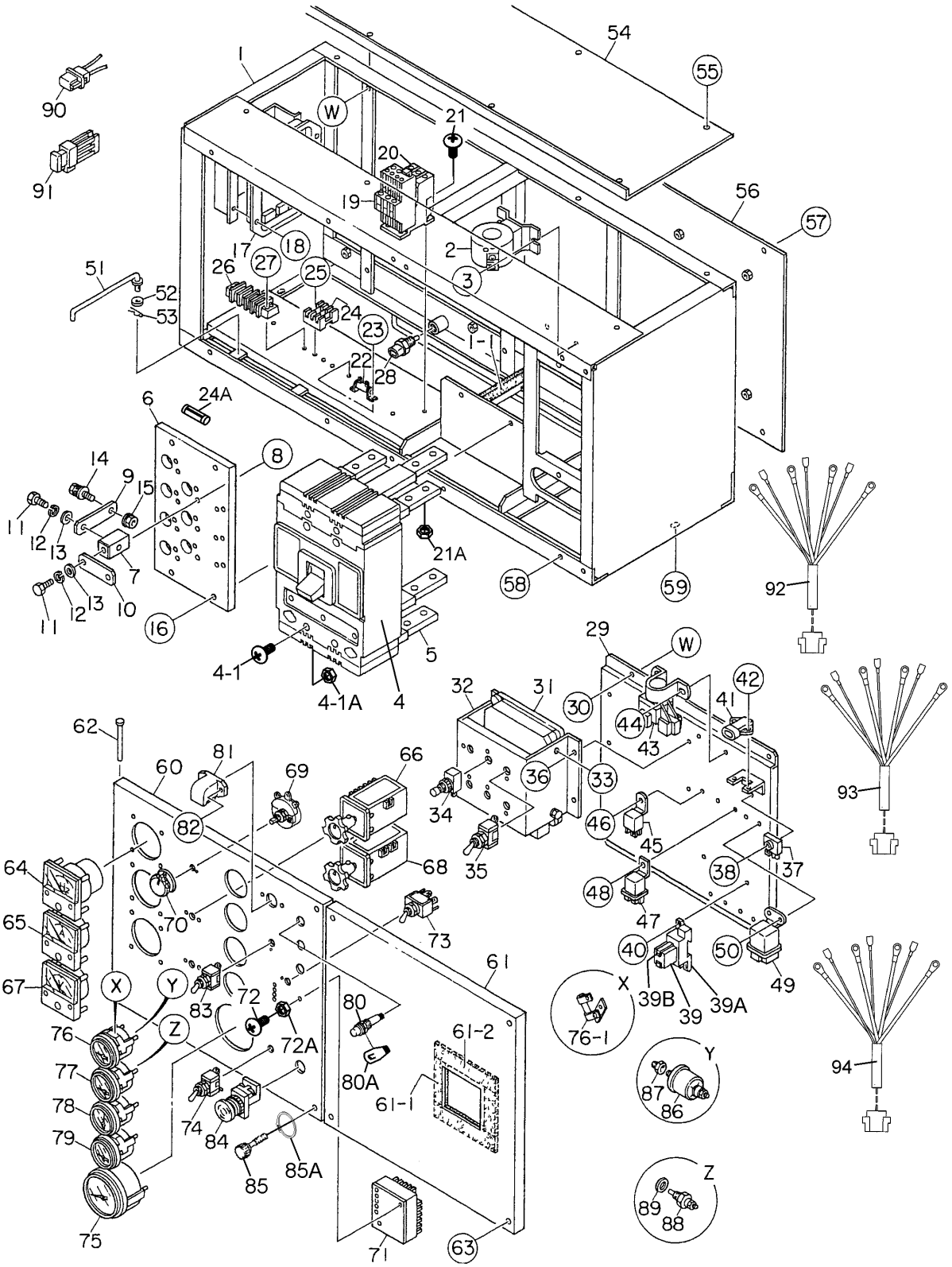
NO.	PART NO.	PART NAME	QTY.	REMARKS
32	C3260503104	BRACKET	1	DCA180SSI
32	M3260500604	BRACKET	1	DCA180SSIU
33	0016906016	HEX HEAD BOLT	4	
34	0601831205	PUSH BUTTON SWITCH	1	
35	0601831330	DIAGNOSTIC SWITCH	1	
36	0016906016	HEX HEAD BOLT	4	
37	0601823240	RECTIFIER	1	
38	0027104020	MACHINE SCREW	1	
39	LY2DUS24VDC	RELAY	3	REPLACES P/N 0601827655
39A	PTF08A	BASE	3	REPLACES P/N 0601823109
39B	PYCA1	CLIP	3	REPLACES P/N 0601824400
40	0027104020	MACHINE SCREW	6	
41	8972177780	SENSOR, BAROMETRIC PRESSURE	1	REPLACES P/N 0602130220
42	0027104016	MACHINE SCREW	2	
43	8980056310	RELAY, STARTER	1	REPLACES P/N 0602201401
44	0027106016	MACHINE SCREW	2	
45	8980137900	RELAY	2	REPLACES P/N 0602202682
46	0027105016	MACHINE SCREW	2	
47	5825500300	RELAY	1	REPLACES P/N 0602201222
48	0027105016	MACHINE SCREW	1	
49	8944607060	RELAY, GLOW PLUG	1	REPLACES P/N 0602202683
50	0027105016	MACHINE SCREW	2	
51	3871824004	STOPPER, CONTROL PANEL	1	DCA180SSI
51	M4213600104	STOPPER, CONTROL PANEL	1	DCA180SSIU
52	0041206000	WASHER,FLAT	1	
53	0605010502	SNAP PIN	1	
54	M4213500104	COVER, CONTROL BOX	1	
55	0016908020	HEX HEAD BOLT	8	
56	M4213400104	BACK PANEL, CONTROL BOX	1	
57	0016908020	HEX HEAD BOLT	8	
58	0016908020	HEX HEAD BOLT	8	
59	0016908020	HEX HEAD BOLT	6	
60	M4223000303	CONTROL PANEL	1	
61	M4223000404	CONTROL PANEL	1	
61-1	0222100100	SEAL RUBBER	2	
61-2	0222100165	SEAL RUBBER	2	
62	0605011211	PIN	2	
63	0017108040	HEX HEAD BOLT	4	
64	0601807642	FREQUENCY METER, 240V	1	
65	0601817000	AC AMMETER, 0~ 300A/600A:5A	1	
66	0601801040	CHANGE- OVER SWITCH, AMMETER	1	
67	0601800275	AC VOLTMETER, 600V	1	
68	0601801041	CHANGE- OVER SWITCH, VOLTMETER	1	
69	0601840073	RHEOSTAT (VOLTAGE REGULATOR)	1	
70	0601840121	KNOB	1	
71	0602202641	CONTROLLER	1	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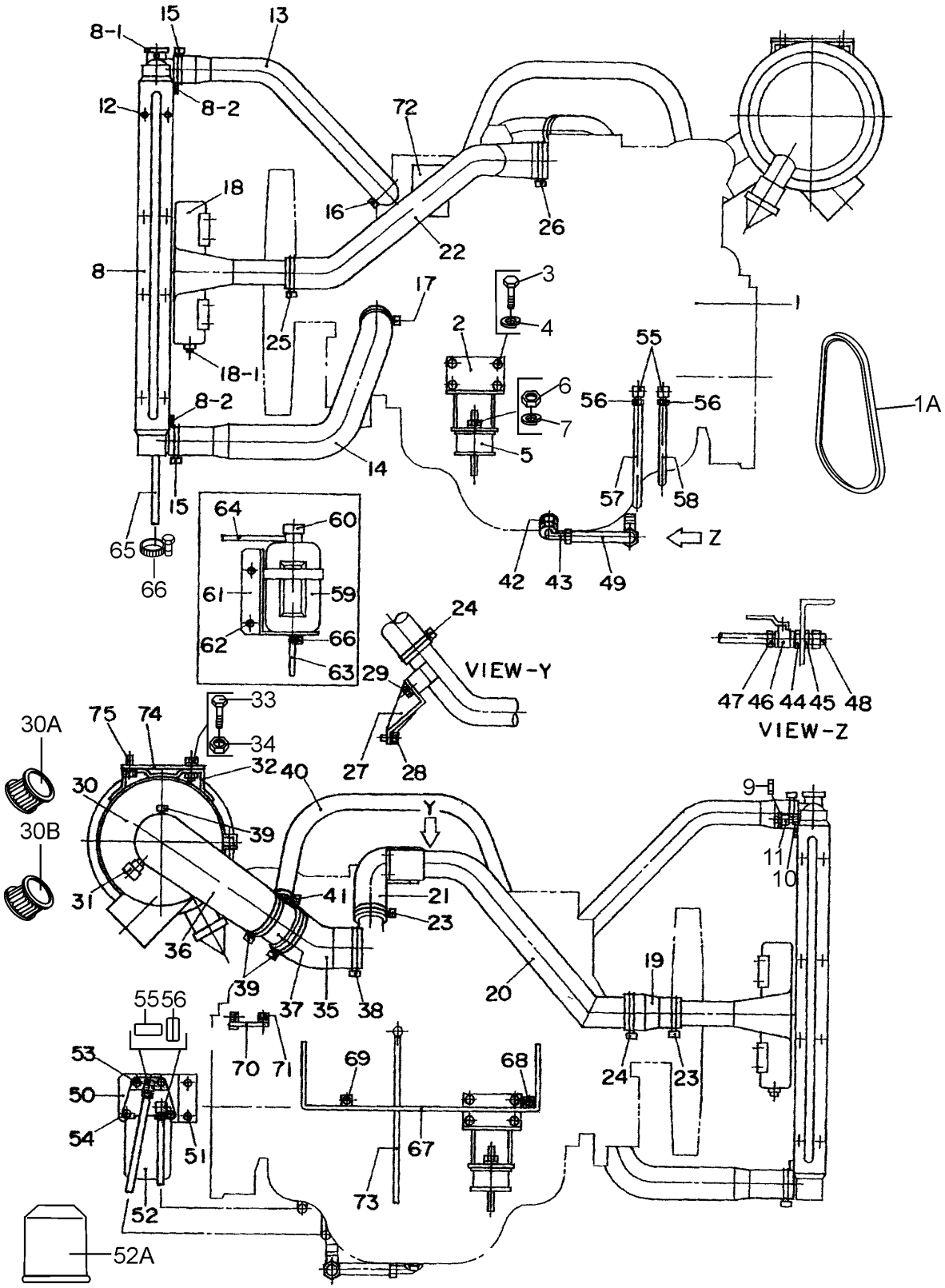
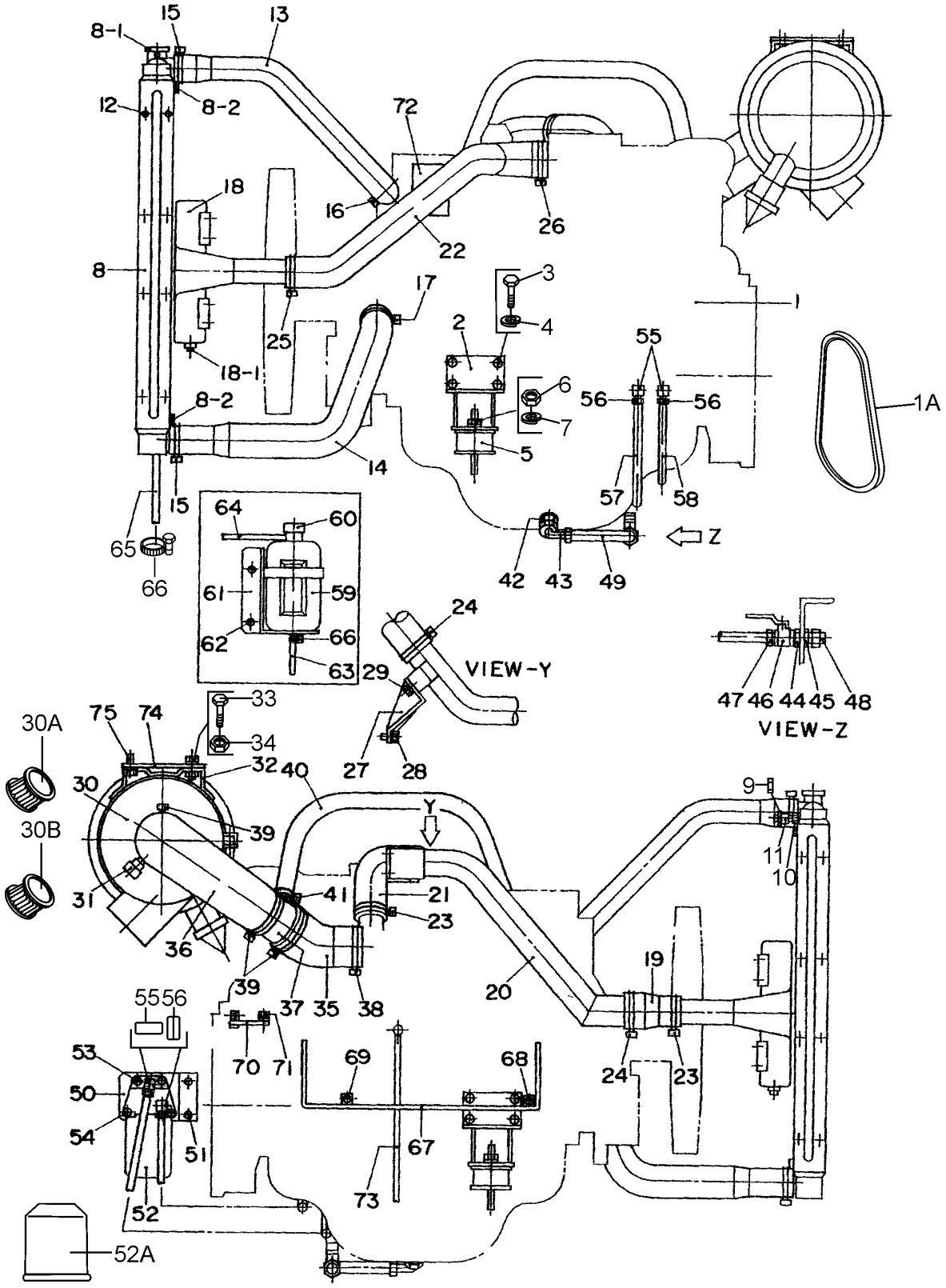
NO.	PART NO.	PART NAME	QTY.	REMARKS
72	0027104035	MACHINE SCREW	2	DCA180SSI
72	0021004040	MACHINE SCREW	2	DCA180SSIU
72A	0207004000	HEX NUT	2	
73	0601831340	SWITCH	1	
74	0601831395	ENGINE SPEED SWITCH	1	
75	0602120098	TACHOMETER	1	
76	0602122093	OIL PRESSURE GAUGE	1	
77	0602123090	WATER TEMPERATURE GAUGE	1	
78	0602121081	CHARGING AMMETER	1	
79	0602125091	FUEL GAUGE	1	
80	0602103090	ALARM LAMP	3	
80A	0601810244	BULB	3	
81	0601810171	PANEL LIGHT	1	
82	0027104020	MACHINE SCREW	2	
83	0601831330	SWITCH, PANEL LIGHT	1	
84	0601831557	EMERGENCY STOP BUTTON	1	DCA180SSI
84	0601831589	EMERGENCY STOP BUTTON	1	DCA180SSIU
85	0845056404	SET SCREW	2	DCA180SSI
85	M9220100004	SET SCREW	2	DCA180SSIU
85A	0080200007	SNAP RING	2	
86	0602122272	UNIT, OIL PRESSURE	1	
87	M9200100004	ADAPTER	1	
88	0602123260	UNIT, WATER TEMPERATURE	1	
89	9095720140	PACKING	1	REPLACES P/N 0602021109
90	0601806644	FUSE, 30A	1	
91	0601806640	FUSE, 65A	1	
92	M3246702604	WIRE HARNESS, GENERATOR	1	
93	M3357202402	WIRE HARNESS, ENGINE	1	
94	M3357202202	WIRE HARNESS, CONTROLLER	1	

ENGINE AND RADIATOR ASSY.



NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M3923200174	ENGINE, 6HK1X	1	
1A	1136715160	FAN BELT	1	REPLACES P/N 0602015275
2	M3303200803	ENGINE FOOT	2	
3	0010310025	HEX HEAD BOLT	8	
4	0042510000	WASHER, LOCK	8	
5	0605000011	RUBBER SUSPENSION	2	
6	0030016000	HEX NUT	2	
7	0040016000	WASHER, LOCK	2	
8	C0923200164	RADIATOR	1	
8-1	1026000620	CAP	1	REPLACES P/N 0602011029
8-2	M3493600604	RUBBER SEAL	2	
9	M9200101004	ADAPTER	1	
10	0150000016	O-RING	1	
11	0602123290	COOLANT LEVEL SWITCH	1	
12	0016908020	HEX HEAD BOLT	16	
13	M3310503903	RADIATOR HOSE	1	
14	M3310503703	RADIATOR HOSE	1	
15	0605515137	HOSE BAND	1	DCA180SSI
15	0605515148	HOSE BAND	2	DCA180SSIU
16	0605515137	HOSE BAND	1	DCA180SSI
16	0605515148	HOSE BAND	1	DCA180SSIU
17	0605515141	HOSE BAND	1	DCA180SSI
17	0605515146	HOSE BAND	1	DCA180SSIU
18	1350001140	INTER COOLER	1	REPLACES P/N M3923200124
18-1	0132004000	PLUG	1	
19	M3310504103	INTER COOLER HOSE	1	
20	M3310400803	INTER COOLER PIPE	1	
21	M3310504003	INTER COOLER HOSE	1	
22	M3310504203	INTER COOLER HOSE	1	
23	0605515236	HOSE BAND	2	
24	0605515214	HOSE BAND	2	
25	0605515206	HOSE BAND	1	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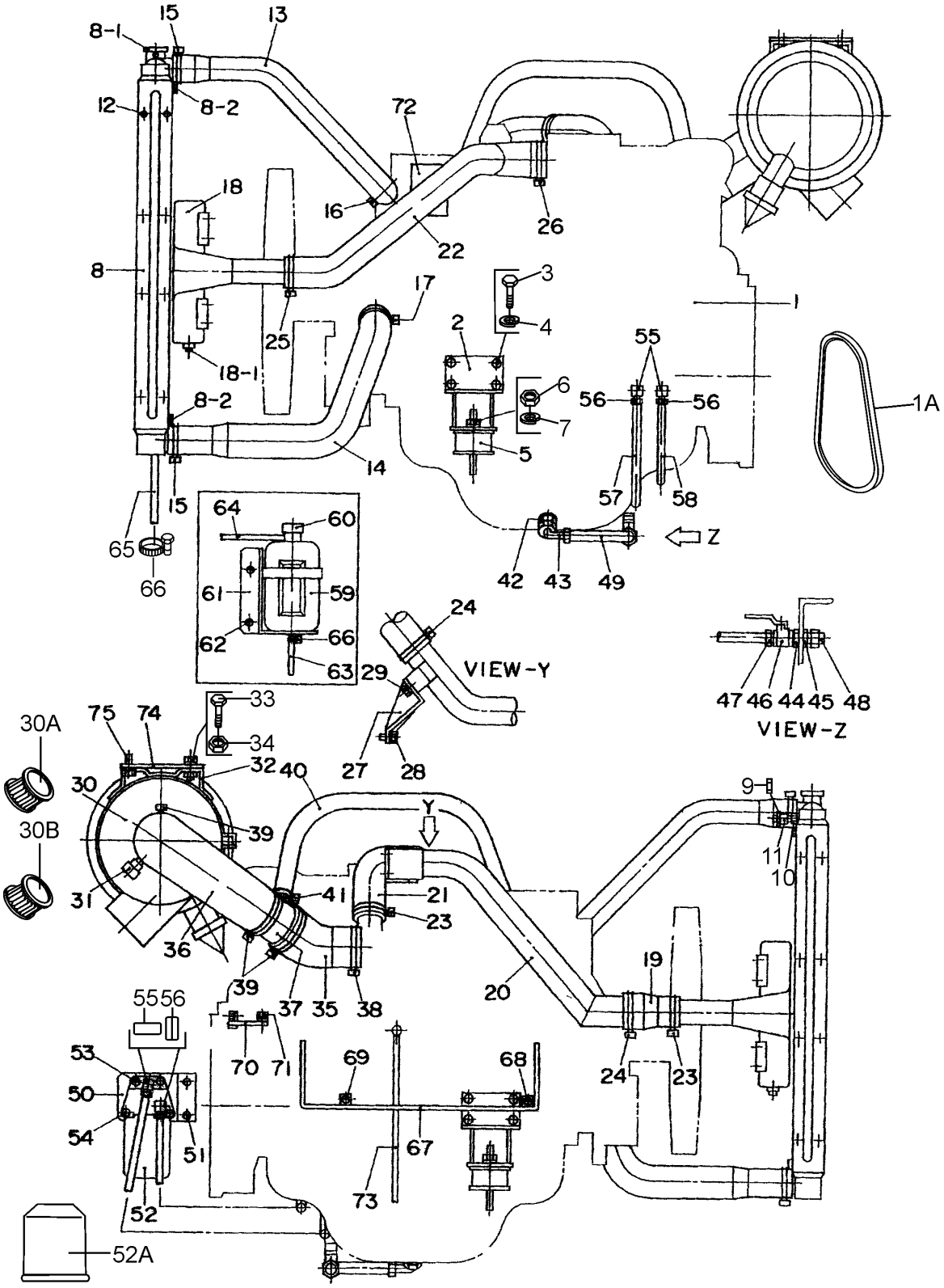
NO.	PART NO.	PART NAME	QTY.	REMARKS
26	0605515238	HOSE BAND	1	
27	M3310203303	PIPE BRACKET	1	
28	0016908020	HEX HEAD BOLT	2	
29	0017112030	HEX HEAD BOLT	1	
30	0602046538	AIR CLEANER	1	DCA180SSI
30	0602046586	AIR CLEANER	1	DCA180SSIU
30A	0602046617	ELEMENT (OUTER), AIR CLEANER	1	DCA180SSI
30A	0602046682	ELEMENT (OUTER), AIR CLEANER	1	DCA180SSIU
30B	0602046618	ELEMENT (INNER), AIR CLEANER	1	DCA180SSI
30B	0602046683	ELEMENT (INNER), AIR CLEANER	1	DCA180SSIU
31	0602040690	INDICATOR, AIR CLEANER	1	DCA180SSI
31	0602040650	INDICATOR, AIR CLEANER	1	DCA180SSIU
32	0602040559	BAND, AIR CLEANER	2	DCA180SSI
32	0602040558	BAND, AIR CLEANER	2	DCA180SSIU
33	0016908025	HEX HEAD BOLT	4	
34	0207008000	HEX NUT	4	
35	M3373101603	HOSE, AIR CLEANER	1	
36	M3373101703	HOSE, AIR CLEANER	1	
37	M3326100304	BLOWBY PIPE	1	
38	0605515211	HOSE BAND	1	DCA180SSI
38	0605515200	HOSE BAND	1	DCA180SSIU
39	0605515260	HOSE BAND	3	DCA180SSI
39	0605515202	HOSE BAND	3	DCA180SSIU
40	0191701230	BLOWBY HOSE	1	
41	0605515068	HOSE BAND	2	DCA180SSI
41	0605515149	HOSE BAND	2	DCA180SSIU
42	0602022581	ADAPTER	1	
43	0602022561	90 DEGREE ELBOW	1	
44	0603306590	CONNECTOR	1	
45	0603300285	ROCKNUT	1	
46	0605511395	VALVE	1	
47	0603306395	HOSE JOINT	1	
48	0602021070	CAP	1	
49	0269200400	DRAIN HOSE	1	DCA180SSI
49	0269200800	DRAIN HOSE	1	DCA180SSIU
50	M3323500204	BRACKET, OIL FILTER	1	
51	0016910025	HEX HEAD BOLT	2	
52	8973243861	OIL FILTER	1	REPLACES P/N 0602041007
52A	1132402322	CARTRIDGE, OIL FILTER	1	REPLACES P/N 0602041221
53	0010110120	HEX HEAD BOLT	2	
53A	0040010000	WASHER, LOCK	2	
53B	0041210000	WASHER, FLAT	2	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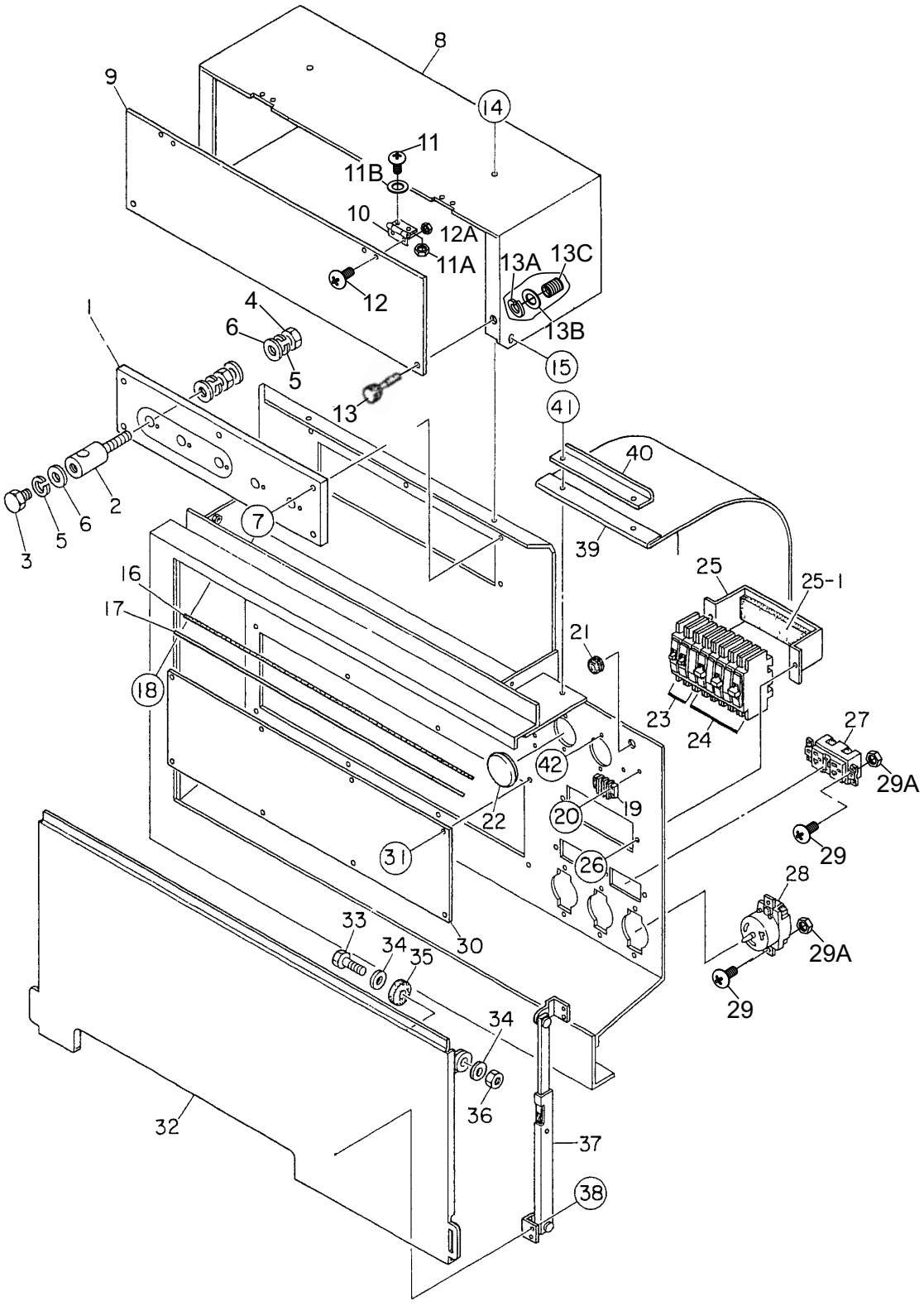
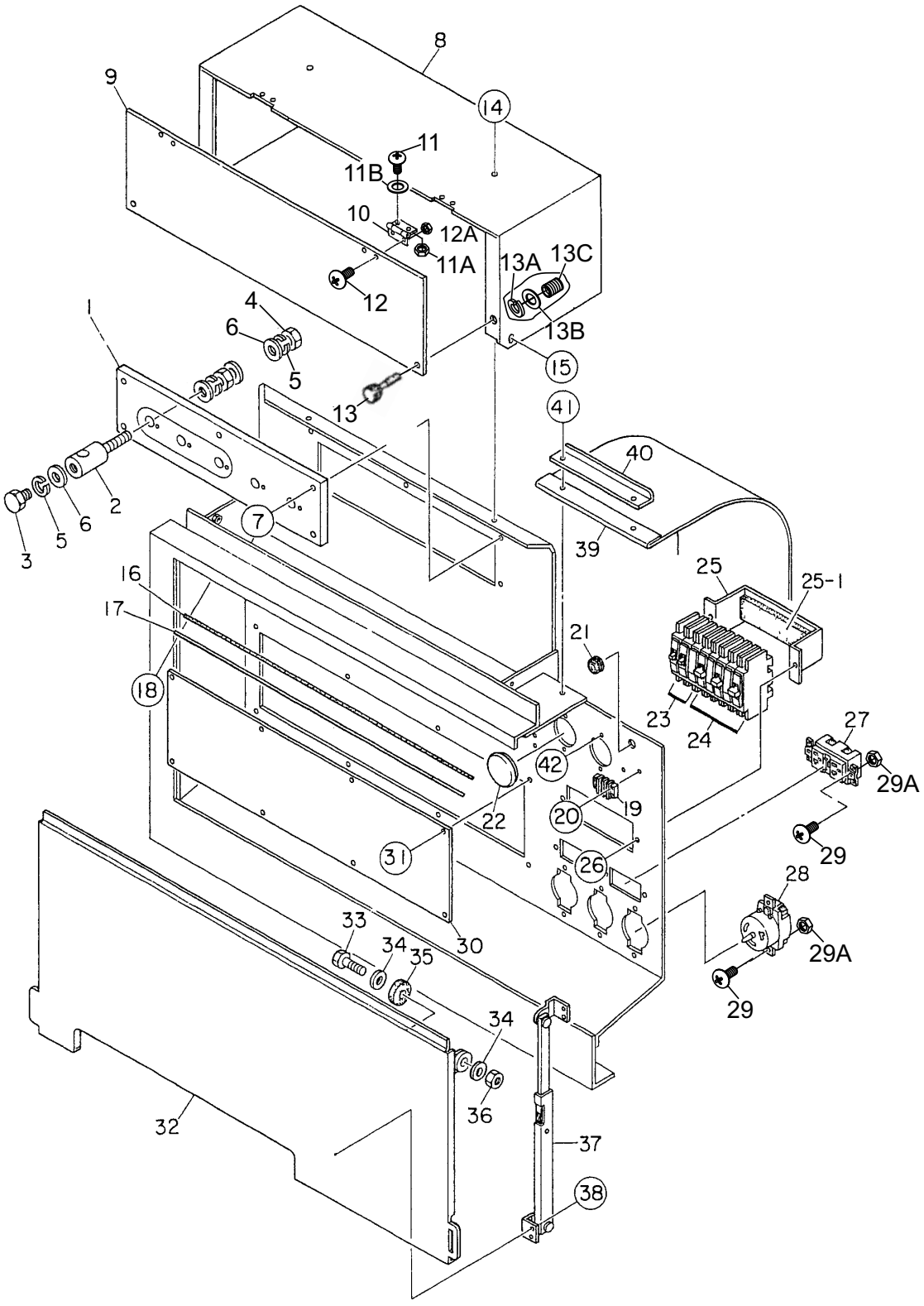
NO.	PART NO.	PART NAME	QTY.	REMARKS
54	0010110150	HEX HEAD BOLT	2	
54A	0040010000	WASHER, LOCK	2	
54B	0041210000	WASHER,FLAT	2	
55	0602022535	ADAPTER	4	
56	0603306398	HOSE JOINT	4	DCA180SSIU
57	C0324300504	ENGINE OIL HOSE	1	DCA180SSI
57	0379001500	ENGINE OIL HOSE	1	DCA180SSIU
58	C0324300604	ENGINE OIL HOSE	1	DCA180SSI
58	0379001450	ENGINE OIL HOSE	1	DCA180SSIU
58	0802081003	RESERVE TANK	1	DCA180SSI
59	M9300000203	RESERVE TANK	1	DCA180SSIU
60	0602010900	CAP, RESERVE TANK	1	
61	M3316100604	BRACKET, RESERVE TANK	1	
62	0016908020	HEX HEAD BOLT	2	
63	0199901150	HOSE	1	
64	0193601450	HOSE	1	
65	0193600650	HOSE	1	
66	0605515106	HOSE BAND	3	
67	M3357300004	HARNESS CLAMP	1	
68	0017108025	HEX HEAD BOLT	1	DCA180SSI
68	0017108020	HEX HEAD BOLT	1	DCA180SSIU
69	0017110020	HEX HEAD BOLT	1	
70	M3357300104	HARNESS CLAMP	1	
71	0017108025	HEX HEAD BOLT	2	DCA180SSI
71	0017108020	HEX HEAD BOLT	2	DCA180SSIU
72	8980305320	ELENT., BLOWBY FILTER, DCA180SSIU	1	REPLACES 0602044210
73	0194801300	HOSE	1	DCA180SSIU
74	3373200304	BRACKET, AIR CLEANER	1	DCA180SSIU
75	0016908025	HEX. HEAD BOLT	4	DCA180SSIU

OUTPUT TERMINAL ASSY.



OUTPUT TERMINAL ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	C0231700003	TERMINAL BOARD	1	DCA180SSI
1	M3230700113	TERMINAL BOARD	1	DCA180SSIU
2	0801830404	OUTPUT TERMINAL BOLT	5	DCA180SSI
2	M9220100914	OUTPUT TERMINAL BOLT	5	DCA180SSIU
3	0801830904	TIE BOLT	5	DCA180SSI
3	M9220101004	TIE BOLT	5	DCA180SSIU
4	0039320000	HEX NUT	10	
5	0040020000	WASHER, LOCK	15	
6	0041420000	WASHER,FLAT	20	
7	0016908040	HEX HEAD BOLT	5	
8	M4236100403	TERMINAL COVER	1	
9	M4236100504	OUTPUT WINDOW	1	
10	0605010040	HINGE	2	
11	0027103010	MACHINE SCREW	4	
11A	0030003000	HEX NUT	4	
11B	0041203000	WASHER,FLAT	4	
12	0027103015	MACHINE SCREW	4	
12A	003003000	HEX NUT	4	
13	M9220100404	SET SCREW	2	DCA180SSI
13	M9220100804	SET SCREW	2	DCA180SSIU
13A	0040006000	WASHER, LOCK	2	
13B	0041806000	WASHER,FLAT	2	
13C	0080200005	RETAINING RING	2	
14	0016906016	HEX HEAD BOLT	2	
15	0016906016	HEX HEAD BOLT	2	
16	M4236400004	CABLE, OUTLET COVER	1	
17	M4236400104	SUPPORTER, CABLE OUTLET COVER	1	
18	0016906020	HEX HEAD BOLT	8	
19	0601815194	TERMINAL BLOCK	1	
20	0025304015	MACHINE SCREW	2	DCA180SSI
20	0027104015	MACHINE SCREW	2	DCA180SSIU
21	0601850275	GROMMET	1	
22	0601851780	BLIND PLUG	2	DCA180SSI
22	0603306775	BLIND PLUG	2	DCA180SSIU
23	0601808803	CIRCUIT BREAKER, 1P 20A	2	
24	0601808804	CIRCUIT BREAKER, 2P 50A	3	
25	C3261600704	BRACKET, CIRCUIT BREAKER	1	DCA180SSI
25	M3260600104	BRACKET, CIRCUIT BREAKER	1	DCA180SSIU
25-1	0222100150	RUBBER CUSHION	1	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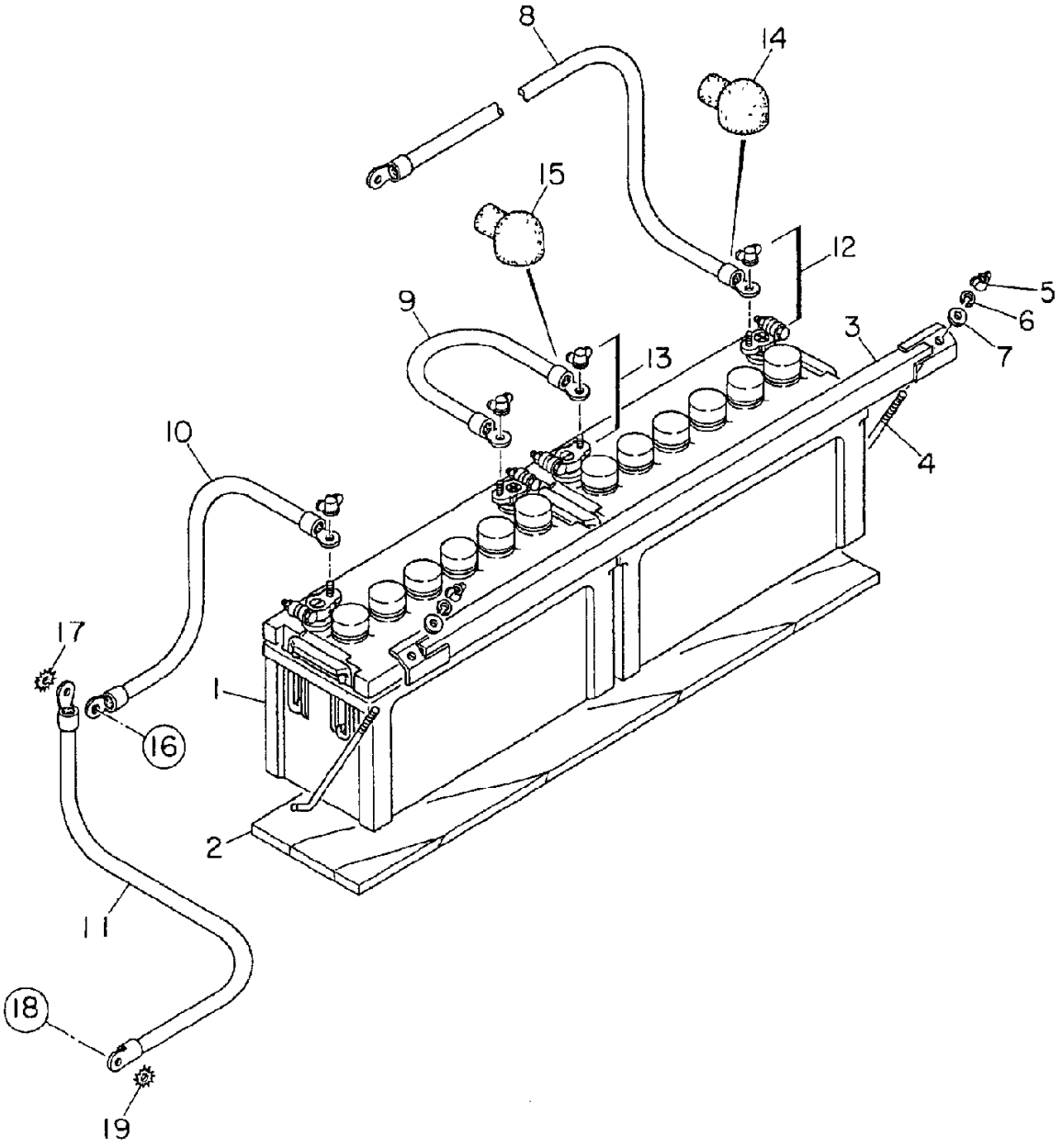
OUTPUT TERMINAL ASSY (CONTINUED)

NO.	PART NO.	PART NAME	QTY.	REMARKS
26	0016906020	HEX HEAD BOLT	2	
27	0601814013	RECEPTACLE, GF-20LA 20A	2	
28	0601812565	RECEPTACLE,CS6369 50A	3	DCA180SSI
28	0601812538	RECEPTACLE, CS6369 50A	3	DCA180SSIU
29	0027104016	MACHINE SCREW	10	
29A	0207004000	HEX NUT	10	
30	M4236400204	COVER	1	
31	0016906016	HEX HEAD BOLT	8	
32	M4236100303	TERMINAL COVER	1	
33	0010112045	HEX HEAD BOLT	2	
34	0041212000	WASHER,FLAT	4	
35	0805009804	STAY RUBBER	2	DCA180SSI
35	M9310200004	STAY RUBBER	2	DCA180SSIU
36	0030012000	HEX NUT	2	
37	0605011505	STAY	1	
38	0027105016	HEX HEAD BOLT	4	
39	M4236100604	COVER	1	
40	M4236400304	BRACKET	1	
41	0016906020	HEX HEAD BOLT	2	DCA180SSI
41	0016906016	HEX HEAD BOLT	2	DCA180SSIU
42	0027104016	MACHINE SCREW	4	

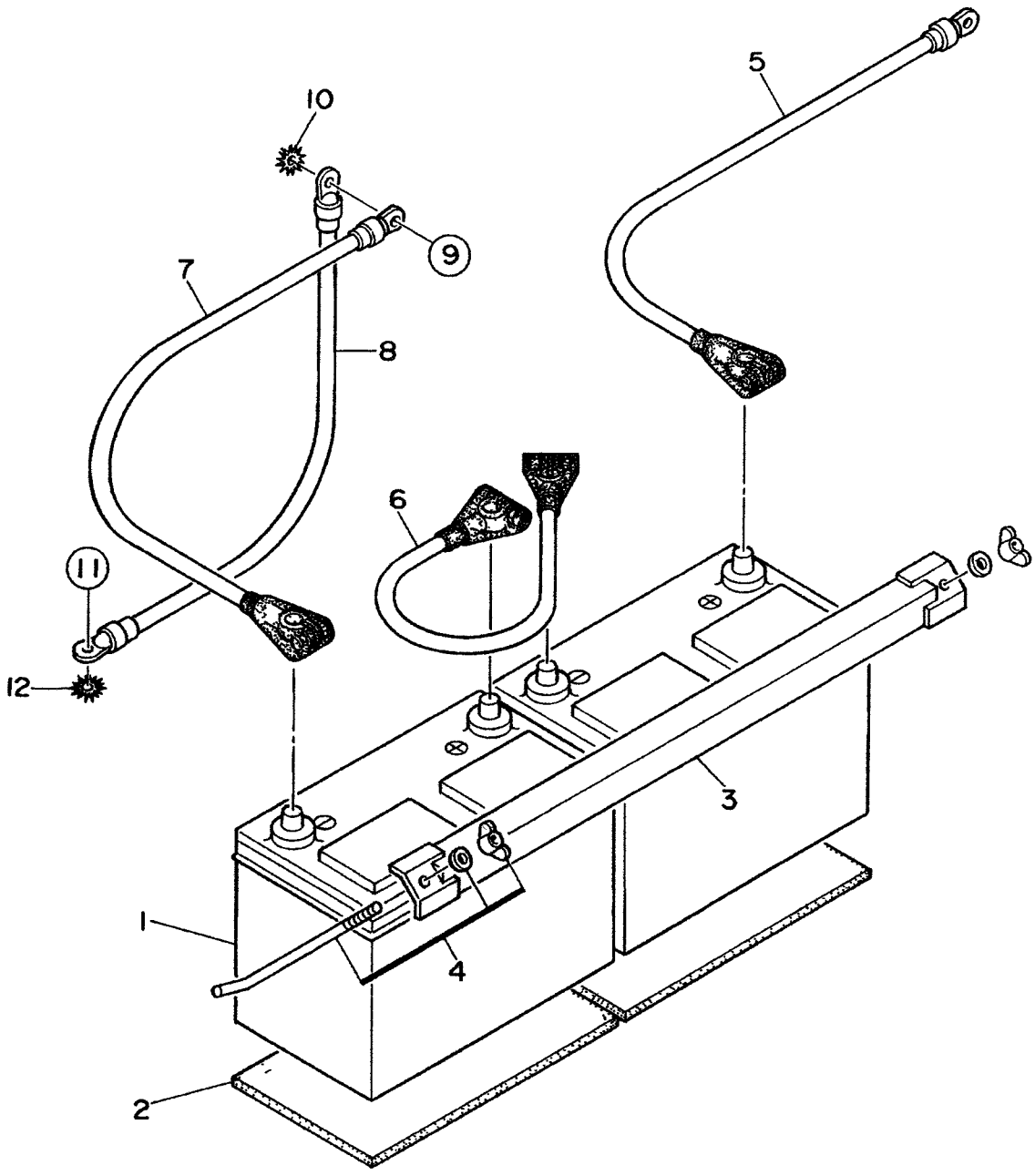
BATTERY ASSY. (DCA180SSI)



BATTERY ASSY. (DCA180SSI)

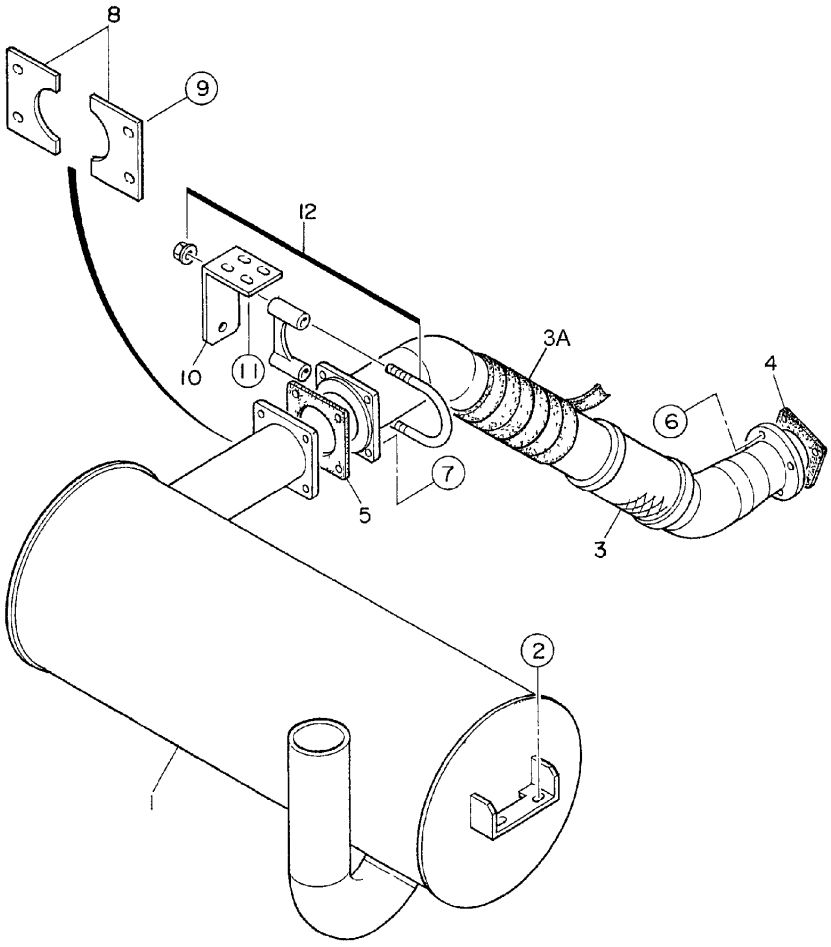
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0165409541	BATTERY	2	
2	6172251004	BATTERY SHEET	1	
3	6412250004	BATTERY BAND	1	
4	0805002904	BATTERY BOLT	2	
5	0037808000	WING NIUT	2	
6	0040008000	WASHER, LOCK	2	
7	0041608000	WASHER, FLAT	2	
8	C0346400804	BATTERY CABLE	1	
9	C0346401004	BATTERY CABLE	1	
10	C0346400904	BATTERY CABLE	1	
11		EARTH CABLE	1	
12	0602220310	TERMINAL ASSY	2	
13	0602220311	TERMINAL ASSY	2	
14	0845040414	TERMINAL CAP (+)	2	
15	0845041304	TERMINAL CAP (-)	2	
16	0017112025	HEX HEAD BOLT	1	
17	0040512000	TOOTHED WASHER	1	
18	0016908020	HEX HEAD BOLT	1	
19	0040508000	TOOTHED WASHER	1	

BATTERY ASSY. (DCA180SSIU)



BATTERY ASSY. (DCA180SSIU)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0602220199	BATTERY	2	
2	M9310500014	BATTERY SHEET	2	
3	M9103000804	BATTERY BAND	1	
4	0602220920	BATTERY BOLT SET	2	
5	M3346901904	BATTERY CABLE	1	
6	M3346902104	BATTERY CABLE	1	
7	M3346902204	BATTERY CABLE	1	
8		EARTH CABLE	1	
9	0017112025	HEX HEAD BOLT	1	
10	0040512000	TOOTHED WASHER	1	
11	0016908020	HEX HEAD BOLT	1	
12	0040508000	TOOTHED WASHER	1	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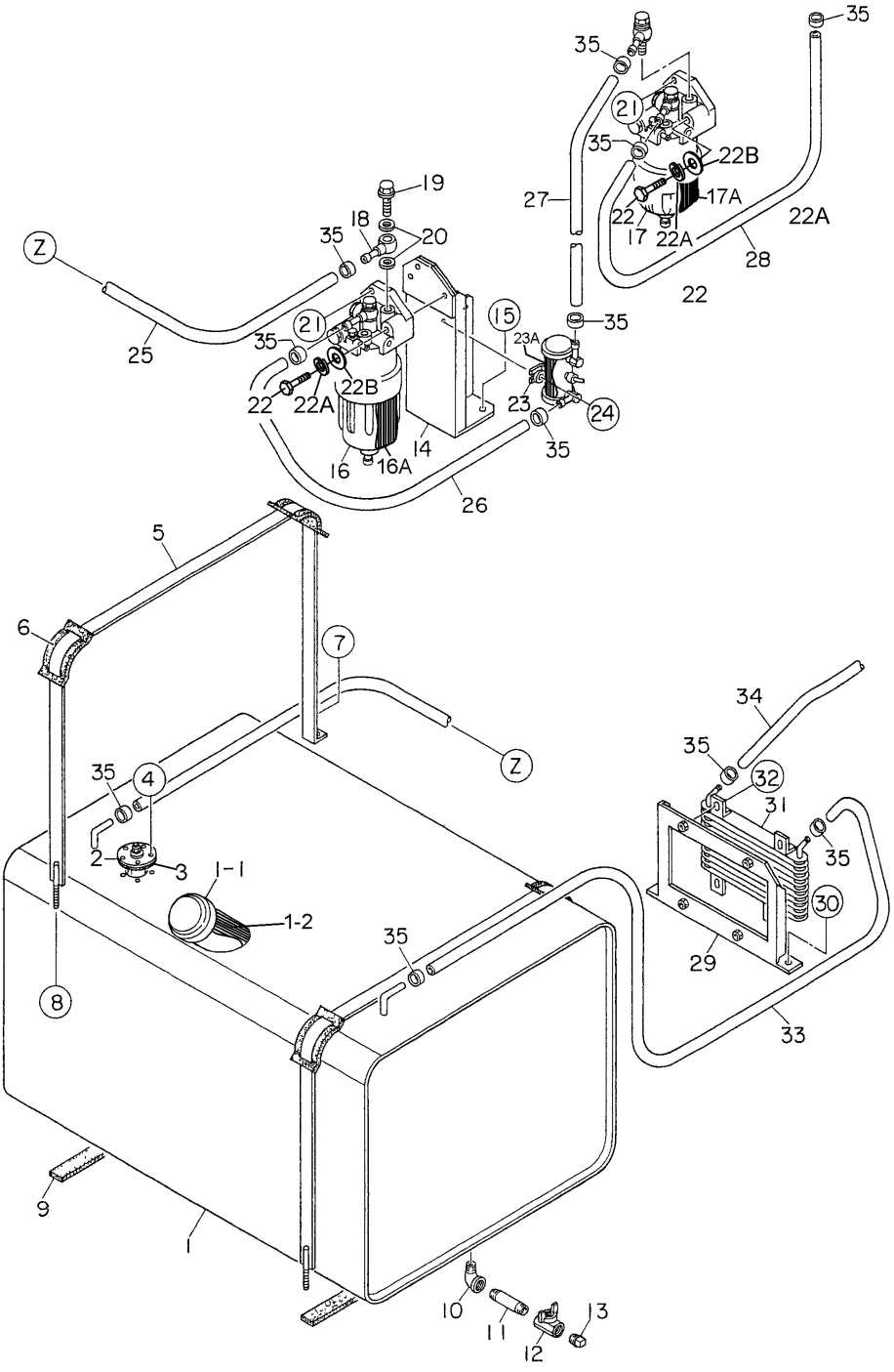
MUFFLER ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	C0331107302	MUFFLER	1	
2	0016910025	HEX HEAD BOLT	4	
3	M3333001803	EXHAUST PIPE	1	
3A	0602311102	TAPE, INSULATING	9	DCA180SSI
3A	0602311130	TAPE, INSULATING	9	DCA180SSIU
4	1141451920	GASKET	1	REPLACES P/N 0602311130
5	7502356004	GASKET	1	DCA180SSI
5	4333200004	GASKET	1	DCA180SSIU
6	0030710000	HEX NUT	8	
7	0017110050	HEX HEAD BOLT	4	
8	C1331300104	COVER	2	DCA180SSI
8	M4330300004	COVER	2	DCA180SSIU
9	0016908020	HEX HEAD BOLT	4	
10	M4333300304	BRACKET	1	
11	0016908020	HEX HEAD BOLT	4	
12	0602326062	U BOLT SET	1	

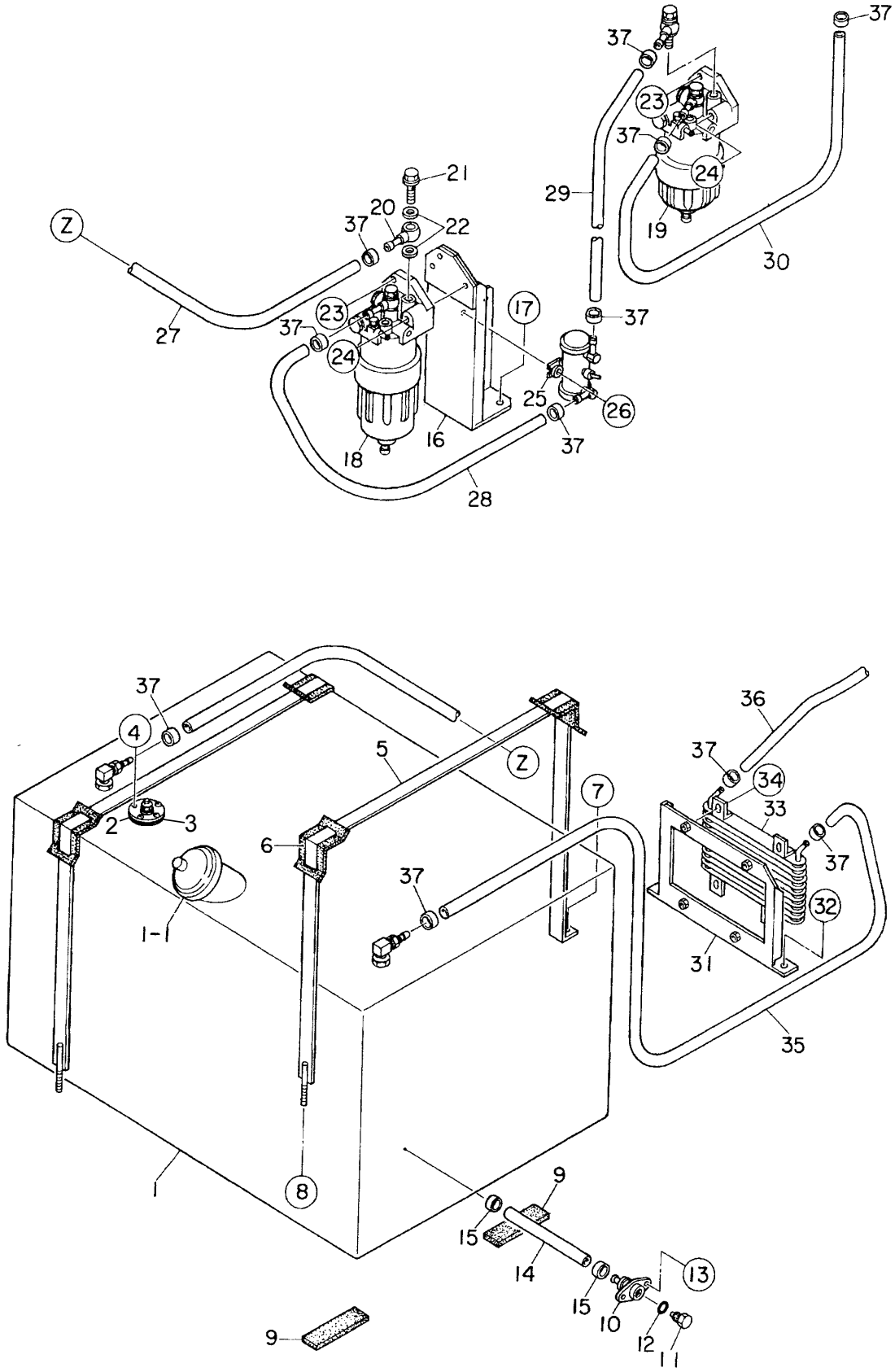
FUEL TANK ASSY. (DCA180SSI)



FUEL TANK ASSY. (DCA180SSI)

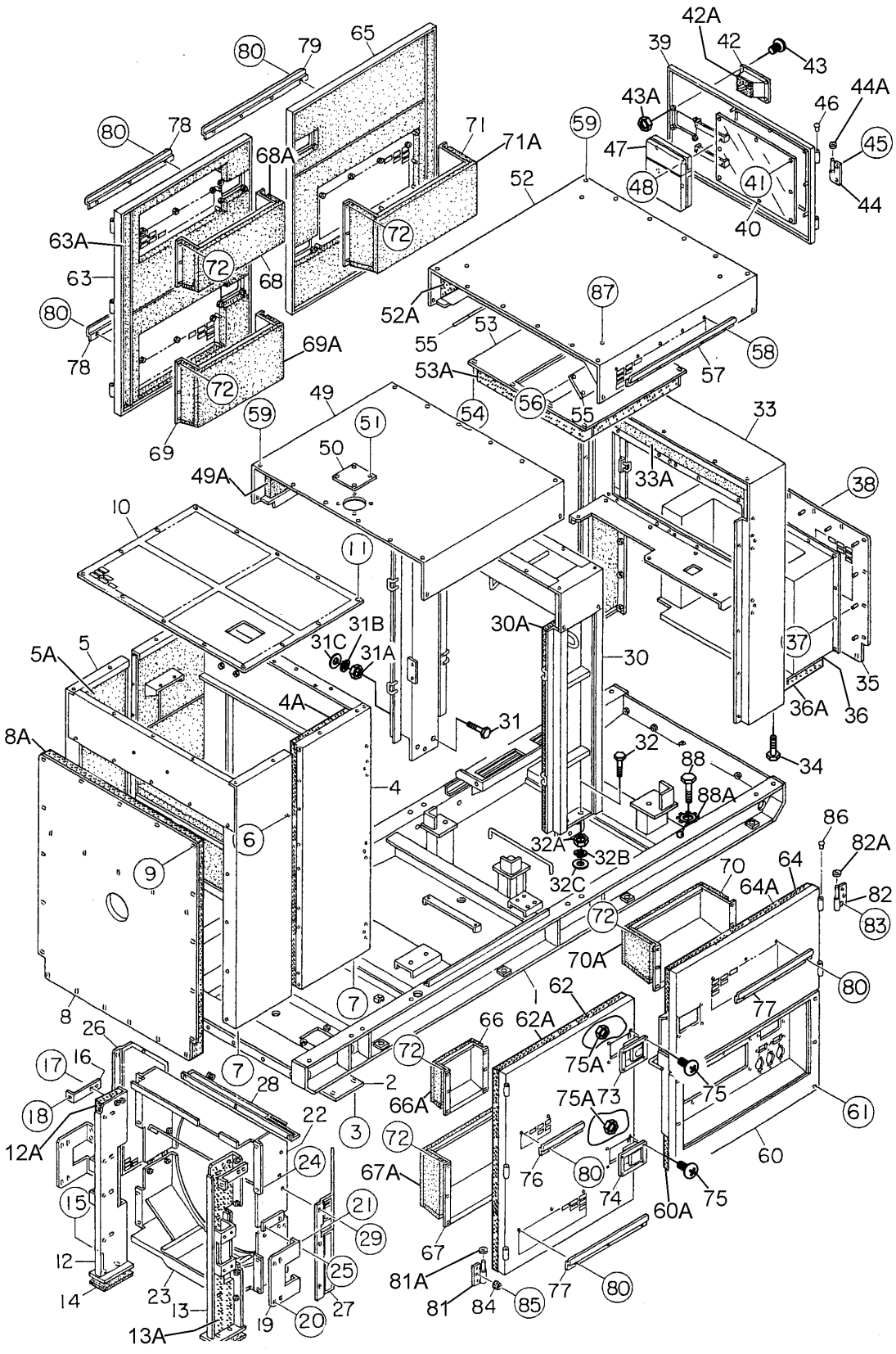
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	C1363001403	FUEL TANK	1	
1-1	0845500104	CAP, FUEL TANK	1	
1-2	0810105400	FUEL FILTER	1	
2	0605501092	FUEL SENDER UNIT	1	
3	0605516090	GASKET	1	
4	0022905015	MACHINE SCREW	5	
5	M4363200104	TANK BAND	2	
6	0805003414	SUPPORTER SHEET	4	
7	0016908020	HEX HEAD BOLT	2	
8	0207608000	U NUT	2	
9	0222100150	TANK SHEET, 1/2"	4	
10	0130206000	STREET ELBOW, 1/2"	1	
11	8085512104	LONG NIPPLE, 1/2"	1	
12	0603325011	VALVE	1	
13	0132006000	PLUG, 1/2"	1	
14	M3366700503	FUEL FILTER BRACKET	1	
15	0016908020	HEX HEAD BOLT	4	
16	8980139861	FUEL FILTER (MAIN)	1	REPLACES P/N 0602042426
16A	8980088400	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042515
17	8980758550	FUEL FILTER (PRE)	1	REPLACES P/N 0602042405
17A	8980758540	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042516
18	8973834270	JOINT PIPE	4	REPLACES P/N 0602042661
19	1096750951	JOINT BOLT	4	REPLACES P/N 0602042621
20	1096300860	PACKING	8	REPLACES P/N 0602042641
21	0015310045	HEX SOCKET HEAD CAP SCREW	4	
21A	0040010000	WASHER, LOCK	4	
21B	0041210000	WASHER, FLAT	4	
22	0010110080	HEX HEAD BOLT	2	
22A	0040010000	WASHER, LOCK	2	
22B	0041210000	WASHER, FLAT	2	
23	8980093970	FUEL FEED PUMP	1	REPLACES P/N 0602023241
23A	8980714010	FUEL FILTER	1	REPLACES P/N 0602042517
24	0016906025	HEX HEAD BOLT	2	
25	0191302850	SUCTION HOSE	1	
26	0191300500	SUCTION HOSE	1	
27	0191300580	SUCTION HOSE	1	
28	0191300780	SUCTION HOSE	1	
29	M3366700703	FUEL COOLER BRACKET	1	
30	0016908020	HEX HEAD BOLT	2	
31	Y131B40000	FUEL COOLER	1	REPLACES P/N 0605517000
32	0016908020	HEX HEAD BOLT	4	
33	0191302160	RETURN HOSE	1	
34	0191301870	RETURN HOSE	1	
35	0605515145	HOSE BAND	12	

FUEL TANK ASSY. (DCA180SSIU)



FUEL TANK ASSY. (DCA180SSIU)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	M4363000102	FUEL TANK	1	
1-1	0605505070	CAP, FUEL TANK	1	
2	0605501069	FUEL SENDER UNIT	1	
3	0605516090	GASKET	1	
4	0027104016	MACHINE SCREW	5	
5	M4363200104	TANK BAND	2	
6	M9310500104	SUPPORTER SHEET	4	
7	0016908020	HEX HEAD BOLT	2	
8	0207308000	SUPER LOCK NUT	2	
9	0222100150	TANK SHEET	4	
10	M9200000003	DRAIN JOINT	1	
11	M9200200004	DRAIN BOLT	1	
12	0150000018	O'RING	1	
13	016906020	HEX HEAD BOLT	2	
14	M1363400104	DRAIN HOSE	1	
15	0605515198	HOSE BAND	2	
16	M33667503	FUEL FILTER BRACKET	1	
17	0016908020	HEX HEAD BOLT	1	
18	8980139862	FUEL FILTER , MAIN	1	REPLACES P/N 0602042426
18A	8980088400	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042515
19	8980758551	FUEL FILTER, PRE	1	REPLACES P/N 0602042405
19A	8980758540	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042516
20	8973834270	JOINT PIPE	4	REPLACES P/N 0602042661
21	1096750951	JOINT BOLT	4	REPLACES P/N 0602042621
22	1096300860	PACKING	8	REPLACES P/N 0602042641
23	0015310045	HEX SOCKET HEAD CAP SCREW	4	
23A	0040010000	WASHER, LOCK	4	
23B	0041210000	WASHER,FLAT	4	
24	0010110080	HEX HEAD BOLT	2	
24A	0040010000	WASHER, LOCK	2	
24B	0041210000	WASHER,FLAT	2	
25	8980093970	FUEL FEED PUMP	1	REPLACES P/N 0602023241
25A	8980714010	FUEL FILTER	1	REPLACES P/N 0602042517
26	0016906025	HEX HEAD BOLT	2	
27	0191302850	SUCTION HOSE	1	
28	0191300500	SUCTION HOSE	1	
29	0191300580	SUCTION HOSE	1	
30	0191300780	SUCTION HOSE	1	
31	M3366700703	FUEL COOLER BRACKET	1	
32	0016908020	HEX HEAD BOLT	2	
33	131B40000	FUEL COOLER	1	REPLACES P/N 0605517000
34	0016908020	HEX HEAD BOLT	4	
35	0191302160	RETURN HOSE	1	
36	0191301870	RETURN HOSE	1	
37	0605515145	HOSE BAND	12	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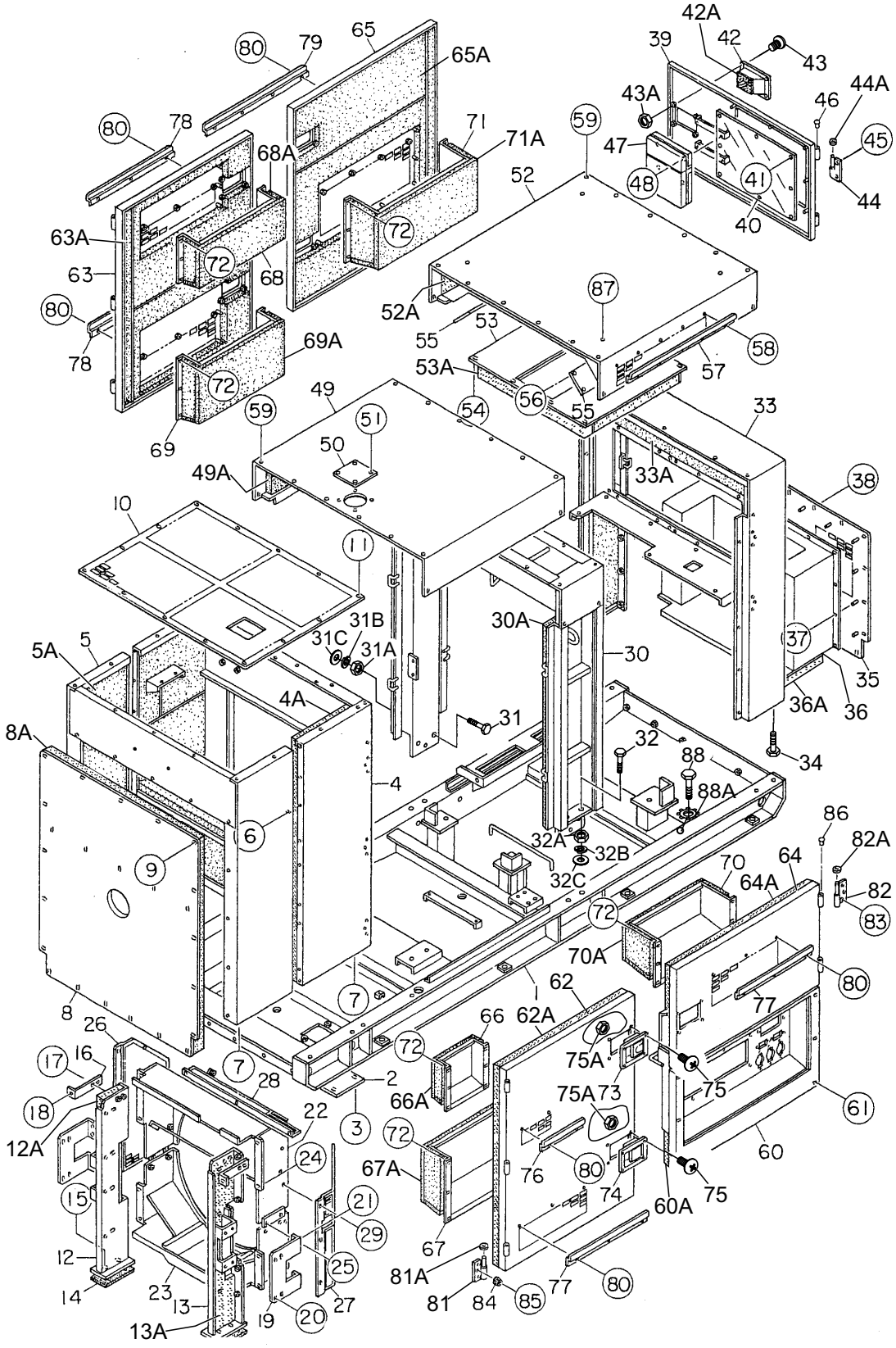
NO.	PART NO.	PART NAME	QTY.	REMARKS
1	C0413006702	BASE	1	DCA180SSI
1	M3413002802	BASE	1	DCA180SSIU
2	M4413400404	COVER	1	
3	0019208020	HEX HEAD BOLT	4	DCA180SSI
3	0016908020	HEX HEAD BOLT	4	DCA180SSIU
4	M3423003202	FRONT FRAME	1	
4A	M3493116703	ACOUSTIC SHEET	1	
5	M3423003302	FRONT FRAME	1	
5A	M3493116703	ACOUSTIC SHEET	1	
6	0016908020	HEX HEAD BOLT	12	
7	0019210025	HEX HEAD BOLT	8	
8	M3423203004	COVER, FRONT FRAME	1	
8A	M3493116804	ACOUSTIC SHEET	1	
9	0019208020	HEX HEAD BOLT	24	
10	M3423203103	OVER COVER, FRONT FRAME	1	
11	0019208020	HEX HEAD BOLT	14	
12	M3310203503	SUPPORTER, RADIATOR	1	
12A	M3493600504	ACOUSTIC SHEET	1	
13	M9910203403	SUPPORTER, RADIATOR	1	
13A	M3493600504	ACOUSTIC SHEET	1	
14	M4310600304	RUBBER SHEET	2	
15	0017112055	HEX HEAD BOLT	4	
16	M3310202504	BRACKET, RADIATOR	2	
17	0016910025	HEX HEAD BOLT	4	
18	0016910025	HEX HEAD BOLT	2	
19	M3310203703	BRACKET, INTER COOLER	2	
20	0016910025	HEX HEAD BOLT	8	
21	0016910025	HEX HEAD BOLT	8	
22	M3310305103	FAN SHROUD	1	
23	M3310305203	FAN SHROUD	1	
24	0016908020	HEX HEAD BOLT	8	
25	0016908020	HEX HEAD BOLT	4	
26	M3310305403	FAN GUARD	1	
27	M3310305303	FAN GUARD	1	
28	M3310305503	FAN GUARD	1	
29	0016908020	HEX HEAD BOLT	11	
30	M3433001602	CENTER FRAME	1	
30A	M3493201504	ACOUSTIC SHEET	1	
31	0010114050	HEX HEAD BOLT	4	DCA180SSI
31	0010114040	HEX HEAD BOLT	4	DCA180SSIU
31A	0030014000	HEX NUT	4	
31B	0040014000	WASHER, LOCK	4	
31C	0041214000	WASHER, FLAT	8	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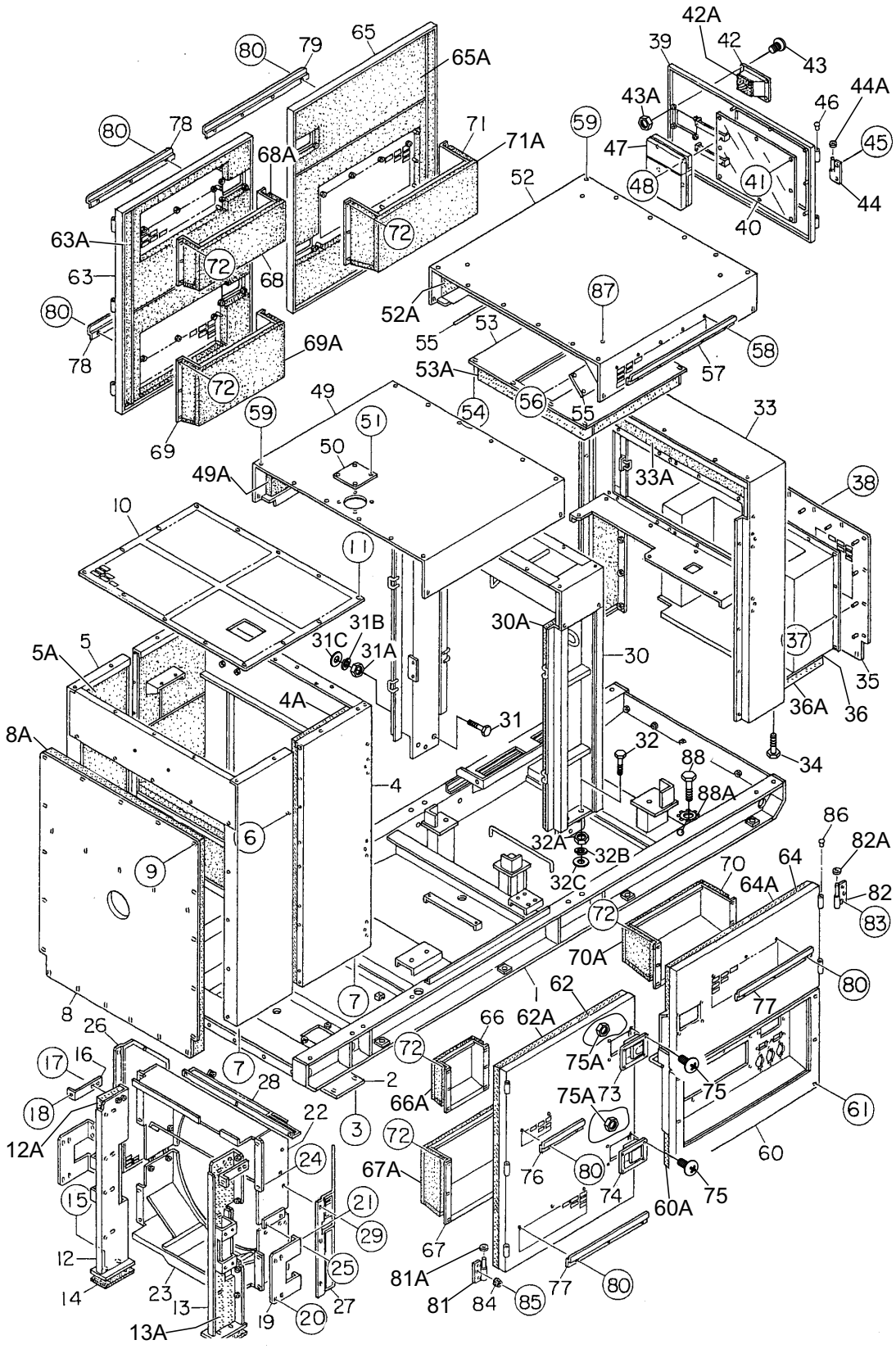
NO.	PART NO.	PART NAME	QTY.	REMARKS
32	0010120045	HEX HEAD BOLT	4	DCA180SSI
32	0010120050	HEX HEAD BOLT	4	DCA180SSIU
32A	0030014000	HEX NUT	4	
32B	0040020000	WASHER, LOCK	4	
32C	0041220000	WASHER,FLAT	8	
33	M3443002402	REAR FRAME	1	
33A	M3493310804	ACOUSTIC SHEET	1	
34	0019210025	HEX HEAD BOLT	4	
34A	0040510000	TOOTHED WASHER	1	DCA180SSI
35	M3443302003	REAR COVER	1	
36	M3443302103	DUCT, REAR COVER	1	
36A	M3493310904	ACOUSTIC SHEET	1	
37	0038406000	HEX NUT	12	
38	0019208020	HEX HEAD BOLT	19	
39	M3443200903	REAR DOOR	1	
40	M4443600004	WINDOW PLATE	1	
41	0207306000	SUPER LOCK NUT	8	
41A	0041206000	WASHER,FLAT	8	
42	B9114000002	DOOR HANDLE ASSY	1	DCA180SSI
42	M9114000002	DOOR HANDLE ASSY	1	DCA180SSIU
42A	C9312500004	SEAL RUBBER	1	
43	0021806015	MACHINE SCREW	4	DCA180SSI
43	0021806016	MACHINE SCREW	4	DCA180SSIU
43A	0030006000	HEX NUT	4	
44	0845047104	HINGE	2	DCA180SSI
44	9110100204	HINGE	2	DCA180SSIU
44A	0845045004	WASHER	2	DCA180SSI
44A	9116100004	WASHER	2	DCA180SSIU
45	0019208020	HEX HEAD BOLT	3	
46	0845031504	BLIND PLUG	2	DCA180SSI
46	9310000004	BLIND PLUG	2	DCA180SSIU
47	0600800320	MANUAL PAK	1	
48	0021806016	MACHINE SCREW	4	
49	M3463101702	ROOF PANEL	1	
49A	M3493511204	ACOUSTIC SHEET	1	
50	M3310600004	COVER	1	
51	0019208020	HEX HEAD BOLT	4	
52	M4463200202	ROOF PANEL	1	
52 A	M4493501903	ACOUSTIC SHEET	1	
53	M3463202802	DUCT, REAR ROOF	1	
53 A	M3493512204	ACOUSTIC SHEET	1	
54	0016908020	HEX HEAD BOLT	10	
55	M4463200304	COVER	2	
56	0016906016	HEX HEAD BOLT	12	
57	M44635000204	GUTTER	2	
58	0019206015	HEX HEAD BOLT	8	
59	0019204020	HEX HEAD BOLT	32	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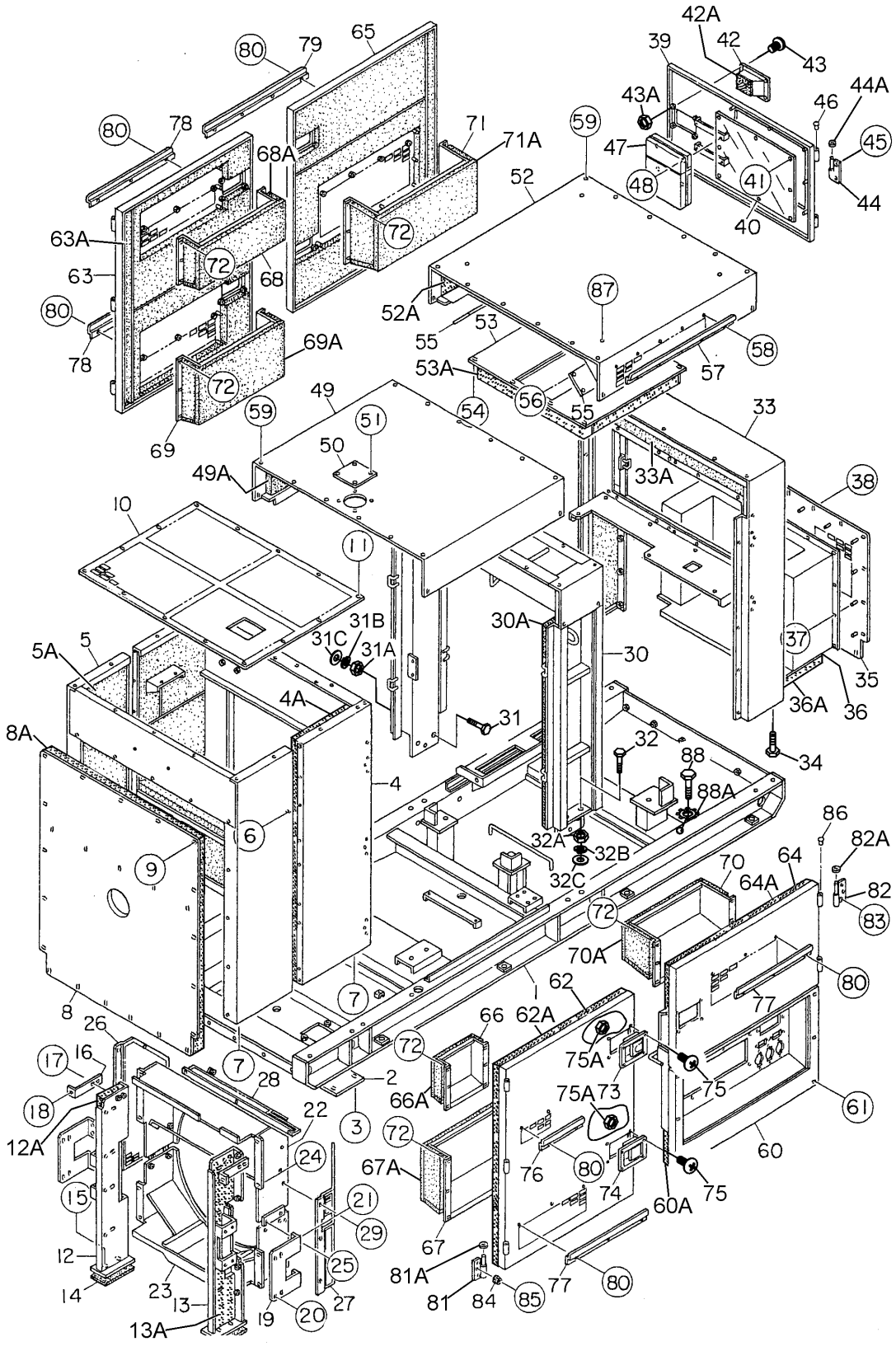
NO.	PART NO.	PART NAME	QTY.	REMARKS
60	M3453201902	SPLASHER PANEL	1	
60A	M3493431904	ACOUSTIC SHEET	1	
61	0019108065	HEX HEAD BOLT	6	
61A	0042308000	WASHER, LOCK	6	
61B	0042408000	WASHER,FLAT	6	
62	M3453006103	SIDE DOOR	1	
62A	M3493431604	ACOUSTIC SHEET	1	
63	M3453006203	SIDE DOOR	1	
63A	M3493431704	ACOUSTIC SHEET	1	
64	M3453006003	SIDE DOOR	1	
64A	M3493431404	ACOUSTIC SHEET	1	
65	M3453006303	SIDE DOOR	1	
65A	M3493431504	ACOUSTIC SHEET	1	
66	M3453303604	DUCT	1	
66A	M3493432004	ACOUSTIC SHEET	1	
67	M3453303704	DUCT	1	
67A	M3493432104	ACOUSTIC SHEET	1	
68	M3453303804	DUCT	1	
68A	M3493432204	ACOUSTIC SHEET	1	
69	M3453303904	DUCT	1	
69A	M3493432304	ACOUSTIC SHEET	1	
70	M3453304204	DUCT	1	
70A	M3493432504	ACOUSTIC SHEET	1	
71	M3453304004	DUCT	1	
71A	M3493431804	ACOUSTIC SHEET	1	
72	0207008000	HEX NUT	38	
73	B9114000002	DOOR HANDLE	4	
74	0825007362	DOOR HANDLE	3	DCA180SSI
74	M9113000102	DOOR HANDLE	3	DCA180SSIU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60A
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81A
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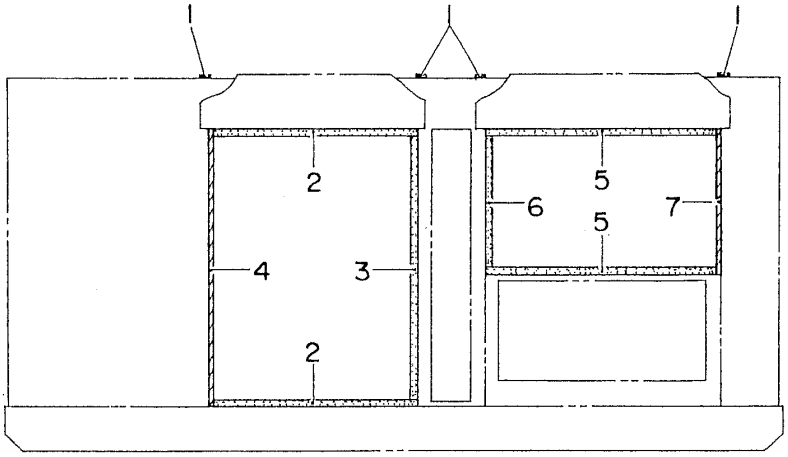
NO.	PART NO.	PART NAME	QTY.	REMARKS
75	0021806015	MACHINE SCREW	28	DCA180SSI
75	0021806016	MACHINE SCREW	28	DCA180SSIU
75A	0030006000	HEX NUT	28	
76	M3453600404	GUTTER	1	
77	M3453600504	GUTTER	2	
78	M4453600004	GUTTER	2	
79	M3453600604	GUTTER	1	
80	0019206015	HEX HEAD BOLT	18	
81	0845046904	HINGE	6	DCA180SSI
81	M9110100804	HINGE	6	DCA180SSIU
81A	0845045004	WASHER	8	DCA180SSI
81A	M9116100004	WASHER	8	DCA180SSIU
82	0845047004	HINGE	5	DCA180SSI
82	M9110100904	HINGE	5	DCA180SSIU
82A	0845045004	WASHER	5	DCA180SSI
82A	M9116100004	WASHER	5	DCA180SSIU
83	0019208020	HEX HEAD BOLT	25	
84	0601850097	STOPPER	9	
85	0025408025	MACHINE SCREW	9	
86	0845031504	BLIND PLUG	11	DCA180SSI
86	M9310000004	BLIND PLUG	11	DCA180SSIU
87	0019210025	HEX HEAD BOLT	4	
88	0016908020	HEX HEAD BOLT	1	DCA180SSIU
88A	0040508000	TOOTHED WASHER	1	DCA180SSIU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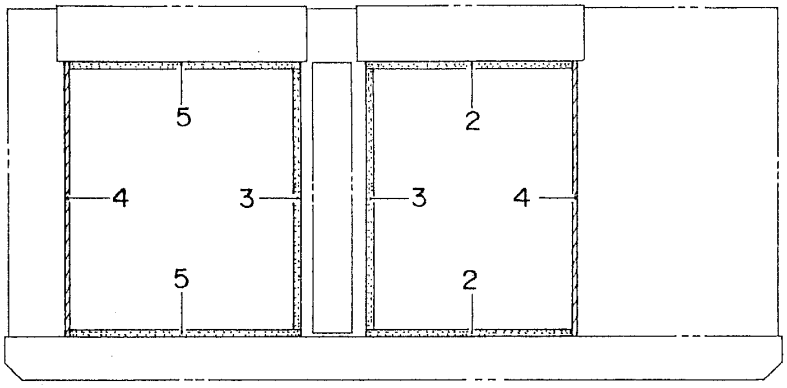
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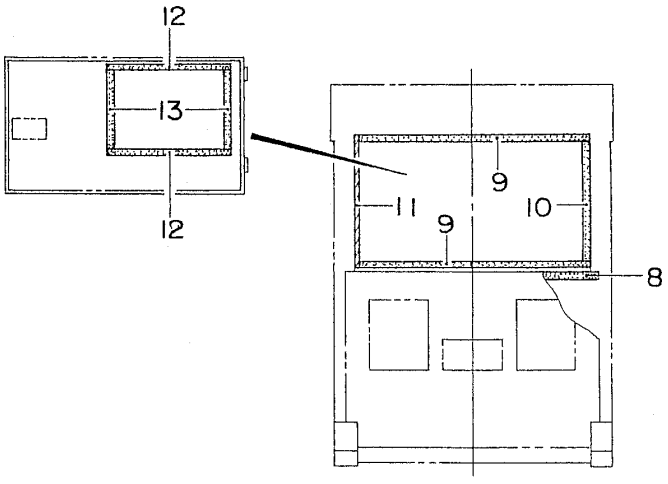
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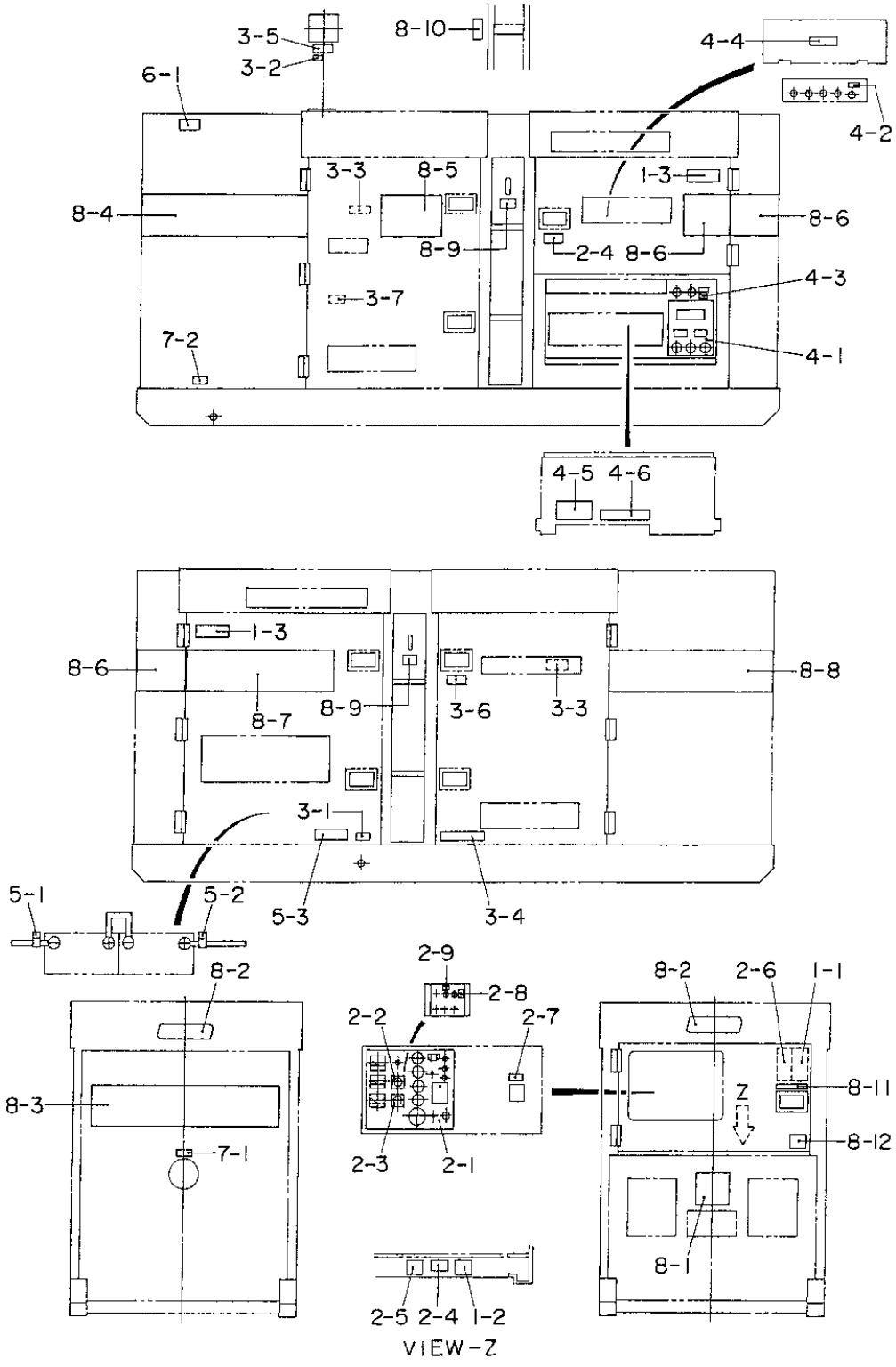
RUBBER SEALS ASSY.

NO.	PART NO.	PART NAME	QTY.	REMARKS
1	0229201240	SEAL RUBBER	4	
2	0228900945	SEAL RUBBER	4	
3	0228901200	SEAL RUBBER	3	
4	0228901260	SEAL RUBBER	3	
5	0228901055	SEAL RUBBER	4	
6	0228900580	SEAL RUBBER	1	
7	0228900640	SEAL RUBBER	1	
8	0229201130	SEAL RUBBER	1	
9	0228801050	SEAL RUBBER	2	
10	0228800550	SEAL RUBBER	1	
11	0228800590	SEAL RUBBER	1	
12	0228100560	SEAL RUBBER	2	
13	0228100370	SEAL RUBBER	2	

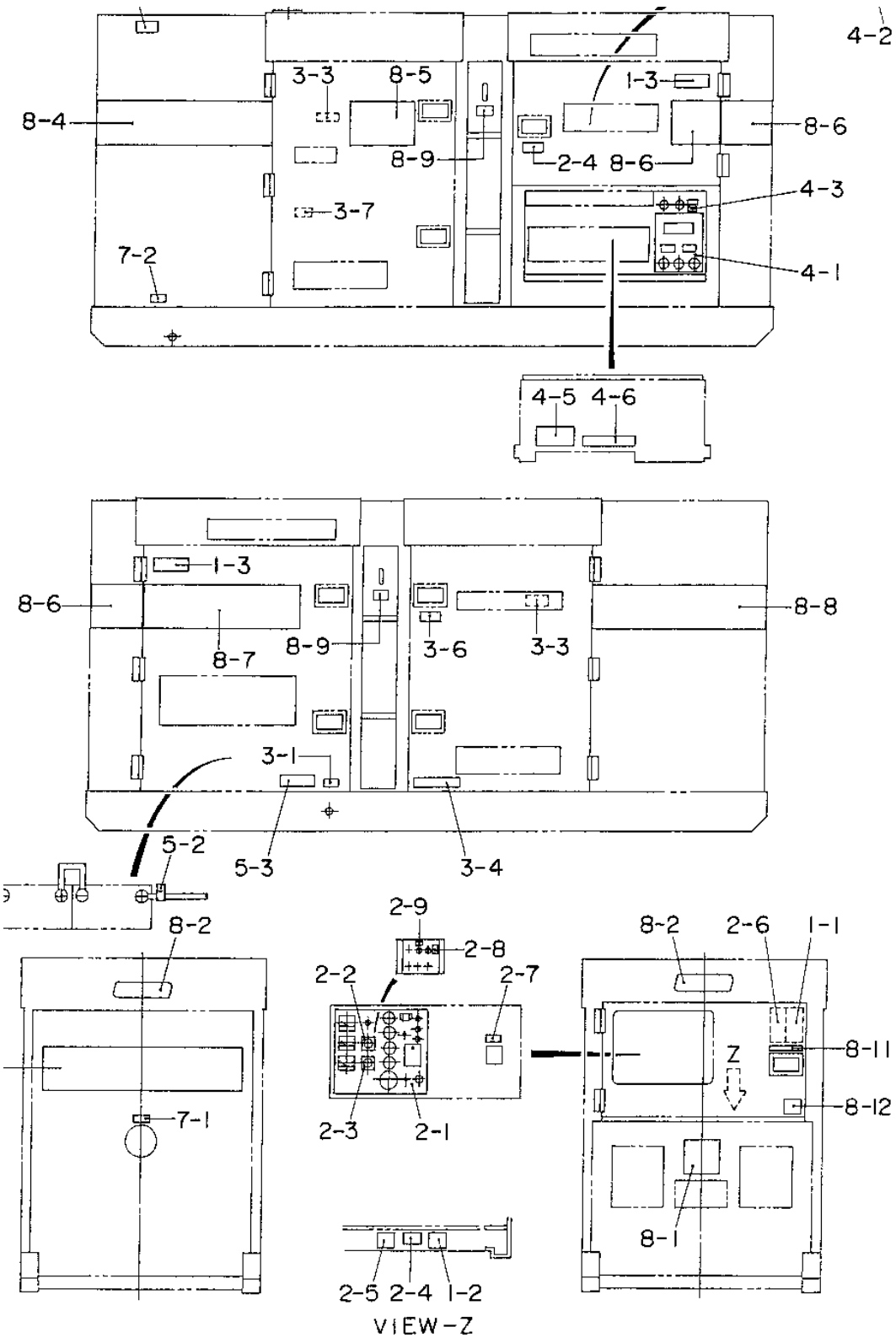
NAMEPLATE AND DECALS ASSY.(DCA180SSI)



NAMEPLATE AND DECALS ASSY.(DCA180SSI)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1-1	M4550000303	DECAL : OPERATING PROCEDURES	1	M45000030
1-2	B9521100404	DECAL : SAFETY INSTRUCTIONS	1	B92110040
1-3	C9521100003	DECAL : CAUTION	2	C92110000
		CONTROL PANEL & BOX GROUP		
2-1	M3550004102	DECAL : CONTROL PANEL	1	M35000410
2-2	0800520904	PLATE : AMMETER CHANGE- OVER SWITCH	1	N-2438
2-3	0800520814	PLATE : VOLTMETER CHANGE- OVER SWITCH	1	N-2439
2-4	B9531100604	DECAL : WARNING ELECTRIC SHOCK HAZARD	2	B93110060
2-5	M9520200404	DECAL : OVER CURRENT RELAY	1	M92020040
2-6	C0551000903	DECAL : SETTING FOR OUTPUT VOLTAGE	1	C05100090
2-7	M9522000504	DECAL : CIRCUIT BREAKER	1	M92200050
2-8	C9521007504	DECAL : DIAGNOSTIC SWITCH	1	C92100750
2-9	C9520027704	DECAL : DIAGNOSTIC BUTTON	1	C92002770
		ENGINE & RADIATOR GROUP		
3-1	6360620204	DECAL : OIL DRAIN PLUG	1	S-1885
3-2	6360610304	DECAL : WATER	1	S-1880
3-3	B9504000404	DECAL : WARNING MOVING PARTS	2	B90400040
3-4	1320610603	DECAL : WATER - OIL CHECK	1	S-1760
3-5	B9504100104	DECAL : WARNING HOT COOLANT	1	B90410010
3-6	B9504000304	DECAL : CAUTION HOT PARTS	1	B90400030
3-7	C9501100004	DECAL : INTER COOLER DRAIN	1	C90110000
		OUTPUT TERMINAL GROUP		
4-1	M4550000503	DECAL : RECEPTACLE & CIRCUIT BREAKER	1	M45000050
4-2	0840614104	DECAL : GROUND	1	S-2635
4-3	9039209064	DECAL : START CONTACT	1	S-4468
4-4	M9520000704	DECAL : 3 - PHASE OUTPUT TERMINAL	1	M92000070
4-5	0840619904	DECAL : DANGER HIGH VOLTAGE	1	S-2731
4-6	M9520100503	DECAL : WARNING	1	M92010050
		BATTERY GROUP		
5-1	0800689504	DECAL : -	1	
5-2	0800689404	DECAL : +	1	
5-3	C9505300004	DECAL : CAUTION	1	C90530000
		MUFFLER GROUP		
6-1	B9504200004	DECAL : WARNING ENGINE EXHAUST	1	B90420000
		FUEL TANK GROUP		
7-1	1320620904	DECAL : DIESEL FUEL	1	S-1756
7-2	6360620004	DECAL : FUEL DRAIN PLUG	1	S-1883

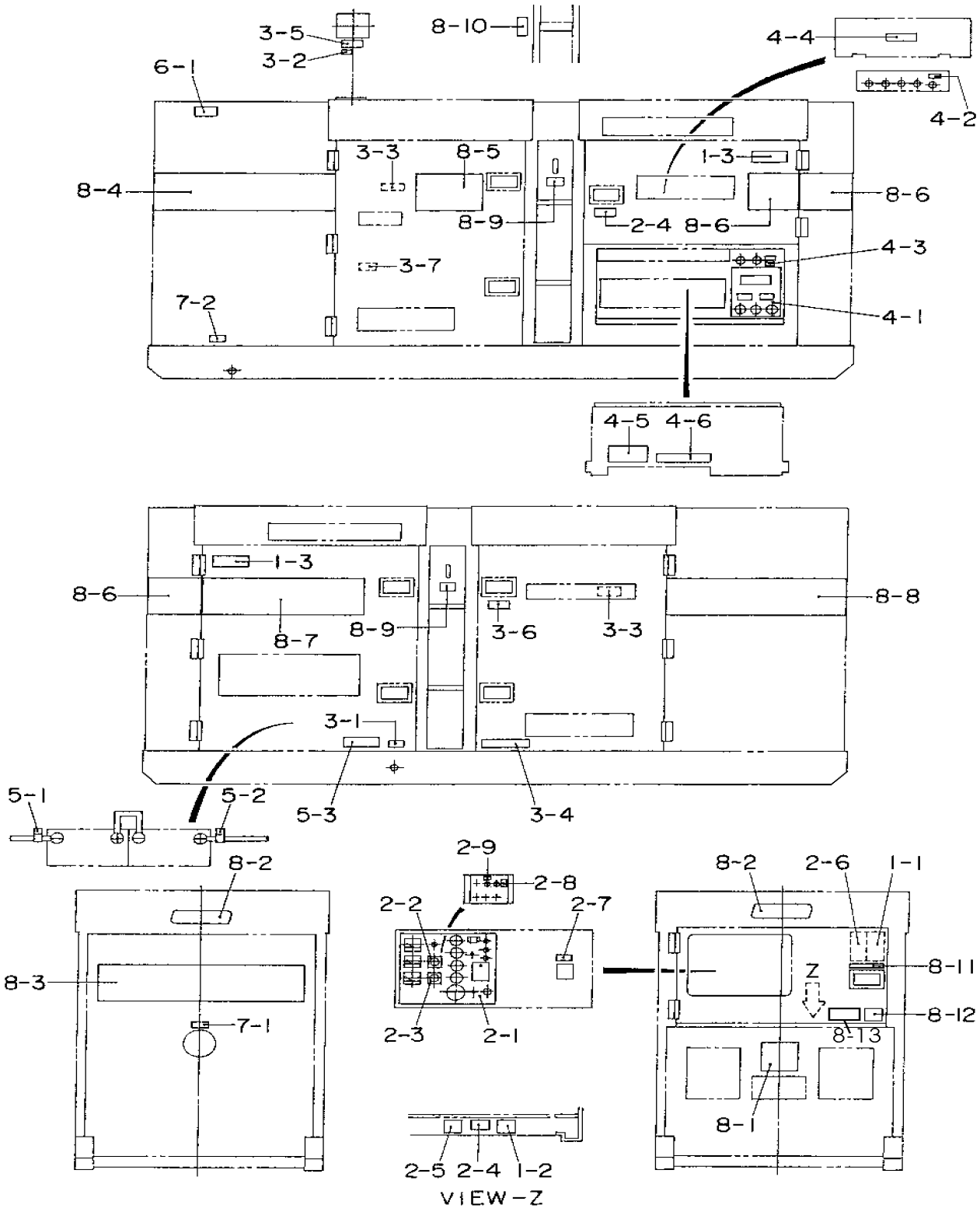
NAMEPLATE AND DECALS ASSY. (CONT. DCA180SSI)



NAMEPLATE AND DECALS ASSY. (CONT. DCA180SSI)

NO.	PART NO.	PART NAME	QTY.	REMARKS
		ENCLOSURE GROUP		
8-1	0840625902	DECAL : MQ	1	S-3057
8-2	0600500090	EMBLEM	2	
8-2A	0021106016	MACHINE SCREW	4	
8-3	C1560100303	STRIPE	1	
8-4	C0560100403	STRIPE	1	
8-5	M3560104803	STRIPE	1	
8-6	C1560100004	STRIPE	3	
8-7	M3560104703	STRIPE	1	
8-8	C0560100303	STRIPE	1	
8-9	1320621504	DECAL : SUPPORT HOOK	2	S-2257
8-10	M3550002204	DECAL : CAUTION	1	M35000220
8-11	M9510000104	DECAL : DOCUMENT BOX LOCATED	1	M91000010
8-12	A9504000014	DECAL : DANGER EXHAUST GAS	1	A90400001

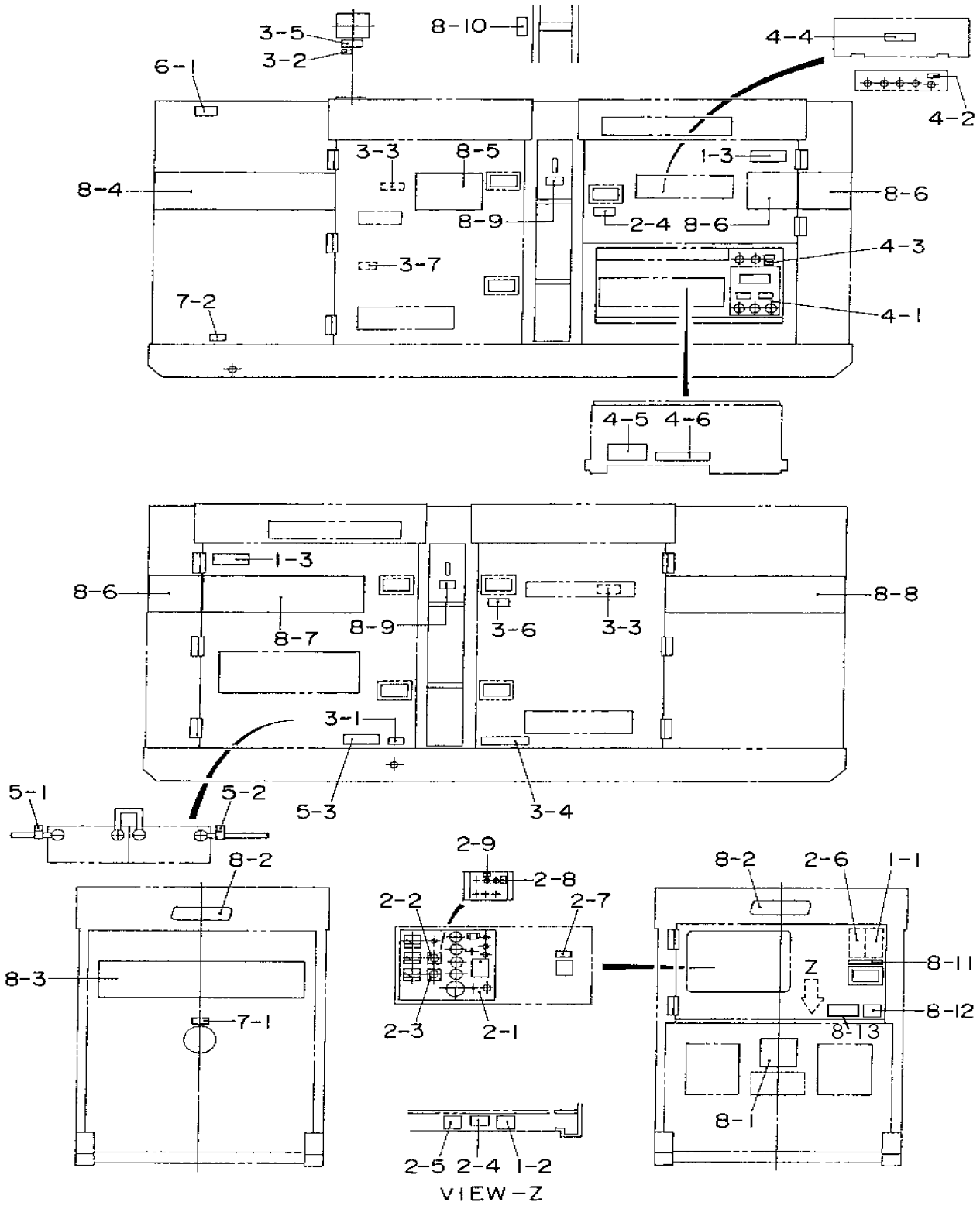
NAMEPLATE AND DECALS ASSY.(DCA180SSIU)



NAMEPLATE AND DECALS ASSY.(DCA180SSIU)

NO.	PART NO.	PART NAME	QTY.	REMARKS
1-1	M4550000303	DECAL : OPERATING PROCEDURES	1	M45000030
1-2	B9520100304	DECAL : SAFETY INSTRUCTIONS	1	M92010030
1-3	C9520100603	DECAL : CAUTION	2	M92010060
		CONTROL PANEL & BOX GROUP		
2-1	M3550004102	DECAL : CONTROL PANEL	1	M35000410
2-2	M9520000104	PLATE : AMMETER CHANGE- OVER SWITCH	1	M92000010
2-3	M9520000204	PLATE : VOLTMETER CHANGE- OVER SWITCH	1	M92000020
2-4	M9520000904	DECAL : DIAGNOSTIC SWITCH	1	M92000020
2-5	M9520001104	DECAL : DIAGNOSTIC BUTTON	1	M92020110
2-6	M9520100004	DECAL : WARNING ELECTRIC SHOCK HAZARD	1	M92010000
2-7	M9520200303	DECAL : SETTING FOR OUTPUT VOLTAGE	1	M92020030
2-8	M9520200404	DECAL : OVER CURRENT RELAY	1	M92020040
2-9	M9522000504	DECAL : CIRCUIT BREAKER	1	M92200050
		ENGINE & RADIATOR GROUP		
3-1	M9500000004	DECAL : OIL DRAIN PLUG	1	M90000000
3-2	M9500100004	DECAL : WATER	1	M90010000
3-3	M9501000304	DECAL : INTER COOLER DRAIN	1	M90010030
3-4	M9503000004	DECAL : WARNING MOVING PARTS	2	M90300000
3-5	M9503000103	DECAL : WATER - OIL CHECK	1	M90300010
3-6	M9503100004	DECAL : WARNING HOT COOLANT	1	M90310000
3-7	M9510100004	DECAL : CAUTION HOT PARTS	1	M91010000
		OUTPUT TERMINAL GROUP		
4-1	M4550000503	DECAL : RECEPTACLE & CIRCUIT BREAKER	1	M45000050
4-2	M9520000004	DECAL : GROUND	1	M92000000
4-3	M9520000504	DECAL : START CONTACT	1	M92000050
4-4	M9520000704	DECAL : 3 - PHASE OUTPUT TERMINAL	1	M92000070
4-5	M9520100404	DECAL : DANGER HIGH VOLTAGE	1	M92010040
4-6	M9520100503	DECAL : WARNING	1	M92010050
		BATTERY GROUP		
5-1	M9500300004	DECAL : -	1	M90030000
5-2	M9500300104	DECAL : +	1	M90030010
5-3	M9510100403	DECAL : CAUTION	1	M91010040
		MUFFLER GROUP		
6-1	M9503200004	DECAL : WARNING ENGINE EXHAUST	1	M90320000
		FUEL TANK GROUP		
7-1	M9500500004	DECAL : DIESEL FUEL	1	M90050000
7-2	M9500500104	DECAL : FUEL DRAIN PLUG	1	M90050010

NAMEPLATE AND DECALS ASSY. (CONT. DCA180SSIU)



NAMEPLATE AND DECALS ASSY. (CONT. DCA180SSIU)

NO.	PART NO.	PART NAME	QTY.	REMARKS
		ENCLOSURE GROUP		
8-1	M9510200002	DECAL : MQ	1	M91020000
8-2	0600500090	EMBLEM	2	
8-2A	0021106016	MACHINE SCREW	4	
8-3	M4560101103	STRIPE	1	
8-4	M3560104703	STRIPE	1	
8-5	M3560104803	STRIPE	1	
8-6	M4560100704	STRIPE	3	
8-7	M4560101003	STRIPE	1	
8-8	M4560101203	STRIPE	1	
8-9	M3550002204	DECAL : CAUTION	1	M35000220
8-10	M3550002204	DECAL : DANGER EXHAUST GAS	1	M90320010
8-11	M9510000104	DECAL : DOCUMENT BOX LOCATED	1	M91000010
8-12	A9504000014	DECAL : SUPPORT HOOK	2	M91200000
8-13	M9504200004	DECAL: WARNING STRAT FIRES	1	M90420000

TERMS AND CONDITIONS OF SALE — PARTS

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

MULTIQUIP CORPORATE OFFICE

18910 Wilmington Ave Tel. (800) 421-1244
Carson, CA 90746 Fax (800) 537- 3927
Contact: mq@multiquip.com
Web: www.multiquip.com

MQ Power

1800 Water Ridge Rd. Tel. (800) 883-2551
Suite 500/600 Fax (972) 315-1847
Lewisville, TX 75057
Contact: mqpower@multiquip.com
Web: www.mqpower.com

MQ Parts Department

800-427-1244 Fax: 800-672-7877
310-537-3700 Fax: 310-637-3284

Service/Tech Support/Warranty

800-835-2551 Fax: 310-638-8046

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.

Further, MQ Power disclaims any warranties or guaranties, expressed or implied, with regards to the information contained in this manual.

Manufactured for Multiquip Inc. by DENYO CO., LTD, JAPAN

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