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**INSTALLATION &
OPERATING
INSTRUCTIONS FOR
ELECTROL
.75BF2
BELT DRIVEN
AC GENERATOR**



TENDAIRE  **ELECTROL
EQUIPMENT
INC.**

INDUSTRIES, INC.

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SECTION 1 SPECIFICATIONS AND GENERAL DESCRIPTION

SPECIFICATIONS

The model .75BF2 generator is of the revolving armature separately excited type. General specifications are as follows:

Rotation	Clockwise at drive end (call factory for counter-clockwise rotation)
Generators Speed	3600 RPM for rated output. Designed to withstand overspeeds to 15,000 RPM.
Cooling	Forced Fan
Insulation	Class F (155 C rating)
Temperature Rise	50 C at full load, rated RPM
Excitation	12 VDC from vehicle system

General Description of ELECTROL Generator

All ELECTROL generators are built with high quality industrial type components, designed and manufactured by ELECTROL. Bearings are electrical motor grade, lubricated and double sealed precision ball bearings. Field laminations are punched from prime cold rolled steel and armature laminations are electrical steel. The copper magnet wire used in both field and armature is insulated with heavy polyamide and has a class H 200°C rating. All armatures are precision balanced. The rotor is skewed to reduce wave distortion due to slot ripple.

WARRANTY

Tendaire Industries, Inc. / Electrol Equipment, Inc. hereby guarantees for a period of one year as hereinafter stated, the alternator described below to be free from defects in material and workmanship if properly installed, operated and serviced under normal conditions according to our instructions.

Taking apart the generator will VOID the warranty!

All parts will be repaired or replaced by Tendaire / Electrol if found by Tendaire to be defective in material or workmanship within one year FROM DATE OF SHIPMENT from our facility.

All transportation charges on parts or units submitted for replacement or repair under this warranty must be borne by the purchaser. Domestic transportation will be reimbursed at the least expensive mode if the unit is found to be defective in workmanship or materials during the first 90 days after shipment from our facility.

After obtaining a Return Goods Authorization Number-- Ship all generators for warranty consideration to:

There is no other warranty expressed or implied. Tendaire / Electrol shall in no event be liable for consequential damages.

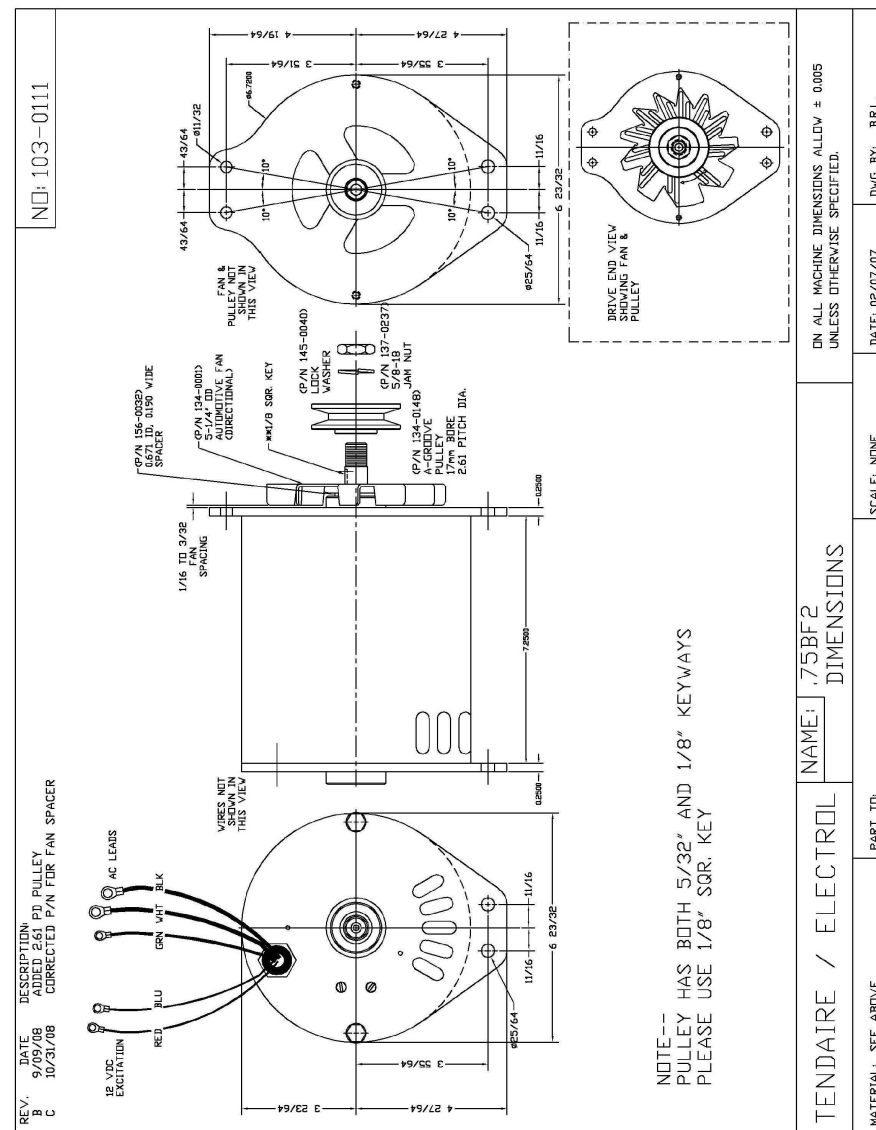
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FIGURE 1 DIMENSIONAL, ELECTROL MODEL .75BF2 GENERATOR

SECTION 2 INSTALLATION

Installing Pulley and Cooling Fan

Proper spacing of the fan blades from the generator endbell is essential for proper cooling. A spacer is used between fan and bearing race to maintain 1/16 to 3/32 inch gap between fan and endbell as shown in figure 7.

Aligning Drive and Generator Pulley

Parallel and angular alignment of the drive pulley on the engine crankshaft and pulley is essential. Align by moving generator on its mounting bracket, not by moving generator pulley. Moving the fan away from the endbell makes it ineffective for cooling the generator and almost always destroys the front bearing if allowed to continue. Alignment may be checked by use of a straight edge held across the pulley on the crankshaft and the generator. (See figure 8.)

Adjusting Belt Tension

Drive belts must be kept tight at all times. A loose, bottoming, or defective belt that is slipping will result in low generator output and excessive belt and pulley wear. Make initial belt tension check when generator is installed; then check belt tension after 1 or 2 hours of operation, again after another 1 or 2 days of operation and then check after 1 week. Following the above initial check, inspect belt for tightness and general condition monthly. Excessive slipping of the belt on the pulley will destroy the front bearing and more.

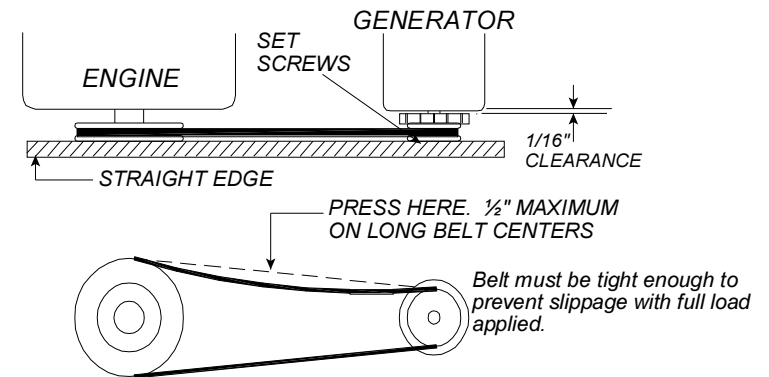
Electrical Connection

Always disconnect battery before doing any electrical wiring. Connect as shown on the appropriate electrical interconnections diagram. Make certain all connections are tight. Do not use the voltage regulator as a terminal block. If the regulator is used as a terminal block, it is easy for terminals on the regulator to become shorted together which may damage regulator or generator.

MAINTENANCE RECORD

[illegible]

FIGURE 8 ALIGNING PULLEY



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INSPECTION PROCEDURES

Before attempting any installation check each of the following and attempt to maximize all items as good installations are essential to continued performance. Far more generators fail due to poor installation than fail due to normal wear.

- 1) **ALIGNMENT:** See Operator's manual; page 7 and figure 8 on page 8.
- 2) **BELT RAP:** The more belt rap (that % of the pulley that the belt is in contact with) the better. It is less likely to slip with proper tension if the belt has a high percentage of wrap.
- 3) **SAME SIZED BELTS:** Be sure where two belts are going over side by side pulleys of the same diameter that both belts are of the same width. If they are not, the smaller belt will, of necessity, slip if the tensions are equal but in any case one of the two belts must slip.
- 4) **FAN SPACING:** See paragraph 1, page 7 and also paragraph 3, page 7 of the operator's manual.
- 5) **OPERATOR'S MANUAL:** Be sure a copy of the operator's manual is left with the machine.
- 6) **STABILITY:** With the hood raised, start the engine at an idle and observe that the generator does not vibrate relative to the engine. Stand so that you are not in line with the fan of the engine or any driven accessories. Gradually increase the engine speed as you watch for excessive vibration of the generator. At all speeds the generator should not vibrate relative to the engine. If it does, brace it additionally and stiffen the brackets, as this type of vibration will ruin bearings, belts, fans, and armatures.

9) **CORRECT NUMBER OF BELTS, AND PULLEYS:** If the generator is driven by one belt only, the generator must be ordered with a 3-1/2" single groove pulley. Failure to do this will result in belt slippage, bearing failure, destroyed fans, pulleys, and armatures.

10) **PRACTICES:** This list is not intended to be all inclusive, as good mechanical and electrical sense and practices are expected and essential for all installations.

Initial Operation

Before placing generator in operation for the first time, inspect unit to make certain electrical connections, mounting and alignment is correct. Review Section 2.

Operation Precautions

The following precautions should be followed whenever operating the generator. Failure to observe these precautions could result in damage to the equipment.

CAUTION

TURN GENERATOR SWITCH OFF WHEN THROUGH USING IT, THE FIELD COILS MAY DRAIN THE BATTERY IF SWITCH IS LEFT ON.

CAUTION

BEFORE TURNING OFF THE ENGINE, RETURN HAND THROTTLE TO NORMAL DRIVING POSITION TO AVOID DIESELING.

CAUTION

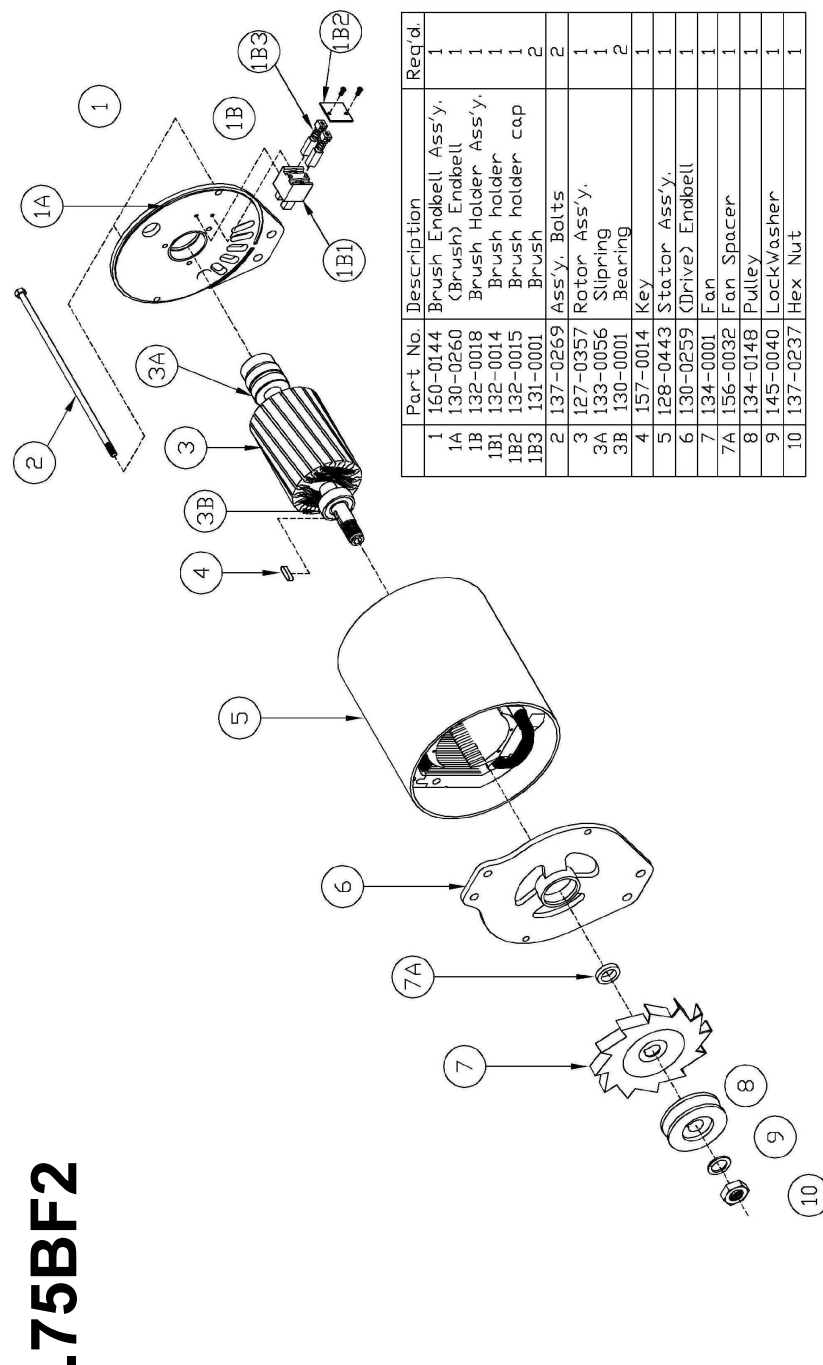
IN APPLICATIONS WHERE GENERATOR IS SUPPLYING POWER TO INDUCTION MOTORS SET THROTTLE FOR CORRECT FREQUENCY. INDUCTION MOTORS WILL OVERHEAT IF FREQUENCY IS NOT CORRECT. THE GENERATOR OUTPUT IS 60 CYCLE AT GENERATOR SPEED OF 3600 RPM.

PLEASE NOTE:

THIS GENERATOR PUTS OUT 70-80 VOLTS FOR HEATING ONLY AND IS NOT INTENDED TO RUN MOTORS OR TOOLS OF ANY KIND.

Frequency Adjustment

In applications where generators are supplying power for lights, heating and power tools with universal motors, frequency control generally is not critical. In applications where generators are supplying power to induction motors, however, excessive variations in frequency may result in motor overheating. Most induction motors will operate satisfactorily when frequency deviation does not exceed $\pm 5\%$ of rated.



.75BF2

Disassembling Generator

- 1) Refer to Page 14.
- 2) Disconnect output lead wires and field wires at generator.
- 3) Remove generator from mounting brackets.
- 4) Remove thru bolts.
- 5) Loosen pulley set screws and pull fan and pulley assembly from shaft. Keep retaining key with pulley.
- 6) Remove brush end cap.
- 7) Remove drive end cap.
- 8) Remove rotor from stator assembly.

Assembling Generator

- 1) Refer to Page 14.
- 2) Install rotor in stator.
- 3) Install drive end cap.
- 4) Install brush end cap. Make certain brush holders and brushes are positioned properly. (See Brush and Brush holder Maintenance.)
- 5) Install thru bolts.
- 6) Install pulley and fan. See Section 2 Installation Instructions.
- 7) Mount generator, align pulleys and tighten belt. See Section 2 Installation Instructions.
- 8) Connect field and output leads. Refer to appropriate interconnection diagram, Figure 9 or 10 depending on vehicle ground and whether system includes or does not include a voltage regulator.
- 9) Check belt tension at intervals listed in Section 2.

OPERATING SYNCHRONOUS AND INDUCTION MOTORS

Induction and synchronous motors are often difficult to start, and operate correctly. This can be caused by a number of different reasons, some of which are listed below:

1) INCORRECT FREQUENCY

Position the throttle control so generator frequency is at 62 cycles with no load on the generator. Check for belt slippage under load.

2) VOLTAGE LOW AT GENERATOR FIELD

Set your engine speed at idle, and measure the voltage between the red and blue lead of the generator when the generator is turned on. This should measure at least 13.5 volts on a 12 Volt battery/charging system. The voltage at your battery terminals should be approximately 14.5 volts with the vehicle running. NOTE that at 60° F, your battery will begin to charge at 13.7 volts, and emit gases at 15.5 volts.

3) LINE VOLTAGE DROP BETWEEN GENERATOR AND MOTOR

Check the voltage drop between the generator output leads, and the motors input leads. Voltage drops can become excessive on improperly sized, and/or too long an extension cord.

MINIMUM WIRE GAUGE FOR STANDARD DUTY EXTENSION CORDS PLUGGED INTO AN ALTERNATOR			
AMP RATING	LENGTH OF EXTENSION CORD IN FEET		
	25 ft.	50 ft.	100 ft.
5	16 Ga.	16 Ga.	16 Ga.
8	16 Ga.	16 Ga.	14 Ga.
10	16 Ga.	14 Ga.	12 Ga.
15	14 Ga.	12 Ga.	10 Ga.
20	12 Ga.	10 Ga.	8 Ga.
30	10 Ga.	8 Ga.	-----

SECTION 4 MAINTENANCE

Preventative Maintenance

Preventative maintenance is the practice of checking the equipment at regular intervals and correcting minor disorders before they become serious. The following chart is enclosed as a guide for establishing a preventative maintenance program.

PREVENTATIVE MAINTENANCE SCHEDULE PROCEDURE

Daily	Check for proper output voltage.
Weekly	Check belt tension and condition of belt. Belt should always be adjusted tight enough to prevent slipping. Make certain set screws holding pulleys in place are tight. Press down on center of belt. Belt should not deflect more than 1/2 inch on long belt center; less on closer coupled installations. Over-tightening will shorten bearing life or bend the shaft. <u>Do Not Over-tighten!</u>
Monthly	Check electrical connections. Tighten if loose.
Yearly	Check condition of brushes. Replace if worn to less than 3/8 inch in length.
Engine Overhaul	Replace bearings. True up slip rings and replace brushes if required.

Brush and Brush Holder Maintenance

Proper maintenance of brushes and brush holders is essential to good generator operation. The following steps are essential:

- 1) Make certain brushes and brush holder are kept clean so that brushes do not stick in the brush holder. A dirty slip ring assembly will also result in poor conduction of current.
- 2) Replace brushes if they are worn to less than 3/8 inch in length

Bearings

Bearings are the double sealed ball bearing type. Periodic replenishment of grease is not required. Replace the bearings if they become noisy. This indicates they have become worn or dry. Several years of operation can be generally expected before replacement becomes necessary.

The bearings are a press fit on the generator shaft. They must be pulled from the shaft and new bearing must be pressed onto the shaft. When pressing bearings onto the shaft, care must be taken that pressure is applied only on the bearing inner ring. Pressure applied to the outer ring will damage the bearing. Final position of bearing on shaft is with bearing inner ring resting against bearing shoulder on the shaft.

SYMPTOM	PROBABLE CAUSE	REMEDY
High Voltage	Overspeed	Reduce speed to rated 60 cycle, 3600 RPM.
Low Voltage or no Output Voltage	Switch Open	Close.
	Fuse Blown	Replace fuse.
	Overload	Reduce load to rated wattage.
	Underspeed	Increase speed to rated 60 cycle, 3600 RPM.
	Loose or defective belt causing underspeed	Check belt condition and tightness. Tighten loose belt as outlined in Section 2, Installation Instructions.
	Defective Generator	Test as follows: Test for 12 Volts going to field. If no change in voltage occurs, generator is probably at fault. Return defective generator to factory for repair.
	Dirty or Worn Brushes or Slip Rings	Check brushes and slip rings. Replace brushes if worn to less than 3/8" in length. Make certain brushes move freely in brush holders.
	Shorted or Open Field Windings	Continuity test for open windings. Test to ground for shorts. Return to factory if windings are open or shorted.
	Shorted or Open Field Windings	Disconnect wires at brush holder with brushes against slip rings, continuity test for open windings. Test to ground for shorts. Return generator to factory for repair if windings are open or shorted.
Noisy Generator	Worn, Dirty, or Improperly positioned Brushes or Worn or Dirty Slip Rings. Note: Brush sparking will probably be evident.	Check condition of brushes and slip rings. Replace brushes if worn to less than 3/8" in length
	Worn or dry bearings	Inspect bearings. Replace if worn or dry. Note: Turn bearing, if it feels rough, replace.