

OPERATION AND PARTS MANUAL



WHISPERWATT™ SERIES MODEL TLG-12SPX4 60 Hz GENERATOR

Revision #1 (12/17/09)

**THIS MANUAL MUST ACCOMPANY
THE EQUIPMENT AT ALL TIMES.**



WARNING



CALIFORNIA — Proposition 65 Warning

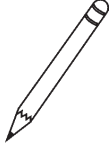
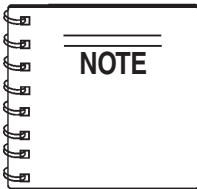
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

**MQ POWER TLG-12SPX4
WHISPERWATT™ GENERATOR**

California Proposition 65 Warning 2
 Table Of Contents 4
 Parts Ordering Procedures 5
 Specifications 6
 Dimensions (Top, Side, Front) 7
 Safety Message Alert Symbols 8-9
 Rules for Safe Operation 10-14
 Installation 15-16
 General Information 17
 Major Components 18
 Generator Control Panel 19-20
 Output Terminal Panel Familiarization 21-23
 Load Application/Max Amperage 24
 Setup 25-28
 Generator Start-up Procedure 29-30
 Generator Shut-Down Procedure 31
 Maintenance (Engine) 32-33
 Maintenance (Trailer) 34-36
 Generator Wiring Diagram 37
 Engine Wiring Diagram 38
 Troubleshooting (Engine) 39-40
 Troubleshooting (Generator) 41
 Explanation of Code in Remarks Column 42
 Suggested Spare Parts 43

COMPONENT DRAWINGS

Generator Assembly 44-45
 Control Panel Assembly 46-49
 Engine and Radiator Assembly 50-53
 Battery Assembly 54-55
 Muffler Assembly 56-57
 Fuel Tank Assembly 58-59
 Enclosure Assembly 60-63
 Rubber Seals Assembly 64-65
 Nameplate and Decals 66-69
 Terms and Condition of Sale — Parts 70



Specifications are subject to change without notice.

PARTS ORDERING PROCEDURES

Ordering parts has never been easier! Choose from three easy options:

Effective:
January 1st, 2006

www.mqpower.com



Order via Internet (Dealers Only):

Order parts on-line using Multiquip's SmartEquip website!

- View Parts Diagrams
- Order Parts
- Print Specification Information



If you have an MQ Account, to obtain a Username and Password, E-mail us at: parts@multiquip.com.

To obtain an MQ Account, contact your District Sales Manager for more information.

Goto www.multiquip.com and click on **Order Parts** to log in and save!

Use the **internet** and qualify for a **5% Discount** on *Standard orders* for all orders which include complete part numbers.*

Note: Discounts Are Subject To Change



Order via Fax (Dealers Only):

All customers are welcome to order parts via Fax.

Domestic (US) Customers dial:
1-800-6-PARTS-7 (800-672-7877)

Fax your order in and qualify for a **2% Discount** on *Standard orders* for all orders which include complete part numbers.*

Note: Discounts Are Subject To Change



Order via Phone: Domestic (US) Dealers Call:
1-800-427-1244

Non-Dealer Customers:

Contact your local Multiquip Dealer for parts or call 800-427-1244 for help in locating a dealer near you.



International Customers should contact their local Multiquip Representatives for Parts Ordering information.

When ordering parts, please supply:

- | | |
|---|--|
| <input type="checkbox"/> Dealer Account Number | <input type="checkbox"/> Specify Preferred Method of Shipment: |
| <input type="checkbox"/> Dealer Name and Address | <input checked="" type="checkbox"/> UPS/Fed Ex <input checked="" type="checkbox"/> DHL |
| <input type="checkbox"/> Shipping Address (if different than billing address) | <input type="checkbox"/> Priority One <input checked="" type="checkbox"/> Truck |
| <input type="checkbox"/> Return Fax Number | <input type="checkbox"/> Ground |
| <input type="checkbox"/> Applicable Model Number | <input type="checkbox"/> Next Day |
| <input type="checkbox"/> Quantity, Part Number and Description of Each Part | <input type="checkbox"/> Second/Third Day |

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!



TLG-12SPX4 — SPECIFICATIONS

Table 1. Generator Specifications

Model	TLG-12SPX4
Type	Revolving field, Protection type Synchronous Generator
Phase	Single Phase
Standby Output	13 KW
Prime Output	12 KW
Voltage	240V/120
Frequency	60 Hz
Speed	3600 rpm
Power Factor	1.0

Table 2. Engine Specifications

Model	KUBOTA D902	
Type	4 Cycle, water-cooled, swirl combustion chamber type	
No. of Cylinders	3 cylinders	
Bore x Stroke	2.83 in. x 2.9 in. (72 mm x 74 mm)	
Rated Output	20.5 HP/3600 rpm	
Displacement	54.8 cu. in. (898 cc)	
Starting	Electric	
Coolant Capacity	0.71 gal. (2.7 liters)	
Lube Oil Capacity	0.95 gal. (3.6 liters)	
Fuel Tank Capacity	13.5 gal. (51 liters)	
Fuel Consumption	1.4 gal. (5.2 liters)/hr at full load	1.1 gal. (4.4 liters)/hr at 3/4 load
	1 gal. (3.8 liters)/hr at half load	0.8 gal. (3.1 liters)/hr at 1/4 load
Battery	12V 65AH (27:525A)	
Fuel	#2 Diesel Fuel	

TLG-12SPX4 — DIMENSIONS (TOP, SIDE AND FRONT)

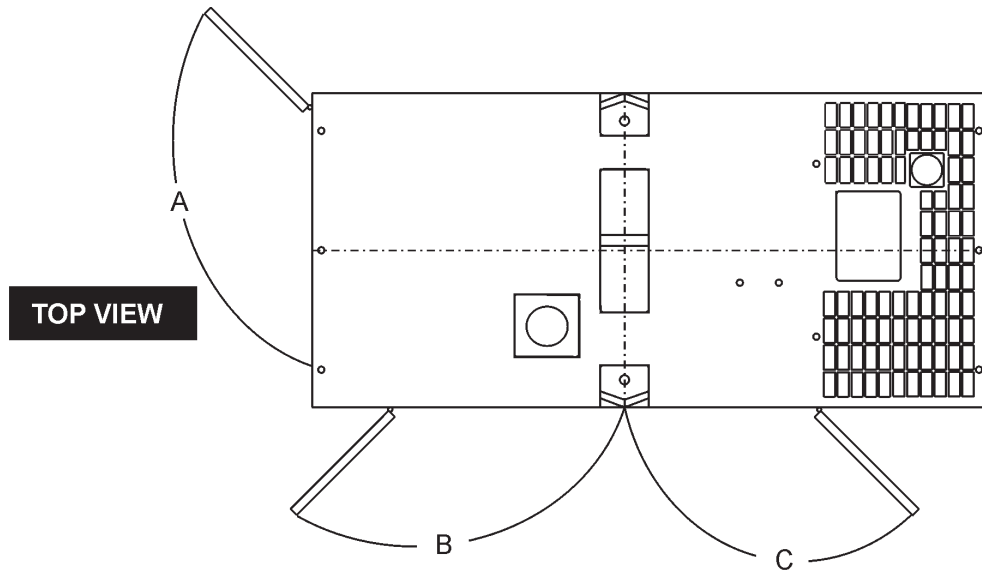


Figure 1. Dimensions

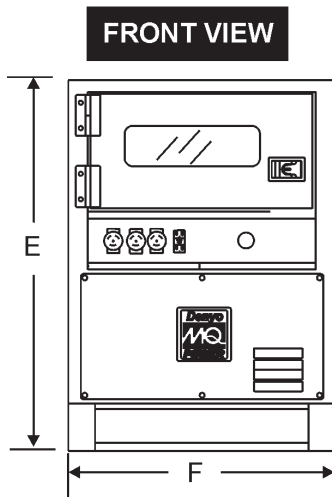
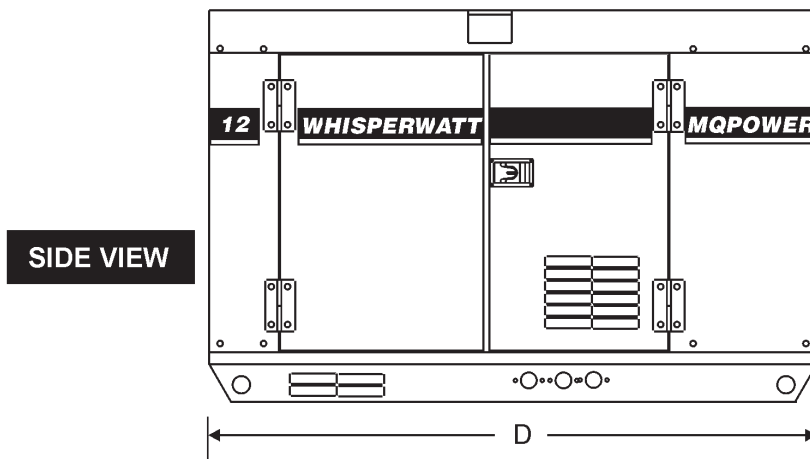
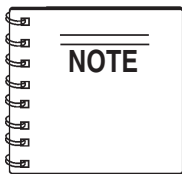


TABLE 3. DIMENSIONS	
Reference Letter	Dimension ft. (mm.)
A	23.23 in. (590 mm.)
B	17.52 in. (445 mm.)
C	19,69 in. (500 mm.)
D	55.12 in. (1,400 mm.)
E	33.46 in. (850 mm.)
F	27,17 in. (690 mm.)

TLG-12SPX4 — SAFETY MESSAGE ALERT SYMBOLS

FOR YOUR SAFETY AND THE SAFETY OF OTHERS!

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.



This Owner's Manual has been developed to provide complete instructions for the safe and efficient operation of the MQ Power **Generator**.

Before using this generator, ensure that the operating individual has read and understands all instructions in this manual.

SAFETY MESSAGE ALERT SYMBOLS

The three (3) 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 three words: **DANGER**, **WARNING**, or **CAUTION**.

DANGER

You **WILL** be **KILLED** or **SERIOUSLY** injured if you do not follow directions.

WARNING

You **COULD** be **KILLED** or **SERIOUSLY** injured if you do not follow directions.

CAUTION

You **CAN** be injured if you do not follow directions

HAZARD SYMBOLS

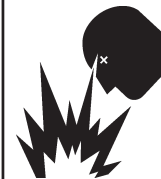
Potential hazards associated with the operation of this equipment will be referenced with "**Hazard Symbols**" which appear throughout this manual, and will be referenced in conjunction with Safety "**Message Alert Symbols**".

WARNING - LETHAL EXHAUST GASES



Gasoline engine exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause **DEATH** if inhaled. **NEVER** operate this equipment in a confined area or enclosed structure that does not provide ample free flow air.

WARNING - EXPLOSIVE FUEL



Diesel fuel is extremely flammable, and its vapors can cause an explosion if ignited. **DO NOT** start the engine near spilled fuel or combustible fluids. **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 approved containers, in well-ventilated areas and away from sparks and flames. **NEVER** use fuel as a cleaning agent.

WARNING - BURN HAZARDS



Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operations. **NEVER** operate the engine with heat shields or heat guards removed.

DANGER - ELECTROCUTION HAZARDS

During operation of this generator, there exists the possibility of **electrocution, electrical shock or burn**, which can cause **severe bodily harm** or even **DEATH!**



TLG-12SPX4 — SAFETY MESSAGE ALERT SYMBOLS

! WARNING - ROTATING PARTS



NEVER operate equipment with covers, or guards removed. Keep **fingers, hands, hair** and clothing away from all moving parts to prevent injury.

! CAUTION - RESPIRATORY HAZARDS



ALWAYS wear approved **respiratory** protection.

! CAUTION - ACCIDENTAL STARTING



ALWAYS place the **engine ON/OFF** switch (**MPEC**) in the **OFF/RESET** position when the generator is not in use.

! CAUTION - SIGHT AND HEARING HAZARDS



ALWAYS wear approved **eye** and **hearing** protection.

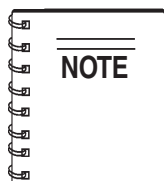
! CAUTION - OVER-SPEED CONDITIONS



NEVER tamper with the factory settings of the engine governor or settings. Personal injury and damage to the engine or equipment can result if operating in speed ranges above maximum allowable.

! CAUTION - EQUIPMENT DAMAGE MESSAGES

Other important messages are provided throughout this manual to help prevent damage to your generator, other property, or the surrounding environment.



This generator, other property, or the surrounding environment could be damaged if you do not follow instructions.

! CAUTION - ENGINE LOAD (WET-STACKING)

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 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.

TLG-12SPX4 — RULES FOR SAFE OPERATION

DANGER - READ THIS MANUAL!

Failure to follow instructions in this manual may lead to **serious injury** or even **DEATH!** This equipment is to be operated by trained and qualified personnel only! This equipment is for industrial use only.

The following safety guidelines should always be used when operating the **generator**.

General Safety:

- **DO NOT** operate or service this equipment before reading this entire manual.



The operator **MUST BE** familiar with proper safety precautions and operations techniques before using generator.

- This equipment should not be operated by persons under 18 years of age.
- **NEVER** operate this equipment without proper protective clothing, shatterproof glasses, steel-toed boots and other protective devices required by the job.



- **NEVER** operate this equipment when not feeling well due to fatigue, illness or taking medicine.
- **NEVER** operate this equipment under the influence or drugs or alcohol.

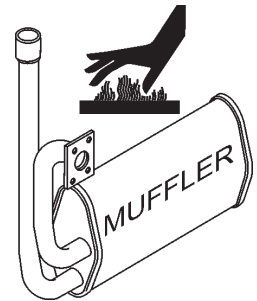


- **ALWAYS** wear proper respiratory (mask), hearing and eye protection equipment when operating the generator.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.

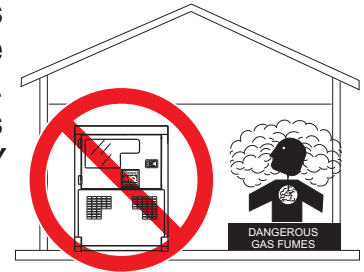


- **NEVER** use accessories or attachments, which are not recommended by Multiquip for this equipment. Damage to the equipment and/or injury to user may result.

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



- The engine section of this generators requires an adequate free flow of cooling air. **NEVER** operate the generator in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause serious damage to the generators or engine and may cause injury to people. Remember the generator's engine gives off **DEADLY** carbon monoxide gas.

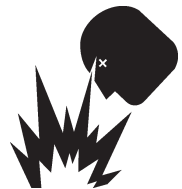


- **ALWAYS** refuel in a well-ventilated area, away from sparks and open flames.

- **ALWAYS** use extreme caution when working with **flammable** liquids. When refueling, **stop the engine** and allow it to cool. **DO NOT smoke** around or near the machine. Fire or explosion could result from fuel vapors, or if fuel is spilled on a hot engine.



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



- **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.

TLG-12SPX4 — RULES FOR SAFE OPERATION

- **ALWAYS** be sure the operator is familiar with proper safety precautions and operation techniques before using generators.
- **NEVER** leave the generator unattended, turn off engine when unattended.
- Unauthorized equipment modifications will void all warranties.
- **ALWAYS** ensure generator is on level ground before use.
- **DO NOT** place hands or fingers inside generators engine compartment when engine is running.
- **NEVER** run engine without air cleaner. Severe engine damage may occur.
- **NEVER** change or adjust the engine speed which has been set at the factory prior to shipping.


Power Cord Safety

- **NEVER** let power cables or cords *lay in water*.
- **NEVER** *stand in water* while AC power from the generators is being transfer to a load.
- **NEVER** use a defective or frayed power cable. Check the cable for cuts in the insulation.
- **NEVER** use a extension cord that is frayed or damaged where the insulation has been cut.
- **ALWAYS** make certain that proper power or extension cord has been selected for the job See Table 6.

Grounding Safety

- **ALWAYS** make sure that electrical circuits are properly *grounded* 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.
- **ALWAYS** make sure the generators are properly grounded to a suitable earth ground (**GROUND ROD**). See installation in this manual.
- **NEVER** use *gas piping* as an electrical ground.

Maintenance Safety

- **NEVER** lubricate components or attempt service on a running machine.
- **High Temperatures** – Always stop engine and allow the engine to cool before adding fuel, oil or performing service and maintenance functions. Contact with **hot!** components can cause serious burns. 
- Keep the machinery in proper running condition.
- Fix damage to the machine immediately and replace any broken parts immediately.
- **ALWAYS** replace any worn or damaged warning decals.
- **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 un-authorized personnel.
- The electrical voltage required to operate the generator can cause severe injury or even death through physical contact with live circuits. Turn all circuit breakers **OFF** before performing maintenance on the generator.
- 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.
- **ALWAYS** allow the machine a proper amount of time to cool before servicing.
- **ALWAYS** service air cleaner frequently to prevent engine malfunction.
- **ALWAYS** disconnect the **NEGATIVE battery terminal** before performing service on the generator.
- Follow all battery safety guidelines listed in this manual when handling or servicing the generator.

TLG-12SPX4 — RULES FOR SAFE OPERATION

WARNING - BURN HAZARDS

To prevent burns, **DO NOT** touch or open any of the below mentioned components while the engine is running or immediately after operations. Always allow sufficient time for the engine and generator to cool before performing maintenance.



■ **Radiator Cap** - Removing the radiator cap while the engine is hot will result in high pressurized, boiling water to gush out of the radiator, causing severe scalding to any persons in the general area of the generator.

■ **Coolant Drain Plug** - Removing the coolant drain plug while the engine is hot will result in hot coolant gushing out of the coolant drain plug, therefore causing severe scalding to any persons in the general area of the generator.

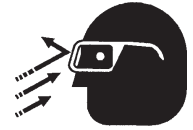


■ **Engine Oil Drain Plug** - Removing the engine oil drain plug while the engine is hot will result in hot oil gushing out of the oil drain plug, therefore causing severe scalding to any persons in the general area of the generator.

Battery Safety

Use the following guidelines when handling the battery:

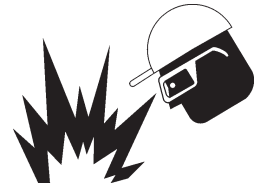
- The battery contains acids that can cause injury to the eyes and skin. To avoid eye irritation, **always** wear safety glasses.
- Use well insulated gloves when picking up the battery.



DANGER - EXPLOSION HAZARDS

The risk of an explosion exists when performing service on the battery. To avoid **severe injury** or **DEATH**:

- **DO NOT** drop the battery. There is the possibility of risk that the battery may 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 in contact with a flame or spark, an explosion could occur.



- **ALWAYS** keep the battery charged. If the battery is not charged a buildup of combustible gas will occur.
- **ALWAYS** keep battery charging and cables in good working condition. Repair or replace all worn cables.
- **ALWAYS** recharge the battery in a vented air environment, to avoid risk of a dangerous concentration of combustible gases.
- In case the battery liquid (dilute sulfuric acid) comes in contact with **clothing or skin**, rinse skin or clothing immediately with plenty of water.
- In case the battery liquid (dilute sulfuric acid) comes in contact with your **EYES**, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

DANGER-Electrocution Hazards

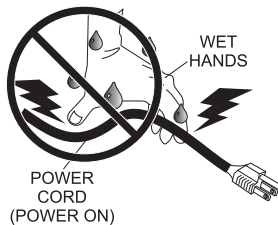
During operation of this generation, there exists the possibility of **electrocution, electrical shock or burn**, which can cause **severe bodily harm** or even **DEATH!**



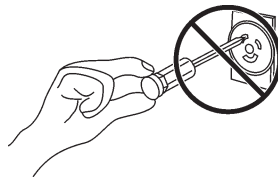
To avoid these hazards:

NEVER use **damaged** or **worn** cables when connecting equipment to the generator. Make sure power connecting cables are securely connected to the generator's output receptacles, incorrect connections may cause damage to the generators and electrical shock.

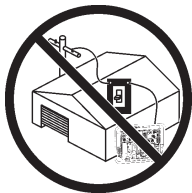
NEVER grab or touch a live power cord with wet hands, the possibility exist of electrical shock, electrocution, and even **death!**



NEVER insert any objects into the output receptacles during operation. This is extremely dangerous. **ALWAYS** turn-off the generators and place all circuit breakers in the "OFF" position when contact with the output receptacles is required. There exist the possibility of **electrocution, electrical shock or burn, which can cause severe bodily harm or even death!**




Backfeed to a utility system can cause **electrocution** and or property damage. **NEVER** connect the generators 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!



DANGER-Lethal Exhaust Gas Hazards



Engine exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled. **NEVER** operate this equipment in a confined area or enclosed structure that does not provide ample free flow air.



 DANGER

Using a generator indoors **CAN KILL YOU IN MINUTES.**

Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell

 NEVER use inside a home or garage, even if doors and windows are open	 Only use OUTSIDE and far away from windows, doors, and vents.
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Avoid other generator hazards.
READ MANUAL BEFORE USE.

Emergencies

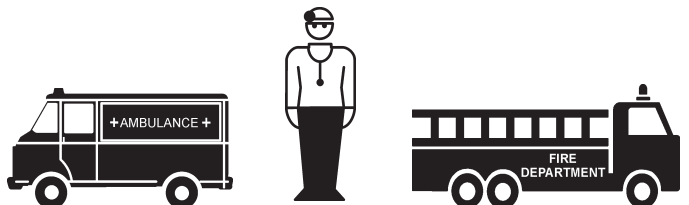
■ **ALWAYS** know the location of the nearest **fire extinguisher**.



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



■ In emergencies **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.



TLG-12SPX4 — RULES FOR SAFE OPERATION



If your generator is trailer mounted, please read the towing and safety requirements listed below.

Towing and Transporting Safety

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 in good operating condition and both units are mechanically sound.

The following list of safety precautions should be followed when towing your generator:

CAUTION - FOLLOW TOWING REGULATIONS

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.

- **ALWAYS** shutdown engine before transporting.
- Drain fuel from generator fuel tank before towing.
- If generator is mounted on a trailer, make sure trailer complies with all local and state safety transportation laws. Follow the listed **Towing & Transporting Safety** guidelines for basic towing techniques.
- 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** attach trailer's safety chains to towing vehicle properly.
- **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.
- Place **chock blocks** underneath wheel to prevent **rolling**, while parked.
- Use the trailer's swivel jack to adjust the trailer height to a level position while parked.
- Avoid sudden stops and starts. This can cause skidding, or jack-knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns.
- Trailer should be adjusted to a level position at all times when towing.
- Raise and lock trailer wheel stand in up position when transporting.
- 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.
- Place **support blocks** underneath the trailer's bumper to prevent **tipping**, while parked.
- Avoid sharp turns to prevent rolling.
- **DO NOT** transport generator with fuel in tank.



For more safety tips, see the trailer safety guidelines section in this manual.

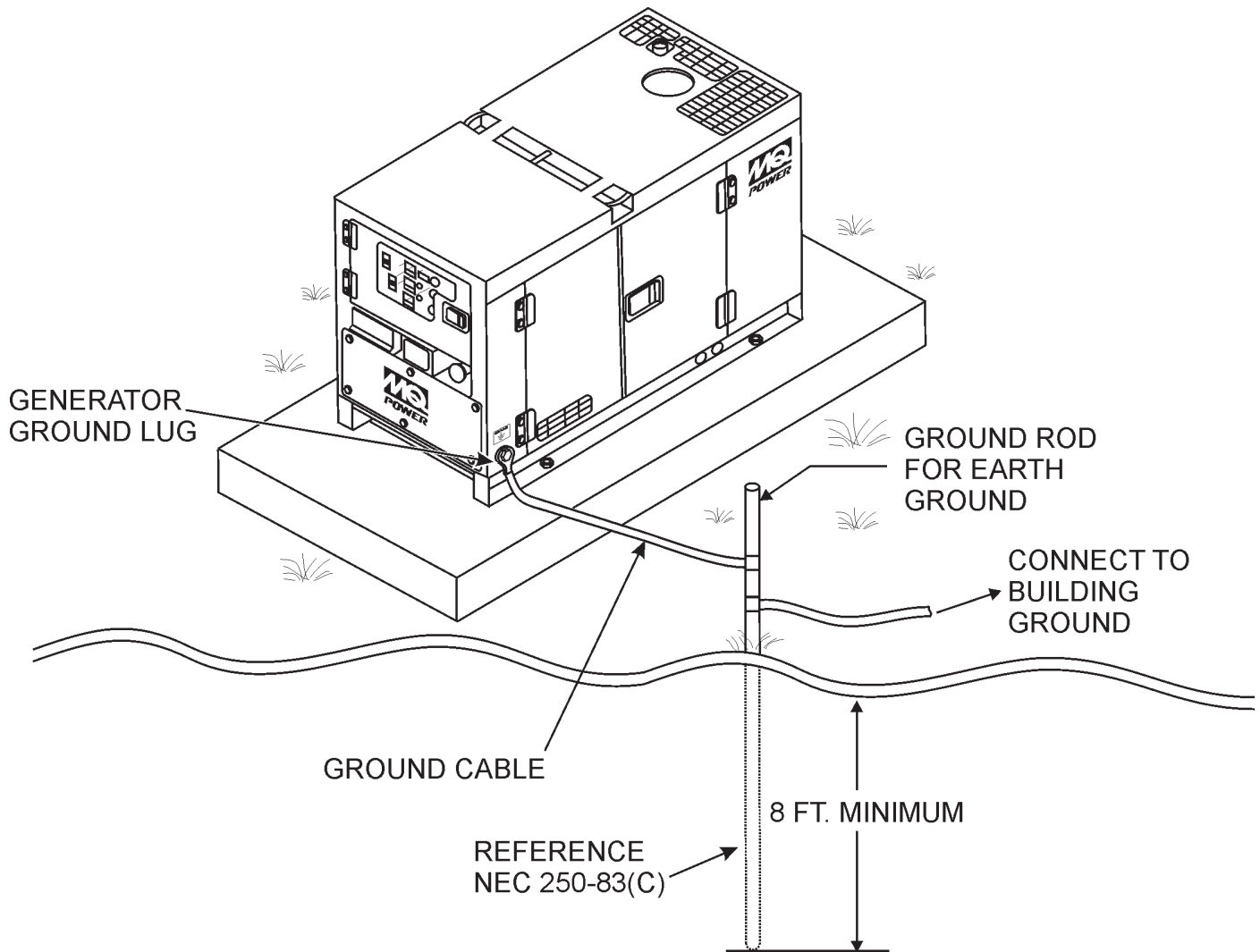


Figure 2. Typical Generator Grounding Application

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 - EXHAUST HAZARD

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.

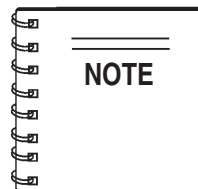
Generator Grounding

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.



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

TLG-12SPX4 Whisperwatt™ Series Familiarization

Generator

The MQ Power Model TLG-12SPX4 is a 13 kW **generator** (Figure 3) that is designed as 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.

Generator Control Panel

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

- Warning Lamp Unit
- Frequency Meter (Hz)
- AC Ammeter (Amps)
- AC Voltmeter (Volts)
- Voltage Regulator
- Ignition Switch
- Hour Meter
- Fuel Gauge
- 3-Pole, 50 amp Main Circuit Breaker
- "Control Box" (located behind the Gen. Control Panel)
 - Automatic Voltage Regulator
 - Current Transformer
 - Voltage Rectifier
 - Starter Relay

Output Terminal Panel

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

- 120V output receptacle (5-20R) GFCI, 20A
- 120V output receptacle (L5-30R), 30A
- 240V output receptacle (L6-30R), 30A
- 120/240V output receptacle (CS6369), 50A
- Throttle Lever
- Ground Terminal

Open Delta Excitation System

The 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

The **TLG-12SPX4** is powered by a 3 cylinder, water cooled, **Kubota Model D902 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 $\pm 0.25\%$.

Extension Cables

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

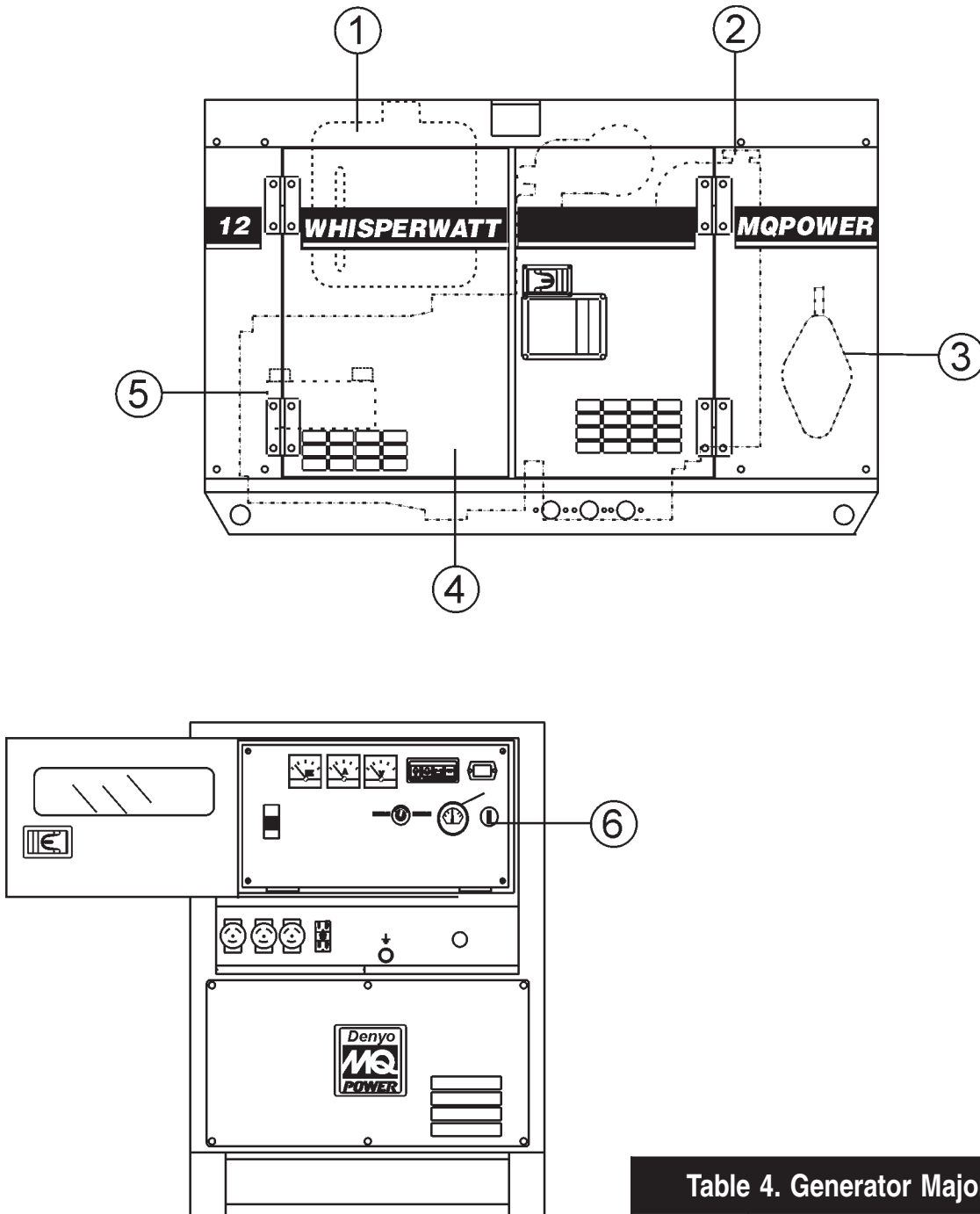


Figure 3. Major Components

Table 4. Generator Major Components

ITEM NO.	DESCRIPTION
1	Fuel Tank Assembly
2	Engine and Radiator Assembly
3	Muffler Assembly
4	Generator Assembly
5	Battery Assembly
6	Generator Control Panel Assembly

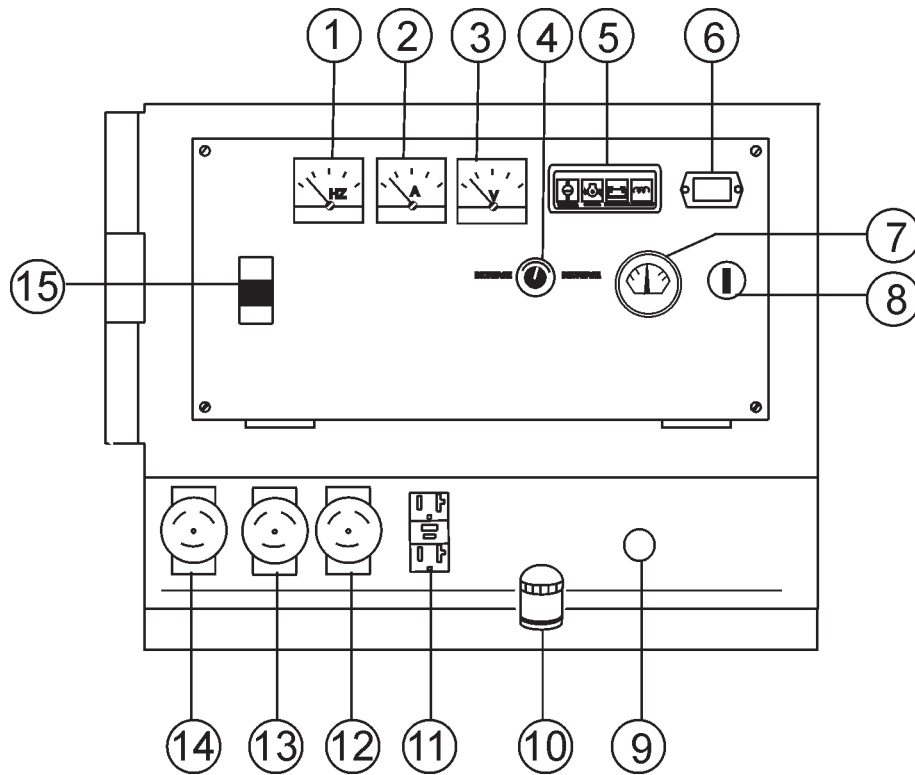


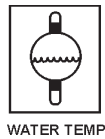
Figure 4. Generator Control Panel

TLG-12SPX4 — GENERATOR CONTROL PANEL

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

1. **Frequency Meter** – Indicates the output frequency in hertz (Hz). Normally 60 Hz.
2. **AC Ammeter** – Indicates the amount of current the load is drawing from the generator.
3. **AC Voltmeter** – Indicates the output voltage present at the **Output Receptacles**.
4. **Voltage Regulator Control** – Allows $\pm 15\%$ manual adjustment of the generator's output voltage.
5. **Engine Warning Display Module** – This module displays the following engine failures:

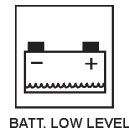
- A. **Overheat Lamp** – This lamp goes ON when the coolant is over 239°F. If the lamp goes ON during normal operation of the generator, the generator will immediately stop. Check for possible trouble before restarting engine.



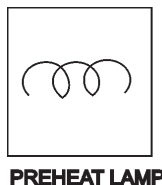
- B. **Low Oil Pressure Lamp** – During normal operation of the generator this lamp should remain OFF. After the oil pressure rises after start-up, the lamp will go OFF. This lamp goes ON when the oil pressure drops below 7.1 PSI. If this lamp is ever lit (ON) during normal operation of the generator, the generator will immediately shutdown. Check for possible trouble before restarting engine.



- C. **Low Battery Fluid Lamp** – This lamp goes ON when the battery fails to charge. If this lamp goes ON during normal operation of the generator, stop the engine and fill the battery with distilled water to the specified level.



- D. **Pre-Heat Lamp** – This lamp indicates when the engine is ready for starting during cold weather operating condition.



6. **Hour Meter** – Indicates the number of hours machine has been in use.
7. **Fuel Gauge** – Indicates the amount of fuel in the Generator.
8. **Ignition Switch** – Insert ignition key into this switch to start engine.
9. **Throttle Lever** – This knob controls the speed of the engine.
10. **Ground Terminal** - Ground terminal for Output Receptacles.
11. **GFCI Receptacle** – Provides 120 VAC output (20 amps max).
12. **Auxiliary Receptacle (for L5-30R)** – Provides 120 VAC output (30 amps max).
13. **Auxiliary Receptacle (for L6-30R)** – Provides 240 VAC output (30 amps max).
14. **Twist Lock Dual Voltage Receptacle (CS6369)** – Provides 120/240 VAC output (50 amps max).
18. **Main Circuit Breaker** – This three-pole, 50A main breaker is provided to protect the the **Output Receptacles** from overload.

TLG-12SPX4 — OUTPUT TERMINAL PANEL FAMILIARIZATION

Output Terminal Panel

The **Output Terminal Panel** (Figure 5) 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.

Output Terminal Familiarization

The “**Output Terminal Panel**” (Figure 5) is provided with the following:

- 120V GFCI receptacle @ 20 amp
- 120V receptacle @ 30 amp
- 240V receptacle @ 30 amp
- 120/240V CS6369 receptacle @ 50 amp
- Throttle Lever
- Ground

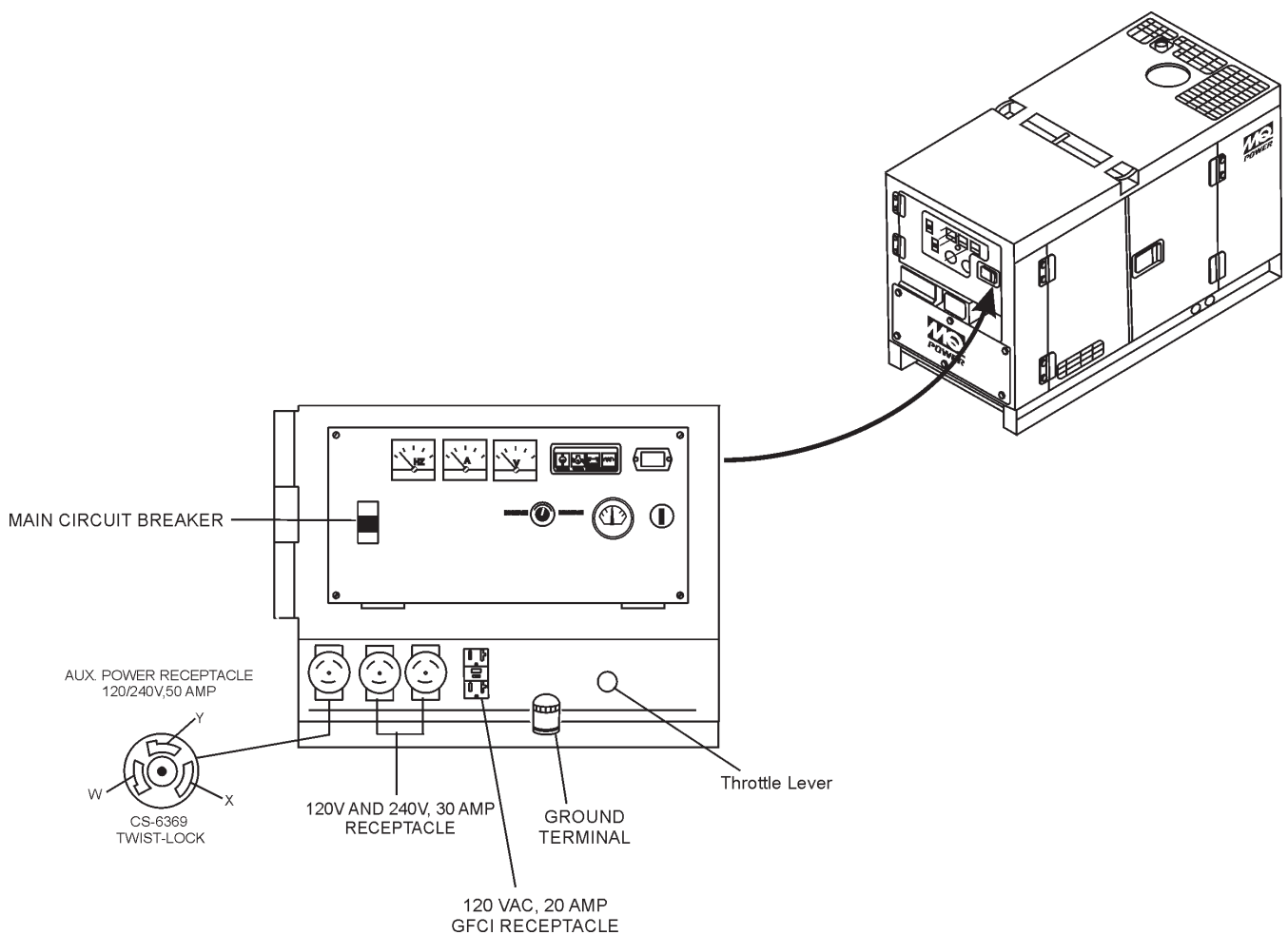


Figure 5. Output Terminal Panel

TLG-12SPX4 — OUTPUT TERMINAL PANEL FAMILIARIZATION

120 VAC GFCI Receptacle

This 120 VAC, 20 amp GFCI (Duplex Nema 5-20R) receptacle can be used anytime the generator is in operation. Pressing the **reset** button resets the GFCI receptacle after being tripped. Pressing the **Test Button** (See Figure 6) in the center of the receptacle will check the GFCI function. Both receptacles should be tested at least once a month.

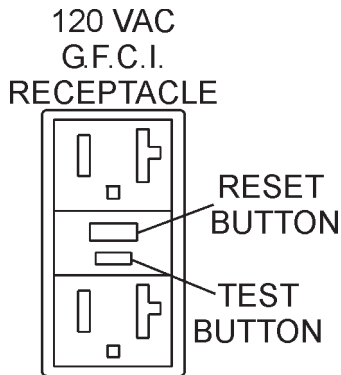


Figure 6. G.F.C.I. Receptacle

Twist Lock Dual Voltage 120/240 VAC Receptacle (Option)

There is one CS-6369 120/240V, 50 amp auxiliary twist-lock receptacle (Figure 7) provided on the output terminal panel. This receptacle is protected by a 50 amp circuit breaker.

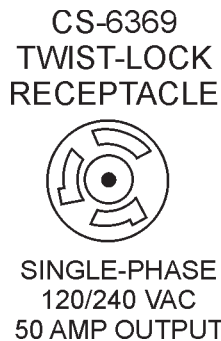


Figure 7. 120/240V CS6369 Twist-Lock Auxiliary Receptacle

L5-30R Twist Lock 120 VAC Receptacle (Option)

There is one L5-30R, 120 VAC 30 amp auxiliary twist-lock receptacle (Figure 8) provided on the output terminal panel.

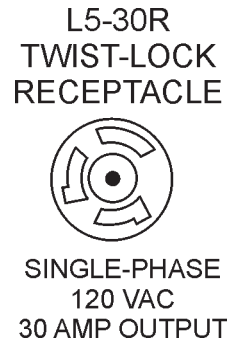


Figure 8. 120 VAC L5-30R Twist-Lock Auxiliary Receptacle

L6-30R Twist Lock 240 VAC Receptacle (Option)

There is one L6-30R, 240 VAC 30 amp auxiliary twist-lock receptacle (Figure 9) provided on the output terminal panel.

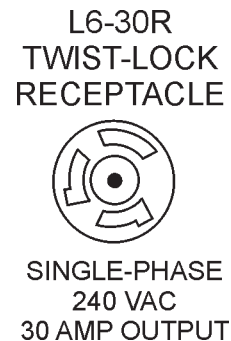


Figure 9. 240 VAC L6-30R Twist-Lock Auxiliary Receptacle

Turn the **voltage regulator control knob** (Figure 10) 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 10. Voltage Regulator Control Knob

TLG-12SPX4 — OUTPUT TERMINAL PANEL FAMILIARIZATION

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, 50A **main** circuit breaker is provided. Make sure to switch **ALL** circuit breakers to the **OFF** position prior to starting the engine.

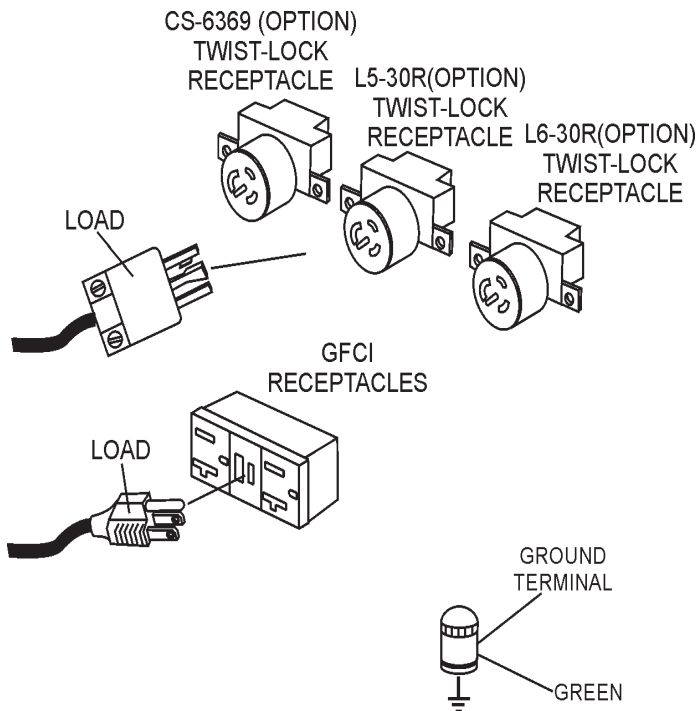


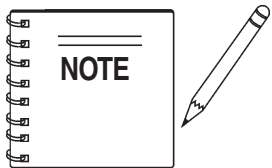
Figure 11. Connecting Loads

TLG-12SPX4 — LOAD APPLICATION/MAXIMUM AMPERAGE

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.



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

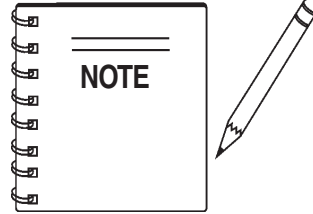
$$\text{WATTS} = \text{VOLTAGE} \times \text{AMPERAGE}$$

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

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

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.



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

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

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

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

DANGER - ELECTRICAL SYSTEM HAZARDS

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 Amperage

Table 7 describes the generator's current output capability.

Rated Voltage	Maximum Amps
Single Phase 120 Volt	41.7 X 2 amps
Single Phase 240 Volt	41.7 amps

Circuit Breakers

To protect the generator from an overload, a 3-pole, 50 amp, **main** circuit breaker has been provided. 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 12) on the dipstick. See Table 8 for proper selection of engine oil.

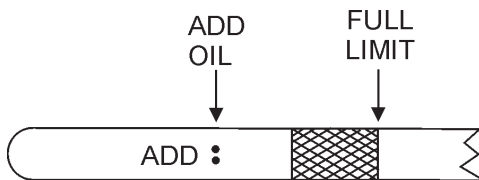


Figure 12. Engine Oil Dipstick

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 **KUBOTA 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 8. Recommended Motor Oil		OIL: SAE	
°F	°C		
122	50		
104	40	10W/40	30
86	30		
68	20		
50	10		
32	0		
-14	-10	ARCTIC OIL	5W/30
-4	-20		
-22	-30		
-40	-40		
		10W/40	15W/30
			10W/30
			10W
			20W/40

Fuel Check

⚠ DANGER - EXPLOSION/FIRE HAZARDS

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 - REFUELING THE GENERATOR

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 optional environmental fuel tank (Figure 13). **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.

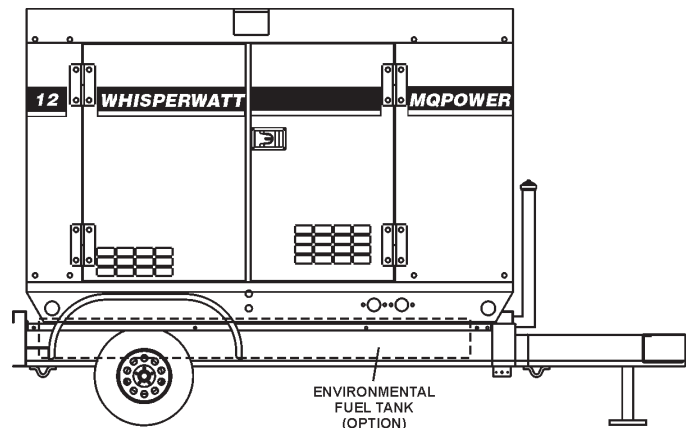


Figure 13. Internal Fuel Tank System

Refueling Procedure:

! WARNING - RESPIRATORY HAZARDS

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



1. **Level Tanks** – Make sure fuel cells are level with the ground. Failure to do so will cause fuel to spill from the tank before reaching full capacity (Figure 14).

! CAUTION - REFUELING THE GENERATOR

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.

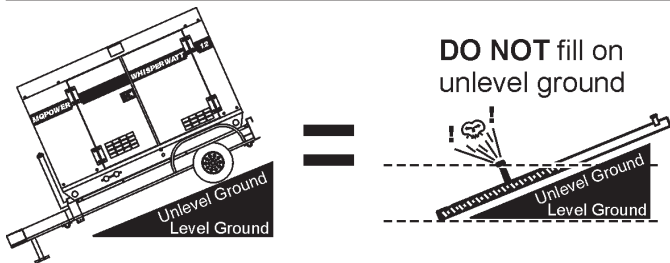
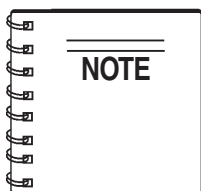


Figure 14. Only Fill on Level Ground



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

2. Remove fuel cap (internal fuel tank) and fill fuel tank as shown Figure 15.

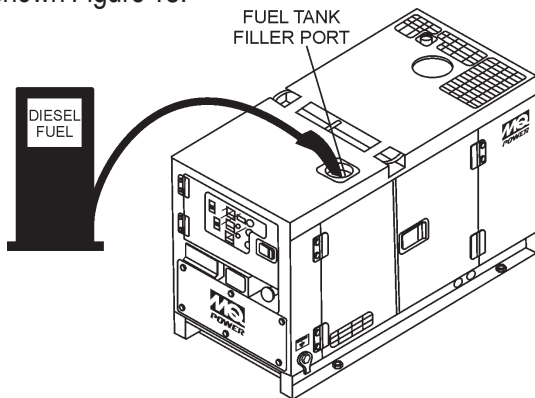
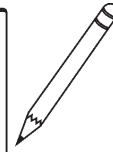
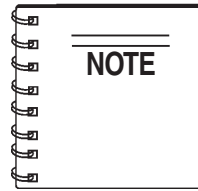


Figure 15. Fueling the Generator



If generator is equipped with an environmental fuel tank, reference Figures 16 and 17.

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.

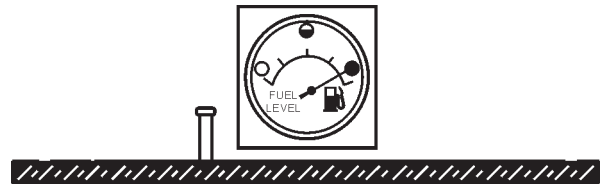


Figure 16. Full Fuel Tank

! CAUTION - REFUELING THE GENERATOR

DO NOT OVER-FILL fuel system. Leave room for fuel expansion. Fuel expands when heated (Figure 17).




Figure 17. Fuel Expansion

Coolant (Antifreeze/Summer Coolant/Water)

KUBOTA recommends 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 **KUBOTA Engine Owner's Manual** for further details.

! WARNING - BURN HAZARDS

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.



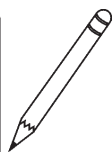
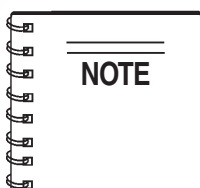
Day-to-day addition of coolant is done from the recovery tank. When adding coolant to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. See Table 9 for engine, radiator, and recovery tank coolant capacities. Make sure the coolant level in the recovery tank is always between the "H" and the "L" markings.

Component	Capacity
Engine and Radiator	1.85 Gal. (7.0 liters)
Reserve Tank	.264 Gal (1.0 liters)

Operation Freezing Weather

When operating in freezing weather, be certain the proper amount of antifreeze (Table 10) has been added.

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



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 **KUBOTA 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 **KUBOTA Engine Owner's Manual**.

The fan belt tension is proper if the fan belt bends 10 to 15 mm (Figure 18) when depressed with the thumb as shown below.

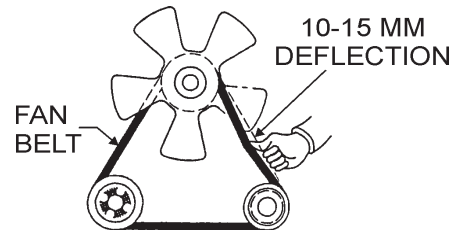




Figure 18. Fan Belt Tension

! CAUTION - ROTATING PARTS



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 19) 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 - BATTERY SERVICING SAFETY

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

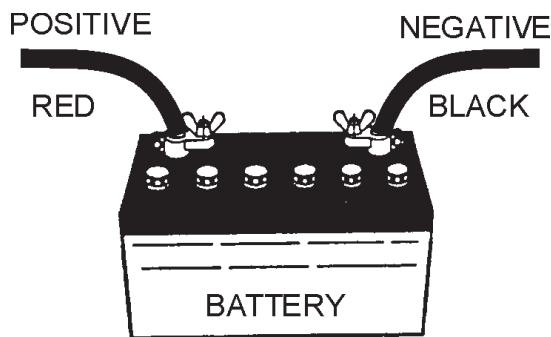
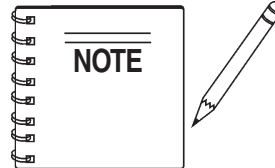


Figure 19. Battery Connections

When connecting battery do the following:

1. **NEVER** connect the battery cables to the battery terminals when the ignition switch is in the **ON** position
2. Place a small amount of battery terminal treatment compound around both battery terminals. This will ensure a good connection and will help prevent corrosion around the battery terminals.



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

! CAUTION - BATTERY SERVICING SAFETY

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

Alternator

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

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

Wiring

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

Piping and Hose Connection

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

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

TLG-12SPX4 — GENERATOR START-UP PROCEDURE

Before Starting

CAUTION - LETHAL EXHAUST HAZARD

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

WARNING - STARTING THE GENERATOR

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

1. Place **main** circuit breaker (Figure 20) on the control panel in the **OFF** position prior to starting the engine.

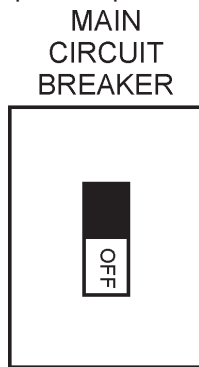
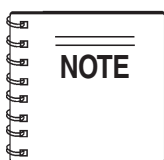
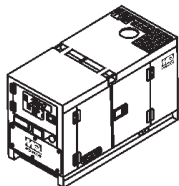


Figure 20. Main Circuit Breaker (OFF)

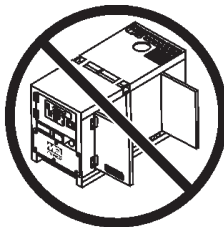


Generator may not be equipped with auxiliary circuit breakers or receptacles. This feature is optional

3. Connect the load to the **receptacles** as shown in Figure 11. These load connection points can be found on the output terminal panel and the output terminal panel's hard wire hookup panel.
4. Close all engine enclosure doors (Figure 21).



CORRECT



INCORRECT

Figure 21. Engine Enclosure Doors

Start-up Procedure

1. Place engine throttle lever (Figure 22) in the **START/IDLE** position (low speed).

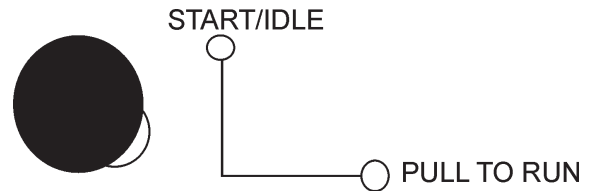


Figure 22. Throttle Lever (Low Speed)

2. Insert the ignition key into the ignition switch. Turn the key to the **RUN** position and check to see that the **Oil Pressure** light turns on (lights up). If it does not come on check the lubrication oil system or check the light for defective wiring. If light does turn on, then proceed to step 2.
2. Turn the key clockwise to the **PRE-HEAT** position (Figure 23A) and observe the **Pre-Heat Lamp**. When the **Pre-Heat Lamp** has turned off, continue turning the ignition key clockwise to the **START** position (Figure 23B). When the engine starts, release the key and allow it to return to the **RUN** position. If engine fails to start within 10 seconds, wait 30 seconds and repeat this step.

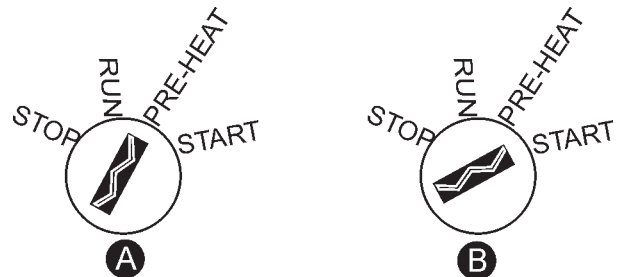


Figure 23. Ignition Switch

3. Let it idle for 3-5 minutes listen and check for any abnormal sounds or smells. If any abnormalities exists shutdown the engine and correct the problem. **DO NOT RUN GENERATOR AT HIGH SPEED OPERATION IMMEDIATELY AFTER STARTING**
4. When the engine starts, the Oil Pressure Light should go out. If the light stays on, stop the engine and check lubricating oil system.

TLG-12SPX4 — GENERATOR START-UP PROCEDURE (MANUAL)

5. Pull the throttle lever (Figure 24) and turn to the right to increase engine speed.

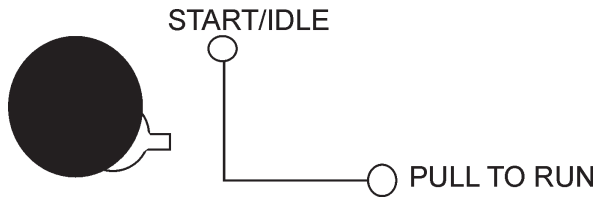


Figure 24. Throttle Lever (High Speed)

6. The generator's frequency meter (Figure 25) displays the 60 cycle output frequency in **HERTZ**.

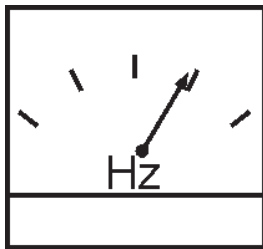


Figure 25. Frequency Meter (Hz)

7. The generator's AC-voltmeter (Figure 26) displays the output voltage in **VOLTS**. If the voltage is not within the specified tolerance, use the voltage adjustment control knob (Figure 27) to increase or decrease the desired voltage.

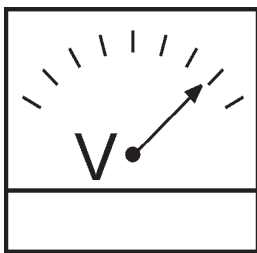


Figure 26. Voltmeter



Figure 27. Voltage Adjust Control Knob

8. The ammeter (Figure 28) 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.

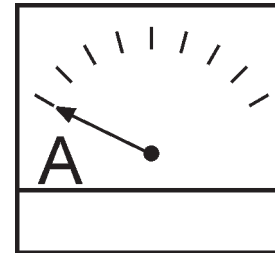


Figure 28. Ammeter (No Load)

7. Place the **main** (Figure 29) circuit breakers on the control panel in the **ON** position.

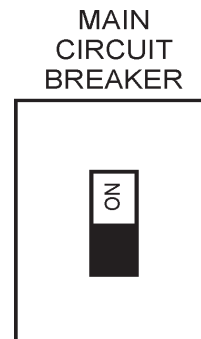


Figure 29. Main, GFCI, and Aux. Circuit Breakers (ON)

12. Observe the generator's ammeter (Figure 30) 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.

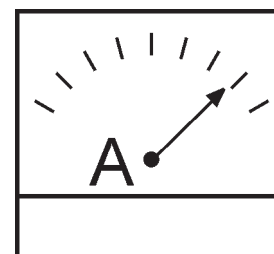


Figure 30. Ammeter (Load)

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

TLG-12SPX4 — GENERATOR SHUT-DOWN PROCEDURES

WARNING - SHUTTING DOWN THE GENERATOR

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** circuit breaker (Figure 31) to the **OFF** position.

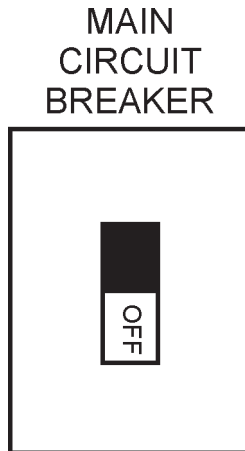


Figure 31. Main Circuit Breaker (OFF)

Emergency Shutdown Procedure

1. Turn the ignition key counter-clockwise to the **STOP** position. When the engine has stopped, remove key. Place key in a safe place where it will not be lost.
2. Place both the **main** circuit breaker as shown in (Figure 31) to the **OFF** position.
3. After an automatic system shutdown, always find and eliminate the problem before restarting generator.

2. Let the engine cool for 3-5 minutes with no load applied.
3. Turn the ignition key counter-clockwise to the **STOP** position. When the engine has stopped, remove key. Place key in a safe place where it will not be lost.
4. Inspect entire generator for any damage or loosening of components that may have occurred during operation.

TABLE 11. 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. H₂O).

*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 11 as a general engine maintenance guideline (Refer to the Engine Instruction Manual).

Air Cleaner

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

Air Cleaner with Dust Indicator (If Equipped)

This indicator 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.

Service Daily

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 exist.

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.

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 **KUBOTA 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. This unit is equipped with an automatic air bleeding system.

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 12.

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.

Cleaning the Fuel Strainer

Clean the fuel strainer if it contains dust or water. Remove dust or water in the strainer cap and wash it in gasoline. Securely fasten the fuel strainer cap so that fuel will not leak. Check the fuel strainer every 200 hours of operation or once a month.

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.

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.
- 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.
- Tighten both cocks and replace the overflow tank.
- Replace with coolant as recommended by the engine manufacturer.
- Close radiator cap tightly.

! WARNING - BURN HAZARDS

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



Generator Storage

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

- Fill 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.

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 32 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 12 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 32) 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.

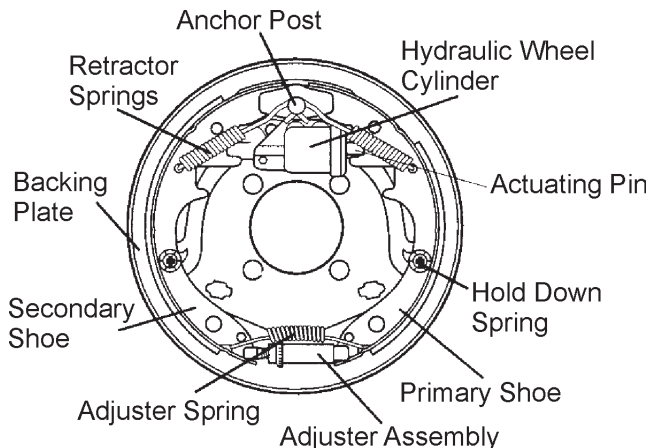


Figure 32. Hydraulic Brake Components

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 12. 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.

TLG-12SPX4 — TRAILER MAINTENANCE

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 - EYESIGHT HAZARD

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



CAUTION - REPAIRING TRAILER WHEELS

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.



Tire Wear/Inflation

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.

Table 13 (Tire Wear Troubleshooting) will help pinpoint the causes and solutions of tire wear problems.

TABLE 13. 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 & tire skidding.	Avoid sudden stops when possible and adjust brakes.

Suspension

The **leaf suspension** springs and associated components (Figure 33) 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 14.

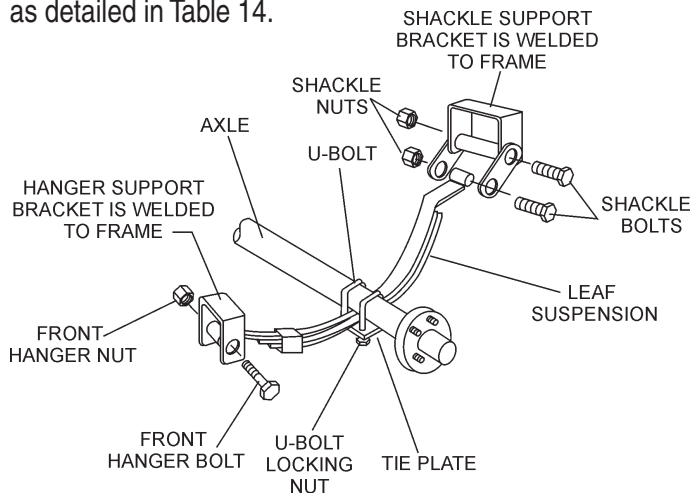


Figure 33. Major Suspension Components

Table 14. 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

TLG-12SPX4 — TRAILER MAINTENANCE

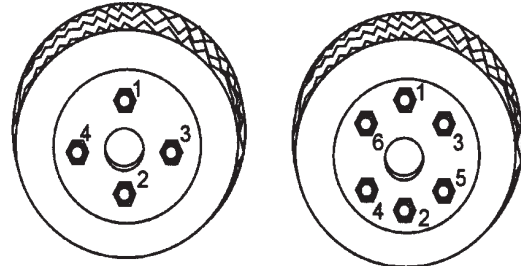
Lug Nut Torque Requirements

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

1. Start all wheel lug nuts by hand.
2. Torque all lug nuts in sequence (see Figure 34). **DO NOT** torque the wheel lug nuts all the way down. Tighten each lug nut in 3 separate passes as defined by Table 15.
3. After first road use, retorque all lug nuts in sequence. Check all wheel lug nuts periodically.

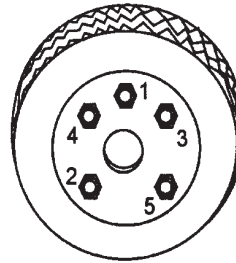
Table 15. Tire Torque Requirements

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

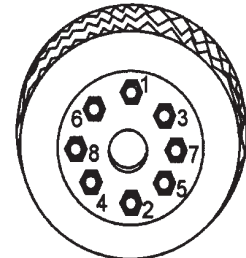


4-LUG NUTS

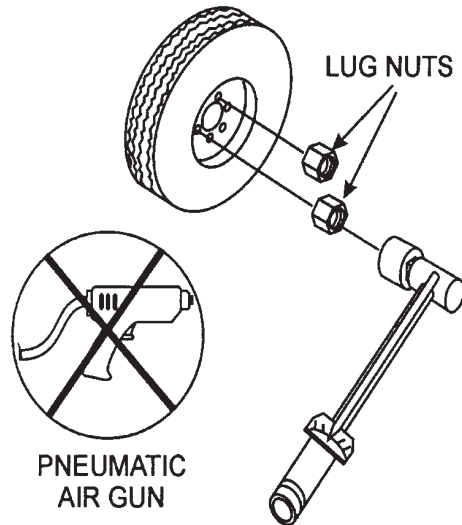
6-LUG NUTS



5-LUG NUTS

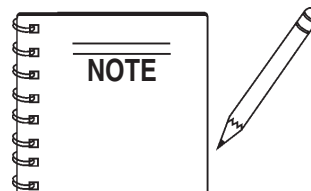


8-LUG NUTS



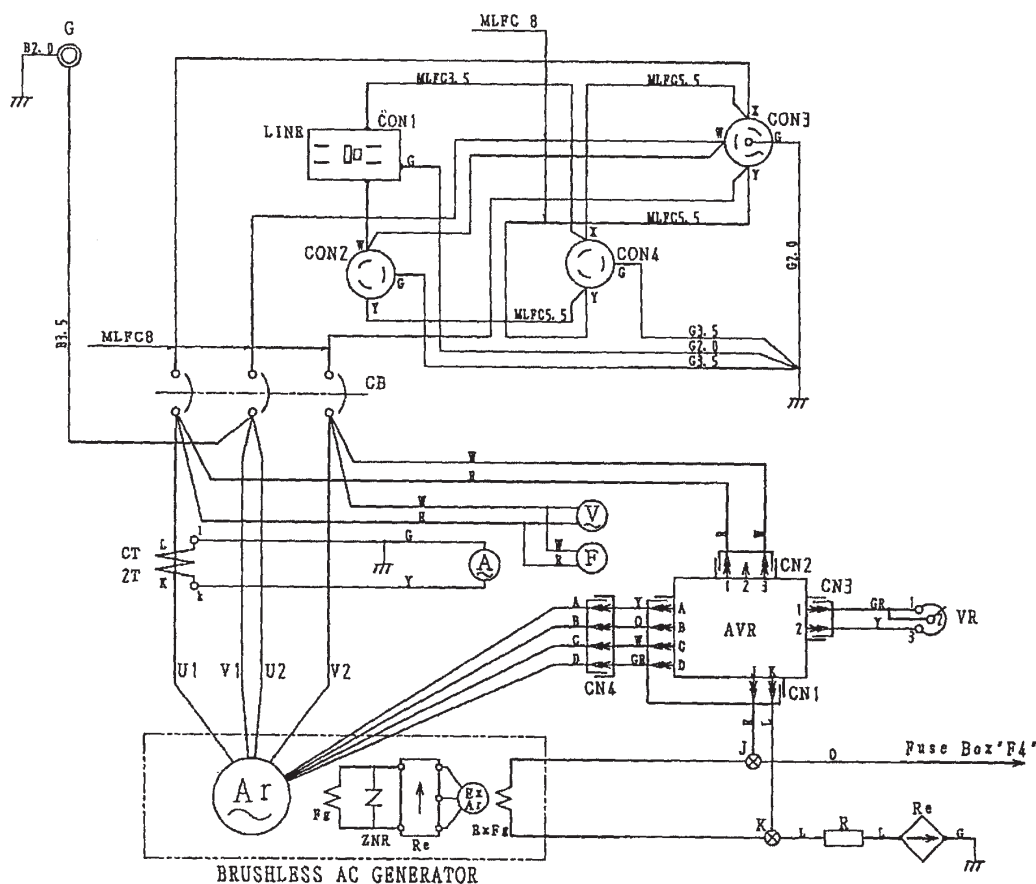
TORQUE WRENCH

Figure 34. Wheel Lug Nuts Tightening Sequence



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

TLG-12SPX4 — GENERATOR WIRING DIAGRAM



WIRING COLOR CODE			
SYMBOL	COLOR	SYMBOL	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		

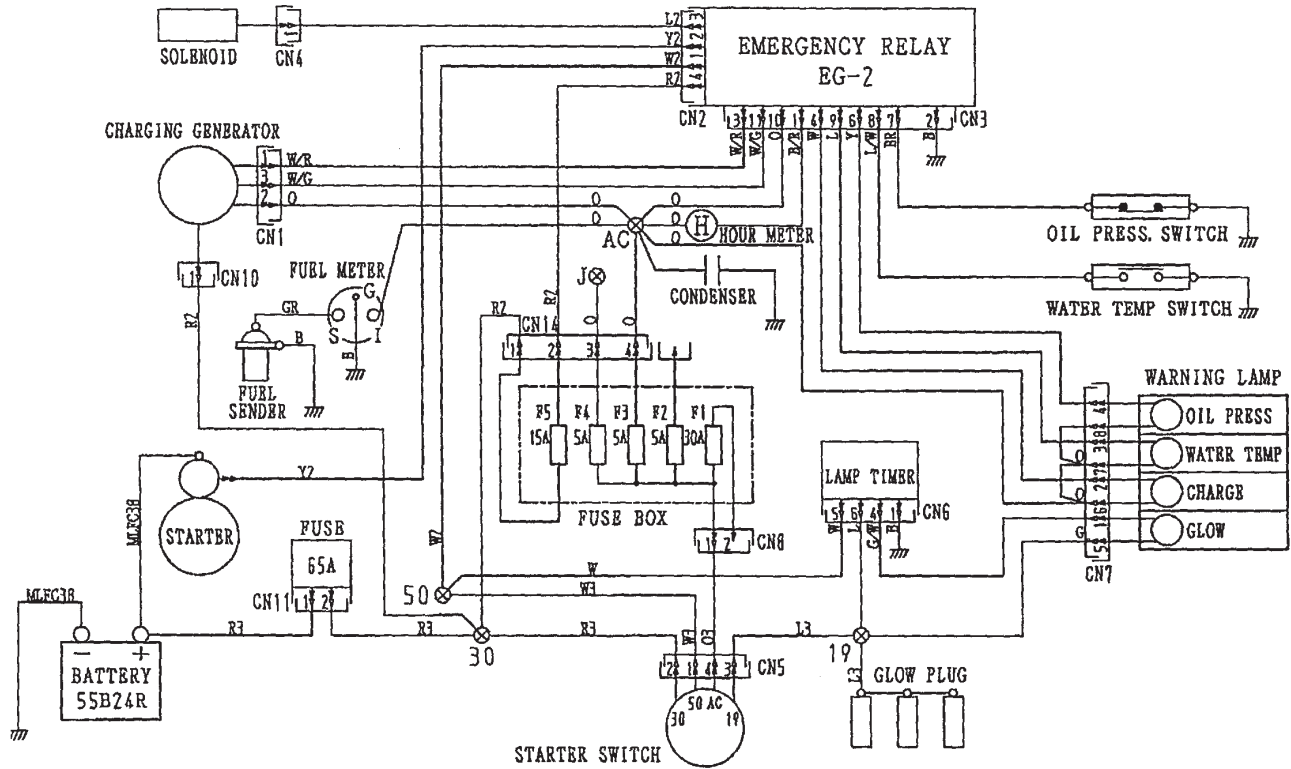
CONNECTOR
(View at Wiring Side)



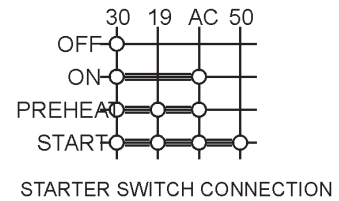
SYMBOL	DESIGNATION
V	AC Voltage Meter
A	AC Ammeter
F	Frequency Meter
CT	Current Transformer Ammeter
AVR	Automatic Voltage Regulator
VR	Voltage Regulator
CB	Circuit Breaker
R	Resistor
Re	Rectifier
CON1	Output Receptacle 5-20R (GFCI)
CON1	Output Receptacle L5-30R
CON1	Output Receptacle CS6369
CON1	Output Receptacle L6-30R
⊗ J,K	Combination Terminal
U,N,V	Output Terminal
⊙ G	Ground Terminal

Figure 35. Generator Wiring Diagram

TLG-12SPX4 — ENGINE WIRING DIAGRAM



WIRING COLOR CODE			
SYMBOL	COLOR	SYMBOL	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		



CONNECTOR (View at Wiring Side)

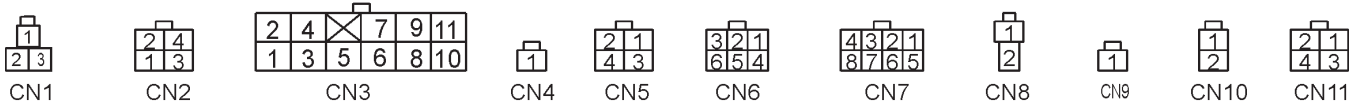


Figure 36. Engine Wiring Diagram

TLG-12SPX4 — TROUBLESHOOTING (ENGINE)

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

TABLE 16. ENGINE TROUBLESHOOTING

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Engine does not start.	No fuel?	Replenish fuel.
	Air in the fuel system?	Bleed system.
	Water in the fuel system?	Remove water from fuel tank.
	Fuel pipe clogged?	Clean fuel pipe.
	Fuel filter clogged?	Clean or change fuel filter.
	Excessively high viscosity of fuel or engine oil at low temperature?	Use the specified fuel or engine oil.
	Fuel with low cetane number?	Use the specified fuel.
	Fuel leak due to loose injection pipe retaining nut?	Tighten nut.
	Incorrect injection timing?	Adjust.
	Fuel cam shaft worn?	Replace.
	Injection nozzle clogged?	Clean injection nozzle.
	Injection pump malfunctioning?	Repair or replace.
	Seizure of crankshaft, camshaft, piston, cylinder liner or bearing?	Repair or replace.
	Compression leak from cylinder?	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder.
	Improper valve timing?	Correct or replace timing gear.
	Piston ring and liner worn?	Replace.
Excessive valve clearance?	Adjust.	
Starter does not run.	Battery discharged?	Charge battery.
	Starter malfunctioning?	Repair or replace.
	Key switch malfunctioning?	Repair or replace.
	Wiring disconnected?	Connect wiring.

TLG-12SPX4 — TROUBLESHOOTING (ENGINE)

TABLE 16. ENGINE TROUBLESHOOTING (CONTINUED)

SYMPTOM	POSSIBLE PROBLEM	SOLUTION
Engine revolution is not smooth.	Fuel filter clogged or dirty?	Clean or change.
	Air cleaner clogged?	Clean or change.
	Fuel leak due to loose injection pipe retaining nut?	Tighten nut.
	Injection pump malfunctioning?	Repair or replace.
	Incorrect nozzle opening pressure?	Adjust.
	Injection nozzle stuck or clogged?	Repair or replace.
	Fuel over flow pipe clogged?	Clean.
	Governor malfunctioning?	Repair.
Either white or blue exhaust gas is observed.	Excessive engine oil?	Reduce to the specified level.
	Piston ring and liner worn or stuck?	Repair or replace.
	Incorrect injection timing?	Adjust.
	Deficient compression?	Adjust top clearance.
Either black or dark gray exhaust gas is observed.	Overload?	Lessen the load.
	Low grade fuel used?	Use the specified fuel.
	Fuel filter clogged?	Clean or change.
	Air cleaner clogged?	Clean or change.
	Deficient nozzle injection?	Repair or replace the nozzle.
Deficient output.	Incorrect injection timing?	Adjust.
	Engine's moving parts seem to be seizing?	Repair or replace.
	Uneven fuel injection?	Repair or replace the injection pump.
	Deficient nozzle injection?	Repair or replace the nozzle.
	Compression leak?	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder.

TLG-12SPX4 — TROUBLESHOOTING (GENERATOR)

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 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.

TLG - 12SPX4 — 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.

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.

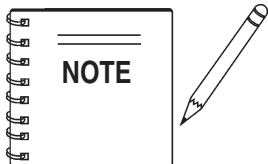
Sample Parts List:

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
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 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.



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 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”

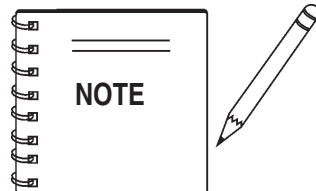
“Make/Obtain Locally” - Indicates that the part can be purchased at any hardware shop or made out of available items. Examples include battery cables, shims, and certain washers and nuts.

“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.

TLG-12SPX4 WHISPER WATT GENERATOR W/KUBOTA D902 DIESEL ENGINE 1 TO 3 UNITS

Qty.	P/N	Description
1	B0310502103	HOSE, RADIATOR UPPER
1	B5310502203	HOSE, RADIATOR LOWER
6	1585332435	FILTER, OIL
5	1523143563	ELEMENT, FUEL FILTER
3	0602046335	ELEMENT, AIR
1	1747297011	FAN BELT
1	A9924800024	CAP AND FILTER, FUEL TANK
1	1584139010	SWITCH, OIL. ENGINE
1	1753883040	SWITCH, THERMOMETER, ENGINE
1	0691820663	AUTOMATIC VOLTAGE REGULATOR
1	0601840073	RHEOSTAT
1	0601840121	KNOB, RHEOSTAT
4	0601806642	FUSE, 5A
2	0601806643	FUSE, 15A
2	0601806644	FUSE, 30A
1	0601806640	FUSE, 65A
3	3741055150	KEY, STARTER SWITCH

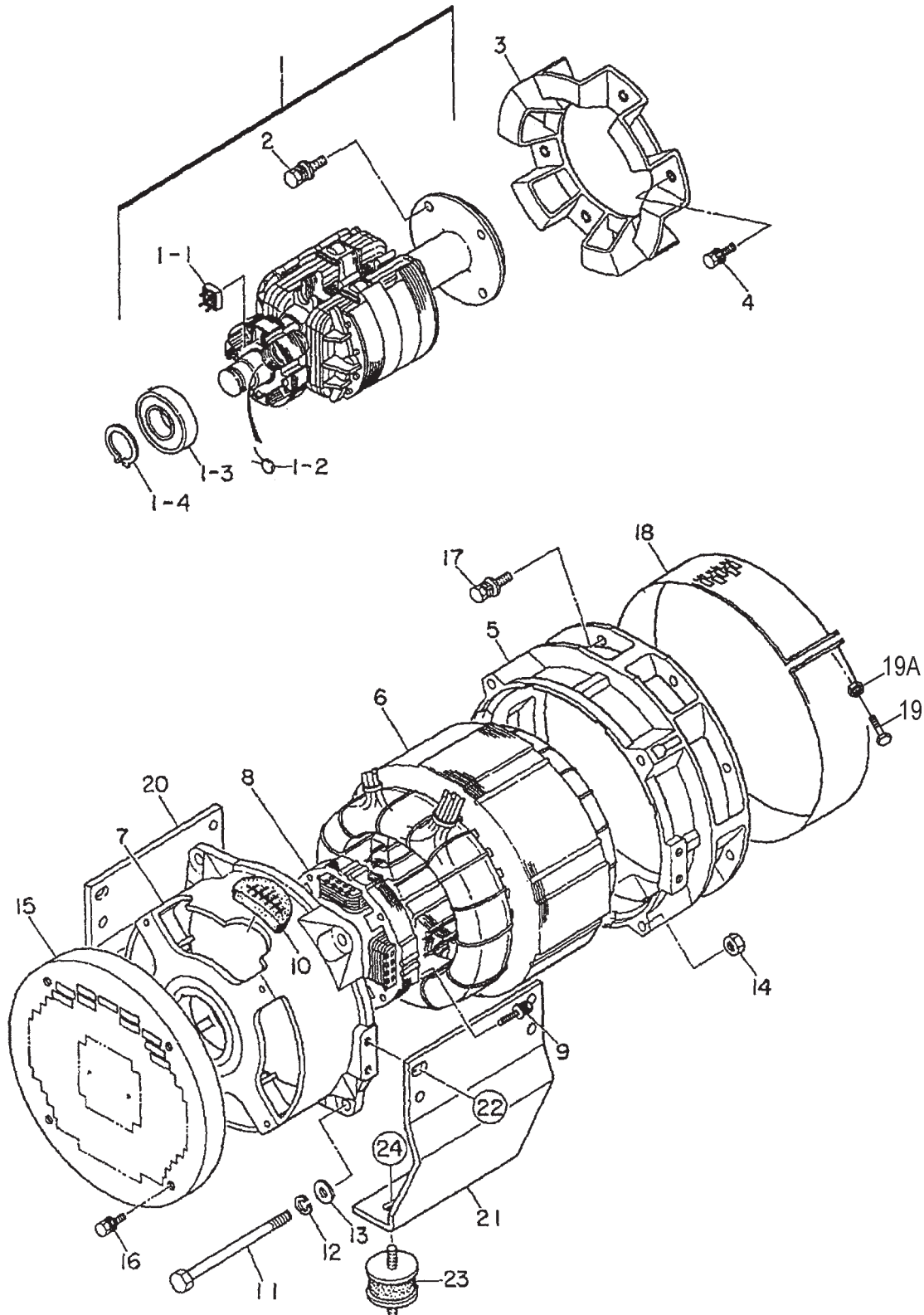
2 0601802149 FUSE, 10A



Part number on this Suggested Spare Parts list may supercede/replace the P/N shown in the text pages of this book.

TLG - 12SPX4 — GENERATOR ASSY.

GENERATOR ASSY.



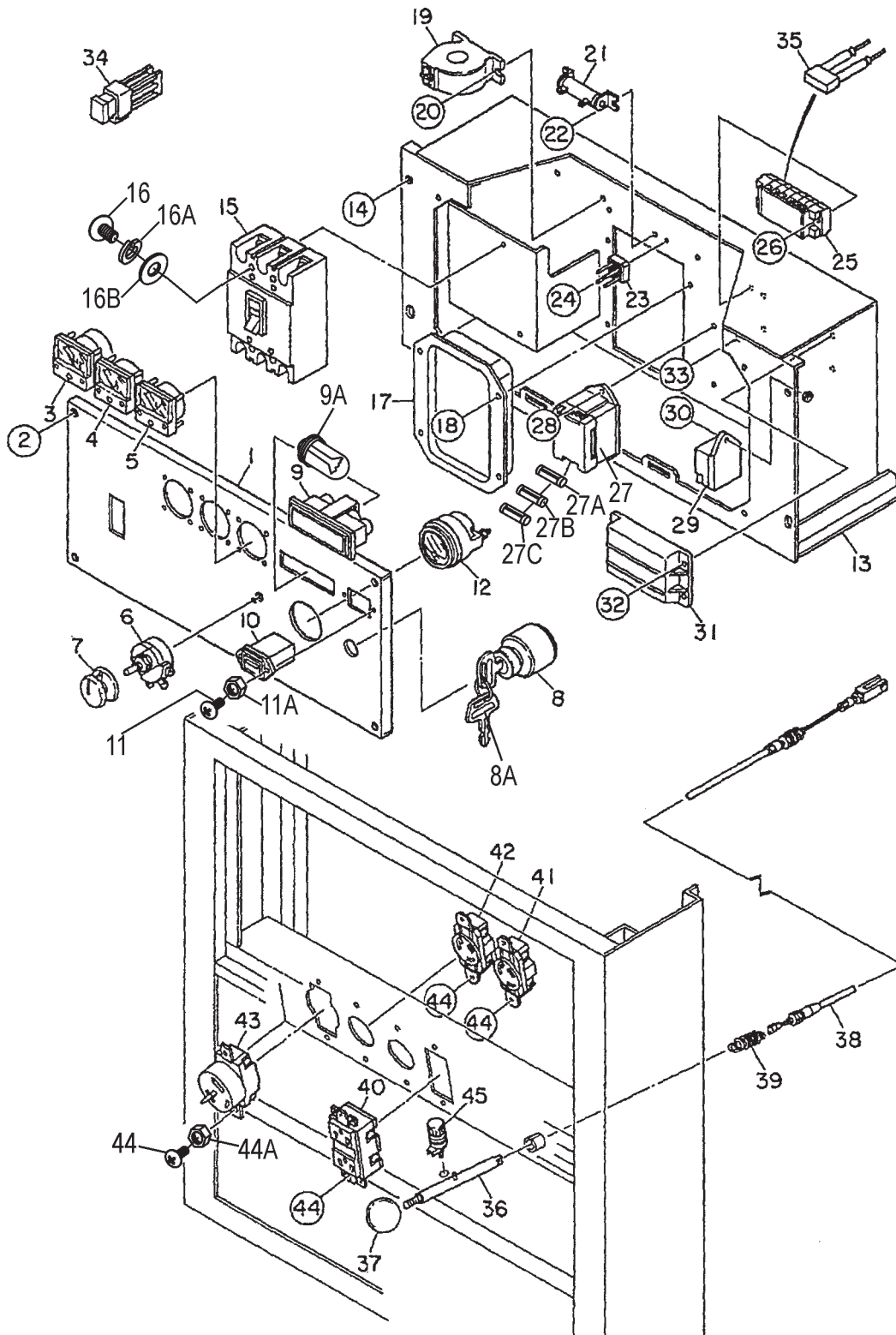
TLG - 12SPX4 — GENERATOR ASSY.

GENERATOR ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	D4110000203	ROTOR ASSY	1	
1-1	0601820037	RECTIFIER	1	S10VB60
1-2	0601822638	SURGE ABSORBER	1	TNR15G 431K
1-3	0071206307	BEARING	1	6307 DDU
1-4	0080000035	SNAP RING	1	
2	0012410030	HEX HEAD BOLT	4	
3	D4111100103	FAN	1	
4	0017108025	HEX HEAD BOLT	6	
5	D4153100102	END BRACKET	1	
6	8521384003	ARMATURE ASSY	1	
7	D4153000202	END BRACKET	1	
8	B0137000003	*FIELD ASSY. EXCITER*	1	
9	0017105035	HEX HEAD BOLT	4	
10	D4153400403	GROMMET	2	
11	D4131200004	SET BOLT	4	
12	0040012000	SPRING WASHER	4	
13	0041212000	PLAIN WASHER	4	
14	0030012000	HEX NUT	4	
15	B0131300104	COVER	4	
16	0017108030	HEX HEAD BOLT	4	
17	0012410025	HEX HEAD BOLT	8	
18	D4155400004	COVER	1	
19	0017106040	HEX HEAD BOLT	4	
19A	0037906000	HEX NUT	1	
20	B0132100303	GENERATOR FOOT	1	
21	B032100203	GENERATOR FOOT	1	
22	0012310025	HEX HEAD BOLT	8	
23	B9310600104	RUBBER SUSPENSION	2	
24	0207010000	HEX NUT	2	

TLG - 12SPX4 — CONTROL PANEL ASSY.

CONTROL PANEL ASSY.



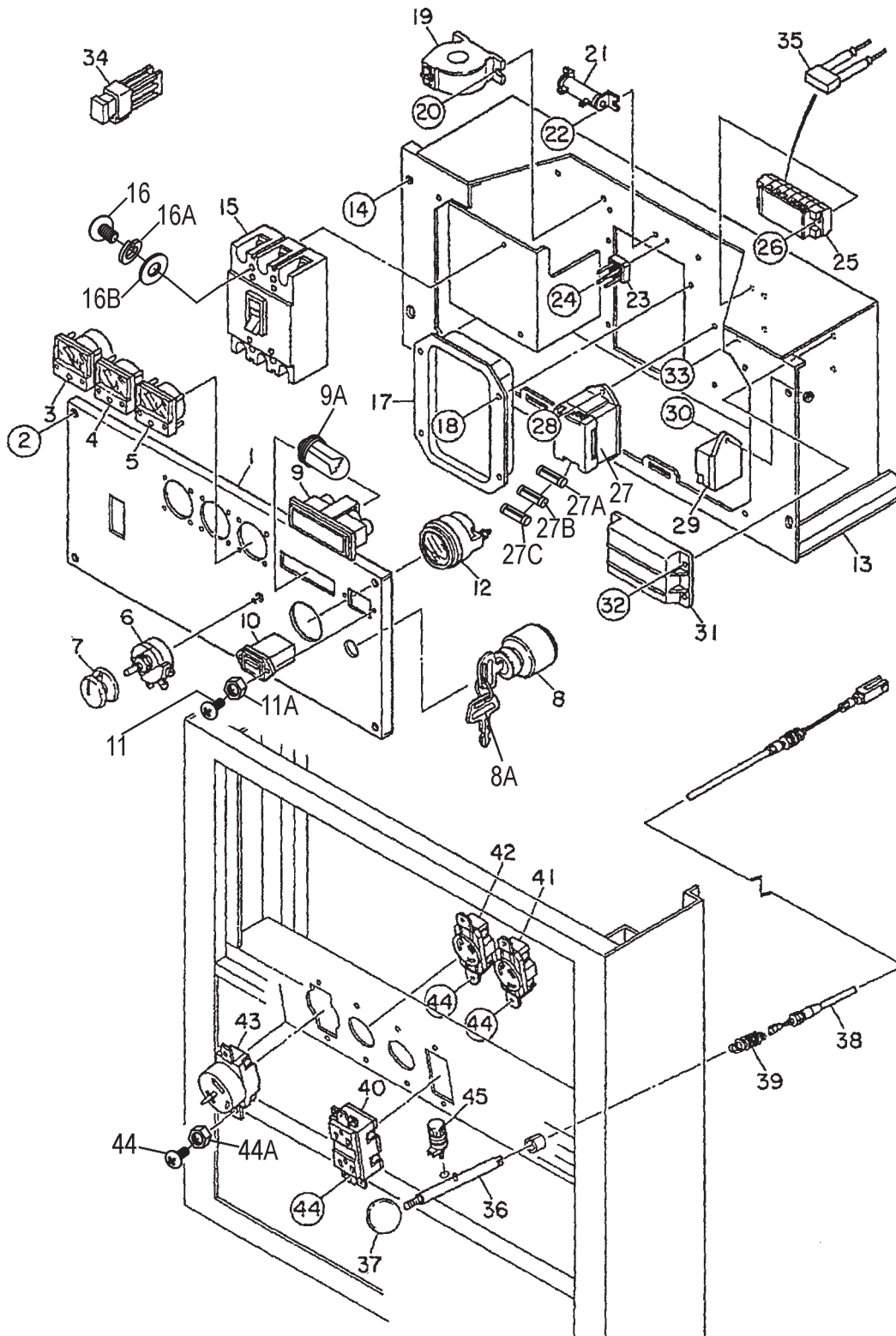
TLG - 12SPX4 — CONTROL PANEL ASSY.

CONTROL PANEL ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	DB0223001503	CONTROL PANEL	1	
2	0021806030	MACHINE SCREW	4	
3	0601800408	FREQUENCY METER, 45~65 Hz	1	
4	0601805745	AC AMMETER, 0~5A	1	
5	0601800281	AC VOLTMETER, 0~150V	1	
6	0601840073	RHEOSTAT (VR), 2W 1k OHM	1	
7	0601840121	KNOB, RHEOSTAT	1	
8	3741059113	STARTER SWITCH	1	REPLACES P/N 0602100077
8A	3741055150	KEY, STARTER SWITCH		
9	0601810523	INDICATOR ASSY	1	
9A	0601810830	BULB	4	
10	0601800682	HOUR METER	1	
11	0027103512	MACHINE SCREW	2	
11A	0030003500	HEX NUT	2	
11B	0040403500	WASHER	2	
12	0602125055	FUEL GAUGE	1	
13	B0213000403	CONTROL BOX	1	
14	0016908020	HEX HEAD BOLT	4	
15	0601806537	CIRCUIT BREAKER, 50A	1	
16	0021004060	MACHINE SCREW	2	
16A	0040004000	SPRING WASHER	2	
16B	0041204000	PLAIN WASHER	2	
17	0601820663	AUTOMATIC VOLTAGE REGULATOR	1	
18	0027105016	MACHINE SCREW	4	
19	0601801123	CURRENT TRANSFORMER, AMMETER	1	
20	0017106016	HEX HEAD BOLT	2	
21	0601842347	RESISTOR, GG20W 30 OHM	1	
22	0027104012	MACHINE SCREW	2	
23	0601823204	RECTIFIER	1	
24	0027103016	MACHINE SCREW	1	
25	0601815759	TERMINAL BOARD	1	
26	0027105020	MACHINE SCREW	2	
27	8701899004	FUSE BOX	1	
27A	0601806642	FUSE, 5A	4	
27B	0601806643	FUSE, 15A	2	
27C	0601806644	FUSE, 30A	2	
28	0027105020	MACHINE SCREW	2	
29	569465992	LAMP TIMER	1	REPLACES P/N 0602201273
30	0027105016	MACHINE SCREW	1	
31	1747260605	EMERGENCY UNIT	1	REPLACES P/N 0602200475
32	0027105025	MACHINE SCREW	4	
33	0016906016	HEX HEAD BOLT	1	
34	0601806640	FUSE, 65A	1	
35	B0260800904	NOISE FILTER	1	
36	7672142003	SLIDE LEVER	1	
37	0805012904	KNOB	1	

TLG - 12SPX4 — CONTROL PANEL ASSY.

CONTROL PANEL ASSY.



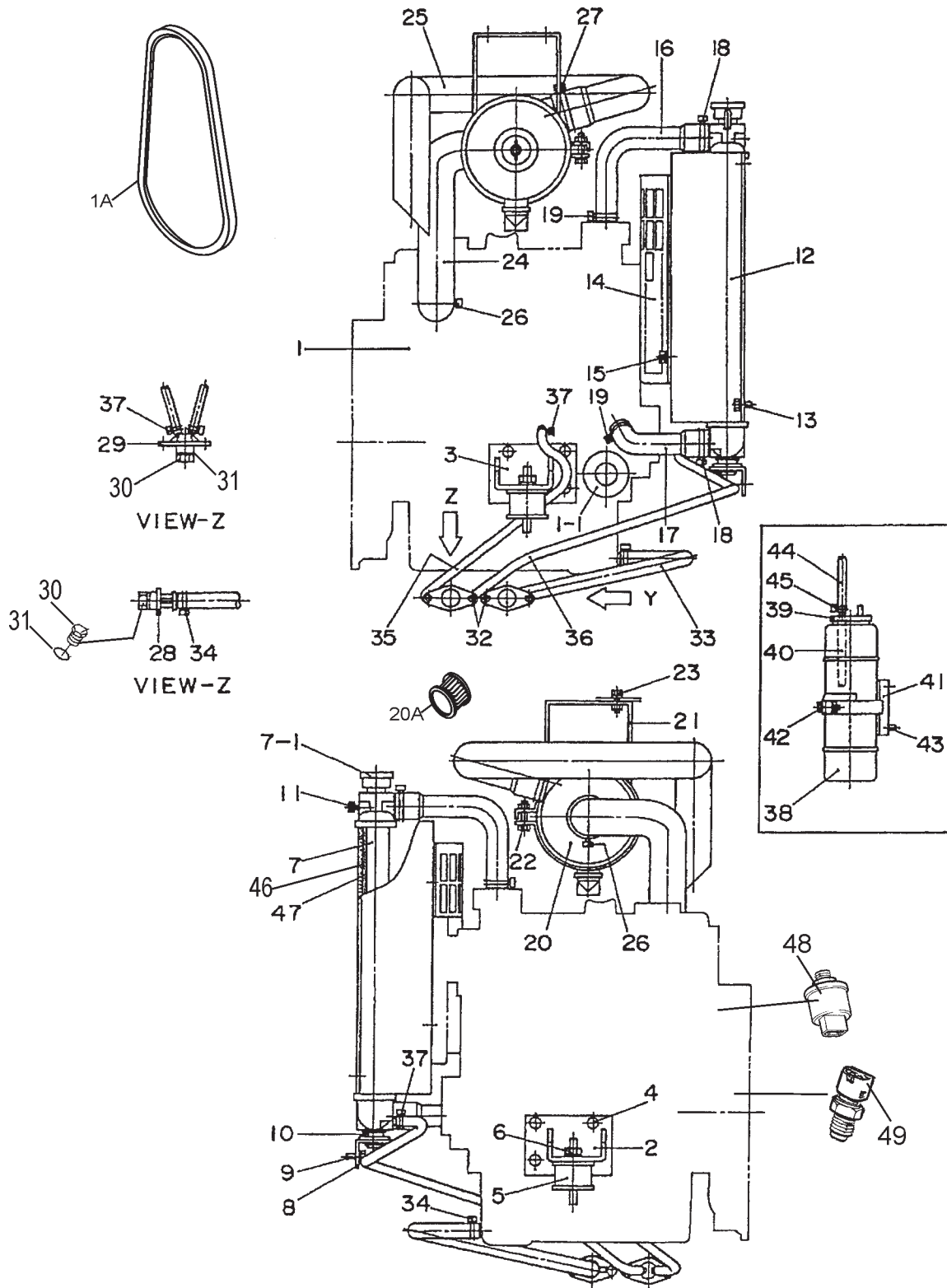
TLG - 12SPX4 — CONTROL PANEL ASSY.

CONTROL PANEL ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
38	B0354400003	THROTTLE CABLE	1	
39	3032143004	SPRING	1	
40	0601812598	RECEPTACLE, 5-20R 120V 20A	1	
41	0601811031	RECEPTACLE, L5-30R 125V 30A	1	
42	0601811033	RECEPTACLE, L6-30R 250V 30A	1	
43	0601812565	RECEPTACLE, CS6369125/250A 50A	1	
44	0027104012	MACHINE SCREW	8	
44A	0207004000	HEX NUT	8	
45	0601815109	GROUND TERMINAL	1	

TLG - 12SPX4 — ENGINE AND RADIATOR ASSY.

ENGINE & RADIATOR ASSY.



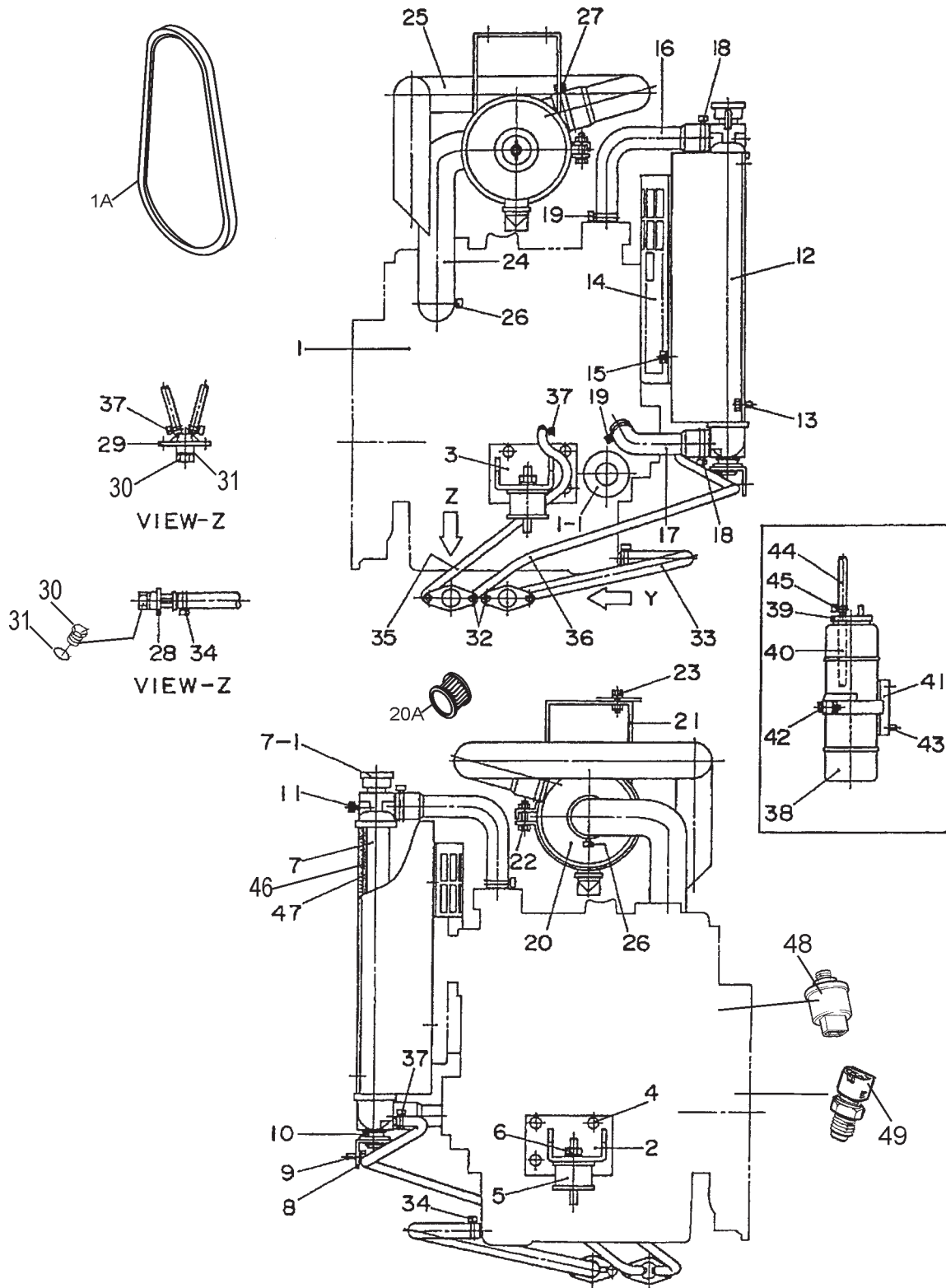
TLG - 12SPX4 — ENGINE AND RADIATOR ASSY.

ENGINE & RADIATOR ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	B0924200144	ENGINE, KUBOTA D902	1	
1A	1747297011	FAN BELT	1	REPLACES P/N 0602011470
1-1	1585332435	CARTRIDGE, OIL FILTER	1	REPLACES P/N 0602041273
2	B0303202004	ENGINE FOOT	1	
3	B0303201904	ENGINE FOOT	1	
4	0341110025	HEX HEAD BOLT	6	
5	B9310600104	RUBBER SUSPENSION	2	
6	0207010000	HEX NUT	2	
7	0602012779	RADIATOR	1	
7-1	0602011079	CAP, RADIATOR	1	
8	B0310101804	BRACKET, RADIATOR	1	
9	0016906016	HEX HEAD BOLT	3	
10	D6312600304	RUBBER MOUNT	2	
11	0016906020	HEX HEAD BOLT	2	
12	B0310300404	FAN SHROUD	1	
13	0016906016	HEX HEAD BOLT	4	
14	B0310200203	FAN GUARD	1	
15	0016906016	HEX HEAD BOLT	3	
16	B0310502103	RADIATOR HOSE, UPPER	1	
17	B0310502203	RADIATOR HOSE, LOWER	1	
18	0605515112	HOSE BAND	2	
19	0605515003	HOSE BAND	2	
20	0602046268	AIR CLEANER	1	
20A	0602046335	ELEMENT, AIR CLEANER	1	
21	B0373200404	BAND, AIR CLEANER	1	
22	0016908030	HEX HEAD BOLT	1	
23	0016908020	HEX HEAD BOLT	2	
24	B0373101003	HOSE, AIR CLEANER	1	
25	B0373100903	HOSE, AIR CLEANER	1	
26	0605515006	HOSE BAND	1	
27	0605515001	HOSE BAND	1	
28	1502025103	DRAIN JOINT, OIL	1	
29	1622014103	DRAIN JOINT, WATER	1	
30	0802011104	PLUG	2	
31	0150000018	O-RING	2	
32	0016906016	HEX HEAD BOLT	4	
33	8705517003	DRAIN HOSE	1	
34	0605515073	HOSE BAND	2	
35	0199900350	DRAIN HOSE	1	
36	0199900720	DRAIN HOSE	1	
37	0605515094	HOSE BAND	4	
38	0802081403	RESERVE TANK	1	
39	0802081104	CAP, RESERVE TANK	1	
40	0199100215	HOSE	1	
41	8702082004	BRACKET, RESERVE TANK	1	

TLG - 12SPX4 — ENGINE AND RADIATOR ASSY.

ENGINE & RADIATOR ASSY.



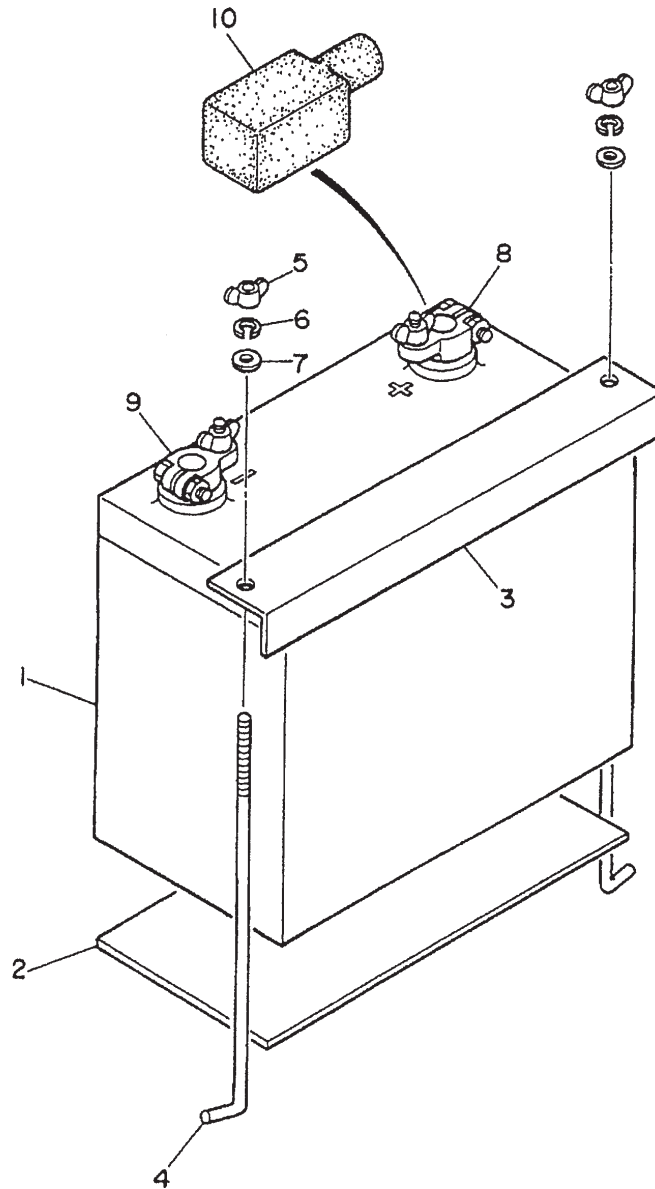
TLG - 12SPX4 — ENGINE AND RADIATOR ASSY.

ENGINE & RADIATOR ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
42	0016906025	HEX HEAD BOLT	1	
43	0016906016	HEX HEAD BOLT	2	
44	0193600800	HOSE	1	
45	0605515094	HOSE BAND	2	
46	0314900350	RUBBER SEAL	2	
47	0314900430	RUBBER SEAL	2	
48	1584139010	SWITCH, OIL	1	
49	0314900430	SWITCH, THERMOMETER	1	

TLG - 12SPX4 — BATTERY ASSY.

BATTERY ASSY.

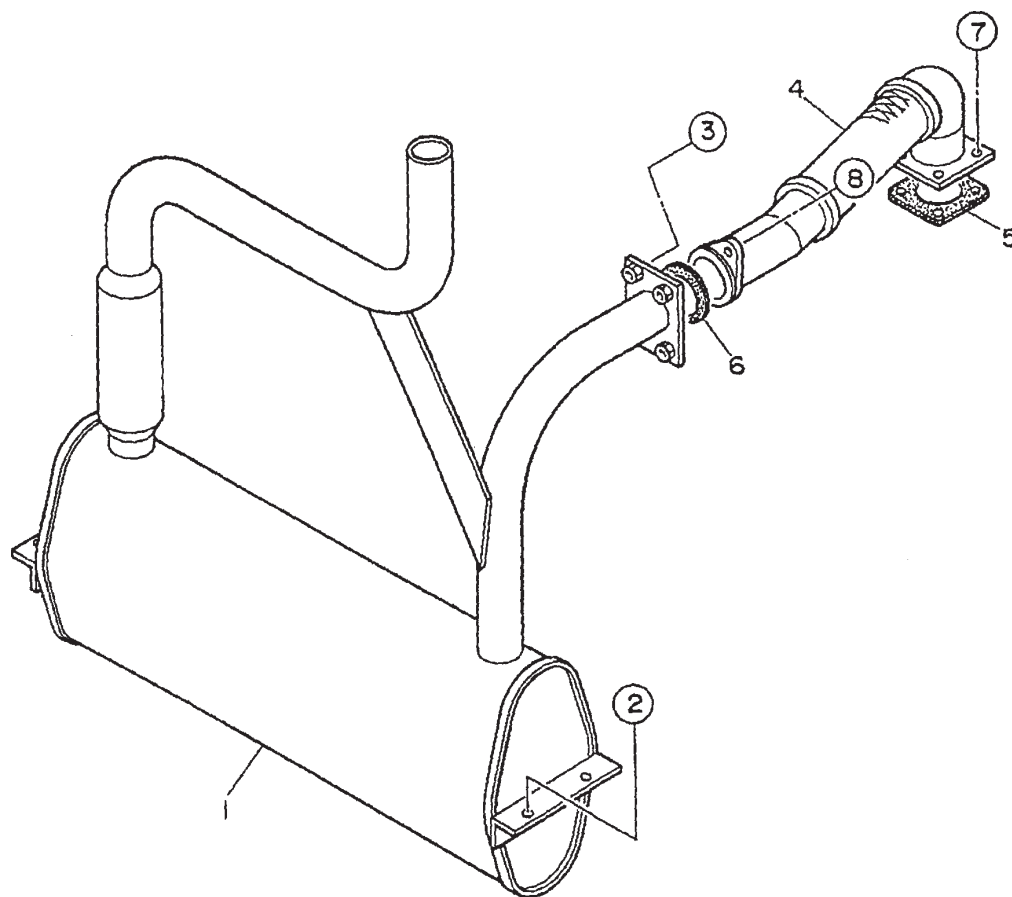


BATTERY ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0165105524	BATTERY	1	
2	8722251004	BATTERY SHEET	1	
3	7552253004	BATTERY BAND	1	
4	7872251004	BATTERY BOLT	2	
5	0037806000	WING NUT	2	
6	0040006000	SPRING WASHER	2	
7	0041606000	PLAIN WASHER	2	
8	0602220312	TERMINAL ASSY., NO. 15L(+)	1	
9	0602220313	TERMINAL ASSY., NO. 15L(-)	1	
10	0602220600	TERMINAL CAP	1	

TLG - 12SPX4 — MUFFLER ASSY.

MUFFLER ASSY.



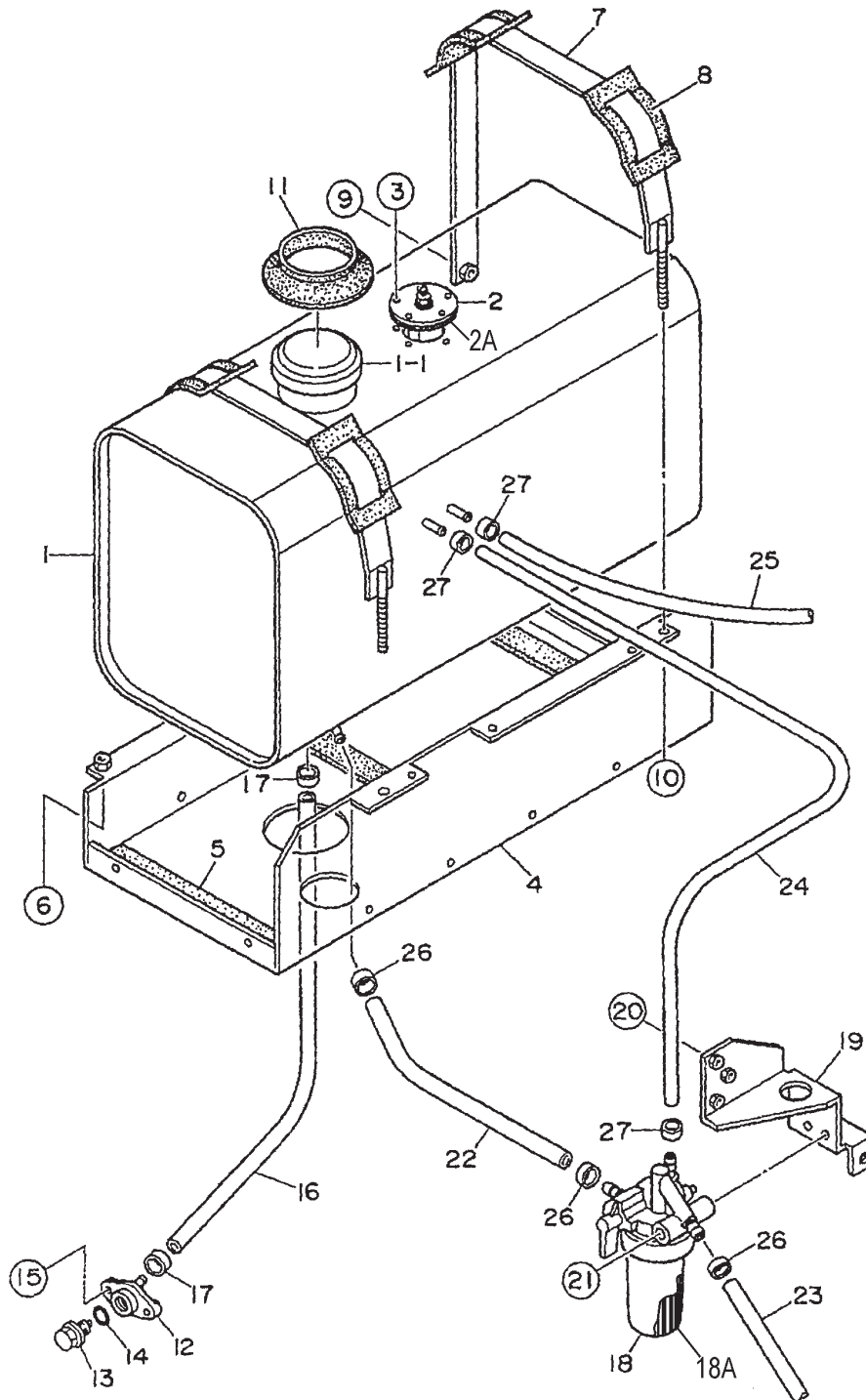
TLG - 12SPX4 — MUFFLER ASSY.

MUFFLER ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	B0331000503	MUFFLER	1	
2	0016908020	HEX HEAD BOLT	4	
3	0016908020	HEX HEAD BOLT	2	
4	B0333002303	EXHAUST PIPE	1	
5	1526312371	GASKET	1	REPLACES P/N 0602320153
6	D9304000004	GASKET	6	
7	0207008000	HEX NUT	4	
8	0016908030	HEX HEAD BOLT	2	

TLG - 12SPX4 — FUEL TANK ASSY.

FUEL TANK ASSY.



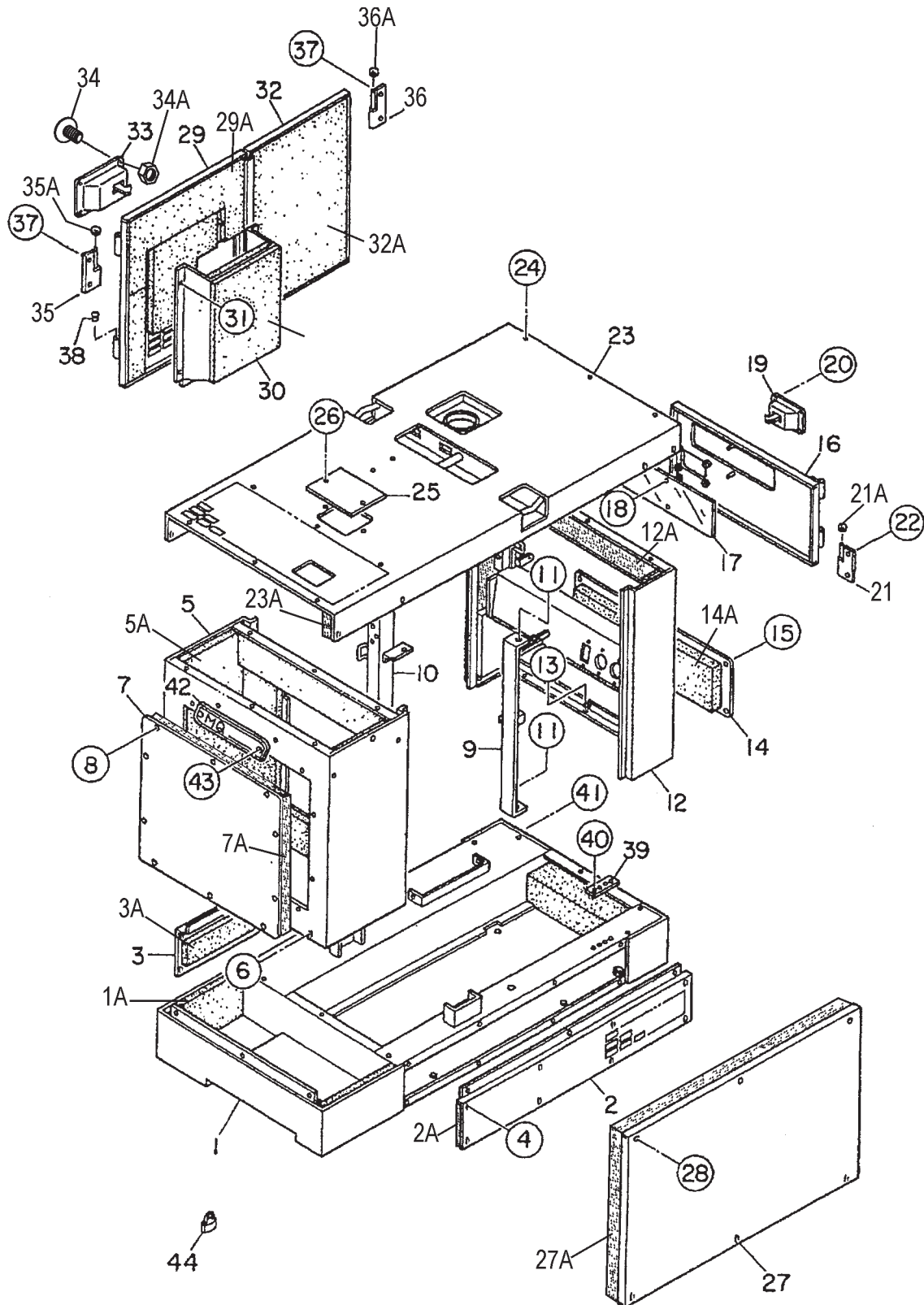
TLG - 12SPX4 — FUEL TANK ASSY.

FUEL TANK ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	B0363000103	FUEL TANK	1	
1-1	A9924800024	CAP & FILTER, FUEL TANK	1	
2	E2924300214	SENDER, FUEL GAUGE	1	
2A	E1924300184	GASKET	1	
3	0022905015	MACHINE SCREW	5	
4	B0483000303	BRACKET, FUEL TANK	1	
5	0222100260	TANK SHEET	3	
6	0016908020	HEX HEAD BOLT	4	
7	B0364200104	TANK BOARD	2	
8	0805003414	PAD, TANK BAND	4	
9	0016908020	HEX HEAD BOLT	2	
10	0207308000	HEX NUT	2	
11	B9312400004	RUBBER SEAL	1	
12	7812014003	DRAIN JOINT	1	
13	0802011104	PLUG	1	
14	0150000018	O-RING	1	
15	0016906016	HEX HEAD BOLT	2	
16	0199900930	DRAIN HOSE	1	
17	0605515094	HOSE BAND	1	
18	1553143012	FUEL FILTER	1	REPLACES P/N 0602042460
18A	1523143563	ELEMENT, FUEL FILTER	1	REPLACES P/N 0602042171
19	B0366700504	BRACKET, FUEL FILTER	1	
20	0016906020	HEX HEAD BOLT	3	
21	0016908065	HEX HEAD BOLT	1	
22	0966180160	SUCTION HOSE	1	REPLACES P/N 0605613132
23	0966180300	SUCTION HOSE	1	REPLACES P/N 0605513152
24	0966140320	RETURN HOSE	1	REPLACES P/N 0605514101
25	0966140320	RETURN HOSE	1	REPLACES P/N 0605514101
26	1430142753	HOSE BAND	4	REPLACES P/N 0605515179
27	1497142751	HOSE BAND	4	REPLACES P/N 0605515072

TLG - 12SPX4 — ENCLOSURE ASSY.

ENCLOSURE ASSY.



TLG - 12SPX4 — ENCLOSURE ASSY.

ENCLOSURE ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	B0413001302	BASE	1	
1A	B0493000703	LINING	1	
2	B0414300103	SPLASHER PANEL	1	
2A	B0497000004	LINING	1	(N)
3	B0414300003	SPLASHER PANEL	1	
3A	B0497000004	LINING	1	(M)
4	0016906016	HEX HEAD BOLT	16	
5	B0423001002	FRONT FRAME	1	
5A	B0493102603	LINING	1	
6	0016908020	HEX HEAD BOLT	5	
7	B0424200504	COVER, FRONT FRAME	1	
8	0016906016	HEX HEAD BOLT	10	
9	B0433300603	HANGER	1	
10	B0433300503	HANGER	1	
11	0016914030	HEX HEAD BOLT	4	
12	B0443000702	REAR FRAME	1	
12A	B0493301604	LINING	1	
13	0016908020	HEX HEAD BOLT	5	
14	B0444300904	COVER, REAR FRAME	1	
14A	B0494300304	LINING	1	
15	0016908020	HEX HEAD BOLT	6	
16	B0443200003	DOOR, REAR FRAME	1	
17	B0445600304	WINDOW PLATE	1	
18	0207006000	HEX NUT	2	
19	0605010230	DOOR HANDLE	1	
20	0021805010	MACHINE SCREW	4	
21	0810015104	HINGE	2	
22	0016906016	HEX HEAD BOLT	4	
23	B0463001202	ROOF PANEL	1	
23A	B0493502603	LINING	1	
24	0016908020	HEX HEAD BOLT	17	
25	8452023004	COVER	1	
26	0016908020	HEX HEAD BOLT	2	
27	B0453100603	SIDE PANEL	1	
27A	B0493404004	LINING	1	
28	0016908035	HEX HEAD BOLT	6	
29	B0453001703	SIDE DOOR	1	
29A	B0493403904	LINING	1	
30	B0453300704	DUCT	1	
30A	B0493404304	LINING	1	
31	0207006000	HEX NUT	4	
32	B0453001803	SIDE DOOR	1	
32A	B0493404204	LINING	1	
33	B9114000002	DOOR HANDLE	1	

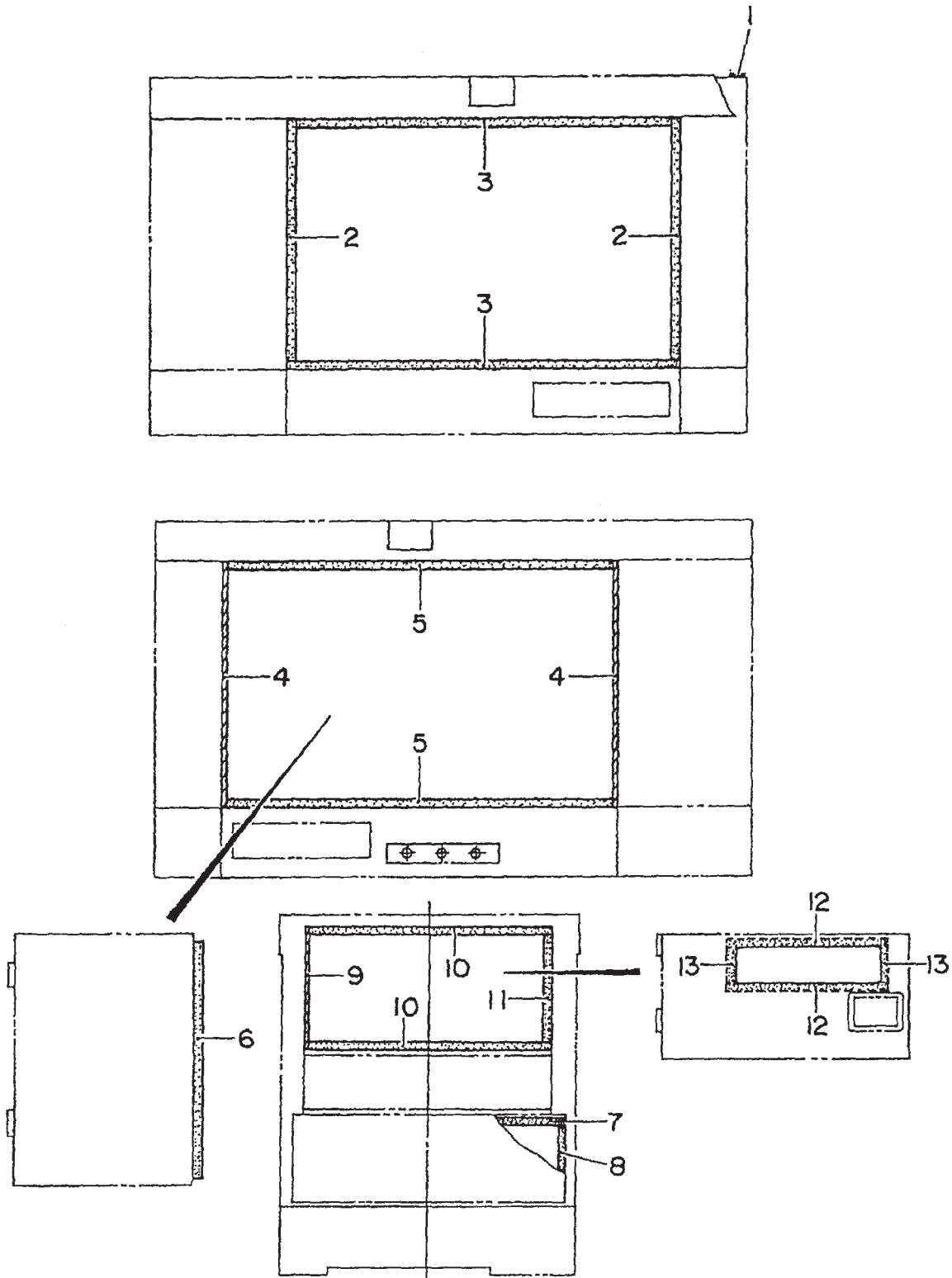
TLG - 12SPX4 — ENCLOSURE ASSY.

ENCLOSURE ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
34	0021806016	MACHINE SCREW	4	
34A	0030006000	HEX NUT	4	
35	0845047204	HINGE	2	
35A	0845045004	WASHER	2	
36	0845047104	HINGE	2	
36A	0845045004	WASHER	2	
37	0016908020	HEX HEAD BOLT	8	
38	0845031504	CAP	4	
39	8511864604	PLATE	1	
40	0016906016	HEX HEAD BOLT	4	
41	0016908020	HEX HEAD BOLT	1	
42	0600500090	EMBLEM	1	
43	0021106016	MACHINE SCREW	2	
44	0601850541	LOCK	2	

TLG - 12SPX4 — RUBBER SEALS ASSY.

RUBBER SEALS ASSY.



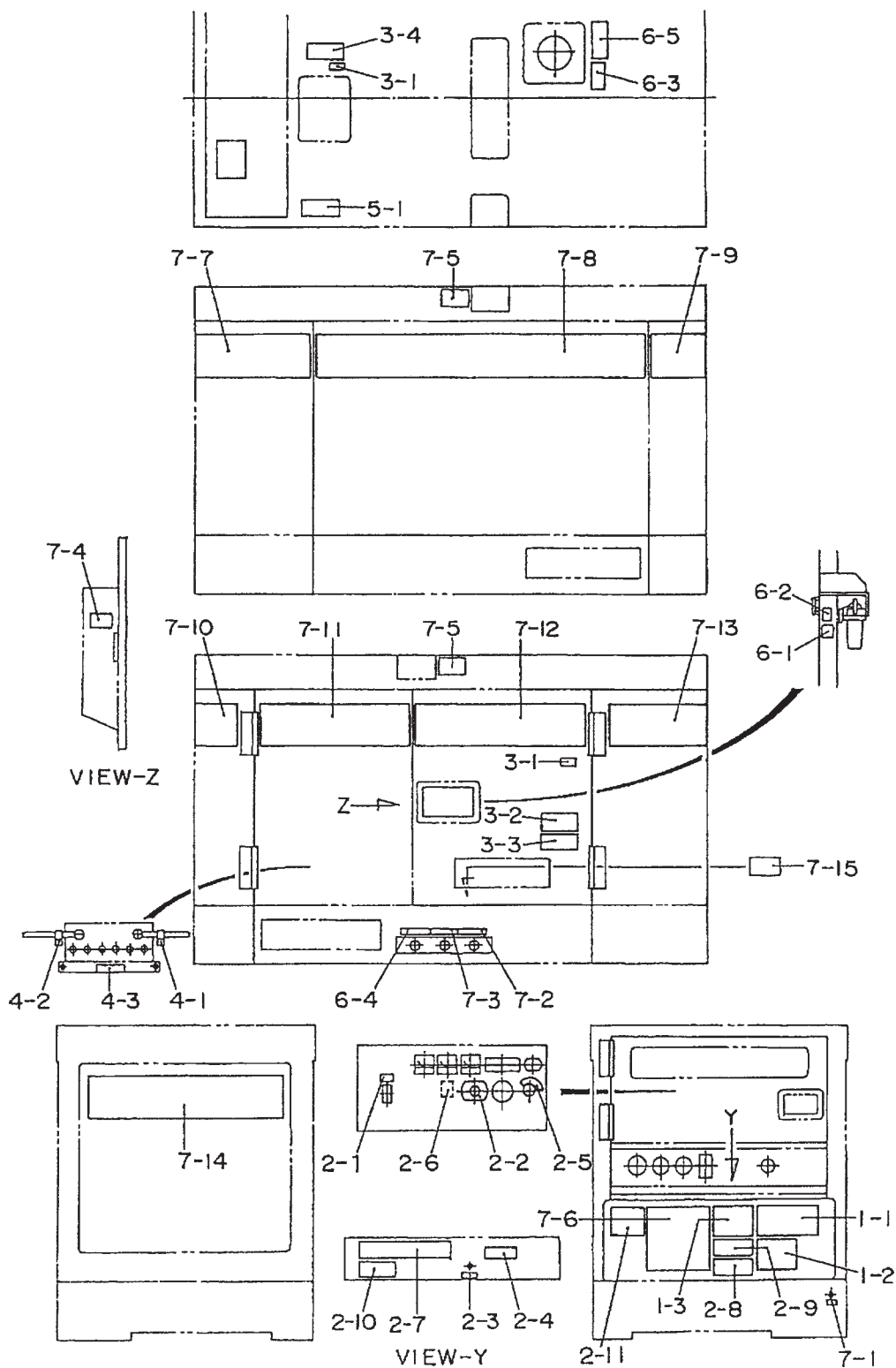
TLG - 12SPX4 — RUBBER SEALS ASSY.

RUBBER SEALS ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1	0314900690	RUBBER SEAL	1	
2	0314900560	RUBBER SEAL	2	
3	0314900920	RUBBER SEAL	2	
4	0229400590	RUBBER SEAL	2	
5	0229400900	RUBBER SEAL	2	
6	0229400550	RUBBER SEAL	1	
7	0314900635	RUBBER SEAL	2	
8	0314900150	RUBBER SEAL	2	
9	0229400290	RUBBER SEAL	1	
10	0229400585	RUBBER SEAL	2	
11	0229400250	RUBBER SEAL	1	
12	0227500380	RUBBER SEAL	2	
13	0227500080	RUBBER SEAL	2	

TLG - 12SPX4 — NAME PLATE ASSY.

NAME PLATE ASSY.



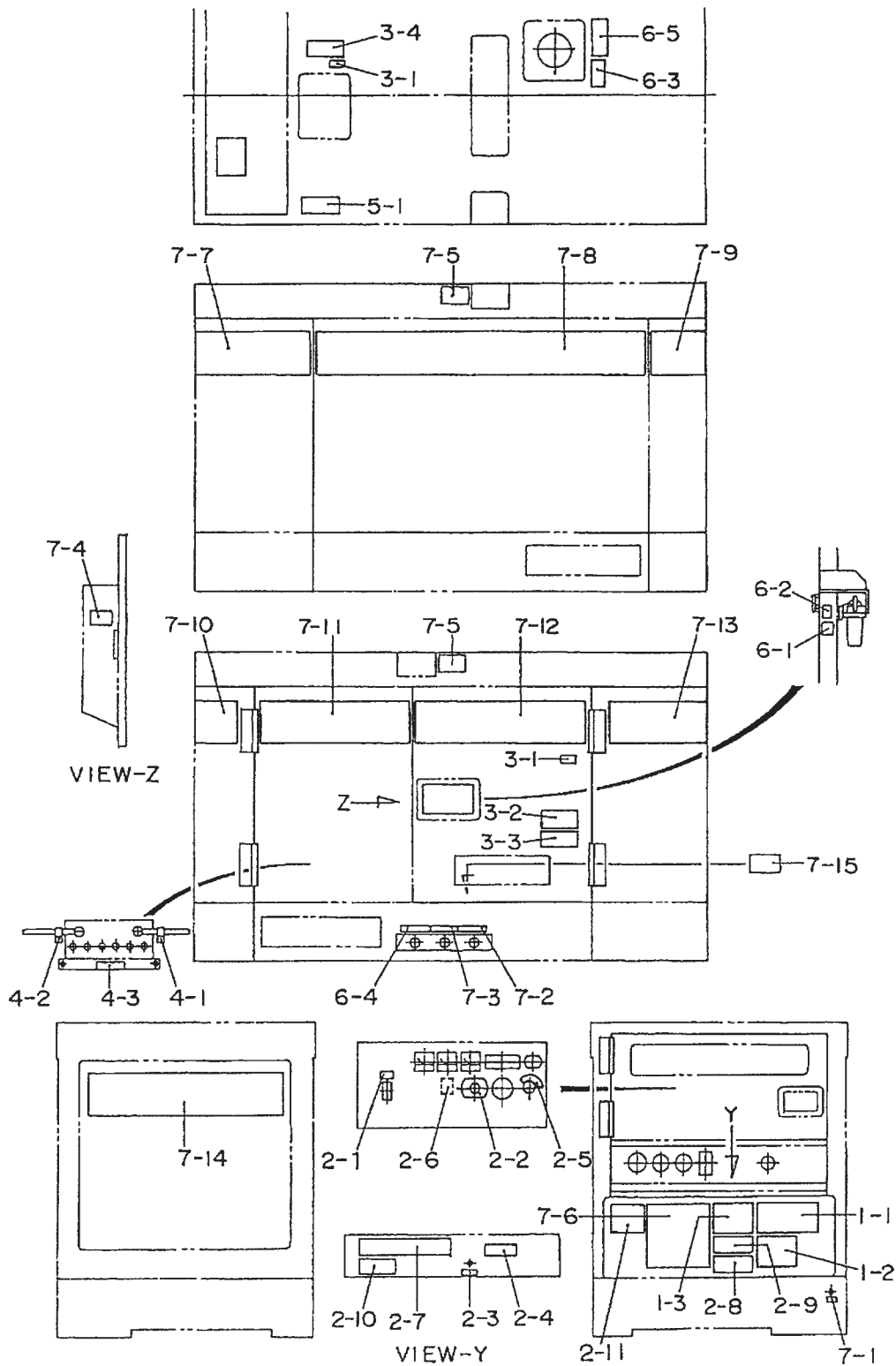
TLG - 12SPX4 — NAME PLATE ASSY.

NAME PLATE ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
1-1	7440611013	DECAL : OPERATING PROCEDURE	1	S-1742B
1-2	6390671104	DECAL : IMPORTANT " CHECK DAILY "	1	S-2377
1-3	B9521100404	DECAL : SAFETY INSTRUCTIONS	1	B92110040
CONTROL PANEL GROUP				
2-1	0840624504	DECAL : CIRCUIT BREAKER	1	S-3031
2-2	7670623004	DECAL : VOLTAGE REGULATOR	1	S-3737
2-3	7670624004	DECAL : GROUND	1	S-3821
2-4	7670422004	DECAL : SPEED CONTROL HANDLE	1	S-3822
2-5	7560615004	DECAL : STARTER SWITCH	1	S-4547
2-6	8700625504	DECAL : FUSE BOX	1	S-4936
2-7	B0550000103	DECAL : OUTPUT TERMINAL	1	B05000010
2-8	B9511100304	DECAL : CAUTION INDOOR WIRING	1	B91110030
2-9	B9511100404	DECAL : CAUTION ELECTRIC LEAKAGE	1	B91110040
2-10	B9531100504	DECAL : DANGER HIGH VOLTAGE	1	B93110050
2-11	A9504000014	DECAL : DANGER INDOOR EXHAUST GAS	1	A90400001
ENGINE & RADIATOR GROUP				
3-1	6360610304	DECAL : WATER	2	S-1880
3-2	B9504000304	DECAL : CAUTION HIGH TEMPERATURE	1	B90400030
3-3	B9504000404	DECAL : WARNING MOVING PARTS	1	B90400040
3-4	B9504100104	DECAL : WARNING HOT COOLANT	1	B90410010
BATTERY GROUP				
4-1	0800689404	DECAL : +	1	S-2090
4-2	0800689504	DECAL : -	1	S-2091
4-3	0820650604	DECAL : DANGER	1	
MUFFLER GROUP				
5-1	B9504200004	DECAL : WARNING DANGEROUS GAS	1	B90420000
FUEL TANK GROUP				
6-1	1630610404	DECAL : CAUTION FUEL FILTER	1	S-1406
6-2	1630680104	DECAL : FUEL COCK	1	S-1407
6-3	B9504501204	DECAL : DIESEL FUEL	1	B90450120
6-4	7810680104	DECAL : FUEL DRAIN	1	S-3060
6-5	B9504500004	DECAL : WARNING	1	B90450000
BONNET GROUP, ETC.				
7-1	0800628504	DECAL : GROUND	1	S-1123
7-2	1630645004	DECAL : OIL DRAIN	1	S-1403
7-3	1630647004	DECAL : COOLANT DRAIN	1	S-1404
7-4	1630610504	DECAL : CAUTION	1	S-1409
7-5	1320621504	DECAL : SUPPORT HOOK	2	S-2257
7-6	0840625902	DECAL : MQ	1	S-3057

TLG - 12SPX4 — NAME PLATE ASSY.

NAME PLATE ASSY.



TLG - 12SPX4 — NAME PLATE ASSY.

NAME PLATE ASSY.

<u>NO.</u>	<u>PART NO.</u>	<u>PART NAME</u>	<u>QTY.</u>	<u>REMARKS</u>
7-7	B0560100004	STRIPE	1	B06010000
7-8	B0560100604	STRIPE	1	B06010060
7-9	B0560100204	STRIPE	1	B06010020
7-10	B0560100304	STRIPE	1	B06010030
7-11	B0560100504	STRIPE	1	B06010050
7-12	B0560100404	STRIPE	1	B06010040
7-13	B0560100104	STRIPE	1	B06010010
7-14	B0560100703	STRIPE	1	B06010070
7-15	B9505000304	DECAL : CAUTION OIL LEVEL GAUGE	1	B90500030

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

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

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

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