

# GENERAC®

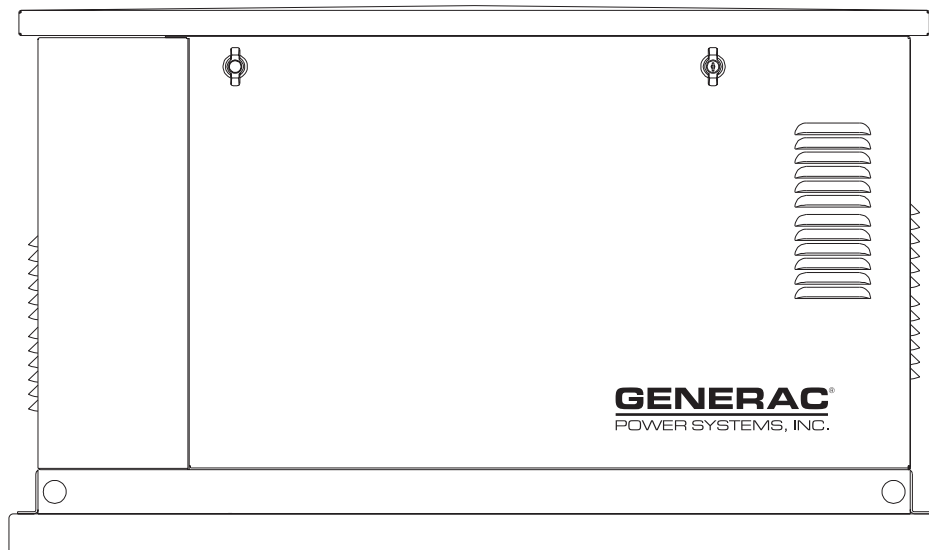
POWER SYSTEMS, INC.

## Installation and Owner's Manual

**Air-cooled Automatic  
Standby Generators**

**Model:**

**05176-0 (13 kW NG, 15 kW LP)**



**\*This manual should remain with the unit.\***



**Not intended for use as Primary Power in place of utility  
or in life-support applications.**



**—▲ DANGER ▲—**

**DEADLY EXHAUST FUMES. OUTDOOR INSTALLATION ONLY!!**

## INTRODUCTION

Thank you for purchasing this model by Generac Power Systems Inc.. This model is a compact, high performance, air-cooled, engine-driven generator designed to automatically supply electrical power to operate critical loads during a utility power failure.

This unit is factory installed in an all-weather, metal enclosure that is intended exclusively for outdoor installation. This generator will operate using either vapor withdrawn liquid propane (LP) or natural gas (NG).

### ◆ READ THIS MANUAL THOROUGHLY

If any portion of this manual is not understood, contact the nearest Authorized Dealer for starting, operating and servicing procedures.

Throughout this publication, and on tags and decals affixed to the generator, DANGER, WARNING, CAUTION and NOTE blocks are used to alert personnel to special instructions about a particular operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. **Their definitions are as follows:**



**After this heading, read instructions that, if not strictly complied with, will result in serious personal injury, including death, in addition to property damage.**



**After this heading, read instructions that, if not strictly complied with, may result in serious personal injury or property damage.**




**After this heading, read instructions that, if not strictly complied with, could result in damage to equipment and/or property.**

#### NOTE:

**After this heading, read explanatory statements that require special emphasis.**

These safety warnings cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the service are essential to preventing accidents.

Four commonly used safety symbols accompany the DANGER, WARNING and CAUTION blocks. The type of information each indicates is as follows:

 This symbol points out important safety information that, if not followed, could endanger personal safety and/or property of others.

 This symbol points out potential explosion hazard.

 This symbol points out potential fire hazard.

 This symbol points out potential electrical shock hazard.

The operator is responsible for proper and safe use of the equipment. The manufacturer strongly recommends that the operator read this *Owner's Manual* and thoroughly understand all instructions before using this equipment. The manufacturer also strongly recommends instructing other users to properly start and operate the unit. This prepares them if they need to operate the equipment in an emergency.

### ◆ CONTENTS

This manual contains pertinent owner's information, including warranty, electrical diagrams, exploded views and lists of repair parts, for model:

- 05176-0 – 13 kW NG, 15 kW LP, V-twin GT-990 Engine

### ◆ OPERATION AND MAINTENANCE

It is the operator's responsibility to perform all safety checks, to make sure that all maintenance for safe operation is performed promptly, and to have the equipment checked periodically by an Authorized Dealer. Normal maintenance service and replacement of parts are the responsibility of the owner/operator and, as such, are not considered defects in materials or workmanship within the terms of the warranty. Individual operating habits and usage contribute to the need for maintenance service.

Proper maintenance and care of the generator ensures a minimum number of problems and keep operating expenses at a minimum. See the Authorized Dealer for service aids and accessories.

### ◆ HOW TO OBTAIN SERVICE

When the generator requires servicing or repairs, simply contact an Authorized Dealer for assistance. Service technicians are factory-trained and are capable of handling all service needs.

When contacting an Authorized Dealer about parts and service, always supply the complete model number and serial number of the unit as given on its data decal, which is located on the generator. See "The Generator" section for decal location.

**Model No.** \_\_\_\_\_ **Serial No.** \_\_\_\_\_

## AUTHORIZED DEALER LOCATION

To locate the nearest AUTHORIZED  
DEALER, please call this number:

**1-800-333-1322**

or locate us on the web at

**www.generac.com**

**Introduction .....Inside Front Cover**

Read This Manual Thoroughly ..... IFC  
Contents..... IFC  
Operation and Maintenance ..... IFC  
How to Obtain Service..... IFC  
Authorized Dealer Locator Number ..... IFC

**Safety Rules .....2**

Standards Index..... 3

**Section 1 – General Information .....4**

1.1 Unpacking/Inspection ..... 4  
1.2 Protection Systems ..... 4  
1.3 System Set LED ..... 4  
1.4 The Generator ..... 5  
1.5 Specifications ..... 6  
    1.5.1 Generator ..... 6  
    1.5.2 Engine ..... 6  
1.6 Fuel Requirements and Recommendations ... 6  
1.7 Fuel Consumption ..... 6  
1.8 Reconfiguring the Fuel System ..... 6

**Section 2 – Installation .....7**

2.1 Installation ..... 7  
    2.1.1 Remote Monitoring Connections ..... 7  
    2.1.2 Roof Open Alarm ..... 8  
    2.1.3 Transfer Switch Connection ..... 8  
2.2 Battery Installation ..... 9  
2.3 The Battery ..... 10

**Section 3 – Post Installation Start-up and Adjustments .....10**

3.1 Before Initial Start-up..... 10  
3.2 Check Transfer Switch Operation ..... 10  
3.3 Electrical Checks ..... 10  
3.4 Generator Tests Under Load ..... 11  
3.5 Checking Automatic Operation..... 12  
3.6 Adjusting the Regulator (Natural Gas Only).. 12  
3.7 Engine Governor Adjustment ..... 13  
    3.7.1 Additional Corrosion Protection..... 13  
3.8 Voltage Regulator Adjustment..... 13

**Section 4 – Operation .....14**

4.1 Using the Auto/Off/Manual Switch ..... 14  
    4.1.1 “Auto” Position..... 14  
    4.1.2 “Off” Position..... 14  
    4.1.3 “Manual” Position ..... 14

4.2 Automatic Transfer Operation..... 14  
4.3 Sequence of Automatic Operation ..... 14  
4.4 Manual Operation ..... 15  
    4.4.1 Close to Normal Source Side .....15  
    4.4.2 Close to Emergency Source Side .....16  
    4.4.3 Return to Normal Source Side.....16  
4.5 Voltage Checks ..... 16  
4.6 Generator Tests Under Load ..... 16  
4.7 Setting the Exercise Timer ..... 17  
4.8 Protection Systems..... 17  
    4.8.1 Low Oil Pressure Switch ..... 17  
    4.8.2 High Temperature Switch..... 17  
    4.8.3 Overcrank ..... 17  
    4.8.4 Overspeed ..... 18

**Section 5 – Maintenance.....18**

5.1 Fuse..... 18  
5.2 Checking the Engine Oil Level..... 18  
5.3 Changing the Engine Oil..... 18  
    5.3.1 Engine Oil Recommendations ..... 18  
    5.3.2 Oil Change Procedure..... 18  
5.4 Changing the Oil Filter ..... 19  
5.5 Changing the Engine Air Cleaner..... 19  
5.6 Spark Plug(s) ..... 19  
5.7 Battery Maintenance..... 20  
5.8 Adjusting Valve Clearance ..... 20  
5.9 Cooling System ..... 21  
5.10 Attention After Submersion..... 21  
5.11 Corrosion Protection ..... 21  
5.12 Out of Service Procedure..... 21  
    5.12.1 Removal From Service..... 21  
    5.12.2 Return to Service ..... 22

**Section 6 – Troubleshooting.....27**

6.1 Troubleshooting Guide..... 27

**Section 7 – Mounting Dimensions..... 28**

**Section 8 – Electrical Data ..... 29**

**Section 9 – Exploded Views and Parts Lists..... 34**

**Section 10 – Warranty ..... 48**



**⚠ SAVE THESE INSTRUCTIONS** – The manufacturer suggests that these rules for safe operation be copied and posted near the unit's installation site. Safety should be stressed to all operators and potential operators of this equipment. **⚠**

**WARNING:**

The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

**WARNING:**

This product contains or emits chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Study these SAFETY RULES carefully before installing, operating or servicing this equipment. Become familiar with this *Owner's Manual* and with the unit. The generator can operate safely, efficiently and reliably only if it is properly installed, operated and maintained. Many accidents are caused by failing to follow simple and fundamental rules or precautions.

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all-inclusive. If using a procedure, work method or operating technique the manufacturer does not specifically recommend, ensure that it is safe for others. Also make sure the procedure, work method or operating technique utilized does not render the generator unsafe.

— **⚠ DANGER ⚠** —

**⚠** Despite the safe design of this generator, operating this equipment imprudently, neglecting its maintenance or being careless can cause possible injury or death. Permit only responsible and capable persons to operate or maintain this equipment.

**⚠** Potentially lethal voltages are generated by these machines. Ensure all steps are taken to render the machine safe before attempting to work on the generator.

**⚠** Parts of the generator are rotating and/or hot during operation. Exercise care near running generators.

— **⚠ WARNING ⚠** —

**⚠** Please read all hazards carefully!

**⚠ GENERAL HAZARDS ⚠**

- For safety reasons, the manufacturer recommends that the installation, initial start-up and maintenance of this equipment is carried out by an Authorized Dealer.
- The engine exhaust fumes contain carbon monoxide, which can be DEADLY. This dangerous gas, if breathed in sufficient concentrations, can cause unconsciousness or even death. This exhaust system must be installed properly, in strict compliance with applicable codes and standards. Following installation, do nothing that might render the system unsafe or in noncompliance with such codes and standards.
- Keep hands, feet, clothing, etc., away from drive belts, fans, and other moving or hot parts. Never remove any drive belt or fan guard while the unit is operating.
- Adequate, unobstructed flow of cooling and ventilating air is critical to correct generator operation. Do not alter the installation or permit even partial blockage of ventilation provisions, as this can seriously affect safe operation of the generator. The generator **MUST** be installed outdoors.
- When working on this equipment, remain alert at all times. Never work on the equipment when physically or mentally fatigued.
- Inspect the generator regularly, and contact the nearest Authorized Dealer for parts needing repair or replacement.
- Before performing any maintenance on the generator, disconnect its battery cables to prevent accidental start up. Disconnect the cable from the battery post indicated by a NEGATIVE, NEG or (–) first. Reconnect that cable last.
- Never use the generator or any of its parts as a step. Stepping on the unit can stress and break parts, and may result in dangerous operating conditions from leaking exhaust gases, fuel leakage, oil leakage, etc.





** ELECTRICAL HAZARDS **

- All generators covered by this manual produce dangerous electrical voltages and can cause fatal electrical shock. Utility power delivers extremely high and dangerous voltages to the transfer switch as does the standby generator when it is in operation. Avoid contact with bare wires, terminals, connections, etc., while the unit is running. Ensure all appropriate covers, guards and barriers are in place before operating the generator. If work must be done around an operating unit, stand on an insulated, dry surface to reduce shock hazard.
- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. **DANGEROUS ELECTRICAL SHOCK MAY RESULT.**
- The National Electrical Code (NEC) requires the frame and external electrically conductive parts of the generator to be connected to an approved earth ground. Local electrical codes also may require proper grounding of the generator electrical system.
- After installing this home standby electrical system, the generator may crank and start at any time without warning. When this occurs, load circuits are transferred to the STANDBY (generator) power source. To prevent possible injury if such a start and transfer occur, always set the generator's AUTO/OFF/MANUAL switch to its OFF position before working on equipment and remove the 5A and 15A fuses from the generator control panel.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. **AVOID DIRECT CONTACT WITH THE VICTIM.** Use a nonconducting implement, such as a rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and get immediate medical help.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock, or may get caught in moving components causing injury.

** FIRE HAZARDS **

- For fire safety, the generator must be installed and maintained properly. Installation always must comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state and national electrical and building codes. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established. Also, ensure that the generator is installed in accordance with the manufacturer's instructions and recommendations. Following proper installation, do nothing that might alter a safe installation and render the unit in noncompliance with the aforementioned codes, standards, laws and regulations.

- Keep a fire extinguisher near the generator at all times. Extinguishers rated "ABC" by the National Fire Protection Association are appropriate for use on the standby electric system. Keep the extinguisher properly charged and be familiar with its use. If there are any questions pertaining to fire extinguishers, consult the local fire department.

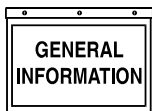
** EXPLOSION HAZARDS **

- Do not smoke around the generator. Wipe up any fuel or oil spills immediately. Ensure that no combustible materials are left in the generator compartment, or on or near the generator, as FIRE or EXPLOSION may result. Keep the area surrounding the generator clean and free from debris.
- Gaseous fluids such as natural gas and liquid propane (LP) gas are extremely EXPLOSIVE. Install the fuel supply system according to applicable fuel-gas codes. Before placing the home standby electric system into service, fuel system lines must be properly purged and leak tested according to applicable code. After installation, inspect the fuel system periodically for leaks. No leakage is permitted.

** STANDARDS INDEX**

In the absence of pertinent standards, codes, regulations and laws, the published information listed below may be used as installation guide for this equipment.

1. NFPA No. 37, STATIONARY COMBUSTION ENGINES AND GAS TURBINES, available from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
2. NFPA No. 76A, ESSENTIAL ELECTRICAL SYSTEMS FOR HEALTH CARE FACILITIES, available same as Item 1.
3. NFPA No. 54, NATIONAL FUEL GAS CODE, available same as Item 1.
4. NFPA No. 58, AMERICAN NATIONAL STANDARD FOR STORAGE AND HANDLING OF LIQUEFIED PETROLEUM GAS, available same as Item 1.
5. NFPA No. 70, NFPA HANDBOOK OF NATIONAL ELECTRIC CODE, available same as Item 1.
6. Article X, NATIONAL BUILDING CODE, available from the American Insurance Association, 85 John Street, New York, N.Y. 10038.
7. AGRICULTURAL WIRING HANDBOOK, available from the Food and Energy Council, 909 University Avenue, Columbia, MO 65201.
8. ASAE EP-3634, INSTALLATION AND MAINTENANCE OF FARM STANDBY ELECTRICAL SYSTEMS, available from the American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085.
9. NFPA No. 30, FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE, available same as Item 1.



- ⚠ Only qualified electricians or contractors should attempt such installations, which must comply strictly with applicable codes, standards and regulations.

## 1.1 UNPACKING/INSPECTION

After unpacking, carefully inspect the contents for damage.

- This standby generator set has been factory supplied with a weather protective enclosure that is intended for **outdoor installation only**.



- ⚠ If this generator is used to power electrical load circuits normally powered by a utility power source, it is required by code to install a transfer switch. The transfer switch must effectively isolate the electrical system from the utility distribution system when the generator is operating (NEC 700, 701 and 702). Failure to isolate an electrical system by such means will result in damage to the generator and also may result in injury or death to utility power workers due to backfeed of electrical energy.

If any loss or damage is noted at time of delivery, have the person(s) making the delivery note all damage on the freight bill or affix his or her signature under the consignor's memo of loss or damage.

If there is loss or damage after delivery, separate the damaged materials and contact the carrier for claim procedures.

“Concealed damage” is understood to mean damage to the contents of a package that is not in evidence at the time of delivery, but is discovered later.

## 1.2 PROTECTION SYSTEMS

Unlike an automobile engine, the generator may have to run for long periods of time with no operator present to monitor engine conditions. For that reason, the engine is equipped with the following systems that protect it against potentially damaging conditions:

1. Low Oil Pressure Sensor
2. High Temperature Sensor
3. Overcrank
4. Overspeed

There are LED readouts on the control panel to notify personnel that one of these faults has occurred. There is also a “System Set” LED that is described below.

## 1.3 SYSTEM SET LED

The “System Set” LED is lit when all of the following conditions are true:

1. The AUTO/OFF/MANUAL switch is set to the AUTO position.
2. The utility voltage being supplied to the unit is being sensed by the Control PCB. If the utility sense voltage is not connected to the unit or if it is below 168 volts AC, then the system set light will flash rapidly. This indicates that if the AUTO/OFF/MANUAL switch is placed in the Auto position, the generator will start.
3. The “Not In Auto” dip switch is set to the OFF position on the control board.
4. No alarms are present, for example, low oil pressure, high temperature, etc.

## 1.4 THE GENERATOR

Figure 1.1 – 15 kW, V-twin GT-990 Engine

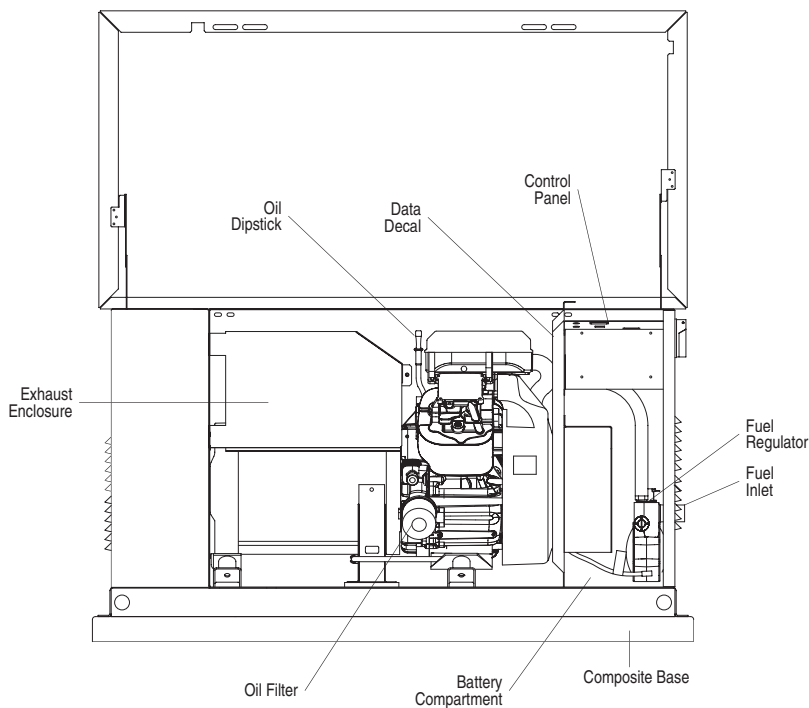
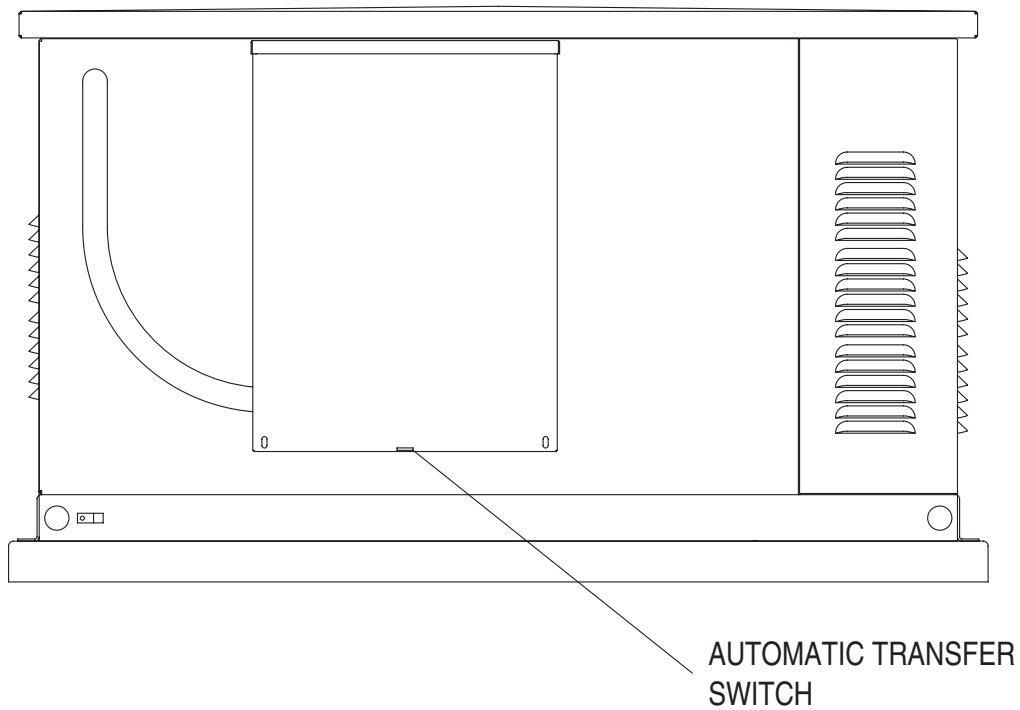


Figure 1.2 – 15 kW, V-twin GT-990 Engine Rear View



## 1.5 SPECIFICATIONS

### ◆ 1.5.1 GENERATOR

Rated Max. Continuous Power Capacity (Watts*).....	13,000 NG/15,000 LP
Rated Voltage.....	120/240
Rated Max. Continuous Load Current (Amps)	
120 Volts + .....	108.3 NG/125.0 LP
240 Volts.....	54.2 NG/62.5 LP
Main Line Circuit Breaker.....	70 Amp
Phase .....	1
Number of Rotor Poles.....	2
Rated AC Frequency.....	60 Hz
Power Factor .....	1
Recommended Air Filter .....	Part # 0C8127
Battery Requirement .....	Group 26/26R at -17.8° C ( 0° F)
	12 Volts and 525 Cold-cranking Amperes Minimum
Weight .....	640 Pounds
Output Sound Level	
@ 23 ft (7m) at full load .....	71.5 db (A)
Normal Operating Range .....	-20°F (-28.8°C)
	to 104°F (40°C)

\* Maximum wattage and current are subject to and limited by such factors as fuel Btu content, ambient temperature, altitude, engine power and condition, etc. Maximum power decreases about 3.5 percent for each 1,000 feet above sea level; and also will decrease about 1 percent for each 6° C (42° F) above 16° C (60° F).

+ Total current in two separate circuits. Current in each circuit must not exceed the value stated for 240V.

### ◆ 1.5.2 ENGINE

Type of Engine .....	GT-990
Number of Cylinders.....	2
Rated Horsepower.....	30 @ 3,600 rpm
Displacement .....	992cc
Cylinder Block .....	Aluminum w/Cast Iron Sleeve
Valve Arrangement .....	Overhead Valves
Ignition System .....	Solid-state w/Magneto
Recommended Spark Plug.....	RC12YC
Spark Plug Gap.....	0.508 mm (0.020 inch)
Compression Ratio.....	9.5:1
Starter.....	12Vdc
Oil Capacity Including Filter.....	Approx. 1.7 Qts
Recommended Oil Filter .....	Part # 070185B
Recommended Air Filter .....	Part # 0C8127
Operating RPM.....	3,600

## 1.6 FUEL REQUIREMENTS AND RECOMMENDATIONS

**With LP gas, use only the vapor withdrawal system.** This type of system uses the vapors formed above the liquid fuel in the storage tank.

The engine has been fitted with a fuel carburetion system that meets the specifications of the 1997 California Air Resources Board for tamper-proof dual fuel systems. The unit will run on natural gas or LP gas, but it has been factory set to run on natural gas. Should the primary fuel need to be changed to LP gas, the fuel system needs to be reconfigured. See "Reconfiguring the Fuel System" for instructions on reconfiguration of the fuel system.

Recommended fuels should have a Btu content of at least 1,000 Btus per cubic foot for natural gas; or at least 2,520 Btus per cubic foot for LP gas. Ask the fuel supplier for the Btu content of the fuel.

Required fuel pressure for **natural gas is five inches to seven inches water column (0.18 to 0.25 psi); and for liquid propane, 11 inches to 14 inches of water column (0.4 to 0.5 psi).**

**NOTE:**

**Any piping used to connect the generator to the fuel supply should be of adequate size to ensure the fuel pressure NEVER drops below 4 inches water column for natural gas or 10 inches water column for liquid propane for all load ranges.**

## 1.7 FUEL CONSUMPTION

Model #	Nat. Gas (*)		LP Vapor (**)	
	1/2 Load	Full Load	1/2 Load	Full Load
05176	156	220	1.58/58	2.40/88

\*Natural gas is in cubic feet per hour.

\*\*LP is in gallons per hour/cubic feet per hour.

## 1.8 RECONFIGURING THE FUEL SYSTEM

To reconfigure the fuel system from NG to LP, follow these steps:

**NOTE:**

**The primary regulator for the propane supply is NOT INCLUDED with the generator. A fuel pressure of 11 to 14 inches of water column (0.4 to 0.5 psi) to the fuel inlet of the generator MUST BE SUPPLIED.**

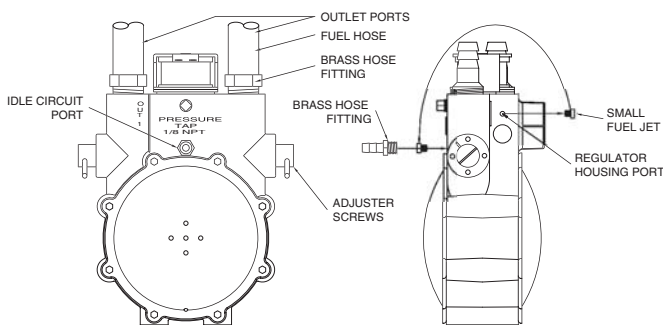
1. Turn off the gas supply. (if connected)
2. Open the roof and remove the door.
3. Remove the battery. (if installed)





4. Remove the engine air in baffle located on the left-hand side of the battery compartment. Two M6 screws are located on top of the baffle and two M6 screws are located on the inside of the baffle towards the back.
5. Remove the small hose clamp and hose from the fuel regulator. It may be necessary to pry the hose off of the brass fitting using a screwdriver to gently lift up the hose edge.
6. Remove the small brass hose fitting from the regulator casting.
7. Place the small fuel jet, thread side first, into the threaded hole originally occupied by the brass hose fitting (Figure 1.3).

Figure 1.3 - Demand Regulator



8. Using a short No. 2 Phillips screw driver, thread the small fuel jet into the regulator casting. Do not over tighten.
9. Apply thread sealant to the threads of the hose fitting and replace it into the regulator body.
10. Re-attach the small hose and hose clamp and tighten as necessary.
11. Replace the engine air in baffle using the four M6 screws.
12. Identify both brass adjustment screws on the regulator.

**NOTE:**

One adjustment screw can be accessed from the front of the unit and the second can be accessed from the back of the unit enclosure by removing the plastic hole plug. The screw can be turned with a long flat blade screwdriver.

13. To adjust the system to run on LP fuel, turn BOTH adjuster screws 1/2 TURN CLOCKWISE. The system should now be set for maximum power and best performance. **DO NOT, UNDER ANY CIRCUMSTANCES, REMOVE THE SET PINS FROM THE REGULATOR HOUSING. THIS WILL VOID THE WARRANTY.**

14. It may be necessary to make minor adjustments to the preset adjustment screw settings to achieve maximum power, particularly at higher altitudes. If experiencing problems with the unit producing maximum power, follow the procedure in "Adjusting the Fuel Regulator".

## 2.1 INSTALLATION

Install the generator set, in its protective enclosure, outdoors, where adequate cooling and ventilating air is always available. Consider these factors:

- Install the unit where air inlet and outlet openings will not become obstructed by leaves, grass, snow, etc. If prevailing winds will cause blowing or drifting snow, consider using a windbreak to protect the unit.
- Install the generator on high ground where water levels will not rise and endanger it.
- Allow sufficient room on all sides of the generator for maintenance and servicing. A good rule is to allow three feet of space on all sides.
- Where strong prevailing winds blow from one direction, face the generator air inlet openings to the prevailing winds.
- Install the generator as close as possible to the fuel supply, to reduce the length of piping.

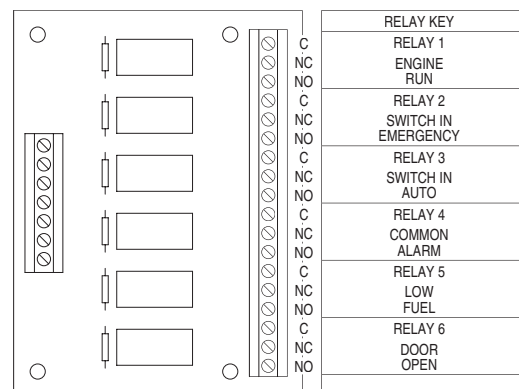
### ◆ 2.1.1 REMOTE MONITORING CONNECTIONS

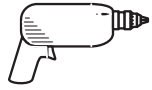
Mounted in the transfer switch is relay contact board (Figure 2.1) that can be used to remotely monitor various functions of the generator system.

The contacts are rated as shown below. Failure to follow these ratings will cause unit failure.

- Arrangement: SPCT (Form C)
- Ratings: Resistive Load, 4Amp max switching current at 30VDC; 2Amp max switching current at 125VAC
- Wire Range: 26-14Awg
- Terminal tightening torque: 5 in/lb.

Figure 2.1 — Remote Monitoring Connections





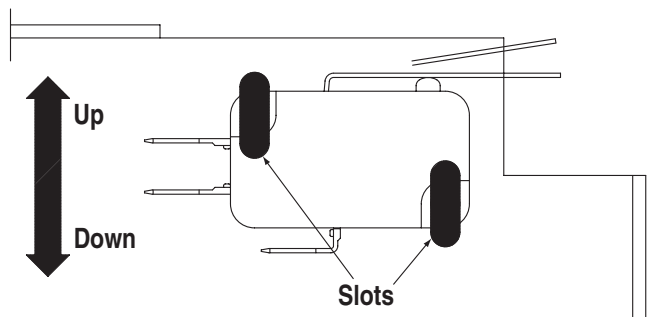
Remote monitoring functions are only available with the AUTO/OFF/MANUAL switch in the Auto or Manual position. Since the contacts are SPDT, it is possible to monitor either state of each alarm function.

- Relay 1: Engine running, normally closed.  
Engine not running, normally open
- Relay 2: Transfer Switch in Emergency, normally closed  
Transfer Switch in Utility, normally open
- Relay 3: Control panel switch in Auto, normally open  
Control panel switch in Manual or Off, normally closed
- Relay 4: The common alarm is activated by any of the following shutdown faults  
Low Oil Pressure  
High Engine Temperature  
Overspeed  
Overcrank  
Common alarm active, normally open  
No Common alarm, normally closed
- Relay 5: Spare, not used on this model
- Relay 6: Enclosure door open, normally closed  
Enclosure door closed, normally open

◆ 2.1.2 ROOF OPEN ALARM

This generator is equipped with an alarm to detect when the roof of the enclosure is open. A limit switch that is installed in the generator enclosure controls this alarm. During shipping, the generator's enclosure panels may have shifted and this limit switch may require adjustment. Simply loosen the two screws and adjust the placement of the limit switch. The arm of the limit switch should be in the depressed position when the enclosure roof is closed and the door latch is secure (see Figure 2.2).

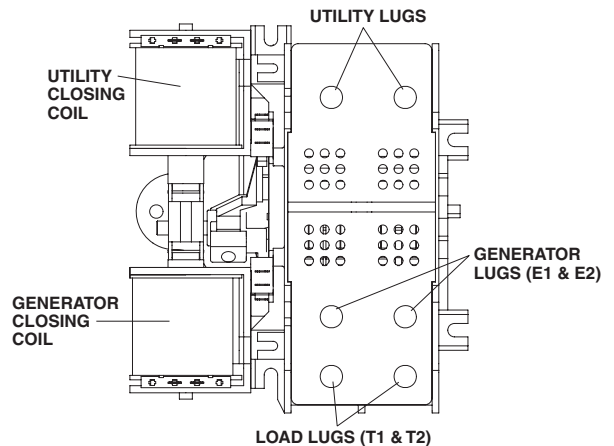
Figure 2.2 — Limit Switch



◆ 2.1.3 TRANSFER SWITCH CONNECTION

These switches (Figure 2.3) are used with a single-phase system, when the single-phase NEUTRAL line is to be connected to a Neutral Lug and is not to be switched.

Figure 2.3 — Typical 2-Pole Transfer Mechanism (200 Amp Shown)



Solderless, screw-type terminal lugs are standard.

Switch Rating	Wire Range	Conductor Tightening Torque
200A	#6-250 MCM	275 in-lbs.

Conductor sizes must be adequate to handle the maximum current to which they will be subjected to, based on the 75°C column of tables, charts, etc. used to size conductors. The installation must comply fully with all applicable codes, standards and regulations.

Before connecting wiring cables to terminals, remove any surface oxides from the cable ends with a wire brush. All power cables should enter the switch next to transfer mechanism terminals. If ALUMINUM conductors are used, apply corrosion inhibitor to conductors. Tighten terminal lugs to the torque values as noted on the decal located on the inside of the door. After tightening terminal lugs, carefully wipe away any excess corrosion inhibitor.

All power cables should enter the switch next to the transfer mechanism terminals.



⚠ Use a torque wrench to tighten the conductors, being sure not to over tighten, or damage to the switch base could occur. If not tightened enough, a loose connection would result, causing excess heat which could damage the switch base.



Connect power source load conductors to clearly marked transfer mechanism terminal lugs as follows

1. Connect UTILITY (NORMAL) power source cables to switch terminals N1, N2.
2. Connect customer LOAD leads to switch terminals T1, T2.

Conductors must be properly supported, of approved insulative qualities, protected by approved conduit, and of the correct wire gauge size in accordance with applicable codes.

Be sure to maintain proper electrical clearance between live metal parts and grounded metal. Allow at least 1/2 inch for 100-400 amp circuits.

## 2.2 BATTERY INSTALLATION



⚠ Do not dispose of the battery in a fire. The battery is capable of exploding.

⚠ A battery presents a risk of electrical shock and high short circuit current. The following precautions are to be observed when working on batteries:

- Remove watches, rings or other metal objects;
- Use tools with insulated handles;
- Wear rubber gloves and boots;
- Do not lay tools or metal parts on top of the battery; and
- Disconnect charging source prior to connecting or disconnecting battery terminals.



⚠ Do not open or mutilate the battery. Released electrolyte has been known to be harmful to the skin and eyes, and to be toxic.

⚠ The electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive.

The following procedures are to be observed:

- Wear full eye protection and protective clothing;
- Where electrolyte contacts the skin, wash it off immediately with water;
- Where electrolyte contacts the eyes, immediately flush thoroughly with water and seek medical attention; and
- Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of 1 pound (500 grams) bicarbonate of soda to 1 gallon (4 liters) or water. The bicarbonate of soda solution is to be added until the evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.

⚠ Lead-acid batteries present a risk of fire because they generate hydrogen gas. The following procedures are to be followed:

- DO NOT SMOKE when near the battery;
- DO NOT cause flame or spark in battery area; and
- Discharge static electricity from body before touching the battery by first touching a grounded metal surface.

⚠ Be sure the AUTO/OFF/MANUAL switch is set to the OFF position before connecting the battery cables. If the switch is set to AUTO or MANUAL, the generator can crank and start as soon as the battery cables are connected.

⚠ Be sure the utility power supply is turned off, or sparking may occur at the battery posts as the cables are attached and cause an explosion.

Fill the battery with the proper electrolyte fluid if necessary and have the battery fully charged before installing it.

Before installing and connecting the battery, complete the following steps:

1. Set the generator's AUTO/OFF/MANUAL switch to OFF.
2. Turn off utility power supply to the transfer switch.
3. Remove the 5 amp fuse from the generator control panel.



⚠ If the AUTO/OFF/MANUAL switch is not set to its OFF position, the generator can crank and start as soon as the battery cables are connected. If the utility power supply is not turned off, sparking can occur at the battery posts and cause an explosion.

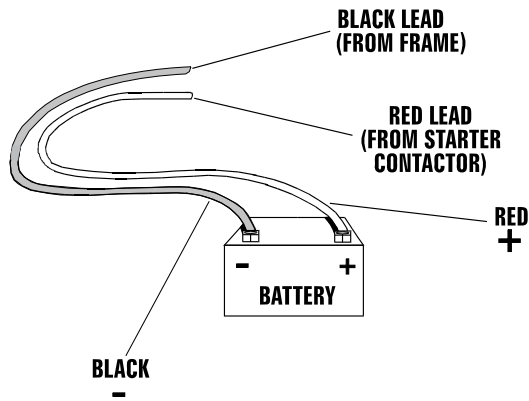
Battery cables were factory connected at the generator (Figure 2.4). Connect cables to battery posts as follows:

4. Connect the red battery cable (from starter contactor) to the battery post indicated by a positive, POS or (+).
5. Connect the black battery cable (from frame ground) to the battery post indicated by a negative, NEG or (—).
6. Replace the 5 amp fuse in the generator control panel.

### NOTE:

**Damage will result if battery connections are made in reverse.**

Figure 2.4 – Battery Cable Connections



**NOTE:**

The generator is equipped with a battery trickle charger that is active when the unit is set up for automatic operation. With the battery installed and utility power source voltage available to the transfer switch, the battery receives a trickle charge while the engine is not running, to prevent self-discharge. The trickle charger is designed to help extend the life of the battery by maintaining the battery when the unit is not running. The trickle charge feature cannot be used to recharge a discharged battery.

### 2.3 THE BATTERY

Servicing of the battery is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When replacing the battery, use the following type of battery: Group 26/26R 12-volt battery with a rating of 525 cold-cranking amps minimum at -17.8° C (0° F) minimum. When using a maintenance-free battery, it is not necessary to check the specific gravity or electrolyte level. Have these procedures performed at the intervals specified in the "Service Schedule." A negative ground system is used. Battery connections are shown on the wiring diagrams. Make sure the battery is correctly connected and terminals are tight. Observe battery polarity when connecting the battery to the generator set.

### 3.1 BEFORE INITIAL START-UP

Before starting, complete the following:

1. Set the generator's main circuit breaker to its OFF (or open) position.
2. Set the generator's AUTO/OFF/MANUAL switch to the OFF position.
3. Turn OFF the utility power supply to the transfer switch using the means provided (such as the utility main line circuit breaker).
4. Check the engine crankcase oil level and, if necessary, fill to the dipstick FULL mark with the recommended oil. Do not fill above the FULL mark.
5. Check the fuel supply. Gaseous fuel lines must have been properly purged and leak tested in accordance with applicable fuel-gas codes. All fuel shutoff valves in the fuel supply lines must be open.

— **CAUTION** —

⚠ Never operate the engine with the oil level below the "Add" mark on the dipstick. Doing this could damage the engine.

### 3.2 CHECK TRANSFER SWITCH OPERATION

Refer to the "Manual Operation" section of the owner's manual for manual operation procedures.

— **DANGER** —

⚠ Do not attempt manual transfer switch operation until all power voltage supplies to the transfer switch have been positively turned off. Failure to turn off all power voltage supplies will result in extremely hazardous and possibly fatal electrical shock.

### 3.3 ELECTRICAL CHECKS

Complete electrical checks as follows:

1. Turn on the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).

— **DANGER** —


⚠ The transfer switch is now electrically "hot." Contact with "hot" parts will result in extremely hazardous and possibly fatal electrical shock. Proceed with caution.

2. Use an accurate AC voltmeter to check utility power source voltage across terminals N1 and N2. Nominal line-to-line voltage should be 240 volts AC.



3. Check utility power source voltage across terminals N1 and the transfer switch neutral lug; then across terminal N2 and neutral. Nominal line-to-neutral voltage should be 120 volts AC.
4. When certain that utility supply voltage is compatible with transfer switch and load circuit ratings, turn OFF the utility power supply to the transfer switch.
5. Set the generator's main circuit breaker to its OFF (or OPEN) position. Initial tests will be conducted at no-load condition.
6. On the generator panel, set the AUTO/OFF/MANUAL switch to MANUAL. The engine should crank and start.
7. Let the engine warm up for about five minutes to allow internal temperatures to stabilize. Then, set the generator's main circuit breaker to its ON (or closed) position.


**DANGER**


 Proceed with caution! Generator power voltage is now supplied to the transfer switch. Contact with live transfer switch parts will result in dangerous and possibly fatal electrical shock.


8. Connect an accurate AC voltmeter and a frequency meter across transfer switch terminal lugs E1 and E2. Voltage should be 242-252 volts; frequency should read about 61-63 Hertz.
9. Connect the AC voltmeter test leads across terminal lug E1 and neutral; then across E2 and neutral. In both cases, voltage reading should be 121-126 volts AC.
10. Set the generator's main circuit breaker to its OFF (or open) position. Let the engine run at no-load for a few minutes to stabilize internal engine generator temperatures.
11. Set the generator's AUTO/OFF/MANUAL switch to OFF. The engine should shut down.

**NOTE:**

**It is important not to proceed until certain that generator AC voltage and frequency are correct and within the stated limits. Generally, if both AC frequency and voltage are high or low, the engine governor requires adjustment. If frequency is correct, but voltage is high or low, the generator's voltage regulator requires adjustment.**

### 3.4 GENERATOR TESTS UNDER LOAD


**WARNING**


 Do not attempt manual transfer switch operation until all power voltage supplies to the transfer switch have been positively turned off. Failure to turn off all power voltage supplies will result in extremely hazardous and possibly fatal electrical shock.

To test the generator set with electrical loads applied, proceed as follows:

1. Set generator's main circuit breaker to its OFF (or OPEN) position.
2. Set the generator's AUTO/OFF/MANUAL switch to OFF.
3. Turn OFF the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).
4. Manually set the transfer switch to the STANDBY position, i.e., load terminals connected to the generator's E1/E2 terminals. The transfer switch operating lever should be down.
5. Set the generator's AUTO/OFF/MANUAL switch to MANUAL. The engine should crank and start immediately.
6. Let the engine stabilize and warm up for a few minutes.
7. Set the generator's main circuit breaker to its ON (or closed) position. Loads are now powered by the standby generator.
8. Turn ON electrical loads. Apply an electrical load equal to the full rated wattage/ampere capacity of the installed generator.
9. Connect an accurate AC voltmeter and a frequency meter across terminal lugs E1 and E2. Voltage should be greater than 230 volts; frequency should be greater than 58 Hertz.
10. Let the generator run at full rated load for 20-30 minutes. Listen for unusual noises, vibration or other indications of abnormal operation. Check for oil leaks, evidence of overheating, etc.
11. When testing under load is complete, turn OFF electrical loads.
12. Set the generator's main circuit breakers to their OFF (or open) positions.
13. Let the engine run at no-load for a few minutes.
14. Set the AUTO/OFF/MANUAL switch to OFF. The engine should shut down.



### 3.5 CHECKING AUTOMATIC OPERATION

To check the system for proper automatic operation, proceed as follows:

1. Set the generator's main circuit breaker to its OFF (or open) position.
2. Check that the AUTO/OFF/MANUAL switch is set to OFF.
3. Manually set the transfer switch to the UTILITY position, i.e., load terminals connected to the utility power source side.
4. Turn ON the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).
5. Set the AUTO/OFF/MANUAL switch to AUTO. Then set the generator's main circuit breaker to its ON (or closed) position. The system is now ready for automatic operation.
6. Turn OFF the utility power supply to the transfer switch.

With the AUTO/OFF/MANUAL switch at AUTO, the engine should crank and start when the utility source power is turned OFF. After starting, the transfer switch should connect load circuits to the standby side. Let the system go through its entire automatic sequence of operation.

With the generator running and loads powered by generator AC output, turn ON the utility power supply to the transfer switch. The following should occur:

- After about 15 seconds, the switch should transfer loads back to the utility power source.
- About one minute after retransfer, the engine should shut down.

### 3.6 ADJUSTING THE REGULATOR (NATURAL GAS ONLY)

Although the generator has been factory set to provide maximum power, it may be necessary in some areas to adjust this setting. Because natural gas has different BTU or power content across the country the engine may not perform as designed.

If experiencing engine problems at high or full load conditions follow these steps. It will require a frequency meter to perform this procedure.

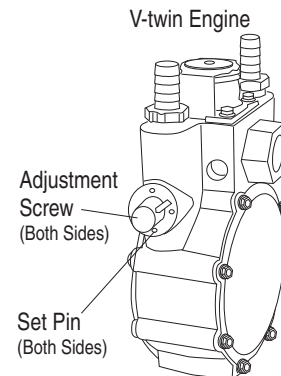
1. Turn off utility power to the main distribution panel in the house. This can be done by switching the service main breaker to the off or open position.
2. Allow the generator to start before loading the generator. Confirm the no-load frequency with the roof open and door off is set at 63-63.5 Hz. Transfer load to emergency circuits.

3. Turn on electrical loads. Be cautious not to overload the generator. Use the following chart as a guide:

Model	120 Volts	240 Volts
005176	108.3 amps	54.1 amps

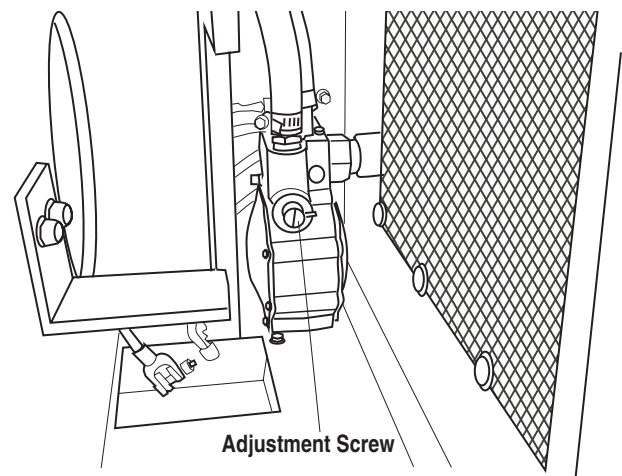
4. When full load has been achieved. Connect a frequency meter to the output lugs of the generator's main line circuit breaker.
5. The fuel regulator is fitted with two adjustment screws. While watching the frequency meter, slowly turn the adjustment screw clockwise or counterclockwise one at a time until highest frequency is read on the meter. Only limited adjustment is available between the set pins. Under no circumstances should any of the pins be removed (Figures 3.1 and 3.2).

Figure 3.1 — Dual Fuel Regulators



6. When the highest frequency is reached maximum power has been set. Then turn both adjustment screws 1/4 turn counterclockwise. Regulator is now set.

Figure 3.2 — Placement of Regulator



- Turn utility power to the main distribution panel back on. This can be done by switching the service main breaker to the on or closed position. Allow the generator to shut down.

**WARNING**

Do not make any unnecessary adjustments. Factory settings are correct for most applications. However, when making adjustments, be careful to avoid overspeeding the engine.

If this procedure or equipment are not available, locate the nearest Service Dealer and they can perform the adjustments.

**NOTE:**

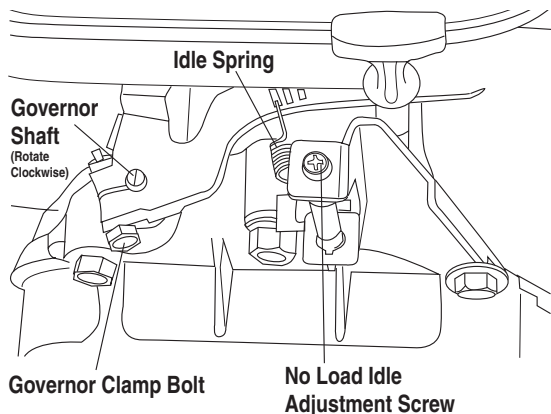
A service fee may be charged for this adjustment.

### 3.7 ENGINE GOVERNOR ADJUSTMENT

If both AC frequency and voltage are correspondingly high or low, adjust the engine governor as follows:

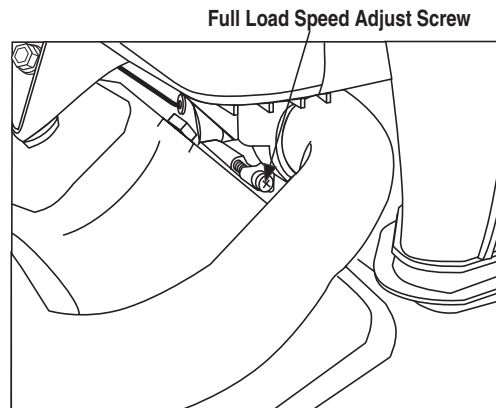
- Loosen governor clamp bolt (See Figure 3.3).

**Figure 3.3 — V-twin Engine Governor Adjustment**



- Completely remove the idle spring.
- With governor arm at wide open throttle position, rotate governor shaft fully clockwise. Tighten clamp bolt to 84 inch-pounds.
- Start unit and apply full load. Use full load speed adjust screw (Figure 3.4) to adjust frequency to 58 Hz.
- Remove load, stop engine, loosen the idle adjust screw and reconnect the idle spring.
- Using a hand, push the governor arm to the closed throttle position. Make sure the idle spring does not stretch at all.
- Restart the unit.
- Slowly turn the idle adjust screw to adjust the no-load idle frequency to 63-63.5 Hz.
- The governor is now set.

**Figure 3.4 — V-twin Full Load Speed Adjust Screw**



#### ◆ 3.7.1 ADDITIONAL CORROSION PROTECTION

Periodically spray all engine linkage parts and brackets with corrosion inhibiting spray such as WD-40® or a comparable product.

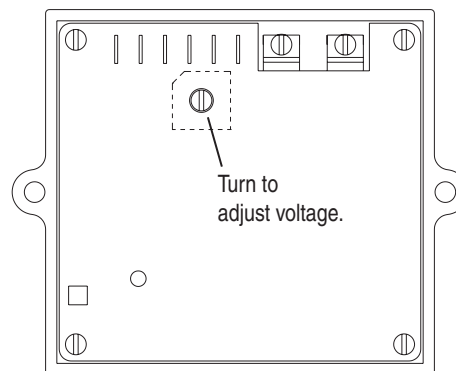
### 3.8 VOLTAGE REGULATOR ADJUSTMENT

With the frequency between 62-63.5 Hertz, slowly turn the slotted potentiometer (Figure 3.5) until line voltage reads 244-252 volts.

**NOTE:**

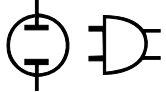
Remove the access panel on top of the control panel to adjust the voltage regulator.

**Figure 3.5 – Voltage Adjustment Potentiometer**



**NOTE:**

The voltage regulator is housed above the generator's control panel. The regulator maintains a voltage in direct proportion to frequency. For example, at 62 Hertz, line-to-neutral voltage will be 124 volts.



## 4.1 USING THE AUTO/OFF/MANUAL SWITCH (FIGURE 4.1)

### ◆ 4.1.1 “AUTO” POSITION

Selecting this switch position activates fully automatic system operation. It also permits starting and exercising of the engine every seven days with the exercise timer (see "Generator Test Under Load"). This position also is used for remote starting, when it is set up.

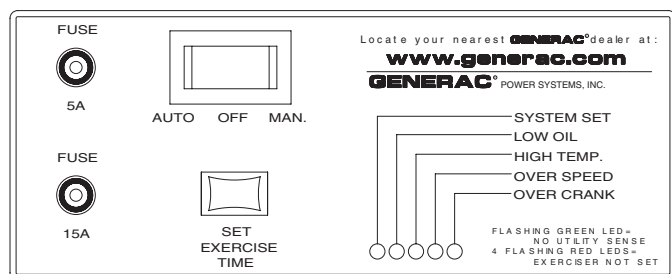
### ◆ 4.1.2 “OFF” POSITION

This switch position shuts down the engine. This position also prevents automatic operation.

### ◆ 4.1.3 “MANUAL” POSITION

Set the switch to MANUAL to crank and start the engine. Transfer to standby power will not occur unless there is a utility failure.

**Figure 4.1 – Generator Control Panel**



## ⚠ WARNING ⚠

⚠ With the switch set to AUTO, the engine may crank and start at any time without warning. Such automatic starting normally occurs when utility power source voltage drops below a preset level or during the normal exercise cycle. To prevent possible injury that might be caused by such sudden starts, always set the switch to OFF and remove both fuses before working on or around the generator or transfer switch. Then, place a “Do Not Operate” tag on the generator panel and on the transfer switch.

## 4.2 AUTOMATIC TRANSFER OPERATION

To select automatic operation, do the following:

1. Make sure the transfer switch main contacts are set to their “Utility” position, i.e., loads connected to the utility power source (Figure 4.2).
2. Be sure that normal utility power source voltage is available to transfer switch terminal lugs N1

and N2.

3. Set the generator’s AUTO/OFF/MANUAL switch to AUTO.
4. Set the generator’s main circuit breaker to its ON (or closed) position.

With the preceding steps complete, the generator will start automatically when utility source voltage drops below a preset level. After the unit starts, loads are transferred to the standby power source. Refer to “Sequence of Automatic Operation.”

## 4.3 SEQUENCE OF AUTOMATIC OPERATION

The generator’s control panel houses a control logic circuit board. This board constantly monitors utility power source voltage. Should that voltage drop below a preset level, circuit board action will signal the engine to crank and start. After the engine starts, the circuit board signals the transfer switch to activate and connect load circuits to the standby power supply (load terminal lugs T1/T2 connect to terminal lugs E1/E2).

Upon restoration of utility source voltage above a preset level, generator circuit board action signals the transfer switch to transfer loads back to that power supply. After retransfer, the engine is signalled to shut down.

The actual sequence of operation is controlled by sensors and timers on a control logic circuit board, as follows:

### A. Utility Voltage Dropout Sensor

- This sensor monitors utility source voltage.
- If utility source voltage drops below about 70 percent of the nominal supply voltage, the sensor energizes a 15-second timer.
- Once the timer has expired, the engine will crank and start.

### B. Engine Warm-up Time Delay

- This mechanism lets the engine warm up for about 10 seconds before the load is transferred to a standby source.

### C. Standby Voltage Sensor

- This sensor monitors generator AC output voltage. When the voltage has reached 50 percent of the nominal rated voltage, transfer to standby can occur.

### D. Utility Voltage Pickup Sensor

- This sensor monitors utility power supply voltage. When that voltage is restored to above 70 percent of the nominal source voltage, a retransfer time delay starts timing.

### E. Retransfer Time Delay

- This timer runs for about 15 seconds.
- At end of a 15-second delay, circuit board action de-energizes the transfer relay in the transfer switch.

- Retransfer to utility power source then occurs.
- F. Engine Cool-down Timer
- When the load is transferred back to utility power source, the engine cool-down timer starts timing.
  - The timer will run for about one minute, and the generator will then shut down.

## 4.4 MANUAL OPERATION



**⚠ Do NOT manually transfer under load. Disconnect transfer switch from all power sources by approved means, such as a main circuit breaker(s).**

A manual HANDLE is shipped with the transfer switch. Manual operation must be checked BEFORE the transfer switch is operated electrically. To check manual operation, proceed as follows:

1. Turn the generator's AUTO/OFF/MANUAL switch to OFF.
2. Turn OFF both UTILITY and EMERGENCY power supplies to the transfer switch, with whatever means provided (such as the main line circuit breakers).

3. Note position of transfer mechanism main contacts by observing the moveable contact carrier arm.
  - Manual operation handle towards the top of switch mechanism - LOAD terminals (T1, T2) are connected to UTILITY terminals (N1, N2).
  - Manual operation handle towards the bottom of switch mechanism - LOAD terminals (T1, T2) are connected to EMERGENCY terminals (E1, E2).



**⚠ Do not use excessive force when operating the transfer switch manually or damage could be done to the manual handle.**

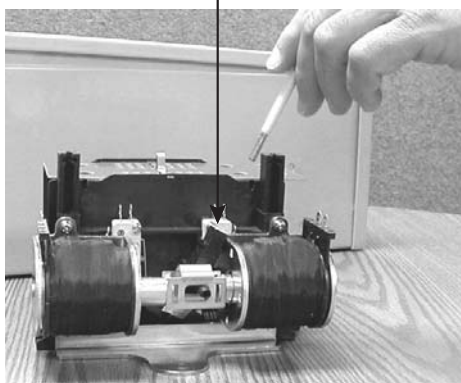
### ◆ 4.4.1 CLOSE TO NORMAL SOURCE SIDE

Before proceeding, verify the position of the switch by observing the position of manual operation handle in Figure 4.2. If the handle is UP, the contacts are closed in the NORMAL position, no further action is required. If the handle is DOWN, proceed with Step 1.

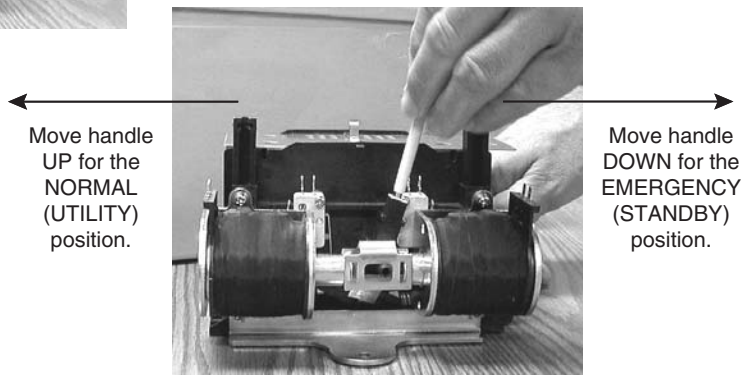
Step 1: With the handle inserted into the actuating shaft, move handle UP. Be sure to hold on to the handle as it will move quickly after the center of travel.

**Figure 4.2 — Actuating Transfer Switch**

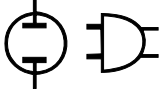
Attach handle to actuating shaft.



**NOTE:** Return handle to storage position in enclosure when finished with manual transfer.







**◆ 4.4.2 CLOSE TO EMERGENCY SOURCE SIDE**

Before proceeding, verify the position of the switch by observing the position of the manual operation handle in Figure 4.2. If the handle is DOWN, the contacts are closed in the EMERGENCY (STANDBY) position. No further action is required. If the handle is UP, proceed with Step 1.

Step 1: With the handle inserted into the actuating shaft, move the handle DOWN. Be sure to hold on to the handle as it will move quickly after the center of travel.

**◆ 4.4.3 RETURN TO NORMAL SOURCE SIDE**

Manually actuate switch to return manual operating handle to the UP position.

**4.5 VOLTAGE CHECKS**

1. Turn ON the UTILITY power supply to the transfer switch with whatever means provided (such as the UTILITY main line circuit breaker).



**⚠ PROCEED WITH CAUTION. THE TRANSFER SWITCH IS NOW ELECTRICALLY HOT. CONTACT WITH LIVE TERMINALS RESULTS IN EXTREMELY HAZARDOUS AND POSSIBLY FATAL ELECTRICAL SHOCK.**

2. With an accurate AC voltmeter, check for correct voltage.

**Single-phase utility supply:**

Measure across ATS terminal lugs N1 and N2. Also check N1 to NEUTRAL and N2 to NEUTRAL.

3. When certain that UTILITY supply voltage is correct and compatible with transfer switch ratings, turn OFF the UTILITY supply to the transfer switch.
4. On the generator panel, set the AUTO/OFF/MANUAL switch to MANUAL position. The generator should crank and start.
5. Let the generator stabilize and warm up at no-load for at least five minutes.
6. Set the generator's main circuit breaker (CB1) to its ON or CLOSED position.



**⚠ PROCEED WITH CAUTION. GENERATOR OUTPUT VOLTAGE IS NOW BEING DELIVERED TO TRANSFER SWITCH TERMINALS. CONTACT WITH LIVE TERMINALS RESULTS IN EXTREMELY DANGEROUS AND POSSIBLY FATAL ELECTRICAL SHOCK.**

7. With an accurate AC voltmeter and frequency meter, check the no-load, voltage and frequency.

**Single-phase generator supply:**

Measure across ATS terminal lugs E1 to E2. Also check E1 to NEUTRAL and E2 to NEUTRAL.

- a. Frequency ..... 60-62 Hertz
  - b. Terminals E1 to E2 ..... 240-246 VAC
  - c. Terminals E1 to NEUTRAL..... 120-123 VAC
  - d. Terminals E2 to NEUTRAL..... 120-123 VAC
8. Set the generator's main circuit breaker (CB1) to its OFF or OPEN position.
  9. Set the AUTO/OFF/MANUAL switch to the OFF position to shut down the generator.

**NOTE:**

**Do NOT proceed until generator AC output voltage and frequency are correct and within stated limits. If the no-load voltage is correct but no-load frequency is incorrect, the engine governed speed probably requires adjustment. If no-load frequency is correct but voltage is not, the voltage regulator may require adjustment.**

**4.6 GENERATOR TESTS UNDER LOAD**

1. Set the generator's main circuit breaker to its OFF or OPEN position.
2. Manually actuate the transfer switch main contacts to their EMERGENCY (STANDBY) position. Refer to "Manual Operation".
3. To start the generator, set the AUTO/OFF/MANUAL switch to MANUAL. When engine starts, let it stabilize for a few minutes.
4. Turn the generator's main circuit breaker to its ON or CLOSED position. The generator now powers all LOAD circuits. Check generator operation under load as follows:
  - Turn ON electrical loads to the full rated wattage/ampere capacity of the generator. DO NOT OVERLOAD.
  - With maximum rated load applied, check voltage and frequency across transfer switch terminals E1 and E2. Voltage should be greater than 230 volts and frequency should be greater than 59 Hertz.
  - Let the generator run under rated load for at least 30 minutes. With unit running, listen for unusual noises, vibration, overheating, etc., that might indicate a problem.
5. When checkout under load is complete, set main circuit breaker of the generator to its OFF or OPEN position.
6. Let the generator run at no-load for several minutes. Then, shut down by setting the AUTO/OFF/MANUAL switch to its OFF position.



7. Move the switch's main contacts back to their UTILITY position. For example, load connected to UTILITY power supply. Refer to "Manual Operation". Handle and operating lever of transfer switch should be in UP position.
8. Turn on the UTILITY power supply to transfer switch, using whatever means provided (such as a UTILITY main line circuit breaker). The UTILITY power source now powers the loads.
9. Set the generator's AUTO/OFF/MANUAL switch to its AUTO position. The system is now set for fully automatic operation.

## 4.7 SETTING THE EXERCISE TIMER

The generator is equipped with an exercise timer. Once it is set, the generator will start and exercise once every seven days, on the day of the week and at the time of day the following sequence is completed. During this exercise period, the unit runs for approximately 12 minutes and then shuts down. Transfer of loads to the generator output does not occur during the exercise cycle.

A switch on the control panel (see Figure 4.1) allows for selection of the day and time for system exercise. To select the desired day and time of day, the following sequence must be done at that time.

1. Verify that the AUTO/OFF/MANUAL switch is set to AUTO.
2. Hold down the set timer switch until the generator starts (approximately 10 seconds) and then release.
3. The generator will start and run for approximately 12 minutes and then shut down on its own. The exerciser will then be set to run at that time of day every week.

### NOTE:

**The exerciser will only work in the AUTO mode and will not work unless this procedure is performed. The exerciser will need to be reset every time the 12-volt battery is disconnected and then reconnected. The exerciser WILL NOT work if dip switch 2 (Remote Not Auto) on the controller printed circuit board is ON.**

## 4.8 PROTECTION SYSTEMS

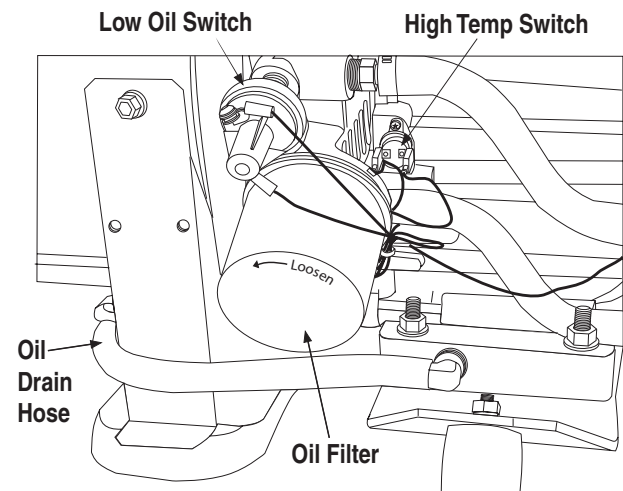
### ◆ 4.8.1 LOW OIL PRESSURE SWITCH

This switch (Figure 4.3) has normally closed contacts that are held open by engine oil pressure during cranking and operating. Should oil pressure drop below the 8 psi range, switch contacts close, and the engine shuts down. The unit should not be restarted until oil is added, and the AUTO/OFF/MANUAL switch must be turned to OFF and then back to AUTO.

### ◆ 4.8.2 HIGH TEMPERATURE SWITCH

This switch's contacts (Figure 4.3) close if the temperature should exceed approximately 140° C (284° F), initiating an engine shutdown. The generator will automatically restart and the LED will reset once the temperature has returned to a safe operating level.

*Figure 4.3 – Low Oil Pressure and High Temperature Switches*

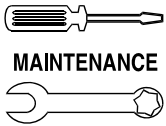


### ◆ 4.8.3 OVERCRANK

This feature prevents the generator from damaging itself when it continually attempts to start and another problem, such as no fuel supply, prevents it from starting. The unit will crank and rest for a preset time limit. Then, it will stop cranking, and the LED will light indicating an overcrank failure. The AUTO/OFF/MANUAL switch will need to be set to OFF and then back to AUTO to reset the generator control board.

### NOTE:

**If the fault is not repaired, the overcrank feature will continue to activate.**



### 4.8.3.1 Approximate Crank Cycle Times

- 15 seconds ON
- 7 seconds OFF
- 7 seconds ON
- 7 seconds OFF
- Repeat for 45 seconds
- Approximately 90 seconds total

### ◆ 4.8.4 OVERSPEED

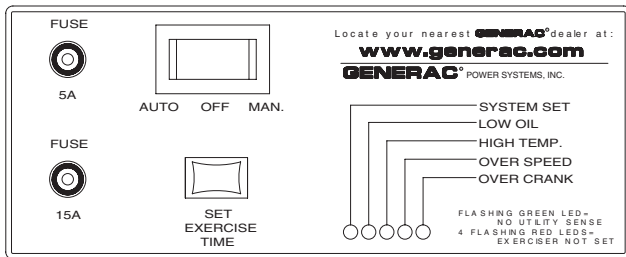
This feature protects the generator from damage by shutting it down if it happens to run faster than the preset limit. This protection also prevents the generator from supplying an output that could potentially damage appliances connected to the generator circuit. Contact the nearest Authorized Dealer if this failure occurs.

## 5.1 FUSE

The generator panel's 15 amp fuse (Figure 5.1) protects the DC control circuit against overload. The fuse is wired in series with the battery output lead to the panel. If the fuse element has melted open, the engine cannot crank or start. Replace the fuse using only an identical 15-amp replacement.

The generator panel's 5 amp fuse protects the battery charge circuit against overload. If the fuse element has melted open, battery charging will not be possible. Replace the fuse using only an identical 5 amp replacement. To remove fuse, push cap down and rotate counterclockwise.

**Figure 5.1 – Generator Control Panel**



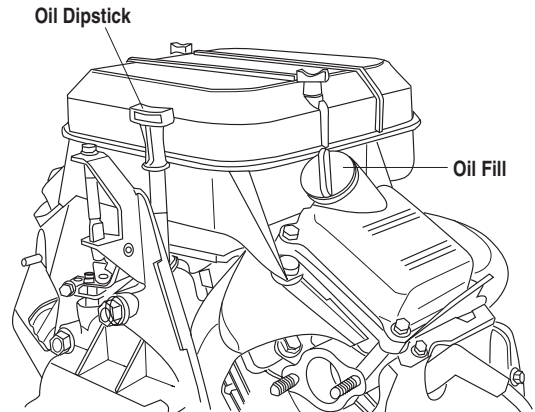
## 5.2 CHECKING THE ENGINE OIL LEVEL

For oil capacities, see "Specifications". For engine oil recommendations, see "Changing the Engine Oil". To check the engine oil level, proceed as follows (Figure 5.2):

1. Start the generator by moving the ATUO/OFF/MANUAL switch to the MANUAL position. Allow it to run for a short while and then shut it down by moving the switch to the OFF position.

2. Remove the dipstick and wipe it dry with a clean cloth.

**Figure 5.2 — Oil Dipstick and Fill**



3. Install the dipstick; then, remove it again. The oil level should be at the dipstick "Full" mark. If necessary, add oil to the "Full" mark only. **DO NOT FILL ABOVE THE "FULL" MARK.**

— **⚠ CAUTION ⚠** —

**⚠ Never operate the engine with the oil level below the "Add" mark on the dipstick. Doing this could damage the engine.**

4. Install the dipstick.
5. Reset the AUTO/OFF/MANUAL switch to its original position.

## 5.3 CHANGING THE ENGINE OIL

### ◆ 5.3.1 ENGINE OIL RECOMMENDATIONS

Use all season SAE 5W-30 synthetic oil or use SAE 30 oil of American Petroleum Institute (API) Service Class SG, SH, SJ or SL.

— **⚠ CAUTION ⚠** —

**⚠ Any attempt to crank or start the engine before it has been properly serviced with the recommended oil may result in an engine failure.**

### ◆ 5.3.2 OIL CHANGE PROCEDURE

To change the oil, proceed as follows:

1. Run the engine until it is thoroughly warmed up then shut OFF the engine.
2. Immediately after the engine shuts OFF, pull the oil drain hose (Figure 5.3) free of its retaining clip. Remove the cap from the hose and drain the oil into a suitable container.

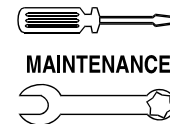
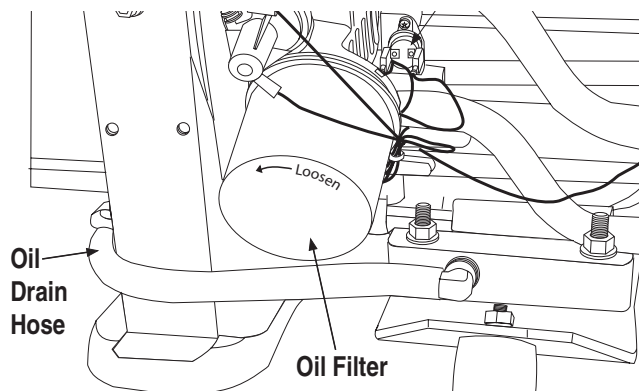


Figure 5.3 – Oil Drain Hose and Filter



3. After the oil has drained, replace the cap onto the end of the oil drain hose. Retain the hose in the clip.
4. Refill with the proper recommended oil (see "Changing the Engine Oil"). See the "Specifications" section for oil capacities.

## 5.4 CHANGING THE OIL FILTER

Change the engine oil filter as follows:

1. With the oil drained, remove the old oil filter by turning it counterclockwise.
2. Apply a light coating of clean engine oil to the gasket of the new filter. See the "Specifications" section for recommended filter.
3. Screw the new filter on by hand until its gasket lightly contacts the oil filter adapter. Then, tighten the filter an additional 3/4 to one turn (Figure 5.3).
4. Refill with the proper recommended oil (see "Changing the Engine Oil"). See the "Specifications" section for oil capacities.
5. Start the engine and check for leaks.

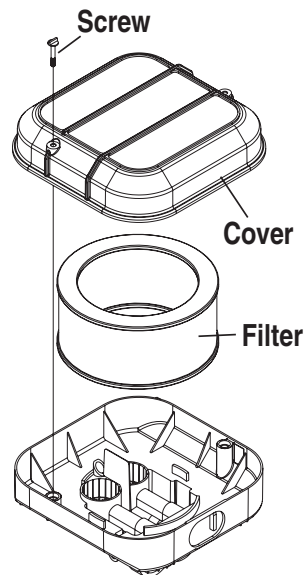
## 5.5 CHANGING THE ENGINE AIR CLEANER

See Figures 1.1 and 1.2, for the location of the air cleaner. Use the following procedure (Figure 5.4):

1. Turn the two screws counterclockwise to loosen.
2. Remove the cover and air filter.
3. Wipe away dust or debris from inside of the air box and around edges.
4. Install the new air cleaner into the air box.
5. Install the cover. Turn the two cover screws clockwise to tighten.

See the "Service Schedule" section for air cleaner maintenance. See the "Specifications" section for air filter replacement part number.

Figure 5.4 — Engine Air Cleaner

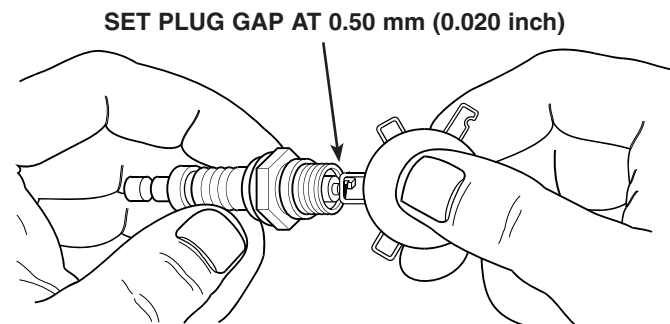


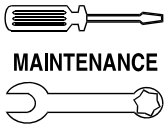
## 5.6 SPARK PLUG(S)

Reset the spark plugs gap or replace the spark plugs as necessary. See the "Service Schedule" section for maintenance requirements.

1. Clean the area around the base of the spark plugs to keep dirt and debris out of the engine. Clean by scraping or washing using a wire brush and commercial solvent. Do not blast the spark plugs to clean.
2. Remove the spark plugs and check the condition. Replace the spark plugs if worn or if reuse is questionable. See the "Service Schedule" section for recommended inspection.
3. Check the spark plug gap using a wire feeler gauge. Adjust the gap to 0.50 mm (0.020 inch) for by carefully bending the ground electrode (Figure 5.5).

Figure 5.5 – Setting the Spark Plug Gap





## 5.7 BATTERY MAINTENANCE

The battery should be inspected per the “Service Schedule”. The following procedure should be followed for inspection:

1. Inspect the battery posts and cables for tightness and corrosion. Tighten and clean as necessary.
2. Check the battery fluid level of unsealed batteries and, if necessary, fill with DISTILLED WATER ONLY. DO NOT USE TAP WATER IN BATTERIES.
3. Have the state of charge and condition checked. This should be done with an automotive-type battery hydrometer.

### ⚠ DANGER ⚠

⚠ Do not dispose of the battery in a fire. The battery is capable of exploding.

⚠ A battery presents a risk of electrical shock and high short circuit current. The following precautions are to be observed when working on batteries:

- Remove watches, rings or other metal objects;
- Use tools with insulated handles;
- Wear rubber gloves and boots;
- Do not lay tools or metal parts on top of the battery; and
- Disconnect charging source prior to connecting or disconnecting battery terminals.

### ⚠ WARNING ⚠

⚠ Do not open or mutilate the battery. Released electrolyte has been known to be harmful to the skin and eyes, and to be toxic.

⚠ The electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following procedures are to be observed:

- Wear full eye protection and protective clothing;
- Where electrolyte contacts the skin, wash it off immediately with water;
- Where electrolyte contacts the eyes, immediately flush thoroughly with water and seek medical attention; and
- Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of 1 pound (500 grams) bicarbonate of soda to 1 gallon (4 liters) or water. The bicarbonate of soda solution is to be added until the evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.

⚠ Lead-acid batteries present a risk of fire because they generate hydrogen gas. The following procedures are to be followed:

- DO NOT SMOKE when near the battery;
- DO NOT cause flame or spark in battery area; and
- Discharge static electricity from body before touching the battery by first touching a grounded metal surface.

⚠ Be sure the AUTO/OFF/MANUAL switch is set to the OFF position before connecting the battery cables. If the switch is set to AUTO or MANUAL, the generator can crank and start as soon as the battery cables are connected.

⚠ Be sure the utility power supply is turned off, and the 5A fuse is removed from the generator control panel, or sparking may occur at the battery posts as the cables are attached, causing an explosion.

## 5.8 ADJUSTING VALVE CLEARANCE

After the first 50 hours of operation, adjust the valve clearance in the engine.

**Important:** If feeling uncomfortable about doing this procedure or the proper tools are not available, contact the nearest Authorized Dealer for service assistance. This is a very important step to insure longest life for the engine.

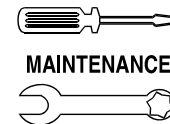
**To adjust valve clearance:**

- Make sure the engine is at room temperature.
- Make sure that the spark plug wire is removed from the spark plug and out of the way.
- Remove the four screws attaching the valve cover with a #2 or #3 phillips screwdriver.
- Make sure the piston is at Top Dead Center (TDC) of its compression stroke (both valves closed). To get the piston at TDC, remove the intake screen at the front of the engine to gain access to the flywheel nut. Use a large socket and socket wrench to rotate the nut and hence the engine. While watching the piston through the spark plug hole. The piston should move up and down. The piston is at TDC when it is up as high as it can go.
- Loosen the rocker jam nut. Use an 10mm allen wrench to turn the pivot ball stud while checking clearance between the rocker arm and the valve stem with a feeler gauge. Correct clearance is 0.002-0.004 inch (0.05-0.1 mm). See Figure 5.6.

**NOTE:**

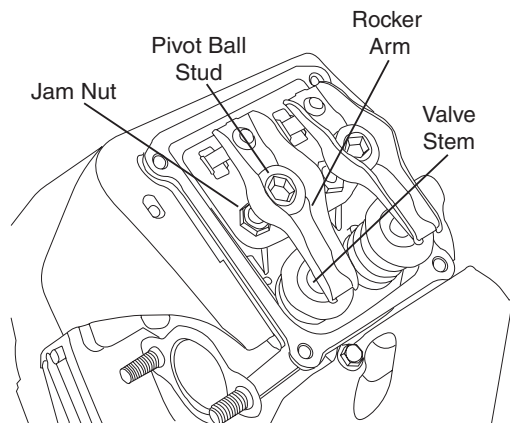
**Hold the rocker arm jam nut in place as the pivot ball stud is turned.**





When valve clearance is correct, hold the pivot ball stud in place with the allen wrench and tighten the rocker arm jam nut. Tighten the jam nut to 174 in/lbs. torque. After tightening the jam nut, recheck valve clearance to make sure it did not change.

Figure 5.6 - Valve Clearance Adjustment



- Install new valve cover gasket.
- Re-attach the valve cover.

**NOTE:**

**Start all four screws before tightening or it will not be possible to get all the screws in place. Make sure the valve cover gasket is in place.**

- Re-attach the spark plug wire to the spark plug.
- Repeat the process for the other cylinder.

## 5.9 COOLING SYSTEM

Air inlet and outlet openings in the generator compartment must be open and unobstructed for continued proper operation. This includes such obstructions as high grass, weeds, brush, leaves and snow.

Without sufficient cooling and ventilating air flow, the engine/generator quickly overheats, which causes it to quickly shut down. (See Figure 5.7 for vent locations.)

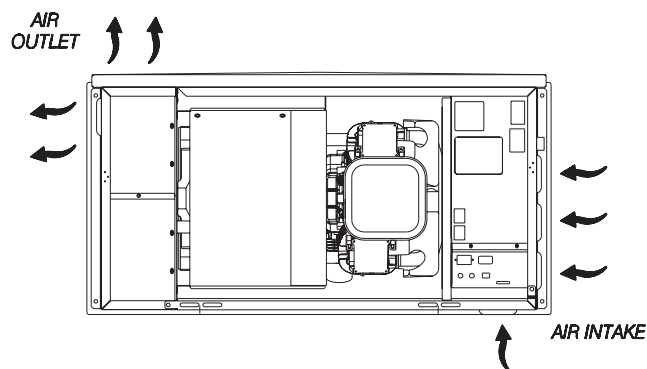
**WARNING**

**The exhaust from this product gets extremely hot and remains hot after shutdown. High grass, weeds, brush, leaves, etc. must remain clear of the exhaust. Such materials may ignite and burn from the heat of the exhaust system.**

**CAUTION**

**The maximum ambient temperature for the generator is 48.9° C (104° F).**

Figure 5.7 – Cooling Vent Locations



## 5.10 ATTENTION AFTER SUBMERSION

If the generator has been submerged in water, it **MUST NOT** be started and operated. Following any submersion in water, have an Authorized Dealer thoroughly clean and dry the generator.

## 5.11 CORROSION PROTECTION

Periodically wash and wax the enclosure using automotive type products. Frequent washing is recommended in salt water/coastal areas. Spray engine linkages with a light oil such as WD-40®.

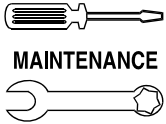
## 5.12 OUT OF SERVICE PROCEDURE

### 5.12.1 REMOVAL FROM SERVICE

If the generator cannot be exercised every seven days, and it is to be out of service longer than 90 days, prepare the generator for storage as follows:

1. Start the engine and let it warm up.
2. Close the fuel shutoff valve in the fuel supply line and allow the unit to shut down.
3. Once the unit has shut down, it will signal a low oil fault.
4. Set the AUTO/OFF/MANUAL switch to OFF and turn off the utility power to the transfer switch.
5. While the engine is still warm from running, drain the oil completely. Refill the crankcase with oil. See "Engine Oil Recommendations".
6. Attach a tag to the engine indicating the viscosity and classification of the oil in the crankcase.
7. Remove the spark plugs and spray fogging agent into the spark plugs threaded openings. Reinstall and tighten the spark plugs.
8. Remove the battery and store it in a cool, dry room on a wooden board. Never store the battery on any concrete or earthen floor.
9. Clean and wipe the entire generator.





MAINTENANCE

## Section 5 – Maintenance

### Air-cooled 15 kW Generators

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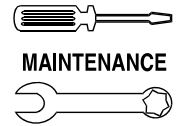
#### ◆ 5.12.2 RETURN TO SERVICE

To return the unit to service after storage, proceed as follows:

1. Set the generator's main circuit breaker to its OFF (or OPEN) position.
2. Verify that utility power is turned off and that the AUTO/OFF/MANUAL switch is set to OFF.
3. Check the tag on the engine for oil viscosity and classification. Verify that the correct recommended oil is used in the engine (see "Enging Oil Requirements"). If necessary, drain and refill with the proper oil.
4. Check the state of the battery. Fill all cells of unsealed batteries to the proper level with distilled water. DO NOT USE TAP WATER IN THE BATTERY. Recharge the battery to 100 percent state of charge, or, if defective, replace the battery. See the "Specifications" section for type and size.
5. Clean and wipe the entire generator.
6. Remove the 5A fuse from the generator control panel.
7. Reconnect the battery. Observe battery polarity. Damage may occur if the battery is connected incorrectly. Replace the 5A fuse in the generator control panel.
8. Open the fuel shutoff valve.
9. Start the unit by moving the AUTO/OFF/MANUAL switch to MANUAL. Allow the unit to warm up thoroughly.
10. Stop the unit and set the AUTO/OFF/MANUAL switch to AUTO. Set the generator's main circuit breaker to its ON (or CLOSED) position.
11. Turn on the utility power to the transfer switch.
12. The generator is now ready for service.

**NOTE:**

**If the battery was dead or disconnected, the exercise timer must be reset.**



## ◆ 7 KW - 40 KW SMALL STANDBY GENERATOR SETS

Following is a recommended maintenance schedule for small standby and residential generator sets from 7 kW to 40 kW in size, and applies to gas engine driven units. The established intervals in the schedule are the *maximum* recommended when the unit is used in an average service application. They will need to be decreased (performed more frequently) if the unit is used in a severe application. Use calendar time from the previous maintenance interval to determine the next required maintenance interval.

### Service Maintenance Interval Information:

The various service maintenance intervals are designated by interval numbers as follows:

- 1 An early inspection of the generator set to insure it is ready to operate when required and to identify any potential problem areas.

*Performed monthly or following each 10 hours of operation of the unit and requires approximately .5 man-hours per unit to complete.*

*This inspection may be performed by the end user providing the following safety steps are taken to prevent the engine from starting automatically without warning:*

**To prevent injury, perform the following steps in the order indicated before starting any maintenance:**

- **Disable the generator set from starting and/or connecting to the load by setting the control panel Auto/Off/Manual switch to the “OFF” position.**
- **Remove the control panel fuse.**
- **Turn off the battery charger.**
- **Remove the negative battery cable.**

**The battery charger must be turned off BEFORE removing the battery cable to prevent an over current condition from burning out sensitive control panel components and circuits.**

**Following all maintenance, reverse these steps to insure the unit is returned to standby setup for normal operation when required.**

- 2 A wear-in service inspection of the generator set to insure it is ready to operate and carry the load when required, and to identify any potential problem areas.

*Performed **ONLY ONCE** following the first three months or the first 30 hours of operation after purchase of the unit and requires approximately **2.5 man-hours** per unit to complete.*

*This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an Authorized Service Dealer.*

- 3 An operational inspection of the generator set to insure it is ready to operate and carry the load when required, and to identify any potential problem areas.

*Performed semi-annually or following each 50 hours of operation of the unit and requires approximately **1.5 man-hours** per unit to complete.*

*This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an Authorized Service Dealer.*

- 4 A mid-level inspection of the generator set to insure it is ready to operate and carry the load when required, and to identify any potential problem areas.

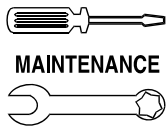
*Performed annually or following each 100 hours of operation of the unit and requires approximately **4.0 man-hours** per unit to complete.*

*This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an Authorized Service Dealer.*

- 5 A comprehensive inspection of the generator set to insure it is properly serviced and ready to operate and carry the load when required, and to identify any potential problem areas.

*Performed annually or following each 250 hours of operation of the unit and requires approximately **6.0 man-hours** per unit to complete.*

*This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an Authorized Service Dealer.*

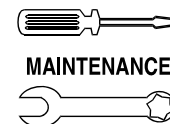


## Section 5 – Maintenance

### Air-cooled 15 kW Generators

Maintenance Tasks	Level 1	Task Comp. (Date-Initials)	Level 2	Task Comp. (Date-Initials)	Level 3	Task Comp. (Date-Initials)	Level 4	Task Comp. (Date-Initials)	Level5	Task Comp. (Date-Initials)
	Recommended to be done monthly/ 10 hrs.		Required to be done 6 months		Required to be done Semi-annually/ 50 hrs.		Required to be done Annually/ 100 hrs.		Required to be done Bi-annually/ 250 hrs.	
1. Disable the unit from operating per the first page warning.	○		○		○		○		○	
2. Check the engine oil level. Adjust as necessary.	○		○		○		○		○	
3. Check the natural gas delivery system for leaks and correct pressure on gas engine driven units. Tighten connections as necessary.	○		○		○		○		○	
4. Check the air inlets and outlets for debris. Clean as necessary.	○		○		○		○		○	
5. Check the battery electrolyte level and specific gravity if accessible. Adjust as necessary.	○		○		○		○		○	
6. Check the battery posts, cables, and charger for loose connections, corrosion, and proper operation. Correct as necessary.	○		○		○		○		○	
7. Check the unit wiring for loose connections, corrosion, and damage. Correct as necessary.							○		○	
8. Check the engine valve clearance. Adjust as necessary.							○		○	
9. Visually inspect the unit looking for leaks, wear or damage, loose connections or components, and corrosion. Correct as necessary.	○		○		○		○		○	

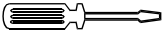
**Section 5 – Maintenance**  
**Air-cooled 15 kW Generators**



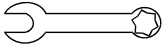
Maintenance Tasks	Level 1	Task Comp. (Date-Initials)	Level 2	Task Comp. (Date-Initials)	Level 3	Task Comp. (Date-Initials)	Level 4	Task Comp. (Date-Initials)	Level 5	Task Comp. (Date-Initials)
	Recommended to be done monthly/ 10 hrs.		Required to be done 6 months		Required to be done Semi-annually/ 50 hrs.		Required to be done Annually/ 100 hrs.		Required to be done Bi-annually/ 250 hrs.	
10. Test the engine and transfer switch safety devices. Correct and/or adjust as necessary.							●		●	
11. Initiate an automatic start and transfer of the unit to site load and exercise it for at least 1 hour looking for leaks, loose connections or components, and abnormal operating conditions. Correct as necessary.			●		●					
12. Start and exercise the unit at full rated load (use a load bank if the site load is not enough) for at least 2 hours looking for leaks, loose connections or components, and abnormal operating conditions. Correct as necessary.							●		●	
13. Perform an engine oil analysis (send a sample to a lab for results). Change the engine oil and filters if the analysis results indicate this is required.							●			
14. Change the engine oil.							● *			
15. Replace the engine oil filter(s).							● *			

\* Change oil and filter after first eight (8) hours of operation and then every 100 hours thereafter. Change sooner when operating under a heavy load or in a dusty or dirty environment or in high ambient temperatures.





**MAINTENANCE**



**Section 5 – Maintenance**

**Air-cooled 15 kW Generators**

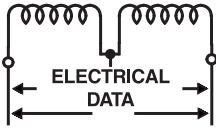
Maintenance Tasks	Level 1	Task Comp. (Date-Initials)	Level 2	Task Comp. (Date-Initials)	Level 3	Task Comp. (Date-Initials)	Level 4	Task Comp. (Date-Initials)	Level 5	Task Comp. (Date-Initials)
	Recommended to be done monthly/ 10 hrs.		Required to be done 6 months		Required to be done Semi-annually/ 50 hrs.		Required to be done Annually/ 100 hrs.		Required to be done Bi-annually/ 250 hrs.	
16. Replace the engine air filter(s).									●	
17. Perform a 5 minute no-load operational run of the unit looking for any post service problems.			●						●	
18. Return the unit to standby setup for operation when required.	●		●		●		●		●	



## 6.1 TROUBLESHOOTING GUIDE

<b>Problem</b>	<b>Cause</b>	<b>Correction</b>
The engine will not crank.	<ol style="list-style-type: none"> <li>1. Fuse blown</li> <li>2. Loose, corroded or defective battery cables</li> <li>3. Defective starter motor</li> <li>4. Dead Battery</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace 15A fuse on generator control panel.</li> <li>2. Tighten, clean or replace as necessary.</li> <li>3. *</li> <li>4. Charge or replace battery.</li> </ol>
The engine cranks but will not start.	<ol style="list-style-type: none"> <li>1. Out of fuel</li> <li>2. Defective fuel solenoid (FS)</li> <li>3. Open #14 wire from engine control board</li> <li>4. Defective spark plug(s)</li> <li>5. Valve lash out of adjustment.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replenish fuel.</li> <li>2. *</li> <li>3. *</li> <li>4. Clean, re-gap or replace plug(s).</li> <li>5. Reset valve lash.</li> </ol>
The engine starts hard and runs rough.	<ol style="list-style-type: none"> <li>1. Air cleaner plugged or damaged</li> <li>2. Defective spark plug(s)</li> <li>3. Fuel regulator not set.</li> <li>4. Fuel pressure incorrect.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check, replace air cleaner.</li> <li>2. Clean, re-gap or replace plug(s).</li> <li>3. Set fuel regulator.</li> <li>4. Confirm fuel pressure is at 11-14" water column (0.4-0.5 psi) for LP and 5-7" water column (0.18-0.25 psi) for natural gas.</li> </ol>
The AUTO/OFF/MANUAL switch is set to OFF, but the engine continues to run.	<ol style="list-style-type: none"> <li>1. Defective switch</li> <li>2. AUTO/OFF/MANUAL switch wired incorrectly</li> <li>3. Defective control board</li> </ol>	<ol style="list-style-type: none"> <li>1. *</li> <li>2. *</li> <li>3. *</li> </ol>
There is no AC output from the generator.	<ol style="list-style-type: none"> <li>1. Main line circuit breaker open</li> <li>2. Generator internal failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Reset circuit breaker to ON (or closed).</li> <li>2. *</li> </ol>
There is no transfer to standby after utility source failure.	<ol style="list-style-type: none"> <li>1. Defective transfer switch coil</li> <li>2. Defective transfer relay</li> <li>3. Transfer relay circuit open</li> <li>4. Defective control logic board</li> </ol>	<ol style="list-style-type: none"> <li>1. *</li> <li>2. *</li> <li>3. *</li> <li>4. *</li> </ol>

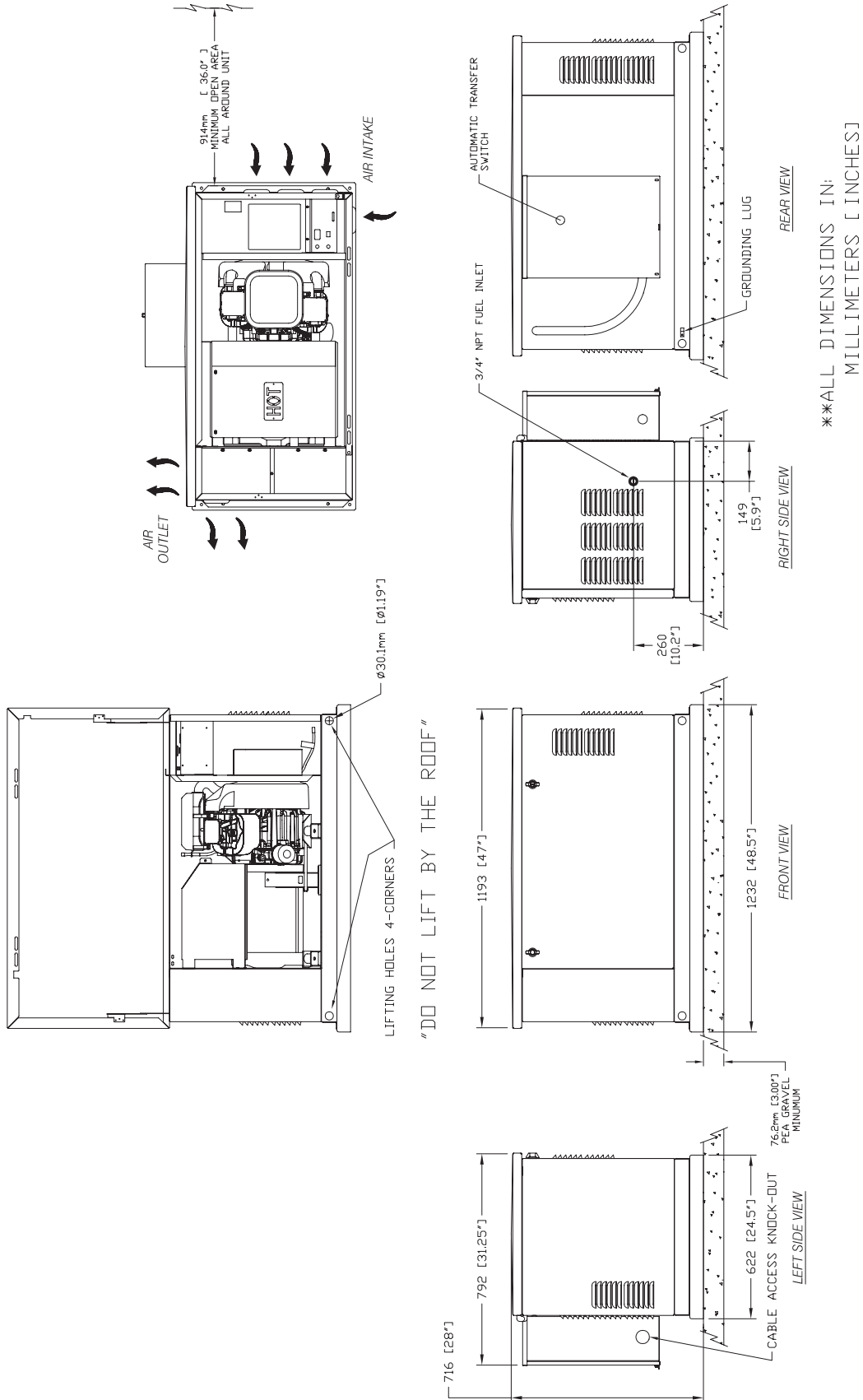
**\*Contact the nearest Authorized Dealer for assistance.**



**Section 7 – Mounting Dimensions**

**Air-cooled 15 kW Generators**

**Drawing No. 0F5927**



# Section 8 – Electrical Data

## Air-cooled 15 kW Generators

### Wiring Diagram – Drawing No. 0F5643-B Part 1

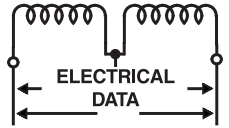
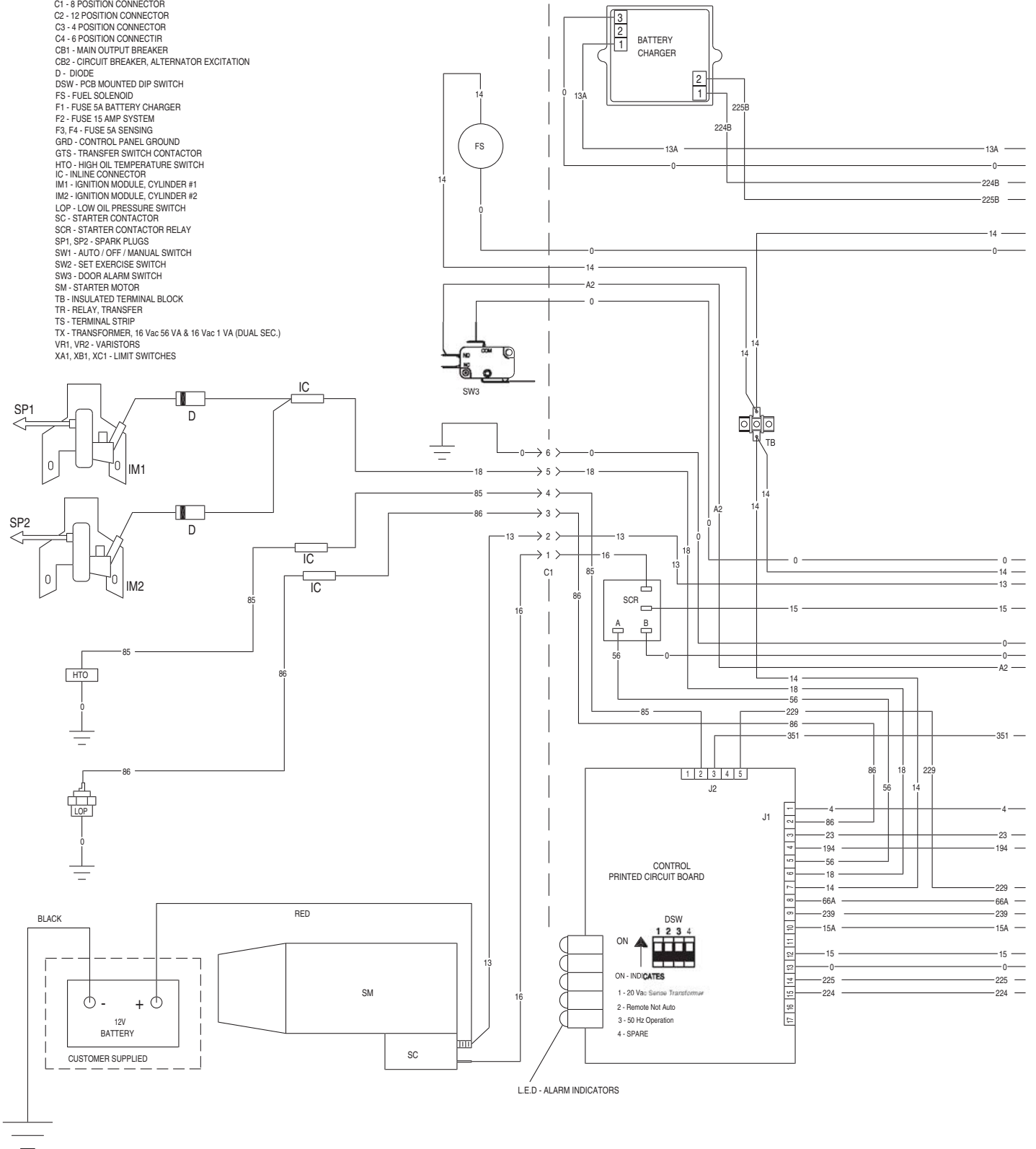
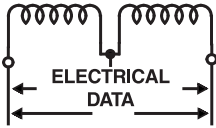


DIAGRAM KEY

- BA - BRUSH ASSEMBLY
- BCR - BATTERY CHARGE RELAY
- C1 - 8 POSITION CONNECTOR
- C2 - 12 POSITION CONNECTOR
- C3 - 4 POSITION CONNECTOR
- C4 - 6 POSITION CONNECTOR
- CB1 - MAIN OUTPUT BREAKER
- CB2 - CIRCUIT BREAKER, ALTERNATOR EXCITATION
- D - DIODE
- DSW - PCB MOUNTED DIP SWITCH
- FS - FUEL SOLENOID
- F1 - FUSE 5A BATTERY CHARGER
- F2 - FUSE 15 AMP SYSTEM
- F3, F4 - FUSE 5A SENSING
- GRD - CONTROL PANEL GROUND
- GTS - TRANSFER SWITCH CONTACTOR
- HTO - HIGH OIL TEMPERATURE SWITCH
- IC - IN-LINE CONNECTOR
- IM1 - IGNITION MODULE, CYLINDER #1
- IM2 - IGNITION MODULE, CYLINDER #2
- LOP - LOW OIL PRESSURE SWITCH
- SC - STARTER CONTACTOR
- SCR - STARTER CONTACTOR RELAY
- SP1, SP2 - SPARK PLUGS
- SW1 - AUTO / OFF / MANUAL SWITCH
- SW2 - SET EXERCISE SWITCH
- SW3 - DOOR ALARM SWITCH
- SM - STARTER MOTOR
- TB - INSULATED TERMINAL BLOCK
- TR - RELAY, TRANSFER
- TS - TERMINAL STRIP
- TX - TRANSFORMER, 16 Vac 56 VA & 16 Vac 1 VA (DUAL SEC.)
- VR1, VR2 - VARISTORS
- XA1, XB1, XC1 - LIMIT SWITCHES

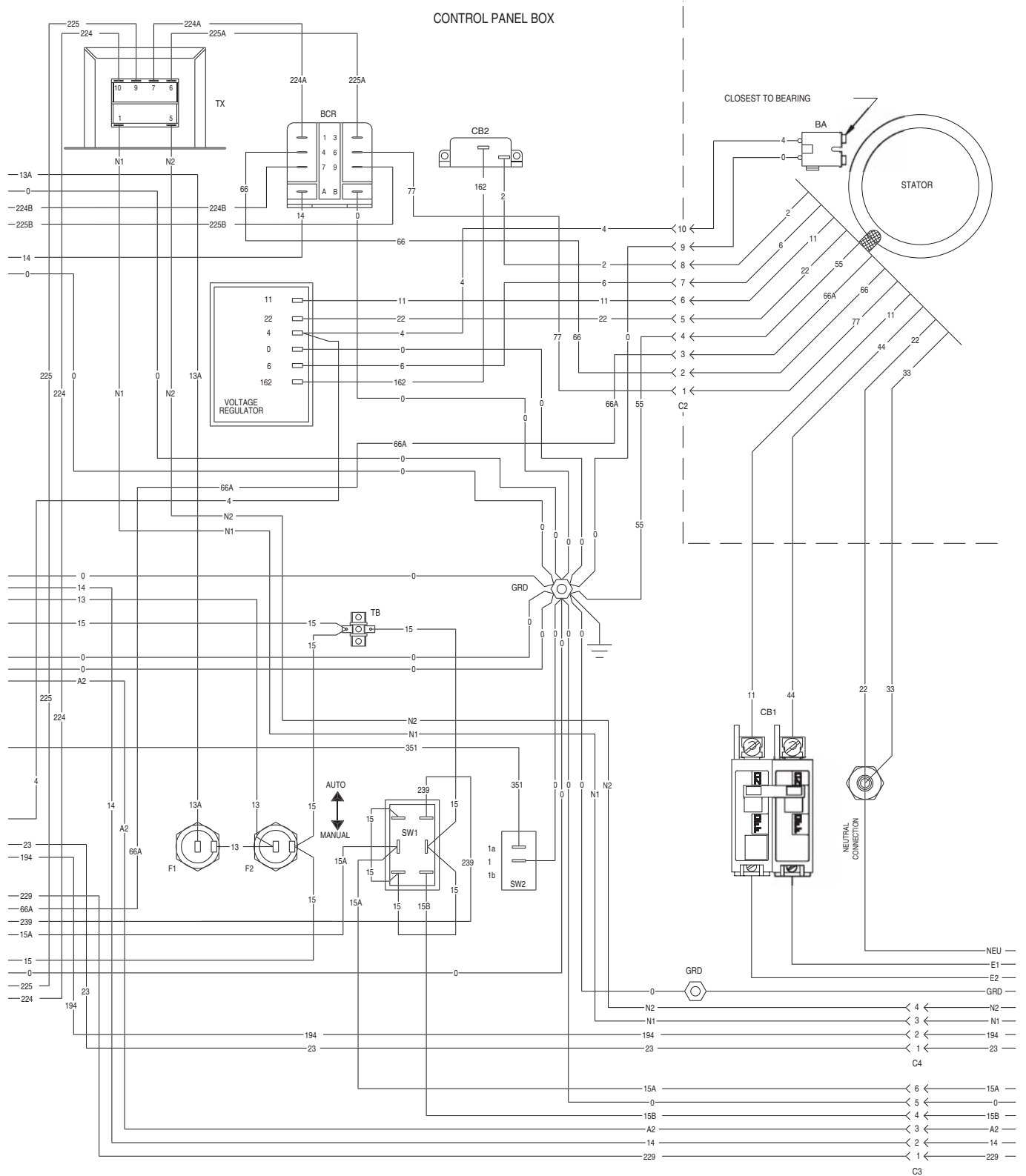
ENGINE WIRING





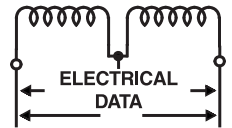
## Section 8 – Electrical Data

### Air-cooled 15 kW Generators Wiring Diagram – Drawing No. 0F5643-B Part 2

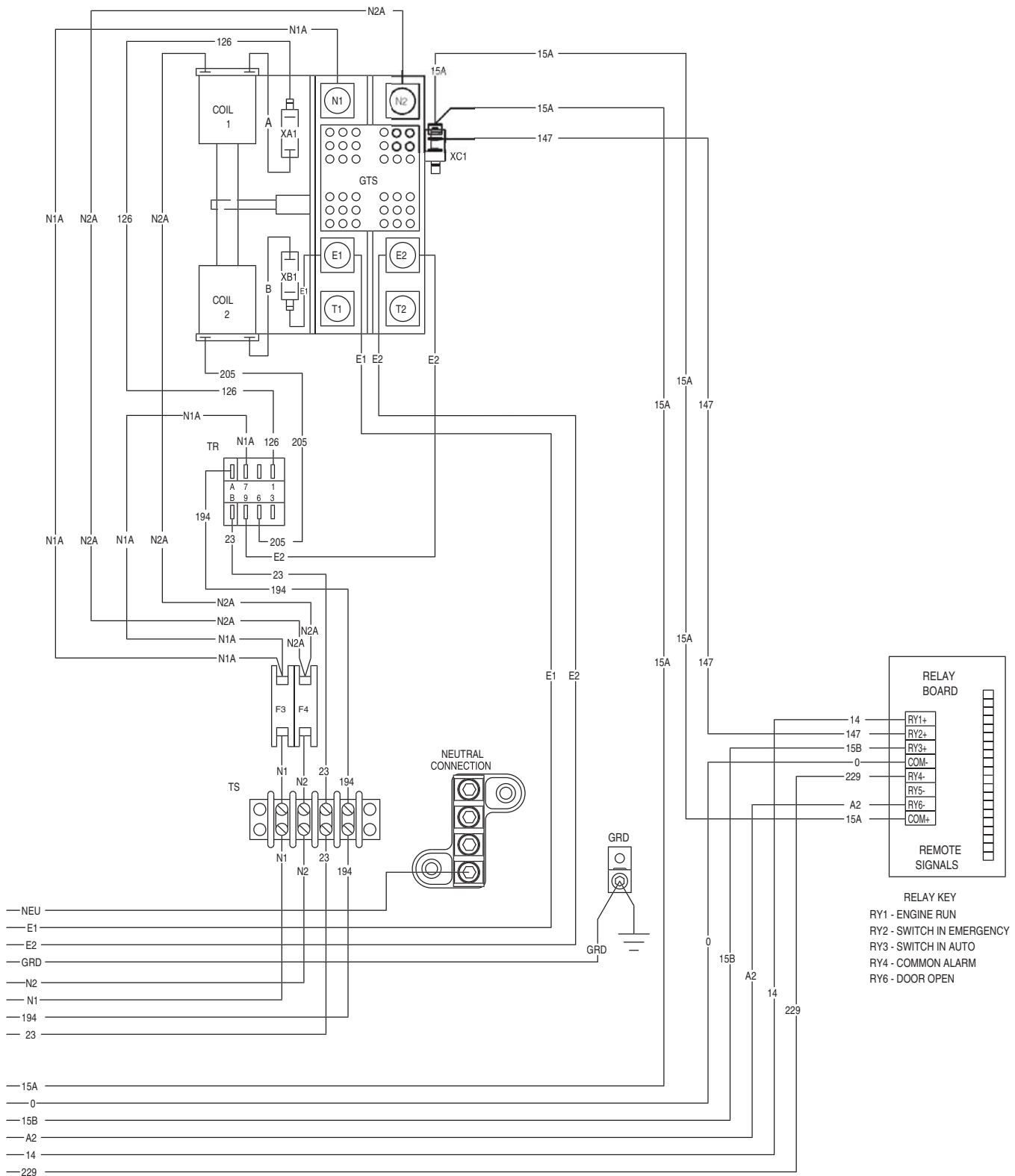


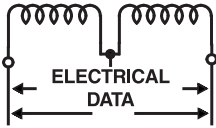


**Section 8 – Electrical Data**  
**Air-cooled 15 kW Generators**  
**Wiring Diagram – Drawing No. 0F5643-B Part 3**



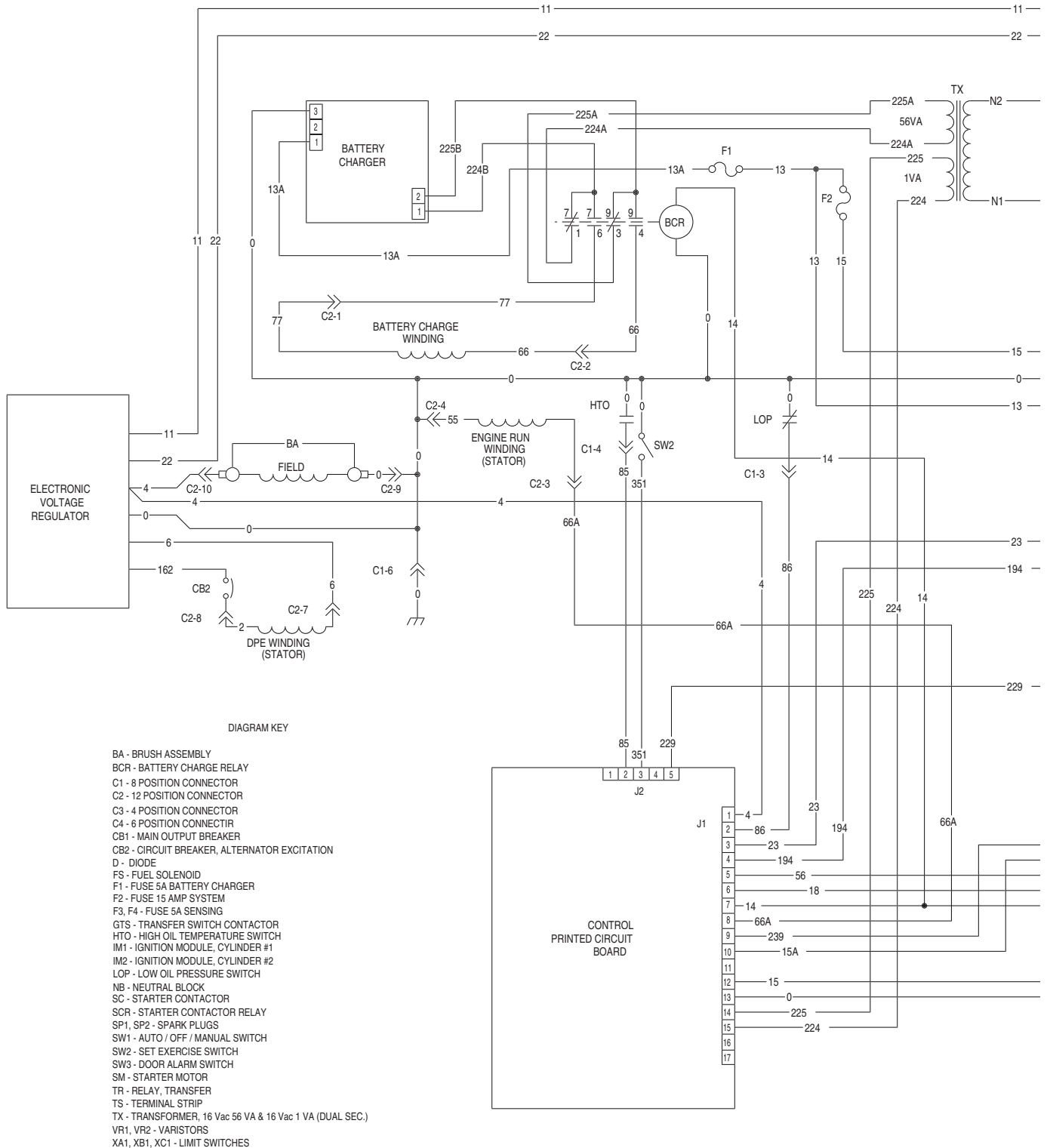
**TRANSFER SWITCH**



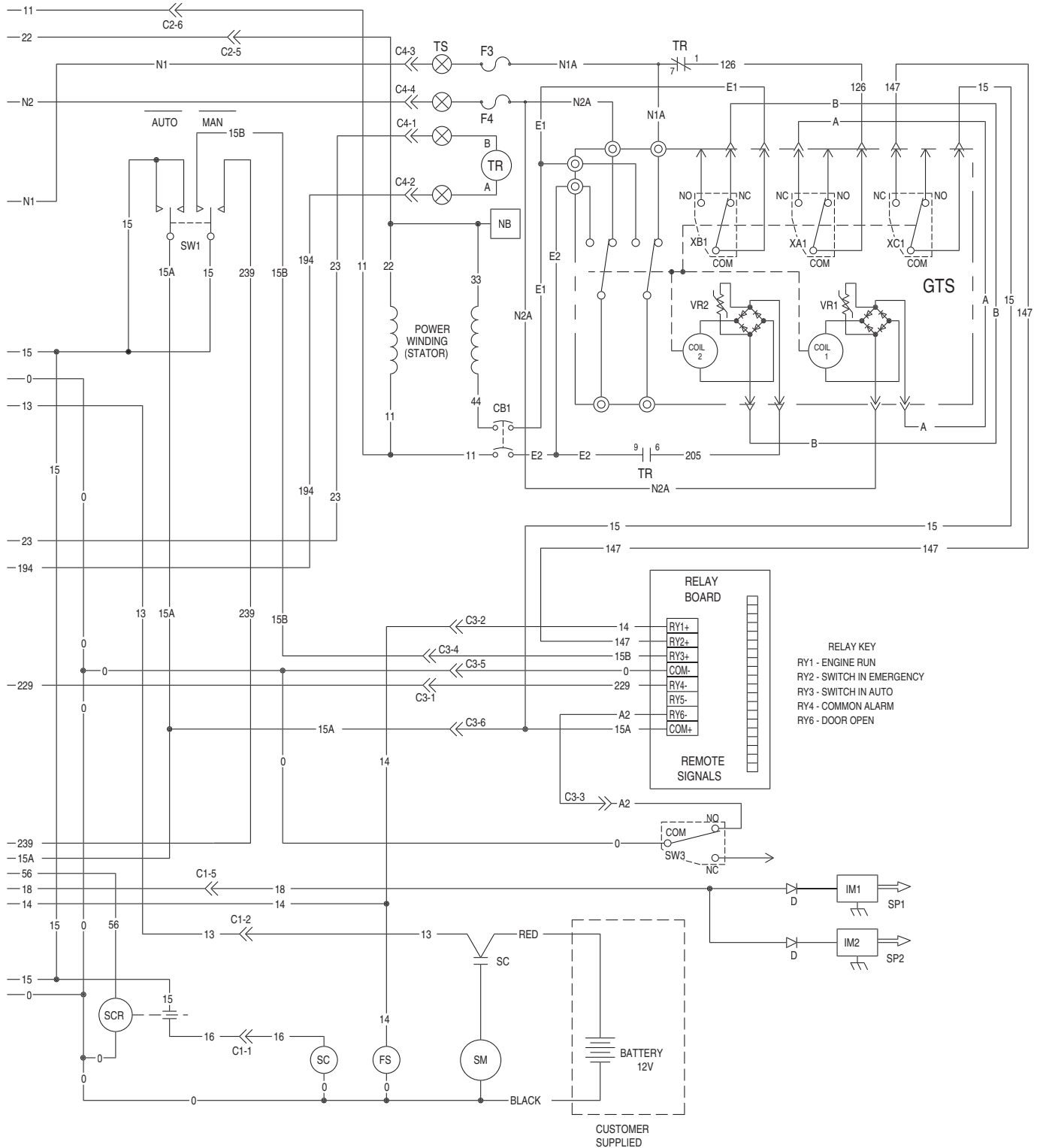
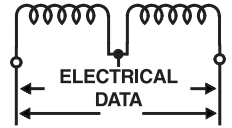


## Section 8 – Electrical Data

### Air-cooled 15 kW Generators Electrical Schematic – Drawing No. 0F5844-B



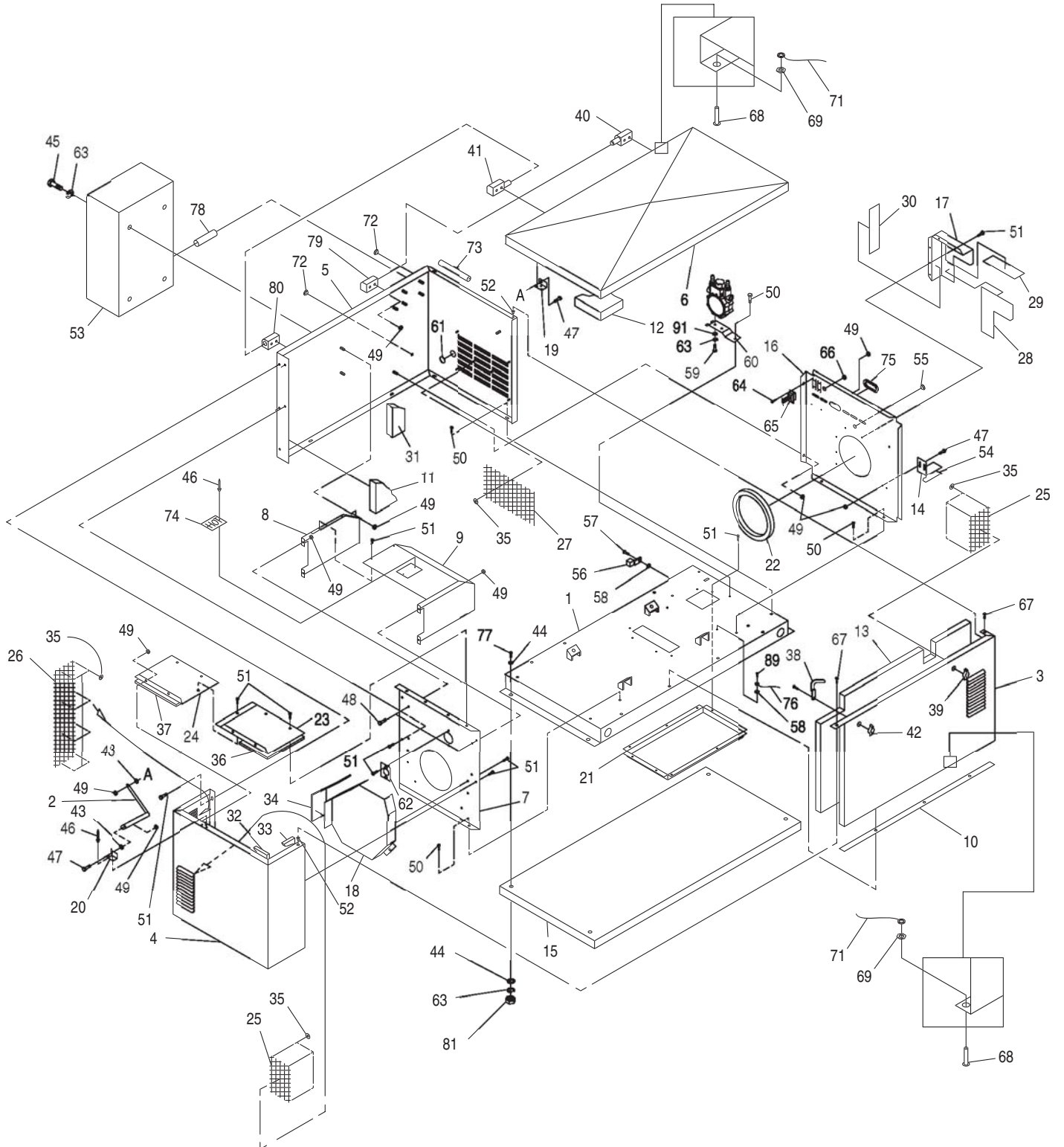
**Section 8 – Electrical Data**  
**Air-cooled 15 kW Generators**  
**Electrical Schematic – Drawing No. 0F5844-B**



**RELAY KEY**  
 RY1 - ENGINE RUN  
 RY2 - SWITCH IN EMERGENCY  
 RY3 - SWITCH IN AUTO  
 RY4 - COMMON ALARM  
 RY6 - DOOR OPEN

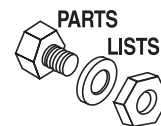
**Section 9 – Exploded Views and Parts Lists**

**Air-cooled 15 kW Generators  
Enclosure – Drawing No. 0F5845**



## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators Enclosure – Drawing No. 0F5845

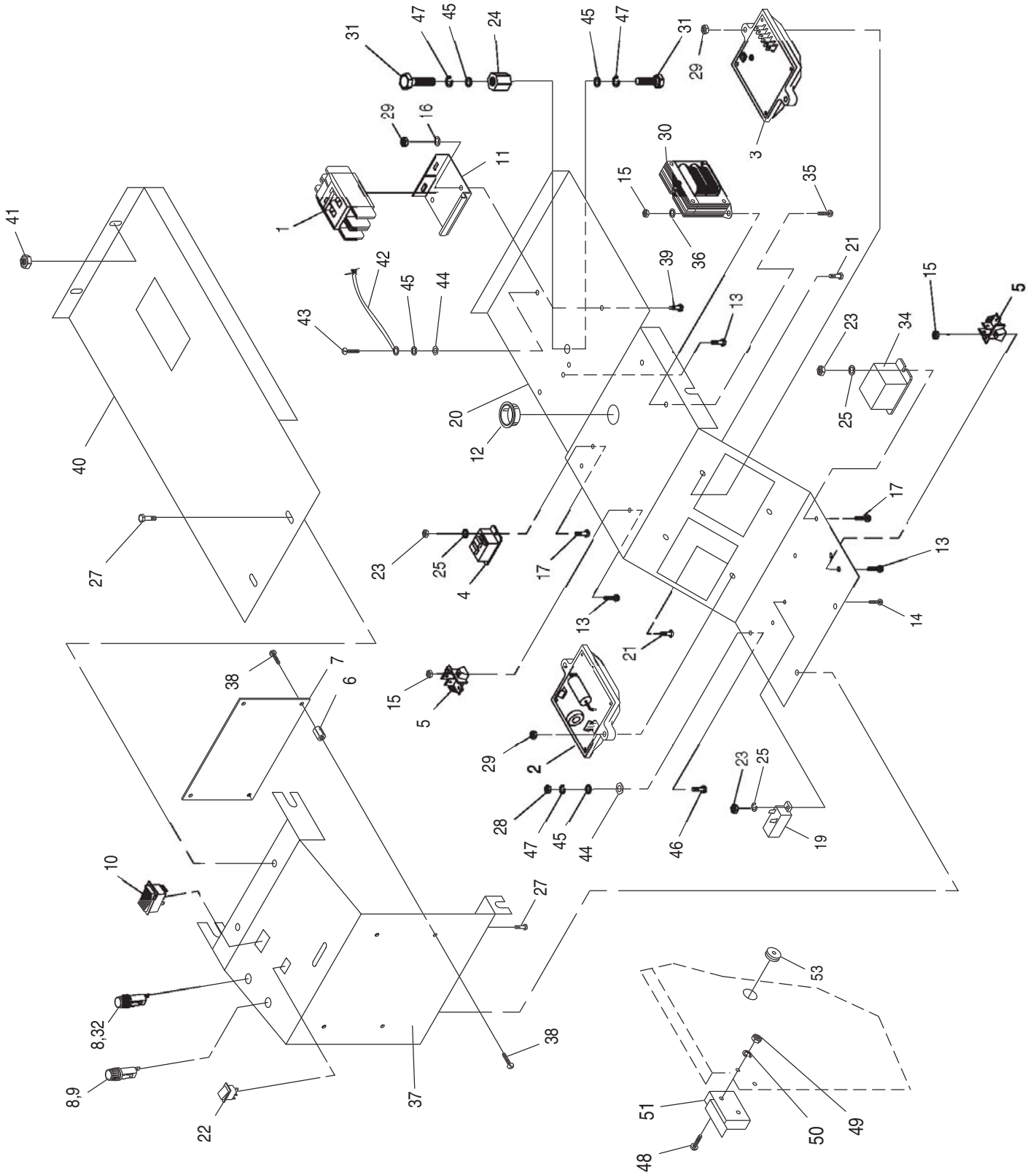


ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DESCRIPTION
1	0C6140	1	ASSEMBLY, ENCLOSURE BASE	41	0F0165	1	HINGE TYPE B WITH STUDS, PIN
2	0C6735	2	SUPPORT, ROOF FOLDING	42	0D3037A	1	LATCH, QUARTER TURN NON-LOCKING
3	0F0063	1	ENCLOSURE, FRONT	43	0A2115	4	WASHER NYLON .250"
4	0C7062	1	ENCLOSURE, EXHAUST SIDE	44	022145	8	WASHER FLAT 5/16
5	0F5629	1	ENCLOSURE, SIDE & BACK	45	042907	4	SCREW HHC M8-1.25 X 16 G8.8
6	0E9873	1	ENCLOSURE, ROOF	46	0F0710	14	RIVET POP 0.125 X 0.337
7	0C7065	1	PANEL, ALTERNATOR DIVIDER	47	047411	6	SCREW HHC M6-1.0 X 16 G8.8
8	0C8101A	1	PANEL, MUFFLER BOX SIDE	48	043116	4	SCREW HHC M6-1.0 X 12 G8.8
9	0C8101B	1	COVER, MUFFLER BOX	49	0D3700	26	NUT, LOCKING FLANGE M6-1.0
10	0C8283	1	GASKET, DOOR SEAL	50	0D4662	11	SCREW HHTT M8-1.2 X 20 BP
11	0C8284A	1	FOAM, BACK ENCLOSURE	51	090388	36	SCREW TAPTITE M6-1.0 X 12 BP
12	0C8284B	1	FOAM, ROOF ENCLOSURE	52	092120	2	NUT LOCK TRIC M6 X 1.0 Y/ZNC
13	0C8284C	1	FOAM, FRONT ENCLOSURE	53	0F5633	1	ASSEMBLY, TRANSFER SWITCH
14	0C8285	1	BRACKET, BATTERY SUPPORT	54	0D3167	1	GASKET, BATTERY SUPPORT BRACKET
15	0C8899A	1	PAD, 24"X48" WITH MOUNTING HOLES	55	0A3328	1	PLUG, PLASTIC 0.593
16	0F5630	1	PANEL, ENGINE DIVIDER	56	055414	1	LUG SLDLSS #2-#8X17/64 CU
17	0E4244	1	BAFFLE, INTAKE	57	092079	1	SCREW TAPTITE M6-1.0X25 BP
18	0D1606	1	HOUSING, FAN	58	0A1658	2	L/WASH SPECIAL ¼
19	0D1839	2	BRACKET, TOP SUPPORT	59	042907	2	SCREW HHC M8-1.25 X 16mm
20	0D1840	2	BRACKET, BOTTOM SUPPORT	60	0E9692	1	BRACKET, REGULATOR MOUNTING
21	0D2425	1	DUCT, BASE AIR	61	0E1330A	1	GROMMET, 38.1 CROSS SLIT WITH HOLE
22	0D2588	1	GASKET, FRONT DIVIDER	62	0E4321	1	PANEL, EXHAUST ALIGNMENT
23	0D2676	1	COVER, FRONT EXHAUST ENCLOSURE	63	022129	10	WASHER LOCK 5/16
24	0D2677	1	COVER, BACK EXHAUST ENCLOSURE	64	074908	8	SCREW TAPTITE M5-0.8 X 10 BP
25	0D2979B	2	CLOTH, HARDWARE 266.7mm x 146mm	65	0D2346	1	HARNESS, ENGINE
26	0D2979C	1	CLOTH, HARDWARE 543mm x 146mm	66	023484F	1	BUSHING, SNAP SB-1000-12
27	0D2979D	1	CLOTH, HARDWARE 266.7mm x 387.4mm	67	0C3906	2	SELF-ALIGN SCREW M6 HH
28	0E4245	1	FOAM, FRONT INTAKE BAFFLE	68	0A7836	2	RIVET, 1/8" X 0.126" - 0.375" LSH POP
29	0E4245A	1	FOAM, TOP INTAKE BAFFLE	69	0A8475	2	L/WASH SPECIAL #10
30	0E4245B	1	FOAM, BACK INTAKE BAFFLE	70	0912970069	1	ASSEMBLY, ROOF / DOOR GROUND WIRE
31	0D3057D	1	FOAM, BACK ENCL. STRIP	71	0912970070	2	ASSEMBLY, ROOF / DOOR GROUND WIRE
32	0D3059A	1	FOAM, EXHAUST SIDE ENCLOSURE END	72	055450	1	PLUG PLASTIC 1.375
33	0D3059B	1	FOAM, EXHAUST SIDE ENCLOSURE FRONT	73	0E5968	11	GASKET, EXTRUDED TRIM
34	0D3059C	1	FOAM, EXHAUST FAN HOUSING	74	0D3701	1	PLATE, "HOT"
35	0D7176	24	WASHER, SELF LOCKING	75	0D3472	1	GROMMET 2.75 X 1/16
36	0D3059D	1	FOAM, FRONT EXHAUST ENCLOSURE COVER	76	0E2874	1	SCREW HHTR 1/4-20 X 3/4
37	0D3059E	1	FOAM, BACK EXHAUST ENCLOSURE COVER	77	043107	4	SCREW HHC M8-1.25 X 25
38	0C7781A	2	DOOR, PAWL	78	0F5681	1	HARNESS
39	0D3037	1	LATCH, QUARTER TURN LOCKING	79	0F0164A	1	HINGE TYPE A WITH STUDS, SOCKET
40	0F0164	1	HINGE TYPE A WITH STUDS, PIN	80	0F0165A	1	HINGE TYPE B WITH STUDS, SOCKET
				81	045771	4	NUT HEX M8-1.25
				82	0D3031	1	FUEL LINE, 3/4"OUTDOOR (NOT SHOWN)



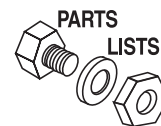
**Section 9 – Exploded Views and Parts Lists**

**Air-cooled 15 kW Generators  
Control Panel – Drawing No. 0F5846**



## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators Control Panel – Drawing No. 0F5846



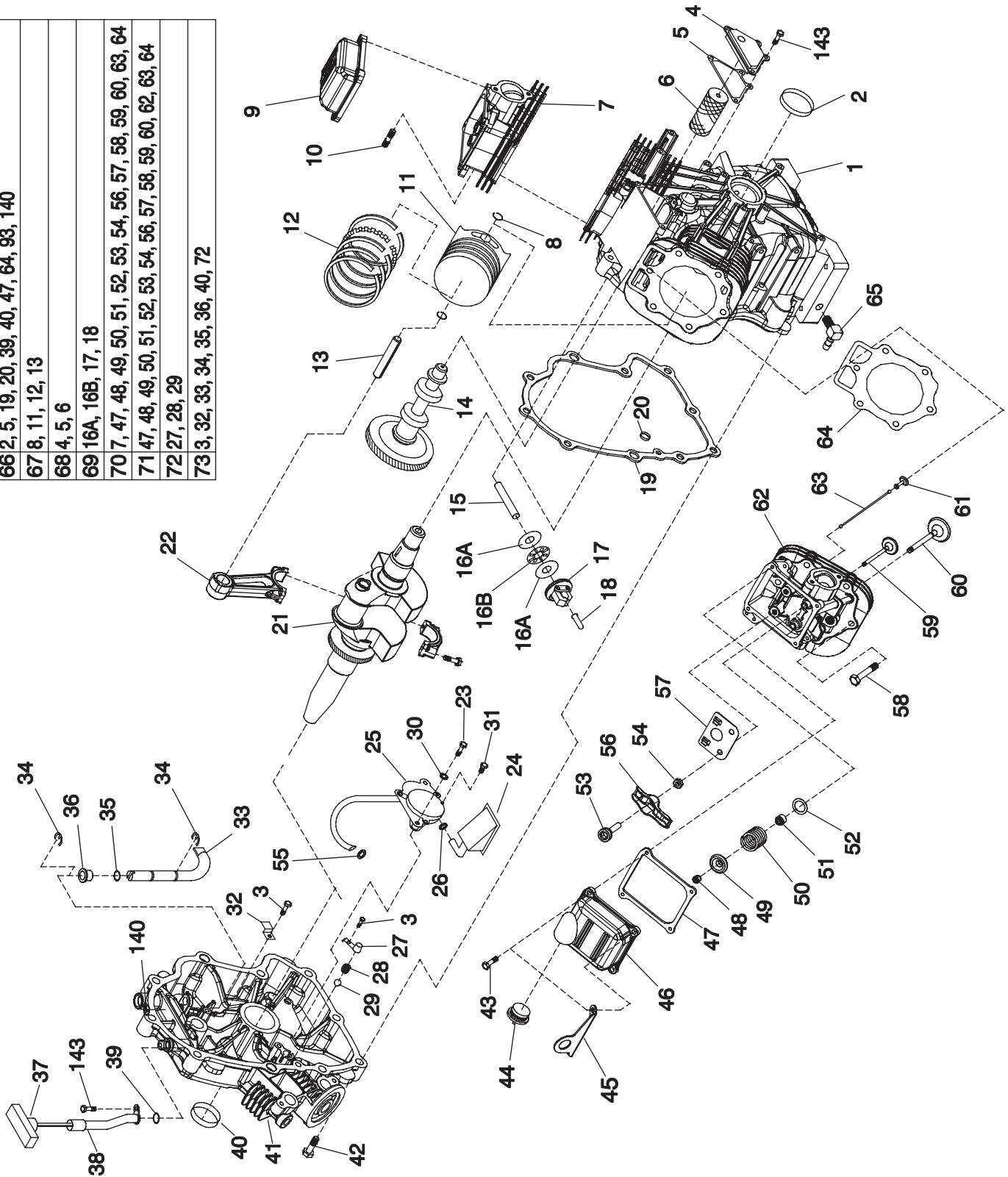
ITEM	PART NO.	QTY.	DESCRIPTION
1	0E7886G	1	CIRCUIT BREAKER 70A X 2P 240V (15KW)
2	0A1801	1	ASSEMBLY, BATTERY CHARGER ENGINE
3	083049	1	ASSEMBLY, POTTED REGULATOR
4	0C2174	1	RELAY, 12V 25A SPST
5	075210A	2	BLOCK 1 POSITION
6	0D3062	4	HEX STAND-OFF #6-32 x 3/8"
7	0D8615	1	ASSEMBLY, HOME STANDBY CONTROLLER
8	032300	2	HOLDER, FUSE
9	022676	1	FUSE, 15AMP X AGC15
10	0E4494	1	SWITCH, ROCKER DPDT ON-OFF-ON
11	0E7890	1	CIRCUIT BREAKER MOUNTING BRACKET
12	023484E	1	SNAP BUSHING
13	075476	4	SCREW PPHM M4-0.7 x 16mm
14	0F4793	2	SCREW PPHM M3-0.5 x 10mm
15	0E6480	6	NUT HEX LOCK M4-0.7 NYLON INSERT
16	023897	2	WASHER FLAT #10
17	0C1085	4	SCREW PPHM M3-0.5 X 8mm
18	0D8443	1	DECAL, CONTROL PANEL (NOT SHOWN)
19	054502	1	CIRCUIT BREAKER 3 X 1 ETA 46-500-P
20	0F5747	1	CONTROL, PANEL BOTTOM
21	075235	4	SCREW HHC M5-0.8 x 30mm
22	0D5240	1	SWITCH, SPST (ON)-ON N/O
23	0D9784	6	NUT HEX LOCK M3-0.5 NYLON INSERT
24	0D8502	1	NEUTRAL CONNECTOR
25	031879	6	WASHER FLAT #4
26	0F5679	1	HARNESS, CONTROL PANEL (NOT SHOWN)
27	074908	4	SCREW TAPTITE, M5-0.8 x 10 BP
28	049813	1	NUT HEX M6-1.0
29	082025	6	NUT HEX LOCK M5-0.8 NYLON INSERT
30	0C3910	1	TRANSFORMER
31	022507	2	SCREW HHC 1/4"-20 x 1/2"
32	099727	1	FUSE 5A X AGC5
33	046689	1	BLOCK TERMINAL STRIP 20A 4 X 6 X 1100V
34	063617	1	RELAY PANEL 12VDC DPDT 10A 240VAC
35	075475	2	SCREW PPHM M4-0.7 x 10mm
36	043180	2	WASHER FLAT M4
37	0D8439	1	COVER, CONTROL PANEL COMPONENT
38	092036	8	SCREW PPHMS/LW #6-32 x 1/4"
39	045770	2	SCREW HHC M5-0.8 x10mm
40	0E7866	1	COVER, CONTROL PANEL
41	0D3700	8	NUT FLANGE M6-1.0 NYLOK
42	0912970069	1	ASSEMBLY, ROOF/DOOR GROUND WIRE
43	0E2874	1	SCREW HHTR 1/4"-20 X 3/4"
44	0A1658	2	WASHER LOCK SPECIAL 1/4"
45	022473	3	WASHER FLAT 1/4"-M6
46	038750	1	SCREW HHC M6-1.0 x 30mm
47	022097	3	WASHER LOCK M6-1/4"
48	027770	2	SCREW RHM #4-40 X 5/8"
49	027771	2	NUT HEX #4-40
50	043182	2	WASHER LOCK M3
51	084464	1	LIMIT SWITCH OPERATION
52	042632	1	GROMMET 1/2 X 1/16 X 3/8

**Section 9 – Exploded Views and Parts Lists**

**Air-cooled 15 kW Generators**

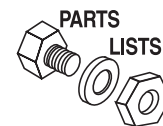
**GT-990 Engine – Drawing No. 0E8774-Q Part 1**

66	2, 5, 19, 20, 39, 40, 47, 64, 93, 140
67	8, 11, 12, 13
68	4, 5, 6
69	16A, 16B, 17, 18
70	7, 47, 48, 49, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 63, 64
71	47, 48, 49, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 62, 63, 64
72	27, 28, 29
73	3, 32, 33, 34, 35, 36, 40, 72



## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators GT-990 Engine – Drawing No. 0E8774-Q Part 1

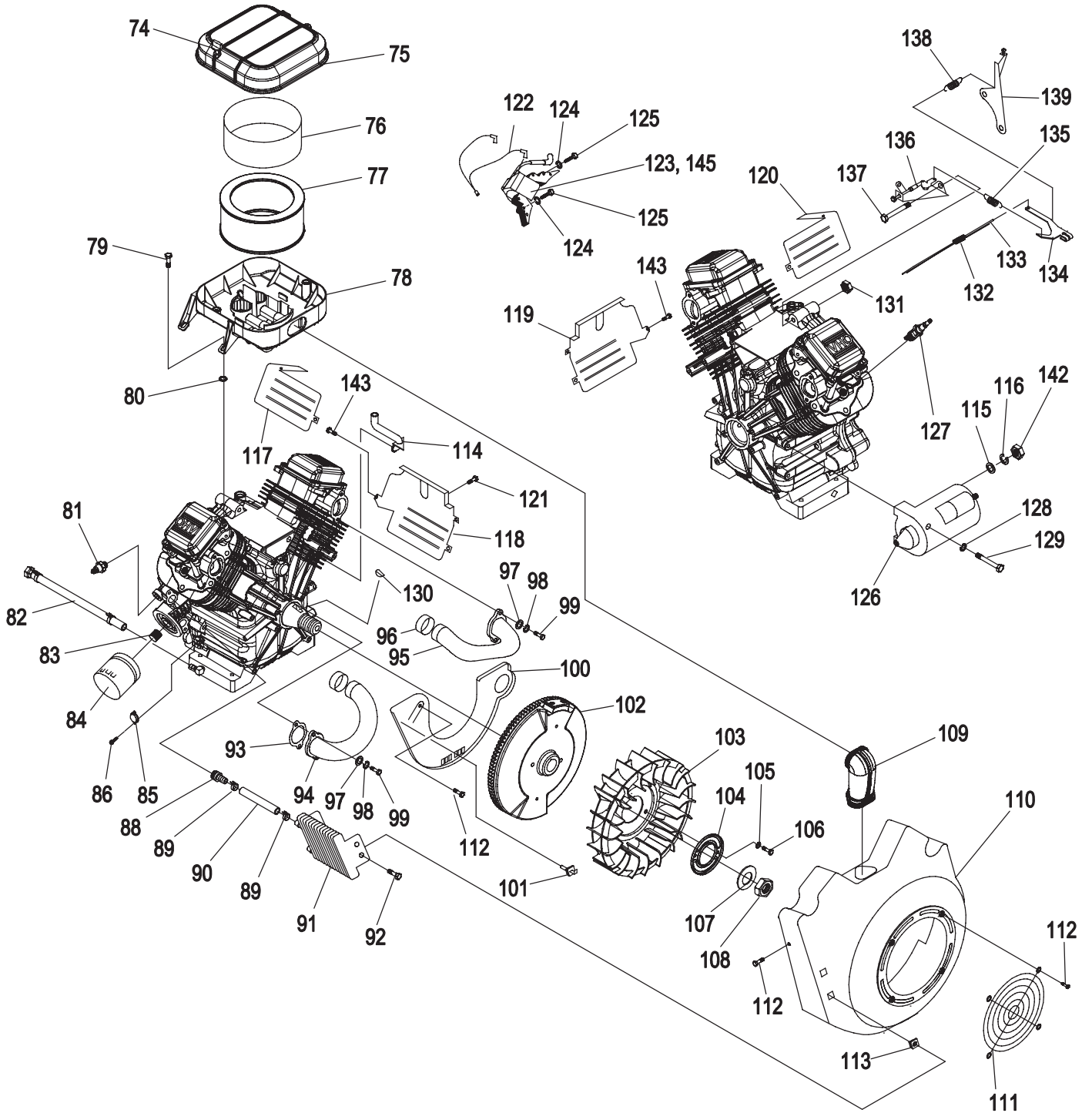


ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DESCRIPTION
1	0C5729	1	ASSEMBLY, CRANKCASE HOUSING WITH SLEEVE	36	0C2992	1	BUSHING, GOVERNOR LOWER
2	0E9843	1	SEAL, 38 I.D. CRANKSHAFT	37	0C3971C	1	ASSEMBLY, DIPSTICK WITH HANDLE
3	090388	3	SCREW, TAPTITE M6-1.0 X 12 YC	38	0C5305	1	TUBE, DIPSTICK
4	0C5372	1	ASSEMBLY, BREATHER	39	0C3027	1	O-RING, OIL CLR 3/8 X 1/2
5	0C3005	1	GASKET, BREATHER COVER	40	0E9842	1	SEAL, 42 I.D. CRANKSHAFT
6	0E3372B	1	SEPARATOR, OIL BREATHER	41	0C5731	1	ASSY, HS COVER W/SLV
7	0D8067A	1	ASSEMBLY, HEAD #1 G&S	42	0C3006	9	SCREW, HHFC M10-1.5 X 55
8	071983	4	RETAINER, PISTON PIN 20	43	080318	8	SCREW HHFC M6-1.0 X 25
9	0C2981C	1	ROCKER, COVER NO OIL FILL	44	093064	1	ASSEMBLY, OIL FILL CAP
10	045761A	4	STUD M8-1.25/10MM X 30 G5 ZINC	45	0G1839	2	LIFT HOOK, GT990/760
11	0E2985	2	PISTON, HC	46	0D2723B	1	ROCKER, COVER WITH OIL FILL
12	021533	2	SET, PISTON RING 90MM	47	0C2979	2	GASKET, VALVE COVER
13	0E1466	2	PIN PISTON	48	086515	8	KEEPER, VALVE SPRING
14	0D4041	1	ASSEMBLY, CAMSHAFT & GEAR	49	0D2274	4	RETAINER, VALVE SPRING
15	0C2983	1	SHAFT, GOVERNOR	50	0D3867	4	SPRING, VALVE
16A	0C2985A	2	ROLLER BEARING, GOVERNOR PLATE	51	078672	2	SEAL, VALVE STEM D7
16B	0C2985B	1	ROLLER BEARING, GOVERNOR	52	0C5371	4	WASHER, VALVE SPRING
17	0D4042	1	ASSEMBLY, GOVERNOR GEAR	53	072694	4	STUD, ROCKER ARM PIVOT
18	0A7811	1	SPOOL, GOVERNOR MACHINED	54	0D3998	4	NUT HEX M8-1.0 G8 YEL CHR
19	0C2977	1	GASKET, CRANK CASE	55	0C3027	2	O-RING, 3/8" X 1/2"
20	0C5943	1	SEAL, OIL PASSAGE	56	0D5313	4	ROCKER ARM
21	0G0140E	1	ASSEMBLY, CRANKSHAFT HORIZONTAL DIRECT DRIVE	57	0D6024	2	PLATE, PUSH ROD GUIDE
22	0E3223	2	ASSEMBLY, CONNECTING ROD	58	0C2976	12	SCREW HHFC M8-1.25 X 65
23	0D2157	2	SCREW SHC M6-1.0 X 50 G8.8	59	086516	2	VALVE, EXHAUST
24	0E6098	1	SCREEN, OIL PICKUP	60	0C2229	2	VALVE, INTAKE
25	0G1536	1	ASSEMBLY, OIL PUMP	61	083897	4	TAPPET, SOLID
26	0E8152	1	O-RING .49 ID X .07 THICK	62	0D8067B	1	ASSEMBLY, HEAD #2 G&S
27	0C3011	2	COVER, OIL RELIEF	63	0D9853D	4	PUSHROD, 147
28	0C3009	2	SPRING, OIL RELIEF	64	0C2978	2	GASKET, HEAD
29	0C3010	2	BALL, 1/2D OIL RELIEF	65	043790	1	BARBED ELBOW 90 3/8NPT X 3/8
30	093873	2	WASHER, LOCK RIB M6	66	0D4010	1	KIT GASKET
31	0F5458	1	SCREW, PLASTITE HI-LOW #10	67	0D4011	1	KIT PISTON & RINGS
32	0C5998	1	CLAMP, OIL TUBE	68	0D4012	1	KIT BREATHER ASSEMBLY
33	0D1667	1	ARM, GOVERNOR	69	0D4013	1	KIT GOVERNOR ASSEMBLY
34	0C2991	2	E-RING, GOVERNOR ARM	70	0D8675A	1	KIT HEAD ASSEMBLY CYLINDER 1
35	0C2988	1	THRUST WASHER, GOVERNOR	71	0D8675B	1	KIT HEAD ASSEMBLY CYLINDER 2
				72	0D4015	1	KIT OIL RELIEF
				73	0D4016	1	KIT GEAR COVER

Section 9 – Exploded Views and Parts Lists

Air-cooled 15 kW Generators

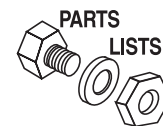
GT-990 Engine – Drawing No. 0E8774-Q Part 2



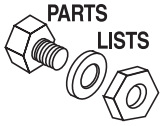


## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators GT-990 Engine – Drawing No. 0E8774-Q Part 2



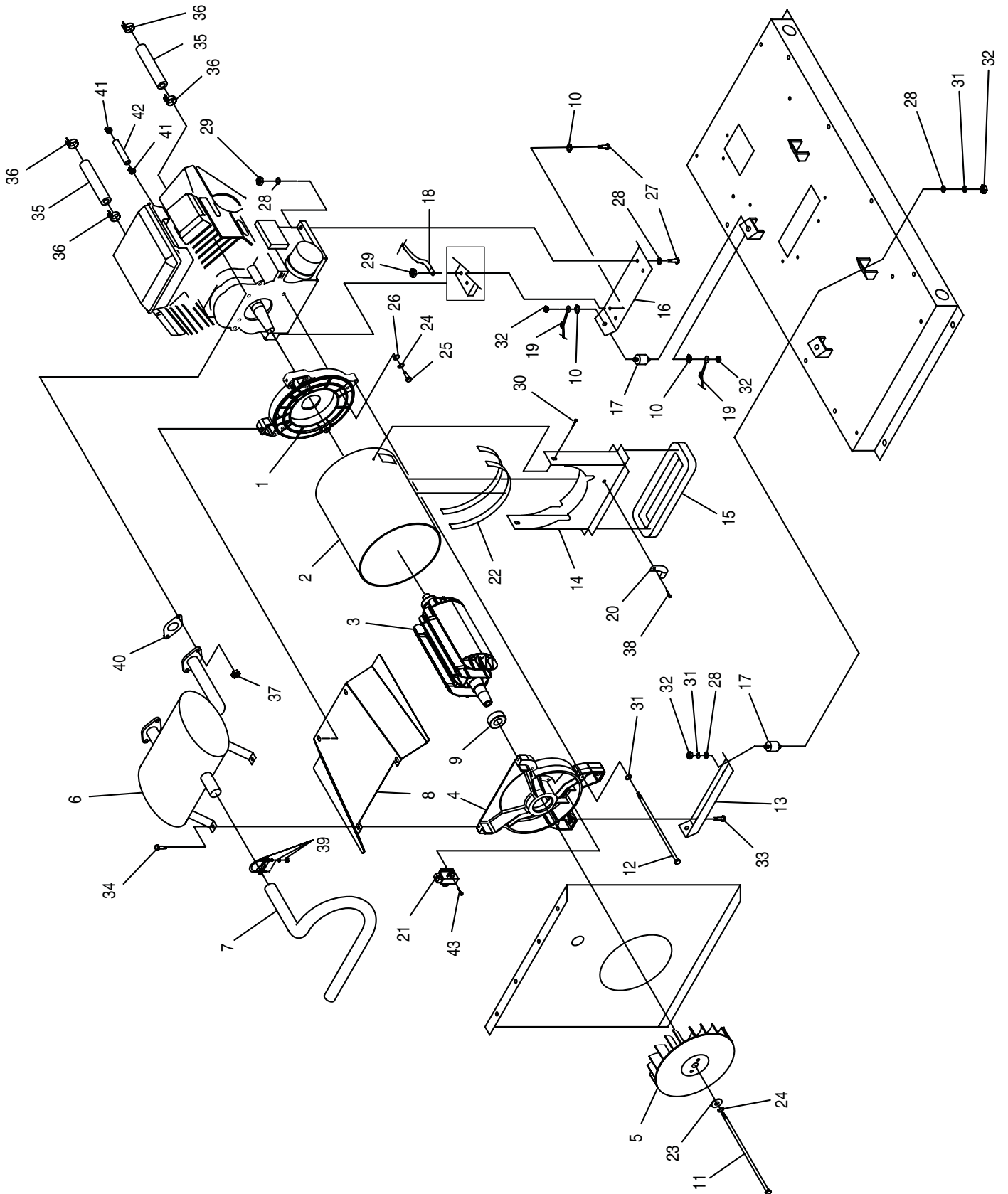
ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DESCRIPTION
74	0C5136A	2	KNOB, AIR CLEANER	110	0C3022A	1	HOUSING, BLOWER NG COOLER
75	0C3024	1	COVER, AIRBOX NG/LP	111	0D1131	1	GUARD, FAN
76	0C3040	1	PRE-CLEANER,	112	045756	25	SCREW TAPTITE M6-1X10 YELLOW CHROME
77	0C8127	1	ELEMENT, AIR CLEANER	113	0C9763	4	NUT, GROMMET 1/4 PLUG
78	0D8564A	1	ASSEMBLY, MIXER/AIRBOX 990	114	0C3036A	1	HOSE, BREATHER
	0D8564B	1	ASSEMBLY, MIXER/AIRBOX 760	115	022145	1	WASHER FLAT 5/16-M8 ZINC
79	0D2595	4	SCREW SHOULDER (8MM) M6-1.0 X 18	116	022129	1	WASHER LOCK M8-5/16
80	0D4417	4	WASHER,RUBBER 1/4" X 1/8" THICK	117	0C3018	1	WRAPPER, UPPER CYLINDER 1
81	0C3025	1	SWITCH, OIL PRESS	118	0C3019	1	WRAPPER, LOWER CYLINDER 1
82	0D3083	1	ASSEMBLY, OIL DRAIN HOSE	119	0D1142A	1	WRAPPER, LOWER CYLINDER 2
83	0C7292	1	NIPPLE, 3/4"-16 UNF	120	0D1143	1	WRAPPER, UPPER CYLINDER 2
84	070185B	1	OIL FILTER	121	0E6043	2	SCREW TAPTITE M5-0.8 X 8 ZP
85	075281	1	SWITCH, THERMAL 284F	122	0F1177	1	ASSEMBLY, GROUND WIRE
86	0F2094	2	SCREW, M3-0.5 X 6 SEMS	123	0C3052	1	ASSY, IGNITION COIL GV-990 CYLINDER 2
87				124	022097	4	WASHER LOCK M6-1/4
88	035461	2	BARBED STR 1/4NPT X 3/8	125	092079	4	SCREW TAPTITE M6-1.0 X 25 BP
89	0F6301	4	CLAMP, HOSE OETIKER 16.5mm	126	0E4271	1	STARTER
90	0G0286	2	HOSE, 3/8" I.D. X 6" LG SAE J30R9	127	0D4529	2	SPARKPLUG
91	0C3026	1	COOLER, OIL	128	022129	2	WASHER LOCK M8-5/16
92	0C9764	4	PLASTITE,1/4-15 X 3/4	129	061906	2	SCREW HHC M8-1.25 X 85 G8.8
93	0C3043	2	GASKET, MANIFOLD / PORT	130	082774	1	KEY, WOODRFF 4 X 19D
94	0C7694	1	MANIFOLD CYLINDER 2	131	0E5343	1	NUT HEX LOCK M10-1.50
95	0C7693	1	MANIFOLD CYLINDER 1	132	0C8468	1	SPRING, ANTI-LASH
96	0C3041A	2	SLEEVE, RUBBER	133	0C3048	1	ROD, GOVERNOR CONTROL
97	070008	4	WASHER FLAT M8 SS	134	0D3754	1	ASSEMBLY, GOVERNOR LEVER
98	070006	4	WASHER LOCK M8 SSTL	135	0D3742	1	SPRING, GOVERNOR
99	040976	4	SCREW SHC M8-1.25 X 20 G12.9	136	0C8482	1	ASSEMBLY, GOVERNOR ADJUSTER
100	0C3016A	1	PLATE, BACKING WITH OIL COOLER	137	0E0486	1	SCREW SHC M10-1.5 X 75 G10.9
101	0E4997	1	GROUND WIRE CONNECTOR	138	0D3743	1	SPRING, GOVERNOR IDLE
102	0C3725B	1	FLYWHEEL ASSEMBLY	139	0D3705	1	ASSEMBLY, GOVERNOR ADJUSTER BRACKET
103	0C3031	1	FAN, NYLON	140	0C2993	1	SEAL, GOVERNOR SHAFT
104	0C3032	1	PLATE, FAN	142	045771	1	NUT HEX M8-1.25 G8
105	0A5992	2	WASHER SHAKEPROOF INT M8 SS	143	0D6147	7	SCREW HHFC M6-1.0 X 10mm
106	051754	2	SCREW HHC M8-1.25 X 12 G8.8	144	0E8152	1	O-RING 0.49" I.D. X 0.07" THICK
107	0C3033	1	WASHER, 25mm I.D.	145	0E7743	1	ASSY, IGNITION COIL 270mm CYLINDER 1
108	0C3034	1	NUT,HEX M24				
109	0C8549A	1	SNORKEL, AIR INTAKE				



## Section 9 – Exploded Views and Parts Lists

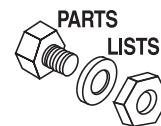
Air-cooled 15 kW Generators

15 kW Generator – Drawing No. 0D3417-L



## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators 15 kW Generator – Drawing No. 0D3417-L

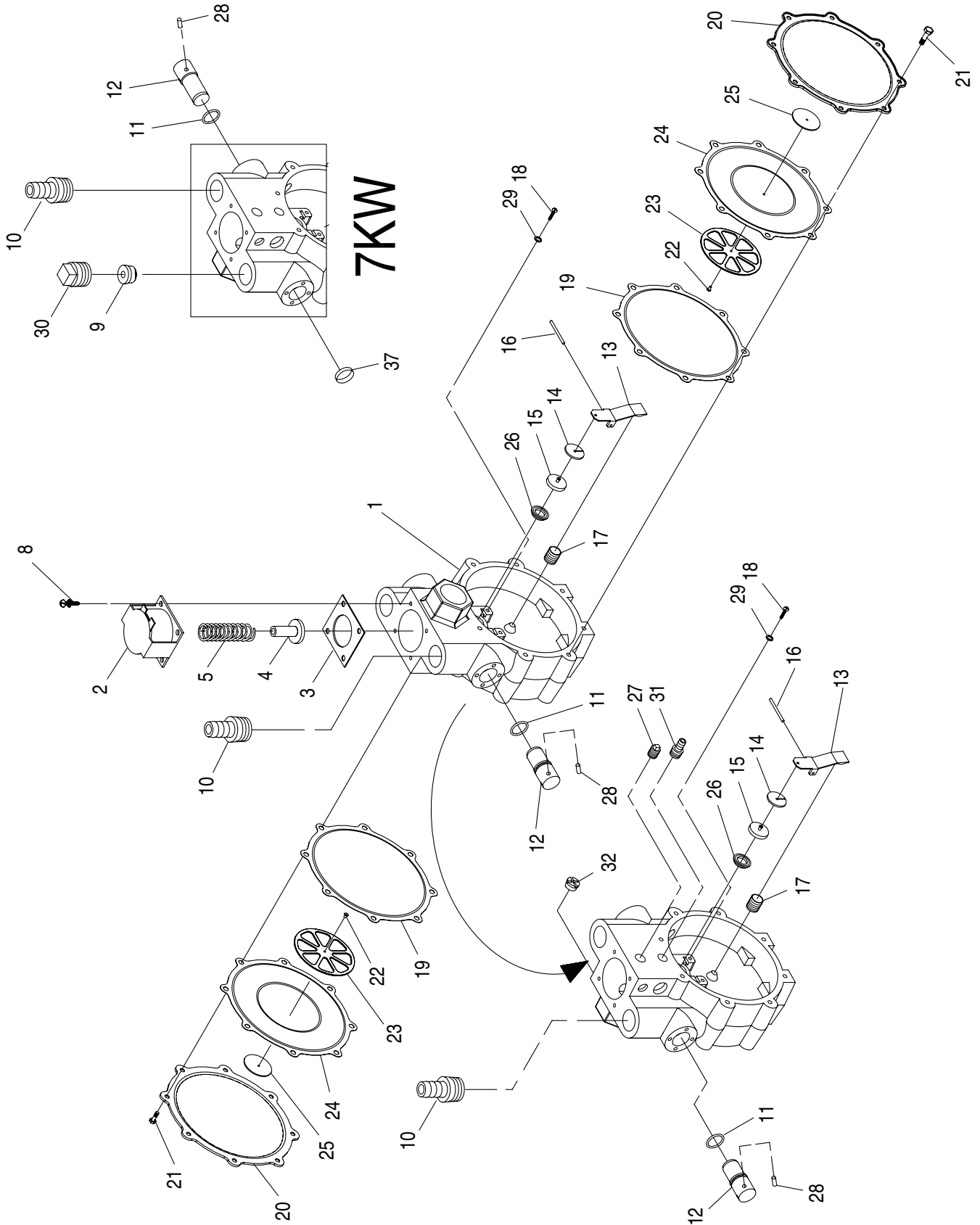


ITEM	PART NO.	QTY.	DESCRIPTION
1	0C6934	1	ADAPTOR, ENGINE
2	0C7930	1	STATOR 12KW
	0D2359		STATOR 13KW / 15KW
3	0C7944	1	ROTOR 12KW
	0D2356		ROTOR 13KW / 15KW
4	0C6043	1	CARRIER, REAR BEARING
5	0D2336	1	FAN, 12" CURVED BLADE
6	0D6634	1	MUFFLER
7	0D3220	1	TAIL PIPE, MUFFLER
8	0C8101	1	PANEL, MUFFLER BASE
9	056482	1	BEARING 1.1811-2.8346
10	0C3168	3	5/16 SPECIAL LOCK WASHER
11	0D1838	1	BOLT, HHCS 3/8"-24 x 15.50"
12	0D1846	4	BOLT, HHCS M8-1.25 x 345mm
13	0C7038	1	BRACKET, ALTERNATOR MOUNTING
14	0D1609	1	DUCT, ALTERNATOR AIR
15	0D2559	1	GASKET, ALTERNATOR AIR DUCT
16	0C7038A	1	BRACKET, ENGINE MOUNTING
17	0C7758	4	RUBBER MOUNT
18	0388050AD0	1	CABLE, #6 48" BLACK BATTERY
19	0C2417A	1	EARTH STRAP 3/8X 3/8
20	082121C	1	CLIP-J, VYNL COAT 0.625" ID
21	066386	1	ASSEMBLY BRUSH HOLDER
22	029451	2.6 FT	TAPE ELEC UL FOAM 1/8 X 1/2
23	049451	1	WASHER FLAT .406ID X 1.62OD
24	022237	5	WASHER LOCK 3/8
25	022511	4	SCREW HHC 3/8-16 X 1-1/4 G5
26	022131	4	WASHER FLAT 3/8 ZINC
27	051731	4	SCREW HHC M8-1.25 X 50 G8.8
28	022145	12	WASHER FLAT 5/16 ZINC
29	049820	4	NUT LOCK HEX M8-1.25 NYL INSERT
30	045756	2	SCREW TAPTITE M6-1.0X10 BP
31	022129	10	WASHER LOCK M8-5/16
32	022259	8	NUT HEX 5/16-18 STEEL
33	059637	2	SCREW TAPTITE 3/8-16 X 3/4 BP
34	0D4662	4	SCREW 5/16-18X3/4" HH THD ROLL
35	0F7065	3 FT	HOSE RES 1/2 LP GAS
36	048031M	4	HOSE CLAMP 3/4" I.D.
37	0F0462	4	NUT HEX W/TOOTH WSHR M8-1.25
38	0C2824	1	SCREW TAP-R #10-32 x 9/16
39	025145	1	U-BOLT 5/16"-18 X 1.25" WITH SADDLE
40	0C4138	2	GASKET, EXHAUST PORT
41	040173	2	CLAMP HOSE #5.5 0.62"-0.62"
42	074995	1.44 FT	HOSE 1/4 ID LPG 350PSI UL21
43	066849	2	SCREW HHTT M5-0.8 X 16

Section 9 – Exploded Views and Parts Lists

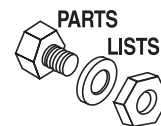
Air-cooled 15 kW Generators

Gas Regulator – Drawing No. 0D8720-H



## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators Gas Regulator – Drawing No. 0D8720-H



ITEM	PART NO.	QTY.	DESCRIPTION
1	0D5694	1	CASTING, TWIN REGULATOR HOUSING
2	0F5022	1	SOLENOID COIL, 12VDC
3	0C4647	1	GASKET , SOLENOID
4	0D4166	1	PLUNGER, LP REGULATOR ASSEMBLY
5	0C6070	1	SPRING-SOLENOID, PLUNGER
8	0F4795	4	SCREW PPHM SEMS M4-0.7 X 10
9	0C5760J	1	JET, GN 410 ENGINE LP (7KW)
10	0C6606	2*	BARBED STRAIGHT 1/2NPT x 1/2
11	097934	2*	O-RING, CHECK VALVE
12	0C4645	2*	ADJUSTER SCREW, TWIN REGULATOR
13	0C5761	2	LEVER, REGULATOR
14	0C5968	2	SUPPORT, INLET SEAL
15	0C6066	2	SEAL, INLET
16	0C5759	2	PIN, PIVOT ARM
17	0C5764	2	SPRING, REGULATOR
	0C5764A	2	SPRING, REGULATOR (7KW)
18	070728	4	SCREW, PFHMS M3-0.5 x 5
19	0C6069	2	GASKET, DIAPHRAGM
20	0C5762	2	COVER, TWIN REGULATOR
21	045764	16	SCREW, TAPTITE M4X8 BP
22	0C6731	2	RIVET, POP .118 X .125
23	0C6067	2	SUPPORT, DIAPHRAGM
24	0C4706	2	DIAPHRAGM, TWIN REGULATOR
25	0C6068	2	CAP, DIAPHRAGM SUPPORT
26	0C4643A	2	INLET, TWIN REGULATOR 11.11 DIA.
27	026073	1	PLUG, STANDARD PIPE 1/8" STEEL SQUARE HEAD
	026073	2	PLUG, STANDARD PIPE 1/8" STEEL SQUARE HEAD (7KW)
28	0A4032	2*	PIN, LIMITED ADJUSTMENT
29	0D3308	4	WASHER, FLAT M3 X 10mm O.D.
30	024310	1	PLUG, STANDARD PIPE 1/2" STEEL SQUARE HEAD (7KW)
31	028414A	1	BARBED STRAIGHT 1/8"NPT X 1/4"
32	0D5698A	1	JET IDLE PRIMER PHILLIPS HD (V-TWIN ONLY)
37	0D3973	1	PLUG, EXPANSION 16mm

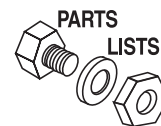
\* A QUANTITY OF 1 IS TO BE USED ON 7KW HOME STANDBY





## Section 9 – Exploded Views and Parts Lists

### Air-cooled 15 kW Generators Transfer Switch – Drawing No. 0F5633\$-A



ITEM	PART NO.	QTY.	DESCRIPTION
1	0D9618	1	TR SW-HSB 200A 2P 250V
2	0E3375	6	LUG SLDLSS 250-#6 AL/CU
3	0F1252	6	SCREW BHSC 1/4-20 X 3/8
4	022097	6	WASHER LOCK M6-1/4
5	074908	5	SCREW HHTT M5-0.8 X 16 BP
6	045771	1	NUT HEX M8-1.25 G8 YEL CHR
7	057329	1	LUG SLDLSS 350-#6 X 13/32 AL/CU
8	027482	1	WASHER SHAKEPROOF EXT 5/16 STL
9	022129	1	WASHER LOCK M8-5/16
10	073590A	2	FUSE 5A X BUS
11****	073591	2	FUSE HOLDER
12	090388	2	SCREW HHTT M6-1.0 X 12 ZINC
13	0A1495	4	SCREW HHTT M4-0.7 X 10 BP
14****	063617	1	RELAY PNL 12VDC DPDT 10A@240VA
15	0C2454	2	SCREW TH-FRM M6-1 X 16 N WA Z/JS
16	0A1661	2	RIVET POP .156 X .675 AL
17	0C4449A	1	ASS'Y-NTRL BL150-200A
18	0F5634	1	WELDMENT XFER SW BOX HSB
19	0E6056	1	COVER TRANSFER SWITCH BOX HSB
20****	0F0668	1	DECAL TRANSFER SWITCH
21	0C2262	1	DECAL TERMINAL STRIP
22***	095282	1	DECAL-LIVE CIRCUIT
23	027770	2	SCREW RHM #4-40 x 5/8
24	064101	4	NUT LOCK FL 3/8-16
25	0F5694	1	SUBPLT TRANSFER SWITCH HSB
26****	063378	3	HOLDER CABLE TIE
27****	028739	5	TIE WRAP UL 3.9" X .10" NATL
28	0F5893	1	DECAL TRANSFER SWITCH DATA 200
29	067210A	1	DECAL GROUND LUG
30	0A9457	1	DECAL NEUTRAL
31	0A9517	1	DECAL MANUAL 5A FUSE
32 *	0E6190	1	DECAL TEST SEQUENCE 2P TS 3R
33	081221	1	DECAL-UL LIST HSB
34	0E6193	1	BRACKET ARM EXTENDER
35	064526	2	SCREW HWHS #6-25 X 3/8 ZNC
36 **	0E6155	1	ARM EXTENDER PIN
37	0F5748	1	HARN 100/200A 2P HS
38 **	0E6033	2	90 DEGREE DN SPADE CONNECTOR
39	0E6303B	1	WIRE E1
40	0E6303	1	WIRE A
41	0E6303A	1	WIRE B
42	0F5770	1	DECAL TERMINAL STRIP
43	020757	1	ALARM PCB
44	0D3062	4	HEX PCB SUPPORT, SCREW-IN
45	092036	8	#6-32 x 0.25" PPH W/ LOCK
46	048850	1	ASSY. TERM. BLOCK 20A 5 x 1100VAC
47	084464	1	LIMIT SW-SW OPERATION
48	043182	2	WASHER LOCK M3

\* CENTER DECAL ON INSIDE OF THE COVER (ITEM #19)

\*\* SUPPLIED WITH TRANSFER SWITCH (ITEM #1).

\*\*\* PLACE DECAL ON OUTSIDE OF COVER, LOWER RIGHT CORNER.

\*\*\*\* NOT SHOWN ON THIS ASSEMBLY, CENTER DECAL ON FRONT OF COVER, 7" FROM TOP OF ENCLOSURE.

\*\*\*\*\* SUPPLIED WITH HARNESS (P/N 0F5748)



## Section 10 – Warranty

### Air-cooled 15 kW Generators

**NOTE: This Emission Control Warranty Statement pertains to this product only IF the generator size is 15 kW or below.**

## CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

### YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (CARB) and Generac Power Systems, Inc. (Generac) are pleased to explain the Emission Control System Warranty on your new engine.\* In California, new utility, and lawn and garden equipment engines must be designed, built and equipped to meet the state's stringent anti-smog standards. Generac will warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect, unapproved modification or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor, ignition system and exhaust system. Generac will repair your engine at no cost to you for diagnosis, replacement parts and labor, should a warrantable condition occur.

### MANUFACTURER'S EMISSION CONTROL SYSTEM WARRANTY COVERAGE:

Emissions control systems on 1995 and later model year engines are warranted for two years as hereinafter noted. If, during such warranty period, any emission-related component or system on your engine is found to be defective in materials or workmanship, repairs or replacement will be performed by a Generac Authorized Warranty Service Facility.

### PURCHASER'S/OWNER'S WARRANTY RESPONSIBILITIES:

As the engine purchaser/owner, you are responsible for the completion of all required maintenance as listed in your factory supplied *Owner's Manual*. For warranty purposes, Generac recommends that you retain all receipts covering maintenance on your engine. However, Generac cannot deny warranty solely due to the lack of receipts or for your failure to ensure the completion of all scheduled maintenance.

As the engine purchaser/owner, you should, however, be aware that Generac may deny any and/or all warranty coverage or responsibility if your engine, or a part/component thereof, has failed due to abuse, neglect, improper maintenance or unapproved modifications, or the use of counterfeit and/or "grey market" parts not made, supplied or approved by Generac.

**You are responsible for contacting a Generac Authorized Warranty Service Facility as soon as a problem occurs.** The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

Warranty service can be arranged by contacting either your selling dealer or a Generac Authorized Warranty Service Facility. To locate the Generac Authorized Warranty Service Facility nearest you, call our toll-free number:

**1-800-333-1322**

**IMPORTANT NOTE:** This warranty statement explains your rights and obligations under the Emission Control System Warranty (ECS Warranty), which is provided to you by Generac pursuant to California law. See also the "Generac Limited Warranties for Generac Power Systems, Inc.," which is enclosed herewith on a separate sheet, also provided to you by Generac. The ECS Warranty applies **only** to the emission control system of your new engine. If there is any conflict in terms between the ECS Warranty and the Generac Warranty, the ECS Warranty shall apply except in circumstances where the Generac Warranty may provide a longer warranty period. Both the ECS Warranty and the Generac Warranty describe important rights and obligations with respect to your new engine.

Warranty service can be performed only by a Generac Authorized Warranty Service Facility. When requesting warranty service, evidence must be presented showing the date of the sale to the original purchaser/owner.

**If there are any questions regarding the warranty rights and responsibilities, contact Generac at the following address:**

**ATTENTION WARRANTY DEPARTMENT  
GENERAC POWER SYSTEMS, INC.  
P.O. BOX 340  
EAGLE, WI 53119**

*Part 1*



### EMISSION CONTROL SYSTEM WARRANTY

Emission Control System Warranty (ECS Warranty) for 1995 and later model year engines:

- (a) **Applicability:** This warranty shall apply to 1995 and later model year engines. The ECS Warranty Period shall begin on the date the new engine or equipment is purchased by/delivered to its original, end-use purchaser/owner and shall continue for 24 consecutive months thereafter.
- (b) **General Emissions Warranty Coverage:** Generac warrants to the original, end-use purchaser/owner of the new engine or equipment and to each subsequent purchaser/owner that each of its engines is ...
  - (1) Designed, built and equipped so as to conform with all applicable regulations adopted by the CARB pursuant to its authority, and
  - (2) Free from defects in materials and workmanship which, at any time during the ECS Warranty Period, may cause a warranted emissions-related part to fail to be identical in all material respects to the part as described in the engine manufacturer's application for certification.
- (c) The ECS Warranty only pertains to emissions-related parts on your engine, as follows:
  - (1) Any warranted, emissions-related parts that are not scheduled for replacement as required maintenance in the *Owner's Manual* shall be warranted for the ECS Warranty Period. If any such part fails during the ECS Warranty Period, it shall be repaired or replaced by Generac according to Subsection (4) below. Any such part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period.
  - (2) Any warranted, emissions-related part that is scheduled only for regular inspection as specified in the *Owner's Manual* shall be warranted for the ECS Warranty Period. A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the ECS Warranty Period. Any such part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period.
  - (3) Any warranted, emissions-related part that is scheduled for replacement as required maintenance in the *Owner's Manual* shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by Generac according to Subsection (4) below. Any such emissions-related part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period prior to the first scheduled replacement point for such emissions-related part.
  - (4) Repair or replacement of any warranted, emissions-related part under this ECS Warranty shall be performed at no charge to the owner at a Generac Authorized Warranty Service Facility.
  - (5) When the engine is inspected by a Generac Authorized Warranty Service Facility, the owner shall not be held responsible for diagnostic costs if the repair is deemed warrantable.
  - (6) Generac shall be liable for damages to other original engine components or approved modifications proximately caused by a failure under warranty of any emission-related part covered by the ECS Warranty.
  - (7) Throughout the ECS Warranty Period, Generac shall maintain a supply of warranted emission-related parts sufficient to meet the expected demand for such emission-related parts.
  - (8) Any Generac authorized and approved emission-related replacement part may be used in the performance of any ECS Warranty maintenance or repairs and will be provided without charge to the owner. Such use shall not reduce Generac ECS Warranty obligations.
  - (9) Unapproved, add-on, modified, counterfeit and/or "grey market" parts may not be used to modify or repair a Generac engine. Such use voids this ECS Warranty and shall be sufficient grounds for disallowing an ECS Warranty claim. Generac shall not be held liable hereunder for failures of any warranted parts of a Generac engine caused by the use of such an unapproved, add-on, modified, counterfeit and/or "grey market" part.

### EMISSION RELATED PARTS INCLUDE THE FOLLOWING:

- 1) Fuel Metering System:
  - 1.2) LPG/Natural Gas carburetion assembly and its internal components.
    - a) Fuel controller (if so equipped)
    - b) Mixer and its gaskets (if so equipped)
    - c) Carburetor and its gaskets (if so equipped)
    - d) Primary gas regulator (if so equipped)
    - e) LP liquid vaporizer (if so equipped)
- 2) Air Induction System including:
  - a) Intake pipe/manifold
  - b) Air cleaner
- 3) Ignition System including:
  - a) Spark plug
  - b) Ignition module
- 4) Catalytic Muffler Assembly (if so equipped) including:
  - a) Muffler gasket
  - b) Exhaust manifold
- 5) Crankcase Breather Assembly including:
  - a) Breather connection tube

\*Generac engine types covered by this warranty statement include the following:

- 1) Prepackaged Standby Generator
- 2) Auxiliary Power Unit (APU) Generator
- 3) Standby Generator

Part 2



## Section 10 – Warranty

### Air-cooled 15 kW Generators

#### GENERAC POWER SYSTEMS STANDARD LIMITED WARRANTY FOR HOME STANDBY/LIGHT COMMERCIAL PRODUCT 45kW AND BELOW

For a period of two (2) years from the date of sale, or start-up by Authorized/Certified Generac Power Systems Dealer, or branch thereof, Generac Power Systems, Inc. will, at its option, repair or replace any part(s) which, upon examination, inspection, and testing by Generac Power Systems or an Authorized/Certified Generac Power Systems Dealer, or branch thereof, is found to be defective under normal use and service, in accordance with the warranty schedule set forth below. Any equipment that the purchaser/owner claims to be defective must be examined by the nearest Authorized/Certified Generac Power Systems Dealer, or branch thereof. This warranty applies only to Generac Power Systems Generators used in "Standby" applications, as Generac Power Systems, Inc. has defined Standby, provided said generator has been properly installed and inspected on-site by appropriate personnel. Scheduled maintenance, as outlined by the generator owner's manual, is highly recommended. This should be performed by an Authorized/Certified Generac Power Systems Dealer, or branch thereof. This will verify service has been performed on the unit throughout the warranty period.

#### WARRANTY SCHEDULE

**YEARS ONE and TWO** — Limited comprehensive coverage on mileage, labor, and parts listed.

• - ALL COMPONENTS

\*Start-up and/or On-line Registration, or Registration Card, along with Proof of Purchase, must be performed and/or sent in.

#### Guidelines:

- Any and all warranty repairs and/or concerns, must be performed and/or addressed by an Authorized/Certified Generac Power Systems Dealer, or branch thereof.
- A Generac Power Systems, Inc. Transfer Switch is highly recommended to be used in conjunction with the genset. If a Non - Generac Power Systems, Inc. Transfer Switch is substituted for use and directly causes damage to the genset, no warranty coverage shall apply.
- All warranty expense allowances are subject to the conditions defined in Generac Power Systems Warranty, Policies, and Procedures Flat Rate Manual.
- Units that have been resold are not covered under the Generac Power Systems Warranty, as this Warranty is not transferable.
- Unit enclosure is only covered against rust or corrosion the first year of the warranty provision.
- Use of Non-Generac replacement part(s) will void the warranty in its entirety.
- Engine coolant heaters (block-heaters), heater controls and circulating pumps are only covered during the first year of the warranty provision (If applicable).

#### THIS WARRANTY SHALL NOT APPLY TO THE FOLLOWING:

1. Any unit built/manufactured prior to January 1, 2005.
2. Costs of normal maintenance (i.e. tune-ups, associated part(s), adjustments, loose/leaking clamps, installation and start-up).
3. Any failure caused by contaminated fuels, oils, coolants/antifreeze or lack of proper fuels, oils or coolants/antifreeze.
4. Units sold, rated or used for "Prime Power", "Trailer Mounted" or "Rental Unit" applications as Generac Power Systems have defined Prime Power, Trailer Mounted or Rental Unit. Contact a Generac Power Systems Distributor for Prime Power, Trailer Mounted or Rental Unit definition and warranty.
5. Units used for prime power in place of existing utility power where utility is present or in place of utility power where utility power service does not normally exist.
6. Failures caused by any external cause or act of God such as, but not limited to, collision, fire, theft, freezing, vandalism, riot or wars, lightning, earthquake, windstorm, hail, volcanic eruption, water or flood, tornado, hurricane, terrorist acts or nuclear holocaust.
7. Products that are modified or altered in a manner not authorized by Generac Power Systems in writing.
8. Failures due, but not limited to, normal wear and tear, accident, misuse, abuse, negligence, or improper installation or sizing.
9. Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
10. Failure due to misapplication, misrepresentation, or bi-fuel conversion.
11. Telephone, facsimile, cell phone, satellite, internet, or any other communication expenses.
12. Rental equipment used while warranty repairs are being performed (i.e. rental generators, cranes, etc.).
13. Overtime, holiday, or emergency labor.
14. Planes, ferries, railroad, busses, helicopters, snowmobiles, snow-cats, off-road vehicle or any other mode of transportation deemed abnormal.
15. Any and all expenses incurred investigating performance complaints unless defective Generac materials and/or workmanship were the direct cause of the problem.
16. Starting batteries, fuses, light bulbs, engine fluids, and overnight freight cost for replacement part(s).

THIS WARRANTY IS IN PLACE OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, SPECIFICALLY, GENERAC POWER SYSTEMS MAKES NO OTHER WARRANTIES AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to purchaser/owner.

GENERAC POWER SYSTEMS ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL GENERAC POWER SYSTEMS BE LIABLE FOR ANY INCIDENTAL, OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC POWER SYSTEMS, INC. NEGLIGENCE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to purchaser/owner. Purchaser/owner agrees to make no claims against Generac Power Systems, Inc. based on negligence. This warranty gives purchaser/owner specific legal rights. Purchaser/owner also may have other rights that vary from state to state.

**Generac Power Systems, Inc. · P.O. Box 8 · Waukesha, WI 53187**  
**Ph: (262) 544-4811 · Fax: (262) 544-4851**

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