

INSTRUCTION MANUAL FOR

ELECTRONIC MANUAL VOLTAGE CONTROL

Model: MVC 300

Part Number: 9 1210 00 106



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WARNING

To prevent personal injury or equipment damage, only qualified technicians/operators should install, operate, or service this device.

CAUTION

Meggers and high potential test equipment should be used with extreme care. Incorrect use of such equipment could damage components contained in the device.

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It is not the intention of this manual to cover all details and variations in equipment, nor does it provide data for every possible contingency regarding installation or operation. The availability and design of all features and options are subject to change without notice. Should further information be required, call Basler Electric Company, Highland, IL.

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SECTION 1

GENERAL INFORMATION

1-1. PURPOSE

The Electronic Manual Voltage Control (MVC-300) is used as a back-up control device to provide manual voltage control in case of voltage regulator failure. The unit can be mounted on a control panel in ground vehicles, stationary equipment or shipboard locations.

1-2. OVERALL DESCRIPTION

The MVC-300 is a solid-state device enclosed in a metallic dark grey chassis and designed to be 'through-the-panel' mounted with controls accessible to an operator from the front of the panel. A terminal strip located on the rear of the device facilitates installation and operation. A **MANUAL VOLTAGE ADJUST** control and an **AUTO-OFF-MANUAL** voltage control mode switch are provided on the front panel.

1-3. SPECIFICATIONS

Table 1-1 provides the electrical and physical specifications of the MVC 300.

Table 1-1. Specifications.

Input Power:	120 Vac, $\pm 10\%$ Single-Phase, 50-320 Hz. 240 Vac, $\pm 10\%$ Single-Phase, 50-320 Hz.
Output Adjustment Range: 120 Vac Input: 240 Vac Input:	1 to 32 Vdc or 1 to 63 Vdc. 1 to 63 Vdc or 1 to 125 Vdc.
Watts Dissipated:	30 W maximum.
Minimum Residual Voltage for Build-up:	6 Vac.
Ambient Operating Temperature:	-40 °F (-40 °C) to +158 °F (+70 °C)
Ambient Storage Temperature:	-85 °F (-65 °C) to +212 °F (+100 °C)
Shock	Withstands up to 15 G's in each of three mutually perpendicular axes.
Vibration:	Withstands the following: 5 - 27 Hz @ 1.3 G's, 27 - 52 Hz @ 0.036" double amplitude, 52 - 500 Hz @ 5 G's.
Weight:	3.0 lbs. (1.36 kg) net, 5 lbs. (2.26 kg) shipping.

SECTION 2

PRINCIPLES OF OPERATION

2-1. GENERAL

- a. The Electronic Manual Voltage Control (MVC-300) is a phase-controlled, silicon-controlled, rectifier (SCR) bridge. By adjusting the front panel **MANUAL VOLTAGE ADJUST** control, the firing angle of the SCR change providing an adjustable voltage level to the exciter field.
- b. During start-up, the build-up circuit holds the SCRs power bridge at maximum output. When the voltage has built-up to approximately 30 Vac, the internal build-up circuit relinquishes control to the **MANUAL VOLTAGE ADJUST** control on the front panel.
- c. The **AUTO-OFF-MAN** voltage control mode switch allows transfer from the voltage regulator to the Manual Voltage Control or from Manual Voltage Control to voltage regulator. A free wheeling diode remains connected to the field to allow safe switching without arcing.
- d. The MVC-300 is designed to operate from 120 or 240 Volt nominal sources without any electrical changes such as tap selection or terminal connections. Taps are provided to select 32, 63, or 125 volt maximum outputs.

SECTION 3

INSTALLATION AND OPERATION

3-1. INSTALLATION

a. The MVC-300 is designed for 'through-the-panel' mounting. Refer to the drilling template of Figure 3-1 and to the outline drawing Figure 3-2. The front panel of the MVC-300 is detachable by removal of the knob and locking nut from the **MANUAL VOLTAGE ADJUST** control and the four corner screws. The MVC-300 can be installed in any position without affecting its operating characteristics, however, it is preferable that the device be mounted vertically to improve ventilation. The **MANUAL VOLTAGE ADJUST** control can be removed and installed remotely by using terminals 14, 15 and 16 or a Basler motor operated control (MOC 2) with a 10 k ohm control element can be connected to terminal 14, 15, and 16. See Figure 3-3 Interconnection Diagram. It is imperative that the MVC-300 be connected to provide an output which corresponds to the voltage regulator ratings in order to prevent damage to the MVC-300 or the regulator. When the MVC-300 and voltage regulator are properly matched, the MVC-300 provides smooth control of the generator output voltage in the manual mode.

b. The chart (Table 3-1) is used to determine the appropriate input voltage and to select the output voltage. Based on voltage regulator model, from column 1, the proper voltage input rating from column 3 is selected and connections are made between the generator and terminals 23 and 24 which will supply the specified voltage. The MVC-300 has a wire jumper connected from the printed circuit board of the MVC-300 to the barrier strip. Column 4 indicates the correct terminal for this jumper connection.

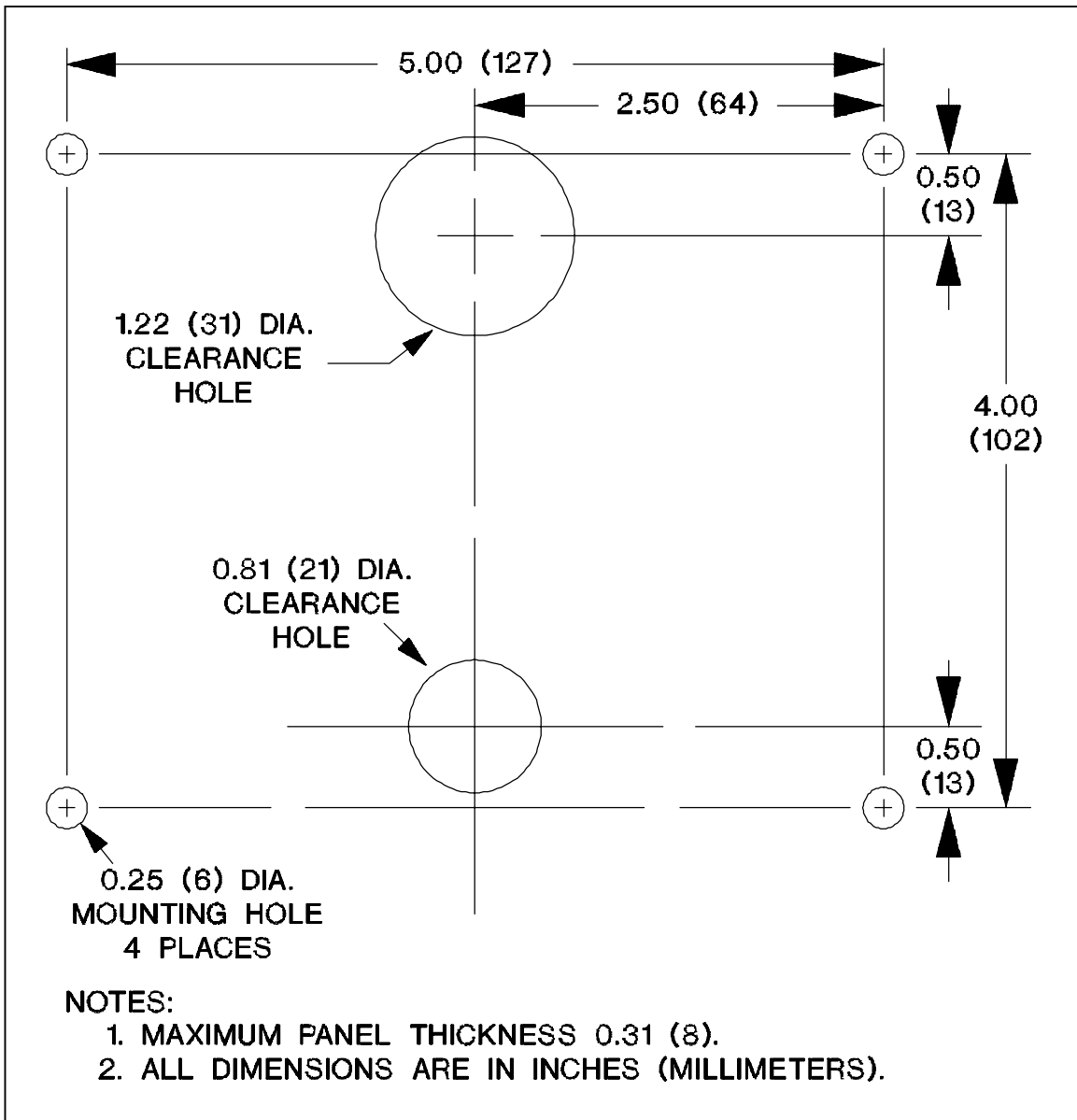


Figure 3-1. Panel Drilling Template

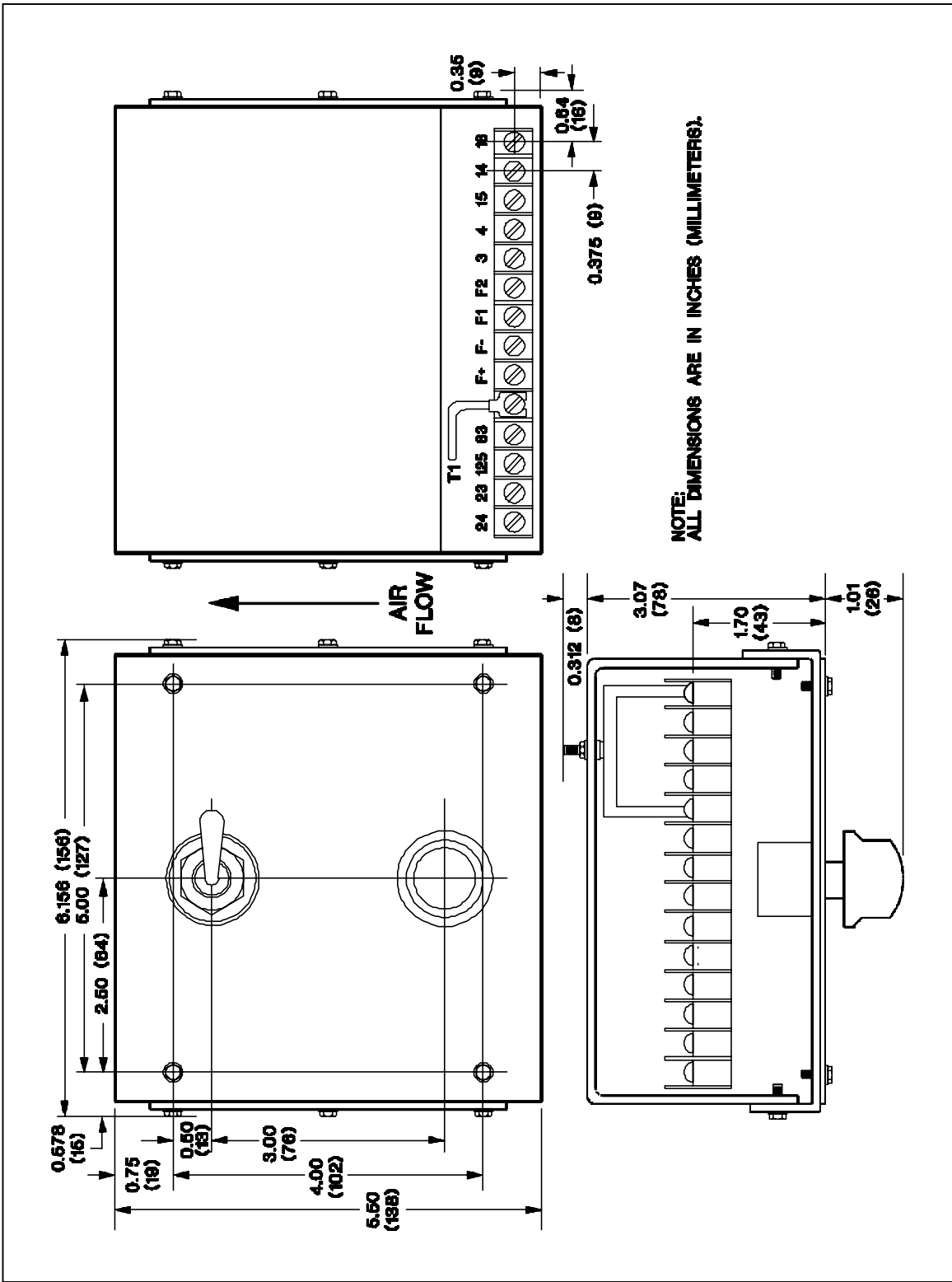


Figure 3-2. MVC 300 Outline Drawing.

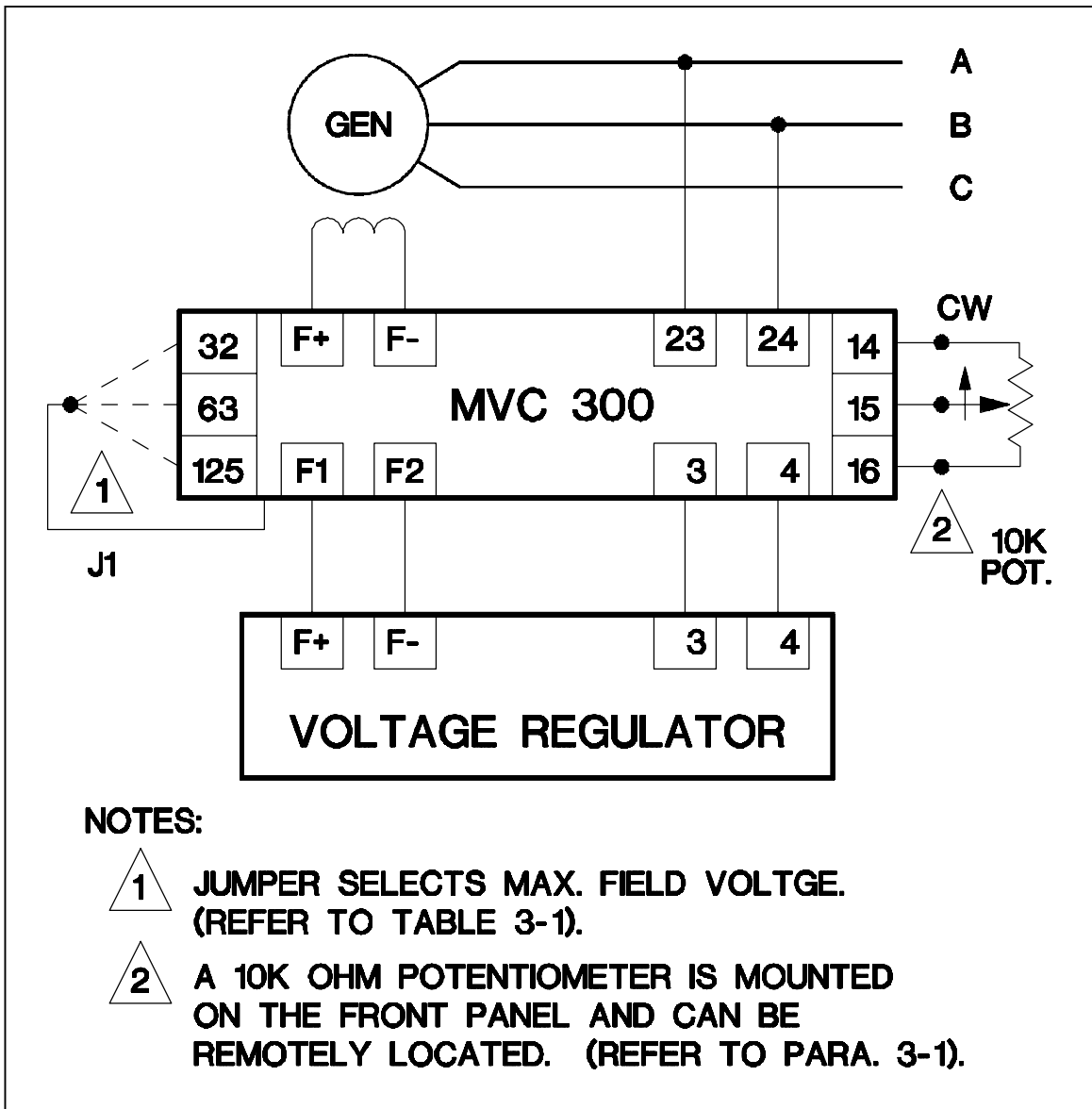


Figure 3-3. MVC 300 Interconnection Diagram, Typical.

Table 3-1. Voltage Selection Chart.

Voltage Regulator Model	Voltage Regulator Rating	MVC Input Voltage	Voltage Selection Terminal
KR7F,KR7FF, SR8A,SR8F	125 V @ 7 A or less	240 Vac	125
SR4A,SR4F, KR4F,KR4FF	63 V @ 7 A or less	120 Vac	63
XR2001,XR2004	63 V @ 7 A or less	240 Vac	63
KR2F,KR2FF	32 V @ 7 A or less	120 Vac	32
APR63-5	63 V @ 7 A or less	240 Vac	63
APR125-5	125 V @ 7 A or less	240 Vac	125

3-2. OPERATION

a. With the **AUTO-OFF-MANUAL** voltage control mode switch placed in **MANUAL**, the automatic voltage regulator is removed from the line and generator output voltage is controlled manually by the **MANUAL VOLTAGE ADJUST** control. When placed in the **AUTOMATIC** position, the generator output voltage is controlled by the automatic voltage regulator. Complete excitation shutdown occurs when the voltage control mode switch is placed in the **OFF** position.

CAUTION

With the voltage control mode switch in either **MANUAL** or **OFF** position, some terminals of the regulator are connected to the generator and present a potential shock hazard. No attempt should be made to remove or troubleshoot the regulator while the generator is running.

b. Start the prime mover following the manufacturer's procedure, set the **MANUAL VOLTAGE ADJUST** control to minimum (counter-clockwise), and place the **AUTOMATIC-OFF-MANUAL** voltage control mode switch in **MANUAL** position. Note that the voltage may be unstable (hunting) if the **MANUAL VOLTAGE ADJUST** control is set below 30 Vac.

c. Allow the generator to build-up and slowly increase the generator output voltage with the **MANUAL VOLTAGE ADJUST** control until the generator output voltage reaches the desired level.

3-3. OPERATIONAL TEST

To verify that the MVC-300 is operating properly, use the following procedure and the connections of Figure 3-4 for a bench test. Notice that the voltage regulator is not necessary for this test.

- (1) With no power applied to the MVC-300 and all connections to the voltage regulator removed, place the **AUTO-OFF-MANUAL** voltage control mode switch to the **MANUAL** position.
- (2) Connect a 120 Vac 100 Watt light bulb to terminals F+ and F- of the MVC-300, and connect the jumper to Terminal 63.

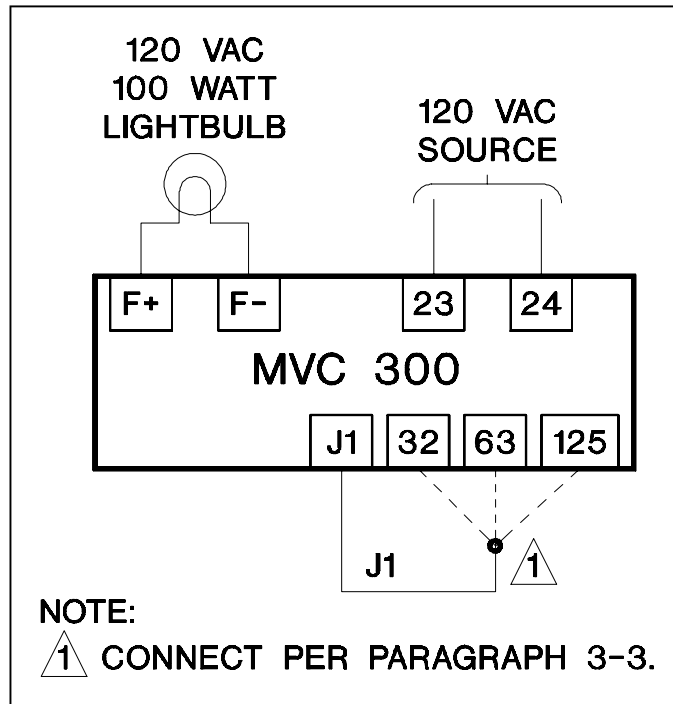


Figure 3-4. Operational Test Set-Up Diagram.

- (3) With the **MANUAL VOLTAGE ADJUST** control fully counter-clockwise (CCW) apply a source of 120 Vac to Terminals 23 and 24 of the MVC-300. Slowly rotate the **MANUAL VOLTAGE ADJUST** control clockwise (CW) and observe that the brightness of the light bulb increases proportionally until it reaches full brightness.
- (4) Rotate the **MANUAL VOLTAGE ADJUST** control fully counter-clockwise (CCW). Remove the 120 Vac source from Terminals 23 and 24 and select 32 volt operation by moving the jumper to Terminal 32. Apply the 120 Vac source to Terminals 23 and 24 of the MVC and observe that the brightness of the light bulb increases as the **MANUAL VOLTAGE ADJUST** control is moved clockwise (CW). Notice that the brightness of the bulb is approximately half of its previous brightness with the jumper connected to this terminal.

SECTION 4
MAINTENANCE AND TROUBLESHOOTING

4-1. PREVENTIVE MAINTENANCE

A periodic inspection should be made of the unit to insure it is clean and free from accumulations of dust and moisture. Verify that all terminal connections of the MVC-300 and the voltage regulator are tight.

4-2. TROUBLESHOOTING

In the event of failure/defective operation of the unit, Table 4-2 provides information to determine the probable cause of the malfunction and the solution. Refer to Paragraph 3-3 and to Figure 3-4 for the bench test procedure.

4-3. RECOMMENDED SPARE PARTS

Due to a protective coating, repair/replacement of individual components on the printed circuit board assembly should not be attempted and the complete replacement of the board is recommended. When ordering replacement parts from Basler Electric always specify the part number, the quantity and the description of the item.

Table 4-1. Replacement Parts List.

Reference Designator	Part Number	Quantity	Description
-----	9 1210 01 103	1	Printed Circuit Board Assembly
F1,F2	04592	2	Fuse, 10 A, 250 V

Table 4-2. Troubleshooting.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

MVC 300 APPEARS TO BE DEFECTIVE.

Step 1. Verify that wiring is correct and proper in accordance with Figure 3-3.

If wiring is defective or incorrect, repair as needed.

If wiring is not defective or incorrect, proceed to Step 2.

Step 2. Check that the **AUTO-OFF-MAN** front panel switch turns off the excitation.

If the excitation does not turn off, replace the MVC 300.

If the excitation shuts down, proceed to Step 3.

Step 3. With the **AUTO-OFF-MAN** front panel switch in **MANUAL**, verify that the generator output voltage builds up.

If the generator output voltage builds up, proceed to Step 6.

If the generator output voltage does not build up, proceed to Step 4.

Step 4. Verify that internal fuses F1 and F2 are good.

If either fuse is defective or blown, replace fuse and proceed to Step 5.

If both fuses are not defective or blown, replace the MVC 300.

Step 5. Verify that the generator output voltage builds-up.

If the generator output voltage does not build-up, replace the MVC 300.

If the generator output voltage builds-up, proceed to Step 6.

Step 6. Verify that the generator output can be controlled by the MVC 300 front panel potentiometer.

If the generator output voltage cannot be controlled by the MVC 300, replace the MVC 300.

If the generator output voltage can be controlled by the MVC 300, proceed to Step 7.

Step 7. Verify that the generator works in the front panel switch **AUTO** position.

If the generator fails to operate with the front panel switch in the **AUTO** position, troubleshoot the voltage regulator.