REDI-LINE™
Electric Generators

INSTALLATION AND SERVICE MANUAL

Models

DA12A	DA12L
DA24A	DA24L
DA36A	DA36L

Pacific Scientific
HIGH PERFORMANCE MOTORS & DRIVES

Warranty Policy

Pacific Scientific warrants its REDI-LINE Generator to the original purchaser and in the case of original equipment manufacturers or distributors, to their original consumer, to be free from defects in material and workmanship. In no event, however, shall Pacific Scientific be liable or have any responsibility under such warranty if the products have been improperly stored, installed, used or maintained, or if customer has permitted any unauthorized modifications, adjustments and/or repairs to such products.

Pacific Scientific obligation hereunder is limited solely to repairing or replacing (at its option), at its factory any products, or parts thereof, which prove to our satisfaction to be defective as a result of defective materials or workmanship, in accordance with our stated warranty, provided however, that the written notice of claimed defects shall be given to Pacific Scientific within two (2) years after the date of the product date code that is affixed to the product, and within thirty (30) days from the date any such defect is first discovered. This warranty does not include brush or commutator wear since wear is normal.

The products or parts claimed to be defective must be returned to Pacific Scientific, or an Authorized REDI-LINE distributor, transportation prepaid by customer, with a detailed written explanation of the claimed defect. Evidence acceptable to Pacific Scientific must be furnished that the claimed defects were not caused by misuse. abuse. or neglect by anyone other than Pacific Scientific.

The foregoing warranties are in lieu of all other warranties (except as to title), whether expressed or implied, including without limitation, any warranty of merchantability or of fitness for any particular purpose, and are in lieu of all other obligations or liabilities on the part of Pacific Scientific. Pacific Scientific's maximum liability with respect to these warranties, arising from any cause whatsoever, including without limitation, breach of contract, negligence, strict liability, tort warranty, patent or copyright infringement, shall not exceed the price specified of the products giving rise to the claim, and in no event shall Pacific Scientific be liable under these warranties or otherwise, even if Pacific Scientific has been advised of the possibility of such damages, for special, incidental, or consequential damages, including without limitation, damage or loss resulting from inability to use the products, increased operating costs resulting from a loss of the products, loss of anticipated profits, or other special, incidental, or consequential damages, whether similar or dissimilar, of any nature arising or resulting from the purchase, installation, removal, repair, operation, use or breakdown of the products, or any other cause whatsoever, including negligence.

The forgoing shall also apply to products, or parts for the same which have been repaired or replaced pursuant to such warranty, and within the period of time, in accordance with Pacific Scientific's date of warranty.

No person, including any agent, distributor, or representative of Pacific Scientific, is authorized to make any representation or warranty on behalf of Pacific Scientific concerning any products or programs manufactured by Pacific Scientific, except to refer purchases to this warranty.

TABLES OF CONTENTS

ABOUT THIS MANUAL

The purpose of this manual is twofold: first, to provide comprehensive installation instructions for Pacific Scientific REDI-LINE generators; and second, to provide comprehensive maintenance, troubleshooting, and repair procedures.

It is imperative that the installation instructions be followed closely. Successful installation depends upon a number of factors, and ignoring any one factor can lead to major problems with the unit.

Troubleshooting has been divided into three sections, the first for isolating installation problems, the second for identifying problems with the unit itself while in the field, and the third for isolating problems requiring bench repair. The owner or installer should initially undertake troubleshooting. Careful troubleshooting can eliminate installation problems and help avoid having to return the unit to the dealer. Bench troubleshooting is for dealer or factory use, and should not be used in the field.

Technical data contained in the manual is for dealer reference.

1. DESCRIPTION AND OPERATION

The REDI-LINE Generator is an electromechanical device that converts DC battery power to AC power. The DC supply consists of one or more deep cycle batteries typically added to a vehicle electrical system. Convenient, remote operation of most tools, appliances and lighting is assured as long as power consumption is within the nameplate rating of the generator. The REDI-LINE generator is designed to supply unregulated, true sine-wave electrical power for years of trouble free service.

The REDI-LINE Generator consists of a DC motor and an AC generator on a common armature assembly. Speed of the DC motor, and, therefore, frequency of the AC generator varies within limits as the load and battery power levels vary. The unit starts automatically when an electrical load is applied.

Figure 1. The Two Basic Versions of REDI-LINE Generators

Features

The following features recommend the REDI-LINE DC to AC generator to users who have need of reliable AC power on service and recreational vehicles, or at remote sites.

- Built rugged and reliable with sturdy steel housing.
- Two year warranty.
- Patented Demand Start Circuitry extends battery life.
- Easily delivers peak output currents up to 1.5 times the continuous output rating for extra starting power.
- Conveniently mounts in any position in a minimum of space.
- True sine-wave output.
- Optional GFI outlet.
- Operates in ambient temperatures from -30°F to 104°F

2. GENERAL SPECIFICATIONS

Nameplate Data

The generator nameplate provides the operational specifications of the generator. The beginning letter designations of the catalog listing describe the generator type. Additional data given on the nameplate includes the generator part number, input data, output data, insulation class, and serial number.

Table 1.1 General Specifications

Models	DA12A-500A	DA12L-1600A	DA24A-800A	DA24L-1600A	DA36A-900A	DA36L-1600A
Input Voltage (DC)	12	12	24	24	36	36
Nominal Input Voltage (DC)	12.6	12.6	25.2	25.2	37.8	37.8
Continuous Output Watts	500	1600	800	1600	900	1600
Surge Output Watts	750	2400	1200	2400	1350	2400
Output Voltage* (AC)	120	120	120	120	120	120
Output Frequency (Hz)	65	65	60	60	60	60
Continuous Output Current (Amps)	4.5	14.5	7.3	12.8	8.2	14.5
Surge Output Current (Amps)	7	22	11	20	12	22
Wave Shape	Sine	Sine	Sine	Sine	Sine	Sine
Length (inches)	16.25	16.75	16.25	15.13	16.25	15.13
Height (inches)	5.5	9.13	5.5	9.13	5.5	9.13
Diameter (inches)	5.18	7.38	5.18	7.38	5.18	7.38
Weight (lbs.)	26	53	26	48	26	48

** Variance from output voltage and frequency is dependent on load size and the DC input voltage. Typical voltage tolerance is ±15%. Typical frequency tolerance is ±5%. Carefully monitor any equipment that is sensitive to fluctuations in either voltage or frequency.

3. UNPACKING

Unpacking

Open the box and lift out the Generator and the insert.

CAUTION: The generator is a piece of heavy equipment. Removing it from the box may require more than one person to avoid dropping the generator and prevent personal injury.

Inspect the unit for any damage that may have been sustained during shipment. If you find damage, contact the shipper immediately to file a claim.

4. PREPARATION FOR INSTALLATION

Most REDI-LINE service requests result from improperly installed units. Improper installation will affect generator performance and may damage the unit.

NOTE: Damage caused by incorrectly installing your REDI-LINE generator is not covered by warranty.

Successful installation calls for proper planning, as well as the use of proper materials during the installation process. Follow the procedures outlined below in preparing for installation of your generator.

Choosing an Acceptable Location

Observe these guidelines when choosing a location to mount your generator and it's battery system.

Cable Routing

Keep the generator as close to the battery as possible to reduce the length of the power cables. Long power cables will reduce the amount of voltage to the generator and decrease performance.

Carefully plan the power supply cable route. Do not allow the cables to rub against sharp surfaces, which could cut the cable insulation and cause a short against the vehicle frame.

Accessibility

Be sure both the REDI-LINE generator and the battery system are located so that they are easily accessible for servicing.

Protection from Moisture

Do not install the generator or battery system in areas with direct exposure to water. Do not use a steam cleaner or a high-pressure washer around the generator unless it is totally protected against water intrusion.

Protection from Damage

Be sure both the REDI-LINE generator and the battery system are installed in areas where they are not subject to damage.

Ventilation Considerations

Allow at least 2 inches of free air space around the REDI-LINE generator. Do not obstruct the ventilation as it can cause the generator to overheat. Install the battery system in an area that is ventilated, so that battery fumes can be readily dissipated.

CAUTION: Do not install the REDI-LINE generator and it's supply batteries in the same compartment.

CAUTION: Do not install the REDI-LINE generator in a compartment that could contain explosive fumes.

Determining Installation Requirements

Determine how frequently and at what loads you plan to use your generator. Find the Redi-Line generator series you purchased and choose the correct installation diagram based on your usage and loads. Use this diagram as a guide when it comes time to do the system installation.

DA12A Series

If the load requirement is not heavy (intermittent hand tool use or light loads for a long period of time) the vehicle battery and charging system should handle both vehicle and additional generator demand.

If the load requirements are heavy (constant use of hand tools or large loads) install one or more auxiliary deep cycle batteries. The auxiliary battery should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your vehicle.

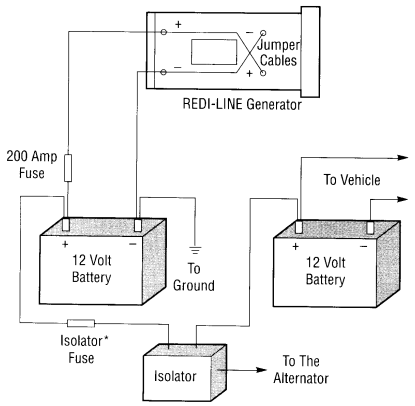
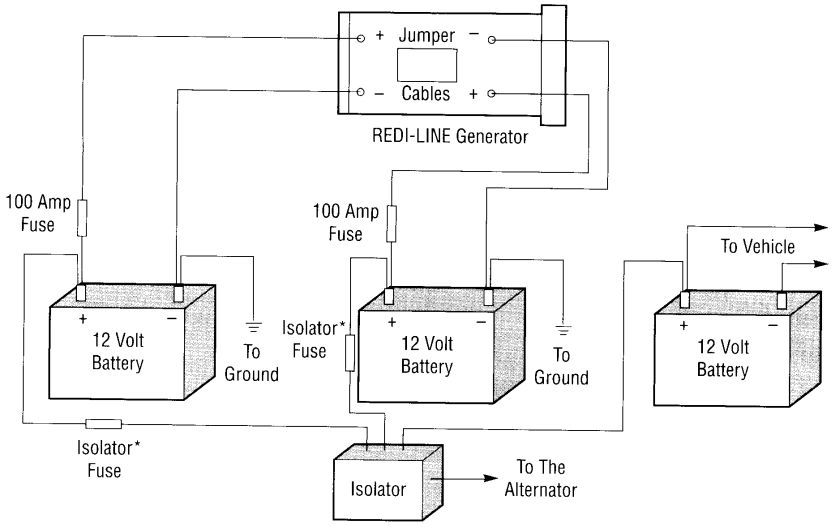


Figure 4-1. Infrequent Use with Varying Loads



*Use fuse size recommended by isolator manufacturer

Figure 4-2. Frequent Use with Varying Loads

DA12L Series

If the load requirement is not heavy (intermittent hand tool use or light loads for a long period of time) install one or more auxiliary deep cycle batteries. The auxiliary battery should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your vehicle.

If the load requirements are heavy (constant use of hand tools or large loads) install two or more auxiliary deep cycle batteries. The auxiliary batteries should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your vehicle.

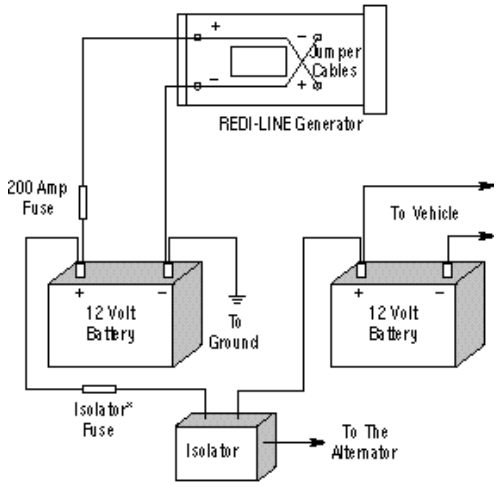


Figure 4-3. Infrequent Use with Varying Loads

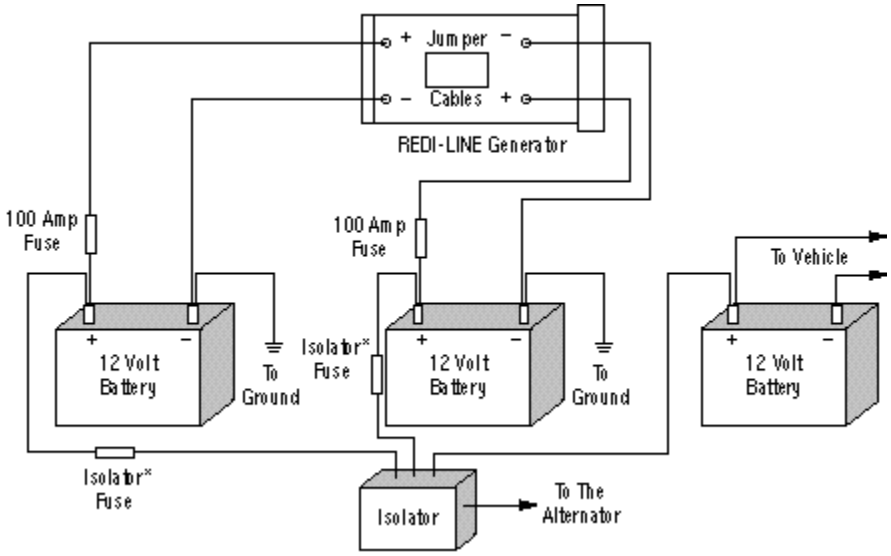


Figure 4-4. Frequent Use with Varying Loads

DA24A Series

If the load requirement is not heavy (intermittent hand tool use or light loads for a long period of time) the vehicle battery and charging system should handle both the vehicle and additional generator demand.

If the load requirements are heavy (constant use of hand tools or large loads) install two or move deep cycle auxiliary batteries. The auxiliary battery should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your vehicle.

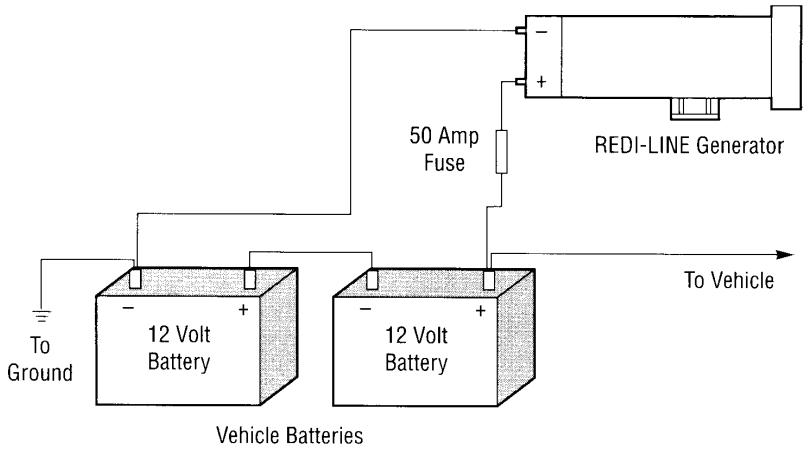


Figure 4-5. Infrequent Use with Varying Loads

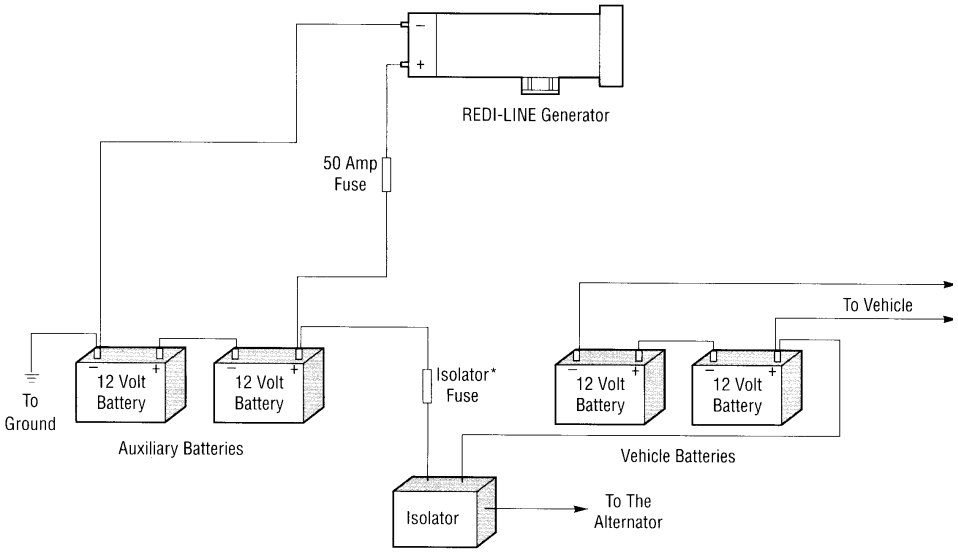


Figure 4-6. Frequent Use with Varying Loads

DA24L Series

If the load requirement is not heavy (intermittent hand tool use or light loads for a long period of time) the vehicle battery and charging system should handle both the vehicle and additional generator demand.

If the load requirements are heavy (constant use of hand tools or large loads) install two or move deep cycle auxiliary batteries. The auxiliary battery should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your

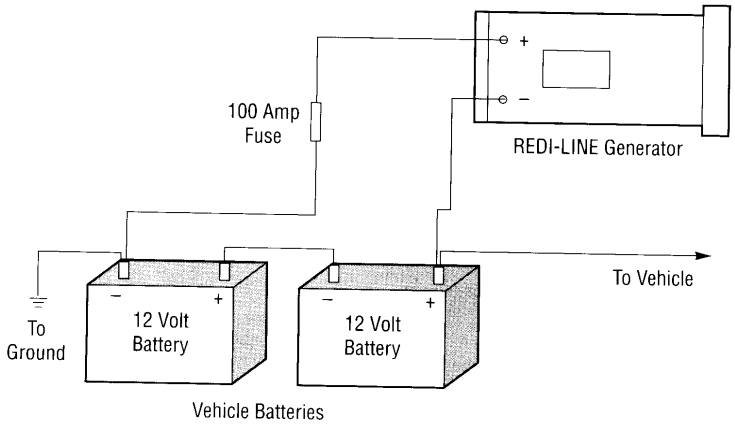


Figure 4-7. Infrequent Use with Varying Loads

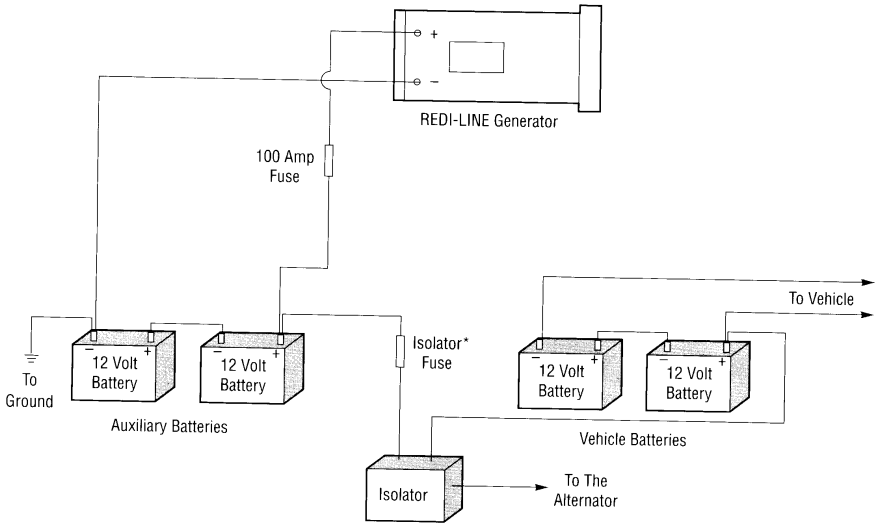


Figure 4-8. Frequent Use with Varying Loads

DA36A Series

If the load requirement is not heavy (intermittent hand tool use or light loads for a long period of time) the vehicle battery and charging system should handle both the vehicle and additional generator demand.

If the load requirements are heavy (constant use of hand tools or large loads) install two or more auxiliary deep cycle batteries. The auxiliary batteries should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your vehicle.

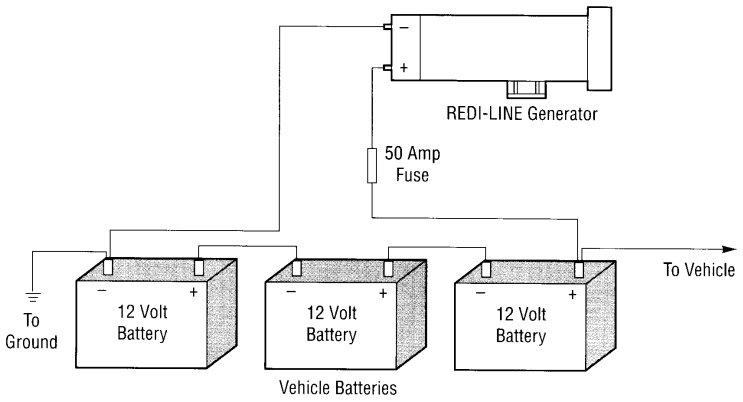


Figure 4-9: Infrequent Use with Varying Loads

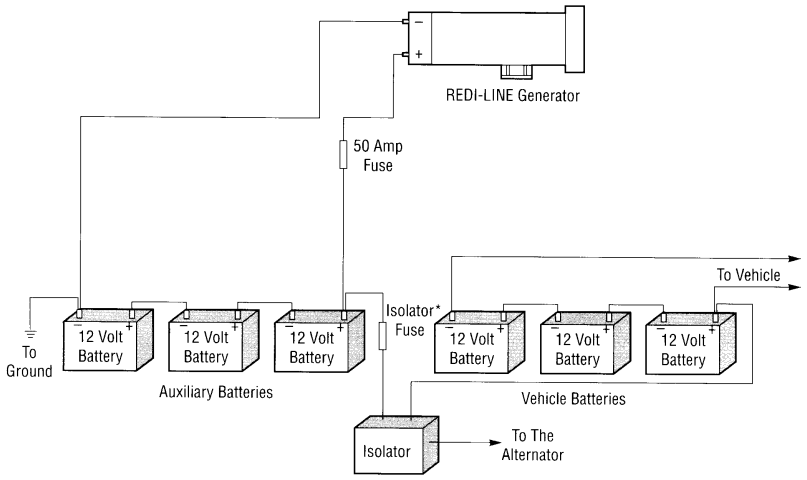


Figure 4-10. Frequent Use with Varying Loads

DA36L Series

If the load requirement is not heavy (intermittent hand tool use or light loads for a long period of time) the vehicle battery and charging system should handle both the vehicle and additional generator demand.

If the load requirements are heavy (constant use of hand tools or large loads) install two or more auxiliary deep cycle batteries. The auxiliary batteries should be isolated from the vehicle battery using a battery isolator. The battery isolator is a one way path so the vehicle charges both batteries but one battery cannot discharge the other. This will ensure the vehicle battery is always charged and you will be able to start your vehicle.

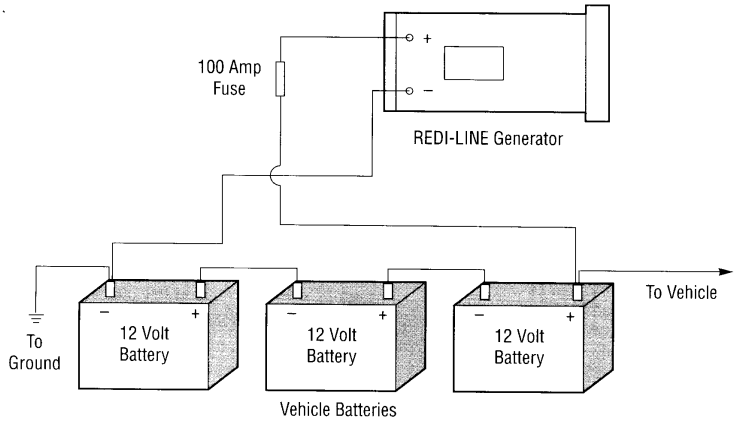


Figure 4-11. Infrequent Use with Varying Loads

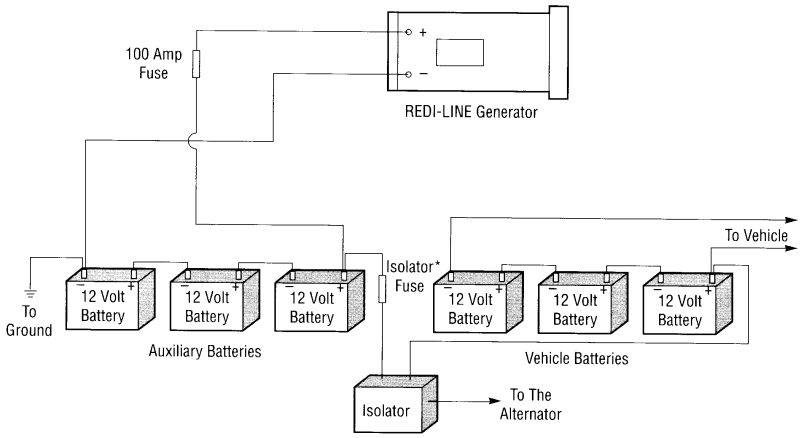


Figure 4-12. Frequent Use with Varying Loads

Battery Selection

Standard automotive batteries are designed to supply 300 to 500 amps of current for a relatively short period; therefore they are not the best power source for REDI-LINE generators. Deep cycle or marine batteries are designed to deliver lower current levels for a longer time, and are capable of taking deep discharges without battery damage. For this reason, a deep cycle battery is recommended for REDI-LINE operation.

Batteries are rated in cold cranking amps (CCA). In general, the higher the CCA the longer the battery will operate a generator load. The length of the duty cycle depends on the battery capacity, the size of the load (tool or appliance connected to the generator), and how frequent the load is applied.

Use the following formula to estimate how long a fully charged deep cycle battery will keep the REDI-LINE operating continuously before the battery needs recharging:

$$\text{Hours} = \frac{\text{Cold Cranking Amps (CCA)}}{180 \text{ X AC Load Amps}}$$

Where:

- Cold Cranking Amps is equal to the sum of all the battery CCAs.
- AC Load Amps is the AC current rating listed on the nameplate of the largest tool or appliance to be powered by the REDI-LINE generator.

For Example:

- Two batteries with a CCA rating of 675 are used to operate a Generator.
- The tool being operated requires an AC load of 4 amps.
- Continuous run time is:

$$\text{Hours} = \frac{675 + 675}{180 \text{ X } 4} = 1.87 \text{ Hours}$$

To extend the operating time of the generator further, connect the generator's battery system to the vehicle charging system. With the vehicle running, the alternator charges the generator battery bank, thereby providing a longer run time.

If the charging system is not powerful enough, the batteries may still ultimately become discharged after a long operating time. If that is the case, you may need to install a larger alternator in your vehicle. Consult your REDI-LINE distributor for more information

Wiring Considerations

Installation and wiring must conform to all applicable codes, including the National Electric Code, state and local, or other codes in effect at the time of installation.

Pacific Scientific recommends that the REDI-LINE Generator always be installed using proper fuses or circuit breakers. Refer to the appropriate Installation figure (Figures 4-1 through 4-12) for fuse sizes and locations. Place fuses no farther than 18" from the battery.

The connection between the supply battery and the REDI- LINE Generator is one of the most critical installation steps. Using the wrong supply cable size could damage the generator. Choose the correct supply cable size from the Table 4-1 below.

Table 4-1. Supply Cable Size Between Battery and REDI-LINE Generator

Generator	**Cable Length in Feet**			
	up to 3’	3’ to 8’	8’ to 10’	10’ +
DA12A-500A Figure 4-1 and 4-2	No. 6	No. 4	No. 4	No. 4
DA24A-800A DA36A-900A Figure 4-5, 4-6, 4-9and 4-10	No. 6	No. 6	No. 6	No. 4
DA12L-1600A Figure 4-3	No. 0	No. 0	No. 0	No. 00
DA12L-1600A Figure 4-4	No. 2	No. 2	No. 2	No. 0
DA24L-1600A DA36L-1600A Figure 4-7, 4-8, 4-11, and 4-12	No. 6	No. 6	No. 6	No. 4

5. INSTALLATION

Before Beginning Installation

The REDI-LINE Generator is a quality product, designed to be rugged, reliable and safe when installed properly. Improper installation can cause damage to the unit and/or result in serious personal injury. Damage caused by incorrectly installing your REDI-LINE generator is not covered by warranty. Read the entire installation procedure before you start to install the generator. If you have questions on installation or operation of the generator, contact your REDI-LINE distributor for assistance. If you do not have a distributor contact, call Pacific Scientific direct at (815) 226-3100.

To prevent damage to the generator, insure that it is sized properly for the application. Excessive AC current draw, above the rating stated on the nameplate, may cause overheating of the generator.

Be sure that all the preparation for installation provisions described in Section 4 have been carried out.

CAUTION: Automotive and marine type batteries produce dangerous current levels. Protect yourself when working around batteries and associated electrical systems. This includes the use of safety goggles.

Mounting

The generator is not position sensitive and may be mounted in whatever orientation best suits your application.

1. Place the unit in the desired position or use the templates in Figures 5-1 or 5-2 to mark the location of the mounting holes.
2. Remove the generator or template. At the marked location, drill 1/4" holes.
3. Attach the generator using four 1/4" flat washers, lock washers, bolts, and nuts through the holes in the base flange. Mounting hardware is not included.
4. Install and secure the batteries in accordance with instructions provided by the battery manufacturer.

Installation Interconnection

Install your REDI-LINE generator according to the interconnection shown in the appropriate installation figure (Figures 4-1 through 4-12). Use the correct cable size (Table 4-1) between the battery and generator. Be sure all electrical connections are securely made.

WARNING
It is important that the polarity (+ and -) be correctly connected to the generator. Note polarity indications on the installation figure (Figures 4-1 through 4-12) you are using.

Do not ground the negative (-) REDI-LINE supply terminal to the vehicle chassis. The negative REDI-LINE terminal must be connected directly to the supply battery using the proper size supply cable.

NOTE: Cable, connectors, fuses and isolators may be available from your authorized REDI-LINE distributor. Many also provide complete installation services.

NOTE: When attaching power cables to the generator; a spark at the connection may occur. This is normal and does not mean the generator is defective.

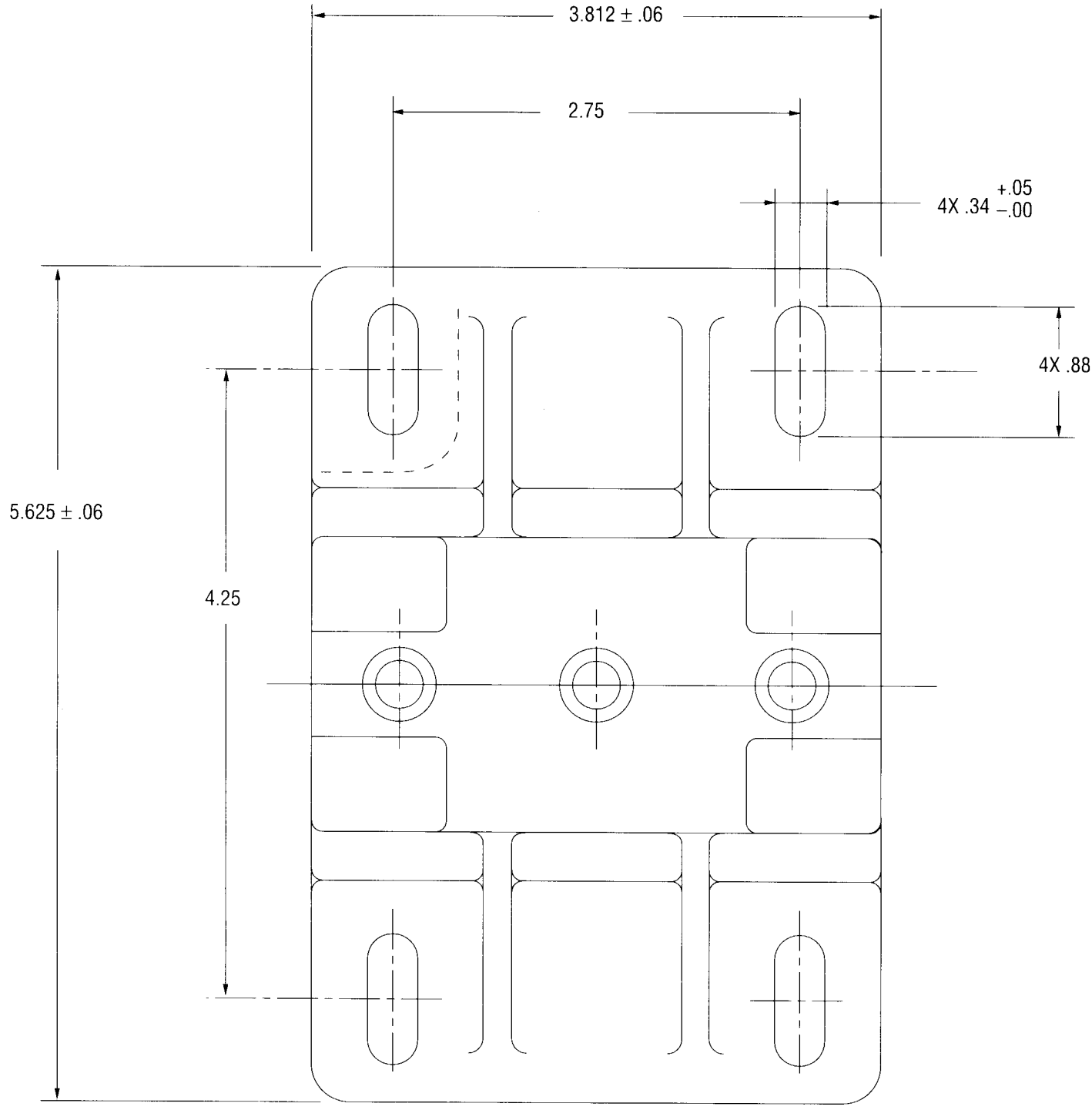
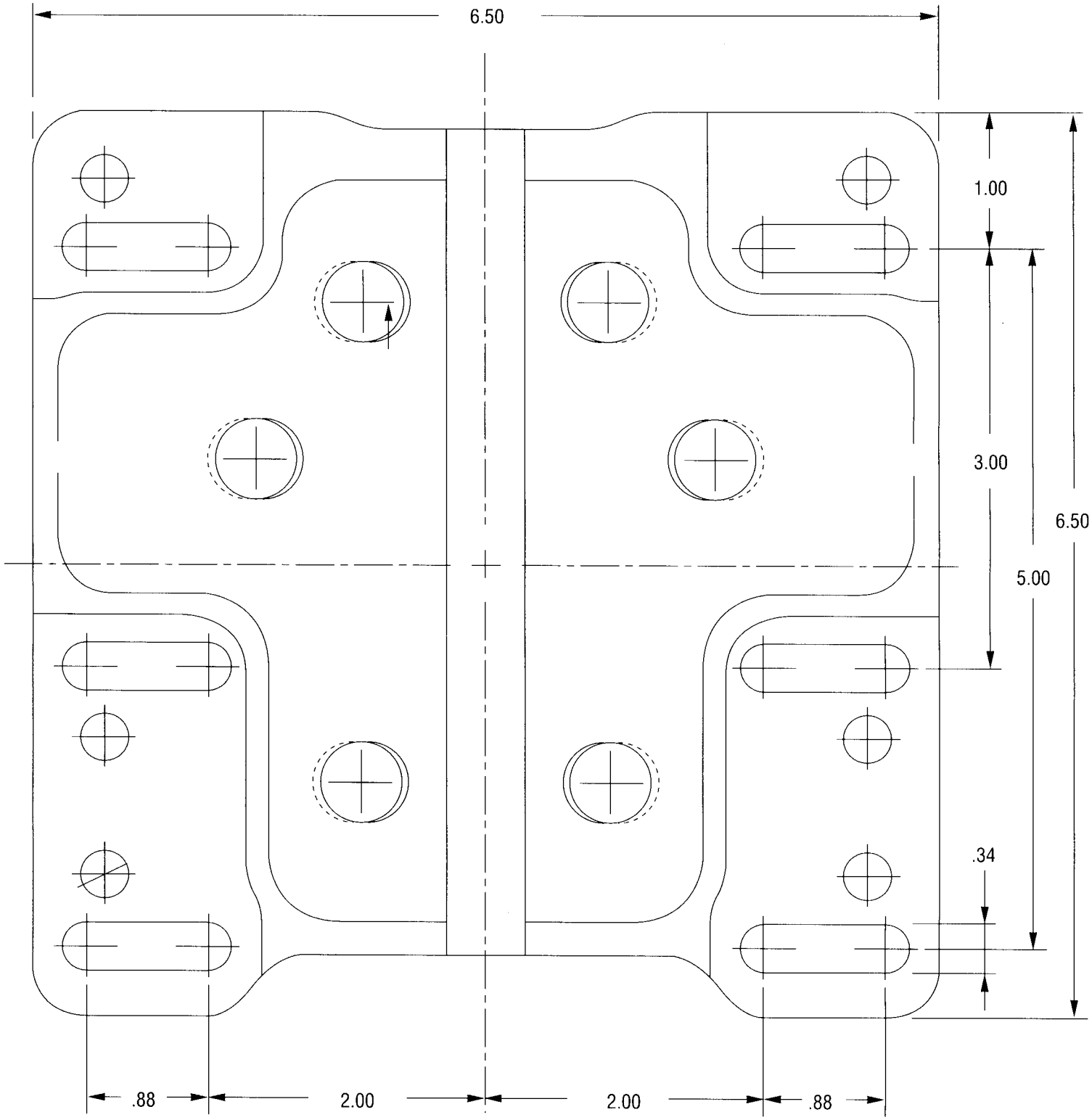


Figure 5-1. Mounting Template for Small Frame Generators



All measurements in inches.

Figure 5-2. Mounting Template for Large Frame Generators

Installation Checkout

After installation is complete, perform the following checkout to see that the REDI-LINE generator has been properly installed. Where remedial action is indicated, respond as directed. If specific checkout results are not obtained, refer to the field troubleshooting procedure in Section 7 to determine the cause of the problem.

1. Check the REDI-LINE generator to see that it is securely mounted. If it is not, tighten the bolts and nuts securing it to its mounted position.
2. Check the batteries to see that they are securely mounted as directed by the manufacturer. If they are not, complete their installation according to the manufacturer's directions.
3. Visually inspect the system interconnection to see that it conforms to the interconnection scheme as shown by the appropriate interconnection drawing (Figures 4-1 through 4-12). Visually check to see that cable routing does not expose the cables to areas where they could be damaged or cut by sharp edges. If any problems are discovered, correct by reconnecting to conform to the interconnection drawing, or rerouting to avoid problem areas.
4. Check all connection points to see that they are properly and securely made. Correct any poorly or improperly made connections.
5. Check to see that the REDI-LINE generator is grounded directly to the battery and not to the vehicle ground. Reconnect if necessary.
6. Apply a load equivalent to a 100-Watt light bulb to the generator. The generator should start. If it does not, see that there is no intervening open switch between the generator and the load. If there is, close the switch. The generator should start. If it does not, refer to the field troubleshooting procedure in Section 7.
7. Observe operation of the generator. The generator should run smoothly. If it does not, or cycles on and off, add more load to the generator. If this does not correct the problem, refer to the field troubleshooting procedure in Section 7.
8. Remove the load. The generator should stop within 10 seconds. If it does not, refer to the field troubleshooting procedure in Section 7.
9. Apply the maximum load expected to the generator. The generator should start. If it does not, refer to the field troubleshooting procedure in Section 7
10. Observe operation of the generator. The generator should run smoothly, and at a constant speed. If it does not, refer to the field troubleshooting procedure in Section 7.
11. Remove the load. The generator should stop within 10 seconds. If it does not, refer to the field troubleshooting procedure in Section 7.

6. MAINTENANCE

Because the REDI-LINE generator contains long life bearings and brushes, it is virtually maintenance free. We recommend that the few maintenance procedures given below be performed on a periodic basis. Because generator environment and usage varies with each application, we suggest that initial cleaning and inspection be performed once a month at first. This period can be extended as experience with the unit increases.

Cleaning

Wipe down the unit with a shop rag or similar cloth. Be sure that ventilation holes are not plugged. Clean any electrical connections that have become corroded.

Mounting and Electrical Connections

Inspect mounting hardware for tightness and tighten as necessary. Inspect cable and battery connections for tightness, and tighten as necessary. Inspect electrical cables for damage, and replace any that show signs of wear.

Brushes

Inspect brushes periodically to insure uninterrupted service. Brush life expectations vary based upon the type of tools or appliances you use with the generator. To avoid damage to the generator, a preventive maintenance inspection interval should be determined for your application. We recommend initially that you inspect the brushes after 500 hours of use. Brush length after 500 hours of use will help you establish an appropriate maintenance schedule. Always clean out brush dust when inspecting or changing brushes.

Damage to the commutators may occur if the brushes are allowed to wear down below 0.56-inch minimum length. This minimum length applies to both AC and DC brushes.

Commutators

When inspecting brushes, check the commutators for wear. If the commutators are worn or pitted, turning and undercutting is recommended. Return your unit to the distributor or factory for service. . Usually three sets of brushes can be worn out before it is necessary to turn the commutators.

7. FIELD TROUBLESHOOTING

Field Service

Pacific Scientific recommends that field troubleshooting be performed whenever a problem is encountered with the REDI-LINE generator, to correct or eliminate problems caused by faulty installation or load changes, and thereby avoid unnecessary returns.

The following pages contain troubleshooting procedures that should be followed if there is a problem in the field. The procedures are oriented toward the installation itself, and are intended to assist in correcting any problems that are a result of an installation problem. If the problem cannot be resolved using these procedures, the Redi-Line generator should be returned to the distributor for additional testing and possible repair.

Most field problems can be traced to installation problems; following these procedures closely can eliminate unnecessary returns and keep the Redi-Line generator in service.

For your convenience we have included a Field Troubleshooting Checklist Form which you should copy and fill out as you perform field troubleshooting. If you should find it necessary to return the unit for repair, include the form with the generator. This will reduce the bench time required by your dealer to diagnose a problem, and thereby reduce your repair costs.

Use of Flow Charts

Locate your specific symptom or symptoms in the troubleshooting flow chart in Figure 7-1. Each symptom will advise you to return the unit for repair, or refer you to an additional flow chart, which will provide a series of inspections, checks, or actions which will either enable you to return the unit to service, or advise you to return the unit for repair.

Field inspection and checkout often consists of a review of installation procedures, materials, and techniques. The areas to be reviewed are specifically identified by the flow chart. Specific checkout procedures not associated with installation are found in the subsection titled “Troubleshooting Checkout Procedures” following the troubleshooting flow charts

Conditional Branches

Where there are conditional branches (diamonds labeled either “Okay” or “Or”), follow the most appropriate path. The conditions for the “Okay” diamonds, shown adjacent to the arrows leaving the diamond, refer to the inspection procedure immediately preceding the diamond, that is, if the arrow is labeled “yes”, the condition inspected was found to be satisfactory.

Additional Troubleshooting and Repair

Section 8, Bench Troubleshooting, provides bench troubleshooting procedures, for use by repair personnel at the distributor’s facility or at the factory. If you have the

appropriate equipment and skills, some of the tests and repairs suggested can be performed in the field. However, before repairs are attempted, you should check with your distributor to make sure that such repairs will not void your warranty.

Should You Need to Return the Unit

Before returning any products for repair, authorization must first be received from your dealer. Dealer requirements may vary, so contact your dealer for instructions before returning a unit to him.

Field Troubleshooting Checklist Form

We have performed the following troubleshooting checks:	And the results were:
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	

Customer Name:_____

Street Address:_____

City:_____State:_____Zip:_____

By:_____

Position:_____

Phone:_____

Fax:_____

e-mail:_____

Troubleshooting Flow Charts

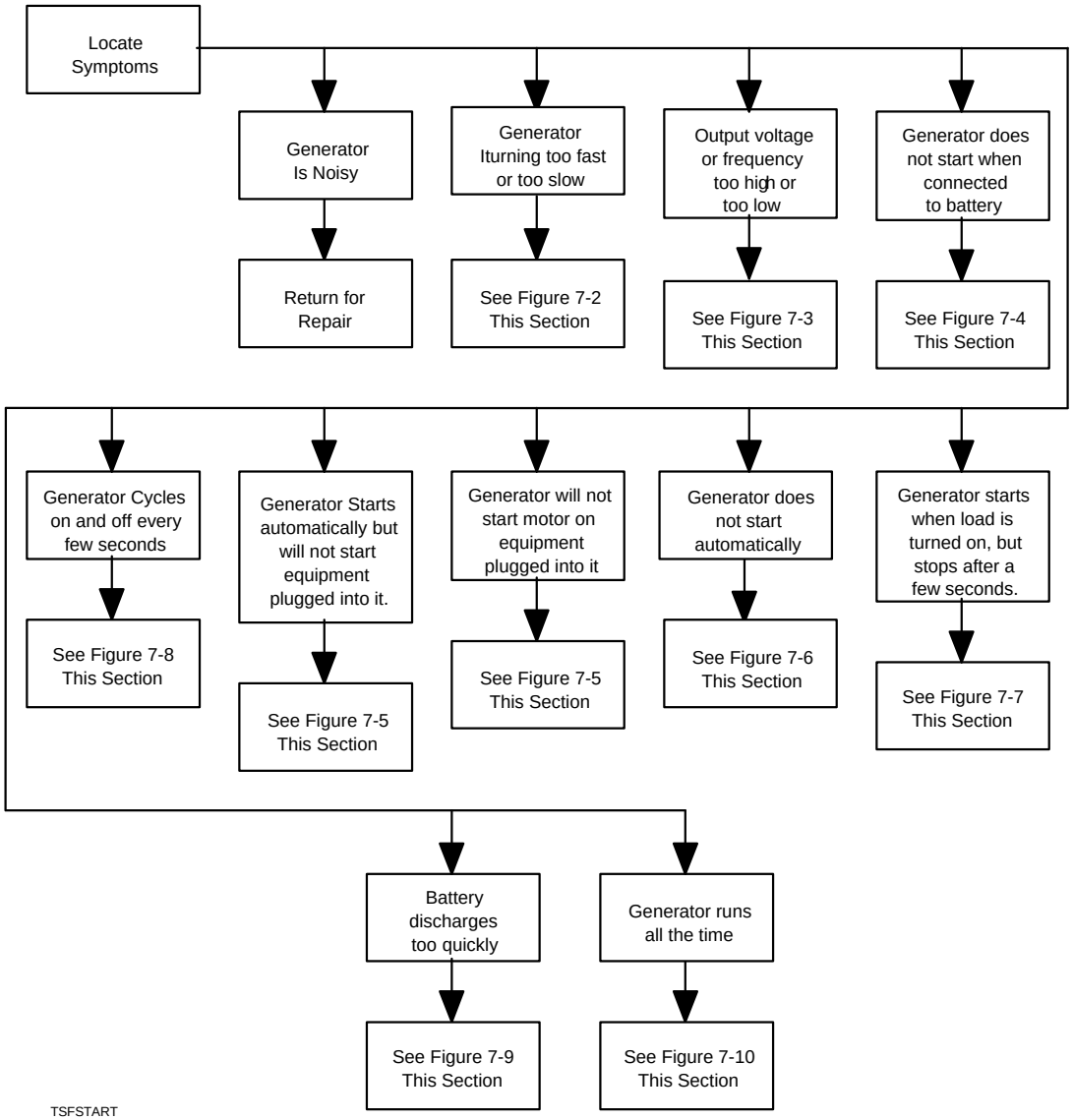


Figure 7-1. Identifying Symptoms

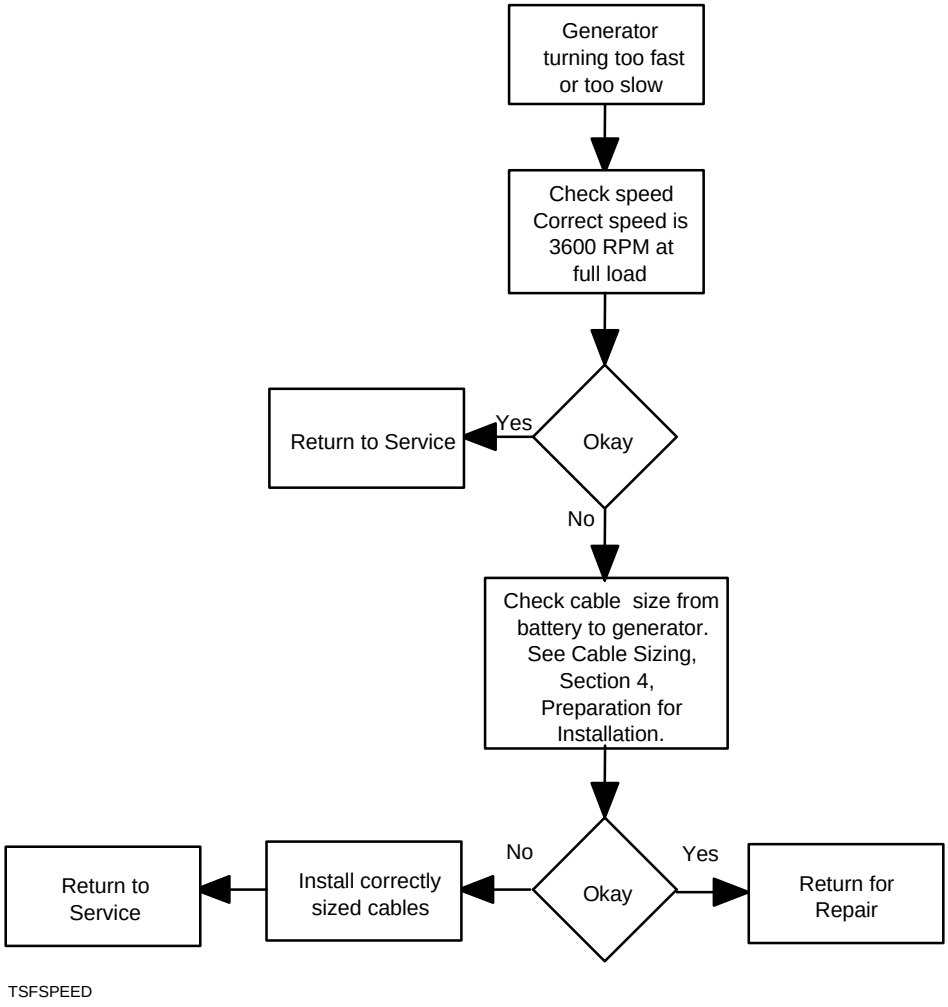


Figure 7-2: Generator Running at an Incorrect Speed

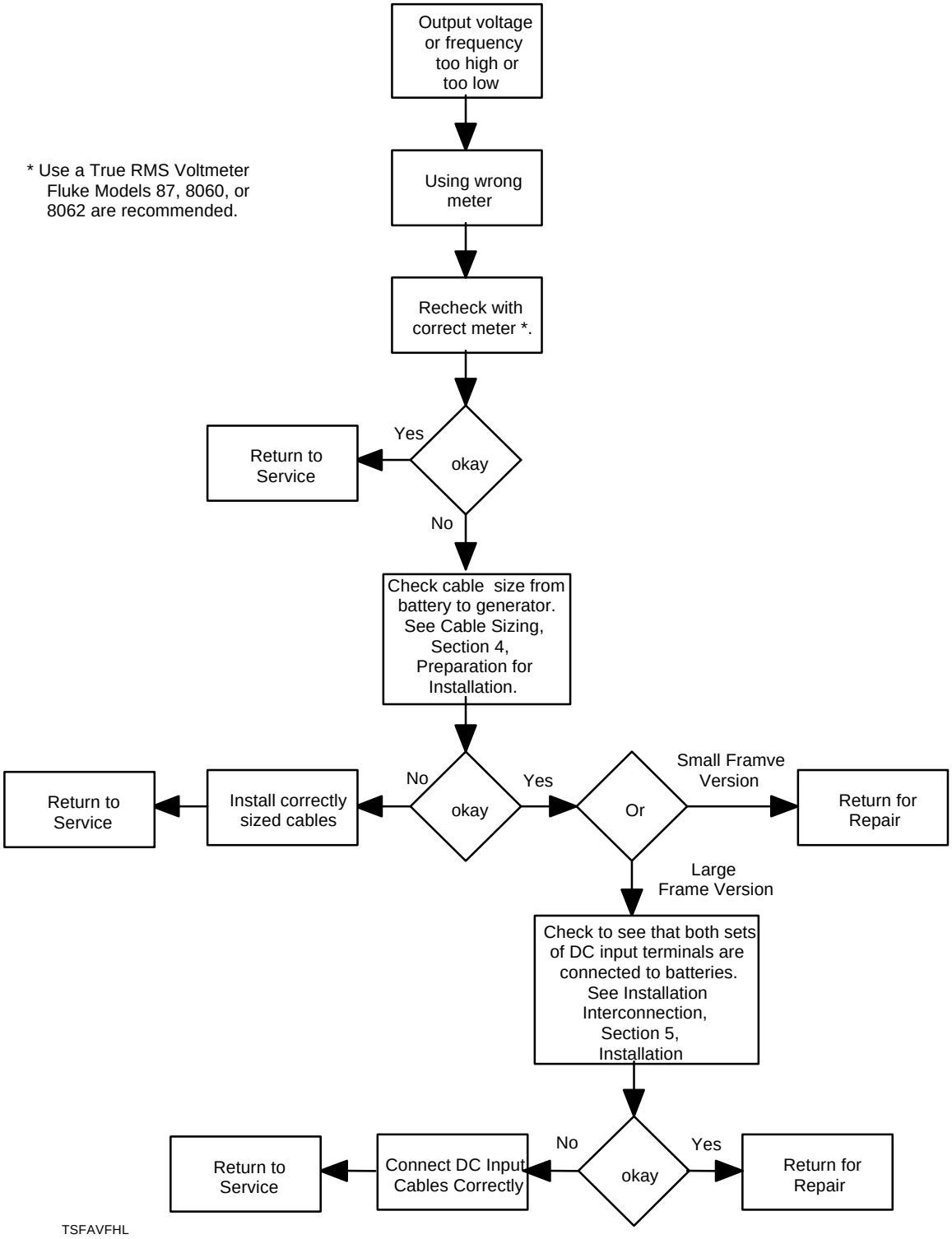


Figure 7-3: Generator Output Voltage or Frequency Incorrect

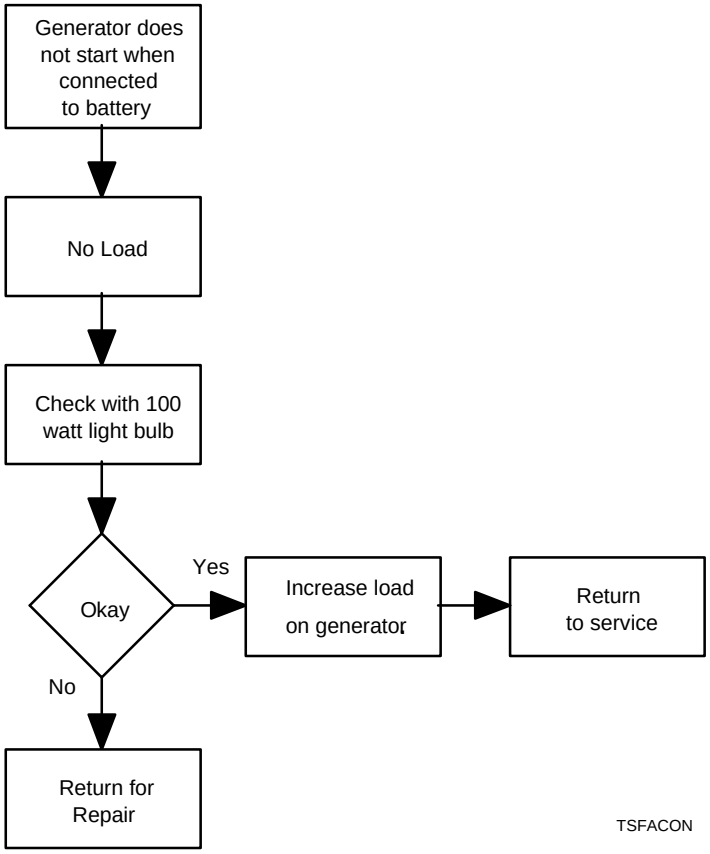
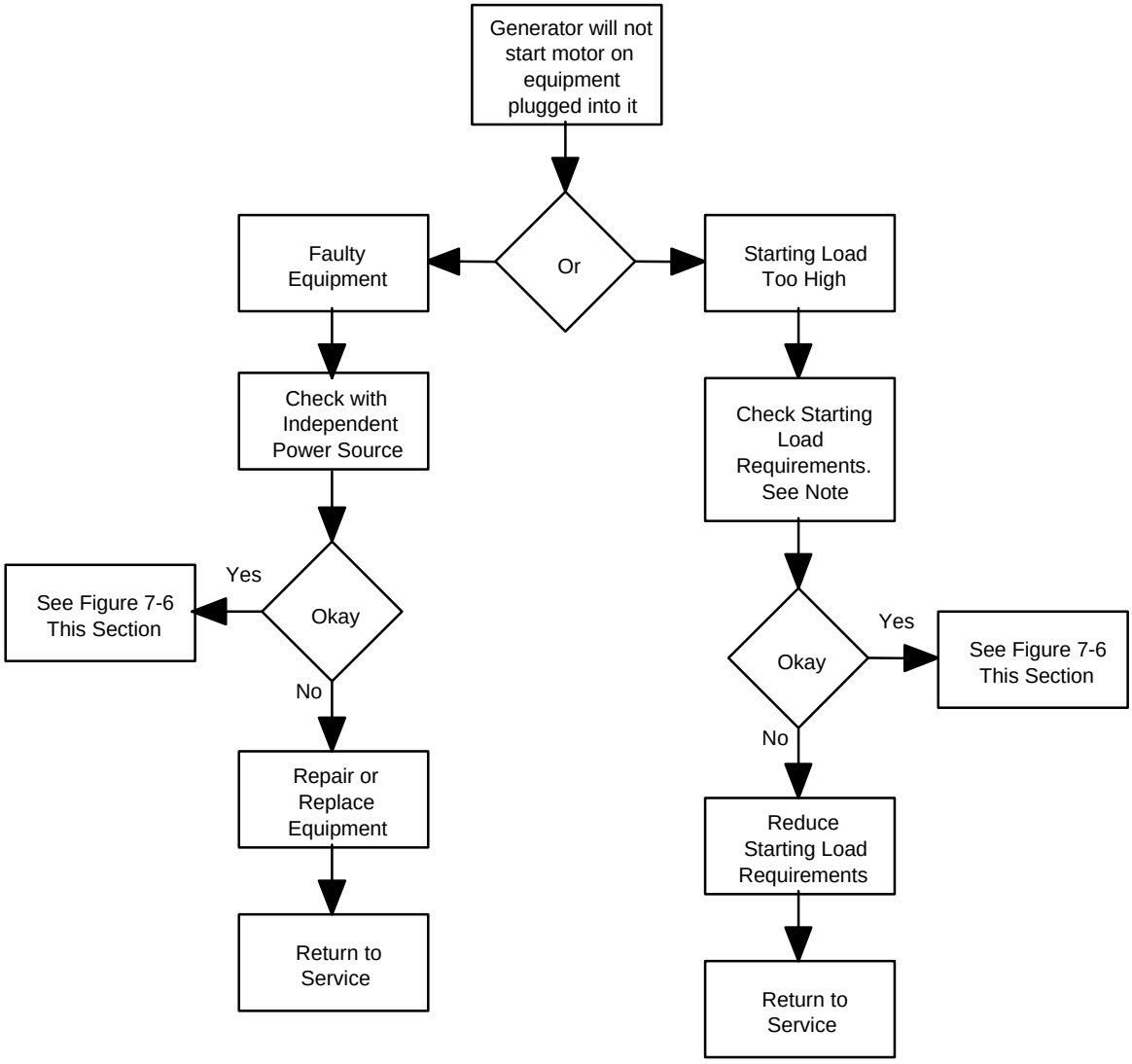


Figure 7-4. Generator Does not Start When Connected to Battery



TSFALOAD

NOTE:
The Redi-Line Generator can provide 1.5 its rated capacity for starting motors and loads.

Figure 7-5: Generator Runs but does not Start Equipment

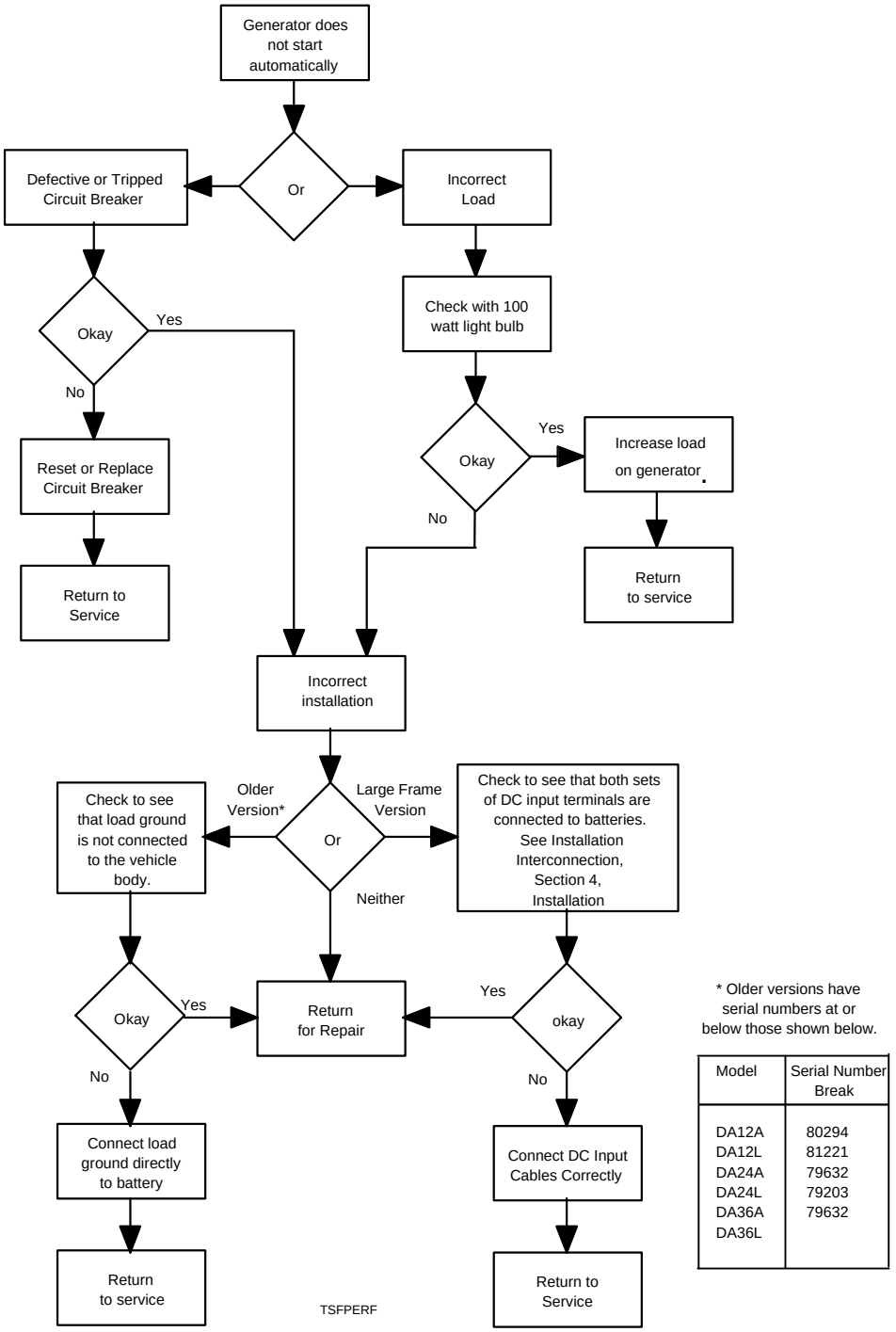


Figure 7-6. Generator Does Not Start Automatically

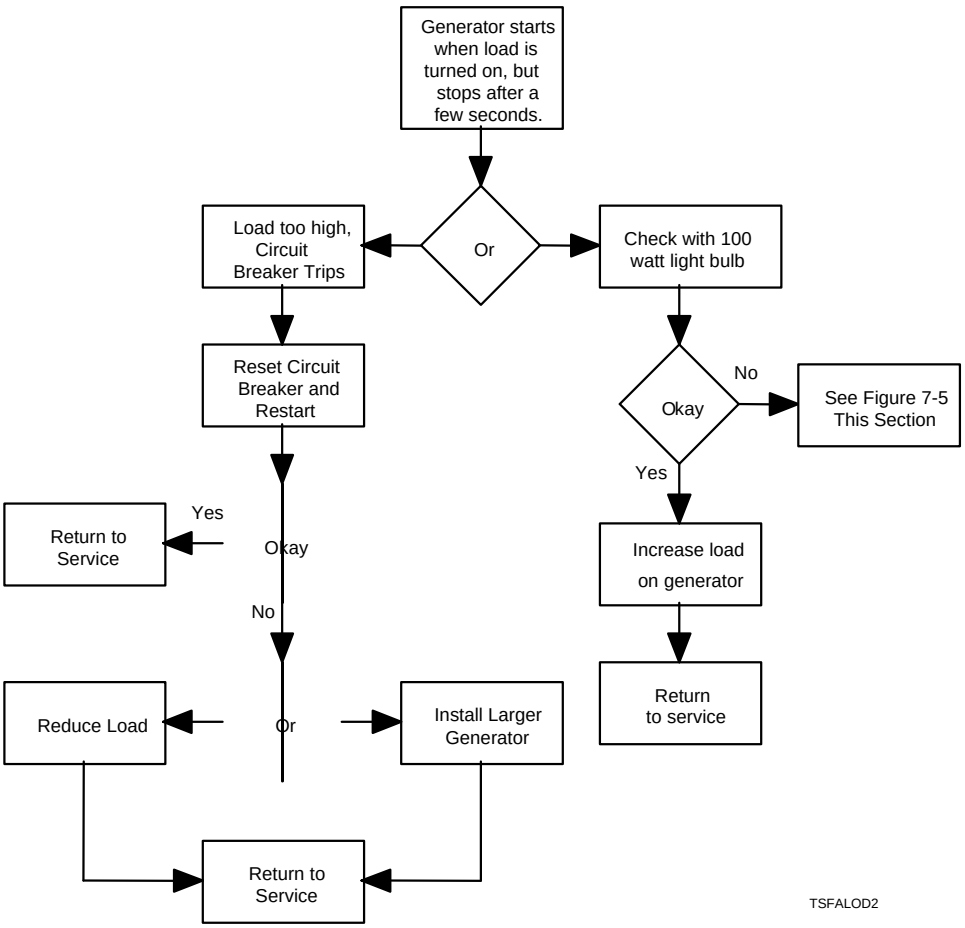


Figure 7-7. Generator Starts With Load, But Stops After A Few Seconds

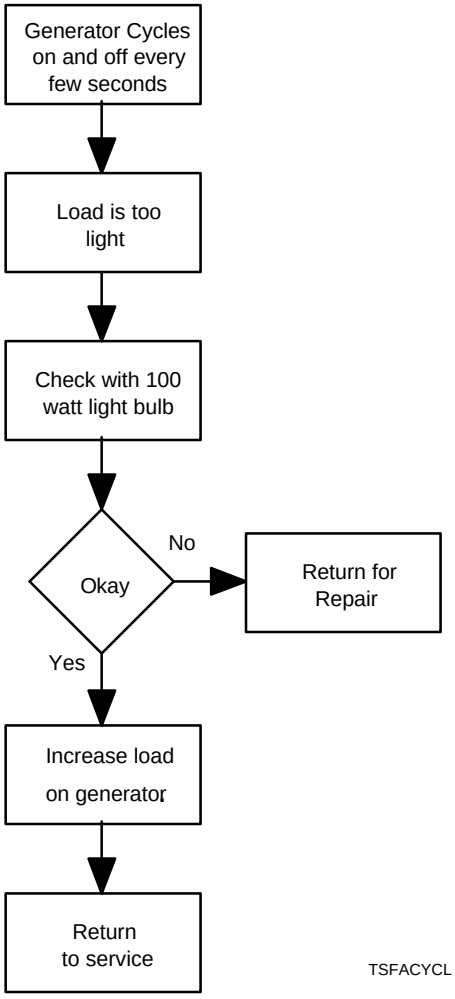


Figure 7-8. Generator Cycles On And Off Every Few Seconds

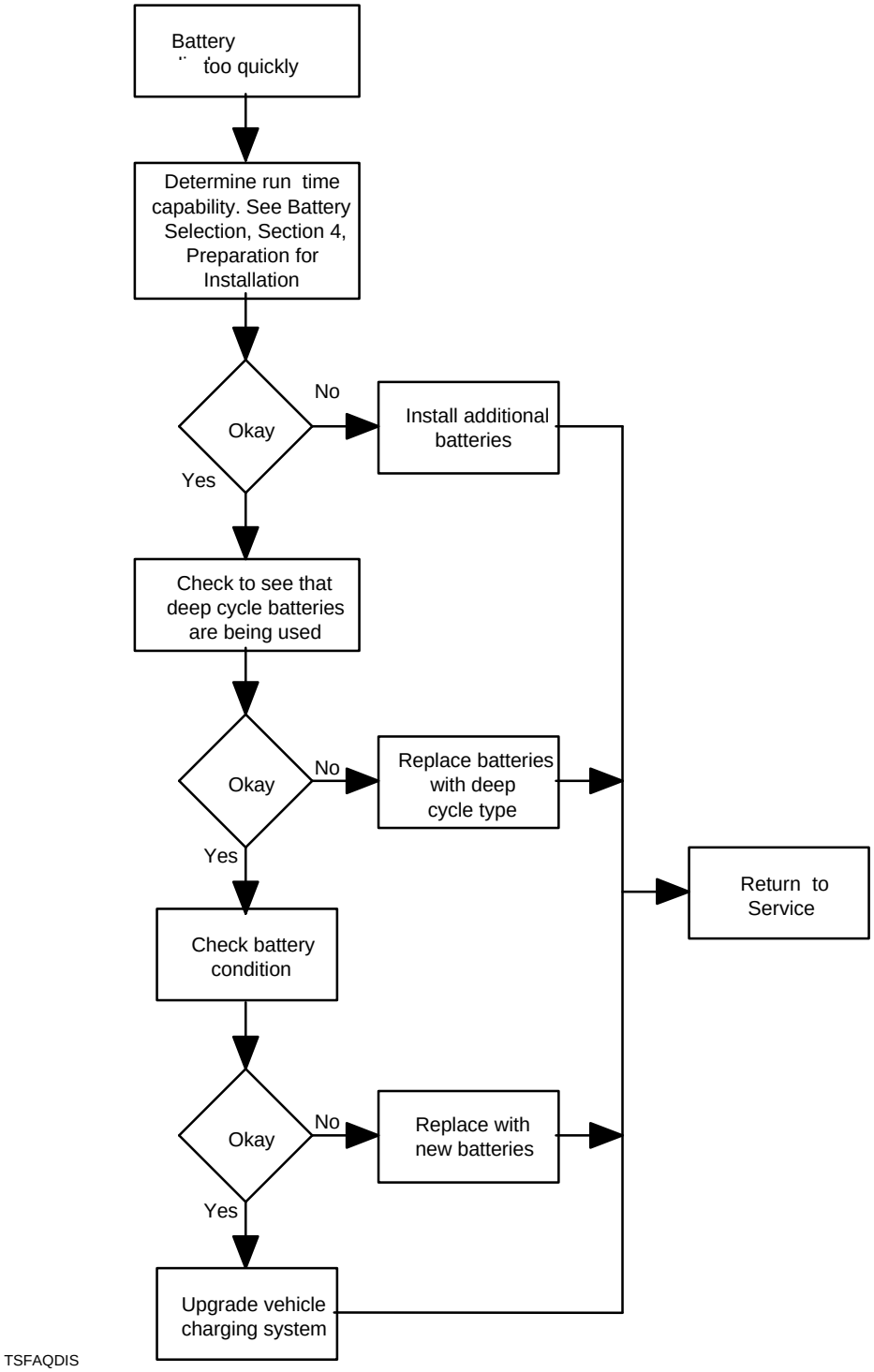
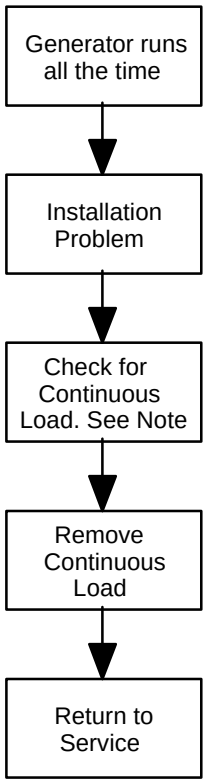


Figure 7-9. Battery Discharges Too Quickly



TSFARUNS

Note: Power strips with ON indicator lamps, equipment with POWER CONNECTED indicator lamps, or similar devices can place enough load on the generator to cause it to run, even though the intended load has been removed.

Figure 7-10. Generator Runs All The Time

Other Troubleshooting Checks

Checking Generator Speed

Users familiar with Redi-Line operation may detect a change in sound if the generator is running off-speed. Such an occurrence is generally the result of a bad or seized bearing and will be accompanied by unusual noise.

Because the rotating components of the Redi-Line generator are totally enclosed, it is difficult to check speed, although it may be done if a suitable strobe unit is available. Instead, we suggest you check frequency, which is an indirect, but closely related, indicator of generator speed. If the frequency is within the proper range, it can be assumed that the generator is functioning properly.

If the generator is producing an unusual noise, but the frequency is within the proper range, monitor the unit closely, and check frequency frequently. If the frequency degrades, return the unit for service.

Checking Voltage or Frequency

Use a true RMS voltmeter to check voltage or frequency. Many voltmeters will not give accurate readings, and Pacific Scientific recommends using a Fluke Model, 87, Model 8060, Model 8062, or equivalent.

Connect the voltmeter leads to the power output points on the generator to take a reading.

Checking Load

Generator load can be checked using a simple 100-watt light bulb in a keyless fixture mounted on a utility box. Equip the utility box with a short power cord and plug. Follow good electrical practices when constructing the device.

CAUTION: The REDI-LINE generator produces enough current to injure or kill a human. Use extreme care when checking the load carrying capabilities of the generator.

To check load, simply plug the device into the power receptacle in the generator. The 100-watt light bulb will apply enough load to the unit to function properly.

8. BENCH TROUBLESHOOTING

Units that have been returned for repair are usually accompanied by information identifying the problems encountered with the equipment. The troubleshooting flow charts contained in this section are continuations of the field troubleshooting flow charts provided in Section 7, Field Troubleshooting, and they therefore reflect the field complaint initiating the return for repair. These flow charts detail an orderly procedure for checking out a faulty unit and isolating the specific problems involved.

Use of Flow Charts

Using the specific field complaints to locate the appropriate troubleshooting flow chart from Figures 8-1 through 8-5. The selected flow chart will provide a series of inspections, checks, or actions that will enable you to isolate the problem and repair it so the unit can be returned to service.

Checkout procedures are found in the subsection titled “Troubleshooting Checkout Procedures” following the troubleshooting flow charts. Repair procedures are found in Section 9, Repair Procedures.

Conditional Branches

Where there are conditional branches (diamonds labeled either “Okay” or “Or”), follow the most appropriate path. The conditions for the “Okay” diamonds, shown adjacent to the arrows leaving the diamond, refer to the inspection procedure immediately preceding the diamond, that is, if the arrow is labeled “yes”, the condition inspected was found to be satisfactory.

Assembly and Disassembly

The procedures given in this section pertain to troubleshooting. Individual steps may direct you to disassemble and assemble a portion of the unit but they will give no details. Be sure to follow individual disassembly and assembly procedures given in Section 9, Repair Procedures, when performing these steps.

Troubleshooting Flowcharts

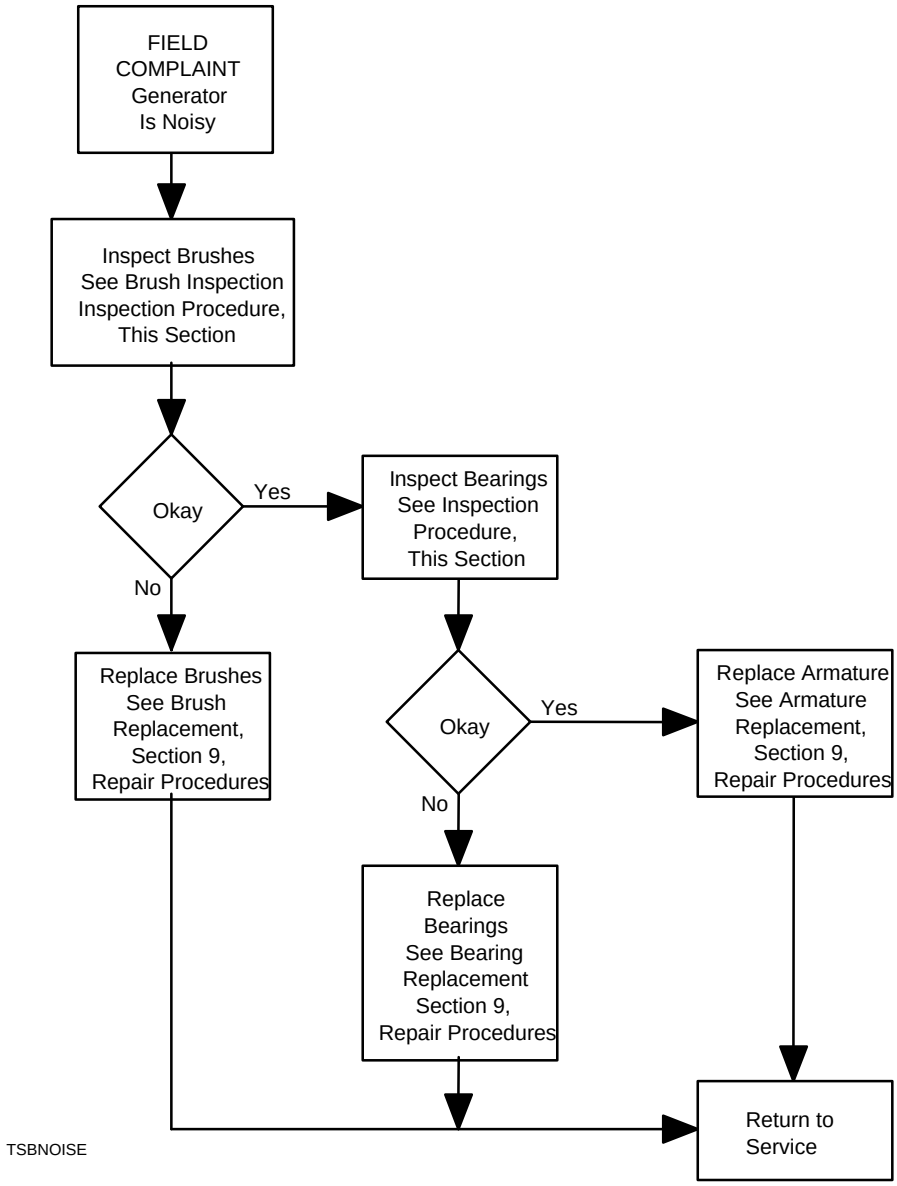


Figure 8-1. Generator Is Noisy

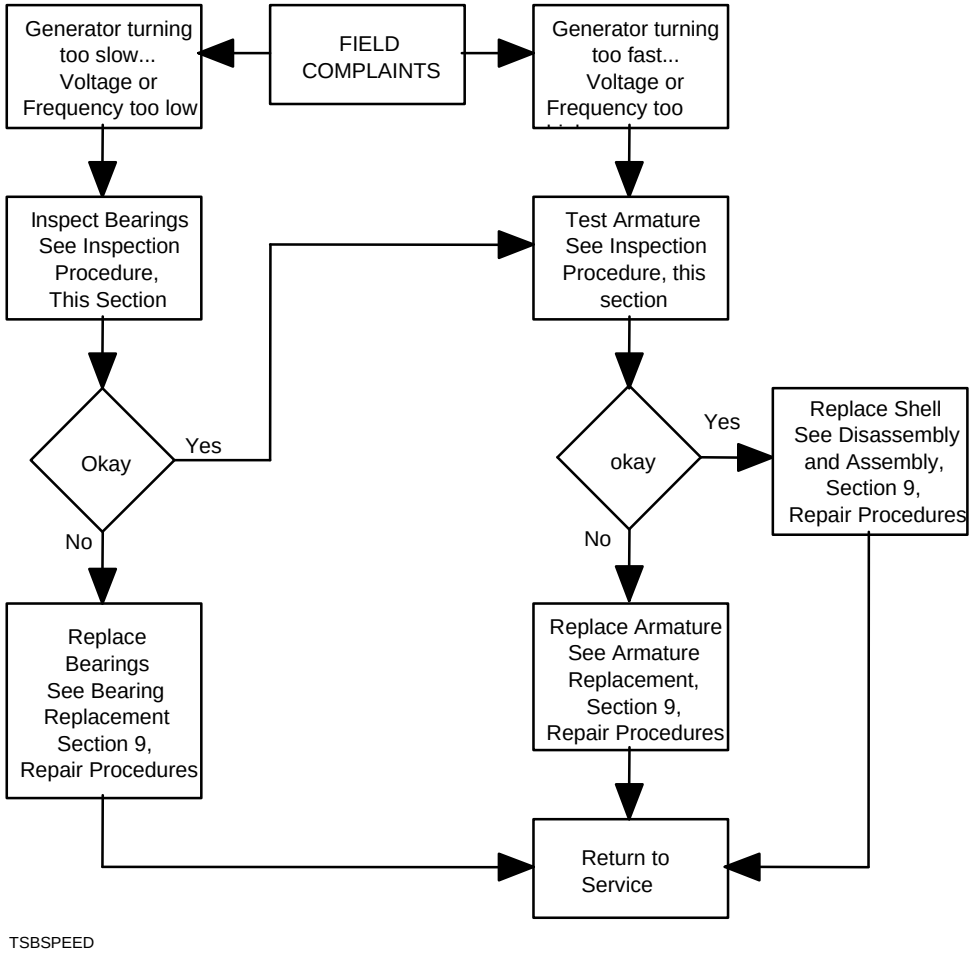


Figure 8-2. Generator Speed, Voltage, or Frequency Too High or Too Low

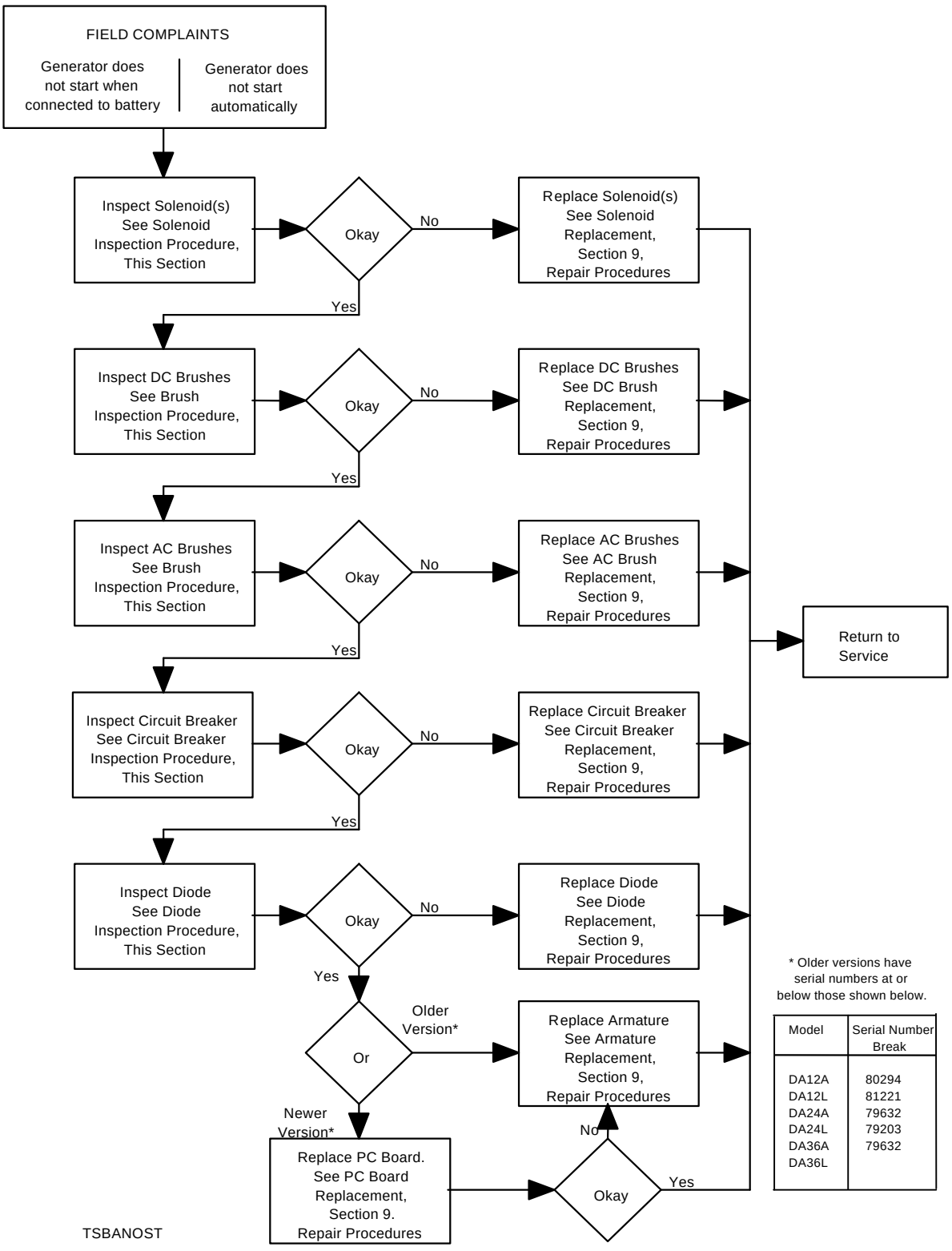
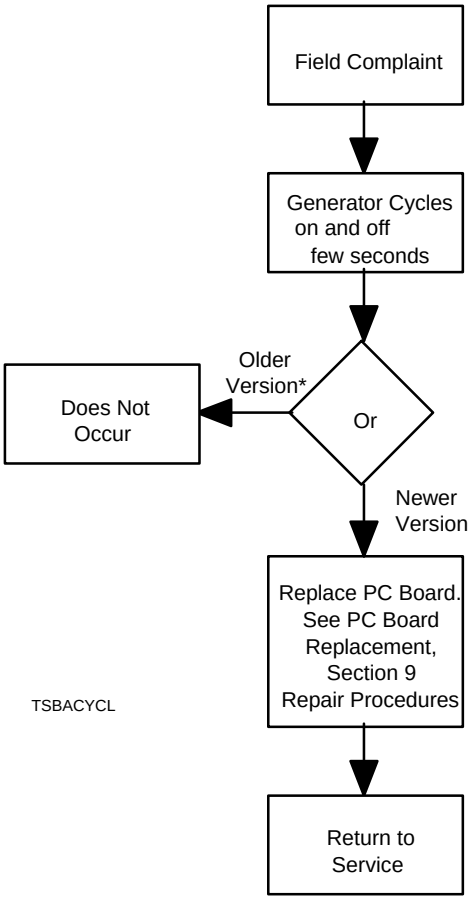


Figure 8-3. Generator Does Not Start When Connected to the Battery or Does Not Start Automatically



* Older versions have serial numbers at or below those shown below.

Model	Serial Number Break
DA12A	80294
DA12L	81221
DA24A	79632
DA24L	79203
DA36A	79632
DA36L	

Figure 8-4. Generator Cycles On and Off Every Few Seconds

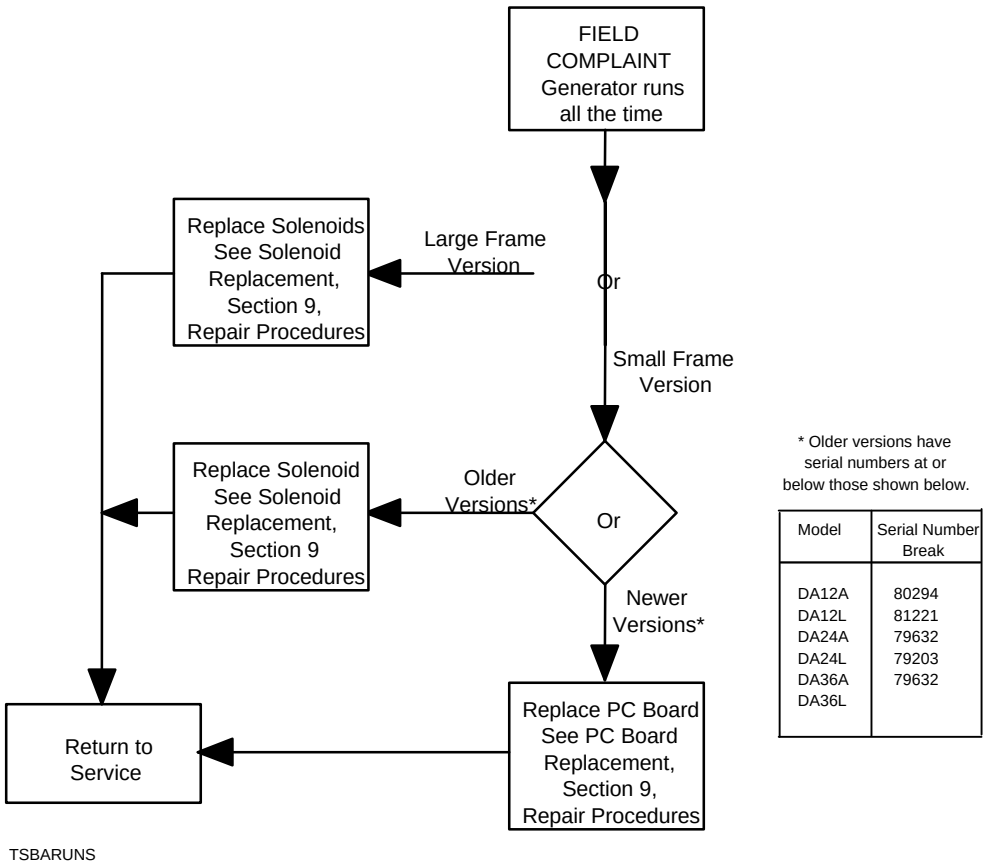


Figure 8-5. Generator Runs all the Time

Troubleshooting Checkout Procedures

The following checkout procedures provide step-by-step procedures for performing the checkout of various components and subassemblies. These procedures often involve some disassembly and re-assembly of the unit. To avoid repetition of detailed information, disassembly and assembly details are not included.

When removing or assembling components and subassemblies to perform checkout procedures, refer to the detailed disassembly and assembly instructions contained in Section 9, Repair Procedures. Failure to do so may result in improper disassembly or assembly.

Procedure No. 1: DC Brush Inspection

Procedure:

1. Remove any electrical connections to the generator.
2. Remove the electrical assembly cover.
3. Disconnect the lead wires to the components inside the cover.
4. If servicing a small frame unit, remove the rear end bell from the housing,

   OR…..

   If servicing a large frame unit, remove the DC brush covers.
5. Check the brushes for free travel within their holders.
6. Remove the brushes and springs. Make note of the position and orientation of each brush removed; if reused, individual brushes must be returned to the same holders, in the same orientation as removed.
7. Visually inspect the springs for distortion.
8. Visually inspect the brushes for damage.
9. Inspect the overall length of the brushes.
10. Reassemble the entire unit.
11. Reconnect the battery and test the unit with a load (100-watt light bulb).

Desired Results:

1. The brushes should move freely within their holders with no binding when they are depressed, and return to their original positions when released.
2. A small amount of spring distortion is acceptable.
3. Brush faces should be smooth, and the entire brush should be free from defects.
4. Brushes should not be shorter than 0.56 inches.
5. Generator should start and run steadily.

Disposition:

1. If any brush binding is found, remove the brushes and clean them and their holders.
2. In small frame units, If major distortion of the spring is discovered, replace the entire rear end bell,

   OR…..

   In large frame units, replace the spring.
3. Burnishing of the brush faces is acceptable, but if pitting or damage is discovered, replace both brushes in the pair. Inspect the armature commutator for damage.
4. If either brush is too short, replace both brushes in the pair.

Procedure No. 2: AC Brush Inspection

Procedure:

1. Remove any electrical connections to the generator.
2. Remove the electrical assembly cover.
3. Disconnect the lead wires to the components inside the cover.
4. Carefully remove the brush holder assemblies.
5. Check the brushes for free travel within their holders.
6. Remove the brushes and springs. Make note of the position and orientation of each brush removed; if reused, individual brushes must be returned to the same holders, in the same orientation as removed.
7. Visually inspect the springs for distortion.
8. Visually inspect the brushes for damage.
9. Inspect the overall length of the brushes.
10. Reassemble the entire unit.

Desired Results:

1. The brushes should move freely within their holders with no binding when they are depressed, and return to their original positions when released.
2. A small amount of spring distortion is acceptable.
3. Brush faces should be smooth, and the entire brush should be free from defects.
4. Brushes should not be shorter than .056 inches.
5. Generator should start and run steadily.

Disposition:

1. If any brush binding is found, remove the brushes and clean them and their holders.
2. If major distortion of the spring is discovered, replace the spring.
3. Burnishing of the brush faces is acceptable, but if pitting or damage is discovered, replace both brushes in the pair. Inspect the armature commutator for damage.
4. If either brush is too short, replace both brushes in the pair.

Procedure No. 3: Bearing Inspection

Procedure:

1. Remove any electrical connections to the generator.
2. Remove the end cap covering the cooling fan.
3. Manually spin the armature by turning the fan in both directions.

Desired Results:

The armature should turn freely in both directions. Do not mistake magnetic resistance for bearing binding.

Disposition:

If any roughness or binding is found, replace the bearings.

Procedure No. 4: Commutator Inspection

Procedure:

1. Remove any electrical connections to the generator.
2. Remove one AC brush assembly from each commutator.
3. Remove one brush access cover from each DC commutator.
4. Visually inspect each commutator for scoring, pitting, or other signs of damage.

Desired Results:

There should be no evidence of damage. Burnishing of the commutator is acceptable.

Disposition:

If any damage is found, replace the armature.

NOTE: A damaged commutator may be resurfaced and undercut if facilities and skills are available to do so. However, it is recommended that any armature with commutator damage be replaced.

Procedure No. 5: Armature Test

Procedure:

1. Disassemble the generator.
2. Measure the resistance between adjacent AC slip rings.
3. Measure the resistance of the DC windings by testing adjacent bars all the way around the commutator.

Desired Results:

1. Resistance between adjacent AC slip rings should fall between 0.5 and 1.5 ohms.
2. Resistance between adjacent bars of the DC windings should be consistently similar.

Disposition:

1. If there is no resistance or excessive (infinite) resistance between adjacent slip rings, replace the armature.
2. If there is no resistance or excessive (infinite) resistance between adjacent bars of the DC windings, replace the armature.
3. If there is measurable but inconsistent resistance between adjacent bars of the DC windings, remove any dirt or foreign metal pieces which may have created a bridge between the bars. Recheck the resistance. If it is still inconsistent, replace the armature.

Procedure No. 6: Solenoid Test

NOTE: This test does to apply to a DA12A-500A. This generator does not have a solenoid.

Procedure:

1. Disconnect the battery from the generator.
2. Remove the electrical assembly cover from the generator but do not disconnect any electrical wires.
3. Remove the PC board from the starting circuit by bypassing it with a jumper as shown in Figure 8-6 or 8-7.
4. Reconnect the battery to the generator and apply a load (100-watt light bulb).

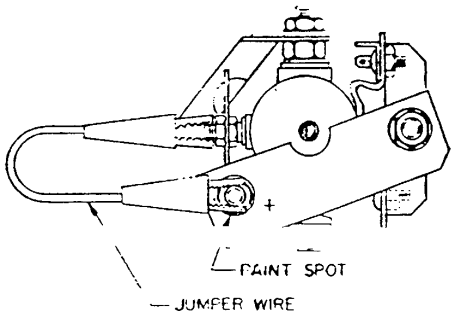


Figure 8-6. Jumper Connection - Small Frame Unit

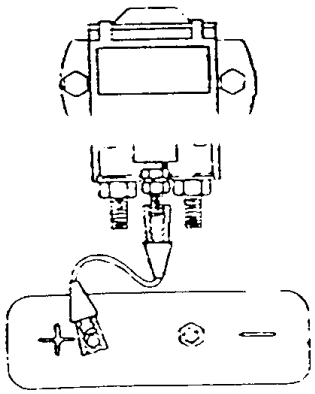


Figure 8-7. Jumper Connection - Large Frame Unit

Desired Results:

There should be an audible click from the solenoid.

Disposition:

1. If there is no click, replace the solenoid.
2. If there is a click, the solenoid is functioning, but DC power is not being applied to the armature.

Procedure No. 7: Circuit Breaker Test

Procedure:

1. Remove any electrical connections to the generator.
2. Remove the electrical assembly cover from the generator but do not disconnect any electrical wires.
3. Disconnect the black wires from the circuit breaker inside the electrical assembly cover. Make note of the connection locations so re-assembly can be performed correctly.
4. Measure the resistance between the circuit breaker terminals.

Desired Results:

Resistance between the circuit breaker terminals should be less than 1 ohm.

Disposition:

1. If resistance is greater than 1 ohm, replace the circuit breaker.
2. If resistance is less than 1 ohm, the circuit breaker is good.

Procedure No. 8: Diode Test

NOTE: This test does not apply to Redi-Line Generator models DA12L-1600A and DA12A-500A.

Procedure:

1. Remove any electrical connections to the generator.
2. If checking a small frame generator, separate but do not disconnect the electrical assembly cover from the generator…

   OR…..

   If servicing a large frame unit, remove the cover over the electrical assembly. Do not disconnect any internal lead wires.

3. Disconnect the orange and white lead wires from the PC board. Note the wiring placement so the lead wires can be reconnected properly to the terminals during re-assembly.
4. Set the ohmmeter to either the R X 1 or the R X 10 resistance range.
5. Measure resistance between the orange lead and ground, and between the white lead and ground, as follows:

   A. Red probe to ground; black probe to orange lead.

   B. Black probe to ground; red probe to orange lead.

   C. Red probe to ground; black probe to white lead.

   D. Black probe to ground; red probe to white lead.

Desired Results:

For each of the resistance readings, the value should fall between zero and infinity, but not at zero or infinity.

Disposition:

If either the A or B reading is zero (a shorted diode) or infinity (an open diode) replace the diode assembly connected to the orange lead.

If either the C or D reading is zero (a shorted diode) or infinity (an open diode) replace the diode assembly connected to the white lead.

9. REPAIR PROCEDURES

General

Repair of Redi-Line generators is confined to replacement of defective parts. The following procedures, therefore, consist of disassembly and assembly procedures only. Many of the components are located on or accessible from the exterior of the unit, and can be removed independently of one another, in any order preferred. Thus, many components can be serviced without disturbing other components. Overall, the order presented is the best when disassembling the unit completely.

When disconnecting and removing electrical components, note the connection points, sequence of parts on studs, and wire routing carefully. Misconnection of electrical components can result in damage to the unit after assembly. Because there is scant room for wiring, the routing of wires is important. If major assembly is undertaken, or if the unit will be re-assembled later, make a sketch of connections and wire routing as the unit is disassembled.

Numbers in parentheses following component names refer to the appropriate exploded view in Section 10, Parts Lists.

Disassembly and re-assembly instructions do not include a step-by-step procedure to account for every component. Disassembly and re-assembly of many components, especially those which will seldom require replacement, is self-evident and instructions should not be necessary. Keep such components together with their attaching parts, so re-assembly after some delay will not become difficult.

Recommended Tools and Equipment

In addition to ordinary hand tools such as pliers, screwdrivers, and wrenches, the service technician will find it highly beneficial to have the following tools readily available:

1. Small jumper wires with alligator clips at each end. (For jumping solenoids.)
2. Retaining-ring pliers.
3. A True RMS Voltmeter (Fluke Models 87, 8060, or are recommended.)
4.

The service technician will find it highly beneficial to have the following equipment readily available:

1. Two 12-volt deep-cycle batteries, at least 85 amp-hr each. To protect against accidental shorts, it is recommended that a 200-amp fuse be installed as close as possible to the positive terminal of each battery.

2. Battery cable, at least #4 gauge, preferably #2 gauge. The exact length of cable needed depends upon the set-up of the test bench. Terminals used on the battery cable should be copper.

3. 100W light bulb assembly (for testing generator performance). This device consists of a 100-watt light bulb in a keyless fixture mounted on a utility box. Equip the utility box with a short power cord and plug. Follow good electrical practices when constructing the device.

Disassembly of Small Frame Units

NOTE: Steps 2, 3, and 4 can be done independently of one another.

1. Remove any electrical connections to the generator.

2. Remove DC Brush Assembly (1) from unit. Brushes are not retained in the assembly, so withdraw the assembly carefully. Note wire connections for later re-assembly.

3. Remove solenoid cover (3) by removing acorn nuts (9). Disconnect the electrical connections carefully, noting their relationships. If necessary, remove solenoid (14) or printed circuit board (24) from solenoid cover.

4. Remove fan shroud (10) by removing screws (11).If necessary remove fan impeller (12) from armature shaft by removing C ring (13)

NOTE: Steps 5 through 8 must be done in the order presented.

5. Remove nuts (37) from tie rods (36).

6. Remove rear end bell (30). See the paragraph below titled Brush Replacement for further disassembly instructions.

7. Remove front end bell (31) and armature (39) as a unit. Withdraw the components from the shell briskly to reduce the amount of magnetic attraction to the armature.

8. If armature (39) is to be replaced, separate bearing (35) from front end bell (30) end bell with a rubber hammer (the bearing is bonded to the end bell).

Re-assembly of Small Frame Units

NOTE: Steps 1 through 4 must be done in the order presented.

1. Assemble front end bell (31) and armature (39). Install bearing (35) on armature and retain with C ring (40) before joining end bell to armature.

2. Insert tie rods (36) through end bell (31). Route the white lead wire over the upper tie rod after it is inserted through the end bell.

3. Carefully Install armature (39) and end bell (31) assembly into shell assembly (43).

CAUTION: The magnets will attract the armature as it is inserted. Do not let the armature commutator or bearing to strike a magnet.

4. Install rear end bell (30). Retain with nuts (37). See the paragraph below titled Brush Replacement for end bell assembly instructions.

NOTE: Steps 5 through 8 can be done independently of one another. Steps 1 through 4 must be complete beforehand.

5. Install the electrical components inside solenoid cover (3). Make sure wire routing and electrical connections are properly made.

6. Install solenoid cover (3) on shell assembly (43) and secure with nuts (29).

7. Install fan (12), if necessary and fan cover (10).

8. Install AC brush assembly (1). Prepare the brush assembly for installation by feeding a small solid copper over the face of the brush and out the small hole in assembly cover. This retains the brush in the holder during installation. Remove the retaining wire after the assembly is secured.

Disassembly of Large Frame Units

NOTE: Steps 2, through 6 can be done independently of one another.

1. Remove any electrical connections to the generator.

2. Remove solenoid cover (1). Disconnect the electrical connections carefully, noting their relationships. If necessary, remove printed circuit board (7) from solenoid cover. Note wire routing and connections for later re-assembly.

3. If necessary, remove solenoid(s) (9 or 15) from top of housing. Note wire connections for later re-assembly. (Step 2 must be completed first.)

4. Remove AC brush assemblies (12 or 16) from unit. Brushes are not retained in the assembly, so withdraw the assemblies carefully. Note wire connections for later re-assembly.

5. Remove DC brush access covers (14 or 18). Remove DC brush springs and brushes. See the paragraph below titled Brush Replacement for removal instructions.

6. Remove fan shroud (21 or 25) by removing screws (22 or 26). If necessary remove fan impeller (23 or 27) from armature shaft by removing C ring (24 or 28).

NOTE: Steps 7 through 13 must be done in the order presented.

7. Disconnect terminals protruding through terminal insulator(s) (16 or 20). Note wire connections for later re-assembly.

8. If necessary, remove the terminal nut (39 or 43) from the negative battery post. Note wire connections for later re-assembly.

9. Remove nuts (28 or 32) from tie rods (27 or 31)).

10. Remove rear end bell (26 or 30). The negative battery post is removed with the rear end bell. See the paragraph below titled Brush Replacement for further disassembly instructions.

11. Remove nuts (29 or 33) from tie rods (27 or 31)

12. Remove front end bell (25 or 29) and armature (39, 43, 44, or 48) as a unit. Withdraw the components from the shell briskly to reduce the amount of magnetic attraction to the armature.

13. If armature (39, 43, 44, or 48) is to be replaced, separate bearing (36, 40, 41 or 45) from front end bell (25 or 29) end bell with a rubber hammer (the bearing is bonded to the end bell).

Re-assembly of Large Frame Units

NOTE: Steps 1 through 7 must be done in the order presented.

1. Assemble front end bell (25 or 29) and armature (39, 43, 44, or 48). Install bearing (36, 40, 41, or 45)) on armature and retain with C ring before joining end bell to armature.

2. Insert tie rods (27 or 31) through end bell (25 or 29).

3. Carefully Install armature (39, 43, 44, or 48) and end bell (25 or 29) assembly into shell assembly (43).

CAUTION: The magnets will attract the armature as it is inserted. Do not let the armature commutator or bearing to strike a magnet.

4. Install nuts (29 or 33) on tie rods (27 or 31). Do not tighten.

5. Install rear end bell (26 or 30). See the paragraph below titled Brush Replacement for end bell assembly instructions.

6. If necessary, install the terminal nut (39 or 43) on the negative battery post on rear end bell (26 or 30). Be sure wire connection components are installed in the reverse order from which they were removed.

7. Re-install terminals through terminal insulator(s) (16 or 20). Be sure wire connection components are installed in the reverse order from which they were removed.

NOTE: Steps 8 through 12 can be done independently of one another. Steps 1 through 7 must be complete beforehand.

8. If necessary install fan impeller (23 or 27) on armature shaft and retain with C ring (24 or 28). Install fan shroud (21 or 25) and retain with screws (22 or 26).

9. Install DC brush springs and brushes. See the paragraph below titled Brush Replacement for installation instructions. Install DC brush access covers (14 or 18).

10. Install AC brush assembly (1). Prepare the brush assembly for installation by feeding a small solid copper over the face of the brush and out the small hole in assembly cover. This retains the brush in the holder during installation. Remove the retaining wire after the assembly is secured.

11. If necessary, install solenoid(s) (9 or 15) on top of housing. Make sure wire routing and electrical connections are properly made.

12. Install the electrical components inside solenoid cover (1). Make sure wire routing and electrical connections are properly made. Install solenoid cover on housing and secure with screws (2).

DC Brush Removal and Replacement

Refer to Figure 9-1 .

Removal

1. Move brush shunts out of the way from the spring.
2. Note the brush ramp position and spring location before removing brushes. Brushes must be installed in the same orientations.
3. Push the spring handle until it clicks. This indicates that the spring is disengaged from the brush holder.
4. Carefully remove the spring (Do not pull on the coiled spring.) Disconnect the brush shunt from the brush holder and remove brush.

Re-assembly

1. Insert the brushes in the brush holder. Position the ramp in exactly the same as it was when removed.
2. Install the spring assembly so that the bottom of the brush ramp is closest to the spring assembly.
3. Press on the spring assembly to ensure the hook on the end of the spring engages with the brush holder.
4. Connect the brush shunts.

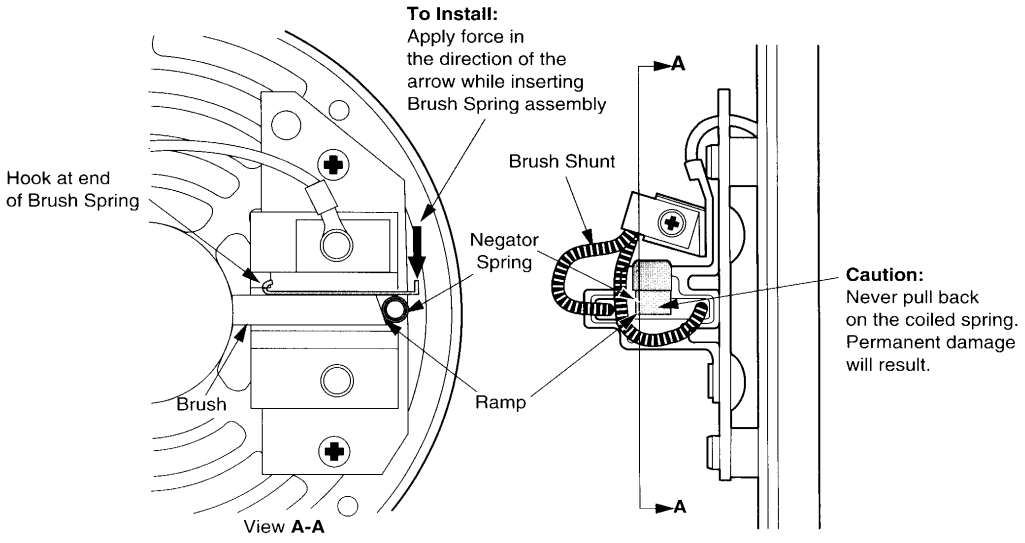


Figure 9-1. Brush Removal and Installation

Checkout after Repair

Checking Voltage or Frequency

Use a true RMS voltmeter to check voltage or frequency. Many voltmeters will not give accurate readings, and Pacific Scientific recommends using a Fluke Model, 87, Model 8060, Model 8062, or equivalent.

Connect the voltmeter leads to the power output points on the generator to take a reading.

Checking Load

Generator load can be checked using a simple 100-watt light bulb.

CAUTION: The REDI-LINE generator produces enough current to injure or kill a human. Use extreme care when checking the load carrying capabilities of the generator.

To check load, simply plug the device into the power receptacle in the generator. The 100-watt light bulb will apply enough load to the unit to function properly.

10. PARTS LISTS

Models Covered

The following parts lists cover small frame generator models DA12A, DA24A, and DA36A; and large frame generator models DA12L and DA24L. Several versions of each of these models exist; and the parts lists cover these earlier versions as well as the latest current versions. Where practical, earlier and later versions are combined on a single exploded view, and separate part number columns identify the parts for each version.

Parts List Conventions

Each parts list consists of four or more columns. Where additional columns are present, there are duplicate part number columns, each column pertaining to a specific Redi-Line model.

The item column contains the callout found on the illustration on the facing page. Items in the illustration are numbered generally in disassembly order, were the unit to be disassembled completely. Attaching parts (screws, nuts, washers, etc.), and similar parts, are usually listed after the parts they attach.

The part number column provides the Pacific Scientific part number; this part number is to be used when ordering the item from Pacific Scientific or your local dealer.

The description column identifies assemblies and assembly parts through the use of dots preceding the item description. A single dot indicates that the item is a part of the unit described by the parts list. Two dots indicate that the item is a part of the single-dot item or assembly immediately preceding it.

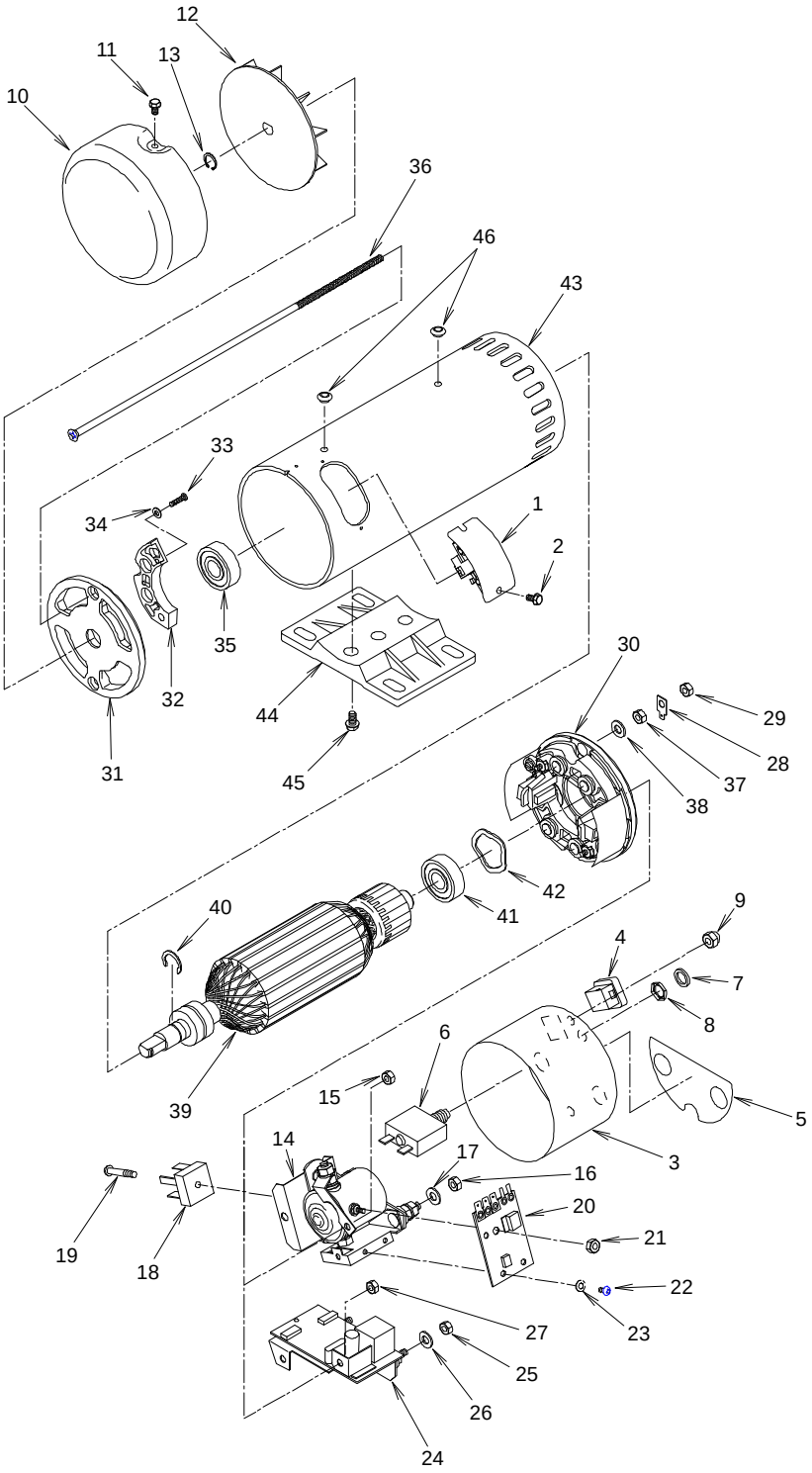


Figure 10-1: Small Frame Generators

Table 10-1: Parts List - Small Frame Generators

	Part Number				
Item	**DA12A**	**DA12A-500**	**DA12A-500A**	**Description**	**Qty**
Ref	FGD1201	FGD1297	FGD1252	Generator Assembly	1
1	YP63444	YP63444	YP63444	. AC Brush Assembly	2
2	YK11230	YK11230	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
3	NO LONGER AVAILABLE	NO LONGER AVAILABLE	YC63231	. Solenoid Cover	1
4	YP04403	YP04403	YP04403	. Electrical Receptacle	1
5	YN00046	YN00046	YN00046	. Decal	1
6	YP05506	YP05506	YP05506	. Circuit Breaker, 12 Volt	1
6	YP05508	YP05508	YP05508	. Circuit Breaker, 24 Volt, 36 Volt	1
7	NO PART NUMBER AVAILABLE	NO PART NUMBER AVAILABLE	NO PART NUMBER AVAILABLE	. . Nut, Lock	1
8	NO PART NUMBER AVAILABLE	NO PART NUMBER AVAILABLE	NO PART NUMBER AVAILABLE	. . Washer	1
9	YK10069	YK10069	YK10069	. Nut, Acorn, ¼20	2
10	YC63229	YC63229	YC63229	. Fan Shroud	1
11	YK11230	YK11230	YK11230	. Screw,, Hex Hd, 10-32 X 3/8	1
12	NO LONGER AVAILABLE	YP01630	YP01630	. Fan Impeller	1
13	NOT USED	VM31079	VM31079	, C-Ring	1
NI	NO PART NUMBER AVAILABLE	NO PART NUMBER AVAILABLE	NOT USED	. Solenoid Assembly	1
14	NO LONGER AVAILABLE	NO LONGER AVAILABLE	NOT USED	. . Solenoid	1
15	NO LONGER AVAILABLE	NO LONGER AVAILABLE	NOT USED	. . Nut	1
16	NO LONGER AVAILABLE	NO LONGER AVAILABLE	NOT USED	. . Nut	1
17	NO LONGER AVAILABLE	NO LONGER AVAILABLE	NOT USED	. . Washer	1
18	NOT USED	NO LONGER AVAILABLE	NOT USED	. . Diode	1
19	NOT USED	NO LONGER AVAILABLE	NOT USED	. . Screw, Hex Head	1
20	NO LONGER AVAILABLE	NOT USED	NOT USED	. Printed Circuit Board	1
21	NO LONGER AVAILABLE	NOT USED	NOT USED	. Nut	1
22	NO LONGER AVAILABLE	NOT USED	NOT USED	. Nut	1
23	NO LONGER AVAILABLE	NOT USED	NOT USED	. Washer	1

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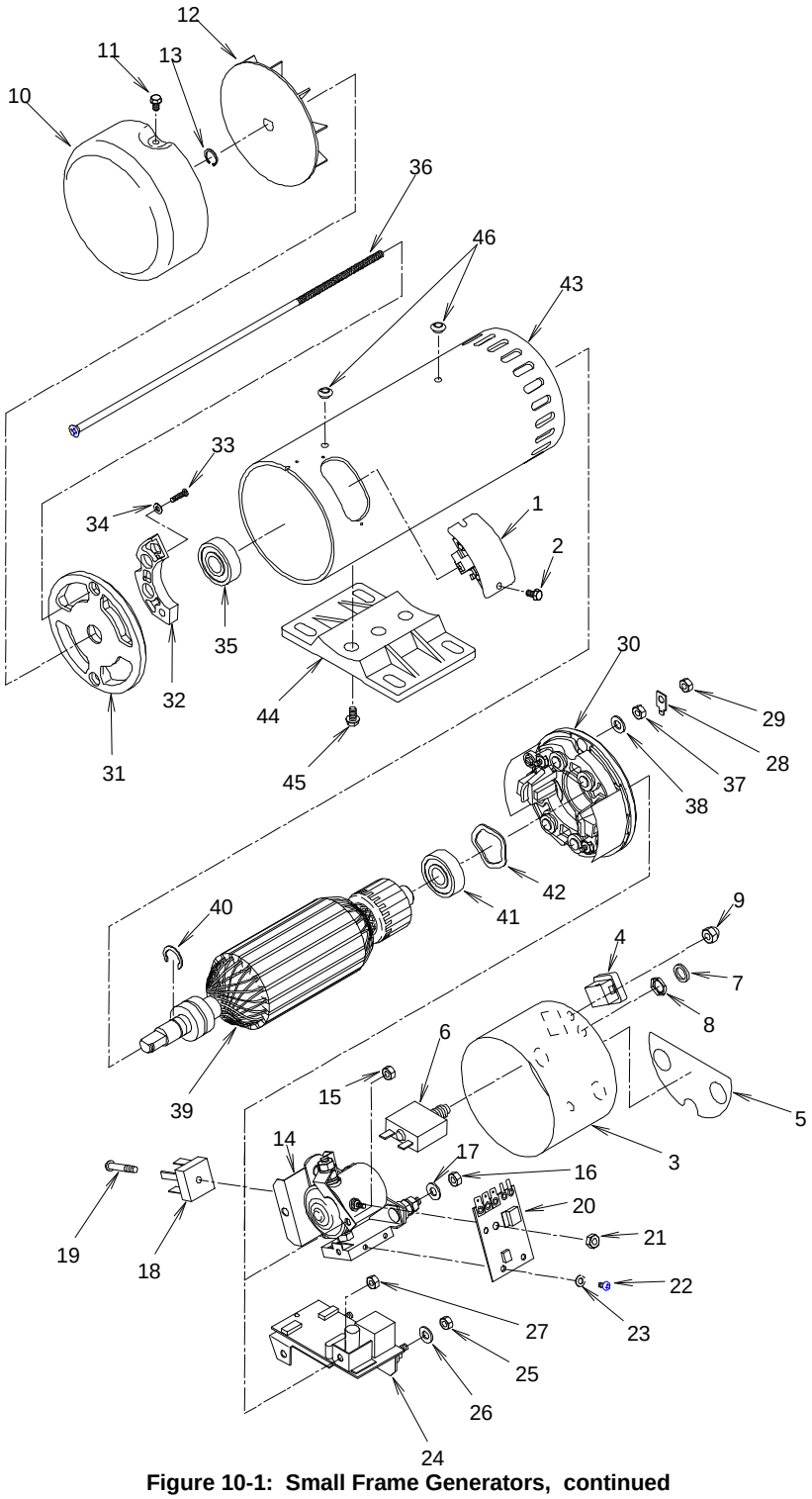

Figure 10-1: Small Frame Generators, continued

Table 10-1: Parts List - Small Frame Generators, continued

	Part Number				
Item	**DA12A**	**DA12A-500**	**DA12A-500A**	**Description**	**Qty**
Ref	FGD1201	FGD1297	FGD1252	Generator Assembly	1
24	NOT USED	NOT USED	YP05816	. Printed Circuit Board and Bracket	1
25	NOT USED	NOT USED	YK10027	. Nut, ¼20	1
26	NOT USED	NOT USED	YK10384	. Washer, ¼20	1
27	NOT USED	NOT USED	YK10027	. Nut, ¼20	1
28	YP05251	YP05251	YP05251	. Tab, Printed Circuit Board, copper	1
29	YK10027	YK10027	YK10027	. Nut, ¼20	1
30	NO LONGER AVAILABLE	YR33072	YR33072	. Rear End Bell	1
NI	NO PART	NO PART	NO PART	. Front End Bell Assembly	1
31	NO LONGER AVAILABLE	YF20274	YF20274	. . Front End Bell	1
32	NO LONGER AVAILABLE	NOT USED	NOT USED	. . Plate, Diode	1
33	YK11077	NOT USED	NOT USED	. . Screw, Slotted, Pan Head, 6-32	2
34	YK10090	NOT USED	NOT USED	. . Washer, No. 6	2
35	HB623SL	HB623SL	HB623SL	. Bearing, 6203, double sealed	1
36	YJ10106	YJ10106	YJ10106	. Tie Rod	2
37	YK10027	YK10027	YK10027	. Nut, ¼20	2
38	YK10384	YK10384	YK10384	. Washer, Flat	2
NI	NO LONGER AVAILABLE	YAA3053	YAA3053	. Armature Assembly, 12 Volt (Armature Assembly w/ bearings)	1
	NO LONGER AVAILABLE	YAA3309	YAA3309	. Armature Assembly, 24 Volt (Armature Assembly w/ bearings)	
	NO LONGER AVAILABLE	YAA5575	YAA5575	. Armature Assembly, 36 Volt (Armature Assembly w/ bearings)	
39	NO LONGER AVAILABLE	YA13053	YA13053	. . Armature, 12 Volt	1
39	NO LONGER AVAILABLE	YA13309	YA13309	. . Armature, 24 Volt	1
39	NO LONGER AVAILABLE	YA15575	YA15575	. . Armature, 36 Volt	1
40	NOT USED	YK11722	YK11722	. . C-Ring	1
41	HB623SL	HB623SL	HB623SL	. . Bearing, 6203, double sealed	1
42	YP03151	YP03151	YP03151	. Washer, Wavy Spring	1
43	NO LONGER AVAILABLE	YH83042	YH83042	. Shell Assembly, 12 Volt	1
43	NO LONGER AVAILABLE	YH83053	YH83053	. Shell Assembly, 24 Volt	1
43	NO LONGER AVAILABLE	YH83053	YH83053	. Shell Assembly, 36 Volt	1
44	YP80007	YP80007	YP80007	. Foot Mount	1
45	YK11231	YK11231	YK11231	. Screw, Hex Head, ¼20 X 9/16	3
46	YP00987	YP00987	YP00987	. Plug	2

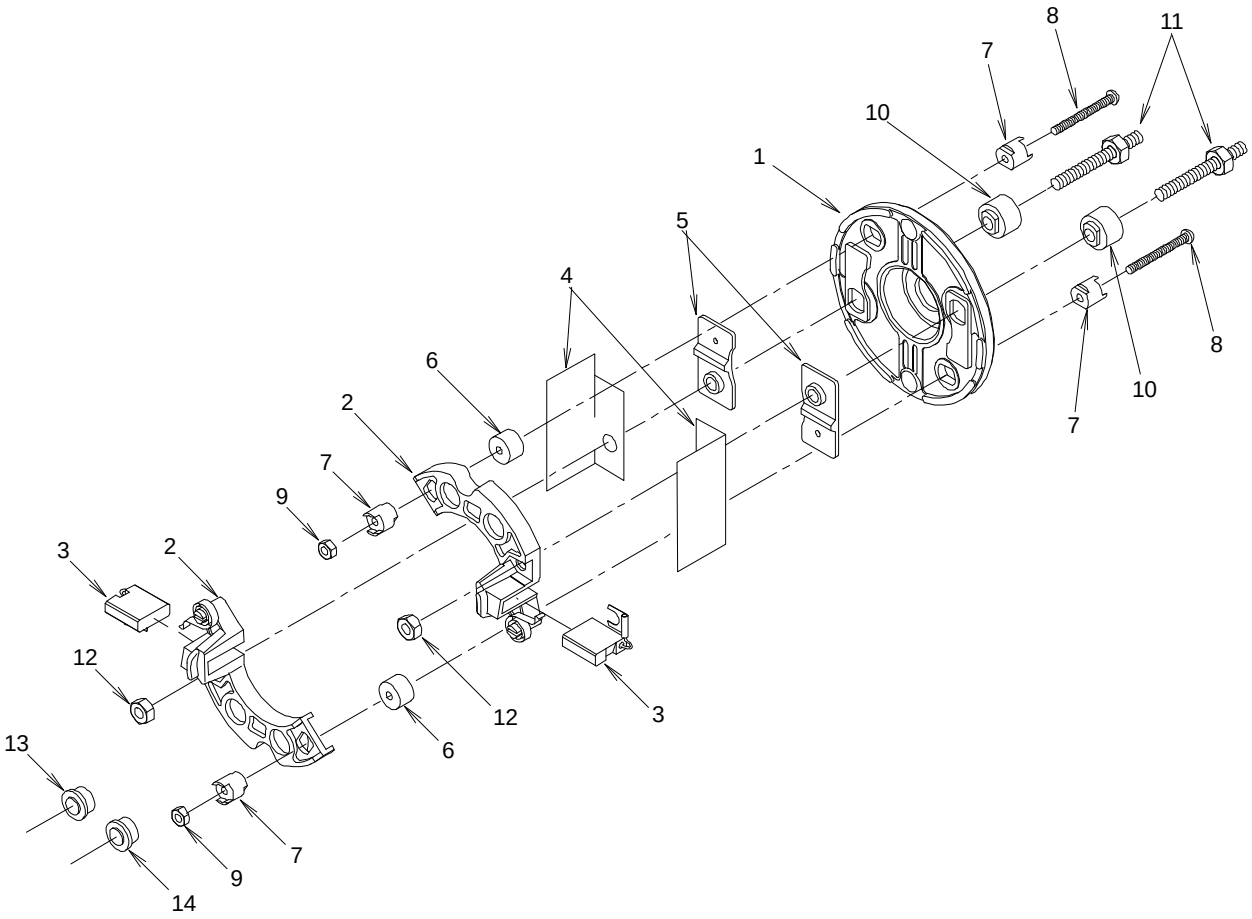

Figure 10-2. End Bell for Earlier Small Frame Generators

Table 10-2: Parts List - End Bell for Earlier Small Frame Generators

Item	Part No.	Description	Qty
Ref	NO LONGER AVAILABLE	End Bell Assembly	1
1	NO LONGER AVAILABLE	. End Bell	1
NI	NO LONGER AVAILABLE	Brush Holder Assembly	2
2	NO LONGER AVAILABLE	. . Brush Holder Plate	2
3	YP00351	. . Brush	2
4	YP02213	. Insulator , Brush	2
5	YP02211	. Brush Holder Insulator	2
6	YP02224	. Diode Plate Spacer	2
7	YP02220	. Diode Plate Insulator	4
8	YK10021	. Bolt, Slotted Head, 8-32 X 1-1/2	2
9	YK10314	. Nut, Std. Hex, 8-32	2
10	YP02218	. Insulator	2
11	YP02103	. Power Terminal	2
12	YK10027	. Nut, Std. Hex, ¼20	2
13	NO LONGER AVAILABLE	. Diode, 25 Amp X 800 Volt, Black (negative)	1
14	NO LONGER AVAILABLE	. Diode, 25 Amp X 800 Volt, Red (positive)	1

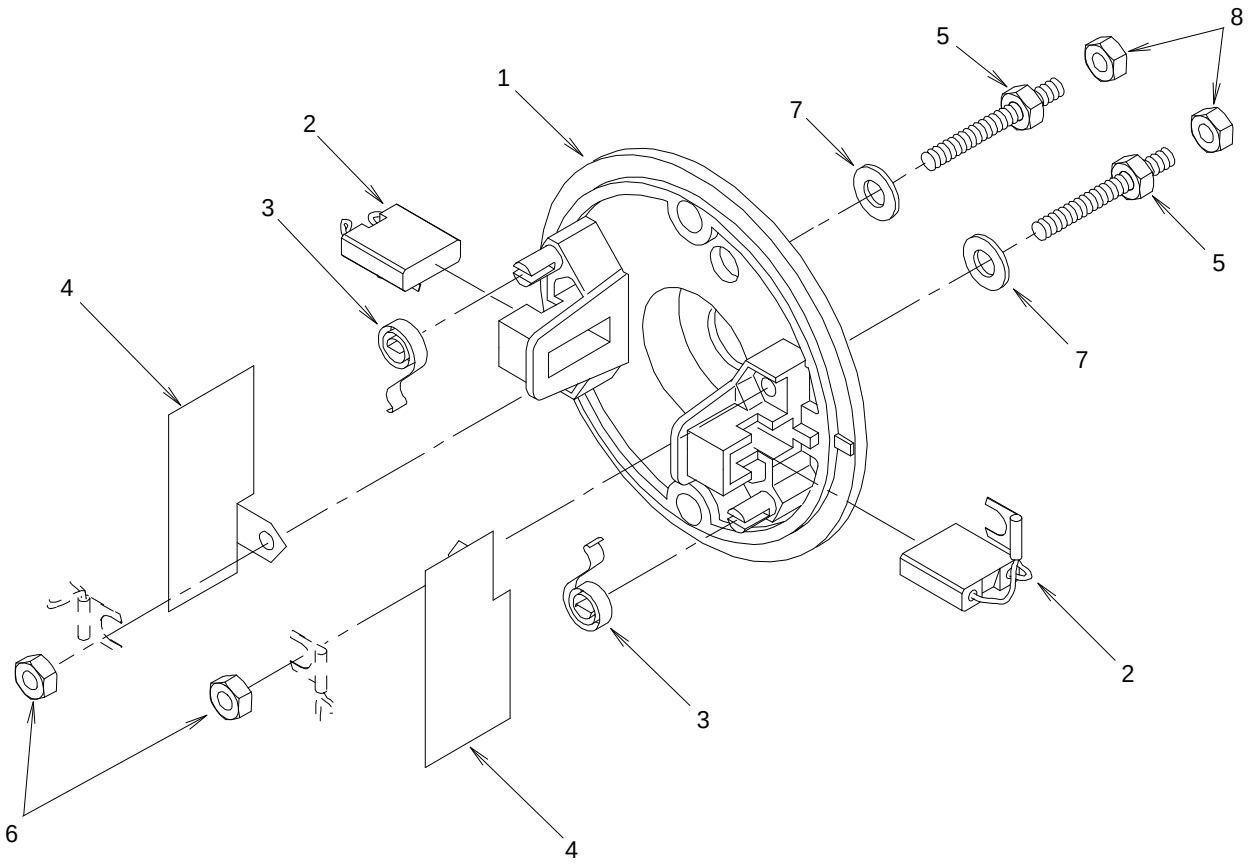

Figure 10-3. End Bell for Current Small Frame Generators

Table 10-3: Parts List - End Bell for Current Small Frame Generators

Item	Part No.	Description	Qty
Ref	YR33072	End Bell Assembly	1
1	YR20193	. End Bell	1
2	YP00351	. Brush	2
3	YP00872	. Brush Spring	2
4	YP02246	. Insulator, Brush	2
5	YP02103	. Power Terminal	2
6	YK10027	. Nut, Std. Hex, ¼20	2
7	YK10384	. Washer	2
8	YK10027	. Nut, Std. Hex, ¼20	2

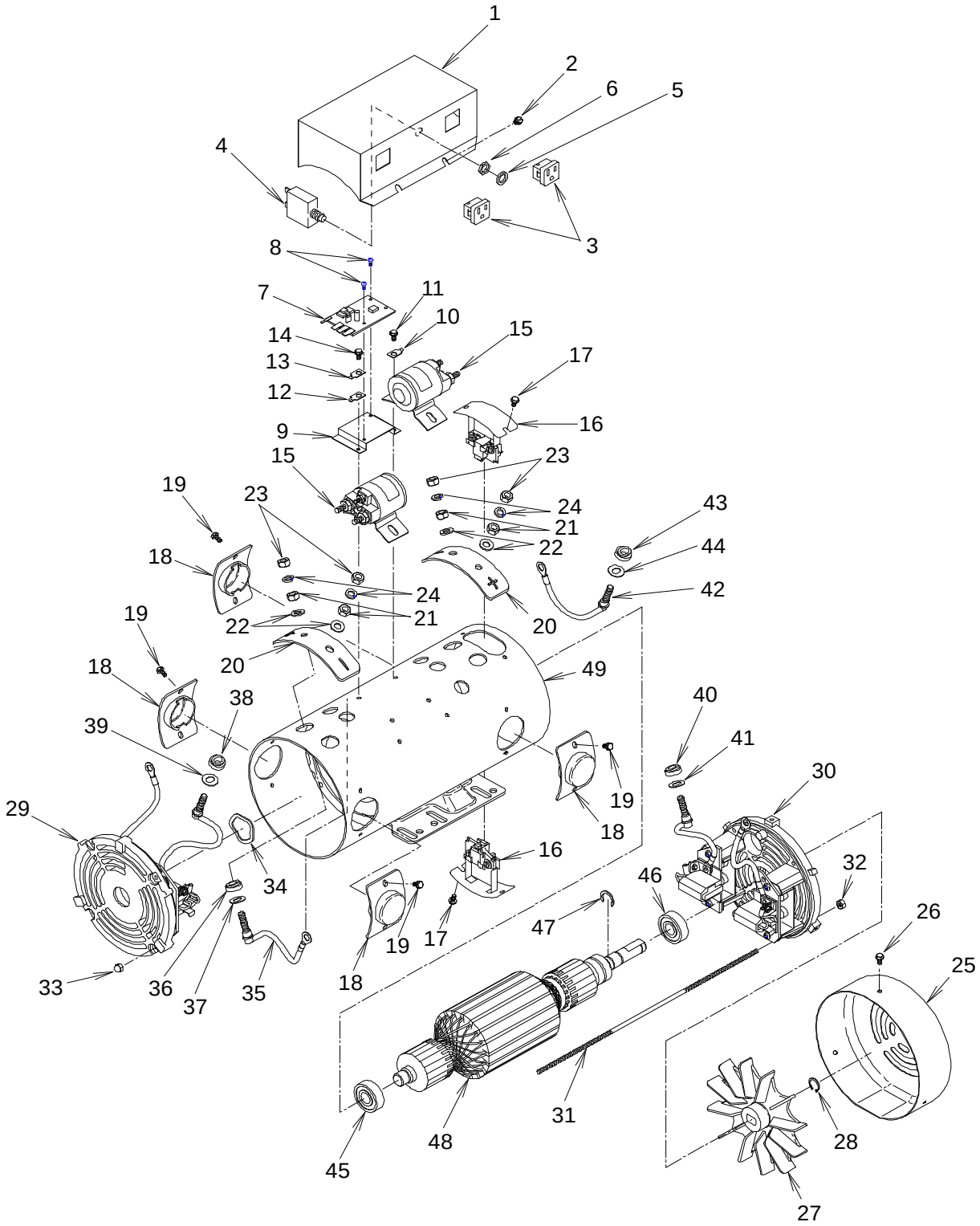

Figure 10-4: 12 Volt Large Frame Generator, Earliest Version

Table 10-4: Parts List - 12-Volt Large Frame Generator, Earliest Version

Item	Part No.	Description	Qty
	DA12L-1600	Generator Assembly	1
1	NO LONGER AVAILABLE	. Solenoid Cover	1
2	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	2
3	YP04403	. Electrical Receptacle	2
4	YP05509	. Reset Assembly	1
5	NO PART NUMBER AVAILABLE	. . Nut, Lock	1
6	NO PART NUMBER AVAILABLE	. . Washer	1
7	NO LONGER AVAILABLE	. Printed Circuit Board	1
8	YK11230	. Screw, Slotted, Pan Hd	2
9	NO LONGER AVAILABLE	. Circuit Board Bracket	1
10	YP05251	. Terminal End	1
11	YK11230	. Screw, Slotted, Pan Head, 10-32 X 3/8	2
12	YP05251	. Terminal End	1
13	YP05251	. Terminal End	1
14	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	2
15	NO LONGER AVAILABLE	. Solenoid	2
16	YP63445	. Brush Assembly	2
17	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
18	YP00315	. Access Cover	4
19	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	8
20	YN00096	. Terminal Insulator	1
21	YK11656	. Washer, Lock	2
22	YK11658	. Washer, Flat	2
23	YK11656	. Nut, 5/16	2
24	YK10960	. Nut, 5/16	2
25	YP80105	. End Cover (Shroud)	1
26	YK11230	. Screw, Slotted, Pan Hd	3
27	YP01581	. Fan Impeller	1
28	YK11134	. C-Ring	1
29	YR70150	. Bell Assembly, Front End, (opposite fan shroud end)	1

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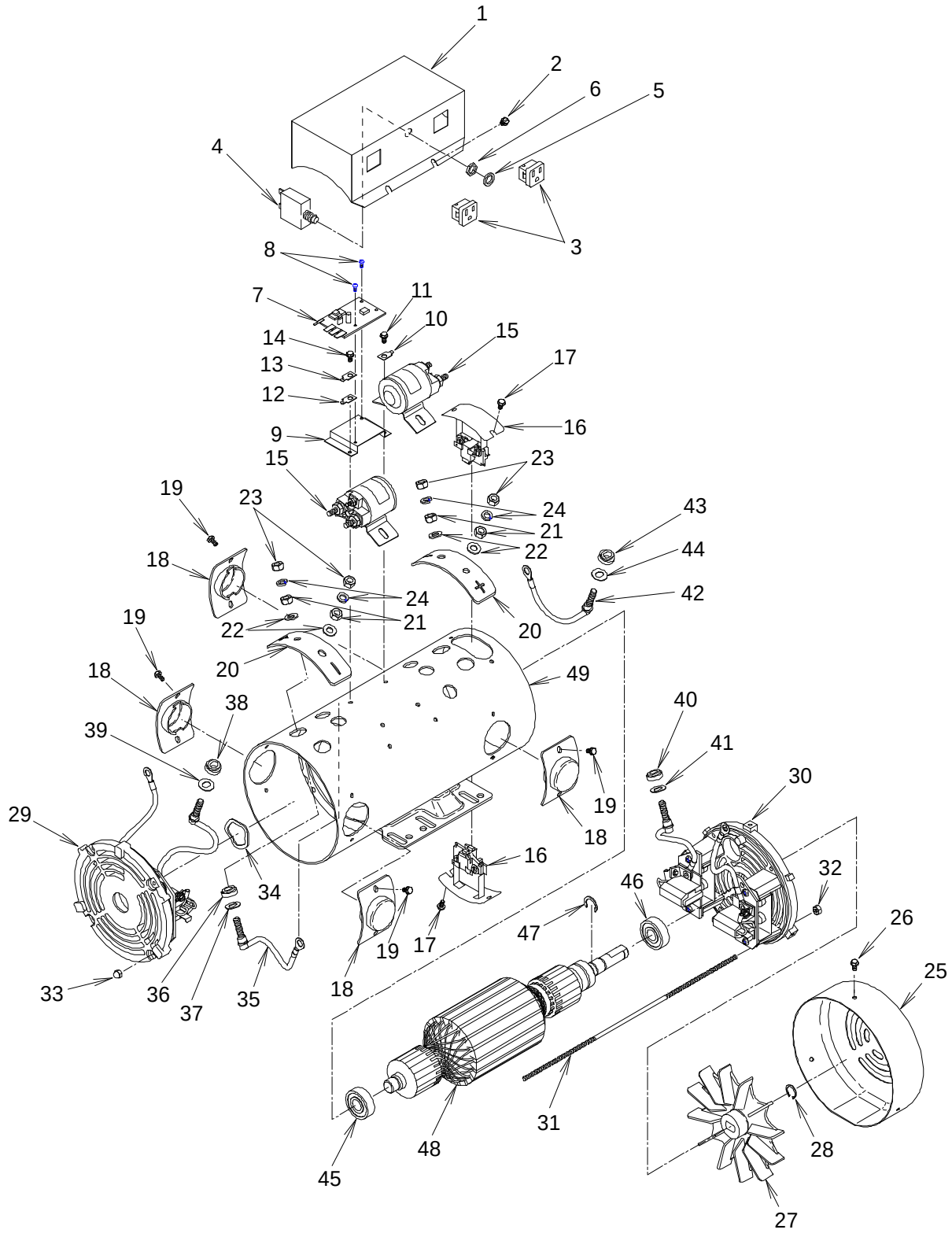

Figure 10-4: 12-Volt Large Frame Generator, Earliest Version, continued

Table 10-4: Parts List - 12-Volt Large Frame Generator, Earliest Version, Continued

Item	Part No.	Description	Qty
Ref	DA12L-1600	Generator Assembly	1
30	NO LONGER AVAILABLE	. Bell Assembly, Rear End (fan shroud end)	1
31	YJ10358	. Tie Rod	4
32	YK11322	. Nut, Acorn, 10-32	4
33	YK10960	. Nut, Lock, 10-32	2
34	YP03151	. Washer, Wavy Spring	1
35	YL35532	. Terminal, Positive, with lead wire	1
36	YP02237	. Insulator	1
37	YK11424	. Washer	1
38	YP02237	. Insulator	1
39	YK11424	. Washer	1
40	YK11424	. Insulator	1
41	YK11424	. Washer	1
42	YL35532	. Terminal, Positive, with lead wire	1
43	YP02237	. Insulator	1
44	YK11424	. Washer	1
45	HB623SL	. Bearing, 6203, double sealed	1
46	HB623SL	, Bearing, 6203, double sealed	1
47	YK10199	. C-Ring	1
48	NO LONGER AVAILABLE	. Armature	1
49	NO LONGER AVAILABLE	. Housing	1

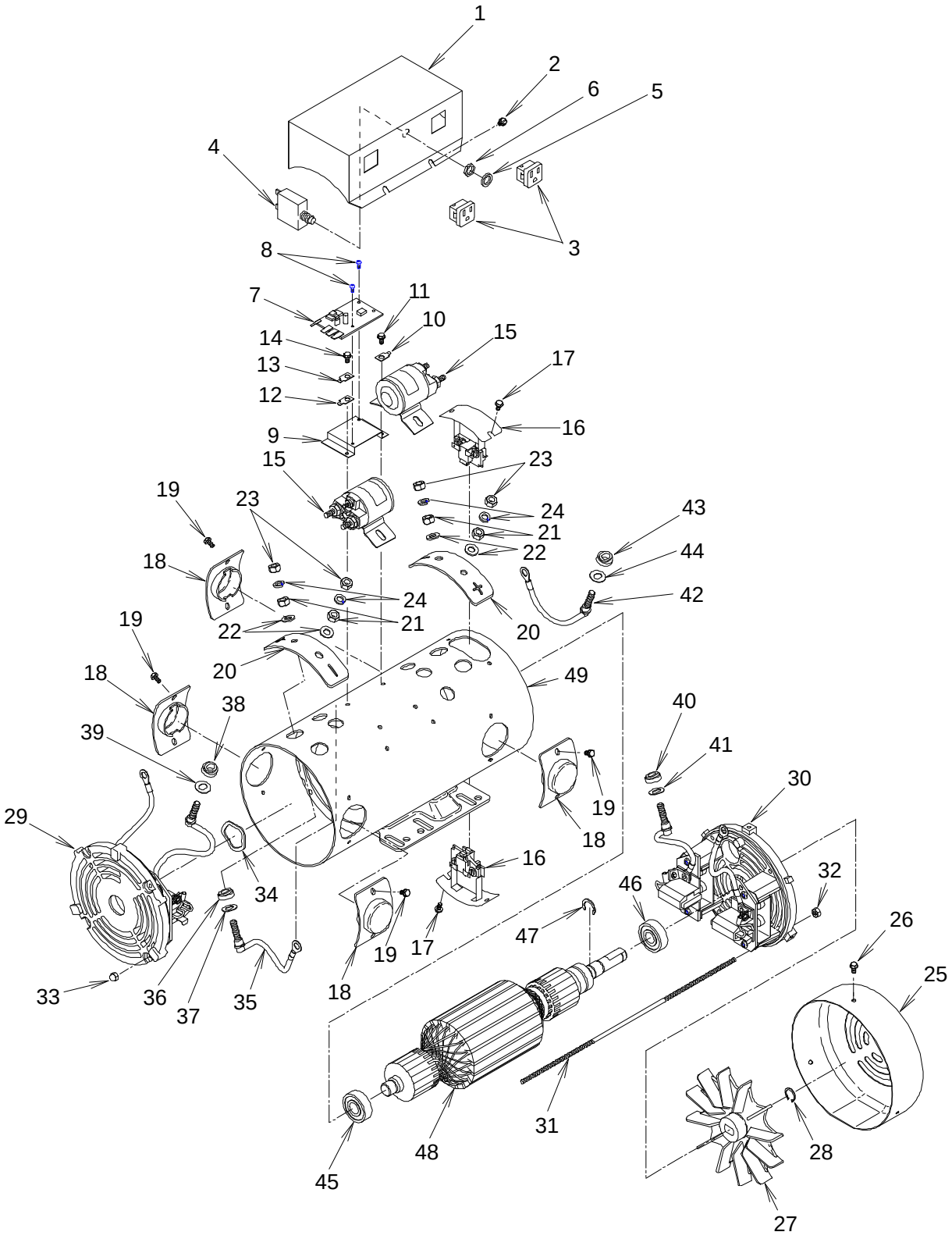

Figure 10-5: 12-Volt Large Frame Generator, Interim Version

Table 10-5: Parts List - 12-Volt Large Frame Generator, Interim Version

Item	Part No.	Description	Qty
Ref	DA12L-1600-1	Generator Assembly	1
1	NO LONGER AVAILABLE	. Solenoid Cover	1
2	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
3	YP04403	. Electrical Receptacle	2
4	YP05509	. Reset Assembly	1
5	NO PART NUMBER	. . Nut, Lock	1
6	NO PART NUMBER	. . Washer	1
7	NO LONGER AVAILABLE	. Printed Circuit Board	1
8	NO LONGER AVAILABLE	. Screw, Slotted, Pan Hd, 10-32 X 3/8	2
9	NO LONGER AVAILABLE	. Circuit Board Bracket	1
10	YP05251	, Terminal End	1
11	YK11230	. Screw, Slotted, Pan Head, 10-32 X 3/8	2
12	YP05251	. Terminal End	1
13	YP05251	. Terminal End	1
14	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	2
15	NO LONGER AVAILABLE	. Solenoid	2
16	YP63445	. Brush Assembly	2
17	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
18	YP00315	. Access Cover	4
19	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	8
20	YN00096	. Terminal Insulator	1
21	YK11656	. Washer, Lock	2
22	YK11658	. Washer, Flat	2
23	YK11656	. Nut, 5/16	2
24	YK10915	. Nut, 5/16	2
25	YP80105	. End Cover, (Shroud)	1
26	YK11230	. Screw, Slotted, Pan Hd	3
27	YP01581	. Fan Impeller	1
28	YK11134	. C-Ring	1
29	YR70150	. Bell Assembly, Front End, (Opposite Fan Shroud)	1
30	YR70215	. Bell Assembly, Rear End, (Fan Shroud End)	1

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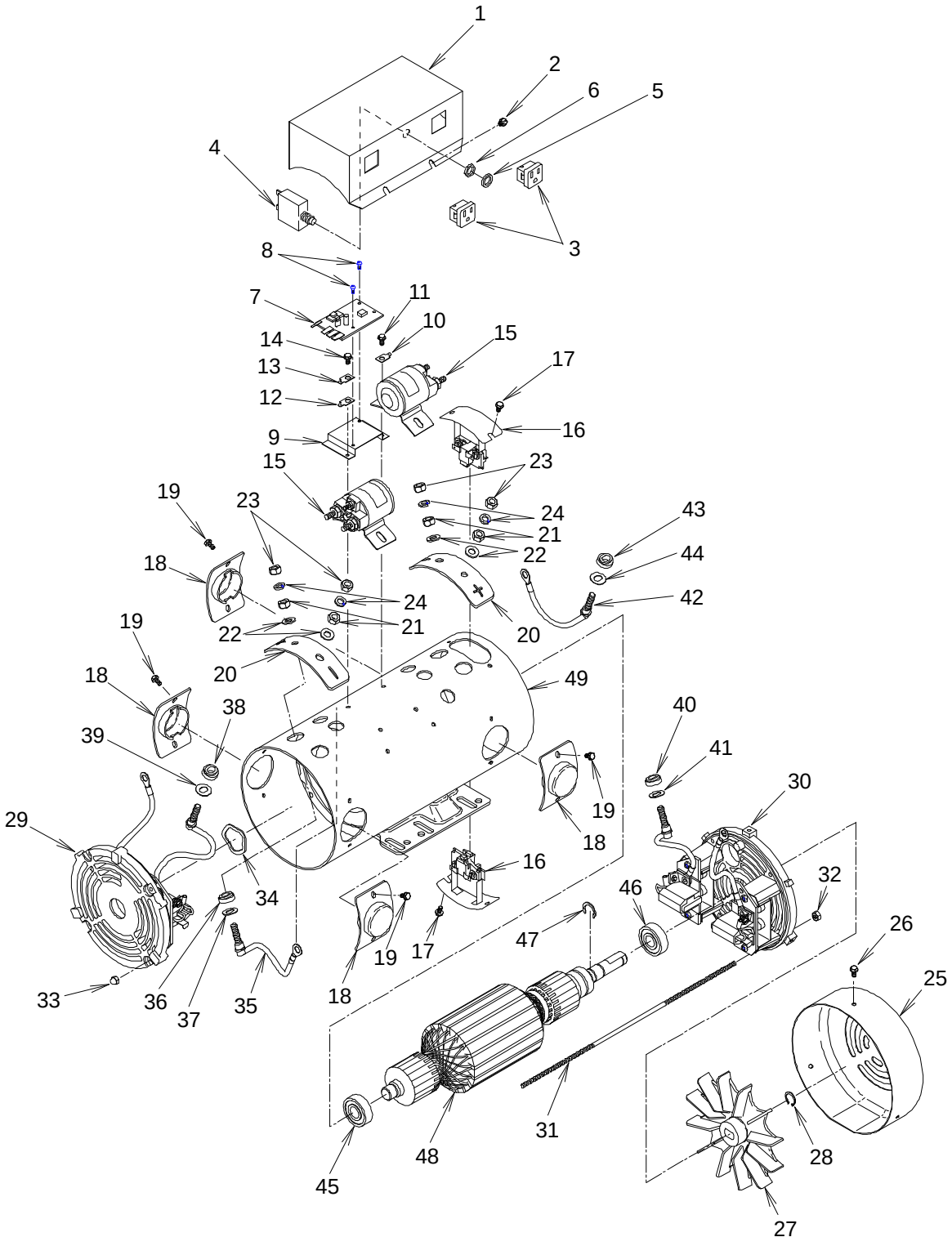

Figure 10-5: 12-Volt Large Frame Generator, Interim Version, continued

Table 10-5: Parts List - 12-Volt Large Frame Generator, Interim Version, Continued

Item	Part No.	Description	Qty
Ref	DA12L-1600-1	Generator Assembly	1
31	YJ11240	. Tie Rod	4
32	YK11322	. Nut, Acorn, 10-32	4
33	YK10960	. Nut, Lock, 10-32	4
34	YP03151	. Washer, Wavy Spring,	1
35	YL35532	. Terminal, Positive, with lead wire	1
36	YP02237	. Insulator	2
37	YK11424	. Washer	2
38	YP02237	. Insulator	1
39	YK11424	. Washer	1
40	YP02237	. Insulator	1
41	YK11424	. Washer	1
42	YL35532	. Terminal, Positive, with lead wire	1
43	YP02237	. Insulator	1
44	YK11424	. Washer	1
45	HB623SL	. Bearing, 6203, double sealed	1
46	HB623SL	. Bearing, 6203, double sealed	1
47	YK11722	. C-Ring	1
48	YAA5170	. Armature	1
49	YH84277	. Housing	1

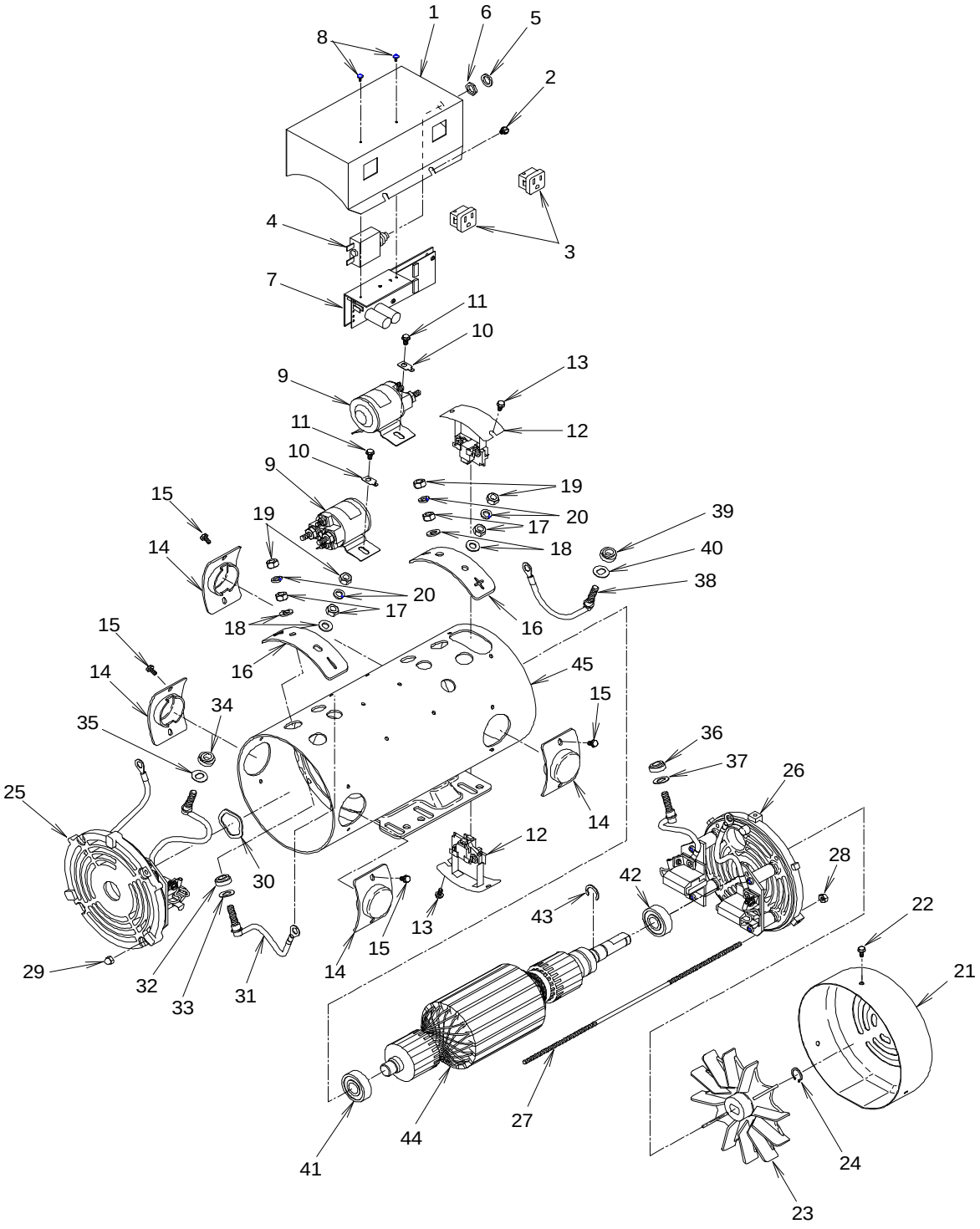

Figure 10-6: 12-Volt Large Frame Generator, Current Version

Table 10-6: Parts List - 12-Volt Large Frame Generator, Current Version

Item	Part No.	Description	Qty
	DA12L-1600A	Generator Assembly	1
1	YC63238	. Solenoid Cover	1
2	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
3	YP04403	. Electrical Receptacle	2
4	YP05509	. Circuit Breaker	1
5	NO PART NUMBER AVAILABLE	. . Nut, Lock	1
6	NO PART NUMBER AVAILABLE	. . Washer	1
7	YP05812	. Printed Circuit Board, With Bracket Assembly, LF	1
8	VM34233	. Screw, Slotted, Pan Hd, 6-32 X 3/8	2
9	YP06171	. Solenoid	2
10	YP05251	. Tab, Printed Circuit Board, copper	2
11	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
12	YP63445	. Brush Holder Assembly, AC	2
13	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
14	YP00315	. Access Cover	4
15	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	8
16	YN00096	. Terminal Insulator	2
17	YK11656	. Washer, Lock	4
18	YK11658	. Washer, Flat	4
19	YK11656	. Nut, 5/16	4
20	YK10915	. Nut, 5/16	4
21	YP80105	. End Cover (Shroud)	1
22	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	3
23	YP01581	. Fan Impeller	1
24	YK11134	. C-Ring	1
25	YR70150	. Bell Assembly, Front End (opposite fan shroud end)	1
26	YR70215	. Bell Assembly, Rear End (fan shroud end)	1
27	YJ11240	. Tie Rod	4
28	YK11322	. Nut, Acorn, 10-32	4
29	YK10960	. Nut, Lock, 10-32	4

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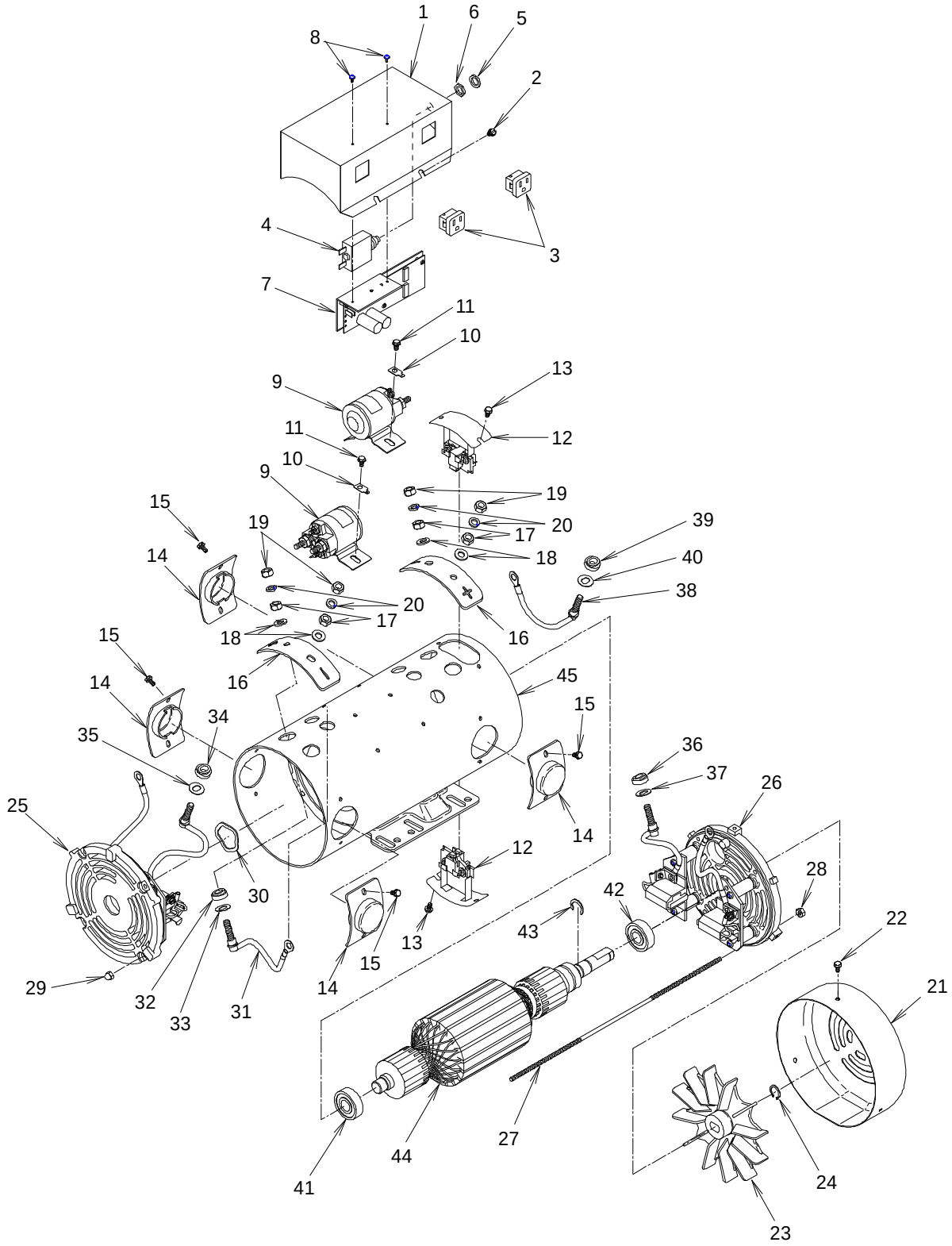


Figure 10-6: 12-Volt Large Frame Generator, Current Version, continued

Table 10-6: Parts List - 12-Volt Large Frame Generator, Current Version, Continued

Item	Part No.	Description	Qty
	DA12L-1600A	Generator Assembly	1
30	YP03151	. Washer, Wavy Spring	1
31	YL35532	. Terminal, Positive, with lead wire	1
32	YP02237	. Insulator	1
33	YK11424	. Washer	1
34	YP02237	. Insulator	1
35	YK11424	. Washer	1
36	YP02237	. Insulator	1
37	YK11424	. Washer	1
38	YP02237	. Terminal, Positive, with lead wire	1
39	YP02237	. Insulator	1
40	YK11424	. Washer	1
41	HB623SL	. Bearing, 6203, double sealed	1
42	HB623SL	. Bearing, 6203, double sealed	1
43	YK11722	. C-Ring	1
44	YAA5170	. Armature	1
45	YH84277	. Housing	1

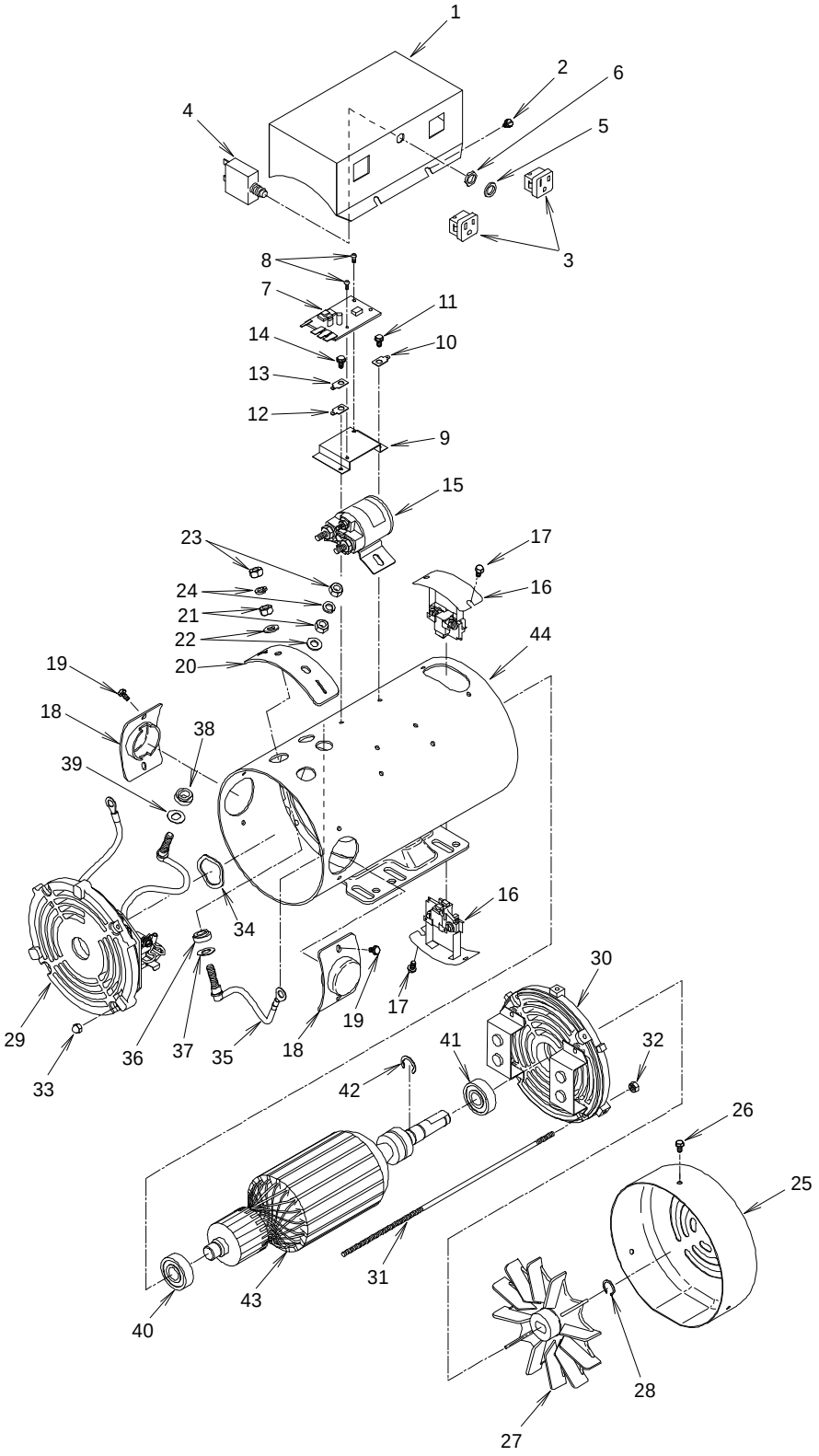


Figure 10-7: 24-Volt Large Frame Generator, Earlier Version

Table 10-7: Parts List - 24-Volt Large Frame Generator, Earlier Version

Item	Part No.	Description	Qty
Ref	DA24L-1600	Generator Assembly	1
1	NO LONGER AVAILABLE	. Solenoid Cover	1
2	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
3	YP04403	. Electrical Receptacle	2
4	YP05509	. Circuit Breaker	1
5	NO PART NUMBER AVAILABLE	. . Nut, Lock	1
6	NO PART NUMBER AVAILABLE	. . Washer	1
7	NO LONGER AVAILABLE	. Printed Circuit Board	1
8	NO LONGER AVAILABLE	. Screw, Slotted, Pan Hd	2
9	NO LONGER AVAILABLE	. Circuit Board Bracket	1
10	YP05251	, Terminal End	1
11	YK11230	. Screw, Slotted, Pan Head	1
12	YP05251	. Terminal End	1
13	YP05251	. Terminal End	1
14	YK11230	. Screw, Slotted, Pan Hd	1
15	NO LONGER AVAILABLE	. Solenoid	1
16	YP63445	. Brush Assembly	2
17	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
18	YP00315	. Access Cover	2
19	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
20	YN00096	. Terminal Insulator	1
21	YK11656	. Washer, Lock	2
22	YK11658	. Washer, Flat	2
23	YK11656	. Nut, 5/16	2
24	YK10915	. Nut, 5/16	2
25	YP80105	. End Cover, (Shroud)	1
26	YK11230	. Screw, Slotted, Pan Hd	3
27	YP01581	. Fan Impeller	1
28	YK11134	. C-Ring	1
29	YR70226	. Bell Assembly, Front End (opposite fan shroud end)	1
30	NO LONGER AVAILABLE	. Bell Assembly, Rear End (fan shroud end)	1

Continued…..

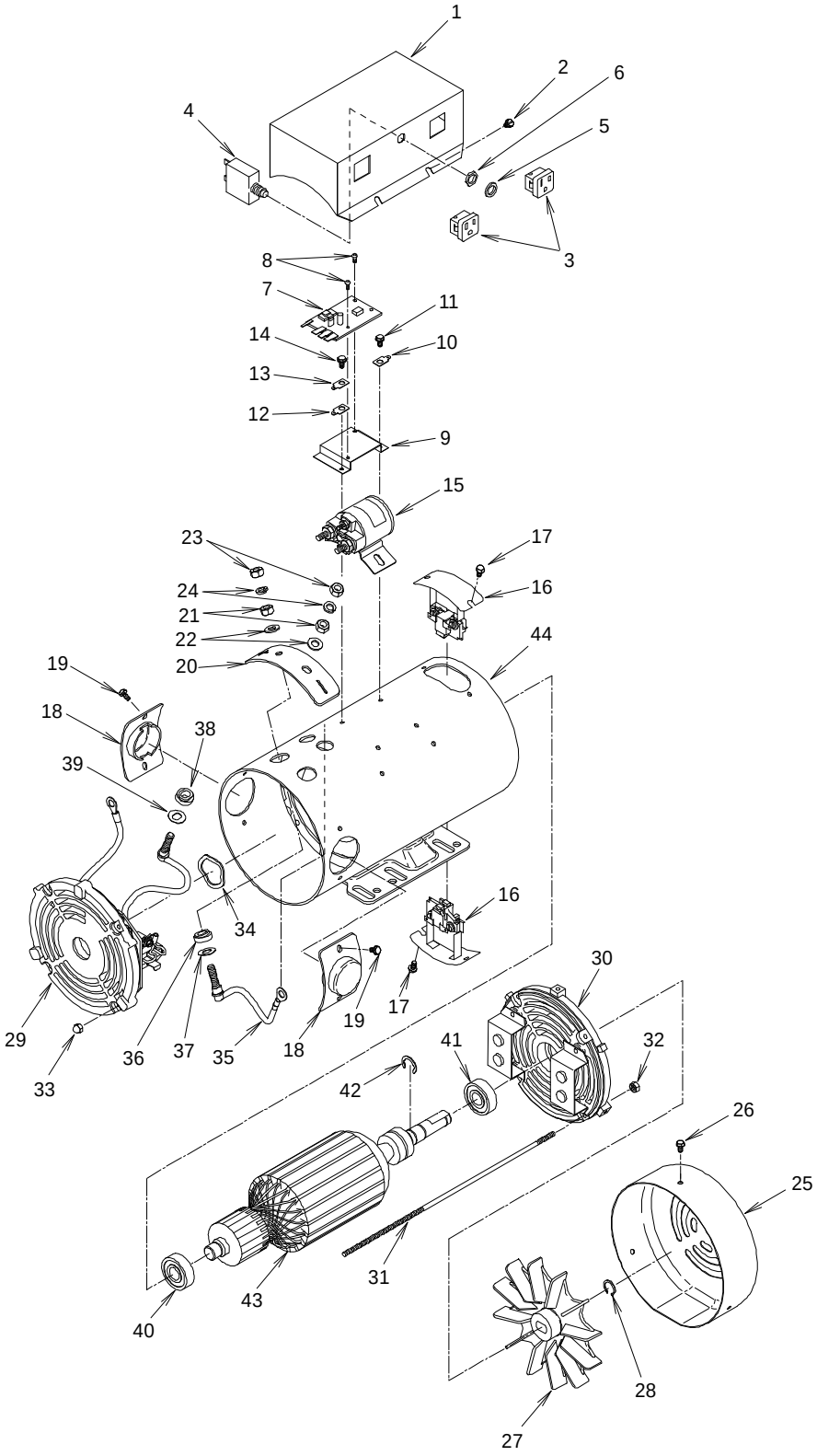


Figure 10-7: 24-Volt Large Frame Generator, Earlier Version, continued

Table 10-7: Parts List - 24-Volt Large Frame Generator, Earlier Version, continued

Item	Part No.	Description	Qty
Ref	DA24L-1600	Generator Assembly	1
31	YK11212	. Tie Rod	2
32	YK11322	. Nut, Acorn, 10-32	2
33	YK10915	. Nut, Lock, 10-32	2
34	YP03151	. Washer, Wavy Spring	1
35	YL35532	. Terminal, Positive, with lead wire	1
36	YP02237	. Insulator	1
37	YK11424	. Washer	1
38	YP02237	. Insulator	1
39	YK11424	. Washer	1
40	HB623SL	. Bearing, 6203, double sealed	1
41	HB623SL	. Bearing, 6203, double sealed	1
42	YK11722	. C-Ring	1
43	YAA5168	. Armature Assembly	1
44	YH84279	. Housing	1

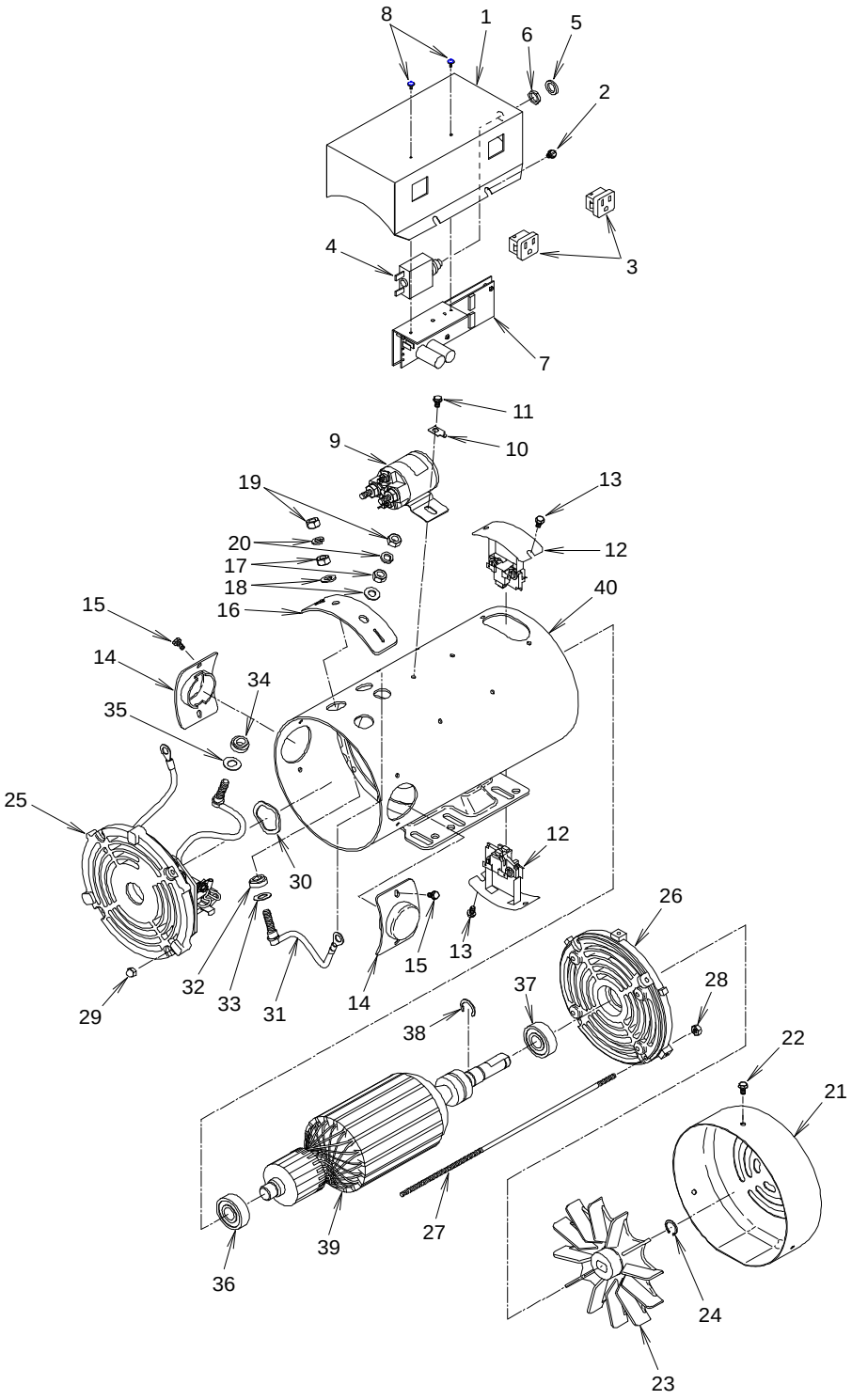


Figure 10-8: 24-Volt Large Frame Generator, Current Version

Table 10-8: Parts List - 24-Volt Large Frame Generator, Current Version

Item	Part No.	Description	Qty
Ref	DA24L-1600A	Generator Assembly	1
1	YC63238	. Solenoid Cover	1
2	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
3	YP04403	. Electrical Receptacle	2
4	YP05509	. Circuit Breaker	1
5	NO PART NUMBER AVAILABLE	. . Nut, Lock	1
6	NO PART NUMBER AVAILABLE	. . Washer	1
7	YP05612	. Printed Circuit Board, With Bracket Assembly, LF	1
8	VM34233	. Screw, Slotted, Pan Hd	2
9	YP06171	. Solenoid	1
10	YP05251	, Tab, Printed Circuit Board, copper	1
11	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	2
12	YP63445	. Brush Holder Assembly, AC	2
13	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
14	YP00315	. Access Cover	2
15	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	4
16	YN00096	. Terminal Insulator	1
17	YK11656	. Washer, Lock	2
18	YK11658	. Washer, flat	2
19	YK11656	. Nut, 5/16	2
20	YK10915	. Nut, 5/16	2
21	YP80105	. End Cover (Shroud)	1
22	YK11230	. Screw, Slotted, Pan Hd, 10-32 X 3/8	3
23	YP01581	. Fan Impeller	1
24	YK11134	. C-Ring	1
25	YR70226	. Bell Assembly, Front End (opposite fan shroud end)	1
26	YR70226	. Bell Assembly, Rear End (fan shroud end)	1
27	YJ11212	. Tie Rod	4
28	YK11322	. Nut, Acorn, 10-32	4
29	YK10960	. Nut, Lock, 10-32	4
30	YP03151	. Washer, Wavy Spring	1

Continued…..

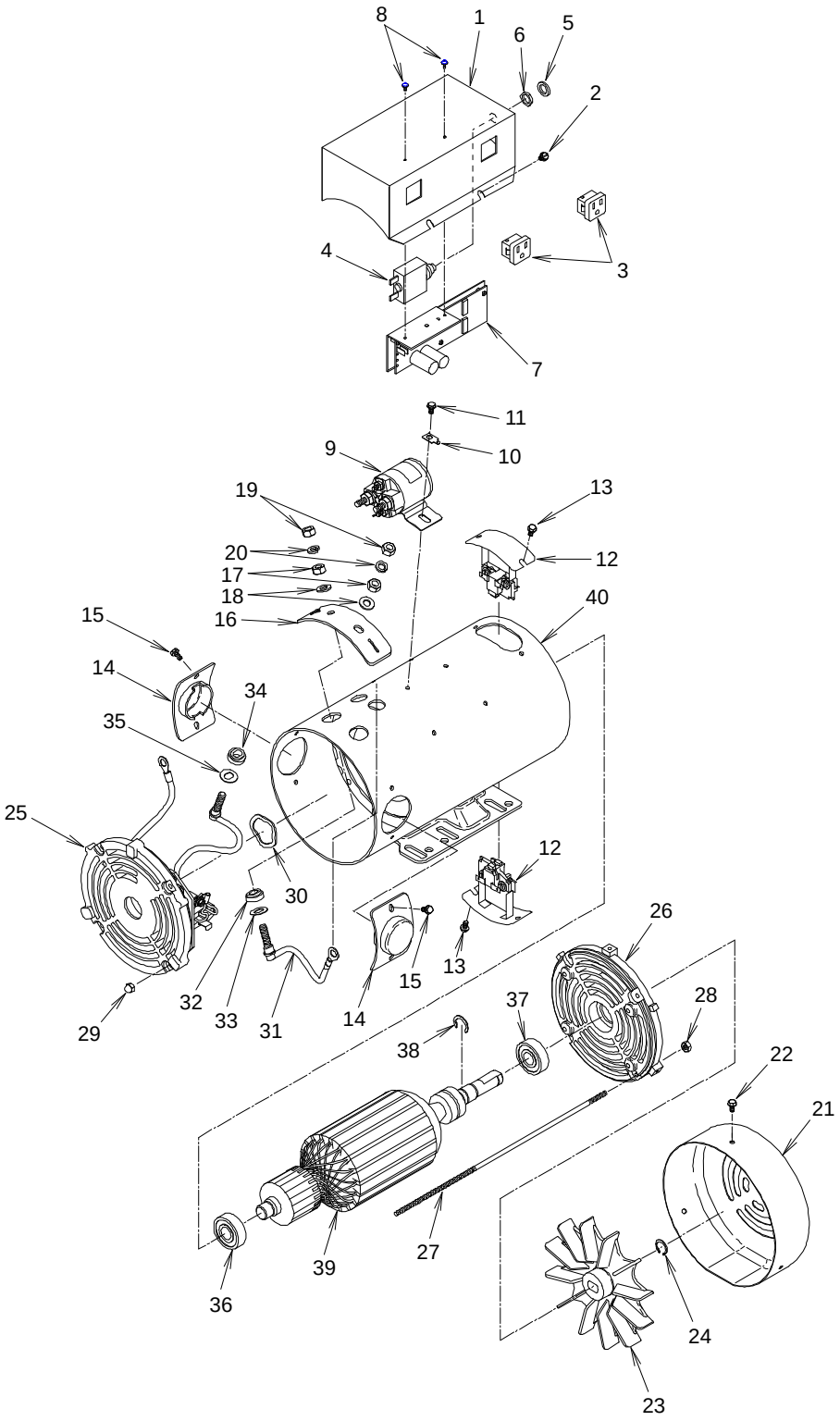


Figure 10-8: 24-Volt Large Frame Generator, Current Version, continued

Table 10-8: Parts List - 24-Volt Large Frame Generator, Current Version, Continued

Item	Part No.	Description	Qty
Ref	DA24L-1600A	Generator Assembly	1
31	YL35532	. Terminal, Positive, with lead wire	1
32	YP02237	. Insulator	1
33	YK11424	. Washer	1
34	YP02237	. Insulator	1
35	YK11424	. Washer	1
36	HB623SL	. Bearing, 6203, double sealed	1
37	HB623SL	. Bearing, 6203, double sealed	1
38	YK11722	. C-Ring	1
39	YAA5168	. Armature	1
40	YH84279	. Housing	1

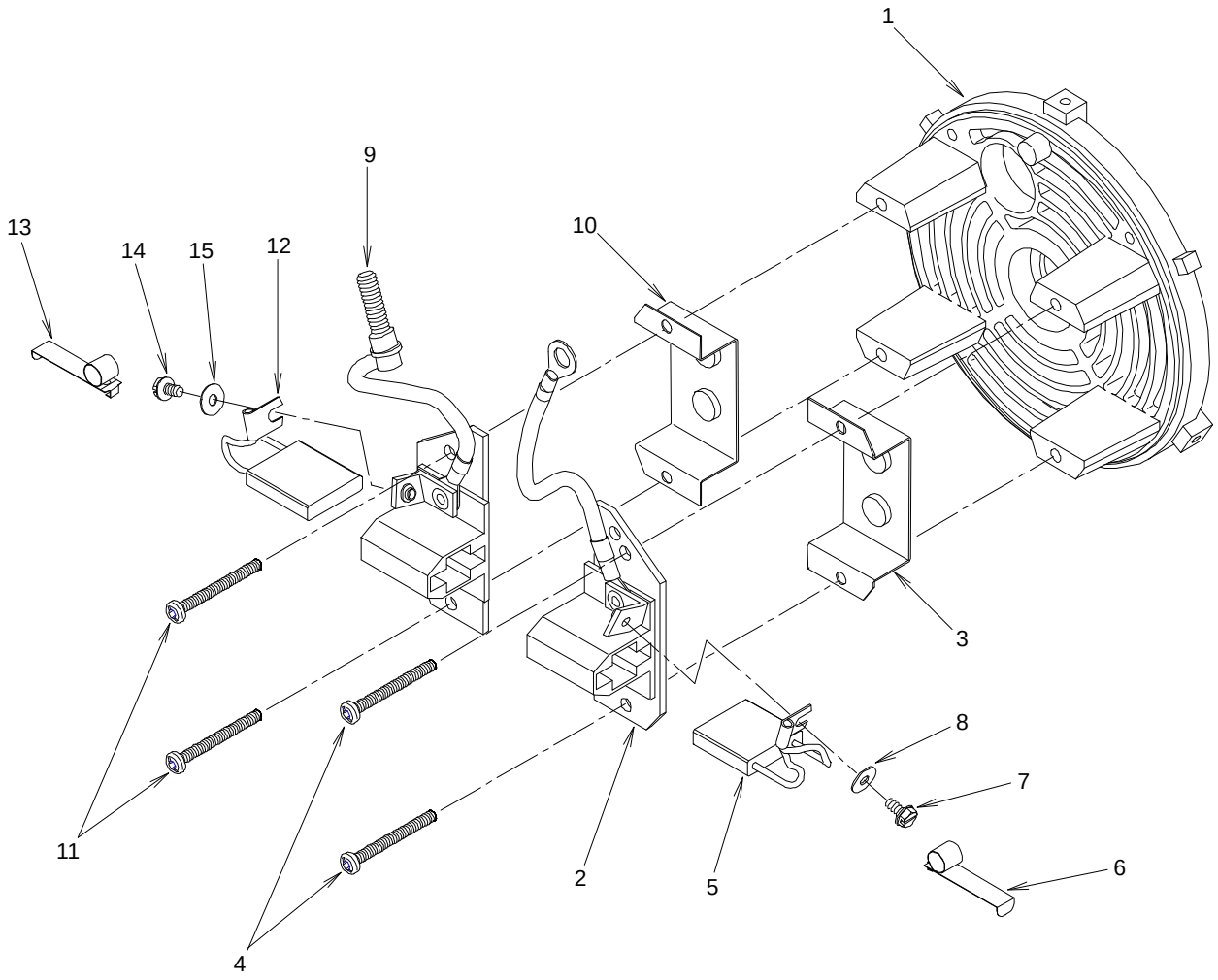


Figure 10-9: End Bell for Large Frame Generators, Earlier Version

Table 10-9: Parts List - End Bell for Large Frame Generators, Earlier Version

Item	Part No.	Description	Qty
Ref	NO LONGER AVAILABLE	End Bell Assembly	1
1	NO LONGER AVAILABLE	. End Bell	1
2	NO PART NUMBER	. Right Hand Brush Holder Assembly	1
3	NO LONGER AVAILABLE	. Diodes Bracket Assembly	1
4	NO LONGER AVAILABLE	. Screw, Socket Head, 10-32 X 2	2
5	YP00372	. Brush	1
6	YP00886	. Brush Spring	1
7	YK10398	. Screw, Std. Hex Hd, 10-32 X 3/8	1
8	YK10343	. Washer, No. 10	1
9	NO PART NUMBER	. Left Hand Brush Holder Assembly	1
10	NO LONGER AVAILABLE	. Diodes Bracket Assembly	1
11	NO LONGER AVAILABLE	. Screw, Socket Head, 10-32 X 2	2
12	YP00372	. Brush	1
13	YP00886	. Brush Spring	1
14	YK10398	. Screw, Std Hex Hd, 10-32 X 3/8	1
15	YK10343	. Washer, No. 10	1

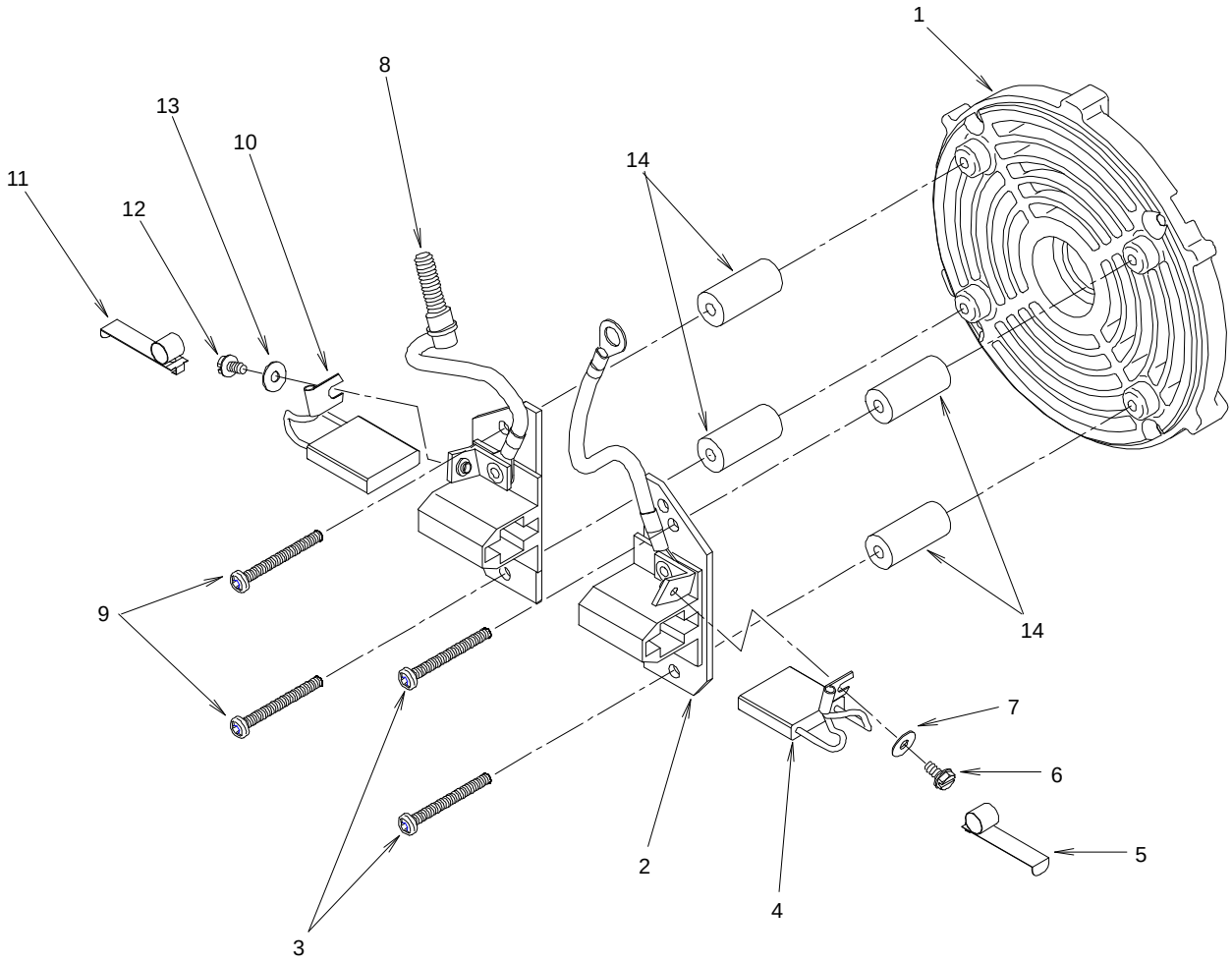


Figure 10-10: End Bell for Large Frame Generators, Current Version

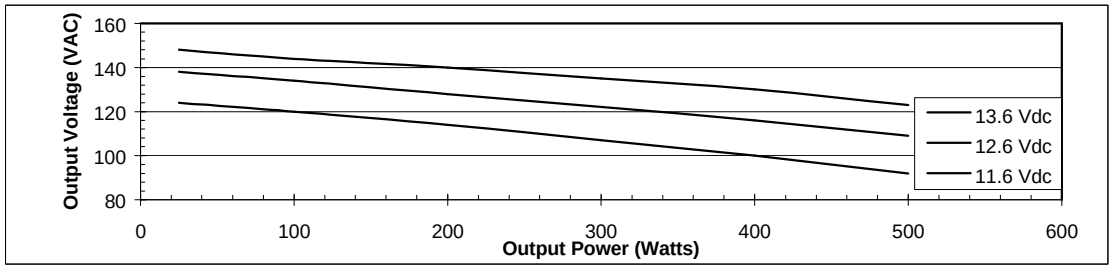
Table 10-10: Parts List - End Bell for Large Frame Generators, Current Version

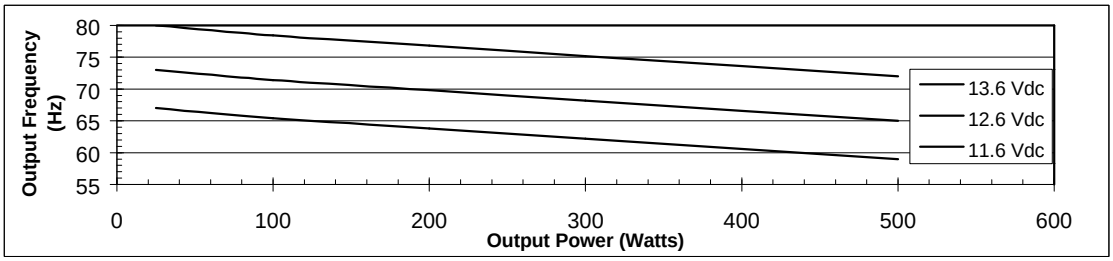
Item	Part No.	Description	Qty
Ref	YR70215	End Bell Assembly	1
1	YR20226	. End Bell	1
2	NO PART NUMBER	. Right Hand Brush Holder Assembly	1
3	YK11738	. Screw, Socket Head, 10-32 X 2	2
4	YP00372	. Brush	1
5	YP00886	. Brush Spring	1
6	YK10398	. Screw, Std. Hex Hd, 10-32 X 3/8	1
7	YK10343	. Washer, No. 10	1
8	NO PART NUMBER	. Left Hand Brush Holder Assembly	1
9	YK11738	. Screw, Socket Head, 10-32 X 2	2
10	YP00372	. Brush	1
11	YP00886	. Brush Spring	1
12	YK10398	. Screw, Std Hex Hd, 10-32 X 3/8	1
13	YK10343	. Washer, No. 10	1
14	YP02985	. Standoff	4

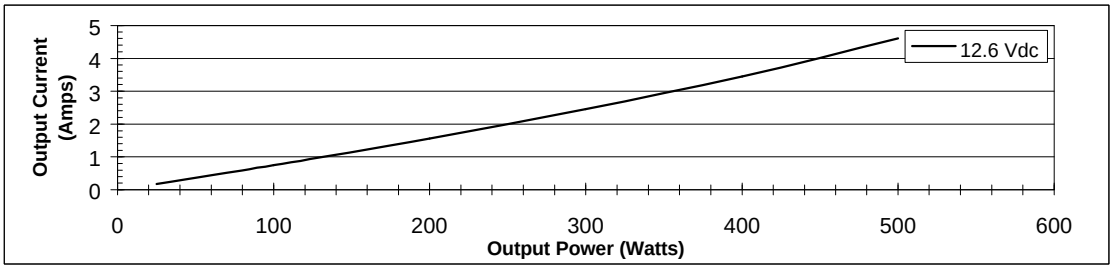
11. TECHNICAL DATA

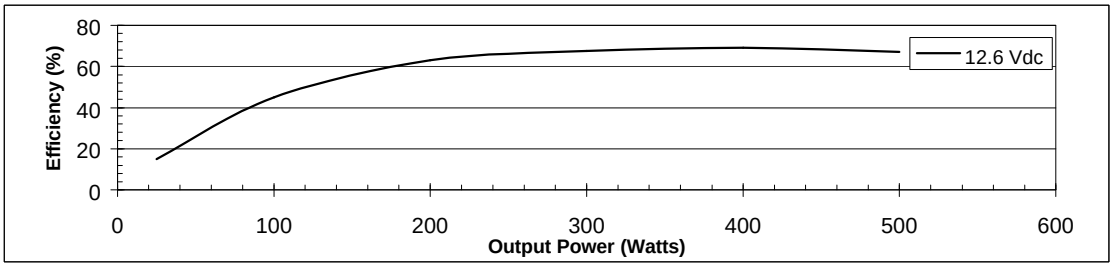
Performance Curves

Figures 11-1 through 11-5 are performance curves, and should be used only by repair technicians who can apply it properly to generator performance during the course of bench analysis and repair. It is not of use to the generator user.









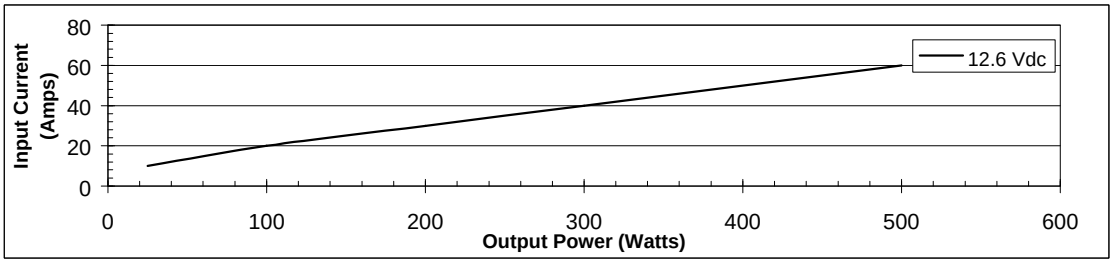
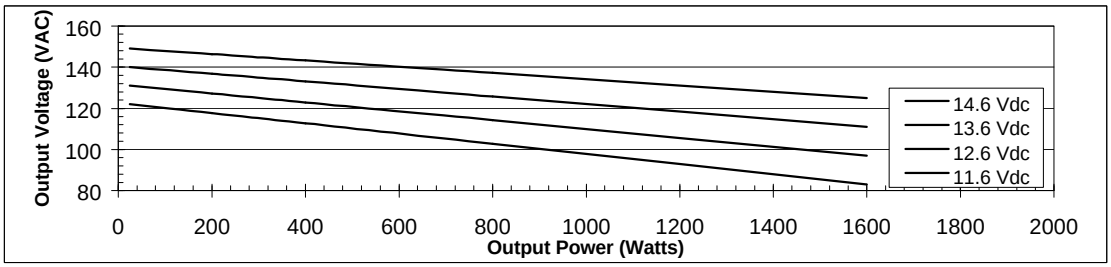
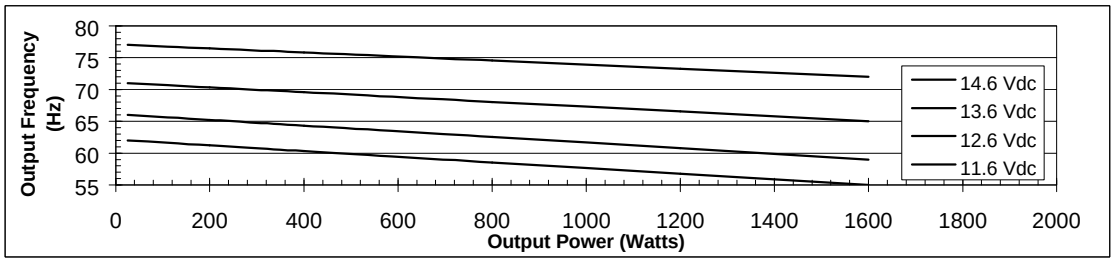
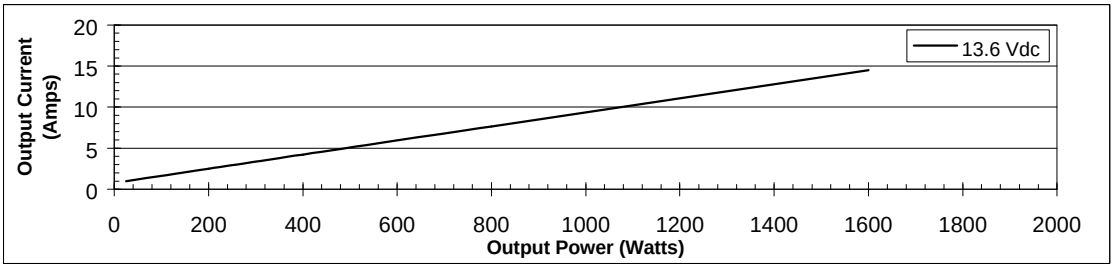
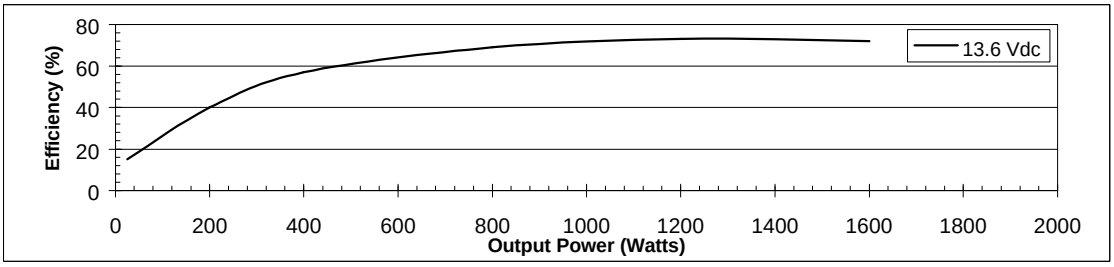


Figure 11-1: Performance Curves for DA12A-500A Redi-Line Generators









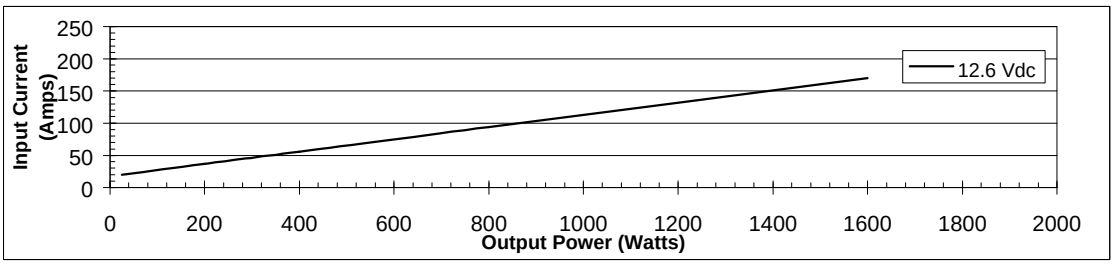
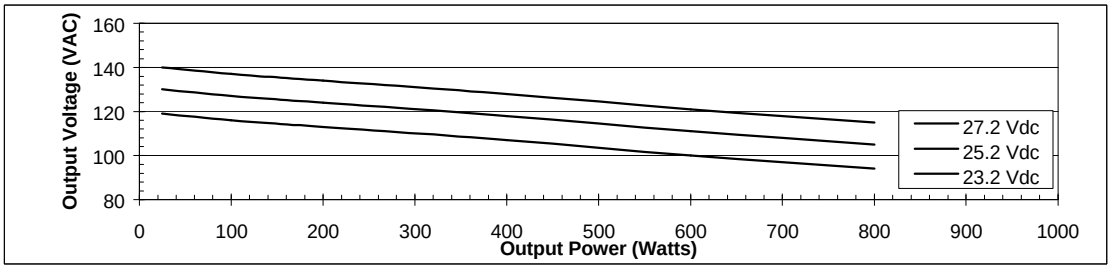
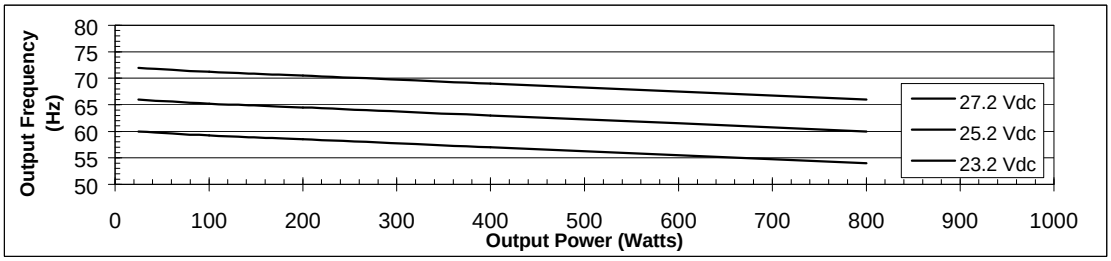
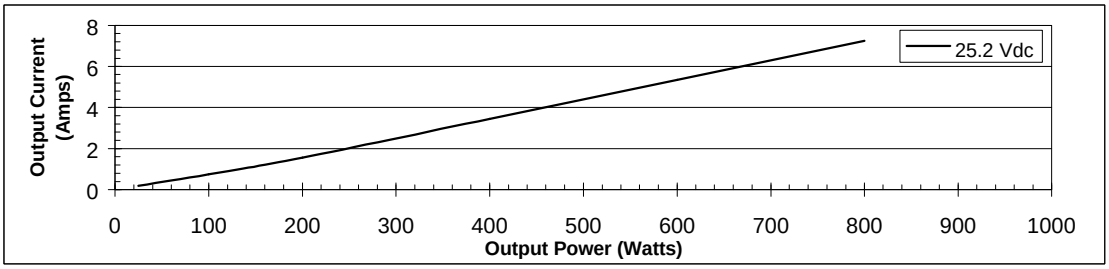
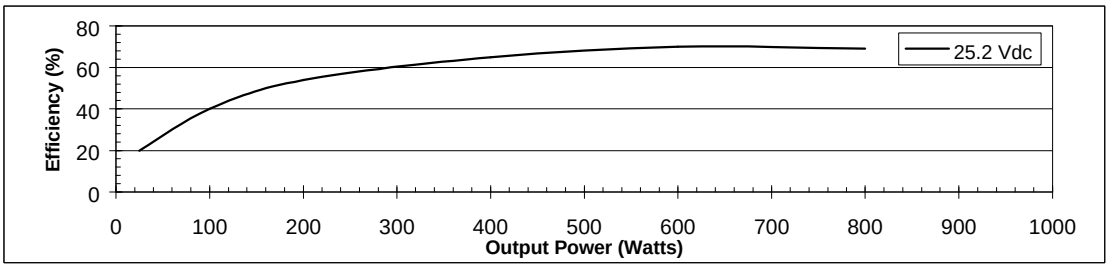


Figure 11-2: Performance Curves for DA12L-1600A Redi-Line Generators









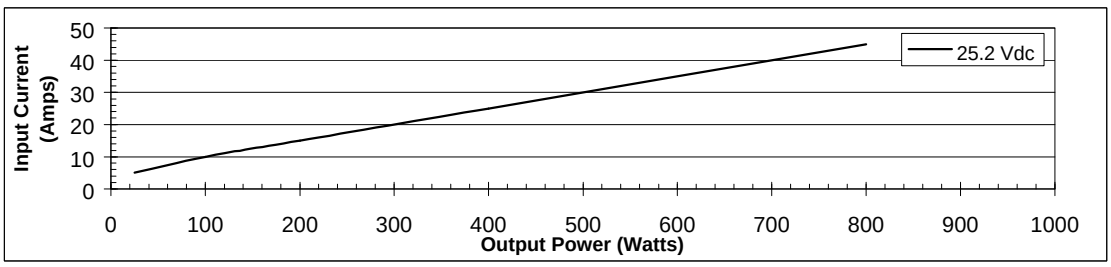
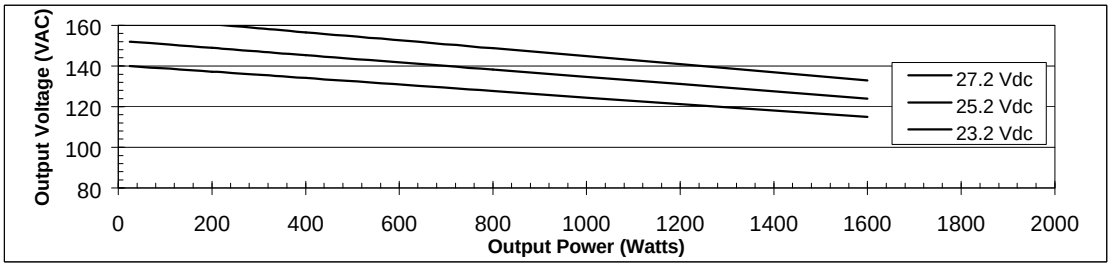
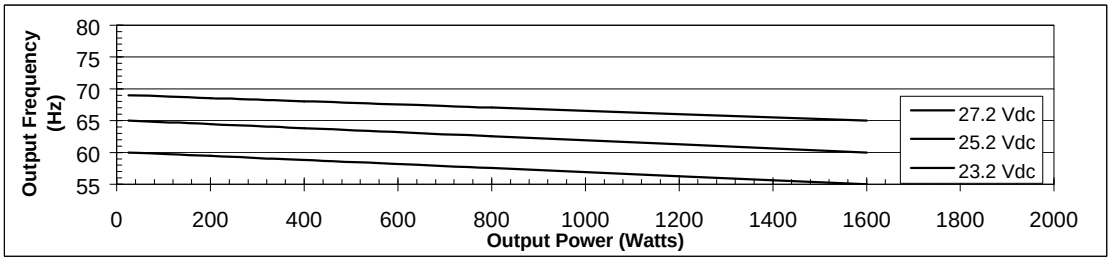
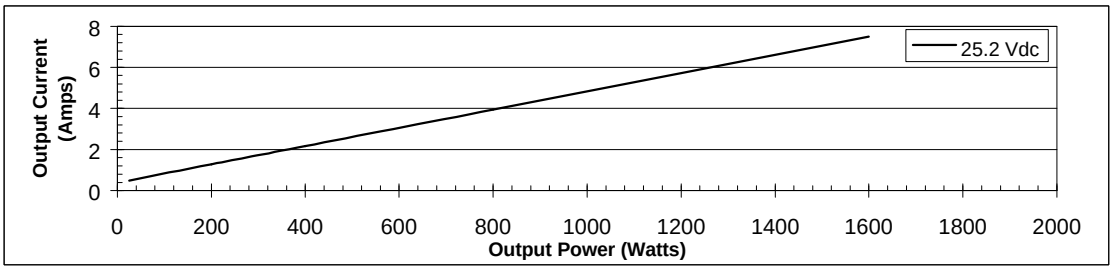
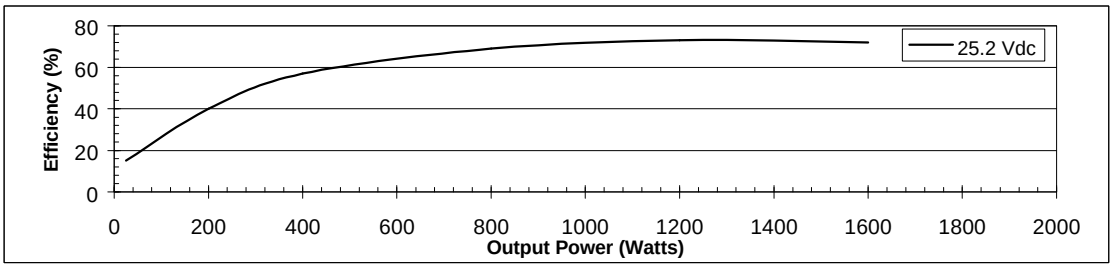


Figure 11-3: Performance Curves for DA24A-800A Redi-Line Generators









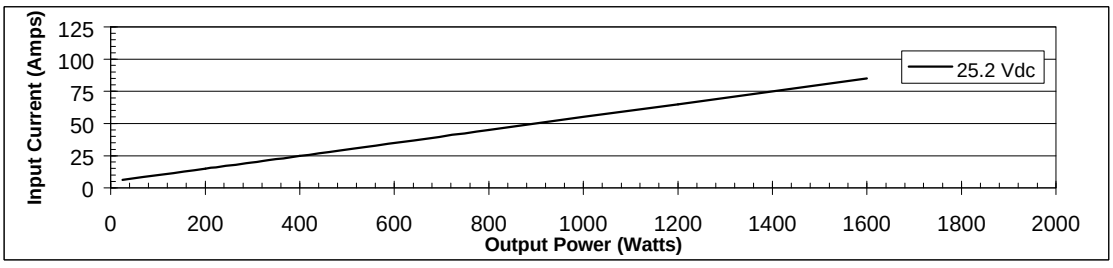
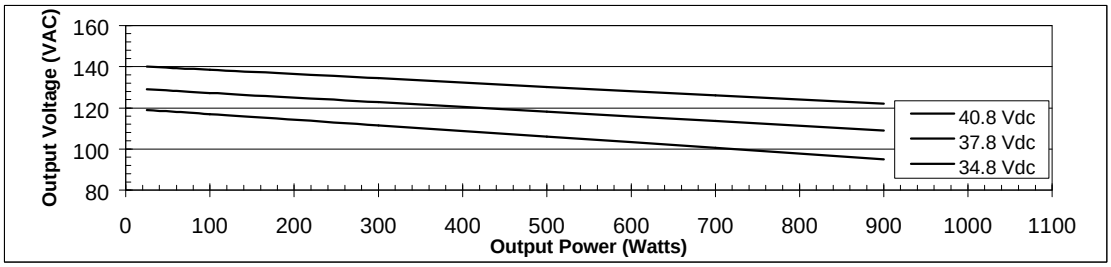
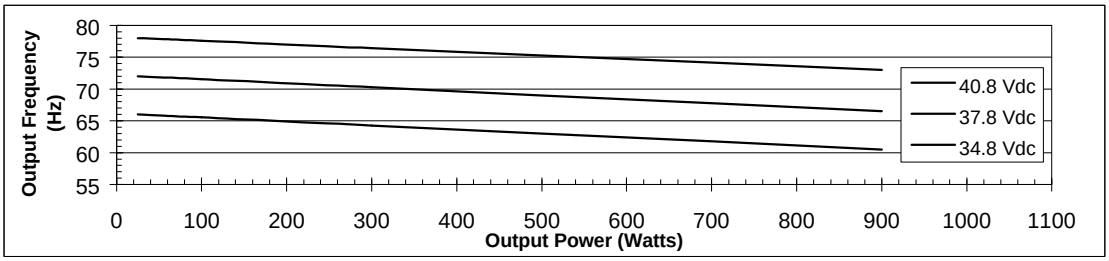
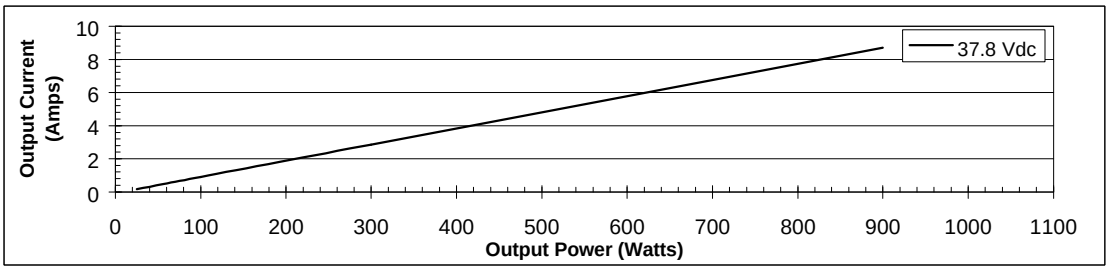
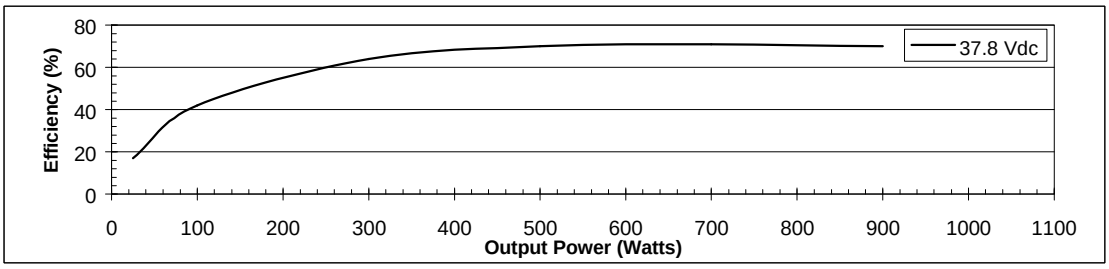


Figure 11-4: Performance Curves for DA24L-1600A Redi-Line Generators









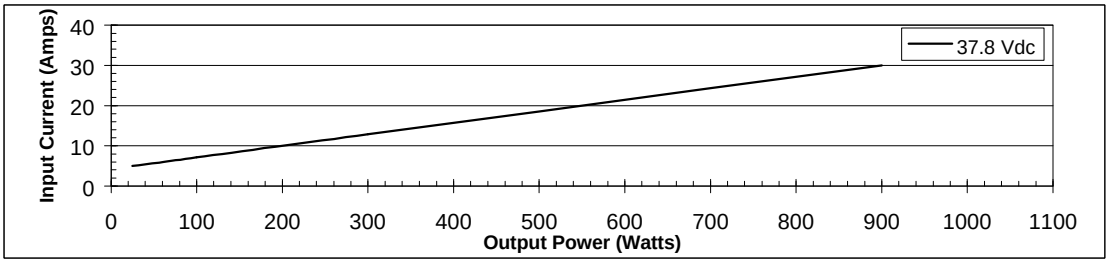


Figure 11-5: Performance Curves for DA36A-900A Redi-Line Generators