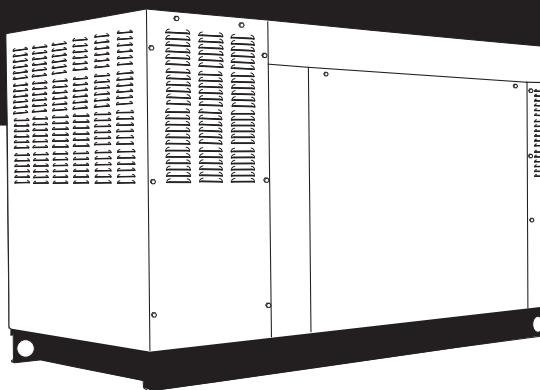


Serial Number

**2.4L**  
**45kW**  
**Models**  
**EPA Certified**

# STATIONARY EMERGENCY GENERATOR OWNER'S MANUAL



*A new standard of reliability*

⚠ Not intended for use in critical life support applications. ⚠

— ⚠ **CAUTION** ⚠ —

ONLY QUALIFIED ELECTRICIANS OR CONTRACTORS SHOULD ATTEMPT INSTALLATION!  
DEADLY EXHAUST FUMES. OUTDOOR INSTALLATION ONLY!

This manual should remain with the unit.

| <b>SECTION</b>                              | <b>PAGE</b> |                                                      |             |
|---------------------------------------------|-------------|------------------------------------------------------|-------------|
| <b>INTRODUCTION</b>                         | <b>1-1</b>  | Initial Inspection for Genset Start-up               | 8-1         |
| Read this Manual Thoroughly                 | 1-1         | Start-up Checklist                                   | 8-2         |
| Operation and Maintenance                   | 1-1         | Preparation for Start-up                             | 8-2         |
| How to Obtain Service                       | 1-1         | <b>OPERATION</b>                                     | <b>9-1</b>  |
| <b>SAFETY RULES</b>                         | <b>1-2</b>  | Stationary Emergency Generator Control and Operation | 9-1         |
| <b>IDENTIFICATION RECORD</b>                | <b>2-1</b>  | Operating Unit with Manual Transfer Switch           | 9-1         |
| Data Label                                  | 2-1         | Engine Start-up and Transfer                         | 9-1         |
| <b>EQUIPMENT DESCRIPTION</b>                | <b>3-1</b>  | Retransfer and Shutdown                              | 9-1         |
| Equipment Description                       | 3-1         | Operating Unit with Automatic Transfer Switch        | 9-1         |
| Engine Oil Recommendations                  | 3-1         | <b>MAINTENANCE</b>                                   | <b>10-1</b> |
| Coolant Recommendations                     | 3-1         | Maintenance Performed by Service Dealers/Contractors | 10-1        |
| <b>ENGINE PROTECTIVE DEVICES</b>            | <b>4-1</b>  | Every Three Months                                   | 10-1        |
| Engine Protective Devices                   | 4-1         | Once Every Six Months                                | 10-1        |
| High Coolant Temperature Switch             | 4-1         | Once Annually                                        | 10-1        |
| Low Coolant Level Sensor                    | 4-1         | First 30 Operating Hours                             | 10-1        |
| Low Oil Pressure Switch                     | 4-1         | First 100 Operating Hours                            | 10-1        |
| Overcrank Shutdown                          | 4-1         | Every 500 Operating Hours                            | 10-1        |
| Overspeed Shutdown                          | 4-1         | Cooling System                                       | 10-1        |
| RPM Sensor Loss Shutdown                    | 4-1         | Overload Protection for Engine DC Electrical System  | 10-1        |
| DC Fuses                                    | 4-1         | Checking Fluid Levels                                | 10-1        |
| <b>FUEL SYSTEMS</b>                         | <b>5-1</b>  | Check Engine Oil                                     | 10-1        |
| Fuel Requirements                           | 5-1         | Battery Fluid                                        | 10-2        |
| Natural Gas Fuel System                     | 5-1         | Engine Coolant                                       | 10-2        |
| Propane Vapor Withdrawal Fuel System        | 5-1         | Maintenance Owner/Operator Can Perform               | 10-2        |
| LP Liquid Fuel System                       | 5-1         | Check Engine Oil Level                               | 10-2        |
| <b>SPECIFICATIONS</b>                       | <b>6-1</b>  | Check Battery                                        | 10-2        |
| Stationary Emergency Generator              | 6-1         | Exercise System                                      | 10-2        |
| Engine                                      | 6-1         | Inspect Cooling System                               | 10-2        |
| Cooling System                              | 6-1         | Check Engine Coolant Level                           | 10-2        |
| Fuel System                                 | 6-1         | Perform Visual Inspection                            | 10-2        |
| Electrical System                           | 6-1         | Inspect Exhaust System                               | 10-2        |
| Weather and Maintenance Kits                | 6-2         | Check Fan Belt                                       | 10-2        |
| Reconfiguring the Fuel System               | 6-2         | Inspect Engine Governor                              | 10-3        |
| Fuel System                                 | 6-2         | Changing Engine Oil                                  | 10-3        |
| Control Panel                               | 6-2         | Changing the Engine Air Filter                       | 10-3        |
| <b>GENERAL INFORMATION</b>                  | <b>7-1</b>  | Spark Plugs                                          | 10-4        |
| Alternator AC Lead Connections              | 7-1         | Coolant Change                                       | 10-4        |
| Four-lead, Single-phase Stator              | 7-1         | Miscellaneous Maintenance                            | 10-4        |
| Alternator Power Winding Connections        | 7-1         | Cleaning the Stationary Emergency Generator          | 10-4        |
| 3-phase Alternators                         | 7-1         | Battery                                              | 10-4        |
| 3-phase Alternators ("Delta" Configuration) | 7-2         | Battery Maintenance                                  | 10-4        |
| <b>INSTALLATION</b>                         | <b>8-1</b>  | Battery Replacement                                  | 10-5        |
| Installation                                | 8-1         | Repair Parts                                         | 10-5        |
| Preparation Before Start-up                 | 8-1         | <b>SERVICE SCHEDULE</b>                              | <b>11-1</b> |
| Transfer Switch                             | 8-1         | <b>TROUBLESHOOTING</b>                               | <b>12-1</b> |
| Fuel System                                 | 8-1         | Troubleshooting Guide                                | 12-1        |
| Generator Set Lubrication                   | 8-1         | <b>EMISSIONS WARRANTY</b>                            | <b>13-1</b> |
| Prior to Initial Start-up                   | 8-1         | <b>NOTES</b>                                         |             |
| Engine Coolant                              | 8-1         | <b>EXPLODED VIEWS &amp; PARTS LISTS</b>              |             |
| Belt Tension                                | 8-1         | <b>WIRING DIAGRAMS &amp; SCHEMATICS</b>              |             |
| Electrical System                           | 8-1         |                                                      |             |



 **SAVE THESE INSTRUCTIONS** – The manufacturer suggests that these rules for safe operation be copied and posted in potential hazard areas. Safety should be stressed to all operators, potential operators, and service and repair technicians for this equipment. 

## INTRODUCTION

Thank you for purchasing this model of the stationary emergency generator product line.

Every effort was expended to make sure that the information and instructions in this manual were both accurate and current at the time the manual was written. However, the manufacturer reserves the right to change, alter or otherwise improve this product(s) at any time without prior notice.

### ◆ READ THIS MANUAL THOROUGHLY

If any portion of this manual is not understood, contact the nearest Service 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 service or 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, or property damage.**



**After this heading, read instructions that, if not strictly complied with, may result in 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.

**For safety reasons, the manufacturer recommends that this equipment be installed, serviced and repaired by a Service Dealer or other competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations. The operator also must comply with all such codes, standards and regulations.**

### ◆ 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 a Service 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 ensure a minimum number of problems and keep operating expenses at a minimum. See a Service Dealer for service aids and accessories.

Operating instructions presented in this manual assume that the generator electric system has been installed by a Service Dealer or other competent, qualified contractor. Installation of this equipment is not a "do-it-yourself" project.

### ◆ HOW TO OBTAIN SERVICE

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

When contacting a dealer about parts and service, always supply the complete Model Number, Serial Number and Type Code (where applicable) from the DATA LABEL that is affixed to the unit.



### 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 a procedure, work method or operating technique is used that 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 install, 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.**



### GENERAL HAZARDS

- For safety reasons, the manufacturer recommends that this equipment be installed, serviced and repaired by a Service Dealer or other competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations. The operator also must comply with all such codes, standards and regulations.
- Installation, operation, servicing and repair of this (and related) equipment must always 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, operated and serviced in accordance with the manufacturer's instructions and recommendations. Following installation, do nothing that might render the unit unsafe or in noncompliance with the aforementioned codes, standards, laws and regulations.
- The engine exhaust fumes contain carbon monoxide gas, which can be DEADLY. This dangerous gas, if breathed in sufficient concentrations, can cause unconsciousness or even death. For that reason, adequate ventilation must be provided. This should be considered prior to installing the generator. The unit should be positioned to direct exhaust gasses safely away from any building where people, animals, etc., will not be harmed. Any exhaust stacks that ship loose with the unit must be installed properly per the manufacturer's instruction, and in strict compliance with applicable 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 in any room or building housing the generator to prevent buildup of explosive gases and to ensure 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.
- Keep the area around the generator clean and uncluttered. Remove any materials that could become hazardous.
- 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 promptly repair or replace all worn, damaged or defective parts using only factory-approved parts.
- 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.



## Standby Emergency Generator Important Safety Instructions



### **ELECTRICAL HAZARDS**

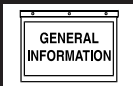
- All stationary emergency generators covered by this manual produce dangerous electrical voltages and can cause fatal electrical shock. Utility power delivers extremely high and dangerous voltages to the transfer switch as well as the generator. Avoid contact with bare wires, terminals, connections, etc., on the generator as well as the transfer switch, if applicable. 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.
- If personnel must stand on metal or concrete while installing, operating, servicing, adjusting or repairing this equipment, place insulative mats over a dry wooden platform. Work on the equipment only while standing on such insulative mats.
- The National Electrical Code (NEC) requires the frame and external electrically conductive parts of the generator to be connected to an approved earth ground. This grounding will help prevent dangerous electrical shock that might be caused by a ground fault condition in the generator or by static electricity. Never disconnect the ground wire.
- Wire gauge sizes of electrical wiring, cables and cord sets must be adequate to handle the maximum electrical current (ampacity) to which they will be subjected.
- Before installing or servicing this (and related) equipment, make sure that all power voltage supplies are positively turned off at their source. Failure to do so will result in hazardous and possibly fatal electrical shock.
- Connecting this unit to an electrical system normally supplied by an electric utility shall be by means of a transfer switch so as to isolate the generator electric system from the electric utility distribution system when the generator is operating. Failure to isolate the two electric system power sources from each other by such means will result in damage to the generator and may also result in injury or death to utility power workers due to backfeed of electrical energy.
- Stationary emergency generators installed with an automatic transfer switch will crank and start automatically when normal (utility) source voltage is removed or is below an acceptable preset level. To prevent such automatic start-up and possible injury to personnel, disable the generator's automatic start circuit (battery cables, etc.) before working on or around the unit. Then, place a "Do Not Operate" tag on the generator control panel and on the transfer switch.
- 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 dry 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**

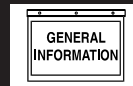
- Keep a fire extinguisher near the generator at all times. Do NOT use any carbon tetra-chloride type extinguisher. Its fumes are toxic, and the liquid can deteriorate wiring insulation. Keep the extinguisher properly charged and be familiar with its use. If there are any questions pertaining to fire extinguishers, consult the local fire department.

### **EXPLOSION HAZARDS**

- Properly ventilate any room or building housing the generator to prevent build-up of explosive gas.
- 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.
- These generators may operate using one of several types of fuels. All fuel types are potentially FLAMMABLE and/or EXPLOSIVE and should be handled with care. Comply with all laws regulating the storage and handling of fuels. Inspect the unit's fuel system frequently and correct any leaks immediately. Fuel supply lines must be properly installed, purged and leak tested according to applicable fuel-gas codes before placing this equipment into service.
- Diesel fuels are highly FLAMMABLE. Gaseous fluids such as natural gas and liquid propane (LP) gas are extremely EXPLOSIVE. Natural gas is lighter than air, and LP gas is heavier than air; install leak detectors accordingly.



# Stationary Emergency Generator General Information



## IDENTIFICATION RECORD

### ◆ DATA LABEL

Every generator set has a DATA LABEL that contains important information pertinent to the generator. The data label, which can be found attached to the generator's lower connection box, lists the unit's serial number and its rated voltage, amps, wattage capacity, phase, frequency, rpm, power factor, production date, etc.

### NOTE:

For actual information related to this particular model, please refer to the Manual Drawing Listing located at the end of this manual, or to the data label affixed to the unit.

### ★ *Stationary Emergency Generator Model and Serial Number*

This number is the key to numerous engineering and manufacturing details pertaining to your unit. Always supply this number when requesting service, ordering parts or seeking information.

### *Data Label*

|                                                                                              |                                |                                          |                              |
|----------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------|------------------------------|
| MODEL                                                                                        | <input type="text"/>           | <input type="text"/>                     |                              |
| PROD DATE                                                                                    | <input type="text"/>           | SERIAL <input type="text"/>              |                              |
| KW <input type="text"/>                                                                      | KVA <input type="text"/>       | PHASE <input type="text"/>               | HERTZ <input type="text"/>   |
| VOLT <input type="text"/>                                                                    | AMP <input type="text"/>       | PWR FACT <input type="text"/>            | ALT RPM <input type="text"/> |
| ENG RPM <input type="text"/>                                                                 | TYPE CODE <input type="text"/> |                                          |                              |
| ALT SUBTRANS REACTANCE <input type="text"/>                                                  |                                | ALT TRANS REACTANCE <input type="text"/> |                              |
| CLASS <input type="checkbox"/> ROTOR <input type="checkbox"/> STATOR WINDING INS AT 25°C AMB |                                |                                          |                              |
| <input type="text"/>                                                                         |                                | <input type="text"/>                     |                              |
| MODEL NO (CAT/CUST NO)                                                                       |                                | SERIAL NO                                |                              |
| <input type="text"/>                                                                         |                                | <input type="text"/>                     |                              |
| <input type="text"/>                                                                         |                                | <input type="text"/>                     |                              |

0G2110 REV C



## EQUIPMENT DESCRIPTION

This equipment is a revolving field, alternating current Stationary Emergency Generator. It is powered by a gaseous fueled engine operating at 1800 rpm for 4-pole direct drive units, 3600 rpm for 2-pole direct drive units and 2300 - 3000 rpm for quiet drive gear units. See the Specifications section for exact numbers. The unit comes complete with a sound attenuated enclosure, internally mounted muffler, control console, mainline circuit breaker, battery charger, and protective alarms as explained in the following paragraph.

All AC connections, including the power leads from the alternator, 120 volt battery charger input and control connections to the transfer switch are available in the main connection box.

The Stationary Emergency Generator incorporates the following alternator features:

- Rotor and Stator insulation class is rated as defined by NEMA MG1-32.6, NEMA MG1-1.66. The generator is self ventilated and drip-proof constructed. Refer to the Specifications section or the data label for the class ratings.
- The voltage waveform deviation, total harmonic content of the AC waveform and telephone influence factor have been evaluated and are acceptable according to NEMA MG1-32.

## ENGINE OIL RECOMMENDATIONS

The unit has been filled with 5W-20 engine oil at the factory. Use a high-quality detergent oil classified "For Service SJ or SH." Detergent oils keep the engine cleaner and reduce carbon deposits. When changing the engine oil, be sure to use 5W-30 engine oil.

### 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.**

#### NOTE:

If not already equipped, it is strongly recommended to use the optional Cold Weather Start Kit for temperatures below 32° F. The part number for the Cold Weather Start Kit can be found in the Specifications section or by contacting an authorized dealer. The oil grade for temperatures below 32° F is 5W-30 synthetic oil.

## COOLANT RECOMMENDATIONS

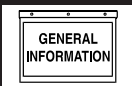
Use a mixture of half low silicate ethylene glycol base anti-freeze and deionized water. Cooling system capacity is listed in the specifications. Use only deionized water and only low silicate anti-freeze. If desired, add a high quality rust inhibitor to the recommended coolant mixture. When adding coolant, always add the recommended 50-50 mixture.

### CAUTION

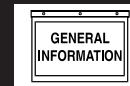
- ⚠ **Do not use any chromate base rust inhibitor with ethylene glycol base anti-freeze or chromium hydroxide ("green slime") forms and will cause overheating. Engines that have been operated with a chromate base rust inhibitor must be chemically cleaned before adding ethylene glycol base anti-freeze. Using any high silicate anti-freeze boosters or additives will also cause overheating. The manufacturer also recommends that any soluble oil inhibitor is NOT used for this equipment.**

### DANGER

- ⚠ **Do not remove the radiator pressure cap while the engine is hot or serious burns from boiling liquid or steam could result.**
- ⚠ **Ethylene glycol base antifreeze is poisonous. Do not use mouth to siphon coolant from the radiator, recovery bottle or any container. Wash hands thoroughly after handling. Never store used antifreeze in an open container because animals are attracted to the smell and taste of antifreeze even though it is poisonous to them.**



## Stationary Emergency Generator Engine Protective Devices



### ENGINE PROTECTIVE DEVICES

The Stationary Emergency Generator may be required to operate for long periods of time without an operator on hand to monitor such engine conditions as coolant temperature, oil pressure or rpm. For that reason, the engine has several devices designed to protect it against potentially damaging conditions by automatically shutting down the unit when the oil pressure is too low, the coolant temperature is too high, the coolant level is too low, or the engine is running too fast.

#### NOTE:

**Engine protective switches and sensors are mentioned here for the reader's convenience. Also refer to the applicable control panel manual for additional automatic engine shutdown information.**

#### ◆ HIGH COOLANT TEMPERATURE SWITCH

The switch will 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.

#### ◆ LOW COOLANT LEVEL SENSOR

To prevent overheating, the engine has a low coolant level sensor. If the level of engine coolant drops below the level of the low coolant level sensor, the engine automatically shuts down.

#### ◆ LOW OIL PRESSURE SWITCH

This switch 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.

#### ◆ OVERCRANK SHUTDOWN

After a prespecified duration of cranking, this function ends the cranking if the engine has failed to start. The overcrank LED will turn ON. Turn OFF the AUTO/OFF/MANUAL switch, then turn switch back to AUTO to reset the generator control board.

#### NOTE:

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

#### Approximate Crank Cycle Times

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

#### ◆ OVERSPEED SHUTDOWN

A speed circuit controls engine cranking, start-up, operation and shutdown. Engine speed signals are delivered to the circuit board whenever the unit is running. Should the engine overspeed above a safe, preset value, the circuit board initiates an automatic engine shutdown. Contact the nearest Authorized Dealer if this failure occurs.

#### ◆ RPM SENSOR LOSS SHUTDOWN

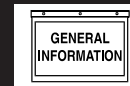
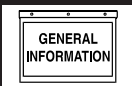
If the speed signal to the control panel is lost, engine shutdown will occur.

#### ◆ DC FUSES

Fuse F1 (15 amp) is located inside of the control panel. It protects the panel wiring and components from damaging overload. **Always remove this fuse before commencing work on the generator.** The unit will not start or crank if the fuse is blown.

Fuse F2 (25 amp) is located in the engine wire harness adjacent to the DC alternator. It is used to prevent circuit failure due to DC alternator failure. If this fuse is blown, battery charging will not occur while the engine is running. Replace these fuses with the same size, type, and rating. (See the exploded views and parts lists at the end of this manual for replacement part number.)





## FUEL SYSTEM

### ◆ FUEL REQUIREMENTS

The Stationary Emergency Generator may be equipped with one of the following fuel systems:

- Natural gas fuel system
- Propane vapor (PV) fuel system
- Liquid propane (LP) fuel system

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

Required fuel pressure for **natural gas is 5 inches to 14 inches water column (0.18 to 0.5 psi); and for liquid propane, 5 inches to 14 inches of water column (0.18 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 five inches water column for natural gas or 5 inches water column for propane vapor for all load ranges. The fuel supply piping shall be sized according to the installation manual using the fuel consumption requirements identified in the Specifications section of the Owner's Manual.

#### NOTE:

It is the responsibility of the installer to make sure that only the correct recommended fuel is supplied to the generator fuel system. Thereafter, the owner/operator must make certain that only the proper fuel is supplied.

### ◆ NATURAL GAS FUEL SYSTEM

Natural gas is supplied in its vapor state. In most cases, the gas distribution company provides piping from the main gas distribution line to the standby generator site. The following information applies to natural gas fuel systems.

- Gas pressure in a building is usually regulated by national, state and local codes.
- To reduce gas pressure to a safe level before the gas enters a building, a primary regulator is needed. The natural gas supplier may or may not supply such a regulator.
- It is the responsibility of the gas supplier to make sure sufficient gas pressure is available to operate the primary regulator.
- Gas pressure at the inlet to the fuel shutoff solenoid should not exceed approximately 14 inches water column (0.5 psi).

### ◆ PROPANE VAPOR WITHDRAWAL FUEL SYSTEM

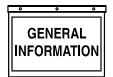
This type of system utilizes the vapors formed above the liquid fuel in the supply tank. Approximately 10 to 20 percent of the tank capacity is needed for fuel expansion from the liquid to the vapor state. The vapor withdrawal system is generally best suited for smaller engines that require less fuel. The installer should be aware of the following:

- When ambient temperatures are low and engine fuel consumption is high, the vapor withdrawal system may not function efficiently.
- Ambient temperatures around the supply tank must be high enough to sustain adequate vaporization, or the system will not deliver the needed fuel volume.
- In addition to the cooling effects of ambient air, the vaporization process itself provides an additional cooling effect.

### ◆ LP LIQUID FUEL SYSTEM

LP is supplied as a liquid in pressure tanks. It is usually made up of propane, butane, or a mixture of the two gases. Propane tends to vaporize readily even at temperatures as low as -20° F (-29° C). However, butane reverts to its liquid state when temperatures drop below 32° F (0° C).

LP in a liquid withdrawal system must be converted to its gaseous state before it is introduced into the engine carburetor. A vaporizer-converter is generally used to accomplish this. In such a converter, heated engine coolant is ported through the converter to provide the necessary heat for conversion of the fuel from a liquid to a gaseous state.



# Stationary Emergency Generator Specifications



## SPECIFICATIONS

### ◆ STATIONARY EMERGENCY GENERATOR

Type.....Synchronous  
Rotor Insulation.....Class H  
Stator Insulation.....Class H  
Total Harmonic Distortion.....<5%  
Telephone Interference Factor (TIF) .....< 50  
Alternator Output Leads 3-phase .....4-wire  
Bearings .....Sealed Ball  
Coupling .....Flexible Disc  
Load Capacity (Standby Rating) .....45kW\*

\* NOTE: Generator rating and performance in accordance with ISO8528-5, BS5514, SAE J1349, ISO3046 and DIN 6271 Standards. KW rating is based on LPG fuel and may derate with natural gas.

|                                                           |                                     |
|-----------------------------------------------------------|-------------------------------------|
| Excitation System .....                                   | Direct                              |
| Generator Output Voltage/kW - 60 Hz                       | <u>kW</u> <u>Amp</u> <u>CB Size</u> |
| 120/240V, 1-phase, 1.0 pf                                 | 45      188      200                |
| 120/208V, 3-phase, 0.8 pf                                 | 45      156      175                |
| 120/240V, 3-phase, 0.8 pf                                 | 45      135      150                |
| 277/480V, 3-phase, 0.8 pf                                 | 45      68      80                  |
| Generator Locked Rotor KVA Available @ Voltage Dip of 35% |                                     |
| Single-phase or 208, 3-phase (45kW) .....                 | 72 KVA                              |
| 480V, 3-phase (45kW) .....                                | 80 KVA                              |

### ◆ ENGINE

Make .....Generac  
Model .....In Line  
Cylinders and Arrangement.....4  
Displacement.....2.4 Liter  
Bore.....3.41 in.  
Stroke.....3.94 in.  
Compression Ratio.....9.5-to-1  
Air Intake System.....Naturally Aspirated  
Valve Seats.....Hardened  
Lifter Type.....Hydraulic

#### Engine Parameters

Rated Synchronous RPM .....60 Hz, 3600  
HP at rated kW (45kW) .....80-92

#### Exhaust System

Exhaust Flow at Rated Output 60 Hz (45kW) .....420 cfm  
Exhaust Temp. at Rated Output (45kW) .....1100° F

#### Combustion Air Requirements (Natural Gas)

Flow at rated power, 60 Hz (45kW) .....144 cfm

#### Governor

Type.....Electronic  
Frequency Regulation.....Isochronous  
Steady State Regulation .....± 0.25%

#### Engine Lubrication System

Type of Oil Pump .....Gear  
Oil Filter .....Full Flow Spin-on, Cartridge  
Crankcase Oil Capacity ....5.25 U.S. qts. (including filter capacity)

### ◆ COOLING SYSTEM

Type.....Pressurized Closed Recovery  
Water Pump.....Belt Driven  
Fan Speed.....2150 rpm  
Fan Diameter.....22 inches  
Fan Mode.....Puller  
Air Flow (inlet air including alternator and combustion air) .....2725 ft<sup>3</sup>/min.  
Coolant Capacity.....(3.0 U.S. gal.)  
Heat Rejection to Coolant (45kW) .....193,000 Btu/h  
Maximum Operating Air Temp. on Radiator.....60° C (150° F)  
Maximum Ambient Temperature .....50° C (140° F)

### ◆ FUEL SYSTEM

Type of Fuel .....Natural Gas, Propane Vapor  
Carburetor.....Down Draft  
Secondary Fuel Regulator.....Standard  
Fuel Shut-off Solenoid .....Standard  
Operating Fuel Pressure .....5 in. - 14 in. Water Column

#### Fuel Consumption - ft<sup>3</sup>/hr (Natural Gas/LPV)

|      | <i>Exercise<br/>Cycle</i> | <i>25%<br/>Load</i> | <i>50%<br/>Load</i> | <i>75%<br/>Load</i> | <i>100%<br/>Load</i> |
|------|---------------------------|---------------------|---------------------|---------------------|----------------------|
| 45kW | 65/25                     | 210/83              | 380/151             | 545/216             | 730/290              |

### ◆ ELECTRICAL SYSTEM

Battery Charge Alternator .....12V, 30 Amp  
Static Battery Charger .....2.5 Amp  
Recommended Battery.....Group 26, 525CCA  
System Voltage .....12 Volts

#### Voltage Regulator

Type.....Electronic  
Sensing .....Single-phase  
Regulation.....± 1%  
Features.....V/F Adjustable, Adjustable  
Voltage and Gain LED Indicators

#### Power Adjustment for Ambient Conditions

Temperature Deration  
3% for every 10° C above °C (45kW) .....25  
1.65% for every 10° above °F (45kW) .....77  
Altitude Deration  
1% for every 100 m above m (45kW) .....183  
3% for every 1000 ft. above ft. (45kW) .....600

Controller .....R-200C

## ◆ WEATHER AND MAINTENANCE KITS

To keep the generator running at its peak, the following kits are offered:

- Cold Weather Kit
  - ~ Recommended for climates with temperatures below 32° F.
- Extreme Cold Weather Kit
  - ~ Recommended Block Heater Kit for protection in temperatures below 32° F. This kit comes pre-installed on all industrial gaseous units.
- Scheduled Maintenance Kit
  - ~ Kit includes the recommended parts to maintain the generator. Refer to the Service Schedule for regular maintenance intervals.

For additional information, or to order any of these kits, please contact an Authorized Service Dealer or Customer Service Representative.

## RECONFIGURING THE FUEL SYSTEM

### NOTE:

**All models are configured to run on natural gas from the factory.**

Before the generator can be operated using a LP fuel source, the fuel system and control panel (refer to the installation drawing for location) must be reconfigured. The steps to reconfigure the generator from a natural gas (NG) to a liquidified petroleum (LP) fuel source are as follows:

## ◆ FUEL SYSTEM

1. Turn the main gas supply off and disconnect the battery.
2. Remove the fuel hose from the outlet port of the demand regulator (see Figure 6.1).
3. Disconnect the power wires from the fuel solenoid located on top of the regulator assembly.
4. Loosen the spring clamp on the small fuel enrichment hose and remove it from the brass hose fitting.
5. Remove the black pipe assembly from the outlet port of the demand regulator (Figure 6.1).
6. Remove the NG fuel jet (loosen counter clockwise) from the outlet port.
7. Remove the LP fuel jet (loosen counter clockwise) from the jet keeper port on the side of the regulator housing. Install this jet into the outlet port in the regulator casting.

### NOTE:

**The jet sizes are stamped on the individual jets. The larger jet size is used for running on NG.**

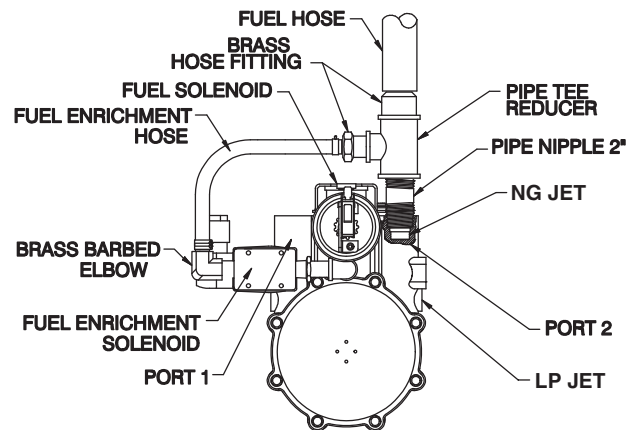
8. Install the previously removed NG jet into the jet keeper port on the side of the regulator housing.
9. Install the previously removed black pipe onto the outlet port of the demand regulator. Use pipe sealant on the pipe threads.
10. Reverse steps 1-4 in this procedure to reactivate the demand regulator.

11. Follow the instructions in the Control Panel section.

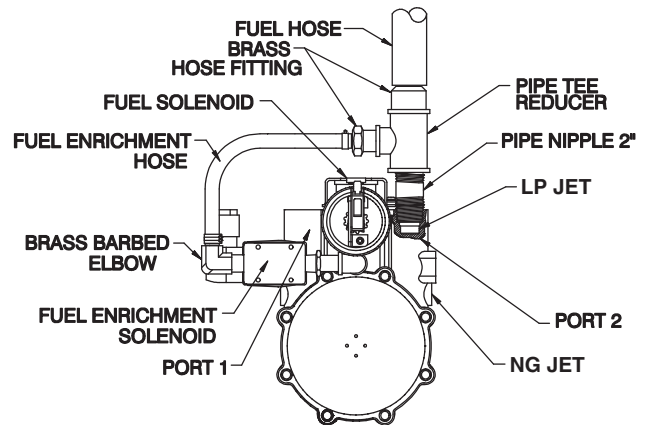


**⚠ Serious injury or damage may occur if not configured properly. Please consult an Authorized Dealer with any questions.**

**Figure 6.1 — Reconfigure the Fuel System**



**NG FUEL SYSTEM**



**LP FUEL SYSTEM**

## ◆ CONTROL PANEL

A fuel select dipswitch is located in the control panel on the circuit board. Engine timing for Natural Gas (NG) Fuel is selected when dipswitch position 4 is set to "ON". Engine timing for LP Fuel is selected when this switch is set to "OFF". See the R-200C Control Panel manual for details.



**⚠ Whenever the Generator's Fuel Regulator is converted from one Fuel type to the other, make sure to configure the Fuel Select Dipswitch for the correct Fuel type.**

## ALTERNATOR AC LEAD CONNECTIONS

See "Voltage Codes". This Stationary Emergency Generator may be rated at any one of three voltages, either single-phase or three-phase. The electrical wires in the unit's AC connection (lower) panel should be installed according to the number of leads and the voltage/phase required for the application. If there are any questions regarding lead connection, refer to the wiring diagrams at the back of this manual.

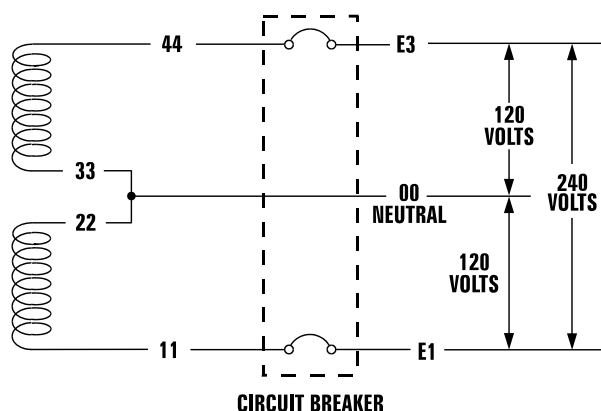
Voltage codes apply to the type of stator assembly installed on a particular generator.

### ◆ FOUR-LEAD, SINGLE-PHASE STATOR

Four-lead alternators (see Figure 7.1) are designed to supply electrical loads with voltage code "A" (240V, 1-phase, 60 Hz). Electrical power is produced in the stator power windings. These windings were connected at the factory to the main circuit breaker as shown in Figure 7.1.

The rated voltage between each circuit breaker terminal is 240V. The rated voltage between each circuit breaker terminal and the neutral point 00 is 120V.

**Figure 7.1 — Four-lead, Single-phase Stator**



## ALTERNATOR POWER WINDING CONNECTIONS

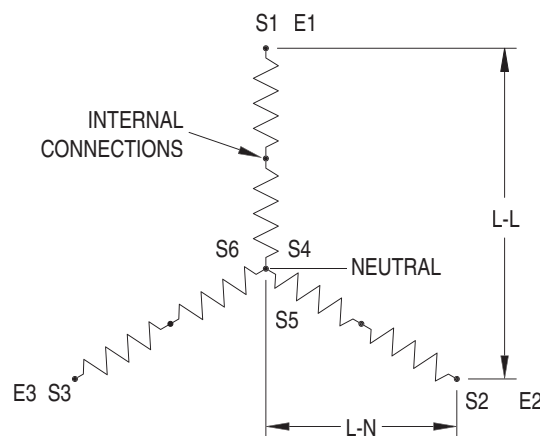
### ◆ 3-PHASE ALTERNATORS

The Stationary Emergency Generator is designed to supply 3-phase electrical loads. Electric power is produced in the alternator power windings. These windings were connected at the factory to the main circuit breaker with a "Y" configuration as shown in Figures 7.2, 7.3 and 7.4.

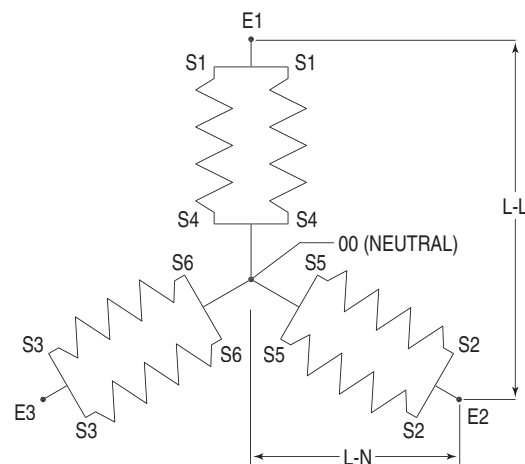
The rated voltage between circuit breaker terminals E1-E2, E1-E3 and E2-E3 is 480V, 208V or 600V depending on the model.

The rated voltage between each circuit breaker terminal and the neutral point 00 is 277V, 120V, or 346V depending on the model.

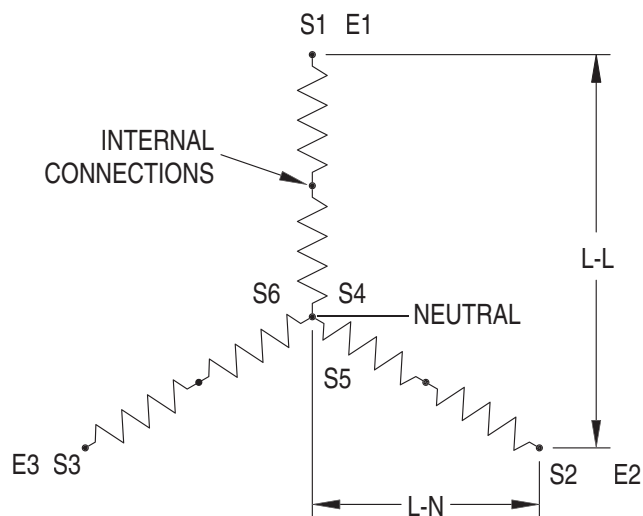
**Figure 7.2 — Stator Power Winding Connections - 3-phase, 277/480V (6 Lead)**



**Figure 7.3 — Stator Power Winding Connections - 3-phase, 120/208V (6 Lead)**



**Figure 7.4 — Stator Power Winding Connections - 3-phase, 346/600V (6 Lead)**



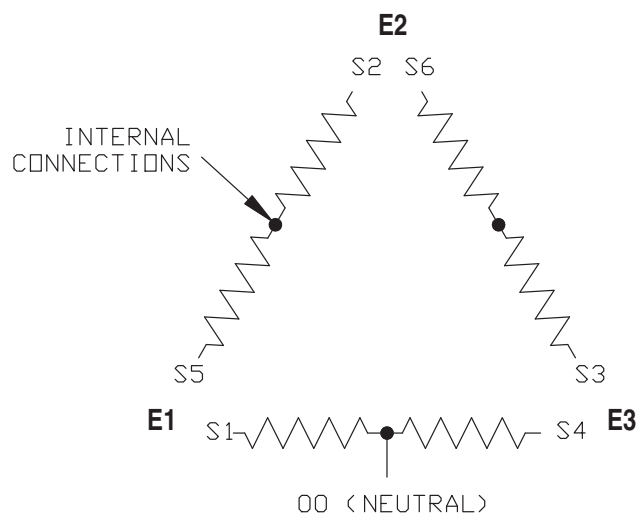
## ◆ 3-PHASE ALTERNATORS ("DELTA" CONFIGURATION)

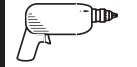
The Stationary Emergency Generator is designed to supply 3-phase electrical loads. Electric power is produced in the alternator power windings. These windings were connected at the factory to the main circuit breaker with a "Delta" configuration as shown in Figures 7.5.

The rated voltage between circuit breaker terminals E1-E2, E1-E3 and E2-E3 is 240V.

The rated voltage between E1 or E3 and the neutral point 00 is 120V.

**Figure 7.5 — Stator Power Winding Connections - 3-phase, 120/240V (6 Lead)**





## INSTALLATION

Refer to the separate "Installation Guide" supplied with the unit.

For safety reasons, the manufacturer recommends that this equipment be installed, serviced and repaired by a Service Dealer or other competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations. The operator also must comply with all such codes, standards and regulations.

## PREPARATION BEFORE START-UP

The instructions in this section assume that the Stationary Emergency Generator has been properly installed, serviced, tested, adjusted and otherwise prepared for use by a competent, qualified installation contractor. Be sure to read the "Safety Rules", as well as all other safety information in this manual, before attempting to operate this (and related) equipment.

Before starting the generator for the first time, the installer must complete the following procedures. For follow-up maintenance information and/or service intervals, please refer to the "Maintenance" section and the "Service Schedule".

### ◆ TRANSFER SWITCH

If this generator is used to supply power to any electrical system normally powered by an electric utility, the National Electrical Code requires that a transfer switch be installed. The transfer switch prevents electrical backfeed between two different electrical systems. (For additional information, see the applicable transfer switch manual for this unit.) The transfer switch, as well as the generator and other electrical components, must be properly located and mounted in strict compliance with applicable codes, standards and regulations.

### ◆ FUEL SYSTEM

Make sure the fuel supply system to the generator (a) delivers the correct fuel at the correct pressure and (b) is properly purged and leak tested according to code. No fuel leakage is permitted. See "Specifications" for more information.

### ◆ GENERATOR SET LUBRICATION

Check the engine crankcase oil level before operating and add oil to the proper level – the dipstick "FULL" mark. Never operate the engine with the oil level below the dipstick "ADD" mark. See "Specifications" and "Engine Oil Recommendations".

Check the oil level in the generator gearbox (if so equipped) prior to initial use and at the intervals indicated by the "Service Schedule." The recommended oil is SAE 90 gear lubricant.

#### NOTE:

**This engine is shipped from the manufacturer with "break-in" oil. This oil should be changed after 30 hours of operation.**

## ◆ PRIOR TO INITIAL START-UP



**⚠ Prior to initially starting the generator, it must be properly prepared for use. Any attempt to crank or start the engine before it has been properly serviced with the recommended types and quantities of engine fluids (oil, coolant, fuel, etc.) may result in an engine failure.**

### ◆ ENGINE COOLANT

Have the engine cooling system properly filled with the recommended coolant mixture. Check the system for leaks and other problems. See "Specifications" and "Coolant" sections.

### ◆ BELT TENSION

Check the engine-fan belt tension and condition prior to placing the unit into service and at recommended intervals. Belt tension is correct when a force of approximately 22 pounds (10 kg), applied midway between pulleys, deflects the belt about 3/8- to 5/8-inch (10 to 16 mm).

### ◆ ELECTRICAL SYSTEM

Make sure the generator is properly connected to an approved earth ground.

Make sure the generator battery is fully charged, properly installed and interconnected, and ready for use.

#### NOTE:

**Battery charger must be connected to 120 VAC, 15 amp circuit to operate.**

Check to ensure that there are no loose electrical connections. Restrain any loose wires to keep them clear of any moving generator set components.

## INITIAL INSPECTION FOR GENSET STARTUP

Inspect for the following.

- Freight Damage.
- Manuals present.
- Fluid Levels (Oil, coolant, battery, Gear Drive).
- Correct fuel piping.
- Correct muffler installation for external applications (open units only).
- Adequate air flow, clearances and ventilation per installation drawings and applicable codes.
- Correct AC and DC wire size, connections and grounding. Control and communication wiring to/from the transfer switch must be run in a separate conduit from the AC power leads.
- **Battery charger connection to 120 VAC.**
- Unit secured to pad.





## START-UP CHECKLIST



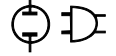
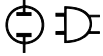
### WARNING

**⚠ Before working on the Stationary Emergency Generator, ensure the following:**

- The AUTO/OFF/MANUAL switch is in the OFF position.
- The 120VAC supply to the battery charger is switched OFF.

### ◆ PREPARATION FOR START-UP

- Ensure that the 120VAC circuit breaker to the battery charger is open.
- Remove the fuse from the the control panel. Open the front door of the control box and remove the 15 Amp ATO fuse in the lower left-hand corner of the control box.
- Connect the battery cables to the battery. Attach negative battery cable last.
- Close the 120VAC circuit breaker to the battery charger.
- Measure the voltage at the battery before and after the charger is turned on.
- Verify all AC electrical connections are tight at the circuit breaker and transfer switch.
- Visually inspect entire area looking for loose paper, plastic wrappings, leaves, etc.
- Check all hoses clamps fittings for leaks or damage.
- Check all electrical plugs throughout the generator. Ensure each plug is seated correctly and fully inserted into its receptacle.
- Verify the AUTO/OFF/MANUAL switch is in OFF position.
- Open the valve to the engine fuel line.
- Bleed the fuel system of air. (necessary for long fuel lines).
- Open the generator main line circuit breaker.
- Connect a manometer to the gas line and record the static pressure. It must be as listed in the Specifications.
- Insert the fuse into the control panel.
- Move the AUTO/OFF/MANUAL switch to the manual position. The engine should now crank and start.
- Check voltage at the generator terminals.
- For 3-phase units, check phase rotation at the transfer switch terminals. The generator phase rotation must match the utility phase rotation.
- Check for coolant, fuel, oil, and exhaust leaks.
- Close the generators main line circuit breaker.
- Turn the generator set off.
- Connect the UTILITY supply to the transfer switch.
- Set the AUTO/OFF/MANUAL switch to AUTO.
- Disconnect utility power before the transfer switch.  
Engine should start, transfer to load.  
Run at least 15 minutes on generator power. Make certain all 3-phase loads are functioning correctly (correct phase rotation).
- Reconnect Utility power  
Transfer switch will transfer back to Utility and engine will shut down within the given time parameters set up for the specific transfer switch and controller.
- Install all covers, access plates and door panels.
- Put the Owners Manual in a safe and accessible place.
- Make certain the AUTO/OFF/MANUAL switch is in the AUTO position.



## STATIONARY EMERGENCY GENERATOR CONTROL AND OPERATION

Refer to the appropriate control panel operator's manual for this unit.

### OPERATING UNIT WITH MANUAL TRANSFER SWITCH

If the Stationary Emergency Generator was installed in conjunction with a transfer switch capable of manual operation only, the following procedure applies. A manually operated transfer switch is one that will not provide automatic start-up and does not include an intelligence circuit.

#### ◆ ENGINE START-UP AND TRANSFER

For additional information, refer to the applicable control panel manual for this unit, as well as any literature pertaining to the specific transfer switch.



**DANGER**

**⚠ The Maintenance Disconnect Switch and the AUTO/OFF/MANUAL switches (if so equipped) must be set properly, or the generator will crank and start as soon as the utility power to the transfer switch is turned off. Refer to applicable control panel and transfer switch manuals for more information.**

**⚠ Do not proceed until certain that utility source voltage is available to the transfer switch and the transfer switch main contacts are set to UTILITY.**

**⚠ Do not attempt manual operation until all power supplies to the transfer switch have been positively turned off, or extremely dangerous - possibly lethal - electrical shock will result.**

**⚠ Transfer switch enclosure doors should be kept closed and locked. Only authorized personnel should be allowed access to the transfer switch interior. Extremely high and dangerous voltages are present in the transfer switch.**

In order to transfer load from the utility source to the generator, follow these directions:

- Turn OFF or disconnect the utility power circuit to the transfer switch, using the means provided (such as the utility source main line circuit breaker).
- Set the transfer handle to its UTILITY (NORMAL) position with load circuits connected to the utility power supply.
- Set the generator's main line circuit breaker to its OFF (or OPEN) position.
- Start the generator.



**CAUTION**

**⚠ Do not crank the engine continuously for longer than 30 seconds, or the heat may damage the starter motor.**

- Let engine stabilize and warm up.
- Check all applicable instrument and gauge readings. When certain that all readings are correct, move the transfer switch manual handle to the STANDBY (or EMERGENCY STANDBY) position, i.e., load circuits supplied by the generator.
- Set the generator's main line circuit breaker to its ON (or CLOSED) position.
- Load circuits are now powered by the generator.

#### ◆ RETRANSFER AND SHUTDOWN

For additional information, refer to the applicable control panel manual for this unit, as well as any literature pertaining to the specific transfer switch.

To transfer the load back to the utility power source and shut down the generator, follow these directions:

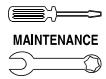
- Set the generator's main line circuit breaker to its OFF (or OPEN) position.
- Manually move the transfer switch handle to its UTILITY (NORMAL) position, i.e., load circuits connected to the utility.
- Turn ON the utility power supply to the transfer switch, using the means provided (such as the utility power source main line circuit breaker).
- Let the generator run at no-load for a few minutes to stabilize internal temperatures.
- Shut down the generator.

### OPERATING UNIT WITH AUTOMATIC TRANSFER SWITCH

If the Stationary Emergency Generator has been installed with an automatic transfer switch, the engine may be started and stopped automatically or manually.

#### NOTE:

Refer to the applicable manual for your transfer switch and to "Transfer Switch Start Signal Connections". In addition, please note the dangers under "Engine Start-up and Transfer."



### MAINTENANCE PERFORMED BY SERVICE DEALERS/CONTRACTORS

#### ⚠ WARNING ⚠

⚠ Before working on the Stationary Emergency Generator, ensure the following:

- The AUTO/OFF/MANUAL switch is in the OFF position.
- The 15A fuse has been removed from the control box.
- The 120VAC supply to the battery charger is switched OFF.
- The negative battery cable has been removed.

#### ◆ EVERY THREE MONTHS

1. Check battery condition.
2. Inspect and test fuel system.
3. Check transfer switch.
4. Inspect exhaust system.
5. Check engine ignition system.
6. Check fan belts.

#### ◆ ONCE EVERY SIX MONTHS

1. Test Engine Safety Devices (low oil pressure, low coolant level, high coolant temperature).

#### ◆ ONCE ANNUALLY

1. Test engine governor; adjust or repair, if needed.
2. Clean, inspect generator.
3. Flush cooling system.
4. Clean/re-gap spark plugs or replace as necessary.

#### ◆ FIRST 30 OPERATING HOURS

1. Change engine "break-in" oil and filter.

#### ◆ FIRST 100 OPERATING HOURS

1. Change engine oil and oil filter. After initial change, service engine oil and filter at 100 operating hours or six months, whichever comes first.
2. Retorque intake and exhaust manifold.

#### ◆ EVERY 500 OPERATING HOURS

1. Service air filter.
2. Check starter.
3. Check engine DC alternator.

### COOLING SYSTEM

Air intake 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 shut down. (See the installation diagram.)

#### ⚠ WARNING ⚠

⚠ The exhaust system parts from this product get 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.

### OVERLOAD PROTECTION FOR ENGINE DC ELECTRICAL SYSTEM

Engine cranking, start up and running are controlled by a solid state Engine Controller circuit board. Battery voltage is delivered to that circuit board via a 15 amp fuse. These overcurrent protection devices will open if the circuit is overloaded.

#### ⚠ CAUTION ⚠

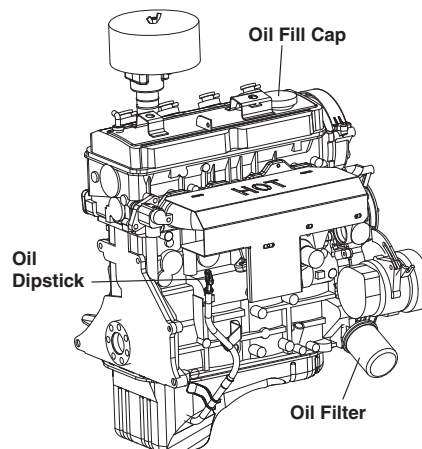
⚠ If a circuit breaker opens or a fuse element melts, find the cause of the overload before resetting the circuit breaker or replacing the fuse.

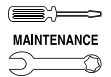
### CHECKING FLUID LEVELS

#### ◆ CHECK ENGINE OIL

Check engine crankcase oil level (Figure 10.1) at least every 20 hours of operation, or prior to use.

*Figure 10.1 - Oil Dipstick and Oil Fill Cap*





## Stationary Emergency Generator Maintenance



- Remove oil dipstick and wipe dry with a clean, lint-free cloth.
- Install oil dipstick, then remove again.
- Oil should be between FULL and ADD marks.
- If oil level is below the dipstick ADD mark, remove oil fill cap. Add the recommended oil to bring oil level up to the FULL mark. DO NOT FILL ABOVE THE "FULL" MARK. See "Engine Oil Recommendations" for recommended oils.

### ◆ BATTERY FLUID

Check battery electrolyte fluid based on the Maintenance Schedule. Fluid should cover separators in all battery cells. If fluid level is low, add distilled water to cover tops of separators. DO NOT USE TAP WATER IN BATTERY.

### ◆ ENGINE COOLANT

Check coolant level in coolant recovery bottle. See the Specifications section.

- Add recommended coolant mixture as necessary.
- Periodically remove radiator pressure cap (only when engine has cooled down) to make sure the coolant recovery system is functioning properly. Coolant should be at bottom of radiator filler neck. If coolant level is low, inspect gasket in radiator pressure cap. Replace cap, if necessary. To have pressure cap tested, contact a Service Facility. Inspect cooling system and coolant recovery system for leaks.

## MAINTENANCE OWNER/ OPERATOR CAN PERFORM



**Before working on the generator, ensure the following:**

- The AUTO/OFF/MANUAL switch is in the OFF position.
- The 15A fuse has been removed from the control box.
- The 120VAC supply to the battery charger is switched OFF.
- The negative battery cable has been removed.

### ◆ CHECK ENGINE OIL LEVEL

Refer to "Checking Fluid Levels".

### ◆ CHECK BATTERY

- See "Checking Fluid Levels".
- Check battery cables for condition, tightness, corrosion or damage. Clean, tighten or replace as necessary.

### ◆ EXERCISE SYSTEM

Start the Stationary Emergency Generator engine at least once every seven days and let it run at least 20 minutes. For more detailed exercise information, see the respective sections in the Control Panel Technical Manual that is supplied with the unit.

### ◆ INSPECT COOLING SYSTEM

- Inspect engine cooling system. See "Maintenance Schedule".
- Check hoses for damage, deterioration, leaks, etc. Correct any discrepancies found.
- Check hose clamps for tightness.

### ◆ CHECK ENGINE COOLANT LEVEL

See the "Checking Fluid Levels" section.

### ◆ PERFORM VISUAL INSPECTION

Complete a thorough visual inspection of the entire engine-generator monthly. Look for obvious damage, loose, missing or corroded nuts, bolts and other fasteners. Look for fuel, oil or coolant leaks.

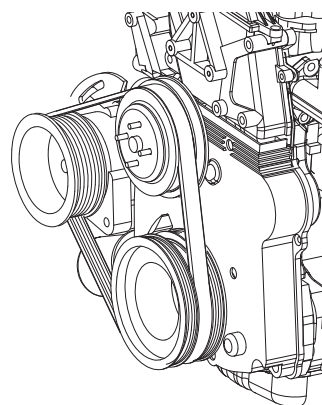
### ◆ INSPECT EXHAUST SYSTEM

Inspect the exhaust system at least once every three months. Check all exhaust system pipes, mufflers, clamps, etc. for condition, tightness, leaks, security, damage.

### ◆ CHECK FAN BELT

- Inspect fan belts every three months. Replace any damaged, deteriorated, worn or otherwise defective belt.
- Check fan belt tension. Thumb pressure, exerted midway between pulleys, should deflect about 3/8 to 5/8 of an inch. Adjust belt tension as required.
- Check fan belt alignment (see Figure 10.2).

*Figure 10.2 – Fan Belt*

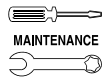


### ◆ INSPECT ENGINE GOVERNOR

Visually inspect electronic governor.



**Do not attempt to adjust the governor. Only qualified service facilities should adjust the governor. Excessively high operating speeds are dangerous and increase the risk of personal injury. Low speeds impose a heavy load on the engine when adequate engine power is not**



## Stationary Emergency Generator Maintenance



available and may shorten engine life. Correct rated frequency and voltage are supplied only at the proper governed speed. Some connected electrical load devices may be damaged by incorrect frequency and/or voltage. Only qualified service technicians should adjust the governed speed.

### ◆ CHANGING ENGINE OIL



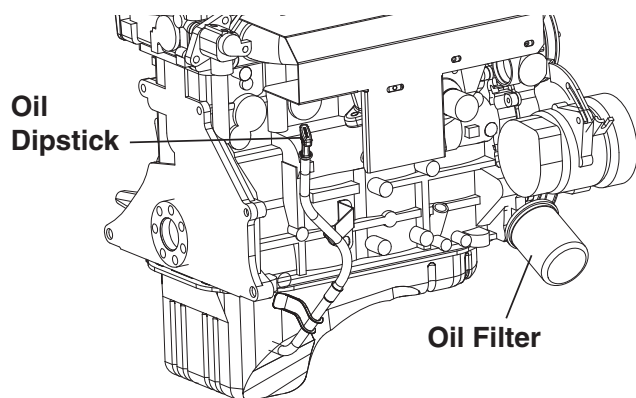
⚠ **Hot oil may cause burns. Allow engine to cool before draining oil. Avoid prolonged or repeated skin exposure with used oil. Thoroughly wash exposed areas with soap.**

Refer to maintenance performed by service facilities for engine oil and filter change frequencies.

Drain the oil while the engine is still warm from running. This means warm up the engine, shut it down and drain immediately as follows:

1. Remove the drain hose from its retaining clip or cut the zip-tie securing the oil drain hose.
2. Loosen and remove OIL DRAIN HOSE CAP. Drain oil completely into suitable container.
3. When all oil has drained, install and tighten OIL DRAIN HOSE CAP and secure drain hose with a new zip-tie, or place the hose in its retaining clip.
4. Turn OIL FILTER (Figure 10.3) counterclockwise and remove. Properly dispose of old filter.

**Figure 10.3 – Oil Filter**



5. Apply light coating of new engine oil to seal of new oil filter. Install FILTER and tighten by hand only. DO NOT OVER TIGHTEN.
6. Remove OIL FILL CAP and add recommended oil. Crankcase oil capacity is listed in the "Specifications" section.



⚠ **After refilling the crankcase with oil, always check oil level on dipstick. NEVER OPERATE ENGINE WITH OIL BELOW THE DIPSTICK "ADD" MARK.**

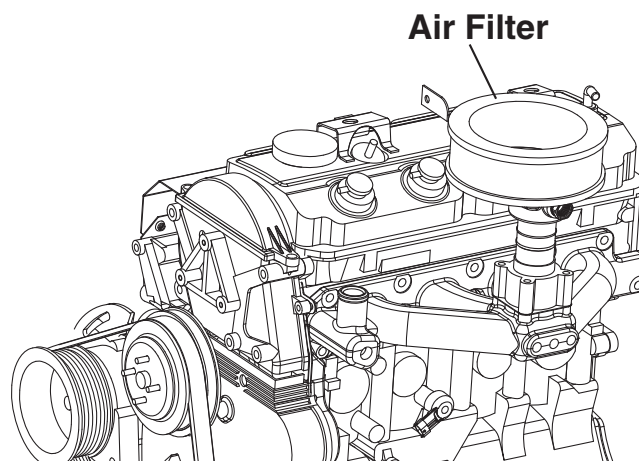
7. Start engine and check for oil leaks.
8. Shut OFF engine and wait 10 minutes for the oil to settle down into the oil pan. Recheck oil level on dipstick. DO NOT fill above the dipstick "FULL" mark.
9. Dispose of used oil at a proper collection center.

### ◆ CHANGING THE ENGINE AIR FILTER

To replace the engine air filter, remove the air filter cover and replace the air filter making sure it is positioned properly before reattaching the cover (Figure 10.4).

See the "Service Schedule," for air filter maintenance.

**Figure 10.4 – Engine Air Filter**

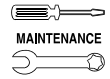
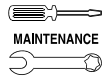


### ◆ SPARK PLUGS

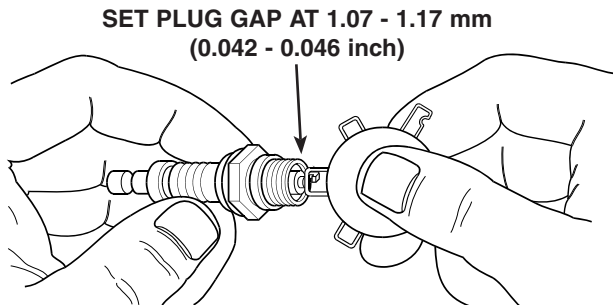
Reset the spark plug gap or replace the spark plugs as necessary (Figure 10.5).

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 1.07-1.17 mm (0.042-0.046 inch) by carefully bending the ground electrode (Figure 10.5).





**Figure 10.5 – Setting the Spark Plug Gap**



## ◆ COOLANT CHANGE

Every year, have a service facility drain, flush and refill the cooling system. See "Specifications" for cooling system recommendations.

## MISCELLANEOUS MAINTENANCE

### ◆ CLEANING THE STATIONARY EMERGENCY GENERATOR

Keep the generator as clean and as dry as possible. Dirt and moisture that accumulates on internal generator windings have an adverse effect on insulation resistance.

Periodically clean generator exterior surfaces. A soft brush may be used to loosen caked on dirt. Use a vacuum system or dry, low pressure air to remove any accumulations of dirt. The generator is housed inside an all-weather enclosure, clean the enclosure with a soft, damp cloth or sponge and water.

Once each year have the generator cleaned and inspected by a Service Dealer. That dealer will use dry, low pressure air to clean internal windings. Parts inside the control console should be cleaned and inspected at this time as well.

Finally, have the insulation resistance of stator and rotor windings checked. If insulation resistances are excessively low, the generator may require drying.

### ◆ BATTERY

All lead-acid storage batteries discharge when not in use. Refer to specific instructions and warnings that accompany the battery. If such information is not available, observe the following precautions when handling a battery:

- DO NOT use jumper cables and a booster battery to crank or start the generator engine.
- DO NOT recharge a weak battery while it is installed in the generator. Remove battery from generator and recharge in a well-ventilated area, away from fuel vapors, sparks, heat or flames.
- Battery electrolyte fluid is an extremely caustic sulfuric solution that can cause severe burns. DO NOT permit fluid to contact eyes, skin, clothing, painted surfaces, wiring insulation, etc. If any battery fluid is spilled, flush the affected area with clear water immediately.

- Always wear safety glasses, rubber apron and gloves when handling a battery.
- Batteries give off explosive hydrogen gas while charging. The gas can form an explosive mixture around the battery for several hours after charging. Any spark, heat or flames can ignite the gas and cause an explosion which can shatter the battery, causing blindness or other serious injury.

### ◆ BATTERY MAINTENANCE

The battery should be inspected per the "Scheduled Maintenance" section. 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 ⚠ —

⚠ Storage batteries give off explosive hydrogen gas. This gas can form an explosive mixture around the battery for several hours after charging. The slightest spark can ignite the gas and cause an explosion. Such an explosion can shatter the battery and cause blindness or other injury. Any area that houses a storage battery must be properly ventilated. Do not allow smoking, open flame, sparks or any spark producing tools or equipment near the battery.

⚠ Battery electrolyte fluid is an extremely corrosive sulfuric acid solution that can cause severe burns. Do not permit fluid to contact eyes, skin, clothing, painted surfaces, etc. Wear protective goggles, protective clothing and gloves when handling a battery. If fluid is spilled, flush the affected area immediately with clear water.

⚠ Do not use any jumper cables or booster battery to crank and start the generator engine. If the battery has completely discharged, remove it from the generator for recharging.

### — ⚠ WARNING ⚠ —

⚠ 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 120VAC power supply to the battery is turned OFF, or sparking may occur at the battery posts as the cables are attached and cause an explosion.





## Stationary Emergency Generator Maintenance



### ◆ BATTERY REPLACEMENT

**NOTE:**

**Unit DOES NOT include battery.**

When supplying or replacing the battery, the recommended number and type of battery is listed in the Specifications Section.

**NOTE:**

**The BCI number should be located directly on the battery.**

### REPAIR PARTS

The later portion of this manual consists of exploded views, parts lists and electrical data pertaining to this generator set. The parts list consists of: (a) an Item Number, (b) a Part Number, (c) Quantity required, and (d) a Description of the part. The Item Number corresponds to an identical number on the exploded view drawing.



## Stationary Emergency Generator Service Schedule



### SERVICE SCHEDULE

#### 22 KW - 150 KW GASEOUS STATIONARY EMERGENCY GENERATOR

The following is a recommended maintenance schedule for Gaseous Stationary Emergency Generator sets from 22kW to 150 kW in size. 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.



***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 15 amp 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.*

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

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

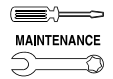
*Performed annually or following each 100 hours of operation of the unit.*

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

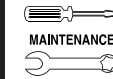
- 5 A comprehensive inspection of the generator set to insure it is properly serviced and ready to operate and carry the load when required, and to identify any potential problem areas.

*Performed annually or following each 250 hours of operation of the unit.*

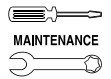
*This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by a Service Dealer.*



## Stationary Emergency Generator Service Schedule



| Maintenance Tasks                                                                                                                     | Level 1                                               |                                      | Level 2                                                    |                                      | Level 3                                                 |                                      | Level 4                                         |                                      | Level 5                                                |                                      |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------|------------------------------------------------------------|--------------------------------------|---------------------------------------------------------|--------------------------------------|-------------------------------------------------|--------------------------------------|--------------------------------------------------------|--------------------------------------|
|                                                                                                                                       | Recom-<br>mended<br>to be done<br>monthly/<br>10 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>3 months/<br>Break-in<br>30 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>Semi-<br>annually/<br>50 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>Annually/<br>100 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>Bi-<br>annually/<br>250 hrs. | Task<br>Comp.<br>(Date-<br>Initials) |
| 1. Disable the unit from operating per the first page warning.                                                                        |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 2. Check the engine oil level. Adjust as necessary.                                                                                   |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 3. Check the engine coolant level. Adjust as necessary.                                                                               |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 4. Check the engine coolant thermal protection level. Correct as necessary.                                                           |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 5. Check the natural gas delivery system for leaks and correct pressure on gas engine driven units. Tighten connections as necessary. |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 6. Check the air inlets and outlets of the enclosure and radiator for debris. Clean as necessary.                                     |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 7. Check the battery electrolyte level and specific gravity if accessible. Adjust as necessary.                                       |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 8. Check the battery posts, cables, and charger for loose connections corrosion, and proper operation. Correct as necessary.          |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 9. Check the unit wiring for loose connections, corrosion, and damage. Correct as necessary.                                          |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |

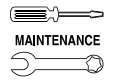


## Stationary Emergency Generator Service Schedule



| Maintenance Tasks                                                                                                                                                                                                      | Level 1                                               |                                      | Level 2                                                    |                                      | Level 3                                                 |                                      | Level 4                                         |                                      | Level 5                                                |                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------|------------------------------------------------------------|--------------------------------------|---------------------------------------------------------|--------------------------------------|-------------------------------------------------|--------------------------------------|--------------------------------------------------------|--------------------------------------|
|                                                                                                                                                                                                                        | Recom-<br>mended<br>to be done<br>monthly/<br>10 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>3 months/<br>Break-in<br>30 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>Semi-<br>annually/<br>50 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>Annually/<br>100 hrs. | Task<br>Comp.<br>(Date-<br>Initials) | Required<br>to be done<br>Bi-<br>annually/<br>250 hrs. | Task<br>Comp.<br>(Date-<br>Initials) |
| 10. Check the engine accessory drive belts and fan coupling device if equipped for correct tension, wear, weather cracking, and damage. Replace as necessary.                                                          |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 11. Check the engine valve clearance/lash. Adjust as necessary.**                                                                                                                                                      |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 12. Visually inspect the unit looking for leaks, wear or damage, loose connections or components, and corrosion. Correct as necessary.                                                                                 |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 13. Test the engine and transfer switch safety devices. Correct and/or adjust as necessary.                                                                                                                            |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 14. 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. |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 15. Replace the engine accessory drive belts.                                                                                                                                                                          |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 16. Check gearbox oil level (if equipped).                                                                                                                                                                             |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |
| 17. Change gearbox oil (if equipped).                                                                                                                                                                                  |                                                       |                                      |                                                            |                                      |                                                         |                                      |                                                 |                                      |                                                        |                                      |

\*\* Not required for engines equipped with hydraulic lifters. See the "Specification" section for lifter type.



## Stationary Emergency Generator Service Schedule



| Maintenance Tasks                                                                                                                                                                                                                     | Level 1<br>Recom-<br>mended<br>to be done<br>monthly/<br>10 hrs.                    | Task<br>Comp.<br>(Date-<br>Initials) | Level 2<br>Required<br>to be done<br>3 months/<br>Break-in<br>30 hrs.               | Task<br>Comp.<br>(Date-<br>Initials) | Level 3<br>Required<br>to be done<br>Semi-<br>annually/<br>50 hrs.                  | Task<br>Comp.<br>(Date-<br>Initials) | Level 4<br>Required<br>to be done<br>Annually/<br>100 hrs.                            | Task<br>Comp.<br>(Date-<br>Initials) | Level5<br>Required<br>to be done<br>Bi-<br>annually/<br>250 hrs.                      | Task<br>Comp.<br>(Date-<br>Initials) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|
| 18. 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. |                                                                                     |                                      |                                                                                     |                                      |                                                                                     |                                      |                                                                                       |                                      |    |                                      |
| 19. 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.                                                                         |                                                                                     |                                      |                                                                                     |                                      |                                                                                     |                                      |  |                                      |                                                                                       |                                      |
| 20. Change the engine oil.                                                                                                                                                                                                            |                                                                                     |                                      |  |                                      |                                                                                     |                                      |  |                                      |  |                                      |
| 21. Replace the engine oil filter(s).                                                                                                                                                                                                 |                                                                                     |                                      |  |                                      |                                                                                     |                                      |  |                                      |  |                                      |
| 22. Replace engine spark plugs. Clean and re-gap or replace as necessary.                                                                                                                                                             |                                                                                     |                                      |                                                                                     |                                      |                                                                                     |                                      |  |                                      |                                                                                       |                                      |
| 23. Replace the engine air filter(s).                                                                                                                                                                                                 |                                                                                     |                                      |                                                                                     |                                      |                                                                                     |                                      |                                                                                       |                                      |  |                                      |
| 24. Perform a 5 minute no-load operational run of the unit looking for any post service problems.                                                                                                                                     |                                                                                     |                                      |  |                                      |                                                                                     |                                      |                                                                                       |                                      |  |                                      |
| 25. Return the unit to standby setup for operation when required.                                                                                                                                                                     |  |                                      |  |                                      |  |                                      |  |                                      |  |                                      |





## Stationary Emergency Generator Troubleshooting



### TROUBLESHOOTING GUIDE

| PROBLEM                                                | CAUSE                                                                                                                                                                                                                                                                                                                          | CORRECTION                                                                                                                                                                                                                                                             |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engine won't crank.                                    | <ol style="list-style-type: none"> <li>15 amp fuse blown.</li> <li>Loose or corroded or defective battery cables.</li> <li>Defective starter contactor.</li> <li>Defective starter motor.</li> <li>Dead or Defective Battery.</li> <li>5 amp fuse blown.</li> </ol>                                                            | <ol style="list-style-type: none"> <li>Replace fuse.</li> <li>Tighten, clean or replace battery cables as necessary.</li> <li>Replace contactor.*</li> <li>Replace starter motor.*</li> <li>Remove, change or replace battery.</li> <li>Replace fuse.*</li> </ol>      |
| Engine cranks but won't start                          | <ol style="list-style-type: none"> <li>Out of fuel.</li> <li>Fuel solenoid (FS) is defective</li> <li>Open Wire #14A from Engine Control circuit board.</li> <li>Spark plugs defective.</li> <li>Door on tank not closed.</li> </ol>                                                                                           | <ol style="list-style-type: none"> <li>Replenish fuel.</li> <li>Replace solenoid.*</li> <li>Reconnect wire.</li> <li>Clean, regap or replace plugs.</li> <li>Close door on tank.</li> </ol>                                                                            |
| Engine starts hard, runs rough.                        | <ol style="list-style-type: none"> <li>Flame arrestor (air cleaner) plugged or damaged.</li> <li>Plugged fuel line.</li> <li>Defective spark plugs.</li> <li>Fuel pressure incorrect.</li> </ol>                                                                                                                               | <ol style="list-style-type: none"> <li>Clean or replace as needed.</li> <li>Unclog fuel line.</li> <li>Clean, regap or replace plugs.</li> <li>Confirm fuel pressure to regulator is as recommended in SPECIFICATIONS.</li> </ol>                                      |
| Engine starts then shuts down.                         | <ol style="list-style-type: none"> <li>Engine oil level is low.</li> <li>Engine is overheated.</li> <li>Defective Low Oil Pressure Switch</li> <li>Defective Coolant Temperature Switch</li> <li>Defective Control Module circuit board.</li> <li>Coolant Level is Low.</li> <li>Defective Low Coolant Level Switch</li> </ol> | <ol style="list-style-type: none"> <li>Check oil and add oil as needed.</li> <li>Check cooling system for leaks.</li> <li>Replace switch.*</li> <li>Replace switch.*</li> <li>Replace board.*</li> <li>Repair leak - Add coolant.</li> <li>Replace Switch.*</li> </ol> |
| AUTO/OFF/MANUAL Switch at OFF, engine continues to run | <ol style="list-style-type: none"> <li>Defective AUTO/OFF/MANUAL switch</li> <li>Open/disconnected wire #15A between AUTO/OFF/MANUAL switch and Control Module circuit board.</li> <li>Defective Control Module circuit board</li> </ol>                                                                                       | <ol style="list-style-type: none"> <li>Replace switch.*</li> <li>Reconnect/close wire.</li> <li>Replace board.*</li> </ol>                                                                                                                                             |
| No AC output from generator.                           | <ol style="list-style-type: none"> <li>Check main line circuit breaker.</li> <li>Check circuit breaker &amp; fuses.</li> <li>Transfer switch set to NORMAL position</li> <li>Generator internal failure.</li> <li>Thermal circuit breaker open.</li> </ol>                                                                     | <ol style="list-style-type: none"> <li>Reset to ON or CLOSED.</li> <li>Reset and replace, if necessary.</li> <li>Set to GENERATOR position.</li> <li>*</li> <li>Auto-reset - Wait 5 min. and attempt restart.</li> </ol>                                               |

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



## **United States Environmental Protection Agency Warranty Statement Warranty Rights, Obligations and Coverage**

The United States Environmental Protection Agency (EPA) and Generac Power Systems, Inc. (Generac), are pleased to explain the Emission Control System Warranty on your new stationary emergency engine. If during the warranty period, any emission control system or component on your engine is found defective in materials or workmanship Generac will repair your engine at no cost to you for diagnosis, replacement parts and labor provided it be done by an Authorized Warranty Service Facility. Your emission control system may include parts such as the fuel metering, ignition, and exhaust systems and other related emission related components listed below. Generac will warrant the emissions control systems on your 2009 and later model year engines provided there has been no abuse, neglect, unapproved modification or improper maintenance of your engine. For engines less than 130 HP the warranty period is two years from the date of sale to the ultimate purchaser. For engines greater than or equal to 130 HP the warranty period is three year from the date of the engine being placed into service.

### **Purchaser's/Owner's Warranty Responsibilities**

As the engine purchaser/owner you are responsible for the following. 1.) The engine must be installed and configured in accordance to the installation specifications. 2.) The completion of all maintenance requirements listed in your Owner's Manual. 3.) Any engine setting adjustment must be done in accordance and consistent with the instructions in the Owner's Manual. 4.) Any emission control system or component must be maintained and operated appropriately in order to ensure proper operation of the engine and control system to minimize emissions at all times.

Generac may deny any, or all Emission Control System Warranty coverage or responsibility of the engine, or an emission control system or component on your engine thereof, if it has failed due to abuse, neglect, unapproved modification or improper maintenance, or the use of counterfeit and/or 'gray market' parts not made, supplied or approved by Generac. Warranty service/scheduled maintenance can be arranged by contacting your selling dealer or an Authorized Warranty Service dealer. The purchaser/owner shall be responsible for any expenses or other charges incurred for service calls and/or transportation of the product to/from the inspection or repair facilities. The purchaser/owner shall be responsible for any and/or all damages or losses incurred while the engine is being transported/shipped for inspection or warranty repairs.

### **Emission Related Parts Include the Following (if so equipped)**

- |                                                           |                                                |
|-----------------------------------------------------------|------------------------------------------------|
| 1) Fuel Metering System                                   | 3) Ignition System including                   |
| 1.1) Gasoline Carburetor assembly and internal components | a) Spark plug, b) Ignition module,             |
| a) Fuel filter, b) Carburetor, c) Fuel Pump               | c) ignition coil, d) Spark plug wire           |
| 1.2) Carburetion assembly and its components              | 4) Exhaust system                              |
| a) Fuel controller, b) Carburetor and its gaskets,        | a) Catalyst assembly, b) Exhaust manifold,     |
| c) Mixer and its gaskets, d) Primary gas regulator        | c) Muffler, d) Exhaust pipe, e) Muffler gasket |
| e) Liquid vaporizer                                       | 5) Crankcase Breather Assembly including       |
| 1.3) Fuel Regulator                                       | a) Breather connection tube, b) PCV valve      |
| 2) Air Induction System including                         | 6) Oxygen Sensor                               |
| a) Intake pipe/manifold, b) Air cleaner                   | 7) Diagnostic Emission-Control System          |



## **United States Environmental Protection Agency Compliance Requirements**

### **Purchaser's/Owner's Recordkeeping Responsibilities**

The United States Environmental Protection Agency (EPA) and Generac Power Systems, Inc. (Generac), are pleased to explain your recordkeeping requirements for compliance with Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines as listed in the Electronic Code of Federal Regulations Title 40 Part 60. As the engine purchaser/owner who operates and maintains their certified emergency stationary engine and emission control system according to applicable emission related guidelines as specified in this Owner's Manual you are required to meet the following notification and recordkeeping requirements to demonstrate compliance. 1.) Maintain documentation that the engine is certified to meet emission standards. 2.) Recordkeeping of maintenance conducted. 3.) Recordkeeping of the provision allowing natural gas engines to operate using propane for a maximum of 100 hours per year as an alternate fuel solely during emergency operations provided the engine is not certified to operate on propane. 4.) Meet all compliance notifications submitted to the purchaser/owner and maintain all supporting documentation. 5.) Recordkeeping of hours of operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. For emergency engines greater than or equal to 130 HP, recordkeeping of hours of operation begins January 1, 2011. For emergency engines less than 130 HP, recordkeeping of hours of operation begins January 1, 2009; Engines are equipped with non-resettable hour meters to facilitate recordkeeping.

Specific Air Quality Management or Air Pollution Control Districts may have different and additional record keeping/ reporting requirements. Your permit to construct and/or operate the engine may be contingent upon compliance with those requirements. Check with your local Air Quality Management or Air Pollution Control District for specific requirements.

Emergency stationary internal combustion engines (ICE) may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, Generac, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. The purchaser/owner may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. Emergency stationary ICE may operate up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing. The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. For purchaser/owner of emergency engines, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as permitted in this section is prohibited.

If you operate and maintain your certified emergency stationary SI internal combustion engine and emissions control systems in accordance with the specifications and guidelines in the Owner's Manual, EPA will not require engine performance testing. If not, your engine will be considered non-certified and you must demonstrate compliance according to Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines as listed in the Electronic Code of Federal Regulations Title 40 Part 60.

### **Emission-Related Installation Instructions**

Your certified emergency stationary engine has pre-set emission control systems or components that require no adjustment. Inspection and replacement of an emissions related component is required to be done in accordance with the requirements cited in the United States Environmental Protection Agency Warranty Statement or can be arranged by contacting your selling dealer or an Authorized Warranty Service dealer. Failing to follow these instructions when installing a certified engine in a piece of nonroad equipment violates federal law 40 CFR 1068.105 (b), subject to fines or penalties as described in the Clean Air Act.

NOTES

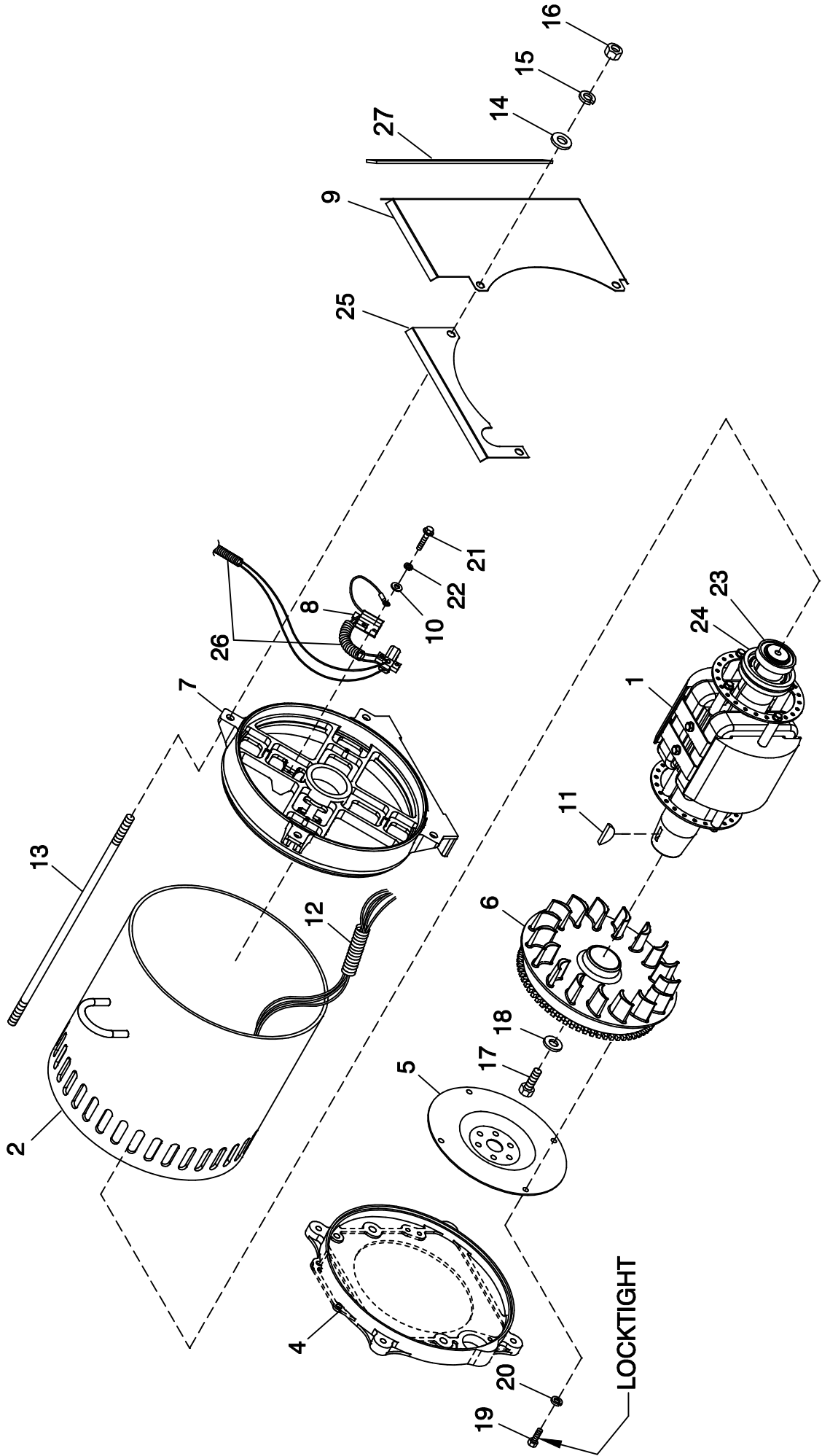
## Stationary Emergency Generator

### Notes

NOTES

## NOTES

GROUP A



EXPLODED VIEW:  
CPL ALTERNATOR DIRECT EXCITATION  
DRAWING #: 0F9803

EXPLODED VIEW: CPL ALTERNATOR DIRECT EXCITATION  
DRAWING #: 0F9803

GROUP A

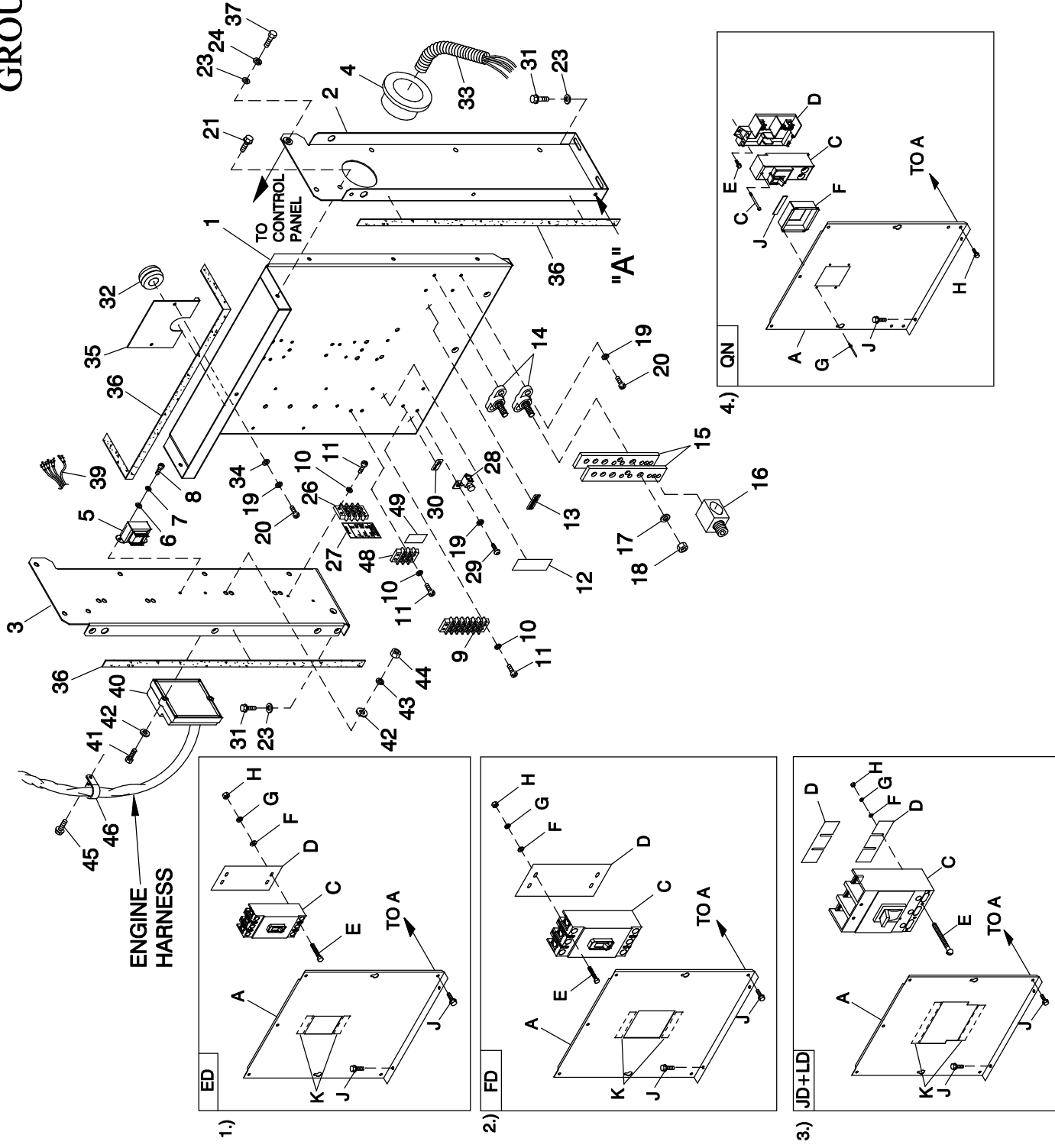
APPLICABLE TO:

| ITEM | PART #        | QTY. | DESCRIPTION                      |
|------|---------------|------|----------------------------------|
| 1    | 0F9677        | 1    | ROTOR-2390-45KD1 CPL             |
|      | 0G0056        | 1    | ROTOR-2390-35KD1 CPL             |
|      | 0G0959        | 1    | ROTOR-2390-45KD1 CPL (G2)        |
|      | 0G1155        | 1    | ROTOR-2390-35KD1 CPL (G2)        |
|      | 0G1931        | 1    | ROTOR 25KW 3PH DIRECT 390 1800   |
|      | 0G2101        | 1    | ROTOR 25KW 1PH DIRECT 390 1800   |
|      | 0G3734        | 1    | RTR-2390-60KD2 CPL               |
|      | 0G6562        | 1    | RTR 390 35AD1 CPL                |
|      | 0G6564        | 1    | RTR 390 35KD1 CPL                |
| 2    | 0F9664        | 1    | STATOR-390 45K 2P 1PH DIRECT     |
|      | 0G0057        | 1    | STATOR-2390-35AD1 CPL            |
|      | 0G0058        | 1    | STATOR-2390-35KD1 CPL            |
|      | 0G0059        | 1    | STATOR-2390-35GD1 CPL            |
|      | 0G0183        | 1    | STATOR-2309-45KW 2P 3PH 208V     |
|      | 0G0184        | 1    | STATOR-2309-45-KD1 CPL           |
|      | 0G1932        | 1    | ASSY STR 390 25GD3 CPL           |
|      | 0G2098        | 1    | ASSY STR 390 25AD1 CPL           |
|      | 0G2099        | 1    | ASSY STR 390 25KD3 CPL           |
|      | 0G2100        | 1    | ASSY STR 390 25JD3 CPL           |
|      | 0G3736        | 1    | ASSY STR 2390 60AD2 CPL          |
|      | 0G3737        | 1    | ASSY STR 390 60KW 2P 3PH 208V    |
|      | 0G3738        | 1    | ASSY STR 390 60KW 2P 3PH 480V    |
|      | 0G6104        | 1    | STR-2390--45JD1 CPL              |
|      | 0G6563        | 1    | STR 390 35AD1 CPL                |
|      | 0G6565        | 1    | STR 390 35GD1 CPL                |
|      | 0G6566        | 1    | STR 390 35KD1 CPL                |
|      | 0G6567        | 1    | STR 390 35JD1 CPL                |
|      | 0H0201        | 1    | STR-2390--60JD2 CPL              |
|      | 0H1299        | 1    | ASSY STR 390 36AD1 CPL           |
|      | 0H1300        | 1    | ASSY STR 390 36JD1 CPL           |
|      | 0H1301        | 1    | ASSY STR 390 36 GD1 CPL          |
| 3    | 0C9708        | REF  | INSTR HYPOT TEST (NOT SHOWN)     |
| 4    | SEE ENGINE EV | REF  | ENGINE ADAPTER                   |
| 5    | SEE ENGINE EV | REF  | FLEXPLATE                        |
| 6    | 0F5767B       | 1    | ASSY FLYWHEEL CPL W/40MM FAN B   |
| 7    | 0E5706        | 1    | REAR BEARING CARRIER 390/DRCT    |
| 8    | 0F7874        | 1    | ASSY BRUSH HOLDER 390/HSB        |
| 9    | 0G0587        | 1    | GUARD REAR BEARING CARRIER       |
| 10   | 038150        | 4    | WASHER FLAT #8 ZINC              |
| 11   | 023454        | 1    | KEY WOODRUFF #E                  |
| 12   | 077043E       | 1    | CONDUIT FLEX 1.0" ID (35" LG)    |
| 13   | 04576100BU    | 4    | STUD M14-2.0 570 G5 ZINC         |
| 14   | 052646        | 4    | WASHER FLAT M14                  |
| 15   | 043123        | 4    | WASHER LOCK M14                  |
| 16   | 051779        | 4    | NUT HEX M14-2.0 G8 YEL CHR       |
| 17   | 0A2601        | 1    | SCREW HHC M16-2.0 X 45 G8.8      |
| 18   | 072879        | 1    | SPACER .69 X 2.75 X .37 ST/ZNC   |
| 19   | 0F8408        | 4    | SCREW HHC M10-1.50 X 16 G10.9    |
| 20   | 046526        | 4    | WASHER LOCK M10                  |
| 21   | 0C3992        | 4    | SCREW HHTT M4-0.7 X 16 BP        |
| 22   | 022264        | 4    | WASHER LOCK #8-M4                |
| 23 * | 047248        | 1    | BALL BEARING-45 MM               |
| 24 * | 070892        | 1    | SLIP RING MACHINED               |
| 25   | 0G0588        | 1    | GUARD REAR BEARING CARRIER       |
| 26   | 077043A       | 1    | CONDUIT FLEX .38" ID (60")       |
| 27   | 056326        | 1    | TRIM VINYL BLACK 1/8GP (16.5"LG) |

\* ROTOR REPLACEMENT PARTS



# GROUP A



EXPLODED VIEW:  
CPL C2 & C4 FLEX HSB  
DRAWING #: 0H1730

**EXPLODED VIEW: CPL C2 & C4 FLEX HSB**  
**DRAWING #: 0H1730**

**GROUP A**

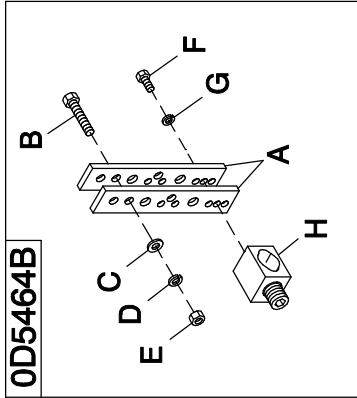
APPLICABLE TO:

| ITEM   | PART #  | QTY. | DESCRIPTION                                        |
|--------|---------|------|----------------------------------------------------|
| 1      | 0F3137  | 1    | PAN CB CONN BOX                                    |
| 2      | 0F3188  | 1    | STAND RH CONTROL                                   |
| 3      | 0F3189  | 1    | STAND LH CONTROL                                   |
| 4      | 023484N | 1    | BUSHING SNAP SB-2.5-31                             |
| 5      | 0F6366B | 1    | XFMR DUAL 120V/16V (FOR 120/240V & 277/480V UNITS) |
|        | 0F6366A | 1    | XFMR DUAL 104V/16V (FOR 120/208V UNITS)            |
| 6      | 043180  | 2    | WASHER FLAT M4                                     |
| 7      | 022264  | 2    | WASHER LOCK #8-M4                                  |
| 8      | 0C3990  | 2    | SCREW PHTT M4-0.7 X 10 ZYC                         |
| (1) 9  | 046357  | REF  | BLOCK TERM 20A 6 X 6 X 1100V                       |
| 10     | 022155  | 6    | WASHER LOCK #6                                     |
| 11     | 0C2428  | 6    | SCREW PHTT #6-32 X 1/2 ZYC                         |
| 12     | 0G7992  | 1    | DECAL RTS CUSTOMER CONNECTION                      |
| 13     | 0A9457  | 1    | DECAL NEUTRAL                                      |
| 14     | 057073  | 2    | JUNCTION BLOCK 3/8-16                              |
| (2) 15 | 0D5466  | REF  | BUS BAR NEUTRAL BLOCK 390                          |
| (2) 16 | 0A7822  | REF  | LUG SLDLSS 600/250-1/0 X 1/4-28                    |
| 17     | 022237  | 2    | WASHER LOCK 3/8                                    |
| 18     | 022241  | 2    | NUT HEX 3/8-16 STEEL                               |
| 19     | 049226  | 6    | WASHER LOCK M5                                     |
| 20     | 0C2266  | 6    | SCREW PHTT M5-0.8 X 16 ZYC                         |
| 21     | 0C2454  | 8    | SCREW THF M6-1 X 16 N WA Z/JS                      |
| 23     | 022473  | 8    | WASHER FLAT 1/4-M6 ZINC                            |
| 24     | 022097  | 4    | WASHER LOCK M6-1/4                                 |
| (1) 26 | 0D4698  | REF  | BLOCK TERM 20A 6 X 3 X 1100V                       |
| 27     | 0H0026  | 1    | DECAL CHARGER POWER 120VAC C2                      |
| 28     | 025433  | 1    | LUG SLDLSS #6-14 X 13/64 CU                        |
| 29     | 024469  | 1    | SCREW HHTT #10-32 X 3/8 CZ                         |
| 30     | 067210A | 1    | DECAL GROUND LUG                                   |
| 31     | 0D6029  | 4    | SCREW HHTT M6-1.0 X 16 ZYC                         |
| 32     | 081008  | 1    | GROMMET 1.25 X .25 X .75                           |
| 33     | 077043J | 1    | CONDUIT FLEX 2.0" ID (36" LG)                      |
| 34     | 051713  | 2    | WASHER FLAT M5                                     |
| 35     | 0F6156  | 1    | PLATE WIRE SNGL GALV                               |
| 36     | 029289  | 1    | TAPE ELEC 1/2 FOAM (AS REQ'D)                      |
| 37     | 047411  | 4    | SCREW HHC M6-1.0 X 16 G8.8                         |
| (3) 39 | 0G0770  | 1    | HARNESS, TRANSFORMER ADAPTER                       |
| (4) 40 | 0H0348  | 1    | PCB ENCLOSURE ASSY 4.2L IGN MD                     |
| (4) 41 | 036943  | 2    | SCREW PPHM #10/32 X 2                              |
| (4) 42 | 023897  | 4    | WASHER FLAT #10 ZINC                               |
| (4) 43 | 022152  | 2    | WASHER LOCK #10                                    |
| (4) 44 | 022158  | 2    | NUT HEX #10-32 STEEL                               |
| 45     | 0C2454  | 1    | SCREW THF M6-1 X 16 N WA Z/JS                      |
| 46     | 055934D | 1    | CLAMP VINYL 1.06 X .406 Z                          |
| 47     | 0F6145  | A/R  | SEAL WEATHER .45"DIA                               |
| 48     | 048766  | REF  | BLOCK TERM 20A 2 X 6 X 1100V                       |
| 49     | 0G7991  | 1    | DECAL GTS CUSTOMER CONNECTION                      |
| 1)     |         |      | UL CIRCUIT BREAKER (ED)                            |
| A      | 0F3328  | 1    | COVER ED CB SHORT STND                             |
| C      | 0D5552  | REF  | CB 0050A 3P 480V S ED4 LL                          |
|        | 0D5553  | REF  | CB 0060A 3P 480V S ED4 LL                          |
|        | 0D5554  | REF  | CB 0070A 3P 480V S ED4 LL                          |
|        | 0D5556  | REF  | CB 0090A 3P 480V S ED4 LL                          |
|        | 0D9693  | REF  | CB 0125A 3P 480V S ED4 LL                          |
| D      | 0F0492  | 1    | INSULATOR CB S (ED-3P)                             |
| E      | 048927  | 4    | SCREW RHM #10-32 X 4-1/2                           |
| F      | 023897  | 4    | WASHER FLAT #10 ZINC                               |
| G      | 022152  | 4    | WASHER LOCK #10                                    |
| H      | 022158  | 4    | NUT HEX #10-32 STEEL                               |
| J      | 0C2454  | 9    | SCREW THF M6-1 X 16 N WA Z/JS                      |
| K      | 029289  | 1    | TAPE ELEC 1/2 FOAM (AS REQ'D)                      |
| 2)     |         |      | UL CIRCUIT BREAKER (FD)                            |
| A      | 0F3138  | 1    | COVER CB CONN BOX                                  |
| C      | 0D5572  | REF  | CB 0150A 3P 600V S FD6 LL                          |
|        | 0D5573  | REF  | CB 0175A 3P 600V S FD6 LL                          |
|        | 0D5574  | REF  | CB 0200A 3P 600V S FD6 LL                          |
|        | 0D5575  | REF  | CB 0225A 3P 600V S FD6 LL                          |
|        | 0D5576  | REF  | CB 0250A 3P 600V S FD6 LL                          |
| D      | 0F0199  | 1    | INSULATOR CB FD FRAME 30MIL                        |
| E      | 081320  | 4    | SCREW SHC 1/4-20 X 4.5 G8.8 NZ                     |
| F      | 022473  | 4    | WASHER FLAT 1/4-M6 7INC                            |

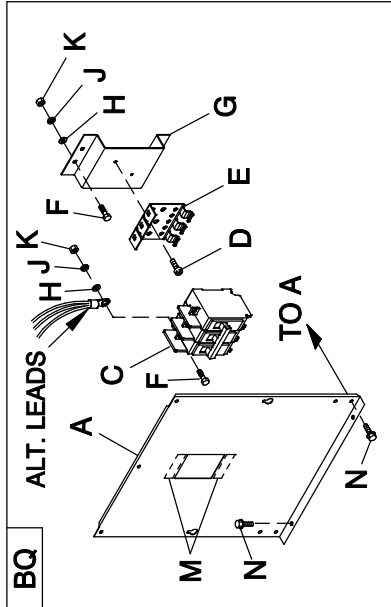
| ITEM | PART # | QTY. | DESCRIPTION                   |
|------|--------|------|-------------------------------|
| G    | 022097 | 4    | WASHER LOCK M6-1/4            |
| H    | 022127 | 4    | NUT HEX 1/4-20 STEEL          |
| J    | 0C2454 | 9    | SCREW THF M6-1 X 16 N WA Z/JS |
| K    | 029289 | 1    | TAPE ELEC 1/2 FOAM (AS REQ'D) |
| 3)   |        |      | UL CIRCUIT BREAKER (JD+LD)    |
| A    | 0F3329 | 1    | COVER JD/LD CB SHRT STAND     |
| C    | 0D5577 | REF  | CB 0300A 3P 600V S JD6 LL     |
| D    | 0F2353 | 2    | INSULATOR CIRCUIT BR. JD/LD   |
| E    | 022770 | 4    | SCREW RHM 1/4-20 X 3          |
| F    | 022473 | 4    | WASHER FLAT 1/4-M6 ZINC       |
| G    | 022097 | 4    | WASHER LOCK M6-1/4            |
| H    | 022127 | 4    | NUT HEX 1/4-20 STEEL          |
| J    | 0C2454 | 9    | SCREW THF M6-1 X 16 N WA Z/JS |
| K    | 029289 | 1    | TAPE ELEC 1/2 FOAM (AS REQ'D) |
| 4)   |        |      | UL CIRCUIT BREAKER (QN)       |
| A    | 0F8135 | 1    | COVER QN FRM CB               |
| C    | 0E7283 | REF  | CB 0150A 2P 240V S QN2 LL     |
|      | 0E7284 | REF  | CB 0175A 2P S QN2 LL 240V     |
|      | 0E3628 | REF  | CB 0200A 2P 240V S QN2 LL     |
| D    | 0E3664 | 1    | BASE, QN CIRCUIT BREAKER      |
| E    | 074908 | 2    | SCREW HHTT M5-0.8 X 10 BP     |
| F    | 0F8140 | 1    | COVER QN CB DISH              |
| G    | 036261 | 4    | RIVET POP .125 X .275 SS      |
| H    | 0C2454 | 11   | SCREW THF M6-1X16 N WA Z/JS   |
| J    | 029289 | 1    | TAPE ELEC 1/2 FOAM (AS REQ'D) |

- (1) ITEM INCLUDED WITH HARNESS  
(2) ITEM INCLUDED WITH 0D5464B  
(3) ITEM USED WITH EARLY MODEL 208V UNITS ONLY  
(4) ITEMS USED ON 4.2L MODELS ONLY.

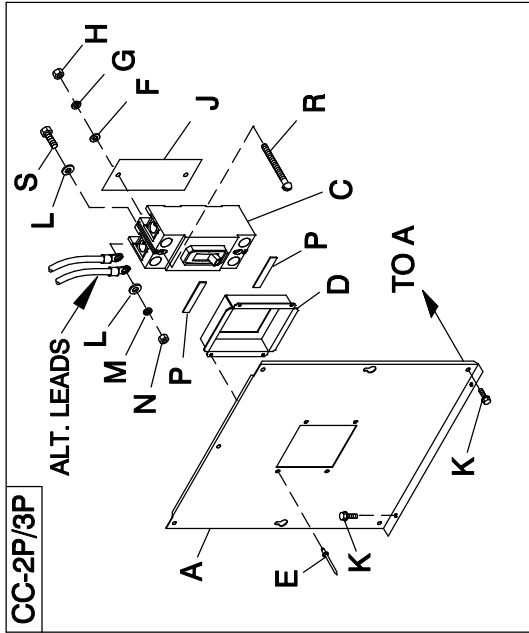
7.) 0D5464B



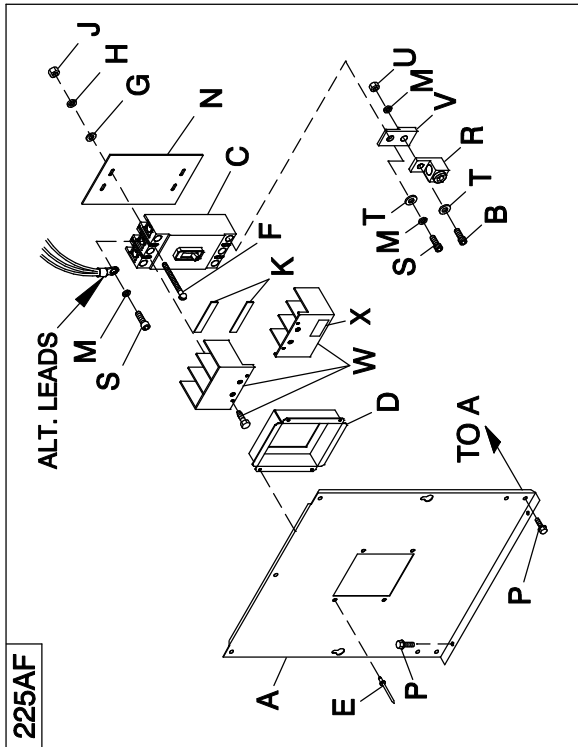
8.) BQ



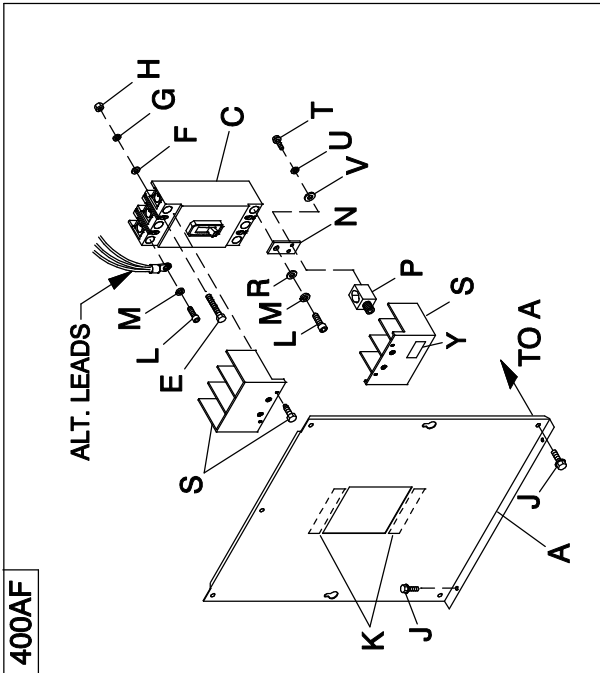
9.) CC-2P/3P



5.) 225AF



6.) 400AF



EXPLODED VIEW: CPL C2 & C4 FLEX HSB  
DRAWING #: 0H1730

GROUP A

APPLICABLE TO:

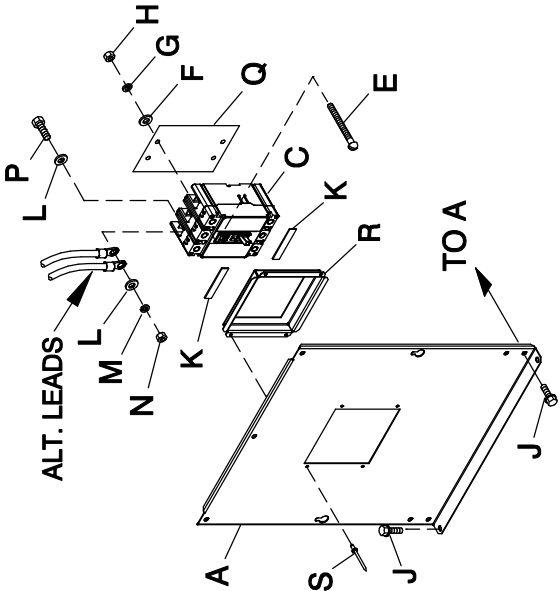
| ITEM  | PART #      | QTY. | DESCRIPTION                          |
|-------|-------------|------|--------------------------------------|
| 5)    |             |      | UL CIRCUIT BREAKER (225AF) (2P & 3P) |
| A     | 0F4185      | 1    | COVER CB C2-C4 (225AF)               |
| B     | 058306      | 3    | SCREW SHC M8-1.25 X 25 G12.9         |
| C     | 0F4165\$    | REF  | CIRCUIT BREAKERS 200A FRAME (3P)     |
|       | 0F4143      | REF  | CB 0040A 3P 480V 225AF (3P)          |
|       | 0F4148      | REF  | CB 0125A 3P 480V G 225AF             |
|       | 0F4149      | REF  | CB 0150A 3P 480V G 225AF             |
|       | 0F4151      | REF  | CB 0200A 3P 480V G 225AF             |
|       | 0G5247\$    | REF  | CB 200A FRAME G 240V (2P)            |
|       | 0G5250      | REF  | CB 175A 2 POLE 240V 225AF (2P)       |
|       | 0G4478      | REF  | CB 200A 2 POLE 240V 225AF (2P)       |
|       | 0F4145      | REF  | CB 0060A 3P 480V G 225AF (3P)        |
| D     | 0F4186      | 1    | COVER CB DISH 225AF (3P)             |
|       | 0F4186AGSOR | 1    | COVER CB DISH 225AF (2P)             |
| E     | 036261      | 4    | RIVET POP .125 X .275 SS             |
| (2) F | 053640      | 2/4  | SCREW RHM #8-32 X 3-1/4              |
| (2) G | 038150      | 2/4  | WASHER FLAT #8 ZINC                  |
| (2) H | 022264      | 2/4  | WASHER LOCK #8-M4                    |
| (2) J | 022471      | 2/4  | NUT HEX #8-32 STEEL                  |
| K     | 029289      | 2    | TAPE ELEC 1/2 FOAM                   |
| (2) M | 022129      | 6/9  | WASHER LOCK M8-5/16                  |
| N     | 0F8432      | 1    | INSULATOR CB 225AF (3P)              |
|       | 0F8432A     | 1    | INSULATOR CB 225AF (2P)              |
| P     | 0C2454      | 11   | SCREW THF M6-1 X 16 N WA Z/JS        |
| (2) R | 0F8451      | 2/3  | LUG SLDLSS 300 MCM-6 AL/CU           |
| (2) S | 049897      | 4/6  | SCREW SHC M8-1.25 X 20 G8            |
| (2) T | 022145      | 4/6  | WASHER FLAT 5/16-M8 ZINC             |
| (2) U | 045771      | 2/3  | NUT HEX M8-1.25 G8 CLEAR ZINC        |
| (2) V | 0F8843      | 2/3  | BUS BAR 200A LUG ADAPTOR             |
| (1) W | W/CB        | 2    | TERMINAL COVER CB                    |
| X     | 0G3259      | 1    | DECAL TERMINAL SHOCK HZD BI          |
| 6)    |             |      | UL CIRCUIT BREAKER (400AF)           |
| A     | 0F4187      | 1    | COVER CB C2-C4 400AF                 |
| C     | 0F4166\$    | REF  | CIRCUIT BREAKERS 400A FRAME          |
| E     | 042419      | 4    | SCREW RHM 10-32 X 4                  |
| F     | 023897      | 4    | WASHER FLAT #10 ZINC                 |
| G     | 022152      | 4    | WASHER LOCK #10                      |
| H     | 022158      | 4    | NUT HEX #10-32 STEEL                 |
| J     | 0C2454      | 9    | SCREW THF M6-1 X 16 N WA Z/JS        |
| K     | 029289      | 1    | TAPE ELEC 1/2 FOAM                   |
| (2) L | 052647      | 2/3  | SCREW SHC M10-1.5 X 25 G12.9         |
| (2) M | 046526      | 2/3  | WASHER LOCK M10                      |
| N     | W/CB        | 3    | BUS BAR CB ADAPTER 225-400 A         |
| P     | 0A7822      | 3    | LUG SLDLSS 600/250-1/0 X 1/4-28      |
| (1) S | W/CB        | 2    | TERM COVER CB                        |
| T     | 023334      | 6    | SCREW HHC 1/4-28 X 1/2 G5            |
| U     | 022097      | 6    | WASHER LOCK M6-1/4                   |
| V     | 022473      | 6    | WASHER FLAT 1/4-M6 ZINC              |
| (2) W | W/CB        | 2/3  | SCREW SHC M10-1.5 X 25 G12.9         |
| (2) X | W/CB        | 2/3  | WASHER LOCK M10                      |
| Y     | 0G3259      | 1    | DECAL TERMINAL SHOCK HZD BI          |
| 7)    |             |      | NEUTRAL BLOCK 390 / 200-400A         |
| A     | 0D5466      | 2    | BUS BAR NEUTRAL BLOCK 390            |
| B     | 039287      | 1    | SCREW HHC M8-1.25 X 45 G8.8 FT       |
| C     | 022145      | 1    | WASHER FLAT 5/16-M8 ZINC             |
| D     | 022129      | 1    | WASHER LOCK M8-5/16                  |
| E     | 045771      | 1    | NUT HEX M8-1.25 G8 YEL CHR           |
| F     | 045335      | 2    | SCREW HHC 1/4-28 X 3/4 G5            |
| G     | 083896      | 2    | WASHER LOCK 1/4-M6 SS                |
| H     | 0A7822      | 1    | LUG SLDLSS 600/250-1/0 X 1/4-28      |
| 8)    |             |      | UL CIRCUIT BREAKER (BQ)              |
| A     | 0G1968      | 1    | COVER BQ CIR BREAKER CPL 3P          |
|       | 0G1970      | REF  | COVER BQ CIR BREAKER CPL 2P          |
| C     | 0A2077      | REF  | CB 0125A 2P 240V S BQ2 LL            |
|       | 040532      | REF  | CB 0100A 3P 240V S BQ3 LL            |
| D     | 0C3990      | 2    | SCREW PHTT M4-0.7 X 10 ZYC           |
| E     | 0E7890      | 1    | BRKT CB MTG BACK                     |
|       | 0E6002      | REF  | MTG TRACK BQ SIEMENS CB 3P           |

| ITEM  | PART #  | QTY. | DESCRIPTION                    |
|-------|---------|------|--------------------------------|
| F     | 022859  | 6    | SCREW RHM #10-32 X 3/4         |
| G     | 0G0008  | 1    | BRKT BQ CB STANDOFF            |
| H     | 023897  | 6    | WASHER FLAT #10 ZINC           |
| J     | 022152  | 6    | WASHER LOCK #10                |
| K     | 022158  | 6    | NUT HEX #10-32 STEEL           |
| M     | 029289  | 1    | TAPE ELEC 1/2 FOAM             |
| N     | 0C2454  | 11   | SCREW THF M6-1 X 16 N WA Z/JS  |
| 9)    |         |      | UL CIRCUIT BREAKER (CC-2P/3P)  |
| A     | 0F4185  | 1    | COVER CB C2-C4 (225AF)         |
| C     | 0H4748  | REF  | CB 0175A 2P 240V E CC LL       |
|       | 0H4749  | REF  | CB 0200A 2P 240V E CC LL       |
|       | 0H4913  | REF  | CB 0100 3P 240V E CC LL        |
|       | 0H4914  | REF  | CB 0125 3P 240V E CC LL        |
|       | 0H4915  | REF  | CB 0150 3P 240V E CC LL        |
|       | 0H4916  | REF  | CB 0175 3P 240V E CC LL        |
|       | 0H4917  | REF  | CB 0200 3P 240V E CC LL        |
| D     | 0H4823A | 1    | COVER CB DISH 2P E CC          |
|       | 0H4823B | 1    | COVER CB DISH 3P E CC          |
| E     | 036261  | 4    | RIVET POP .125 X .275 SS       |
| (2) F | 038150  | 2/4  | WASHER FLAT #8 ZINC            |
| (2) G | 022264  | 2/4  | WASHER LOCK #8-M4              |
| (2) H | 022471  | 2/4  | NUT HEX #8-32 STEEL            |
| J     | 0H4698  | 1    | INSULATOR CB 2P E TYPE CC      |
|       | 0H4698A | 1    | INSULATOR CB 3P E TYPE CC      |
| K     | 0C2454  | 11   | SCREW HWHT M6-1 X 16 N WA Z/JS |
| (2) L | 023897  | 4/6  | WASHER FLAT #10 ZINC           |
| (2) M | 049226  | 2/3  | WASHER LOCK M5                 |
| (2) N | 051716  | 2/3  | NUT HEX M5-0.8 G8 CLEAR ZINC   |
| P     | 029289  | 2    | TAPE ELEC 1/2 FOAM             |
| (2) R | 053640  | 2/4  | SCREW RHM #8-32 X 3-1/4        |
| (2) S | 052619  | 2/3  | SCREW HHC M5-0.8 X 20 G8.8     |

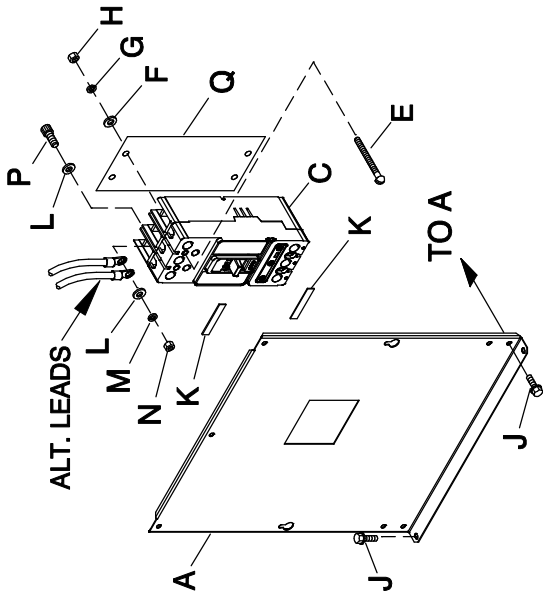
(1) HARDWARE FOR MTG. CB TERMINAL COVERS IS  
SUPPLIED WITH CIRCUIT BREAKERS.

(2) QTY. REQ'D FOR "2POLE / 3POLE" BREAKER

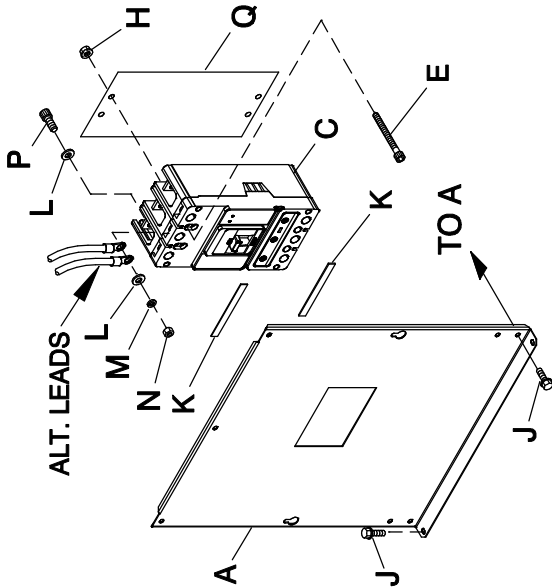
12.) FG FRAME



10.) JG FRAME



11.) KG FRAME



EXPLODED VIEW:  
CPL C2 & C4 FLEX HSB  
DRAWING #: 0H1730

## EXPLODED VIEW: CPL C2 &amp; C4 FLEX HSB

DRAWING #: 0H1730

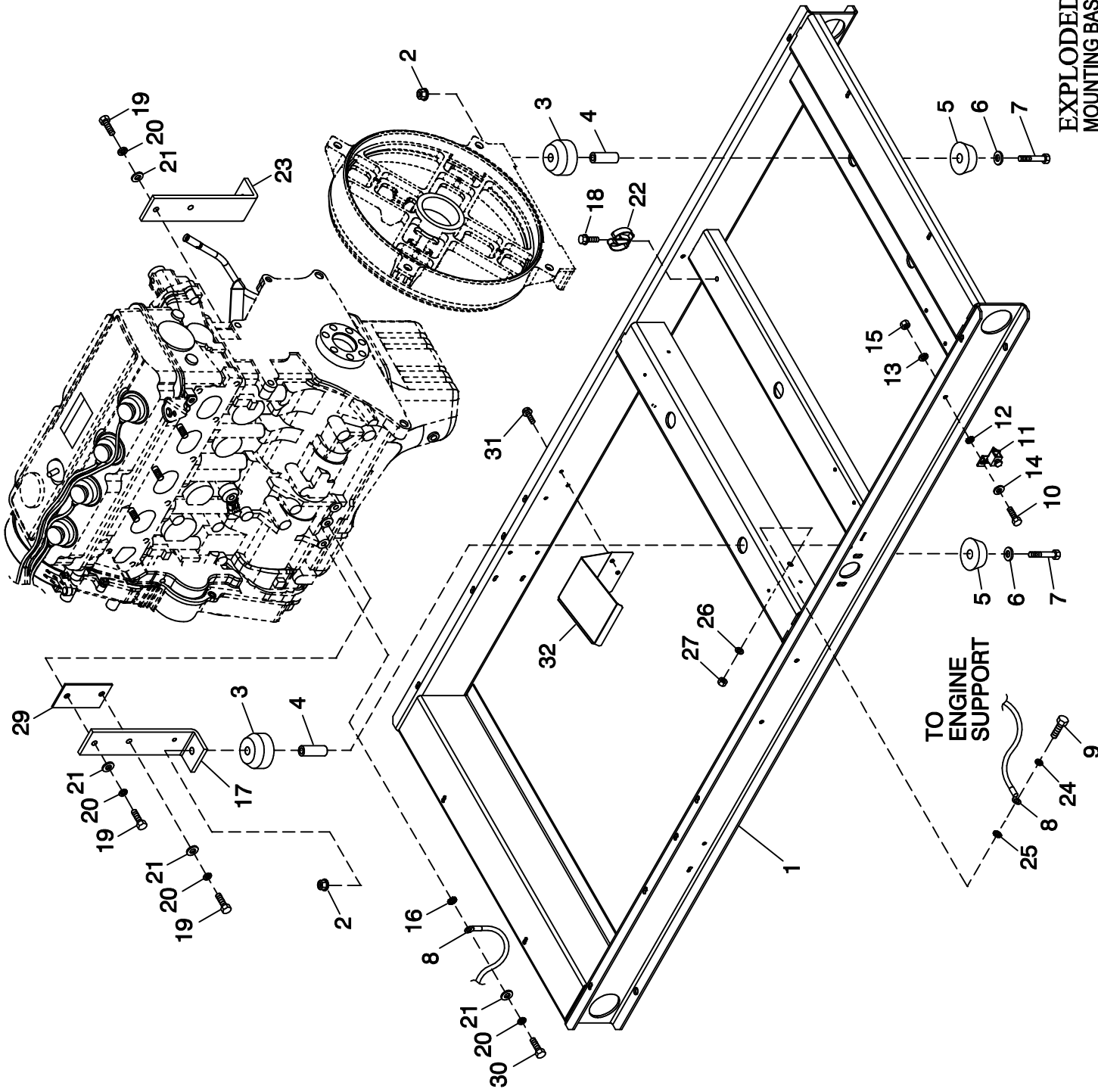
GROUP A

APPLICABLE TO:

| ITEM | PART #  | QTY. | DESCRIPTION                   |
|------|---------|------|-------------------------------|
| 10)  |         |      | UL CIRCUIT BREAKER (JG)       |
| A    | 0H5629  | 1    | COVER JG E CB C2 STAND        |
| C    | 0H5580  | REF  | CB 0250 3P 600V E JG LL       |
| E    | 022770  | 4    | SCREW RHM 1/4-20 X 3          |
| F    | 022473  | 4    | WASHER FLAT 1/4-M6 ZINC       |
| G    | 022097  | 4    | WASHER LOCK M6-1/4            |
| H    | 022127  | 2    | NUT HEX 1/4-20 STEEL          |
| J    | 0C2454  | 9    | SCREW THF M6-1 X 16 N WA Z/JS |
| K    | 029289  | 1    | TAPE ELEC 1/2 FOAM            |
| L    | 022145  | 6    | WASHER FLAT 5/16-M8 ZINC      |
| M    | 022129  | 3    | WASHER LOCK M8-5/16           |
| N    | 045771  | 3    | NUT HEX M8-1.25 G8 CLEAR ZINC |
| P    | 049897  | 3    | SCREW SHC M8-1.25 X 20 G8     |
| Q    | 0H5576A | 1    | INSULATOR CB E 3P JG          |
| 11)  |         |      | UL CIRCUIT BREAKER (KG)       |
| A    | 0H5630  | 1    | COVER KG E CB C2 STAND        |
| C    | 0H5582  | REF  | CB 0300 3P 600V E KG LL       |
| E    | 0D2157  | 4    | SCREW SHC M6-1.0 X 50 C8.8    |
| H    | 0D3700  | 4    | NUT FLANGE M6-1.0 NYLOK       |
| J    | 0C2454  | 9    | SCREW THF M6-1 X 16 N WA Z/JS |
| K    | 029289  | 1    | TAPE ELEC 1/2 FOAM            |
| L    | 022145  | 6    | WASHER FLAT 5/16-M8 ZINC      |
| M    | 022129  | 3    | WASHER LOCK M8-5/16           |
| N    | 045771  | 3    | NUT HEX M8-1.25 G8 CLEAR ZINC |
| P    | 049897  | 3    | SCREW SHC M8-1.25 X 20 G8     |
| Q    | 0H5581A | 1    | INSULATOR CB E 3P KG          |
| 12)  |         |      | UL CIRCUIT BREAKER (3P FG)    |
| A    | 0F4185  | 1    | COVER CB G 225AF C2-C4        |
| C    | 0H5486  | REF  | CB 0060 3P 480V E FG LL       |
|      | 0H5488  | REF  | CB 0080 3P 480V E FG LL       |
|      | 0H5490  | REF  | CB 0100 3P 480V E FG LL       |
| E    | 0H5721  | 4    | SCREW PPHM #8-32 X 1-3/4 ZINC |
| F    | 038150  | 4    | WASHER FLAT #8 ZINC           |
| G    | 022264  | 4    | WASHER LOCK #8-M4             |
| H    | 022471  | 4    | NUT HEX #8-32 STEEL           |
| J    | 0C2454  | 9    | SCREW THF M6-1 X 16 N WA Z/JS |
| K    | 029289  | 1    | TAPE ELEC 1/2 FOAM            |
| L    | 023897  | 6    | WASHER FLAT #10 ZINC          |
| M    | 049226  | 3    | WASHER LOCK M5                |
| N    | 051716  | 3    | NUT HEX M5-0.8 G8 CLEAR ZINC  |
| P    | 052619  | 3    | SCREW HHC M5-0.8 X 20 G8.8    |
| Q    | 0H4698A | 1    | INSULATOR CB 3P E TYPE CC/FG  |
| R    | 0H5560  | 1    | COVER CB DISH 3P E FD         |
| S    | 036261  | 4    | RIVET POP .125 X .275 SS      |

| ITEM | PART # | QTY. | DESCRIPTION |
|------|--------|------|-------------|
|------|--------|------|-------------|

# GROUP C



EXPLODED VIEW:  
MOUNTING BASE 2.4L C2  
DRAWING #: 0F9807



## EXPLODED VIEW: MOUNTING BASE 2.4L C2

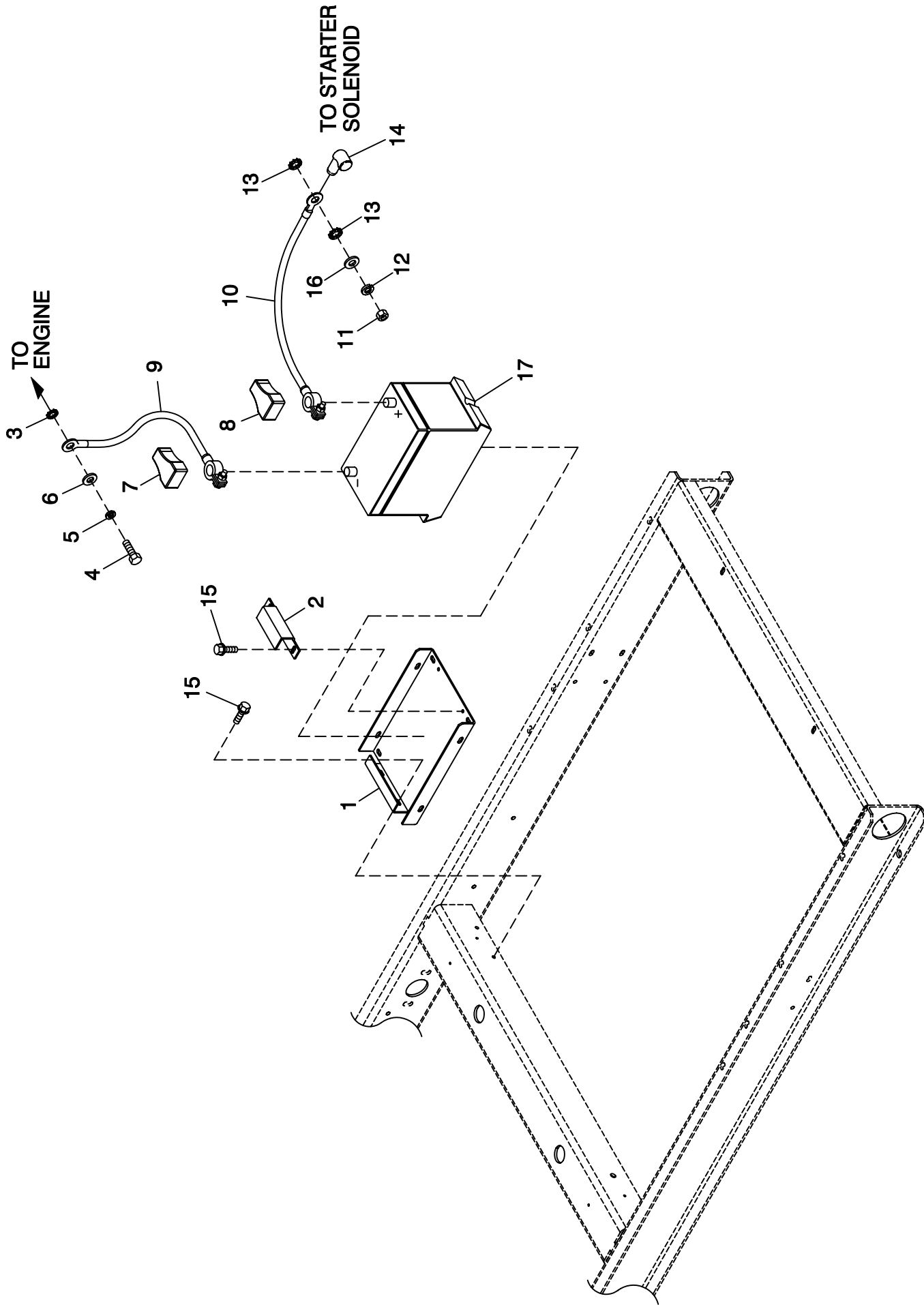
DRAWING #: 0F9807

GROUP C

APPLICABLE TO:

| ITEM | PART #     | QTY. | DESCRIPTION                      |
|------|------------|------|----------------------------------|
| 1    | 0F9517     | 1    | WELDMENT FRAME 2.4L C2           |
| 2    | 052860     | 4    | NUT FLANGED HEX M12-1.75         |
| 3    | 052251     | 4    | DAMPENER VIBRATION 40 BLUE       |
| 4    | 052257     | 4    | SPACER .49 X .62 X 1.87 PWDR/ZNC |
| 5    | 052252     | 4    | DAMPENER VIBRATION               |
| 6    | 052259     | 4    | WASHER FLAT M12                  |
| 7    | 052891     | 4    | SCREW HHC M12-1.75 X 80 G8.8     |
| 8    | 0536210410 | 1    | ASSY WIRE 14.00"                 |
| 9    | 042909     | 1    | SCREW HHC M8-1.25 X 30 G8.8      |
| 10   | 047411     | 1    | SCREW HHC M6-1.0 X 16 G8.8       |
| 11   | 055414     | 1    | LUG SLDLSS #2-#8 X 17/64 CU      |
| 12   | 022447     | 1    | WASHER SHAKEPROOF INT 1/4        |
| 13   | 022097     | 1    | WASHER LOCK M6-1/4               |
| 14   | 022473     | 2    | WASHER FLAT M6-1/4 ZINC          |
| 15   | 049813     | 1    | NUT HEX M6 -1.0 G8 YEL CHR       |
| 16   | 022261     | 1    | WASHER SHAKEPROOF INT 3/8        |
| 17   | 0F9597A    | 1    | SUPPORT LH ENGINE 2.4L           |
| 18   | 045764     | 1    | SCREW HHTT M4-0.7 X 8 BP         |
| 19   | 062963     | 4    | SCREW HHC M10-1.25 X 30 G8.8     |
| 20   | 022302     | 5    | WASHER LOCK 7/16                 |
| 21   | 022131     | 5    | WASHER FLAT 3/8-M10 ZINC         |
| 22   | 065852     | 1    | SPRING CLIP HOLDER .37-.62       |
| 23   | 0F9597     | 1    | SUPPORT RH ENGINE 2.4L           |
| 24   | 022129     | 1    | WASHER LOCK M8-5/16              |
| 25   | 026204     | 1    | WASHER SHAKEPROOF INT 5/16       |
| 26   | 022145     | 1    | WASHER FLAT 5/16-M8 ZINC         |
| 27   | 045771     | 1    | NUT HEX M8-1.25 G8 CLEAR ZINC    |
| 29   | 0F9596     | 1    | SPACER ENGINE MOUNT (2.4L G1)    |
|      | 0F9596A    | 1    | SPACER LH ENGINE MOUNT (2.4L G2) |
| 30   | 052212     | 1    | SCREW HHC M10-1.25 X 25 C8.8     |
| 31   | 0C2454     | 3    | SCREW HWHT M6-1 X 16 N WA Z/JS   |
| 32   | 0H5718     | 1    | HEAT SHIELD 2.4L G2              |

GROUP C



EXPLODED VIEW:  
BATTERY 2.4L CPL  
DRAWING #: 0F9813

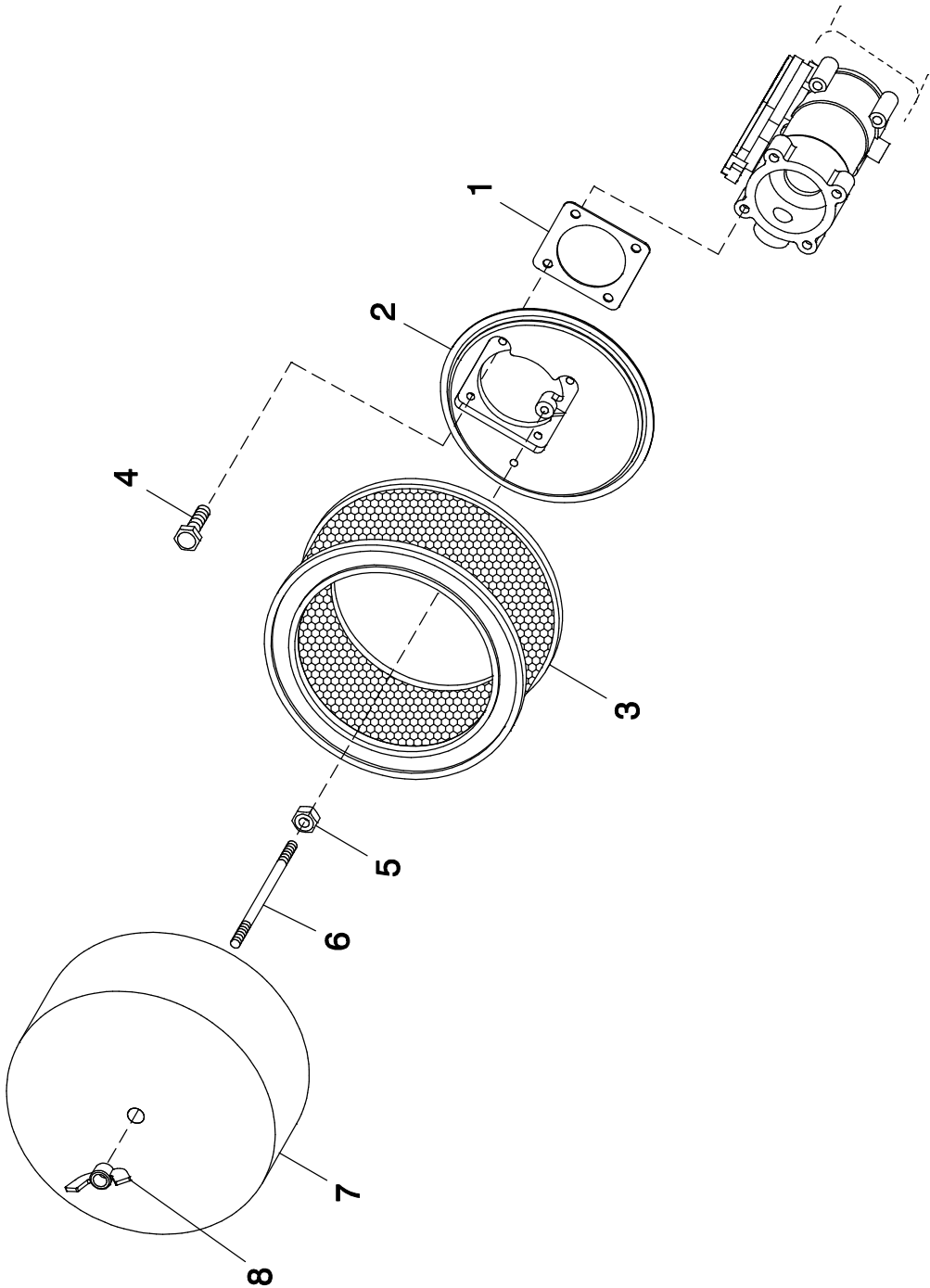
EXPLODED VIEW: BATTERY 2.4L CPL  
DRAWING #: 0F9813

GROUP C

APPLICABLE TO:

| ITEM | PART #     | QTY. | DESCRIPTION                    |
|------|------------|------|--------------------------------|
| 1    | 0F3408B    | 1    | BATTERY TRAY C1 CPL            |
| 2    | 0F3411     | 1    | STRAP BATTERY RETAINMENT       |
| 3    | 025507     | REF  | WASHER SHAKEPROOF EXT 7/16 STL |
| 4    | 052212     | REF  | SCREW HHC M10-1.25 X 25 G8.8   |
| 5    | 046526     | REF  | WASHER LOCK M10                |
| 6    | 022131     | REF  | WASHER FLAT 3/8-M10 ZINC       |
| 7    | 050331A    | REF  | BATTERY POST COVER RED +       |
| 8    | 050331     | REF  | BATTERY POST COVER BLACK -     |
| 9    | 038805Y    | 1    | CABLE BATTERY BLACK #1 X 18.00 |
| 10   | 03880400AE | 1    | CABLE BATT RED #1 X 18.00      |
| 11   | 045771     | REF  | NUT HEX M8-1.25 G8 YEL CHR     |
| 12   | 022129     | REF  | WASHER LOCK M8-5/16            |
| 14   | 0F3976     | 1    | BOOT CONTACTOR CABLES          |
| 15   | 0C2454     | 4    | SCREW THF M6-1 X 16 N WA Z/JS  |
| 16   | 022145     | REF  | WASHER FLAT 5/16-M8 ZINC       |
| 17   | 077483     | REF  | BATTERY 12VDC 75-AH 26         |

GROUP D



EXPLODED VIEW:  
AIR CLEANER C2  
DRAWING #: 0F9809

EXPLODED VIEW: AIR CLEANER C2  
DRAWING #: 0F9809

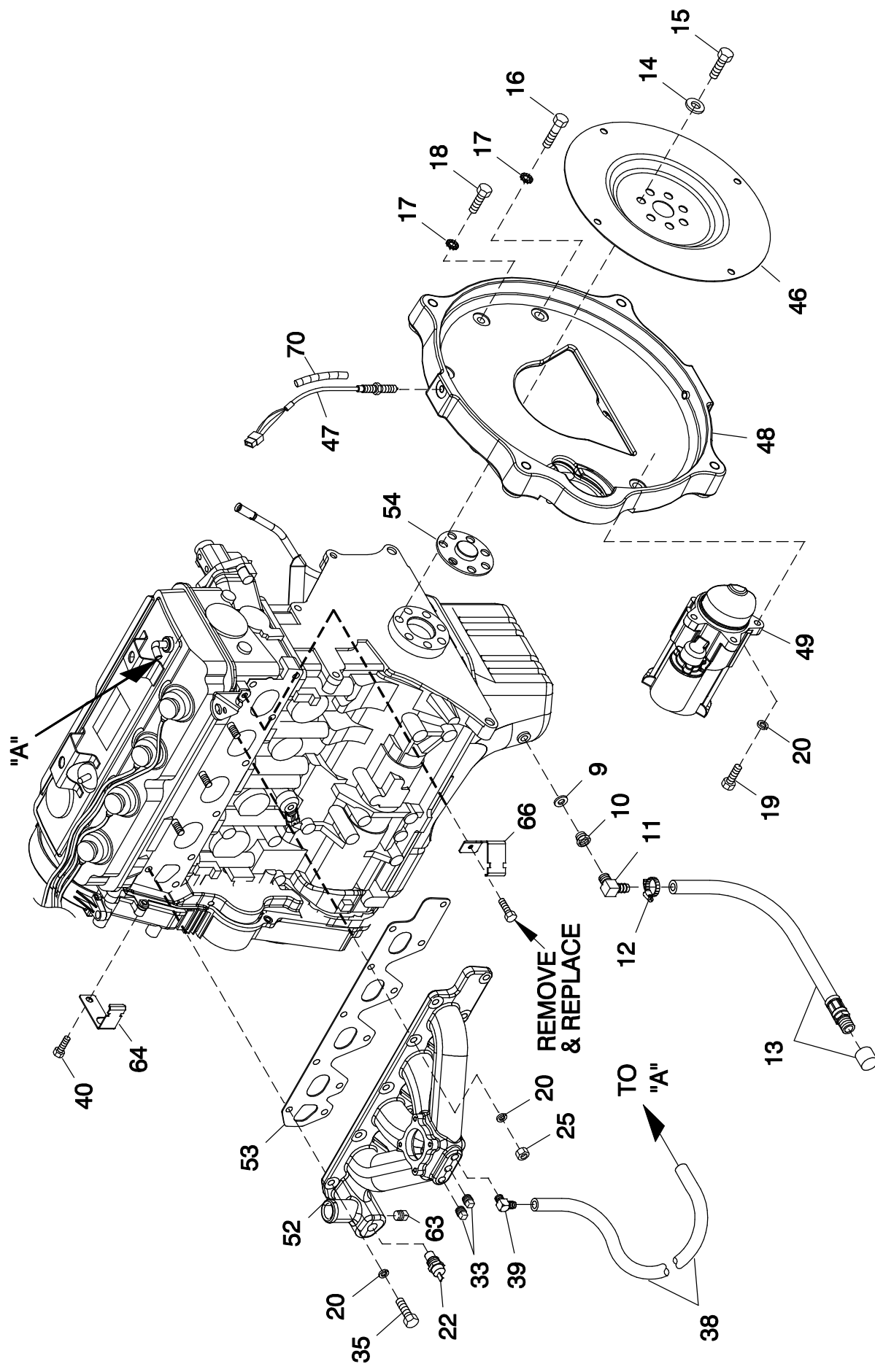
GROUP D

APPLICABLE TO:

| ITEM  | PART #  | QTY. | DESCRIPTION                   |
|-------|---------|------|-------------------------------|
| 1     | 0E6586  | 1    | GASKET BOSCH 32 & 40          |
| 2     | 0E0519A | 1    | ADAPTER CARBURETOR W/PVC CONN |
| 3     | 0C8127  | 1    | ELEMENT AIR CLEANER           |
| 4     | 049815  | 4    | SCREW HHC M5-0.8 X 16 G8.8    |
| 5     | 022127  | 1    | NUT HEX 1/4-20 STEEL          |
| (1) 6 | 062974  | 1    | STUD TH 1/4-20 X 4-1/2 G2 ZNC |
| 7     | 0G0190  | 1    | PLATE, AIR CLEANER TOP 2.4L   |
| 8     | 037561  | 1    | NUT WING 1/4-20 NYLK          |

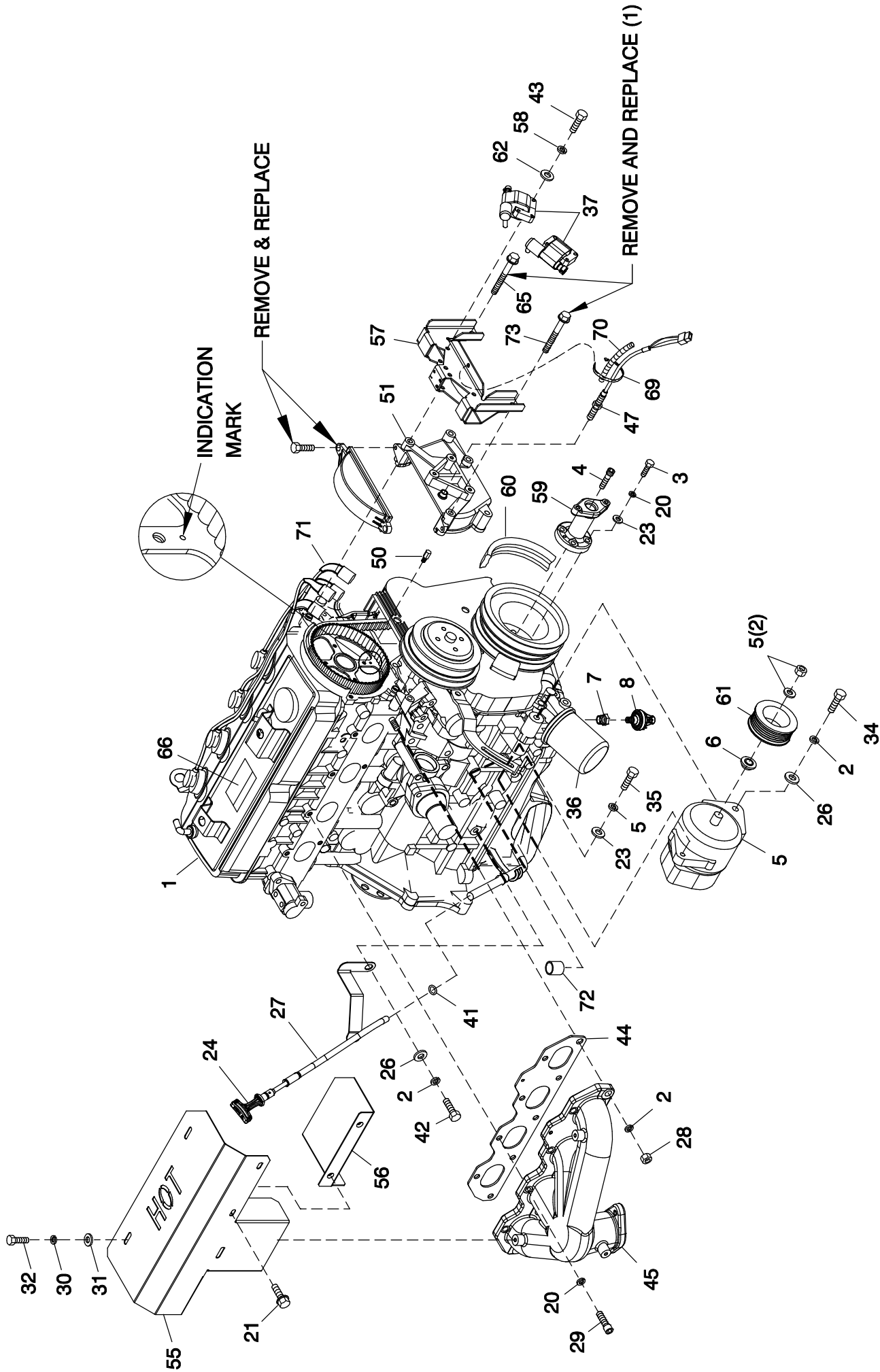
(1) APPLY MEDIUM STRENGTH BLUE TREAD LOCKING FLUID TO THREADS ON  
ONE END OF I/N 6 (STUD) THAT SCREWS INTO I/N 2 (CARB ADAPTER).

## GROUP D



**EXPLODED VIEW:**  
**ENG COMMON PARTS 2.4L G2**  
**DRAWING #: 0G9980**

# GROUP D



EXPLODED VIEW:  
ENG COMMON PARTS 2.4L G2  
DRAWING #: 0G9980

## EXPLODED VIEW: ENG COMMON PARTS 2.4L G2

DRAWING #: 0G9980

## GROUP D

APPLICABLE TO:

| ITEM  | PART #  | QTY. | DESCRIPTION                                |
|-------|---------|------|--------------------------------------------|
| 1     | 0H1619  | 1    | ENGINE 2.4L G2 CERTIFIED                   |
| 2     | 046526  | 4    | WASHER LOCK M10                            |
| 3     | 039414  | 4    | SCREW HHC M8-1.25 X 35 G8.8                |
| 4     | 0G0149  | 1    | SCREW SHC M14-1.5 X 35 G10.9               |
| 5     | 0E9868A | 1    | ALTERNATOR DC W/OUT PULLEY                 |
| (2) 6 | 0F3217  | 1    | SPACER DC ALTERNATOR PULLEY                |
| 7     | 042574  | 1    | ADAPTOR 1/8 NPTF TO 1/8 BSPT               |
| 8     | 0A8584  | 1    | SWITCH OIL PRESSURE 10 PSI 2 POL (R-PANEL) |
|       | 0F4612  | 1    | SENDER OIL PRESSURE 1/8" NPT (H-PANEL)     |
| 9     | 057772  | 1    | WASHER NYLON .565                          |
| 10    | 057765  | 1    | ADAPTER M14-1.50 X 3/8 NPT                 |
| 11    | 043790  | 1    | BARBED EL 90 3/8 NPT X 3/8                 |
| 12    | 0C7649  | 1    | CLAMP HOSE .38-.87                         |
| 13    | 069860E | 1    | HOSE DRAIN ASSY 28"                        |
| 14    | 063076  | 7    | WASHER FLAT .531 ID X 1.062 OD             |
| 15    | 0G1394  | 7    | SCREW HHC M12-1.25 X 20 G10.9              |
| 16    | 052830  | 2    | SCREW HHC M10-1.25 X 45 G8.8               |

| ITEM   | PART #      | QTY.   | DESCRIPTION                                       |
|--------|-------------|--------|---------------------------------------------------|
| 17     | 025507      | 5      | WASHER SHAKEPROOF EXT 7/16 STL                    |
| 18     | 062963      | 3      | SCREW HHC M10-1.25 X 30 G8.8                      |
| 19     | 049821      | 3      | SCREW SHC M8-1.25 X 30 G12.9                      |
| 20     | 022129      | 26     | WASHER LOCK M8-5/16                               |
| 21     | 0D6029      | 3      | SCREW THF M6-1 X 16 N WA Z/JS                     |
| 22     | 0A6751      | 1      | SWITCH HI-TEMP 245D X 3/8 NPT (R-PANEL)           |
|        | 0E0502      | 1      | TEMPERATURE SENDER                                |
| 23     | 022145      | 7      | WASHER FLAT 5/16-M8 ZINC                          |
| 24     | 0F2664H     | 1      | ASSY DIPSTICK W/TEXT GTH-530                      |
| 25     | 045771      | 3      | NUT HEX M8-1.25 G8 CLEAR ZINC                     |
| 26     | 022131      | 2      | WASHER FLAT 3/8-M10 ZINC                          |
| 27     | 0G8427A     | 1      | ASSY DIPSTICK TUBE 2.4 G2                         |
| 28     | 046525      | 2      | NUT HEX M10-1.25 G8 YEL CHR                       |
| 29     | 058306      | 7      | SCREW SHC M8-1.25 X 25 G12.9                      |
| 30     | 022097      | 3      | WASHER LOCK M6-1/4                                |
| 31     | 022473      | 3      | WASHER FLAT 1/4-M6 ZINC                           |
| 32     | 043116      | 3      | SCREW HHC M6-1.0 X 12 G8.8                        |
| 33     | 026073A     | 2      | PLUG STD PIPE 1/4 STEEL SQ HD                     |
| 34     | 052243      | 1      | SCREW HHC M10-1.5 X 60 G8.8                       |
| 35     | 0A8258      | 9      | SCREW HHC M8-1.25 X 25 G10.9                      |
| (1) 36 | 0A45310244  | 1(REF) | FILTER 1.5L/2.4L G2 OIL                           |
| 37     | 0G8853      | 4      | COIL-2.4L G2 IGNITION                             |
| 38     | 047290      | 1      | HOSE 3/8 ID SINGLE BRAID (15" LG)                 |
| 39     | 049340      | 1      | BARBED EL 90 1/4 NPT X 3/8                        |
| (3) 40 | 045757      | 1      | SCREW HHC M6-1.0 X 25 G8.8                        |
| 41     | 0G3823      | 1      | O-RING SIZE 9.0MM X 2.0MM NITR                    |
| 42     | 052213      | 1      | SCREW HHC M10-1.25 X 20 C8.8                      |
| 43     | 034413      | 8      | SCREW HHM #10-32 X 1-1/4                          |
| (1) 44 | 0G0951      | 1(REF) | GASKET EXHAUST MANIFOLD                           |
| 45     | 0G3910      | 1      | EXHAUST MANIFOLD G2 (MACHINE) (25KW, 35KW & 45KW) |
| 46     | 0G6093E     | 1      | FLEX PLATE 2 POLE 2.4L G2                         |
| 47     | 0D2244M     | 2      | ASSY MAGPICKUP(3/8-24 MALE)                       |
| 48     | 0F9420      | 1      | ADAPTER ENGINE 2.4L MACHINE                       |
| 49     | 0G7461      | 1      | STARTER MOTOR 12V                                 |
| 50     | 0G1472A     | 1      | CAM SENSOR PIN ASSY                               |
| 51     | 0G1476      | 1(REF) | COVER CAM GEAR G2 REWORKED                        |
| 52     | 0G0707      | 1      | MANIFOLD INTAKE (USE HOSE 0G0816)                 |
|        | 0G8488      | 1      | MANIFOLD INTAKE (MACHINED) (USE HOSE 0H1546)      |
| (1) 53 | 0G0950      | 1(REF) | GASKET INTAKE MANIFOLD                            |
| 54     | 0F9583      | 1      | SPACER 2.4L G2 FLEX PLATE                         |
| 55     | 0G92210AS0R | 1      | SHIELD HEAT                                       |
| 56     | 0G0792A     | 1      | SHIELD HEAT SML                                   |
| 57     | 0G8852      | 1      | BRACKET ASM-2.4L COIL G2                          |
| 58     | 022152      | 8      | WASHER LOCK #10                                   |
| 59     | 0F9501      | 1      | ADAPTER 2.4L CRANKSHAFT MACH                      |
| (1) 60 | 0G0952      | 1(REF) | POLY V-BELT G2 (3600 RPM)                         |
|        | 0D3488S     | 1      | BELT SERPENTINE 37.0" (1800 RPM)                  |
| 61     | 0G0788      | 1      | PULLEY DC ALTERNATOR (3600 RPM)                   |
|        | 0G2750      | 1      | PULLEY 69 OD DC ALTERNATOR (1800 RPM)             |
| 62     | 023897      | 8      | WASHER FLAT #10 ZINC                              |
| 63     | 026925      | 1      | PLUG STD PIPE 3/8 STEEL SQ HD                     |
| (3) 64 | 0F2776      | 1      | BRACKET, SIGNAL CONDITIONER                       |
| (1) 65 | 052203      | 1(REF) | SCREW HHC M8-1.25 X 70 G8.8                       |
| (3) 66 | 0F2776D     | 1      | BRACKET SIGNAL CONDITONER                         |
| 67     | 0G7313      | REF    | DECAL EMISSION CTRL INFO 2.4L                     |
| 68     | 0G8877B     | 1      | HARN ENG 2.4L R-200B 3600 NO-T (NOT SHOWN)        |
|        | 0H1275A     | 1      | HARN ENG 2.4L R-200C 3600 RPM (NOT SHOWN)         |
| 69     | 029333A     | 3      | TIE WRAP UL 7.4"X .19" BLK                        |
| 70     | 077043H     | 2      | CONDUIT FLEX .25"ID                               |
| 71     | 0G8854      | 1      | SPARK PLUG WIRE SET 2.4L G2 IG                    |
| (5) 72 | 0G9520      | 1(REF) | PLUG TAPER                                        |
| 73     | 052265      | 1(REF) | SCREW HHC M8-1.25 X 65 C8.8                       |
| (4) 74 | 0H0015      | 1      | HARN EMISSIONS OVERLAY 2.4L (NOT SHOWN)           |

(1) SUPPLIED WITH ENGINE.

(2) NOT USED ON 1800 RPM UNITS.

(3) USED WITH H-PANEL ONLY

(4) CALIFORNIA EMISSIONS COMPLIANT MODELS ONLY

(5) APPLY LOCTITE 620 BEARING RETAINMENT COMPOUND TO I/N 72.



**EXPLODED VIEW: ENG COMMON PARTS 2.4L G2**

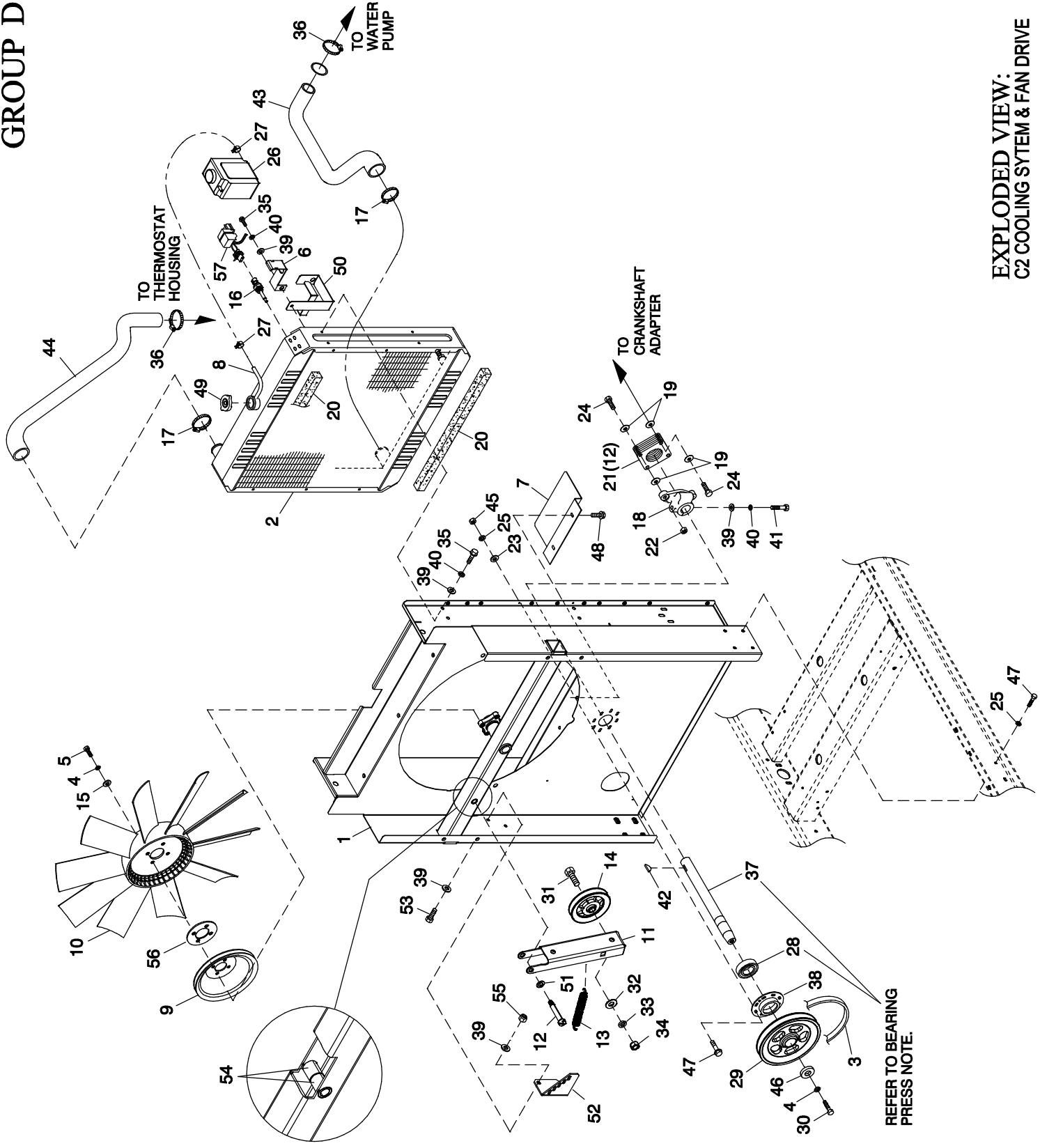
**DRAWING #: 0G9980**

**APPLICABLE TO:**

**GROUP D**

**THIS PAGE IS LEFT INTENTIONALLY BLANK**

# GROUP D



EXPLODED VIEW:  
C2 COOLING SYTEM & FAN DRIVE  
DRAWING #: 0H3075

# EXPLODED VIEW: C2 COOLING SYTEM & FAN DRIVE DRAWING #: 0H3075

## GROUP D

APPLICABLE TO:

| ITEM   | PART #      | QTY. | DESCRIPTION                                              |
|--------|-------------|------|----------------------------------------------------------|
| 1      | 0H30830ST03 | 1    | WELDMENT RADIATOR SUPPORT C2                             |
| 2      | 0F2608      | 1    | RADIATOR 598 X 568 X 49 CPL RH                           |
| 3      | 0F5263      | 1    | V-BELT 31/64" X 57-3/8"                                  |
| 4      | 046526      | 5    | WASHER LOCK M10                                          |
| (1) 5  | 059981      | 4    | SCREW HHC M10-1.5 X 30 G10.9                             |
| 6      | 0F2776A     | 1    | BRACKET, SIGNAL CONDITIONER (USED ONLY WITH QTA PRODUCT) |
| 7      | 0F5050A     | 1    | SHIELD RADIATOR C4                                       |
| 8      | 029032      | 1    | HOSE 9/32 ID (27" LG)                                    |
| 9      | 0F2573      | 1    | PULLEY FAN V-GROOVE 9"                                   |
| 10     | 0F4011      | 1    | FAN COOL 22" DIA 10 BLADE LH                             |
| 11     | 0H20620ST03 | 1    | ARM BELT TENSIONER                                       |
| (1) 12 | 0H2051      | 1    | SHOULDER BOLT 1/2 X 2-1/4"                               |

| ITEM   | PART #      | QTY.    | DESCRIPTION                                            |
|--------|-------------|---------|--------------------------------------------------------|
| 13     | 0F2862      | 1       | SPRING TENSION CPL                                     |
| 14     | 0F2560      | 1       | PULLEY V-BELT 4" FLANGED                               |
| 15     | 022131      | 4       | WASHER FLAT 3/8-M10 ZINC                               |
| 16     | 0E2507      | 1       | PROBE, COOLANT LEVEL 3/8NPTF                           |
|        | 0H1827      | 1       | PROBE COOLANT LEVEL 3/8-18NPTF                         |
| 17     | 035685      | 2       | CLAMP HOSE #28 1.32-2.25                               |
| 18     | 0F2561      | 1       | HUB FLEX PLATE                                         |
| 19     | 0C8145      | 8       | WASHER FLEX (THIN)                                     |
| 20     | 052250      | 2       | TAPE FOAM 1 X 1 (26.75" LG)                            |
| 21     | 0C7043      | 12      | DISK FLEX                                              |
| 22     | 0C8165      | 2       | NUT HEX LOCK 5/16-24 NY INS                            |
| 23     | 022473      | 8       | WASHER FLAT 1/4-M6 ZINC                                |
| (1) 24 | 0C8146      | 4       | SCREW HHC 5/16-24 X 1.124                              |
| 25     | 022097      | 16      | WASHER LOCK M6-1/4                                     |
| 26     | 076749      | 1       | TANK COOLANT RECOVERY                                  |
| (2) 27 | 048031C     | 2(REF)  | CLAMP HOSE BAND 1/4                                    |
| 28     | 031971      | 1       | BEARING #6205 2NSE C3 E SRI2 S                         |
| 29     | 0F4496      | 1       | PULLEY 4.5" DIA MACHINED                               |
| (1) 30 | 042911      | 1       | SCREW HHC M10-1.5 X 30 G8.8                            |
| 31     | 0F2872      | 1       | SCREW HHC 1/2-13 X 2" G8                               |
| 32     | 022304      | 1       | WASHER FLAT 1/2 ZINC                                   |
| 33     | 022195      | 1       | WASHER LOCK 1/2                                        |
| 34     | 022196      | 1       | NUT HEX 1/2-13 STEEL                                   |
| 35     | 0F8651      | 9       | SCREW HHFC M8-1.25 X 20 W/M6                           |
| 36     | 099502      | 2       | CLAMP HOSE #24 B1.06-2.00                              |
| 37     | 0F9867      | 1       | SHAFT FAN DRIVE                                        |
| 38     | 0F2461      | 1       | RETAINER BEARING                                       |
| 39     | 022145      | 14      | WASHER FLAT 5/16-M8 ZINC                               |
| 40     | 022129      | 10      | WASHER LOCK M8-5/16                                    |
| (1) 41 | 039287      | 1       | SCREW HHC M8-1.25 X 45 C8.8                            |
| 42     | 082774      | 1       | KEY WOODRUFF 4 X 19D                                   |
| 43     | 0G0795      | 1       | HOSE LOWER RADIATOR G2                                 |
| 44     | 0G0816      | 1       | HOSE UPPER RADIATOR G2 (USED WITH MANFLD P/N 0G0707)   |
|        | 0H1546      | 1       | HOSE UPPER RADIATOR G2 (USED WITH MANFLD P/N 0G8488)   |
| 45     | 049813      | 8       | NUT HEX M6 X 1.0 G8 YEL CHR                            |
| 46     | 052644      | 1       | SPACER .5 X 1.5 X .25 STL/ZINC                         |
| 47     | 0C8566      | 16      | SCREW HHFC M6-1.0 X 20 G8.8                            |
| 48     | 0C2454      | 2       | SCREW THF M6-1 X 16 N WA Z/JS                          |
| 49     | 090283      | 1       | CAP RADIATOR 13 PSI                                    |
| 50     | 080713      | 1       | BRACKET COOLANT TANK                                   |
| 51     | 052677      | 1       | WASHER NYLON .50 X .87 X .06                           |
| 52     | 0H30880ST03 | 1       | BRACKET TENSIONER SPRING                               |
| 53     | 039253      | 2       | SCREW HHC M8-1.25 X 20 C8.8                            |
| (3) 54 | 0H2844      | 2 (REF) | BEARING SLEEVE 1/2 X 3/4 X 1                           |
| 55     | 049820      | 2       | NUT HEX LOCK M8-1.25 NY INS                            |
| 56     | 0G53150AL0R | 1       | SPACER CPL COOLING FAN 1/8"                            |
| (4) 57 | 0H1851      | 1       | ASSY PCB LCL SENSOR (USE WITH I/N 16, P/N 0H1827 ONLY) |
| (4) 58 | 029333A     | 9       | TIE WRAP UL 7.4" X .19" BLK (NOT SHOWN)                |

### BEARING PRESS NOTE:

APPLY LOCTITE 620 BEARING RETAINMENT COMPOUND TO BEARING SURFACE ON ITEM 37 PRIOR TO PRESSING ITEM 28 ONTO ITEM 37. ALSO APPLY LOCTITE 620 BEARING RETAINMENT COMPOUND TO THE OUTSIDE OF 28 PRIOR TO INSTALLING ITEM 28 INTO ITEM 38.

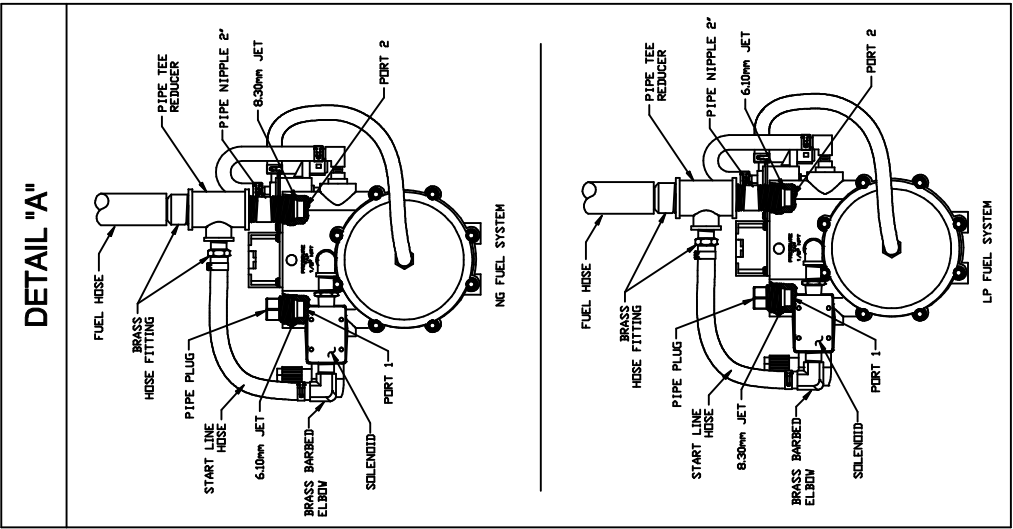
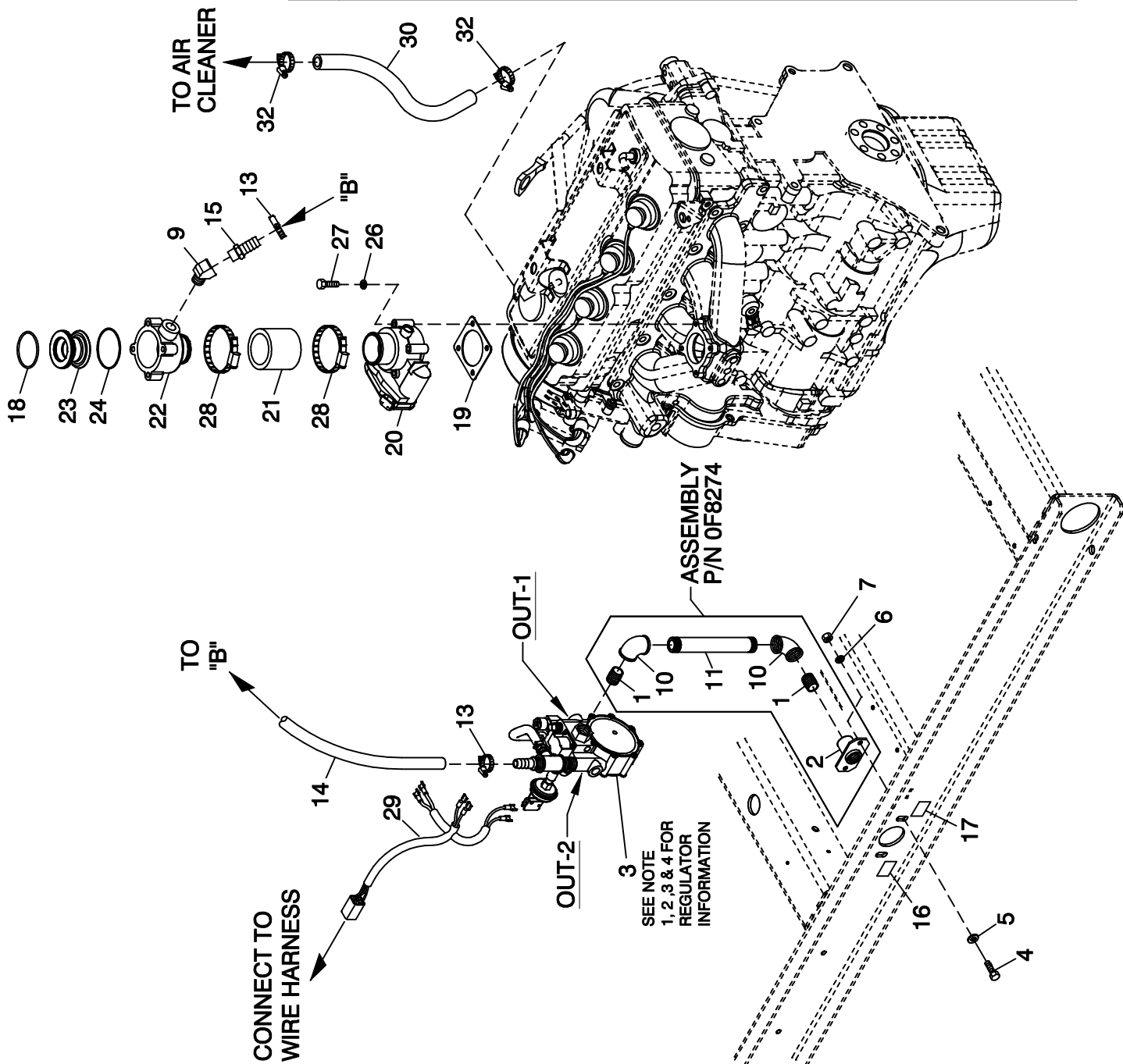
(1) APPLY MEDIUM STRENGTH BLUE THREAD LOCKING FLUID TO THREADS.

(2) INCLUDED WITH I/N 26.

(3) ITEM 54 IS INCLUDED WITH ITEM 1.

(4) USE WITH R-PANEL ONLY

# GROUP E



EXPLODED VIEW:  
FUEL SYSTEM 2.4L C2 G2  
DRAWING #: 0G1151

APPLICABLE TO:

| ITEM | PART #  | QTY. | DESCRIPTION                                   |
|------|---------|------|-----------------------------------------------|
| 1    | 026915  | 2    | NIPPLE CLOSE 3/4 X 1.375                      |
| 2    | 075580  | 1    | FLANGE FUEL INLET                             |
| 3    | 0F6390C | 1    | REGULATOR ASSY 2.4L (25KW)                    |
|      | 0F6390B | 1    | REGULATOR ASSY 2.4L (35KW & 45KW)             |
| 4    | 039253  | 2    | SCREW HHC M8-1.25 X 20 G8.8                   |
| 5    | 022145  | 2    | WASHER FLAT 5/16-M8 ZINC                      |
| 6    | 022129  | 2    | WASHER LOCK M8-5/16                           |
| 7    | 045771  | 2    | NUT HEX M8-1.25 G8 CLEAR ZINC                 |
| 9    | 0E8286  | 1    | STREET EL 45D 1/2 NPT BRASS                   |
| 10   | 026812  | 2    | ELBOW 90D 3/4 NPT                             |
| 11   | 0F8379  | 1    | NIPPLE PIPE 3/4 NPT X 7                       |
| 13   | 057823  | 2    | CLAMP HOSE #10 .56 - 1.06                     |
| 14   | 059057  | 1    | HOSE 3/4 ID SAE-30R2 (18" LG)                 |
| 15   | 047527  | 1    | BARBED STR 1/2 NPT X 3/4                      |
| 16   | 0D1509  | 1    | DECAL INLET PRESSURE                          |
| 17   | 050279  | 1    | DECAL FUEL INLET NG (NATURAL GAS APPLICATION) |
|      | 050280  | 1    | DECAL FUEL INLET LPG (LP VAPOR APPLICATION)   |
| 18   | 0F2119  | 1    | O-RING 45.63 ID X 2.62 WIDTH                  |
| 19   | 0E6586  | 1    | GASKET BOSCH 32                               |
| 20   | 0E4394  | 1    | ACTUATOR BOSCH 40 GOVERNOR (45KW)             |
|      | 0E4395  | 1    | ACTUATOR BOSCH 32 GOVERNOR (25 & 35KW)        |
| 21   | 040105  | 1    | HOSE COOL 2 IN ID 20R4 (45KW)                 |
|      | 057753B | 1    | HOSE 1.5 ID X 2 LG 20R4 (35KW)                |
| 22   | 0G4573C | 1    | MIXER ACTUATOR 32MM MACHINED (25KW)           |
|      | 0G4573B | 1    | MIXER ACTUATOR 40MM MACHINED (35 & 45KW)      |
| 23   | 0F7790E | 1    | VENTURI THROTTLE 26MM (35 & 45KW)             |
|      | 0F7790H | 1    | VENTURI THROTTLE 19MM (25KW)                  |
| 24   | 0E7121  | 1    | O-RING 47.625 ID X 2.38 WIDTH                 |
| 26   | 022097  | 4    | WASHER LOCK M6-1/4                            |
| 27   | 046580  | 4    | SCREW SHC M6-1.0 X 45 G12.9                   |
| 28   | 035685  | 2    | CLAMP HOSE #28 1.32-2.25                      |
| 29   | 0F6155  | 1    | HARNESS CPL FUEL JUMPER                       |
| 30   | 047290  | 1    | HOSE 3/8 ID SINGLE BRAID (18" LG)             |
| 32   | 057823  | 2    | CLAMP HOSE #10 .56-1.06                       |

**RECONFIGURING THE FUEL SYSTEM**

Note: All models are configured to run on natural gas from the factory.

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

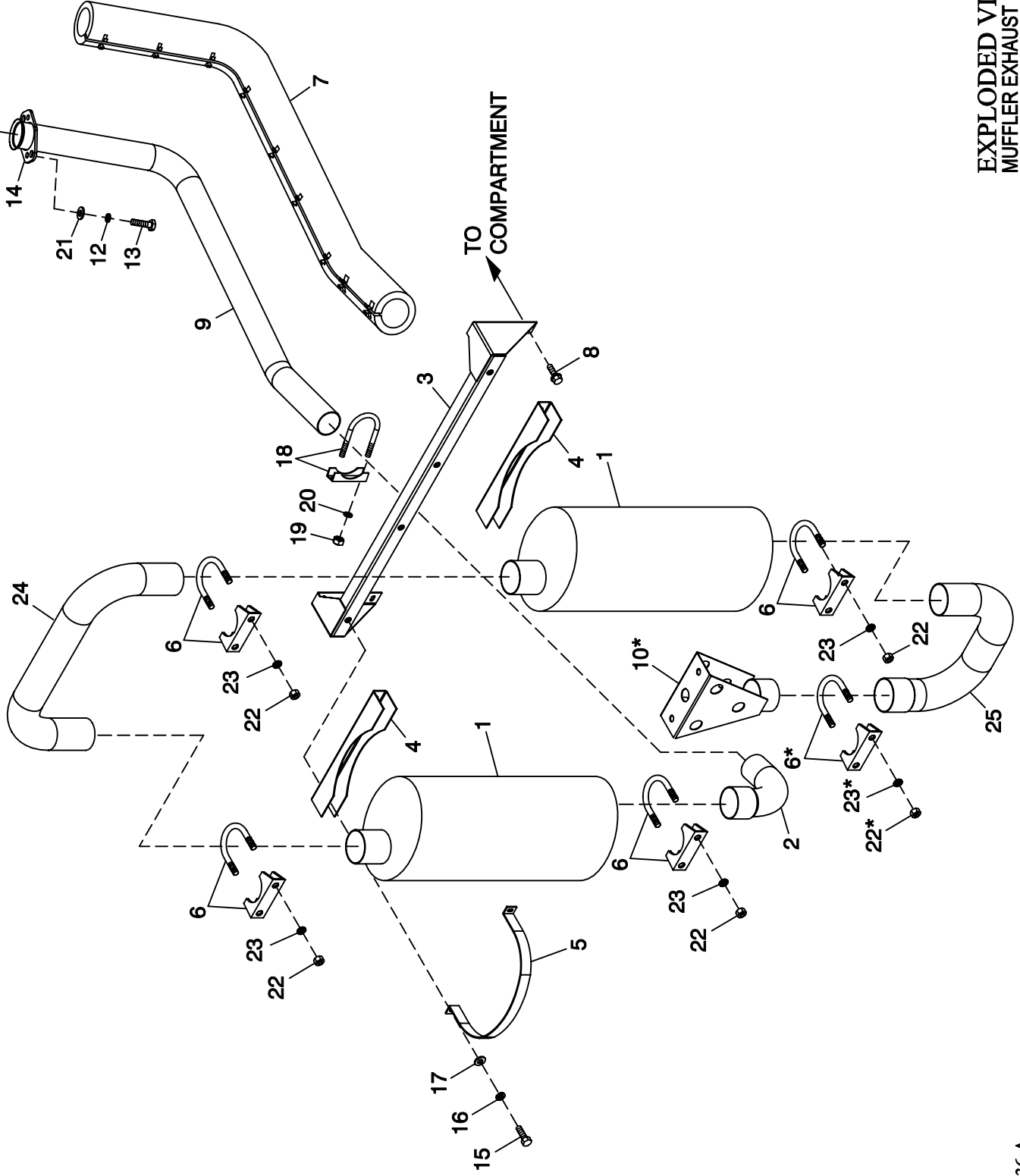
1. Turn the main gas supply off.
2. Remove the carburetor fuel hose from the outlet port of the demand regulator (See Detail "A").
3. Disconnect the power wires from the fuel solenoid located on top of the regulator assembly.
4. Loosen the spring clamp on the small fuel enrichment line and remove the hose from the hose barb.
5. Remove the black pipe assembly from the outlet port of the demand regulator.
6. Remove the NG fuel jet (loosen counter clockwise) from the outlet port.
7. Remove the LP fuel jet (loosen counter clockwise) from the jet keeper port on the side of the regulator housing. Install this jet into the outlet port in the regulator casting.

Note: The jet sizes are stamped on the individual jets. The larger jet size is used for running on NG.

8. Install the previously removed NG jet into the jet keeper port on the side of the regulator housing.
9. Install the previously removed black iron pipe onto the outlet port of the demand regulator.
10. Reverse steps 1-4 in this procedure to reactivate the demand regulator.
11. For LP vapor application substitute LPG fuel inlet decal p/n 050280 for NG fuel inlet decal p/n 050279 (Item 17).
12. When switching fuel types, the proper dip switch settings must be made to the control panel. See owners manual, fuel section, for more details.

# GROUP F

TO R/H SIDE  
EXHAUST MANIFOLD



EXPLODED VIEW:  
MUFFLER EXHAUST  
DRAWING #: 0G1146

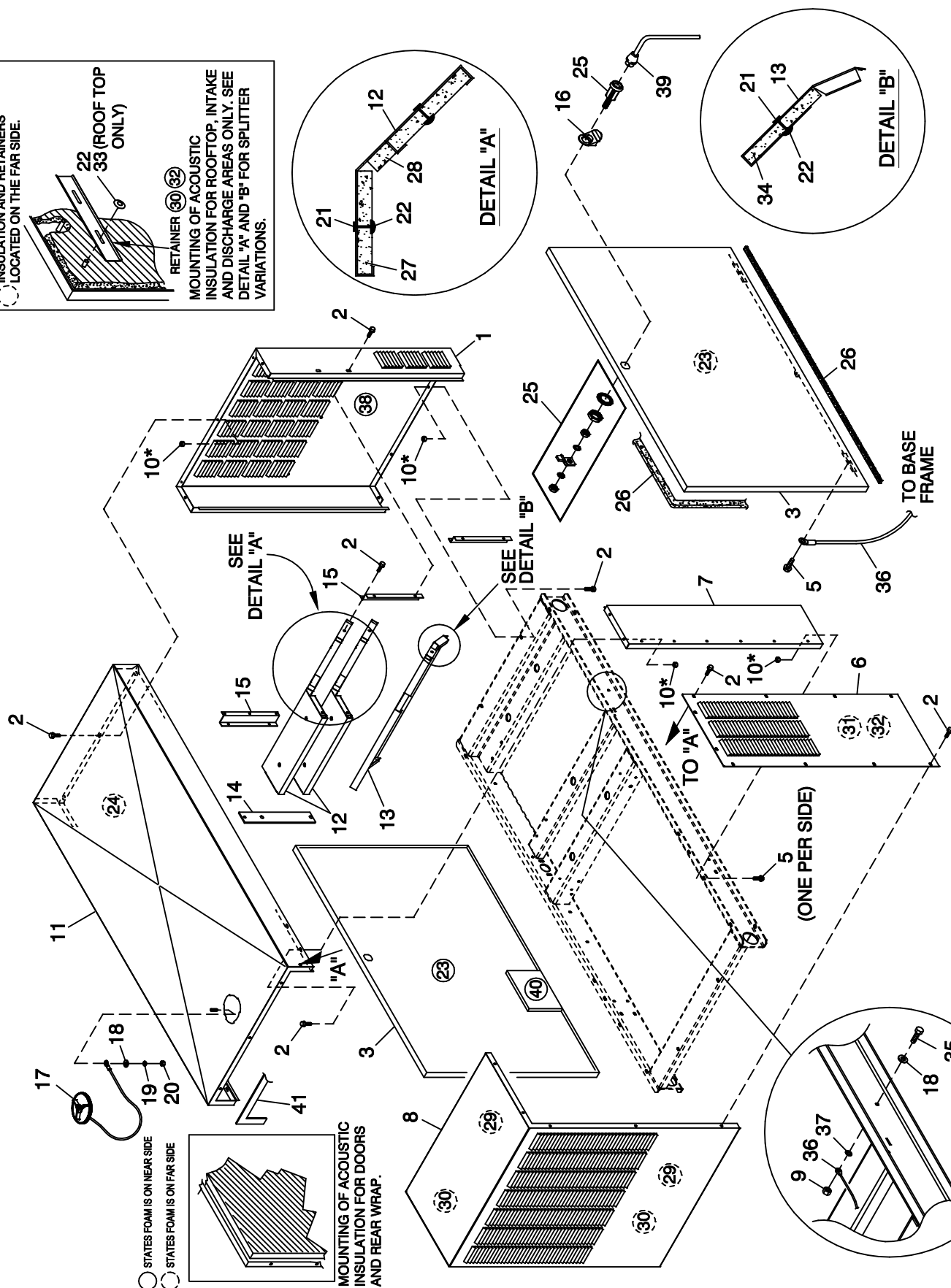
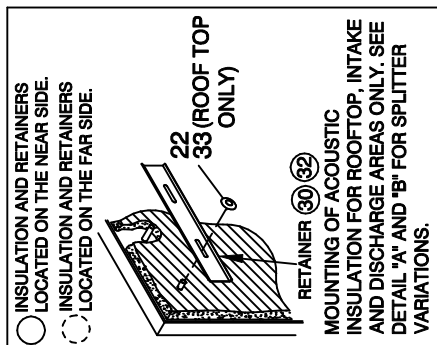
REVISION: G-8436-A  
DATE: 6/28/06

**EXPLODED VIEW: MUFFLER EXHAUST****DRAWING #: 0G1146****GROUP F****APPLICABLE TO:**

| ITEM | PART #  | QTY. | DESCRIPTION                         |
|------|---------|------|-------------------------------------|
| 1    | 0F9794  | 2    | MUFFLER 7" X 9" X 18-1/2" 2" IN/OUT |
| 2    | 0G0113  | 1    | EXHAUST ELBOW 2 1/4 OD 2 1/2OD      |
| 3    | 0G1007  | 1    | BRACKET MUFFLER                     |
| 4    | 0F2830  | 2    | MUFFLER BRACKET STIFFENER           |
| 5    | 0F2962  | 2    | MUFFLER STRAP                       |
| 6    | 080762  | 5    | BOLT U 3/8-16 X 2.62                |
| 7    | 0E0170A | 1    | EXHAUST BLANKET 988MM (C2)          |
| 8    | 0C2454  | 4    | SCREW THF M6-1 X 16 N WA Z/JS       |
| 9    | 0G0776  | 1    | PIPE EXHAUST G2                     |
| 10   | 0G0007  | 1    | DIFFUSER EXHAUST WELDMENT           |
| 11   | 044149  | 1    | GASKET EXHAUST RING                 |
| 12   | 085917  | 2    | WASHER LOCK 3/8 SS                  |
| 13   | 0D2611  | 2    | SCREW HHC 3/8-16 X 1-3/4 SS         |
| 14   | 0E8816  | 1    | EXHAUST FLANGE 2" PIPE              |
| 15   | 049721  | 4    | SCREW HHC M6-1.0 X 35 G8.8 BLK      |
| 16   | 022097  | 4    | WASHER LOCK M6-1/4                  |
| 17   | 022473  | 4    | WASHER FLAT 1/4-M6 ZINC             |
| 18   | 036797  | 1    | BOLT U 5/16-18 X 2.25               |
| 19   | 022259  | 2    | NUT HEX 5/16-18 STEEL               |
| 20   | 070006  | 2    | WASHER LOCK M8 SS                   |
| 21   | 088775  | 2    | WASHER FLAT 3/8 SS                  |
| 22   | 022241  | 10   | NUT HEX 3/8-16 STEEL                |
| 23   | 085917  | 10   | WASHER LOCK 3/8 SS                  |
| 24   | 0F2809  | 1    | PIPE EXHAUST CROSSOVER              |
| 25   | 0F2808B | 1    | PIPE EXHAUST MUFFLER OUT            |

\* NOT USED ON OPEN SET.

# GROUP F



EXPLODED VIEW:  
 ENCLOSURE C2  
 DRAWING #: 0H0004



## EXPLODED VIEW: ENCLOSURE C2

DRAWING #: 0H0004

GROUP F

APPLICABLE TO:

| ITEM   | PART #     | QTY. | DESCRIPTION                                             |
|--------|------------|------|---------------------------------------------------------|
| (2) 1  | 0G0045     | 1    | REAR WRAP C2 CPL                                        |
| 2      | 0C2454     | 54   | SCREW THF M6-1 X 16 N WA Z/JS                           |
| (2) 3  | 0F5849     | 2    | DOOR C2                                                 |
| 4      | 087233     | 2    | RIVET POP .1875 X .450 SS                               |
| 5      | 0E3257     | 4    | SCREW TH-FRM M6 W/CAP SHKPRF W                          |
| (2) 6  | 0F5852     | 2    | DISCHARGE DUCT LH & RH SIDE C2                          |
| (2) 7  | 0F9833     | 2    | FRONT CORNERS C2                                        |
| (2) 8  | 0F5851     | 1    | DISCHARGE CENTER DUCT C2                                |
| 9      | 049813     | 2    | NUT HEX M6 X 1.0 G8 YEL CHR                             |
| (1) 10 | 077992     | 21   | NUT HEX LOCK M6-1.0 SS NY INS                           |
| (3) 11 | 0F9835     | 1    | ROOF C2                                                 |
| 12     | 0F2786     | 2    | SPLITTER C4                                             |
| 13     | 0F2785     | 1    | SPLITTER LOWER C4                                       |
| 14     | 0F3364     | 1    | SPLITTER STINGER C2                                     |
| 15     | 0F4880     | 2    | SUPPORT SPLITTER LH C2                                  |
| 16     | 0F5049     | 2    | TAB PULL                                                |
| 17     | 0F4487A    | 1    | ASSEMBLY COVER ACCESS                                   |
| 18     | 022473     | 3    | WASHER FLAT 1/4-M6 ZINC                                 |
| 19     | 022097     | 1    | WASHER LOCK M6-1/4                                      |
| 20     | 022127     | 1    | NUT HEX 1/4-20 STEEL                                    |
| 21     | 0F3072     | 10   | INSULATION RETAINMENT HANGER                            |
| 22     | 078115     | 26   | WASHER SELF LOCKING DOME #4-40                          |
| 23     | 0G5892     | 2    | INSULATION DOOR C2                                      |
| 24     | 0G5892A    | 1    | INSULATION ROOF TOP                                     |
| 25     | 0F5048D    | 2    | WISE-ACTION LATCH SLOTTED CIR                           |
| 26     | 0E5968     | 1    | GASKET EXTRUDED TRIM (328" LG)                          |
| 27     | 0G5892D    | 2    | INSULATION SPLITTER                                     |
| 28     | 0G5892C    | 2    | INSULATION SPLITTER                                     |
| 29     | 0F4051C    | 2    | INSULATION DUCT                                         |
| 30     | 0F3890B    | 4    | RETAINER INSULATION (820)                               |
| 31     | 0F4051B    | 2    | INSULATION DUCT SIDES                                   |
| 32     | 0F3890     | 4    | RETAINER INSULATION (450)                               |
| 33     | 078115A    | 6    | WASHER SELF LOCKING DOME #8-32                          |
| 34     | 0G5892E    | 1    | INSULATION LOWER SPLITTER                               |
| 35     | 042568     | 2    | SCREW HHC M6-1.0 X 20 G8.8                              |
| 36     | 0912970094 | 2    | ASSY WIRE 14 AWG 34.8" GRN/YEL                          |
| 37     | 022447     | 2    | WASHER SHAKEPROOF INT 1/4                               |
| 38     | 0G5892B    | 1    | INSULATION REAR WRAP                                    |
| 39     | 0F8869D    | 1    | KEY WISE-ACTION LATCH SLOT CIR                          |
| 40     | 0E5298L    | 1    | FOAM 300 X 300 THERMAL ACO (APPLIES TO 4.2L UNITS ONLY) |
| 41     | 066760     | 1    | STRIP SEALANT 1/8 X 1 (44.52"LG)                        |

(1) ALUMINUM ENCLOSURE NOTE: ALL ENCLOSURE PANELS THAT FASTEN TO THE BASE FRAME MUST BE SECURED USING ITEM 2 & 5 THREAD FORMING FASTENER AND I/N 10 LOCK NUT. LOCK NUT IS TO BE INSTALLED AFTER THREAD FORMING FASTENER HAS PENETRATED THROUGH EXTRUSIONS IN ENCLOSURE PANELS. ALL ROOF PANELS ARE TO BE SECURED IN THE SAME MANNER.

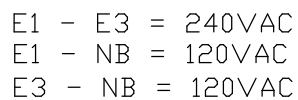
(2) NOTE: PART NUMBER SHOWN IS FOR TAN / STEEL. REFER TO THE SAMPLE GUIDE BELOW FOR AVAILABLE COLOR AND/OR ALUMINUM PART NUMBER FORMAT.

|                               |                                 |
|-------------------------------|---------------------------------|
| 0FXXXXSN = TAN / STEEL        | 0FXXXXST13 = BISQUE / STEEL     |
| 0FXXXXAN = TAN / ALUMINUM     | 0FXXXXALT13 = BISQUE / ALUMINUM |
| 0FXXXXSG = T- GRAY / STEEL    | 0FXXXXST14 = GRAY / STEEL       |
| 0FXXXXNG = T- GRAY / ALUMINUM | 0FXXXXALT14 = GRAY / ALUMINUM   |
| 0FXXXXST05 = WHITE / STEEL    |                                 |
| 0FXXXXAL05 = WHITE / ALUMINUM |                                 |

(3) PART NUMBER SHOWN IS FOR TAN. SEE GUIDE BELOW FOR AVAILABLE COLOR AND PART NUMBER FORMAT.

|                               |                                 |
|-------------------------------|---------------------------------|
| 0FXXXXAN = T- GRAY / ALUMINUM | 0FXXXXALT13 = BISQUE / ALUMINUM |
| 0FXXXXAL05 = WHITE / ALUMINUM | 0FXXXXALT14 = GRAY / ALUMINUM   |

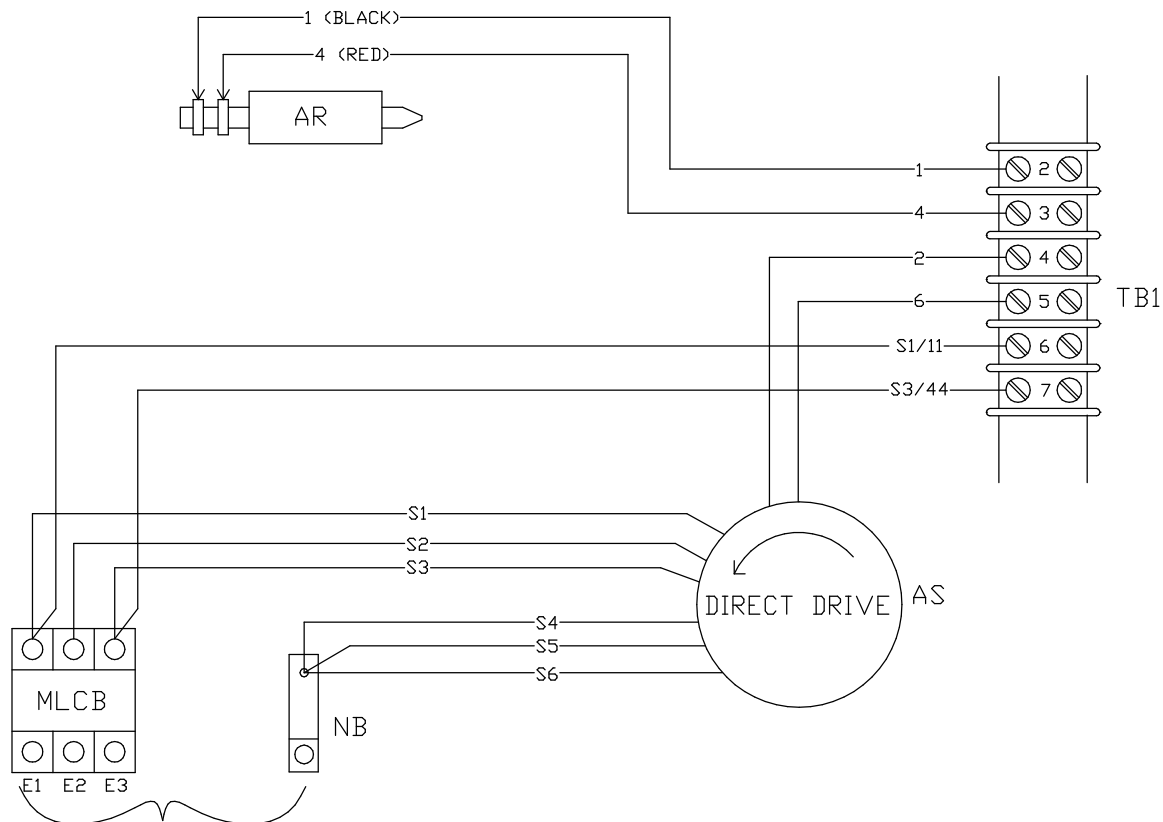
|      |   |                      |
|------|---|----------------------|
| AR   | = | ALTERNATOR ROTOR     |
| AS   | = | ALTERNATOR STATOR    |
| MLCB | = | MAIN CIRCUIT BREAKER |
| NB   | = | NEUTRAL BLOCK        |



## OPTION 2 - THREE PHASE, R-SERIES CONTROL PANEL, 6-WIRE 120/208V

### LEGEND

AR = ALTERNATOR ROTOR  
 AS = ALTERNATOR STATOR  
 MLCB = MAIN CIRCUIT BREAKER  
 NB = NEUTRAL BLOCK



GENERATOR OUTPUT  
 CUSTOMER CONNECTION

E1 TO E2 }  
 E2 TO E3 } \*208VAC  
 E1 TO E3 }

E1, E2, OR E3 TO NB = \* 120VAC

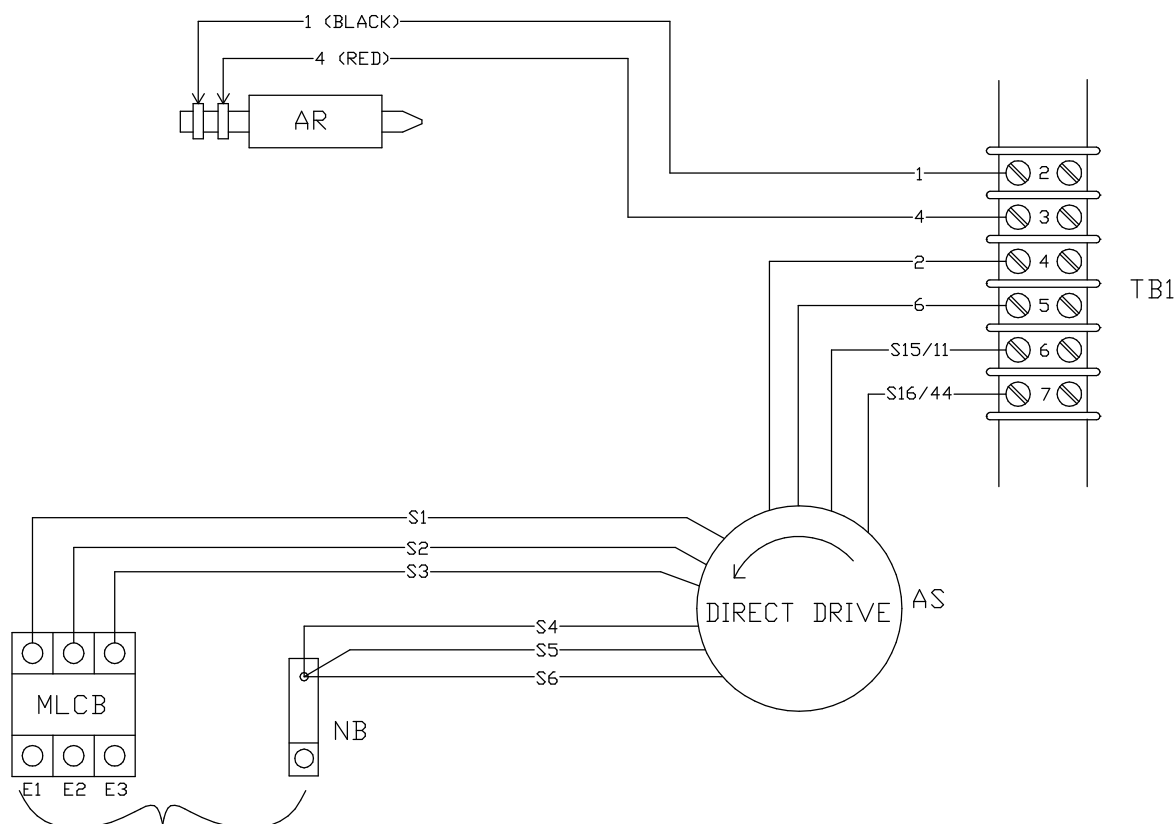
\*NOTE: THE 8th DIGIT OF THE MODEL NUMBER SPECIFIES OUTPUT VOLTAGE

"G" = 120/208VAC

## OPTION 3 - THREE PHASE, R-SERIES CONTROL PANEL, 6-WIRE 277/480V

### LEGEND

AR = ALTERNATOR ROTOR  
 AS = ALTERNATOR STATOR  
 MLCB = MAIN CIRCUIT BREAKER  
 NB = NEUTRAL BLOCK



GENERATOR OUTPUT  
 CUSTOMER CONNECTION

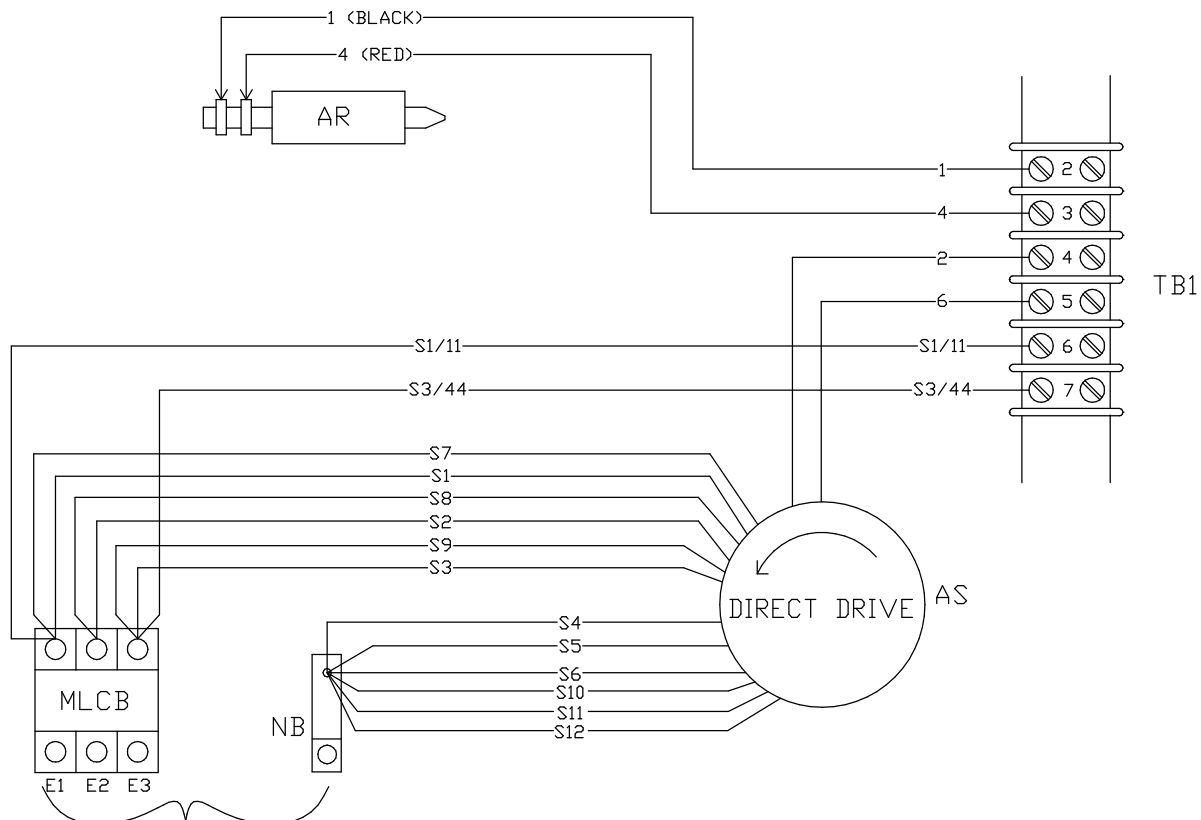
E1 TO E2  
 E2 TO E3 } \*480VAC  
 E1 TO E3 }

E1, E2, OR E3 TO NB = \* 277VAC

\*NOTE: THE 8th DIGIT OF THE MODEL NUMBER SPECIFIES OUTPUT VOLTAGE

"K" = 227/480VAC

|      |   |                      |
|------|---|----------------------|
| AR   | = | ALTERNATOR ROTOR     |
| AS   | = | ALTERNATOR STATOR    |
| MLCB | = | MAIN CIRCUIT BREAKER |
| NB   | = | NEUTRAL BLOCK        |



E1 TO E2 } \*208VAC  
E2 TO E3 }  
E1 TO E3 }

E1, E2, OR E3 TO NB = \* 120VAC

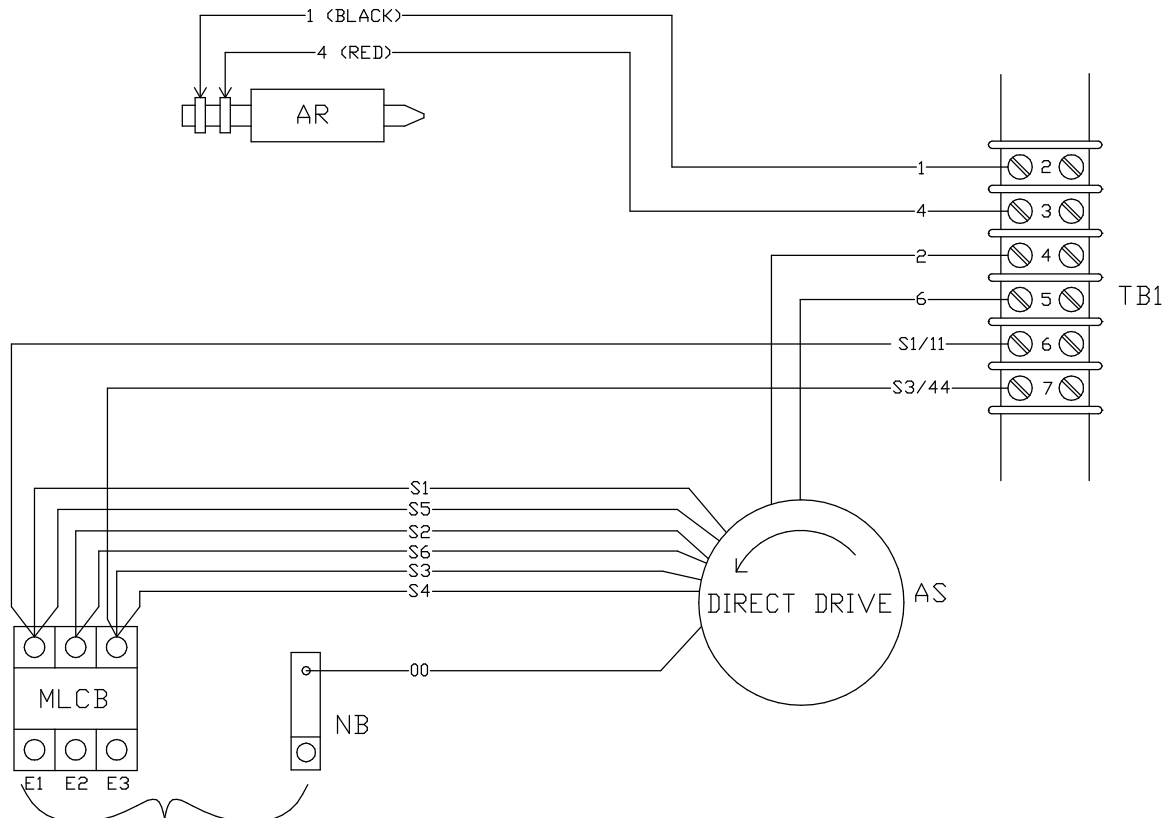
\*NOTE: THE 8th DIGIT OF THE MODEL NUMBER SPECIFIES OUTPUT VOLTAGE

"G" = 120/208VAC

## OPTION 5 - THREE PHASE DELTA, R-SERIES CONTROL PANEL, 7-WIRE 120/240V

### LEGEND

AR = ALTERNATOR ROTOR  
 AS = ALTERNATOR STATOR  
 MLCB = MAIN CIRCUIT BREAKER  
 NB = NEUTRAL BLOCK



GENERATOR OUTPUT  
 CUSTOMER CONNECTION

E1 TO E2 }  
 E2 TO E3 } \*240VAC  
 E1 TO E3 }

E1, OR E3 TO NB = \* 120VAC

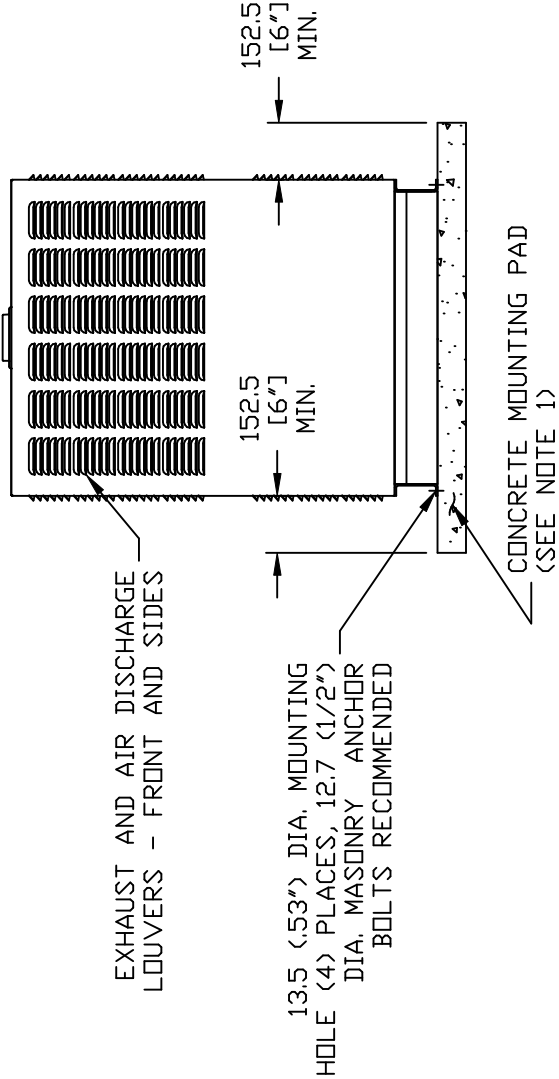
\*NOTE: THE 8th DIGIT OF THE MODEL NUMBER SPECIFIES OUTPUT VOLTAGE  
 "j" = 120/240VAC

THIS PAGE IS LEFT INTENTIONALLY BLANK

| ENGINE/KW  | WEIGHT DATA        |                               |                                              |                                            |
|------------|--------------------|-------------------------------|----------------------------------------------|--------------------------------------------|
|            | ENCLOSURE MATERIAL | WEIGHT (GENSET ONLY) KG [LBS] | WEIGHT (WOODEN SHIPPING CRATE/SKID) KG [LBS] | SHIPPING WEIGHT (SKID AND GENSET) KG [LBS] |
| 2. 4L/25KW | STEEL              | 631 [1393]                    | 44 [98]                                      | 676 [1491]                                 |
|            | ALUMINUM           | 579 [1276]                    | 44 [98]                                      | 623 [1374]                                 |
| 2. 4L/35KW | STEEL              | 631 [1393]                    | 44 [98]                                      | 676 [1491]                                 |
|            | ALUMINUM           | 579 [1276]                    | 44 [98]                                      | 623 [1374]                                 |
| 2. 4L/45KW | STEEL              | 641 [1414]                    | 44 [98]                                      | 686 [1512]                                 |
|            | ALUMINUM           | 588 [1297]                    | 44 [98]                                      | 633 [1395]                                 |

NOTES:

- 1) MINIMUM RECOMMENDED CONCRETE PAD SIZE: 1155 (45.5") WIDE X 2255 (88.8") LONG. REFERENCE INSTALLATION GUIDE SUPPLIED WITH UNIT FOR CONCRETE PAD GUIDELINES.
- 2) ALLOW SUFFICIENT ROOM ON ALL SIDES OF THE GENERATOR FOR MAINTENANCE AND SERVICING. THIS UNIT MUST BE INSTALLED IN ACCORDANCE WITH CURRENT APPLICABLE NFPA 37 AND NFPA 70 STANDARDS AS WELL AS ANY OTHER FEDERAL, STATE AND LOCAL CODES FOR MINIMUM DISTANCES FROM OTHER STRUCTURES.
- 3) CIRCUIT BREAKER INFORMATION:  
SEE SPECIFICATION SHEET WITHIN OWNERS MANUAL
- 4) INSIDE STUB-UP AREA FOR AC LOAD LEAD CONDUIT CONNECTION, NEUTRAL CONNECTION, BATTERY CHARGER 120 VOLT AC (.5 AMP MAX.) CONNECTION, AND ACCESS TO TRANSFER SWITCH CONTROL WIRES. REMOVE FRONT COVER FOR ACCESS.
- 4A) FIELD CUT HOLE IS ONLY REQUIRED FOR MOUNTING OF GENERATOR ON AN EXISTING PAD.
- 5) REFERENCE OWNERS MANUAL FOR LIFTING WARNINGS.
- 6) REMOVE EITHER LEFT OR RIGHT HAND SIDE PANEL TO ACCESS EXHAUST MUFFLER AND FAN BELT.

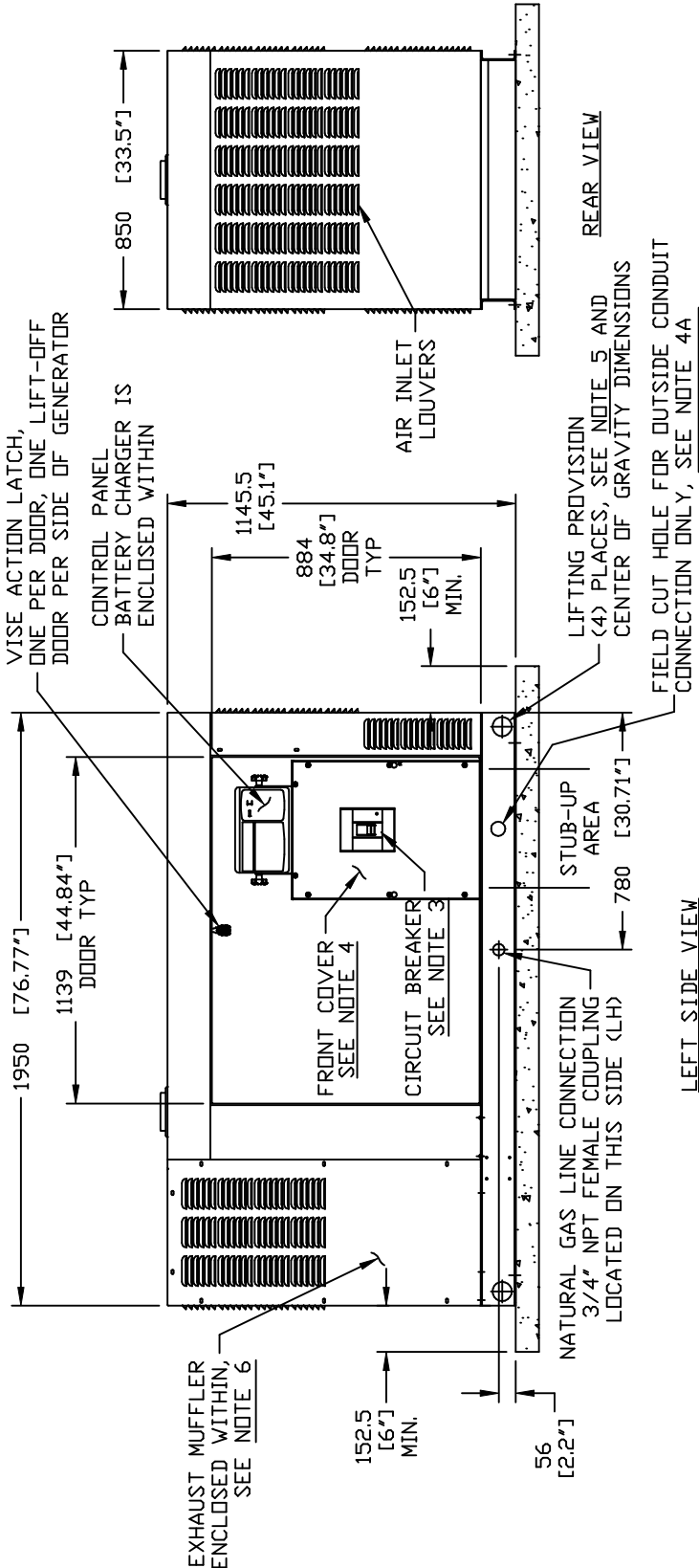
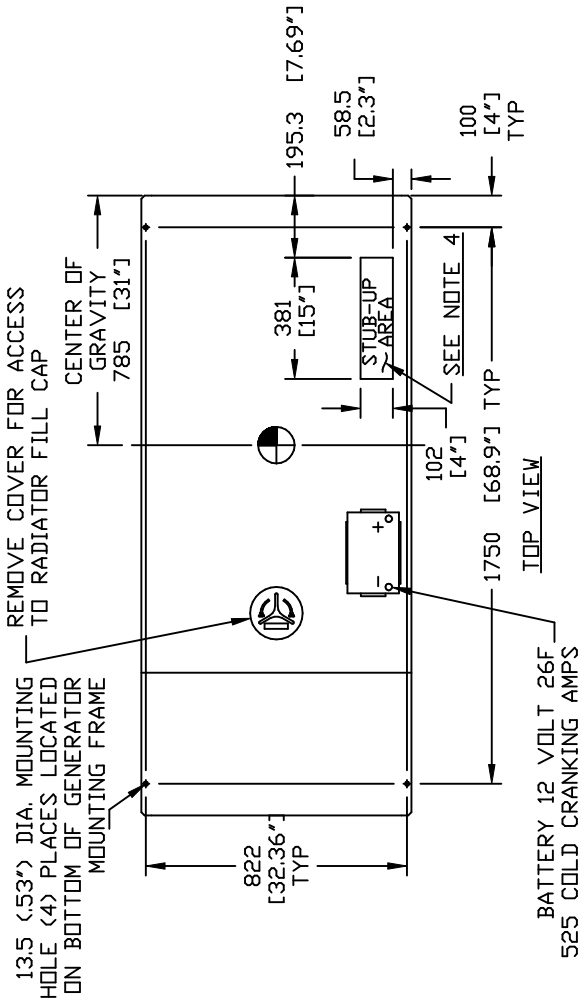




# GROUP G

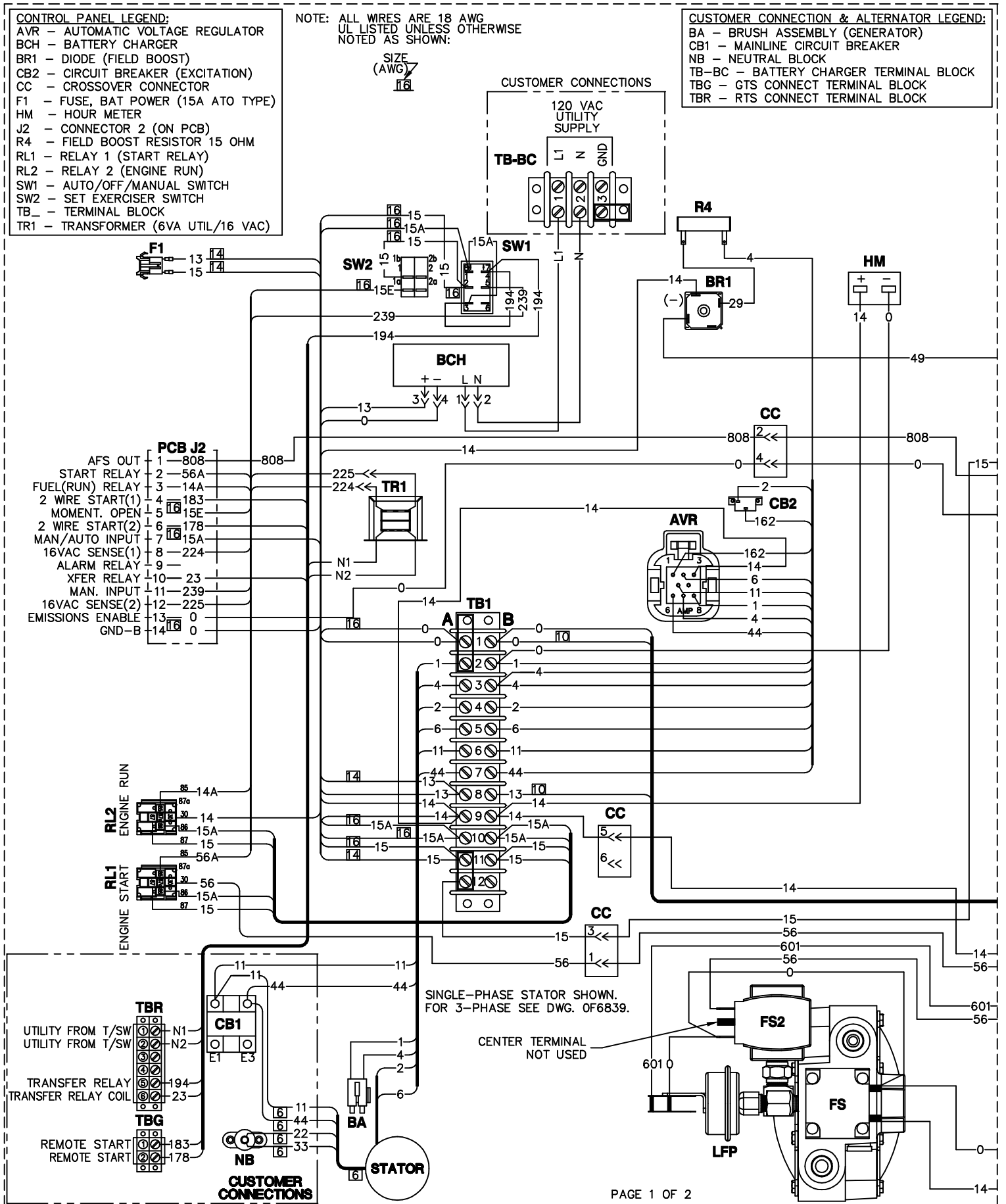
| SERVICE ITEM        | 2, 4L           |
|---------------------|-----------------|
| OIL FILL CAP        | EITHER DOOR     |
| OIL DIP STICK       | THRU RIGHT DOOR |
| OIL FILTER          | THRU RIGHT DOOR |
| OIL DRAIN HOSE      | THRU RIGHT DOOR |
| RADIATOR DRAIN HOSE | THRU LEFT DOOR  |
| AIR CLEANER ELEMENT | EITHER DOOR     |
| SPARK PLUGS         | THRU RIGHT DOOR |
| MUFFLER             | SEE NOTE 6      |
| FAN BELT            | SEE NOTE 6      |
| BATTERY             | THRU LEFT DOOR  |

REFERENCE OWNERS MANUAL FOR PERIODIC REPLACEMENT PART LISTINGS



EXPLODED VIEW:  
INSTLTN DRAWING 2.4L 25 KW, 35KW & 45KW  
DRAWING #: 0G0325

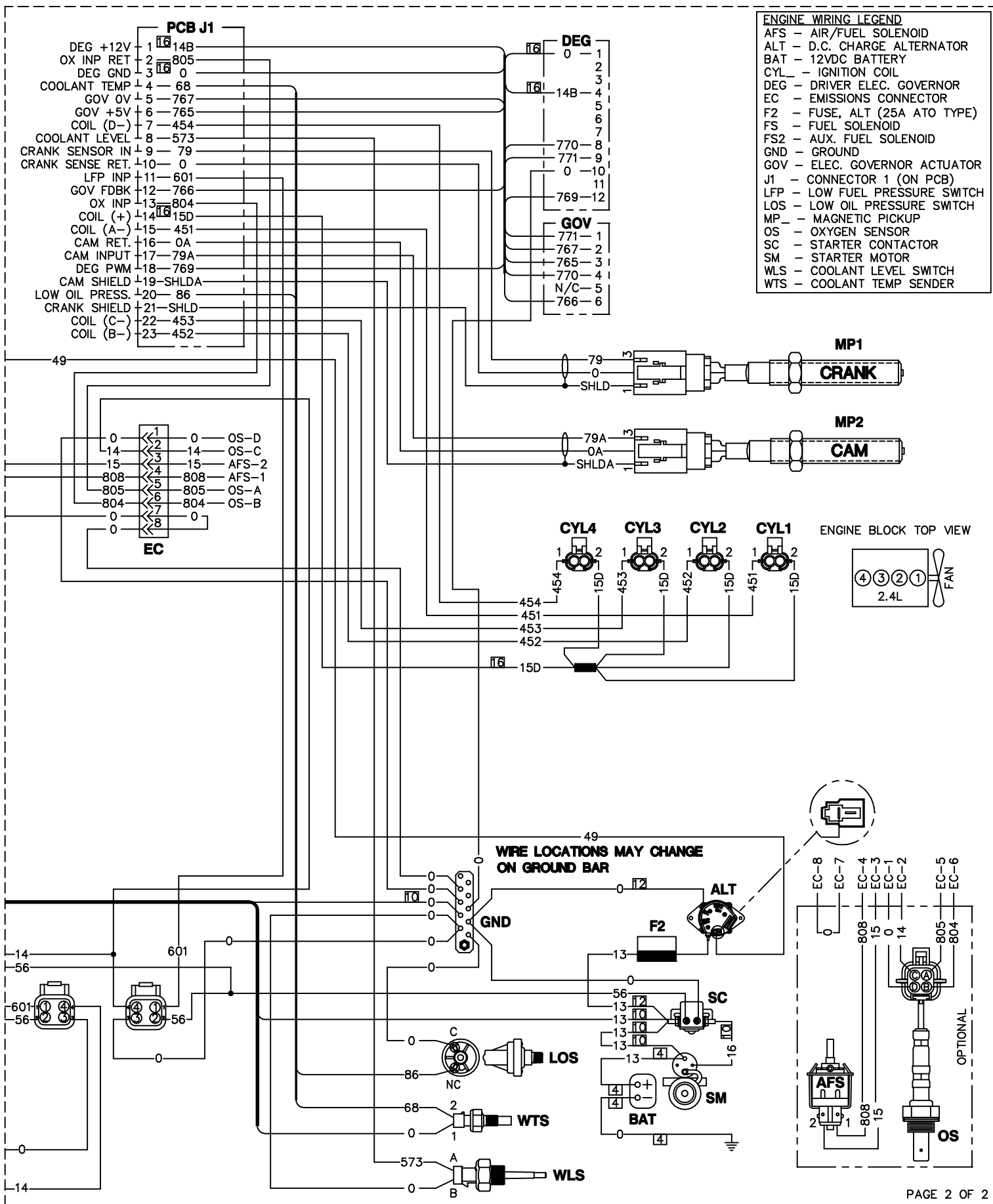
## GROUP G



## WIRING - DIAGRAM

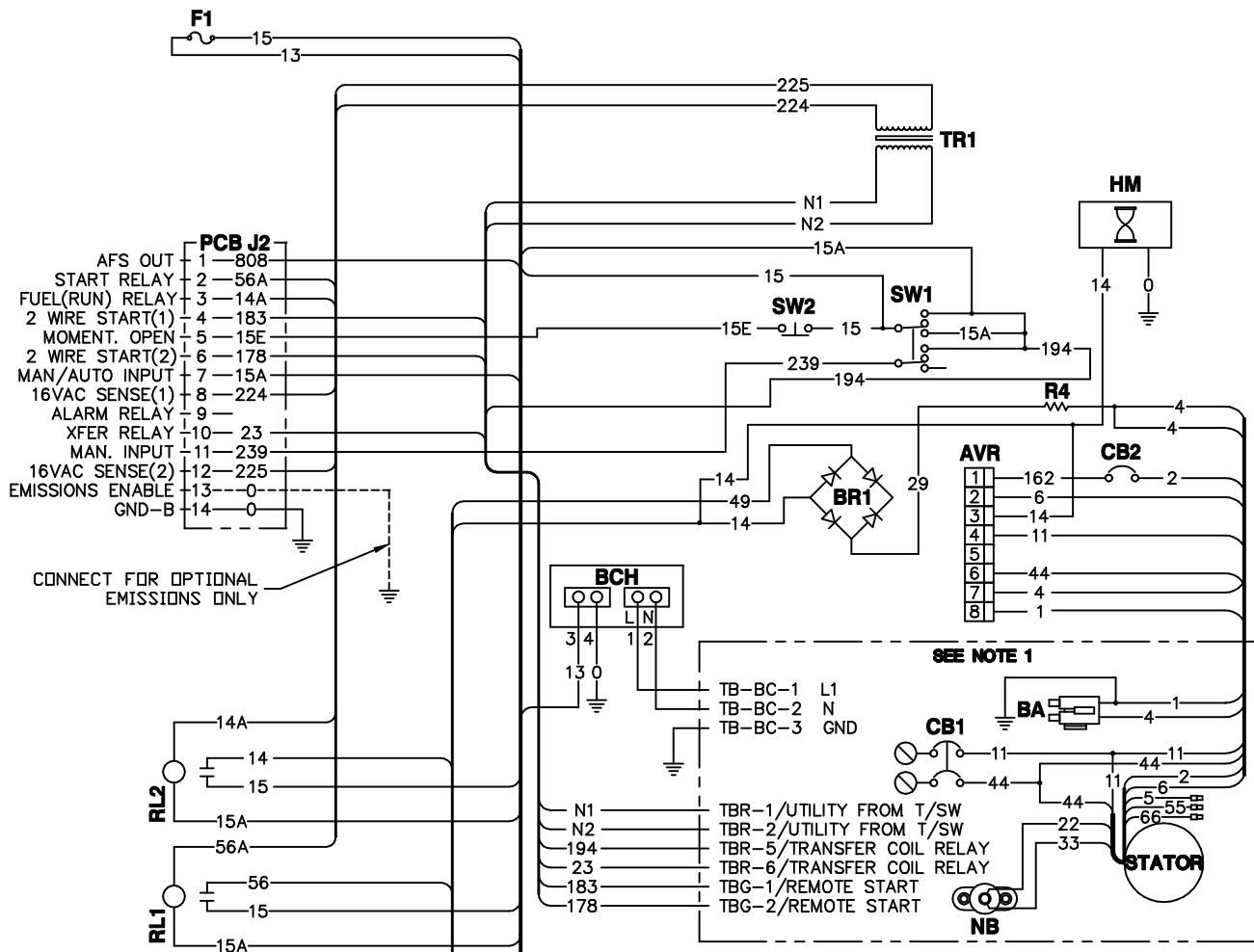
## 2.4L R-200C

DRAWING #: 0H1273



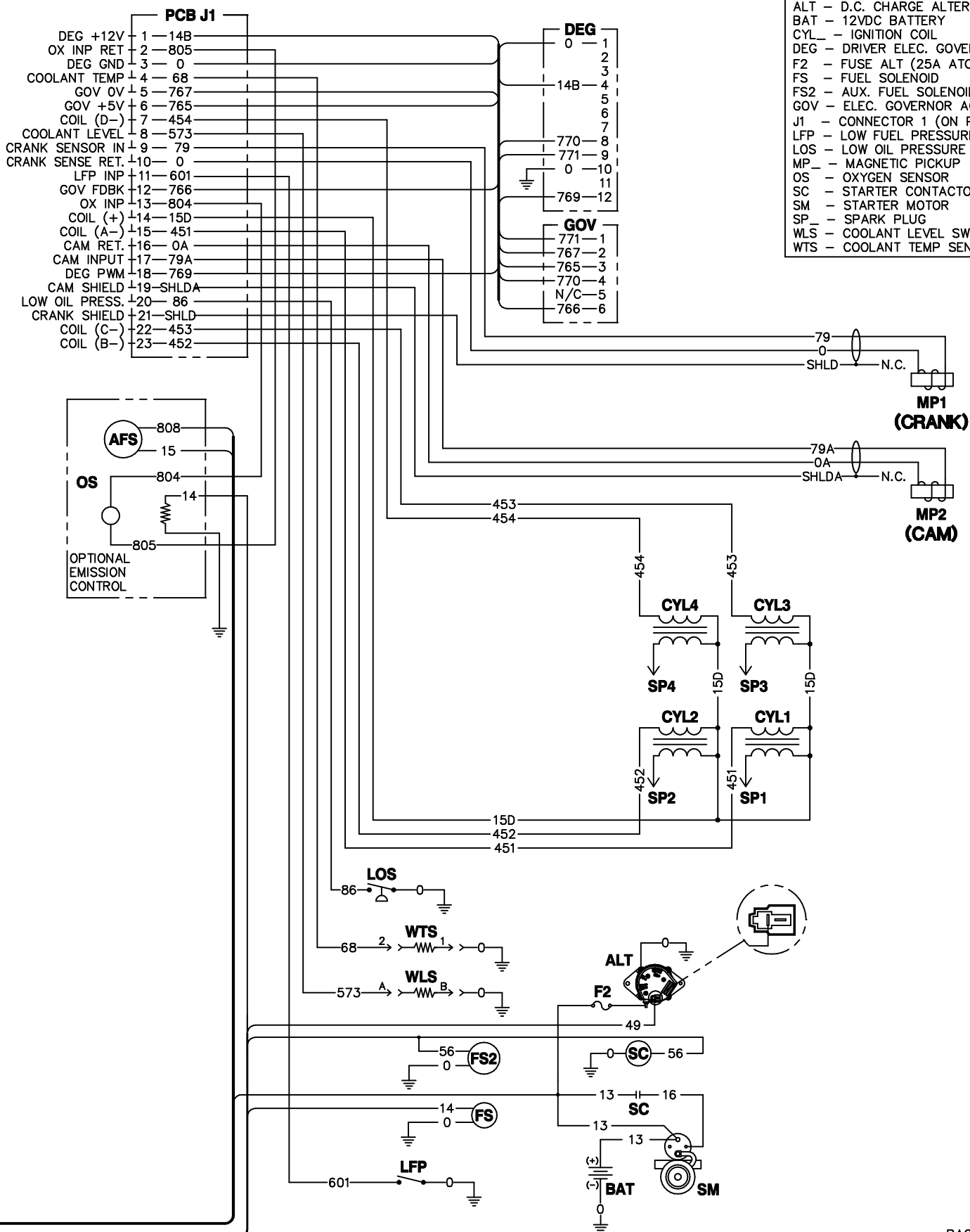
**CONTROL PANEL LEGEND:**

AVR - AUTOMATIC VOLTAGE REGULATOR  
 BCH - BATTERY CHARGER  
 BR1 - DIODE (FIELD BOOST)  
 CB2 - CIRCUIT BREAKER (EXCITATION)  
 F1 - FUSE BAT POWER (15A ATO TYPE)  
 HM - HOUR METER  
 J2 - CONNECTOR 2 (ON PCB)  
 R4 - FIELD BOOST RESISTOR 15 OHM  
 RL1 - RELAY 1 (START RELAY)  
 RL2 - RELAY 2 (ENGINE RUN)  
 SW1 - AUTO/OFF/MANUAL SWITCH  
 SW2 - SET EXERCISER SWITCH  
 TR1 - TRANSFORMER (6VA UTIL/16 VAC)



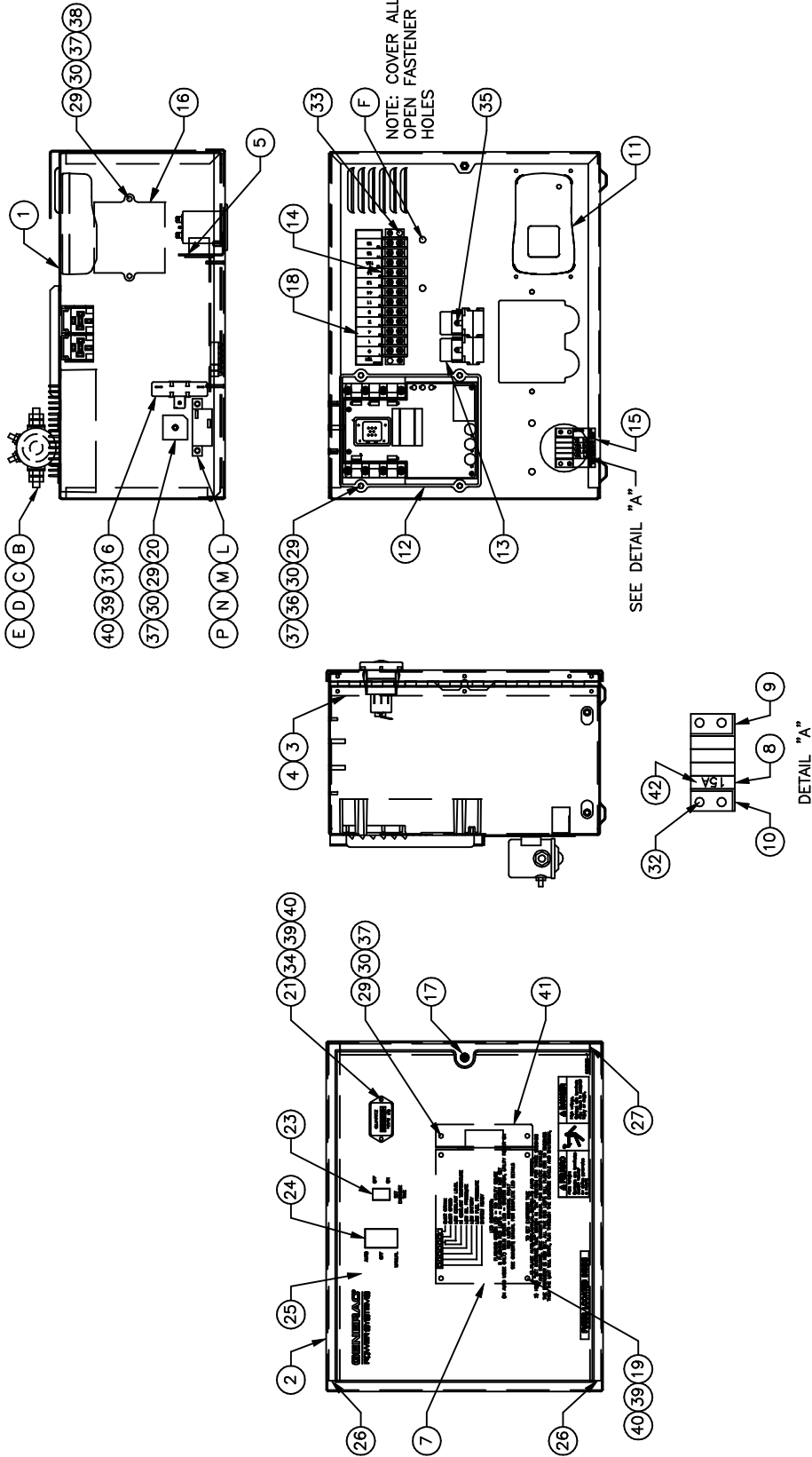
## ENGINE WIRING LEGEND

AFS - AIR/FUEL SOLENOID  
 ALT - D.C. CHARGE ALTERNATOR  
 BAT - 12VDC BATTERY  
 CYL - IGNITION COIL  
 DEG - DRIVER ELEC. GOVERNOR  
 F2 - FUSE ALT (25A ATO TYPE)  
 FS - FUEL SOLENOID  
 FS2 - AUX. FUEL SOLENOID  
 GOV - ELEC. GOVERNOR ACTUATOR  
 J1 - CONNECTOR 1 (ON PCB)  
 LFP - LOW FUEL PRESSURE SWITCH  
 LOS - LOW OIL PRESSURE SWITCH  
 MP - MAGNETIC PICKUP  
 OS - OXYGEN SENSOR  
 SC - STARTER CONTACTOR  
 SM - STARTER MOTOR  
 SP - SPARK PLUG  
 WLS - COOLANT LEVEL SWITCH  
 WTS - COOLANT TEMP SENDER



GROUP G

| MODEL | ITEM L<br>RATING | ITEM L<br>P/N |
|-------|------------------|---------------|
| 45KW  | 5A               | 048512        |
| 60KW  | 5.5A             | 054450        |



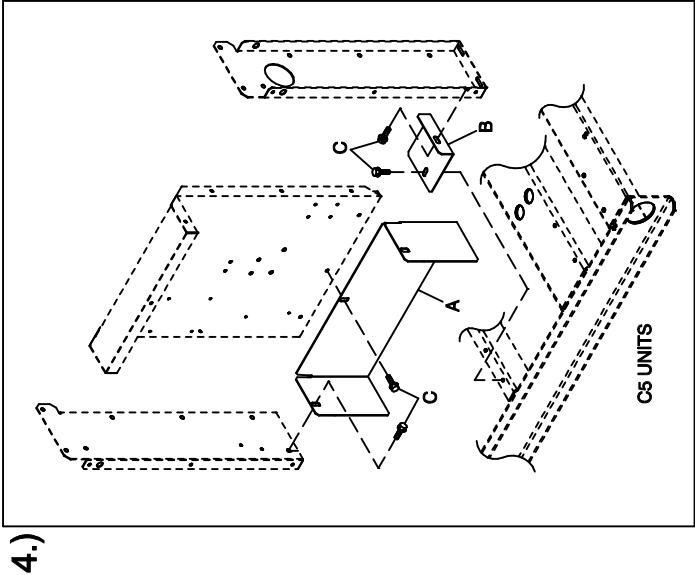
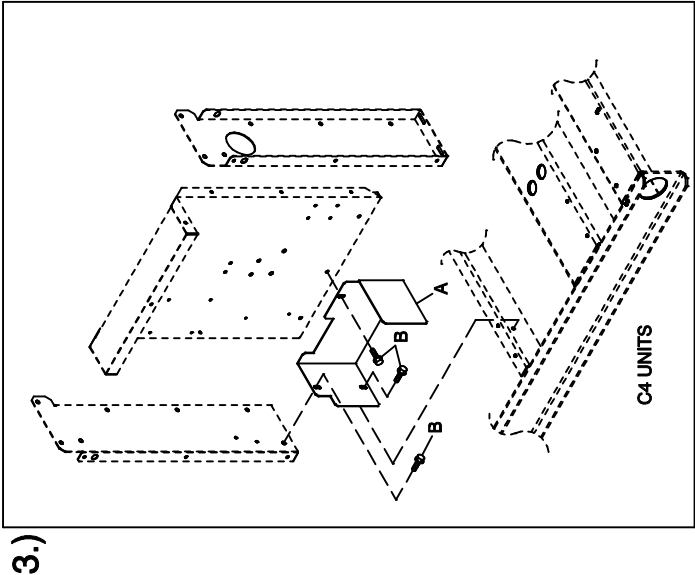
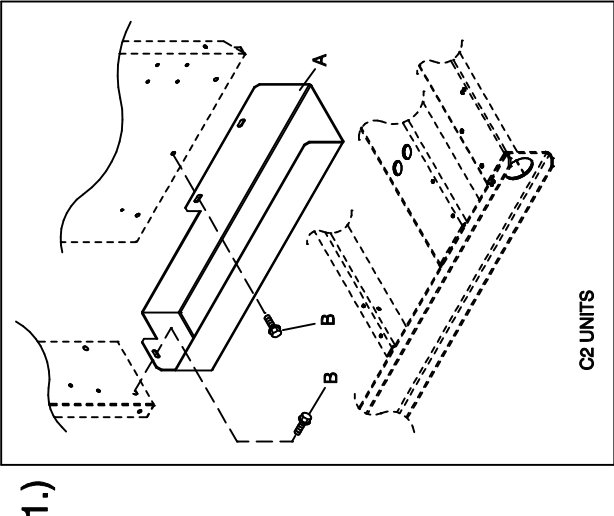
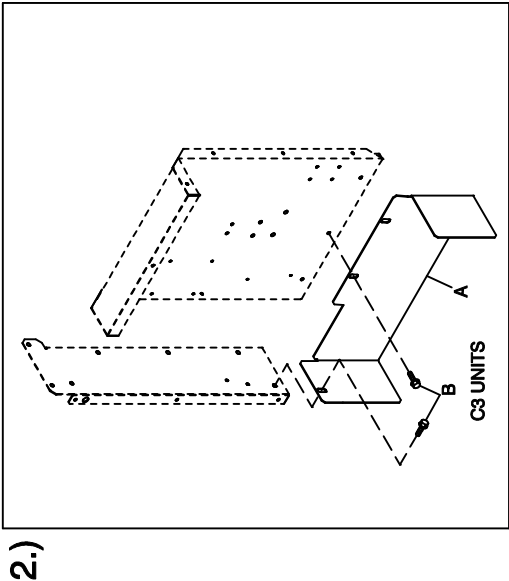
EXPLODED VIEW:  
R-200C 3600 RPM 2.4L  
DRAWING #: 0H1434D

APPLICABLE TO:

| ITEM                                  | PART #      | QTY. | DESCRIPTION                                |
|---------------------------------------|-------------|------|--------------------------------------------|
| COMPONENTS INCLUDED IN 0H1434E        |             |      |                                            |
| 1                                     | 0F1823B     | 1    | ENCL HSB CONTROL PANEL                     |
| 2                                     | 0F3078BST03 | 1    | COVER CONTROL PANEL R-200B                 |
| 3                                     | 0F2606      | 1    | HINGE CONTINUOUS H-PANEL                   |
| 4                                     | 036261      | 7    | RIVET POP .125 X .275 SS                   |
| 5                                     | 0E7358      | 4    | SCREW PPPH HI-LO #4-24 X 3/8               |
| 6                                     | 052777      | 1    | WASHER FLAT M3                             |
| 7                                     | 0H1176B     | 1    | ASSY PCB R-200C CNTRL 3600 RPM             |
| *8                                    | 0F1262      | REF. | HOLDER FUSE WICKMANN 178.6150              |
| *9                                    | 0F1263      | REF. | ADPTR RH SIDE WICKMANN 178.6191            |
| *10                                   | 0F1264      | REF. | ADPTR LH SIDE WICKMANN 178.6192            |
| 11                                    | 0G8023A     | 1    | BAT C 13.4VDC 2.5A W/4POS PLUG             |
| 12                                    | 0G2885      | 1    | ASSY PCB HI-PWR VOLTAGE RGLTR              |
| 13                                    | 0E6875A     | 2    | RELAY 12VDC C FORM W/DIODE                 |
| *14                                   | 055911      | REF. | BLOCK TERM 20A 12 X 6 X 1100V              |
| 15                                    | 0F5459      | 1    | DECAL CPL CNT PNL FUSES                    |
| 16                                    | 0E3161      | 1    | ASSY PCB BOSCH GOV DRIVER                  |
| 17                                    | 0G3648      | 1    | M5X0.8 CAPTIVE PANEL KNLD HD               |
| 18                                    | 0F5462      | 1    | DECAL CPL 3.9L TB1                         |
| 19                                    | 0A5062J     | 4    | SPACER 9.5H 3.2 ID                         |
| 20                                    | 029673      | 1    | DIO BRIDGE 25A 600V                        |
| 21                                    | 0C1457A     | 1    | HOUR METER 10-80VDC                        |
| 22                                    | 0F1958      | 1    | PLATE HARNESS CLAMP                        |
| 23                                    | 082573      | 1    | SWITCH RK RDPST 125V SPD                   |
| 24                                    | 0E4494      | 1    | SWITCH RK RDPST ON-OFF-ON                  |
| 25                                    | 0G8997      | 1    | DECAL CONTROL FLEX R-200B                  |
| 26                                    | 0F6305      | 2    | SEAL COVER 3.18X12.7X382                   |
| 27                                    | 0F6305A     | 1    | SEAL COVER 3.18X12.7X283                   |
| 28                                    | 0F5886      | 2    | SCREW HHPM M5-0.8 X 12                     |
| 29                                    | 051713      | 11   | WASHER FLAT M5                             |
| 30                                    | 049226      | 11   | WASHER LOCK M5                             |
| 31                                    | 0F5752F     | 1    | RES WW 15R 5% 25W QK CONN                  |
| 32                                    | 0F5884      | 2    | SCREW PHTT M3.5-0.6 X 10                   |
| 33                                    | 0F5896      | 2    | SCREW PHTT M3.5-0.6 X 16                   |
| 34                                    | 074076      | 2    | SCREW PHM M3-0.5 X 10 BLACK                |
| 35                                    | 0C3990      | 2    | SCREW PHTT M4-0.7 X 10 ZYC                 |
| 36                                    | 080823      | 4    | SCREW PPHM M5-0.8 X 50 ZNC                 |
| 37                                    | 051716      | 9    | NUT HEX M5-0.8 G8 YEL CHR                  |
| 38                                    | 079224      | 2    | SCREW PPHM M5-0.8 X 30 SS                  |
| 39                                    | 043182      | 7    | WASHER LOCK M3                             |
| 40                                    | 051714      | 7    | NUT HEX M3-0.5 G8 YEL CHR                  |
| 41                                    | 0F3192      | 1    | SUPPORT ANGLE PCB                          |
| 42                                    | 0E7403C     | 1    | FUSE ATO TYPE 15 AMP (BLUE)                |
| 43                                    | 0G9056      | 1    | HARN CTRL PNL R-200B 2.4L/4.2L (NOT SHOWN) |
| COMPONENTS INSTALLED PER THIS DRAWING |             |      |                                            |
| A                                     | 056739      | 1    | RELAY SOLENOID 12VDC PNL MNT               |
| B                                     | 022287      | 2    | SCREW HHC 1/4-20 X 3/4 G5                  |
| C                                     | 022473      | 4    | WASHER FLAT 1/4-M6 ZINC                    |
| D                                     | 022097      | 2    | WASHER LOCK M6-1/4                         |
| E                                     | 022127      | 2    | NUT HEX 1/4-20 STEEL                       |
| F                                     | 0F6145      | A/R  | SEAL WEATHER .45"DIA                       |
| G                                     | 0F2627A     | 1    | COVER CONTROL PANEL SIDE                   |
| H                                     | 091526      | 4    | SCREW PPHM M5-0.8 X 12 ZNC                 |
| J                                     | 049226      | 4    | WASHER LOCK M5                             |
| K                                     | 051713      | 4    | WASHER FLAT M5                             |
| L                                     | SEE CHART   | 1    | DPE BREAKER                                |
| M                                     | 052777      | 2    | WASHER FLAT M3                             |
| N                                     | 043182      | 2    | WASHER LOCK M3                             |
| P                                     | 051714      | 2    | NUT HEX M3-0.5 G8 YEL CHR                  |

NOTE: ITEMS MARKED BY \* ARE PART OF WIRE HARNESS.

GROUP H



EXPLODED VIEW:  
C4 CB CONNECTION BOX SHIELDING C2/C4  
DRAWING #: 0G0258D



EXPLODED VIEW: C4 CB CONNECTION BOX SHIELDING C2/C4  
DRAWING #: 0G0258D

GROUP H

APPLICABLE TO:

| ITEM | PART #      | QTY. | DESCRIPTION                   |
|------|-------------|------|-------------------------------|
| 1.)  | C2 UNITS    |      |                               |
| A    | 0F9832      | 1    | SHIELD CONN BOX C2            |
|      | 0F9832GGS0R | 1    | SHIELD CONTROL STAND C2       |
| B    | 0C2454      | 4    | SCREW THF M6-1 X 16 N WA Z/JS |
| 2.)  | C3 UNITS    |      |                               |
| A    | 0F9832B     | 1    | SHIELD CONTROL STAND C3       |
|      | 0F9832KGS0R | 1    | SHIELD CONTROL STAND C3       |
| B    | 0C2454      | 3    | SCREW THF M6-1 X 16 N WA Z/JS |
| 3.)  | C4 UNITS    |      |                               |
| A    | 0F9832A     | 1    | SHIELD CONTROL STAND C4       |
| B    | 0C2454      | 3    | SCREW THF M6-1 X 16 N WA Z/JS |
| 4.)  | C5 UNITS    |      |                               |
| A    | 0F9832C     | 1    | SHIELD CONTROL STAND C5       |
|      | 0F9832D     | 1    | SHIELD CONTROL STAND C5       |
|      | 0F9832EGS0R | 1    | SHIELD CONTROL STAND C5       |
|      | 0F9832HGS0R | 1    | SHIELD CONTROL STAND C5       |
|      | 0F9832JGS0R | 1    | SHIELD CONTROL STAND C5       |
| B    | 0F9832FGS0R | 1    | SHIELD CONTROL STAND C5       |
| C    | 0C2464      | 3    | SCREW THF M6-1 X 16 N WA Z/JS |

