GEK-83454

INSTRUCTIONS

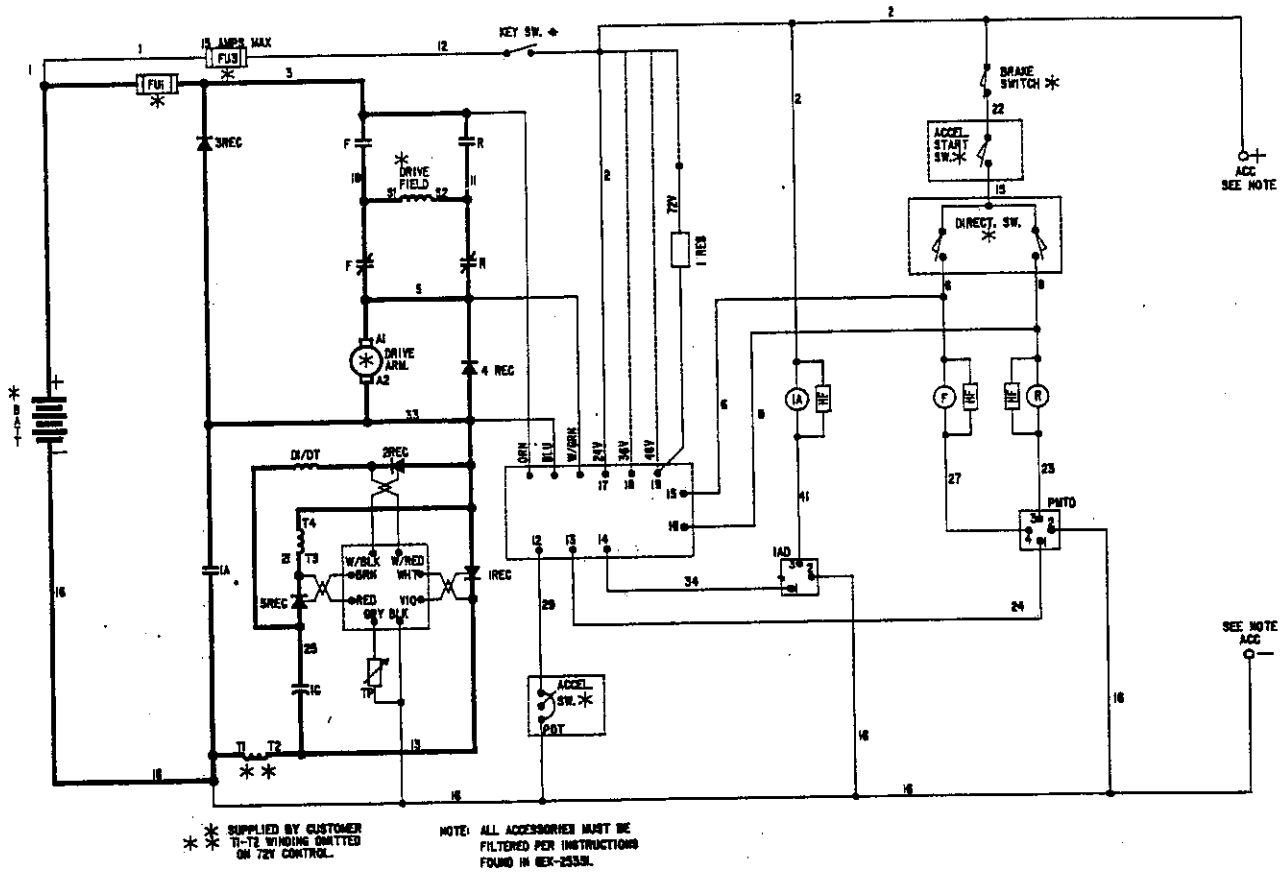
MAINTENANCE AND TROUBLESHOOTING FOR THE EV-10* SCR CONTROL

GENERAL ELECTRIC

*Trademark of General Electric

JANUARY, 1983

TABLE OF CONTENTS



NOTE

Heavy lines are power circuits;
light lines are control circuits.

Figure 1.5.1
EV-10 ELEMENTARY

Ref. 91.TMP.9

CHAPTER 5
MAINTENANCE AND TROUBLESHOOTING

SECTION 1
GENERAL MAINTENANCE INSTRUCTIONS

The SCR control, like all electrical apparatus, does have some thermal losses. The semiconductor junctions have finite temperature limits above which these devices may be damaged. For these reasons, normal maintenance should guard against any action which exposes the components to excessive heat, such as steam cleaning, or which reduces the heat dissipating ability of the control, such as restricting air flow.

The following DO'S and DON'TS should be observed:

1. Advise the truck manufacturer of any controls that will be used in ambients of 100°F (40°) or over.

2. Use filters on all external components having inductive coils. Refer to the vehicle manufacturer for specifications.

3. Do not steam-clean the control. In dusty areas, use low pressure air to blow off the control. In oily or greasy areas, use a mild solution of detergent, denatured alcohol, or Freon TF degreaser to wash off the control; then blow it completely dry with low pressure air.

4. Mount the SCR panel against the frame of the truck. The truck frame, acting as an additional heat sink, will give improved truck performance by keeping the SCR control package cooler. Add Silicone Grease (Dow Corning No. 342 or equivalent) between the SCR Control base and the vehicle frame.

5. Keep the terminal boards and other exposed SCR control parts free of dirt and paint which might change the effective resistance between points.

CAUTION

THE TRUCK SHOULD NOT BE PLUGGED IN WHEN IT IS JACKED UP AND THE DRIVE WHEELS ARE IN A FREE-WHEELING POSITION. THIS CAN CREATE EXCESSIVE VOLTAGES THAT CAN BE HARMFUL TO THE CONTROL.

SECTION 2
TROUBLESHOOTING DIAGNOSTIC DIAGRAM

HOW TO USE THE DIAGNOSTIC DIAGRAM

DIAGRAMS ARRANGED BY FAILURE

The diagrams are arranged by failure modes. These modes are described in oval-shaped boxes at the top of each page.

FIND YOUR SYMPTOM AND FOLLOW THE ARROWS

Find the symptom that describes your vehicle's failure mode and proceed to the next step following the arrow.

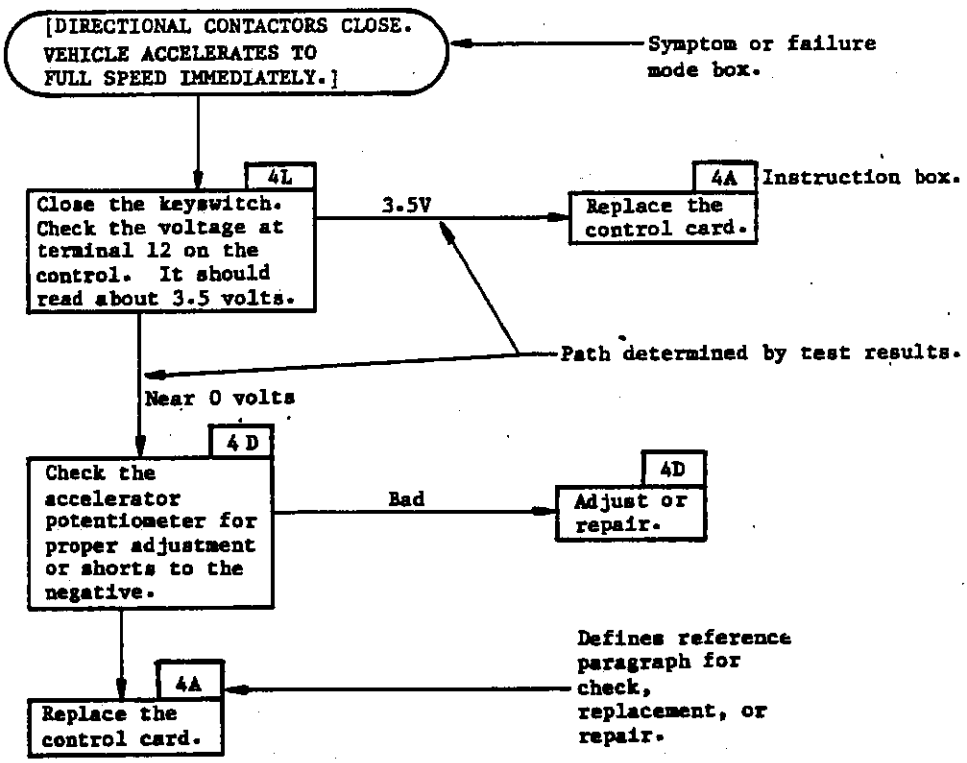
FOLLOW THE INSTRUCTIONS

Follow the instruction described in the box and proceed to the next box along the arrow path which coincides with the result of your action.

NOTE

The numbers and letters (i.e., 4A) enclosed in small boxes in the upper right corner of some instruction boxes correspond to a particular segment in Section 4, Checking Components. Please refer to that segment for more detailed instructions.

EXAMPLE


[DIRECTIONAL CONTACTORS CLOSE. VEHICLE ACCELERATES TO FULL SPEED IMMEDIATELY.]
Symptom or failure mode box.
4L
Close the keyswitch. Check the voltage at terminal 12 on the control. It should read about 3.5 volts.
3.5V
4A
Replace the control card.
4A Instruction box.
Path determined by test results.
Near 0 volts
4 D
Check the accelerator potentiometer for proper adjustment or shorts to the negative.
Bad
4D
Adjust or repair.
4A
Replace the control card.
Defines reference paragraph for check, replacement, or repair.

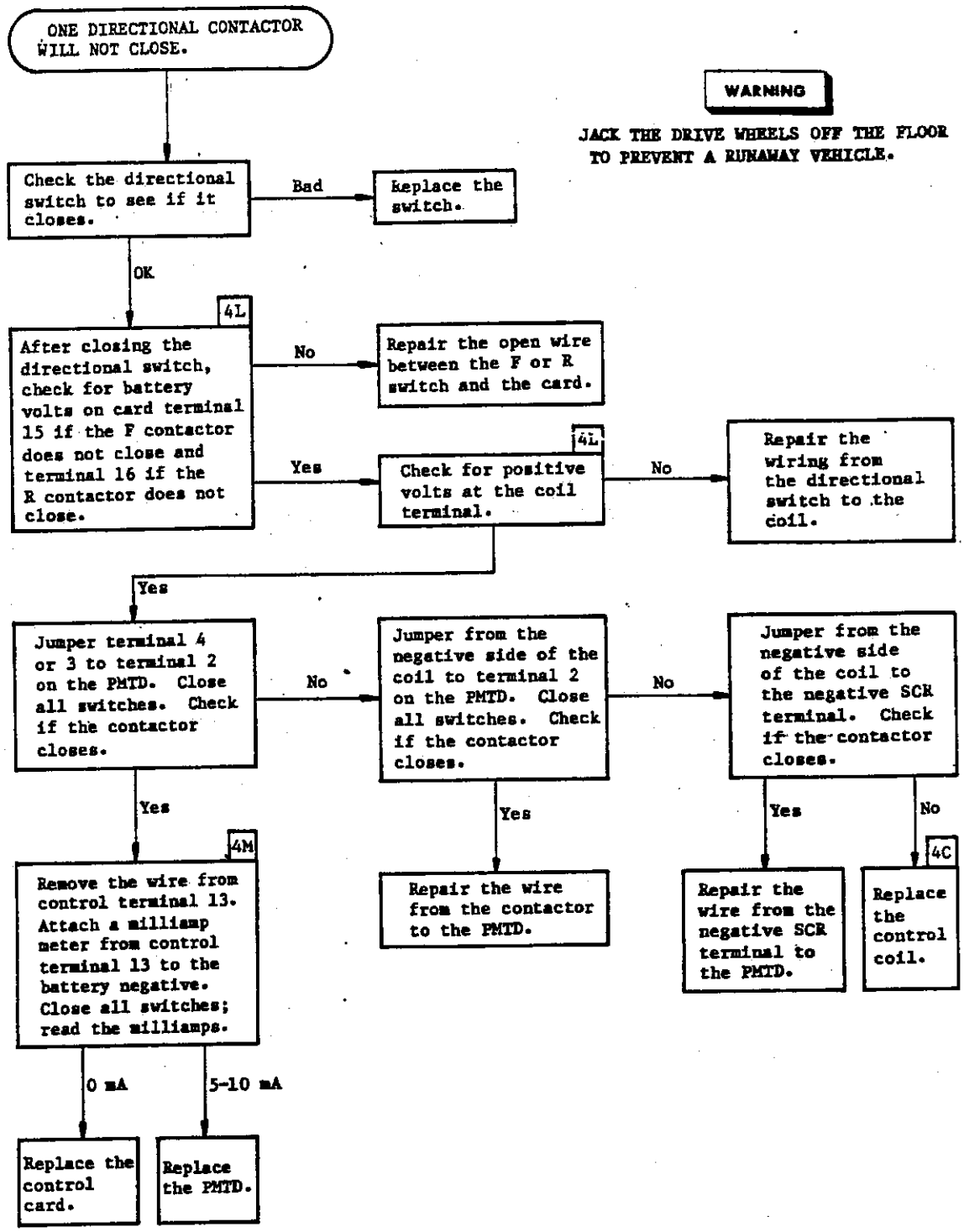
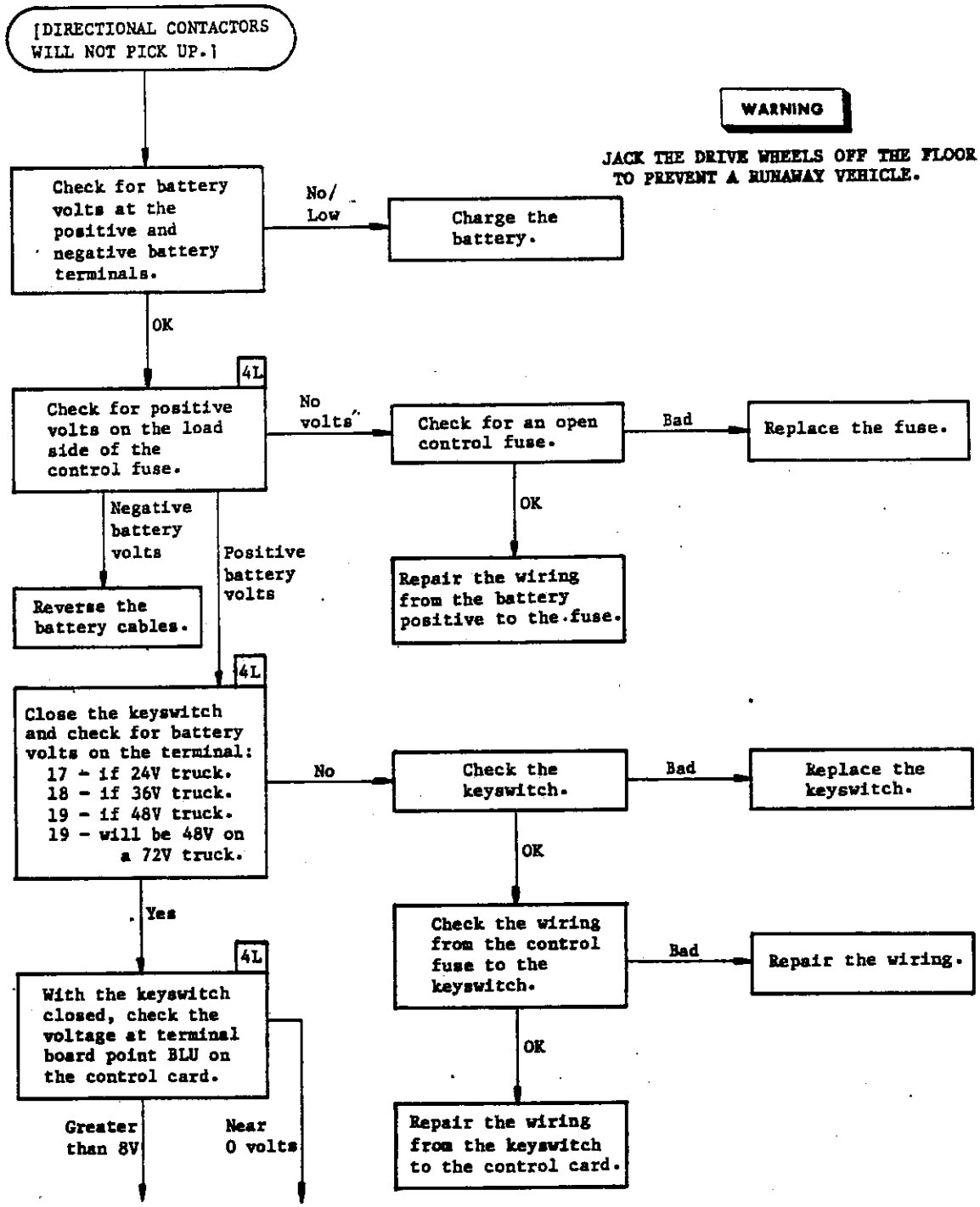


Figure 5.2.1, Sheet 1
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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TROUBLESHOOTING DIAGNOSTIC DIAGRAM

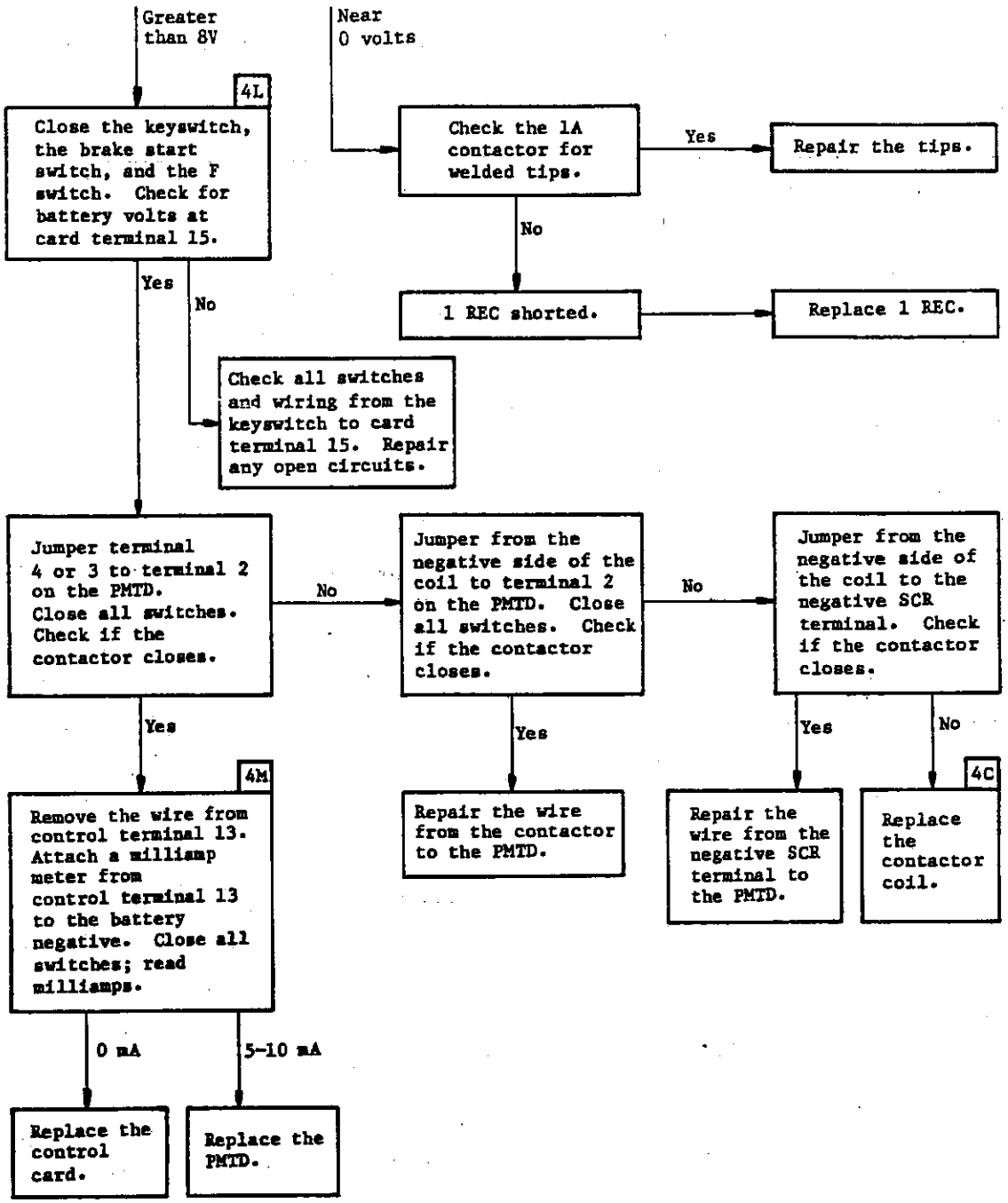
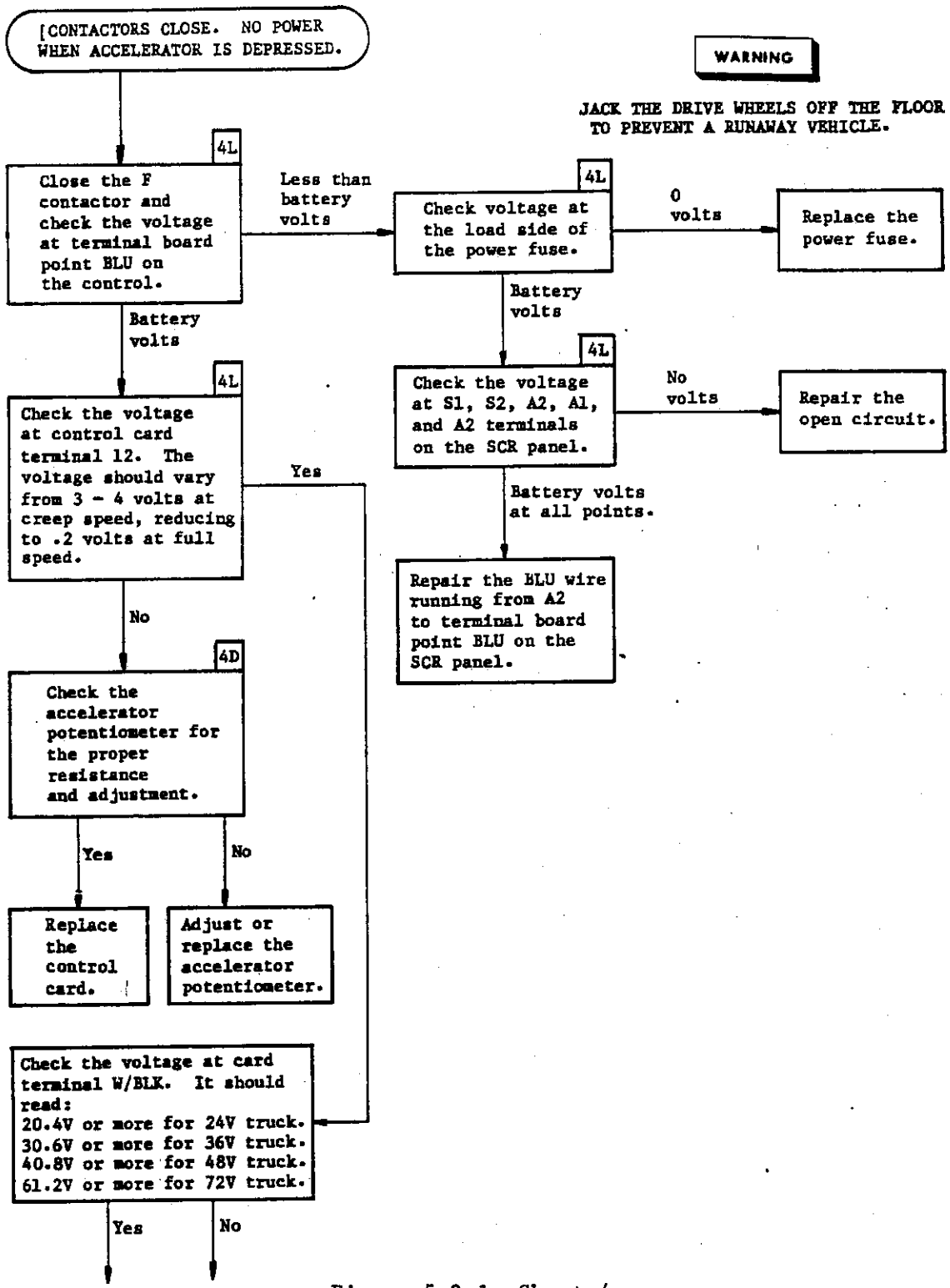


Figure 5.2.1, Sheet 3
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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TROUBLESHOOTING DIAGNOSTIC DIAGRAM

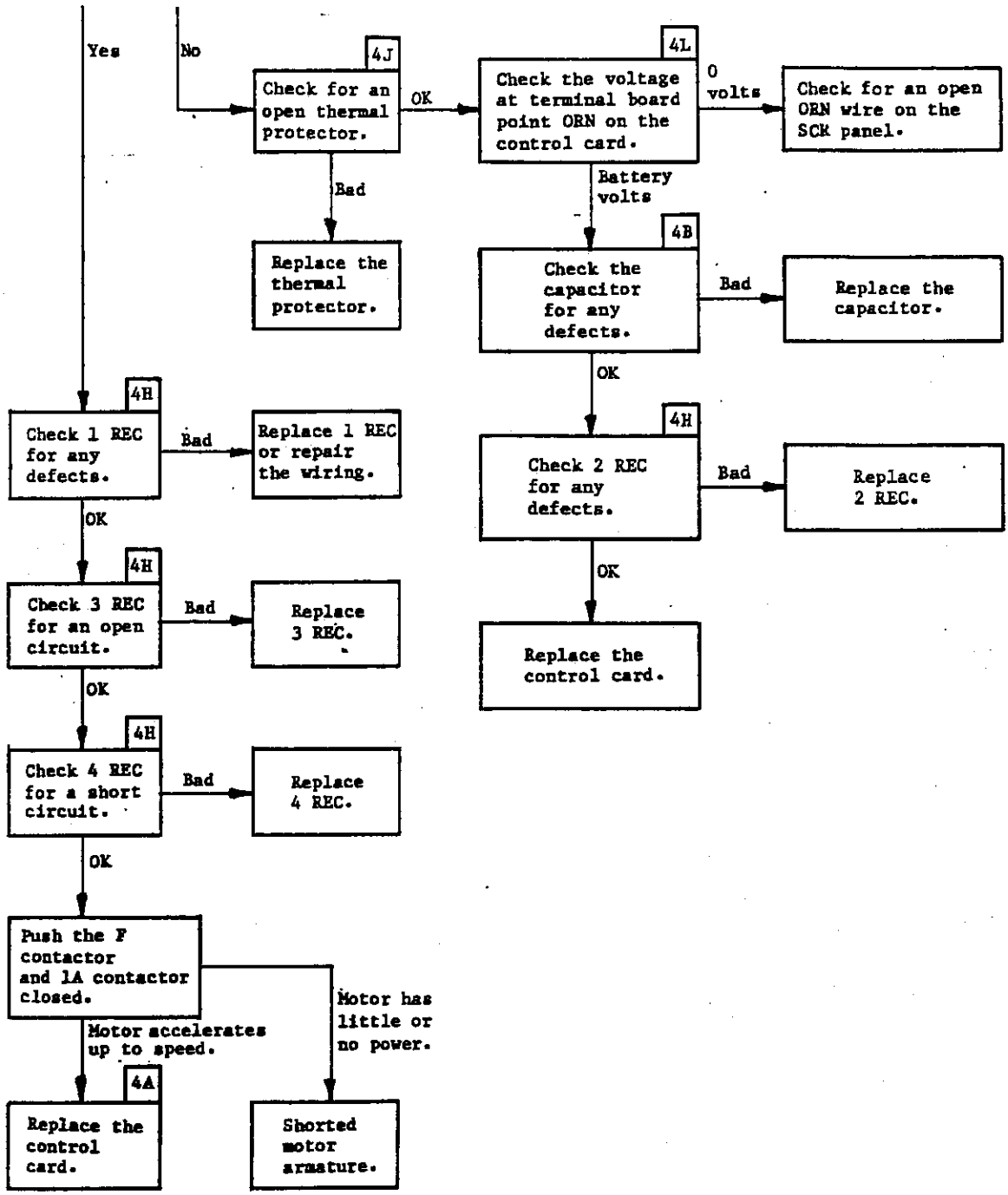
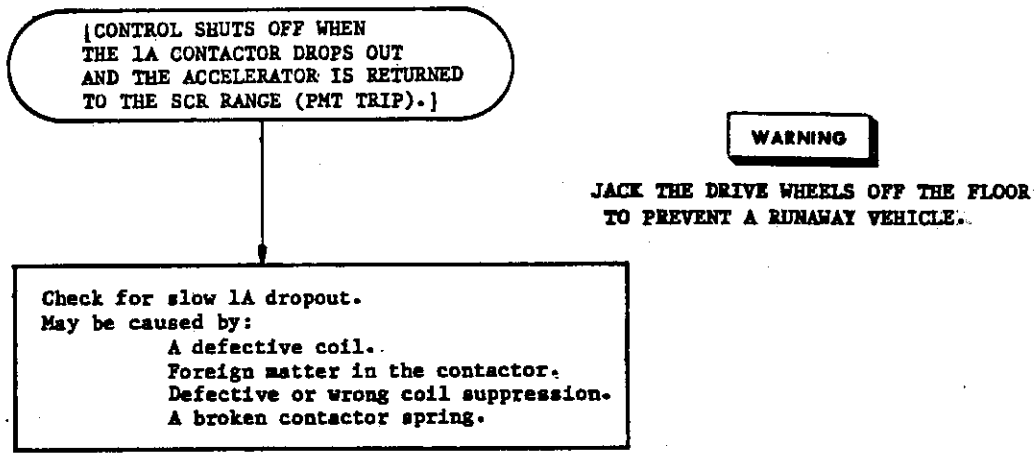


Figure 5.2.1, Sheet 5
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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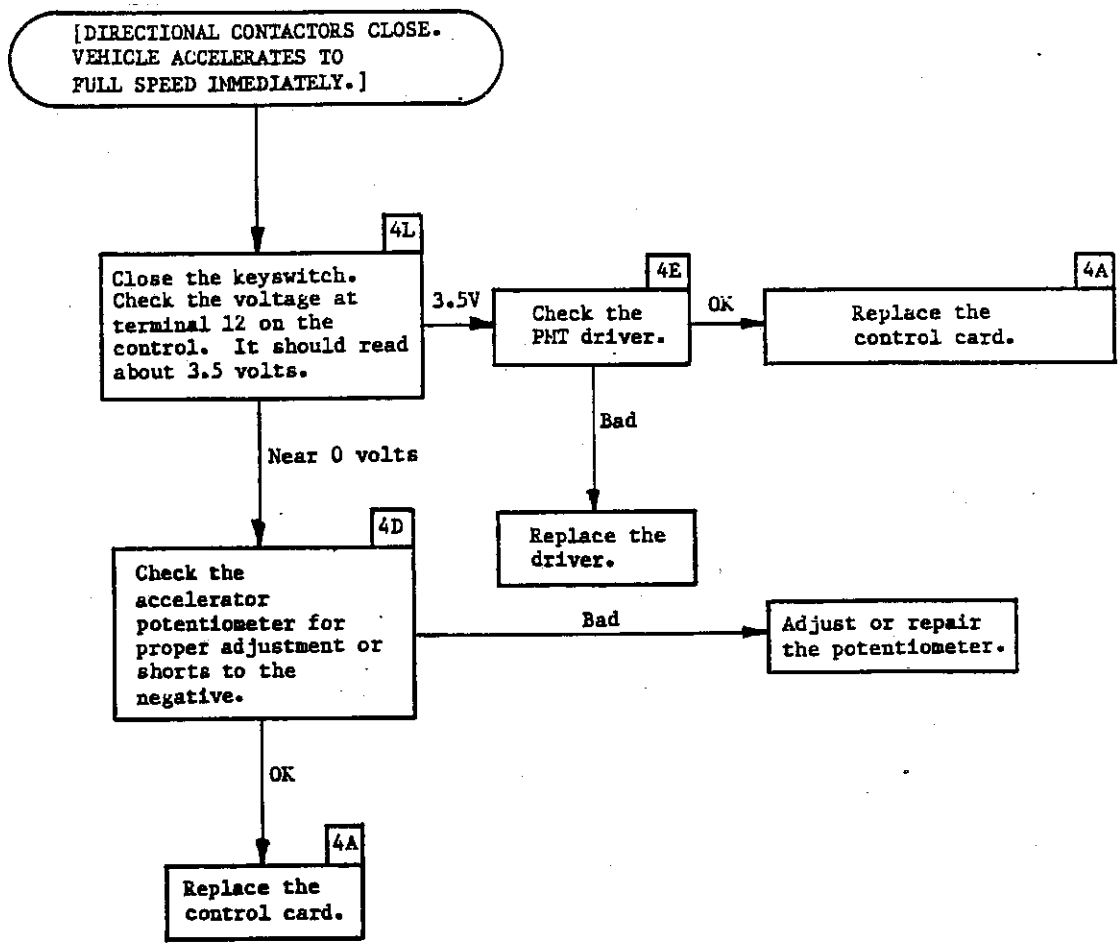
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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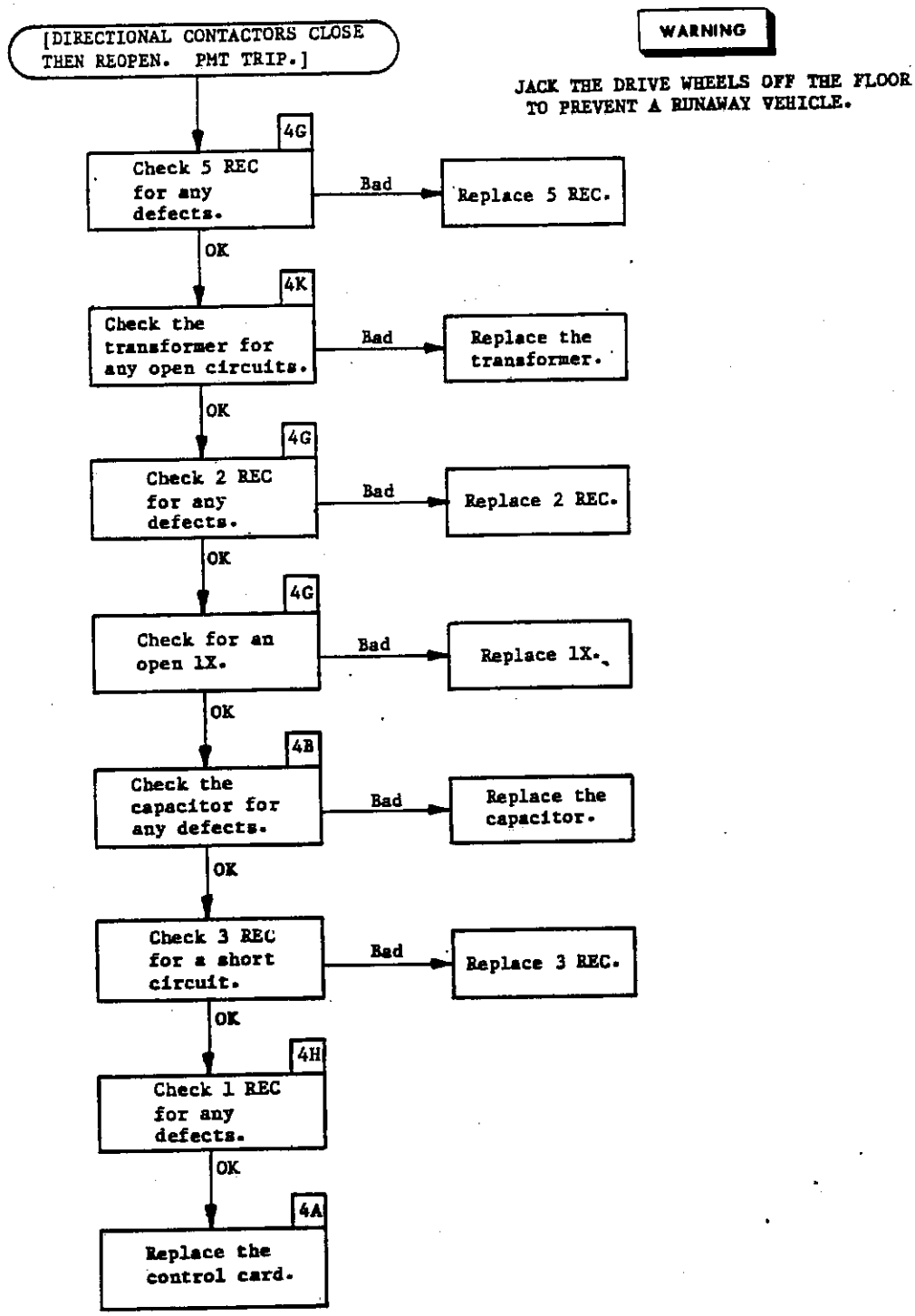
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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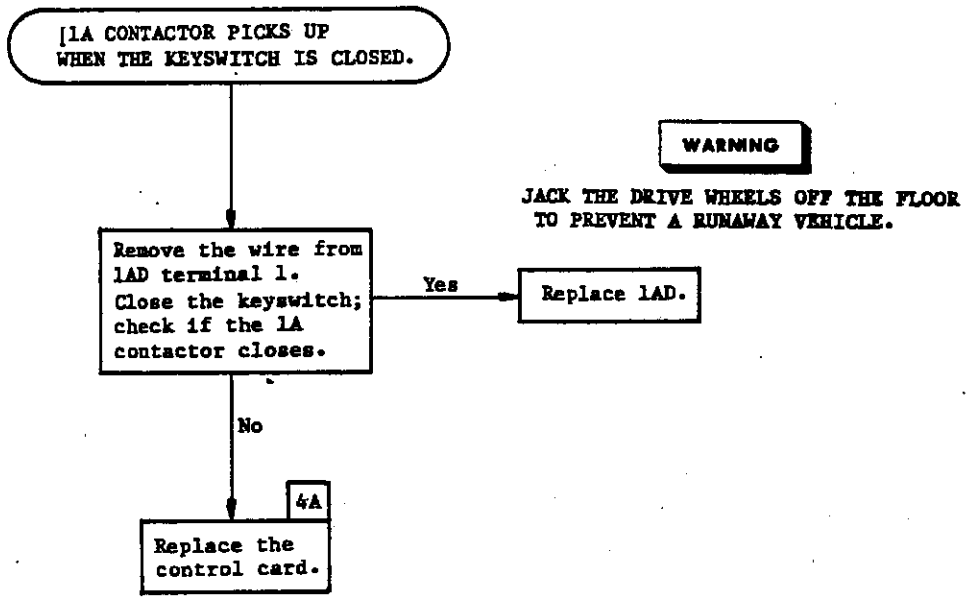
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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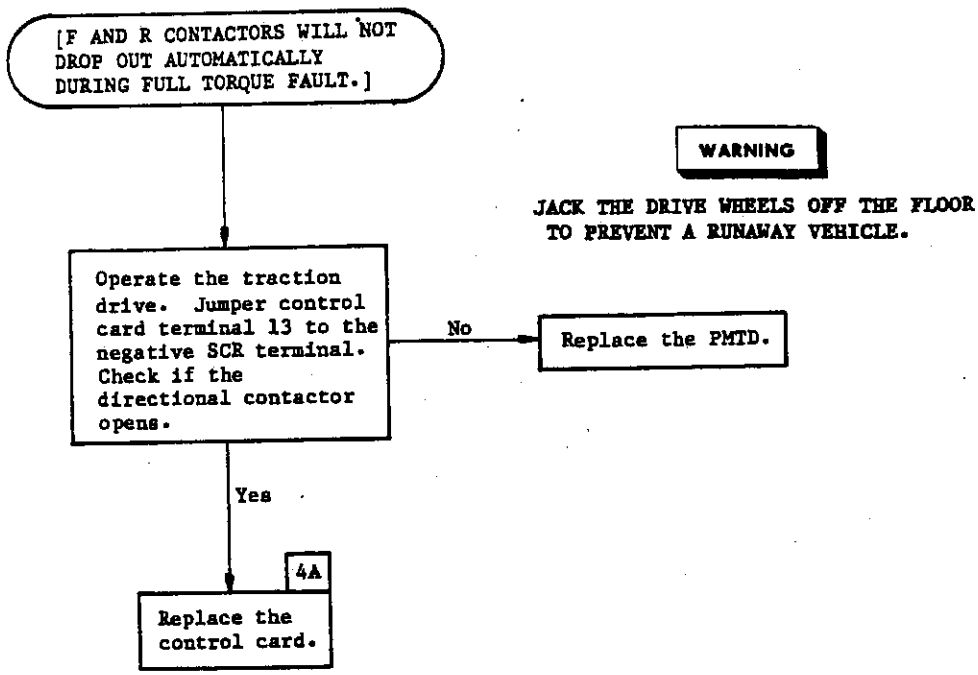
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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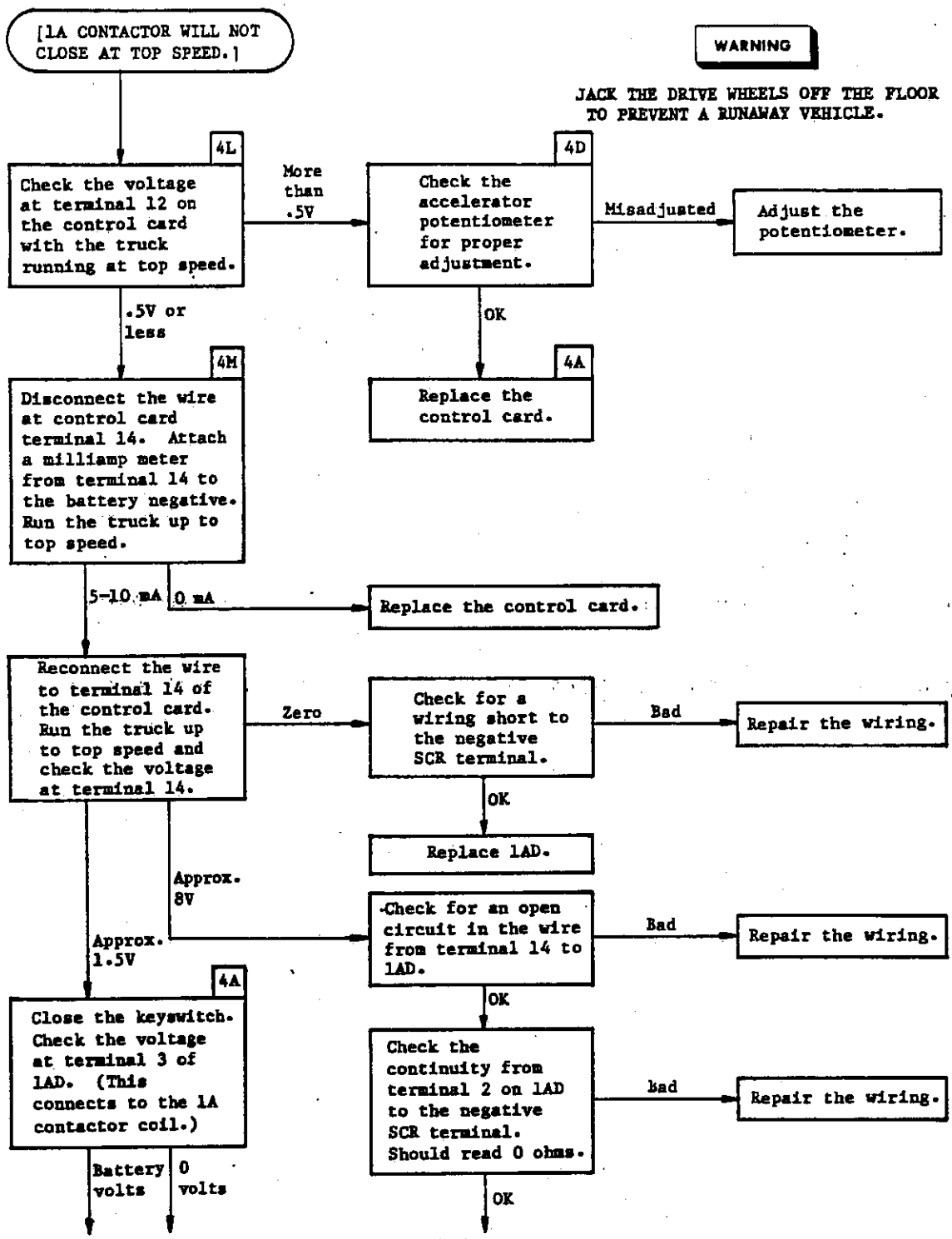
TROUBLESHOOTING DIAGNOSTIC DIAGRAM



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TROUBLESHOOTING DIAGNOSTIC DIAGRAM

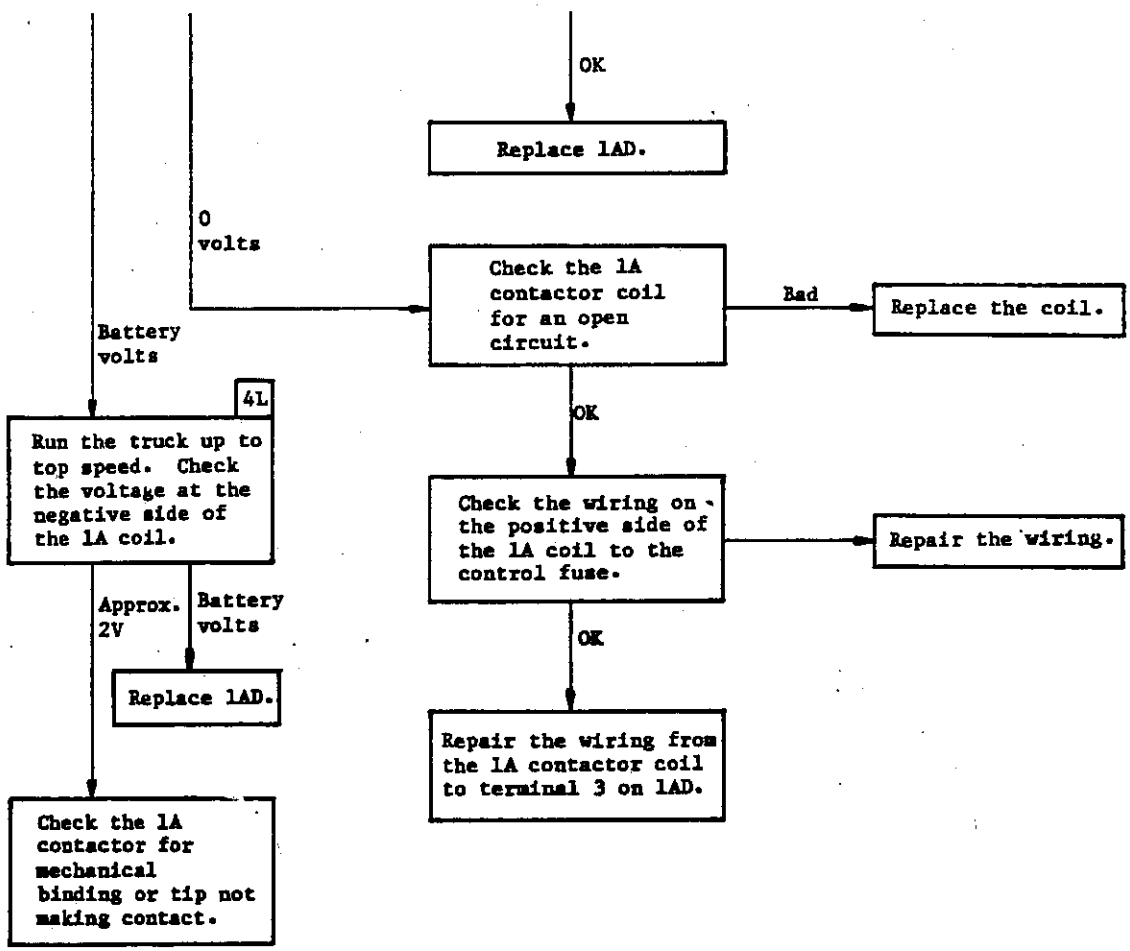


Figure 5.2.1, Sheet 12
TROUBLESHOOTING DIAGNOSTIC DIAGRAM

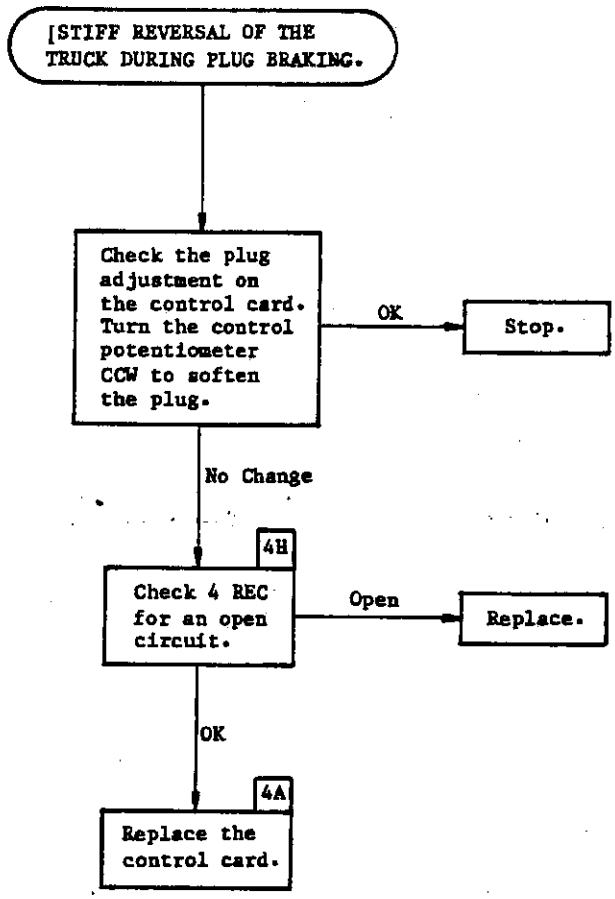


Figure 5.2.1, Sheet 13
TROUBLESHOOTING DIAGNOSTIC DIAGRAM

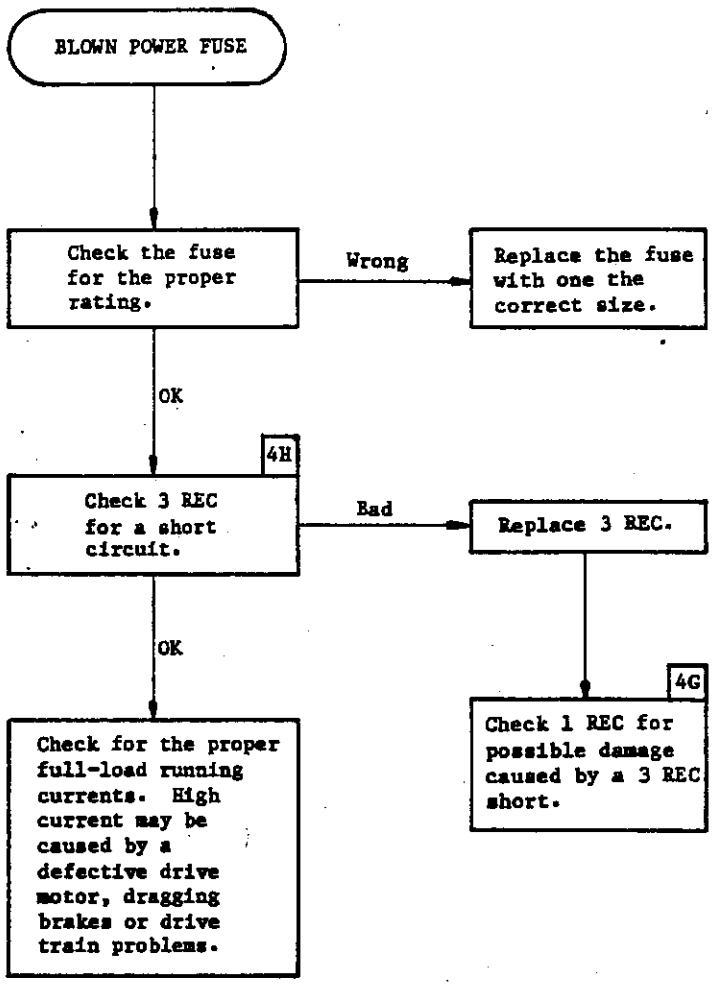


Figure 5.2.1, Sheet 14
TROUBLESHOOTING DIAGNOSTIC DIAGRAM

SECTION 3
DESCRIPTION OF OSCILLATOR CARD INPUTS AND OUTPUTS

INPUTS

Table 5.3.1
OSCILLATOR CARD INPUTS

COLOR	FUNCTION
W/GRN	Plugging input
GRY	Thermal protector input
ORN	Battery volts reference
RED	Gate drive for 5 REC
BRN	Gate loading for 5 REC
W/BLK	Gate loading for 2 REC & capacitor volts
W/RED	Gate drive for 2 REC
BLU	PMT/current limit sense input
WHT	Gate drive for 1 REC
VIO	Gate loading for 1 REC
BLK (2)	Negative card input - 1 wire from negative on transformer and 1 wire from thermal protector.

OUTPUTS

Table 5.3.2
OSCILLATOR CARD OUTPUTS

TERMINAL NUMBER	FUNCTION
19	Battery positive input for 48 volt vehicle
18	Battery positive input for 36 volt vehicle
17	Battery positive input for 24 volt vehicle
16	Reverse directional switch input
15	Forward directional switch input
14	Signal for 1A driver
13	Signal for PMTD or F/R driver
12	Accelerator potentiometer input

SECTION 4
CHECKING COMPONENTS

This section provides step-by-step instructions for checking the components. These instructions include meter readings from the Volt-Ohm-Meter, with the desired reading indicated at the end of that particular step.

MAIN SCR CONTROL CARD (4A)

The troubleshooting diagnostics check all outside devices and eliminate them as the source of the problem. If that does not resolve the problem, then the card must be faulty.

INSTRUCTIONS FOR REMOVAL OF THE CONTROL CARD

WARNING

TO AVOID DAMAGE TO THE CARD, DO NOT REMOVE THE SCR CONTROL CARD FROM ITS METAL TOP AND BOTTOM.

1. Remove all wires from the outside terminal board on the control card.

2. Remove all wires from the inside terminal board on the control card.

3. Remove the 2 screws attaching the control card bottom to the stand-up bracket (near the capacitor).

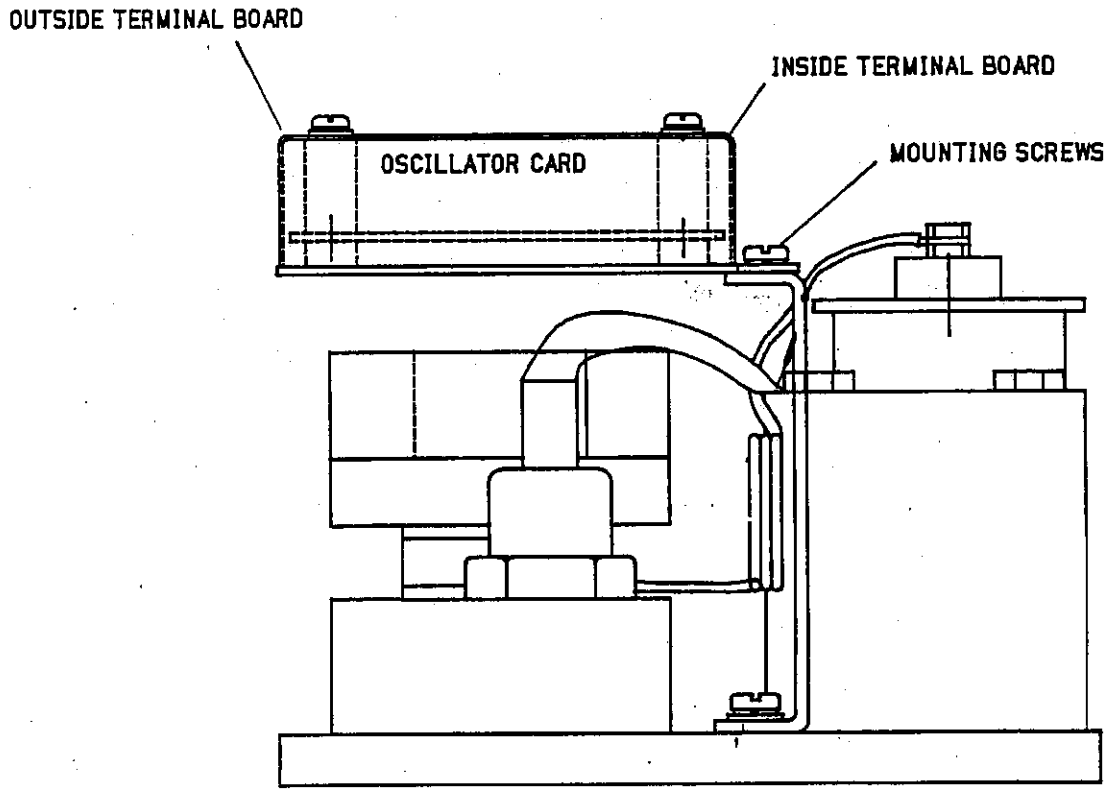


Figure 5.4.1
SCR CONTROL CARD

Ref. 91.TMP.26

CAPACITOR 1C (4B)

WARNING

TO AVOID ELECTRICAL SHOCK OR A RUNAWAY VEHICLE, DISCONNECT THE BATTERY AND DISCHARGE THE CAPACITOR BEFORE DOING ANY TESTING.

USING A VOLT-OHM-METER (VOM) SET TO THE R X 10,000 SCALE:

1. Remove the wires from one of the terminals of the capacitor.
2. Connect the leads from the VOM across the capacitor terminals. The meter should swing to 0 ohms, then gradually swing to above 100,000 ohms.
3. Reverse the leads of the VOM. The meter should swing to 0 ohms, then gradually swing to above 100,000 ohms.
4. Check the resistance from one of the capacitor terminals to its case. Meter reading: 50,000 ohms or more.

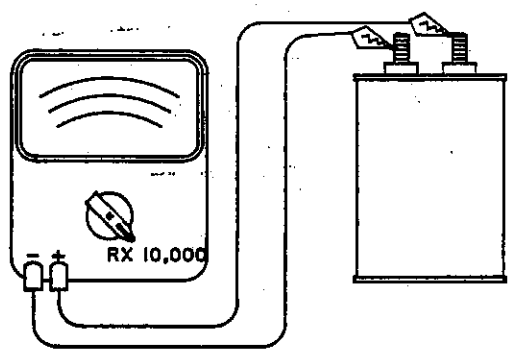


Figure 5.4.2
CAPACITOR CHECK

Ref. 91.TMP.27

CONTACTORS F, R, 1A, and P (4C)

For 150 and 300 amp contactors, refer to GEH-4469 located in Section 7 of this chapter.

For 75 amp contactors, refer to GEH-3099A located in Section 7 of this chapter.

POTENTIOMETER IN ACCELERATOR (4D)

1. Disconnect the battery.

2. Remove the wire from terminal board point 12.

3. Connect a Volt-Ohm-Meter from the wire at terminal board point 12 to the negative on the transformer with the scale set to R X 100.

4. Set the accelerator at creep speed.
   Meter reading: 4800 to 6000 ohms.

5. Move the accelerator to top speed.
   Meter reading: 200 ohms or less.

6. Move the negative VOM lead to the truck frame.
   Meter reading: 1,000,000 ohms or more.

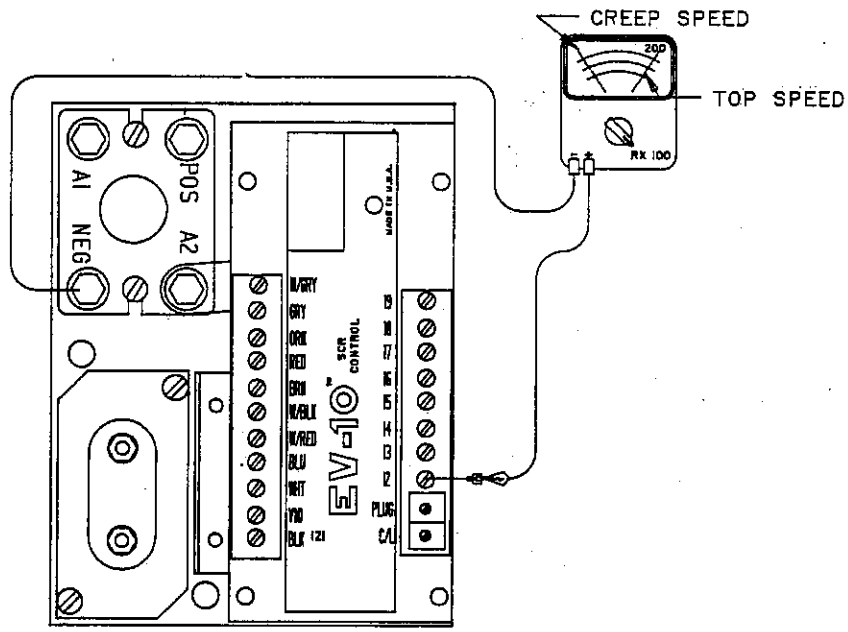


Figure 5.4.3
ACCELERATOR POTENTIOMETER CHECK

Ref. 91.TMP.28

DRIVER MODULE (4E)

Resistor = 8200 ohms 2 watts for 72 volts.
= 4700 ohms 2 watts for 24/36/48 volts.

USING A VOM SET TO THE 50V DC SCALE:

(For 24/36/48V, use a VOM set to a 100V dc scale.)

1. Disconnect the leads.
2. Connect the resistor, coil and switch to terminals 1 and 3 as shown.
3. Connect the battery negative to terminal 2 and the battery positive to the junction of the switch and the resistor.
4. Connect the negative lead of the VOM to terminal 2 and the positive lead of the VOM to terminal 3. Read the battery voltage on the VOM.
5. Close the switch. The VOM meter reading should drop to 2V or less.
6. Move the resistor and the positive meter lead from terminal 3 to terminal 4.
7. Repeat the same test.

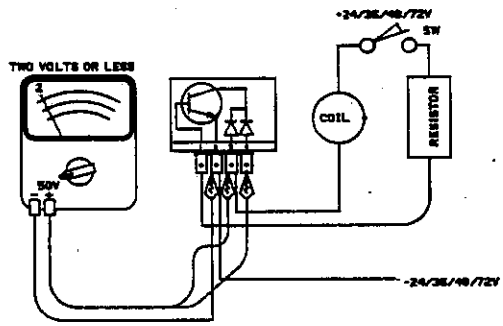


Figure 5.4.4
DRIVER MODULE CHECK

Ref. 91.TMP.29

HOURMETER MODULE (4F)

USING A VOM SET TO THE R X 1 SCALE:

1. Disconnect the lead from terminal 4.

2. Connect the positive lead of the VOM to terminal 3 and the negative lead of the VOM to terminal 4.
   Meter reading: less than 20 ohms.

3. Move the positive lead to terminal 2.
   Meter reading: less than 20 ohms.

4. Move the positive lead to terminal 1.
   Meter reading: less than 20 ohms.

SWITCH THE VOM TO THE R X 10,000 SCALE:

5. Connect the negative lead of the VOM to terminal 3 and the positive lead to terminal 4.
   Meter reading: 50,000 ohms or more.

6. Move the negative lead to terminal 2.
   Meter reading: 50,000 ohms or more.

7. Move the negative lead to terminal 1.
   Meter reading: 50,000 ohms or more.

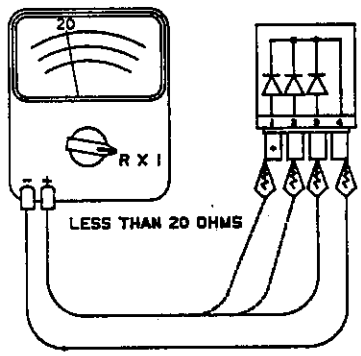


Figure 5.4.5
HOURMETER MODULE CHECK

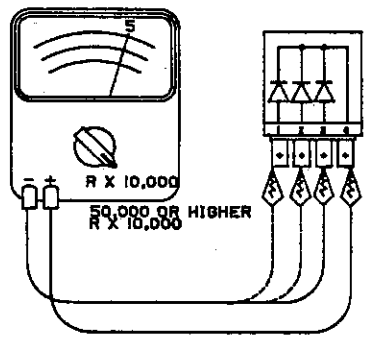


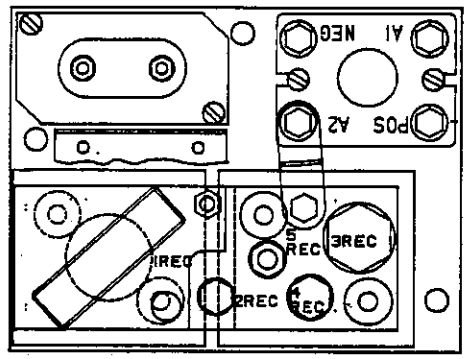
Figure 5.4.6
HOURMETER MODULE CHECK

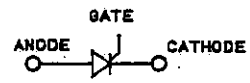
Ref. 91.TMP.30
Ref. 91.TMP.31

SCR (1 REC, 2 REC, 5 REC) (4G)

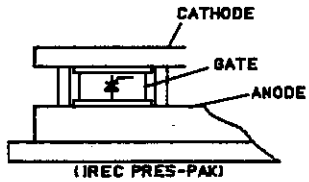
WARNING

TO AVOID ELECTRICAL SHOCK OR A RUNAWAY VEHICLE, DISCONNECT THE BATTERY AND DISCHARGE THE CAPACITOR BEFORE DOING ANY TESTING.





NOTE: 1 REC MUST BE IN PLACE WITH CORRECT SPRING PRESSURE



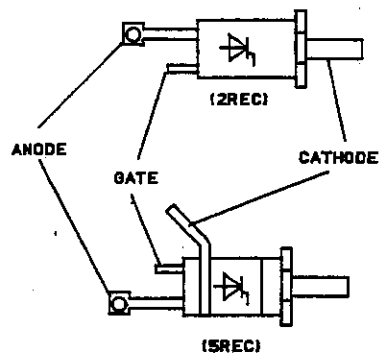


Figure 5.4.7
SCR LOCATIONS

Ref. 91.TMP.32

1 REC

USING A 6V TEST LIGHT, AS SHOWN:

1. Disconnect the WHT wire from the card.

2. Connect the negative lead of the test light to terminal board point VIO (cathode).

3. Connect the positive lead of the test light to terminal board point BLU (anode). If the light comes on, 1 REC has shorted. If the light does not come on, continue testing.

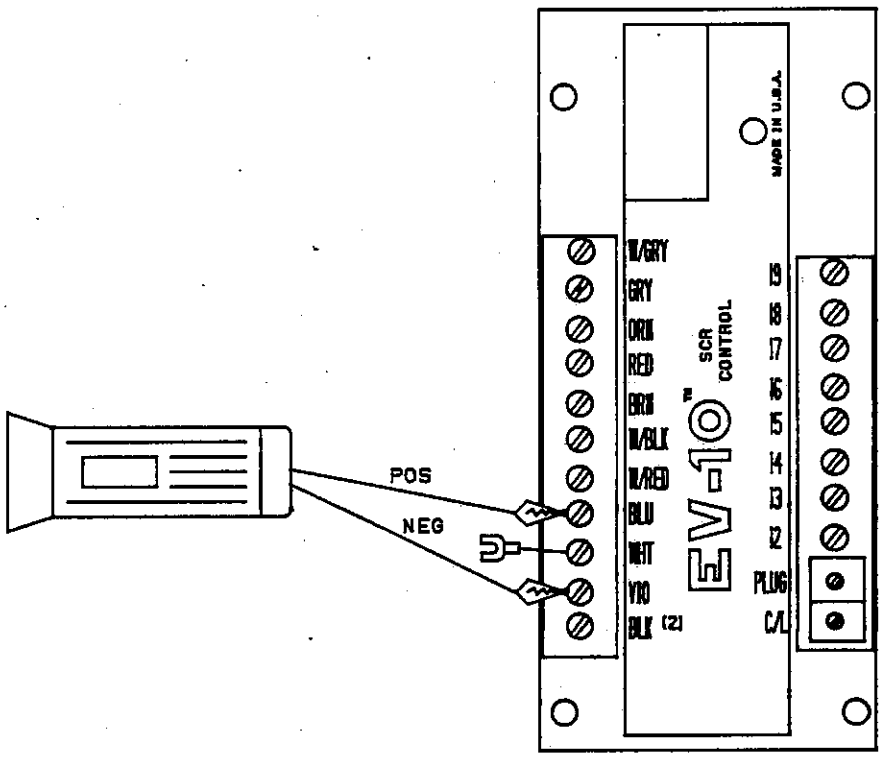


Figure 5.4.8
1 REC TEST LIGHT CHECK

Ref. 91.TMP.33

1 REC (Continued)

4. Touch the WHT (gate) wire to terminal board point BLU. The light should come on. If it does not, 1 REC is open.

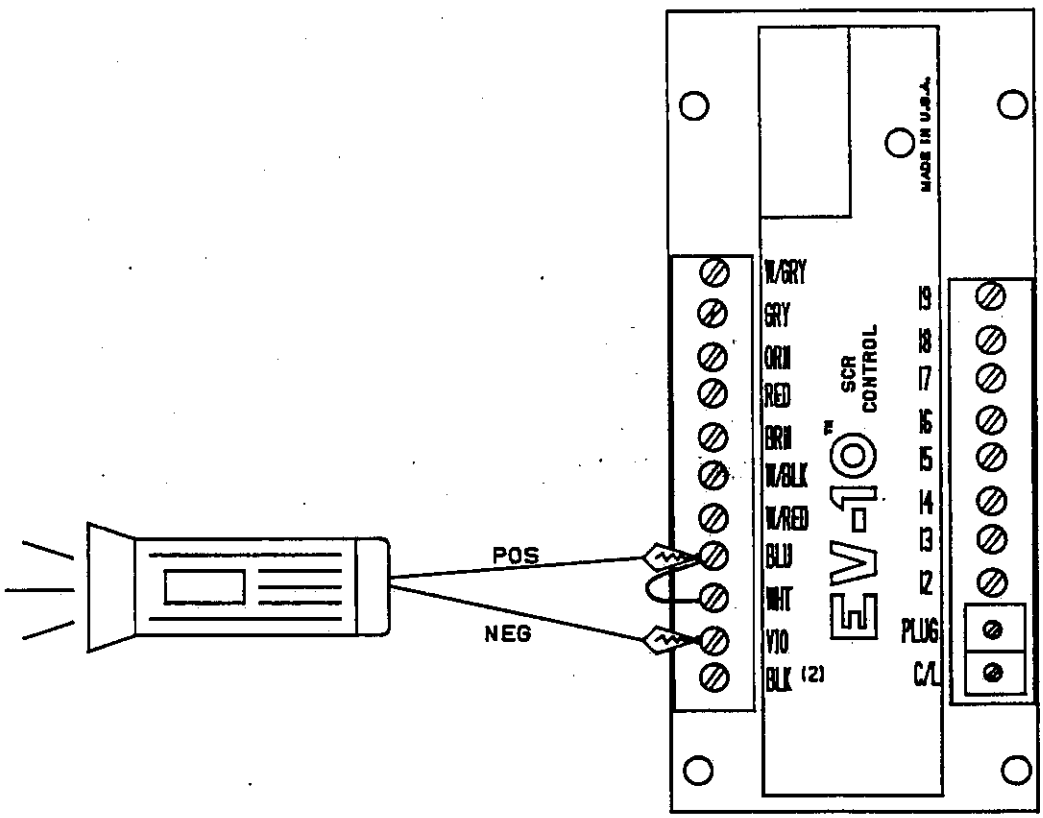


Figure 5.4.9
1 REC TEST LIGHT CHECK

Ref. 91.TMP.34

1 REC (Continued)

USING A VOM SET TO THE R X 1 SCALE:

1. Disconnect the BLU wire from terminal board point BLU.

2. Disconnect the WHT wire from terminal board point WHT.

3. Connect the negative lead of the VOM to the WHT wire (gate).

4. Connect the positive lead of the VOM to terminal board point VIO (cathode). Replace 1 REC if the reading is either zero or infinity.

5. Reverse the meter leads and check again. Replace 1 REC if the reading is zero or infinity.

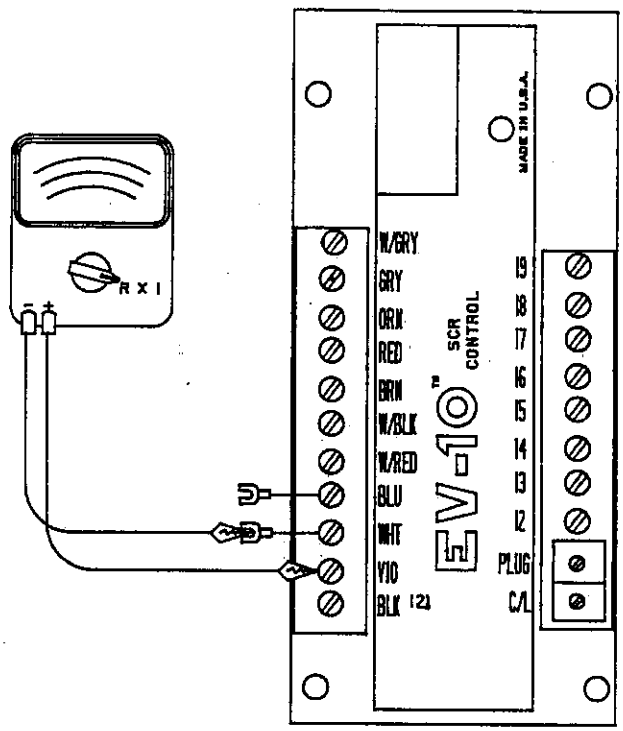


Figure 5.4.10
1 REC VOM CHECK

Ref. 91.TMP.35

1 REC (Continued)

SWITCH THE VOM TO THE R X 100 SCALE:

6. Connect the negative lead of the VOM to the BLU wire (anode).

7. Connect the positive lead of the VOM to terminal board point VIO (cathode). Replace 1 REC if the meter reads zero.

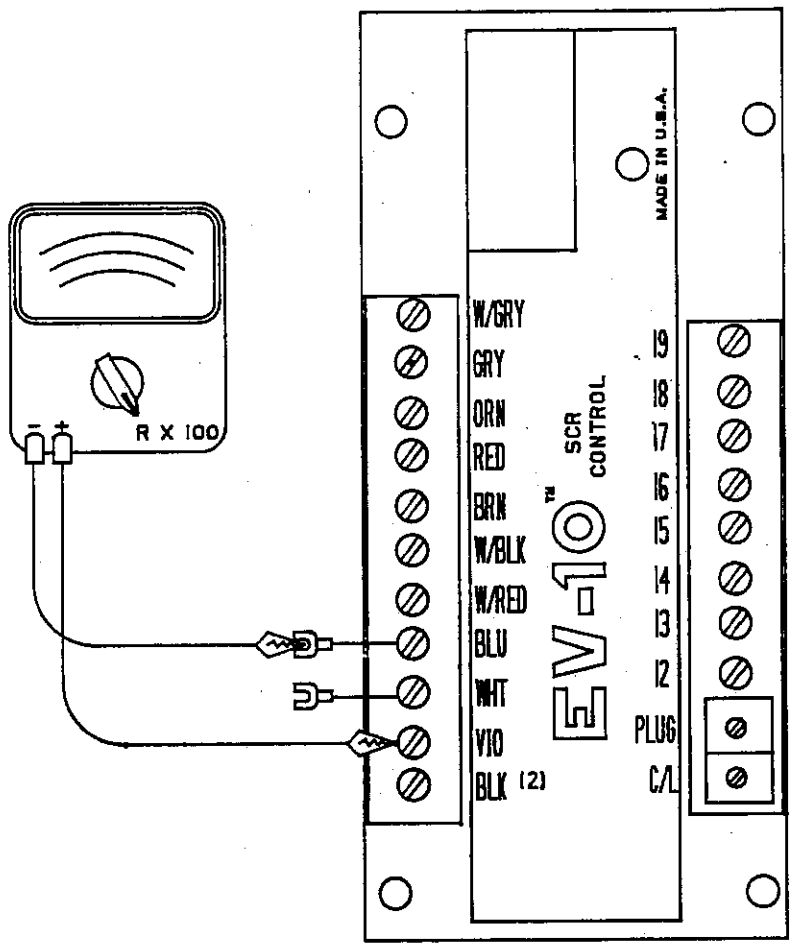


Figure 5.4.11
1 REC VOM CHECK

Ref. 91.TMP.36

2 REC

USING A 6V TEST LIGHT, AS SHOWN:

1. Disconnect the W/RED wire from the card.

2. Connect the negative lead of the test light to terminal board point W/BLK (cathode).

3. Connect the positive lead of the test light to terminal board point BLU (anode). If the light comes on, 1 REC has shorted. If the light does not come on, continue testing.

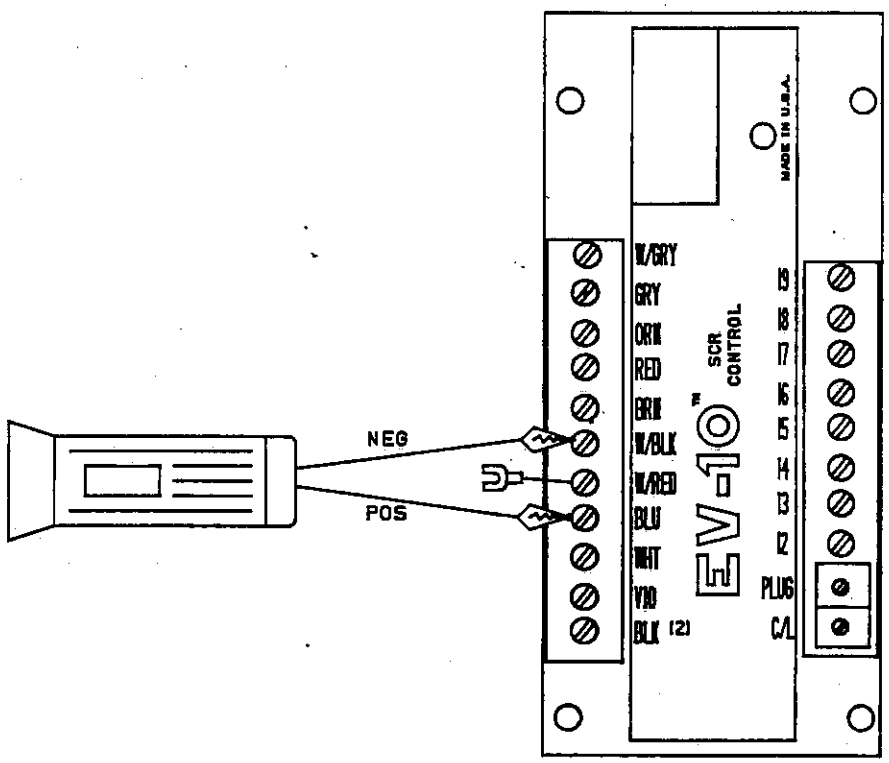


Figure 5.4.12
2 REC TEST LIGHT CHECK

Ref. 91.TMP.37

2 REC (Continued)

4. Touch the W/RED (gate) wire to terminal board point BLU. The light should come on and stay on when the W/RED wire is removed; if not, 2 REC is open.

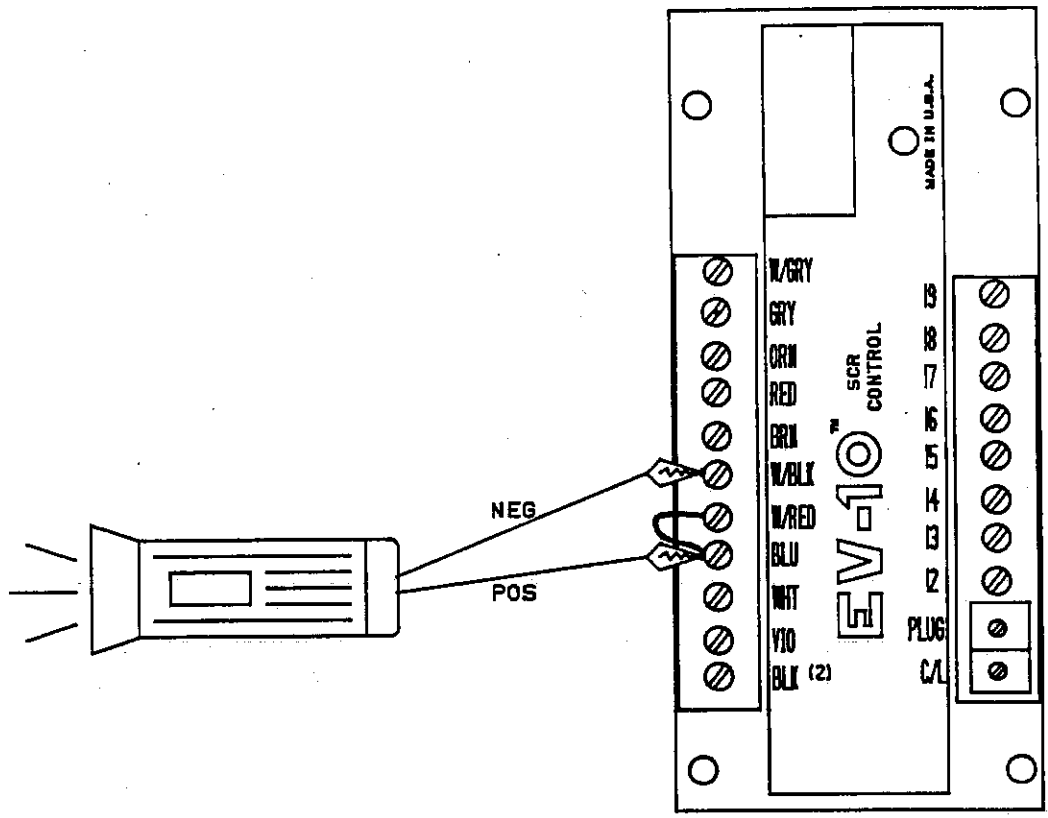


Figure 5.4.13
2 REC TEST LIGHT CHECK

Ref. 91.TMP.38

2 REC (Continued)

USING A VOM SET TO THE R X 1 SCALE:

1. Disconnect the BLU wire from terminal board point BLU.
2. Disconnect the W/RED wire from terminal board point W/RED.
3. Connect the negative lead of the VOM to the W/RED wire (gate).
4. Connect the positive lead of the VOM to terminal board point W/BLK (cathode). Replace 2 REC if the reading is either zero or infinity.
5. Reverse the meter leads and check again. Replace 1 REC if the reading is zero or infinity.

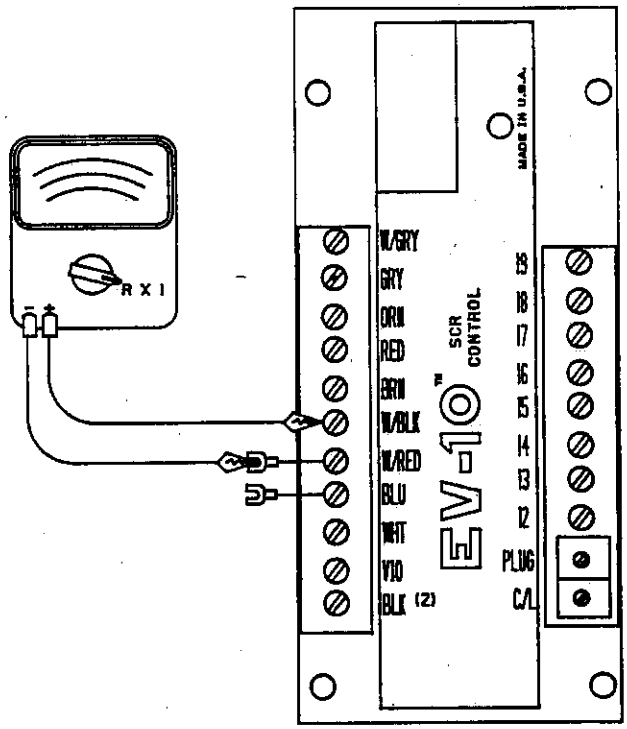


Figure 5.4.14
2 REC VOM CHECK

Ref. 91.TMP.39

2 REC (Continued)

SWITCH THE VOM TO THE R X 100 SCALE:

6. Connect the negative lead of the VOM to the BLU wire (anode).

7. Connect the positive lead of the VOM to terminal board point W/BLK (cathode). Replace 2 REC if the meter reads zero.

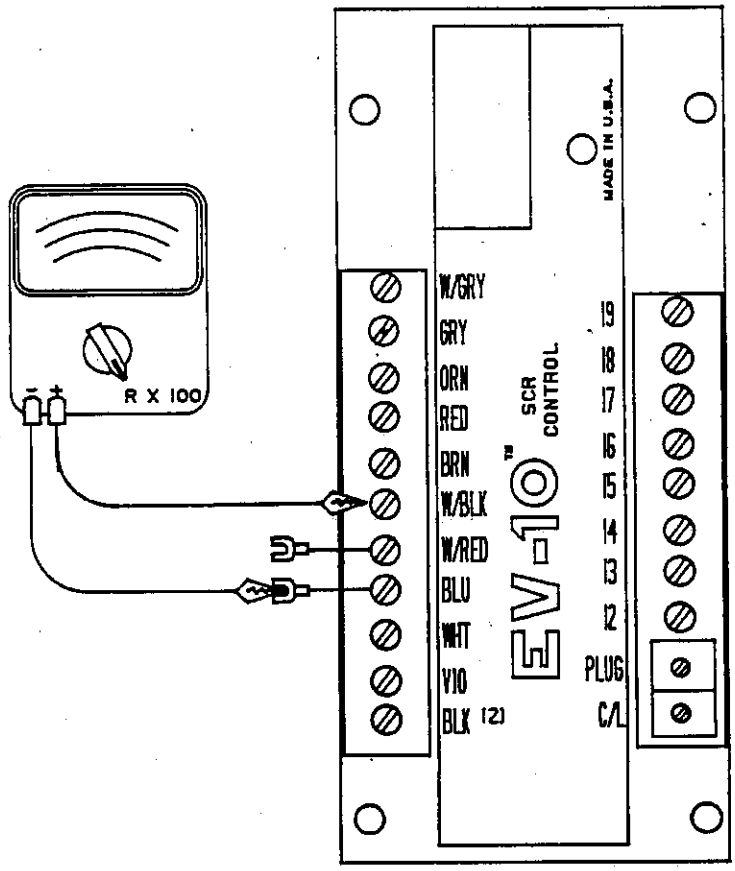


Figure 5.4.15
2 REC VOM CHECK

Ref. 91.TMP.40

5 REC

USING A 6V TEST LIGHT, AS SHOWN:

1. Disconnect the RED wire from the card.

2. Connect the negative lead of the test light to terminal board point BRN (cathode).

3. Connect the positive lead of the test light to terminal board point W/BLK (anode). If the light comes on, 1 REC has shorted. If the light does not come on, continue testing.

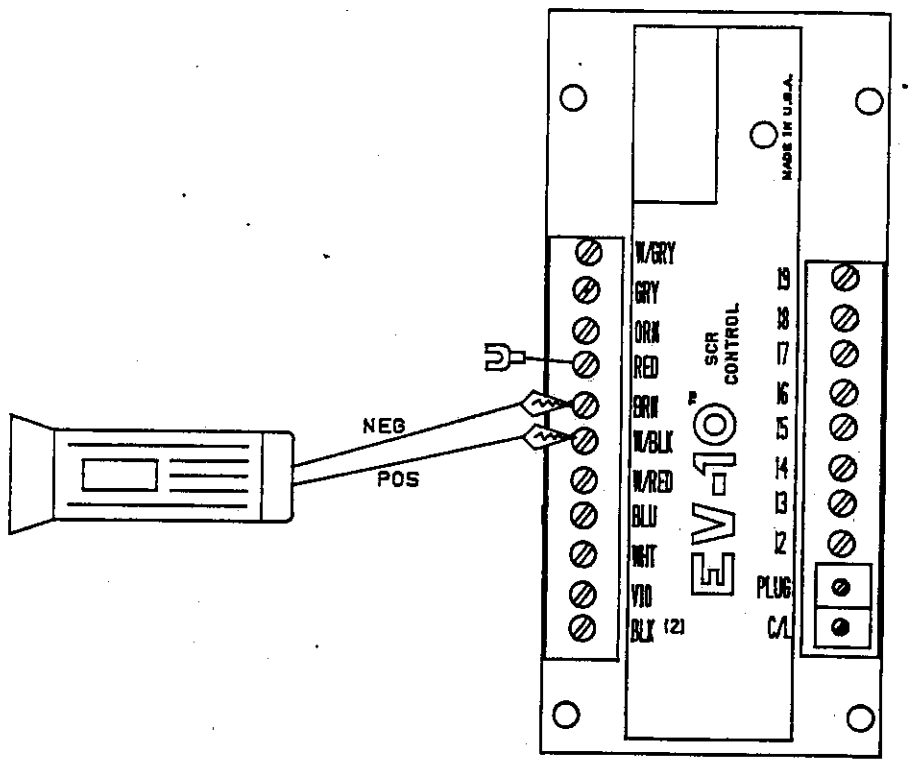


Figure 5.4.16
5 REC TEST LIGHT CHECK

Ref. 91.TMP.41

5 REC (Continued)

4. Touch the RED (gate) wire to terminal board point W/BLK. The light should come on and stay on when the RED wire is removed; if not, 5 REC is open.

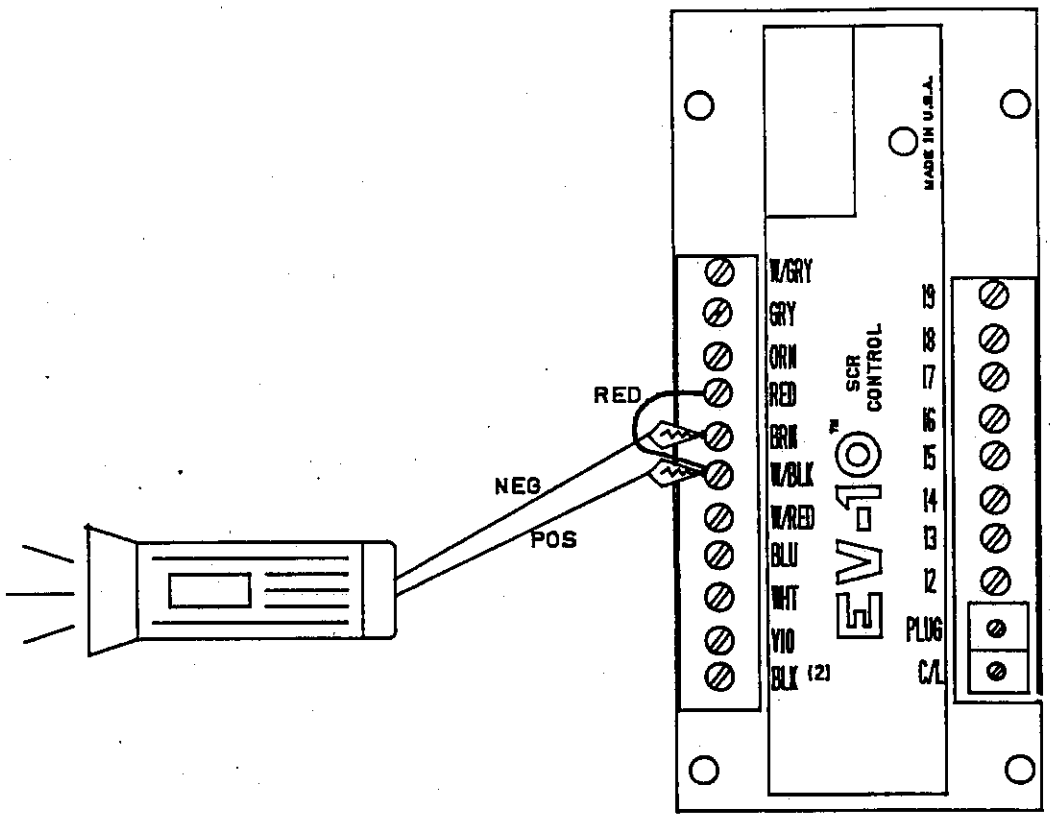


Figure 5.4.17
5 REC TEST LIGHT CHECK

Ref. 91.TMP.42

5 REC (Continued)

USING A VOM SET TO THE R X 1 SCALE:

1. Disconnect the W/BLK wire from terminal board point W/BLK (anode).
2. Disconnect the BRN wire from terminal board point BRN.
3. Connect the negative lead of the VOM to the BRN wire (cathode).
4. Connect the positive lead of the VOM to terminal board point RED (gate). Replace 5 REC if the reading is either zero or infinity.
5. Reverse the meter leads and check again. Replace 5 REC if the reading is zero or infinity.

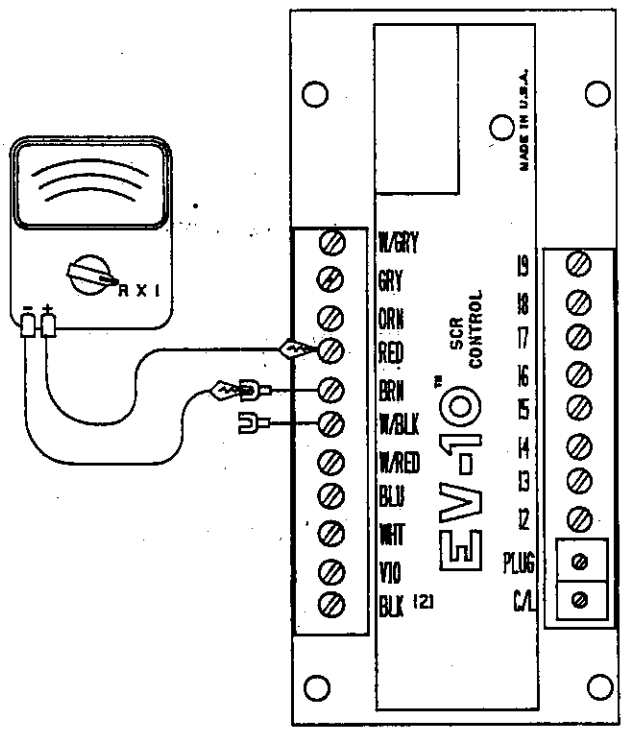


Figure 5.4.18
5 REC VOM CHECK

Ref. 91.TMP.43

5 REC (Continued)

SWITCH THE VOM TO THE R X 100 SCALE:

6. Connect the negative lead of the VOM to the W/BLK wire (anode).

7. Connect the positive lead of the VOM to the BRN wire (cathode). Replace 5 REC if the meter reads zero.

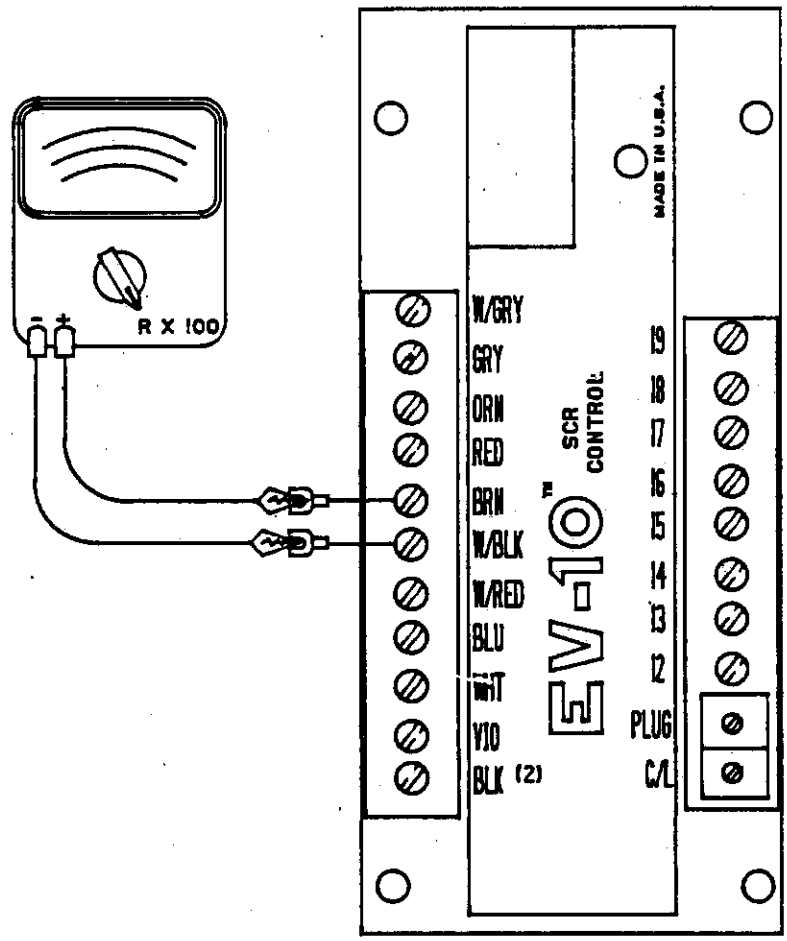


Figure 5.4.19
5 REC VOM CHECK

Ref. 91.TMP.44

RECTIFIERS (3 AND 4 REC) (4H)

WARNING

TO AVOID ELECTRICAL SHOCK OR A RUNAWAY VEHICLE, WHEN CHECKING DIODES, DISCONNECT THE BATTERY AND DISCHARGE THE CAPACITOR 1C.

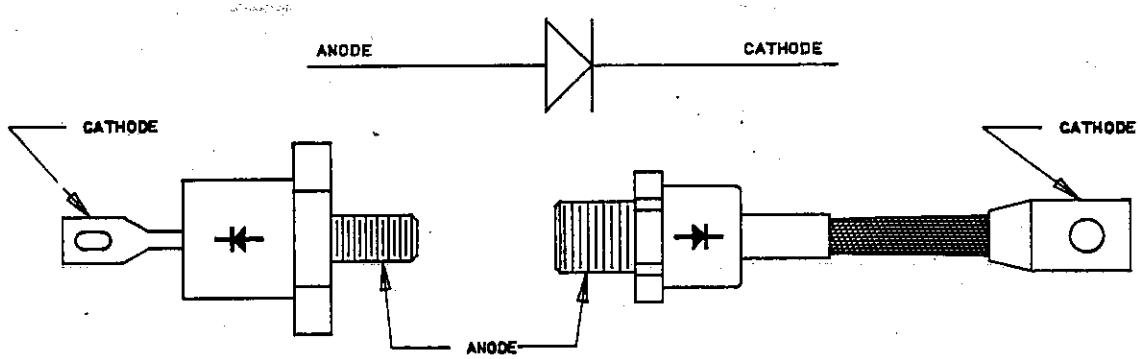


Figure 5.4.20
DIODE DESCRIPTION

Ref. 91.TMP.45

RECTIFIERS (3 AND 4 REC) (Continued)

USING A CONTINUITY TEST LIGHT:

1. Disconnect the cathode end from the panel wiring.
2. Connect the negative lead of the test light to the anode.
3. Connect the positive lead of the test light to the cathode. If the light comes on, the REC has shorted. If the light does not come on, continue testing.

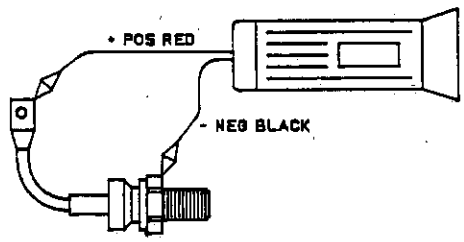


Figure 5.4.21
3 AND 4 REC TEST LIGHT CHECK

USING A CONTINUITY TEST LIGHT (Continued):

4. Connect the negative lead of the test light to the cathode.
5. Connect the positive lead of the test light to the anode. The light should normally come on. If it comes on, the test is concluded using a continuity light. If it does not come on, the diode is open.

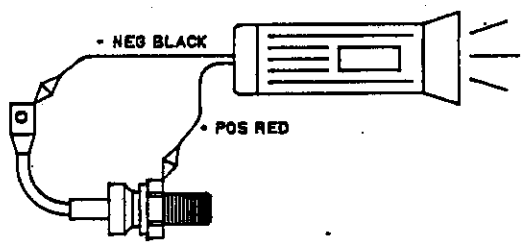


Figure 5.4.22
3 AND 4 REC TEST LIGHT CHECK

Ref. 91.TMP.46
Ref. 91.TMP.47

RECTIFIERS (3 AND 4 REC) (Continued)

USING A VOLT-OHM-METER (VOM) SET TO THE R X 10,000 SCALE:

1. Disconnect the VOM.
2. Connect the positive lead of the VOM to the cathode.
3. Connect the negative lead of the VOM to the anode.
   Meter reading: 50,000 ohms or more.

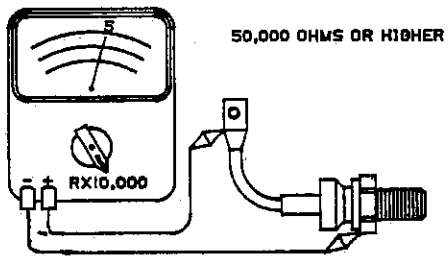


Figure 5.4.23
3 AND 4 REC VOM CHECK

USING A VOLT-OHM-METER (VOM) SET TO THE R X 10,000 SCALE (Continued):

SWITCH THE VOM TO THE R X 1 SCALE:

4. Connect the positive lead of the VOM to the anode.
5. Connect the negative lead of the VOM to the cathode.
   Meter reading: 7 to 12 ohms.

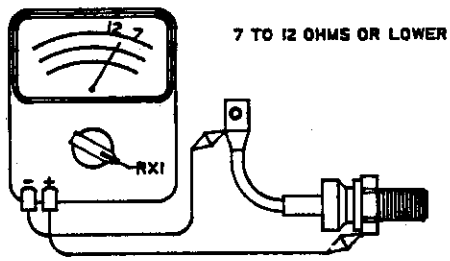


Figure 5.4.24
3 AND 4 REC VOM CHECK

Ref. 91.TMP.48
Ref. 91.TMP.49

THERMAL PROTECTOR (TP) (4J)

USING A VOLT-OHM-METER (VOM) SET TO THE R X 100 SCALE:

1. Disconnect the GRY wire from terminal board point GRY.

2. Connect the leads of the VOM to the GRY wire and to terminal board point BLK as shown in Figure 5.4.25. The resistance should be less than 200 ohms when at normal temperature.

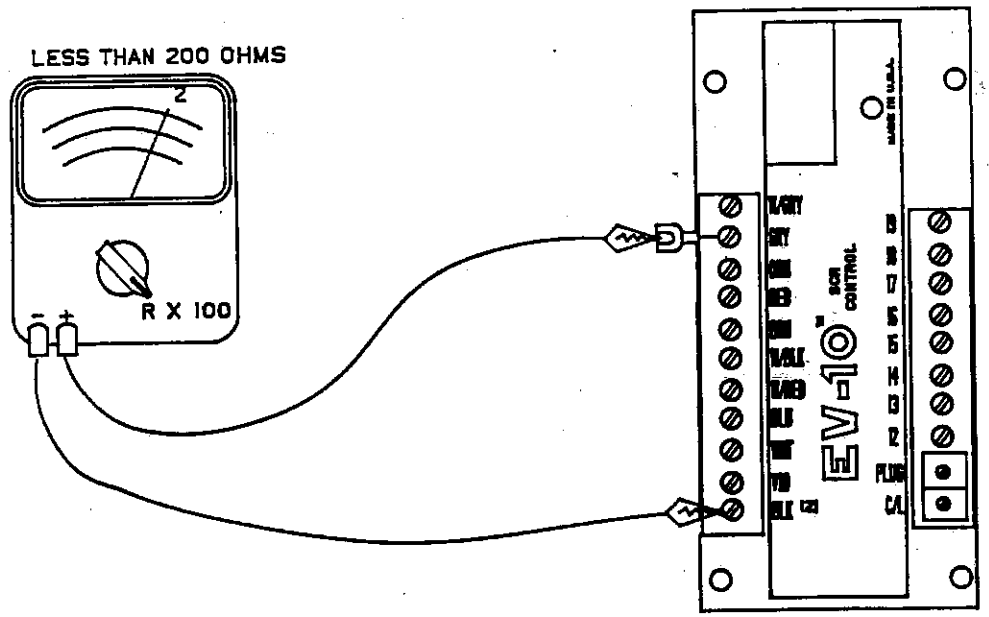


Figure 5.4.25
THERMAL PROTECTOR CHECK

Ref. 91.TMP.50

TRANSFORMER (4K)

USING A VOM SET TO THE R X 1 SCALE:

1. Connect the leads of the VOM to the negative (transformer) and 1C.
   Meter reading: less than 2 ohms.

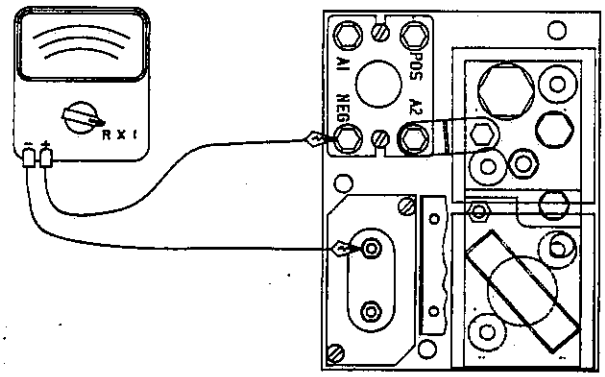


Figure 5.4.26
TRANSFORMER CHECK

2. Connect the leads of the VOM to A2 (transformer) and terminal board point BRN.
   Meter reading: less than 2 ohms.

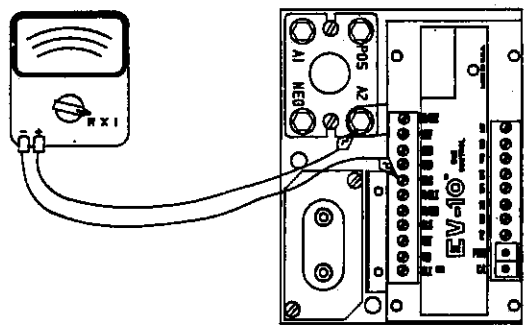


Figure 5.4.27
TRANSFORMER CHECK

Ref. 91.TMP.51
Ref. 91.TMP.52

VOLTAGE CHECK (4L)

USING A VOM SET TO THE DC VOLTAGE SCALE:

1. Set the VOM equal to or greater than the anticipted voltage.
2. Connect the black negative head of the VOM to the SCR negative.
3. Connect the red positive lead of the VOM to the point described in the Troubleshooting Diagnostic Diagram.
4. Read the voltage.

MILLIAMP CHECK (4M)

USING A VOM SET TO THE 10 MA. SCALE:

1. Connect the black negative lead of the VOM to the SCR negative.
2. Disconnect the wire from the point described in the Troubleshooting Diagnostic Diagram.
3. Connect the red positive lead to the point indicated.
4. Read the milliamps.

SECTION 5
REPLACEMENT OF COMPONENTS

NOTE

The use of a heat transfer grease such as GE Versilube G-350-M or its equivalent is recommended.

REPLACEMENT OF THE 1 REC MODULE

1. Remove the 1 REC gate wire (WHT) from the inside card terminal board.
2. Remove the wires from the outside card terminal board.
3. Remove the two card mounting screws and rotate the card over the capacitor and the transformer.
4. Unplug the two thermal protector wires.
5. Disconnect the T2-strap from the top heat sink.
6. Remove the spring assembly by first removing its mounting bolts.
7. Clean both heat sinks with a clean rag and isopropyl alcohol.
8. Apply a light coat of heat transfer grease to both ends of the 1 REC Press-Pak.
9. Install and torque the heat sink/spring assembly according to the torquing instructions that follow.
10. Reconnect the thermal protector, strap (T2), card, and card wires.

TORQUING INSTRUCTIONS

MOUNTING PROCEDURE

1. Apply Silicon Grease (Dow No. 44) to both sides of the SCR.
2. Locate the SCR in place with the pin on the large heat sink.
3. With the anode down, place the upper heat sink on top with the clamp in position. (See Figure 5.5.1.)

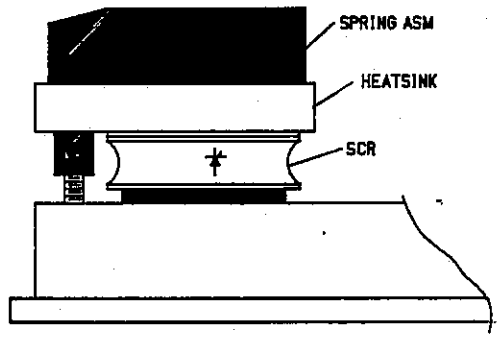


Figure 5.5.1
MOUNTING PROCEDURE

4. Tighten the bolts evenly until they are finger tight. Then tighten each bolt 1/4 turn using a 7/16 socket wrench on the bolt heads.
5. Place the force indicator gauge firmly against the springs, as shown on the outline drawing, so that both ends and the middle are in solid contact with the springs. The edges of the gauge will then indicate the spring deflection or force. Correct mounting force is indicated when the proper edges coincide.

Ref. 91.TMP.53

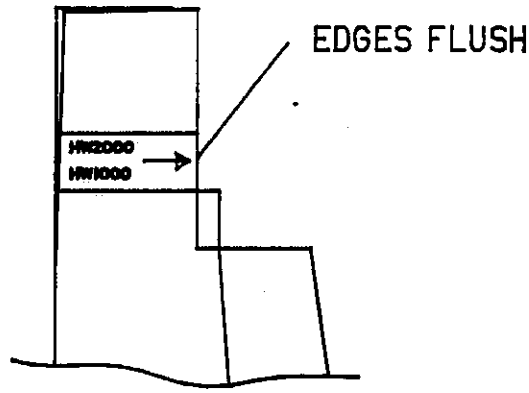


Figure 5.5.2
CORRECT TORQUING FORCE

6. If the mounting force indicated is less than rated force, tighten the bolts alternately 1/4 turn at a time until the points coincide. (See Figure 5.5.3.)

7. If excessive force is indicated, loosen the bolts and start over. Never try to adjust spring force by backing off the bolts. Spring friction will produce false readings.

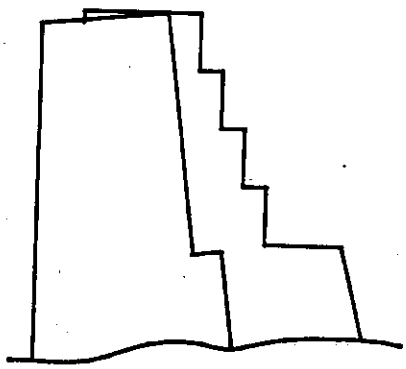


Figure 5.5.3
LESS THAN RATED FORCE

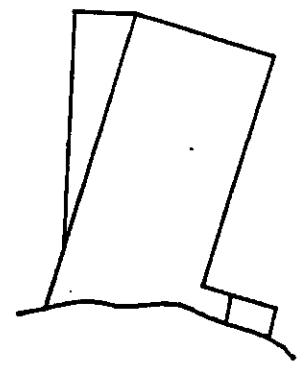


Figure 5.5.4
EXCESSIVE FORCE

Ref. 91.TMP.54
Ref. 91.TMP.55
Ref. 91.TMP.56

CALIBRATE THE FORCE GAUGE

If you suspect the force gauge is out of calibration due to wear or damage, check it on a flat surface, as indicated in Figure 5.5.5.

NOTE

If the edges are not flush within ±.010, calibrate the gauge by filing the bottom contact points.

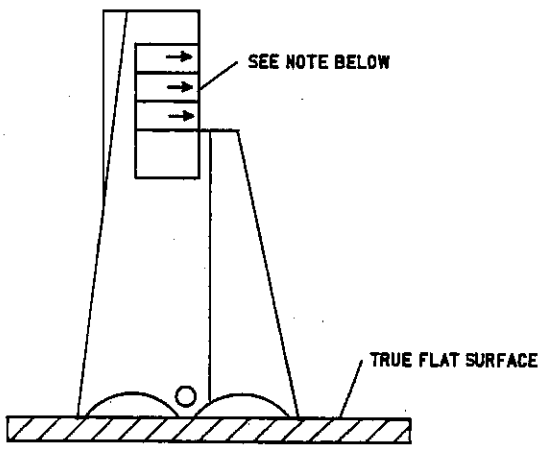


Figure 5.5.5
FORCE GAUGE

Ref. 91.TMP.57

REPLACEMENT OF THE CAPACITOR

1. Remove the nuts from the capacitor connections and remove the wires.

2. Remove the two mounting screws and bracket.

3. Reverse this procedure to install a new capacitor.

REPLACEMENT OF THE TRANSFORMER/CHOKE

1. Disconnect all transformer leads.

2. Remove the two mounting screws and lift the transformer free.

3. Reverse this procedure to reassemble.

REPLACEMENT OF THE CONTROL CARD

1. The panels are factory-adjusted for a particular motor and truck and should not need adjustment when used with this motor and truck.

NOTE

If the panels are used to control motors or trucks for which they were not factory-adjusted, the settings may be out of optimum adjustment to the extent that they do interact.

2. Clockwise (CW) rotation increases the function being adjusted.

3. Connect the shunt, the millivoltmeter, and the voltmeter to measure the battery current and motor voltage.

   a. Connect the shunt and the millivoltmeter between battery negative and 1 REC (or between the truck receptacle and the battery plug).

   b. Connect the voltmeter between battery positive and T2 on the SCR panel.

4. Jack up the truck so that the drive wheels are free to rotate. If a brake interlock is used, jumper it out so that power and the brakes can be applied at the same time.

5. Equipment required:

   a. 50 millivolt dc shunt.

NOTE

The shunt rating must be greater than the current to be measured. Best results are obtained when the reading is between half and full scale on the meter. If a shunt of too high a rating is used (i.e., a 500 amp rating to read 100 amps), the meter will be hard to read and the accuracy of the reading will be poor.

6. Check that the ohms in the accelerator potentiometer are less than 200 ohms in the top SCR range.

7. Check the card settings:

   a. Check the current limit by first moving the accelerator until either the F or R contactor operates. Do not move the accelerator to the point where 1A picks up. Apply the brakes until the wheels come to a standstill (the wheels must not be turning) and read the current to see if it falls below the maximum rating of 170 amps and within the rating specified by the truck manufacturer.

WARNING

Do not stall the motor for more than 30 seconds at a time. Allow time for the motor to cool between stalls. To avoid personal injury or a runaway vehicle, do not operate the motor at high speeds or plug the motor with the wheels jacked up.

   b. With the truck on the ground, plug the truck from top speed. If the stopping distance is not as desired, adjust the plugging trimpot.

8. Tuneup Procedure.

   a. Turn the plugging trimpot fully clockwise to prevent any interaction when setting the current limit trimpot..

   b. Turn the current limit trimpot fully counterclockwise.

   c. Check to be sure the plugging trimpot is turned fully clockwise.

   d. Depress the accelerator until F or R operate, but not the 1A contactor.

   e. Apply the brakes until the wheels come to a standstill and remain at a standstill.

   f. Slowly turn the current limit trimpot in a clockwise direction until the current reaches 170 amps, or as specified by the truck manufacturer.

NOTE

Since these controls are used on a variety of types and sizes of trucks for various applications, it is common for the truck manufacturer to set the current limit at some value below this maximum. For this reason, it is recommended that you obtain the actual current limit setting for your particular truck from the truck manufacturer.

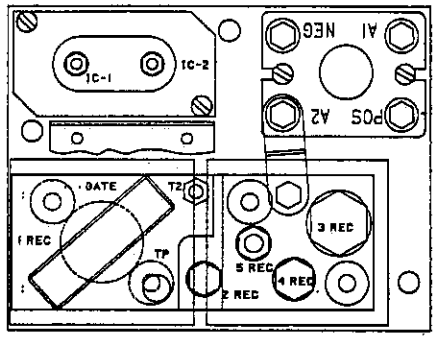
WARNING

Do not stall the motor for more than 30 seconds at a time. Allow time for the motor to cool between stalls. To avoid personal injury or a runaway vehicle, do not operate the motor at high speeds or plug the motor with the wheels jacked up.

g. To adjust the static plugging, the truck should be in its normal running condition and on the ground. Turn the plugging trimpot fully counterclockwise. This will give the longest distance for stopping.

h. Turn the trimpot clockwise to increase the stopping distance. If the stopping distance is too short or too long, continue to adjust the trimpot until the desired stopping distance is obtained.

PLACEMENT OF THE COMPONENTS



WIRE NO	COLOR SIZE	FROM	TO	WIRE DESCRIPTION
	GRY/#22	CARD GRY	TP (EITHER)	
	BLK #22	CARD BLK	TP (EITHER)	TWISTED PAIRS
	VIO #22	CARD VIO	1REC HS-T2	259A9500 P10
	WHT/#22	CARD WHT	1REC GATE	TWISTED PAIRS
	BLU/#22	CARD BLU	HS-A2	259A9500 P6
	WHT/RED/#22	CARD W/RED	2REC GATE	259A9500 P12
	WHT/BLK/#22	CARD W/BLK	2REC-C	259A9500 P11 TWISTED PAIRS
	BLK/#22	CARD BLK	IC-2	259A9500 P2
	WHT/ORN/#22	CARD W/ORN	4REC-C	259A9500 P13
	ORN/#22	CARD ORN	TRANS-POS	259A9500 P8
	BRN/#22	CARD BRN	5REC-C	259A9500 P7
	RED/#22	CARD RED	5REC GATE	259A9500 P3 TWISTED PAIRS
5 CHOKE 25 16	BLK #8 BLK #12 BLK #10	4 REC-C 2 REC-C 5 REC-A IC-2	TRANS-A1 IC-1 IC-1 1 REC-T2	69A754IP88K49 69A754IP128K19 69A754IP108K19
	WIRE STRAP	TRANS-T3 TRANS-T2	5 REC-C 1 REC-T2	

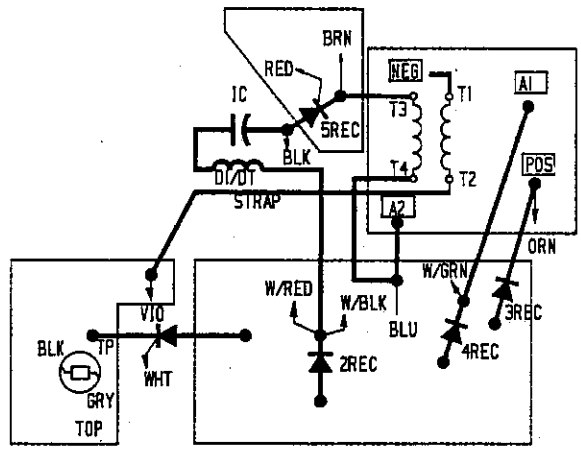
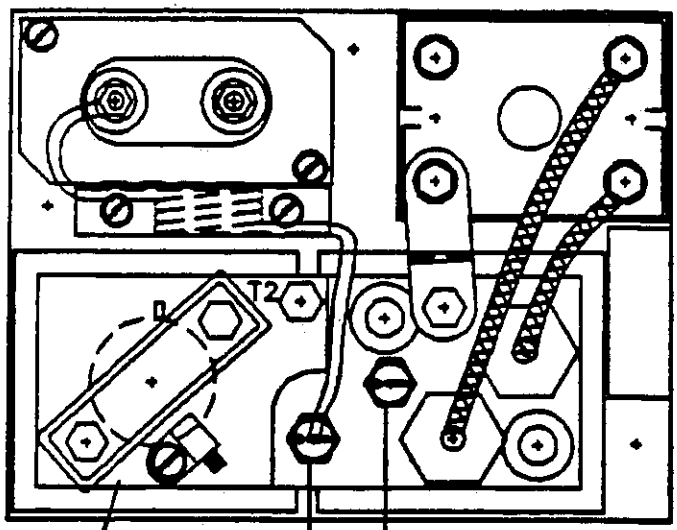


Figure 5.5.6
PLACEMENT OF COMPONENTS

Ref. 91.TMP.58

EV-10 SCR PANEL

OLD

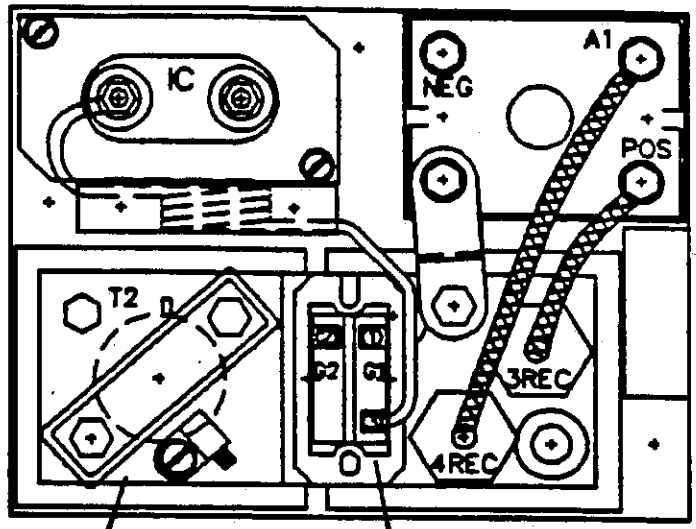


HEAT SINK
44A717441-001

5REC
259A9209PYD

2REC
259A9209PXM (24-48V)
259A9210PXC (72-80V)

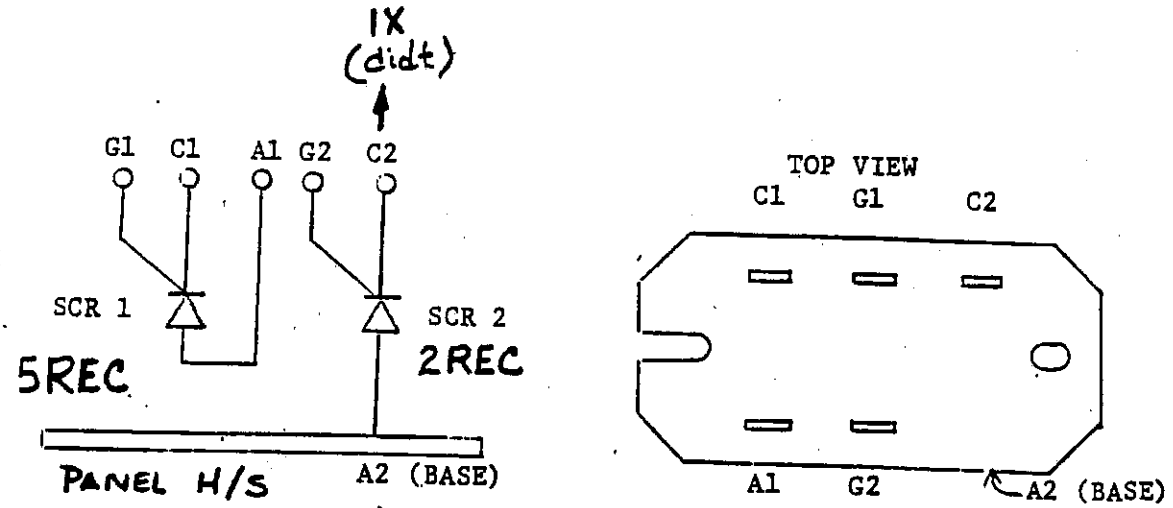
NEW



HEAT SINK
44A723546-001

2REC/5REC
44A717074-001

OLDNEW 12/12/85



NOTE: ALL TERMINALS (EXCEPT A2) TO BE MARKED ON BODY NEAR EACH TERMINAL.

FIGURE 2-CONNECTIONS AND TERMINALS

INSTRUCTIONS

GEH-4469

150- AND 300-AMPERE ELECTRIC-VEHICLE CONTROL CONTACTORS

IC4482-CTR A700, A800 SERIES

Before any adjustments, servicing, parts replacement or any other act is performed requiring physical contact with the electrical working components or wiring of this equipment, DISCONNECT THE BATTERY, DISCHARGE CAPACITOR(S), AND JACK WHEELS OFF FLOOR.

DESCRIPTION

GENERAL

These d-c contactors are designed for low-voltage, intermittent-duty operation such as found in battery truck service.

PURPOSE OF INSTRUCTIONS

The purpose of these instructions is to instruct the user on proper care and maintenance to obtain satisfactory service from these devices. The manufacturer of the electric vehicle has tested and applied these contactors according to the requirements of his vehicle. No modifications or changes should be made in the layout, physical arrangement or electrical connections without his permission.

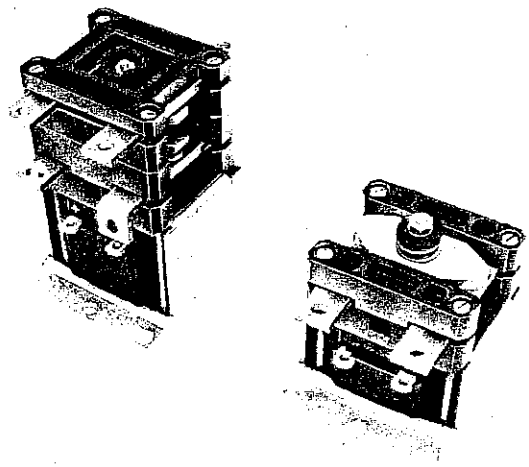


Fig. 1. Right - Single-pole, single-throw type (one normally open contact)
Left - Single-pole, double-throw type (one normally open and one normally closed contact)

MOUNTING

These contactors are designed to mount on a vertical surface or on a horizontal surface.

DISASSEMBLY AND ASSEMBLY

Two main categories of these contactors are available. The single-pole normally open types, and the single-pole double-throw types which have one normally open and one normally closed contact (Fig. 1). The assembly and disassembly of these devices will be covered individually.

Single-pole, Double-throw Type (One Normally Open and One Normally Closed Contact)

DISASSEMBLY

(Refer to Fig. 2, page 2 for exploded view and parts index).

1. Remove all electrical connections and remove the contactor from the vehicle for easier servicing.

2. Loosen the four long bolts in each corner, remove the top contact retainer, and the long bolts.

3. Remove the two top stationary normally closed contacts.

4. Remove the two contact spacers.

5. Remove the two bottom stationary contacts.

6. Remove armature and movable-contact assembly.

7. Remove magnet frame and coil from base.

8. Loosen and remove the 10-32 nut from the armature and movable-contact assembly using a 3/8-inch socket or nut driver. Note the order in which the parts are removed from the stud.

PARTS INDEX

1. Long bolt with #8 lock washer
2. Top contact retainer
3. Top stationary contact
4. Contact spacer
5. Bottom stationary contact
6. Armature and movable-contact assembly
   a. 10-32 nut
   b. No. 10 lock washer
   c. No. 10 flat washer
   d. Movable-contact carrier
   e. Shim
   f. Movable contact
   g. Spring cup (snaps into 6f)
   h. Contact spring
   i. Bottom stationary-contact support
   j. Armature
   k. Spiral return spring
7. Magnet frame
8. Coil
9. Base
10. Bus connector

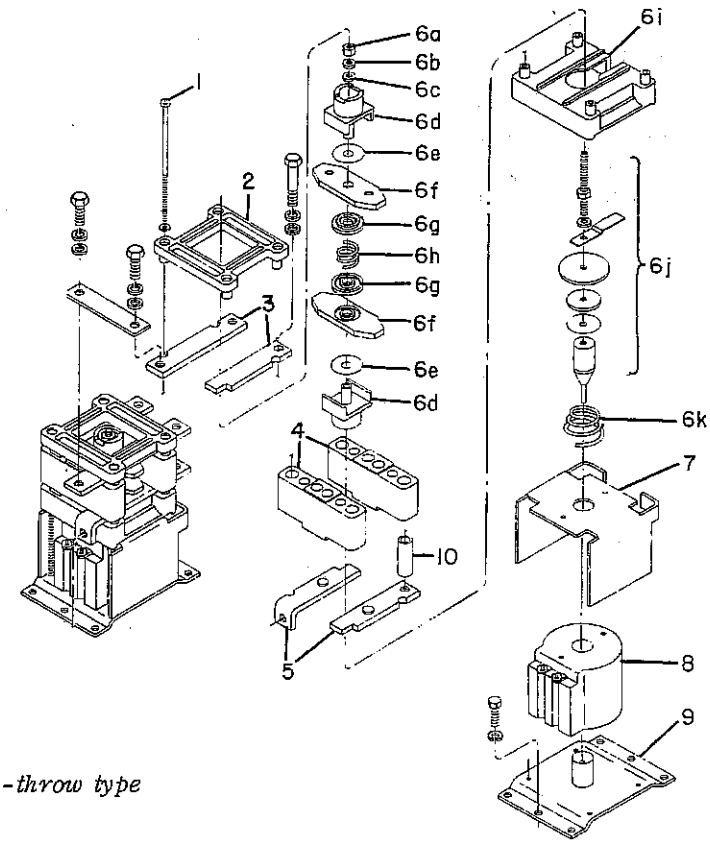


Fig. 2. Assembly of single-pole, double-throw type

PARTS INDEX

1. Long bolt with #8 lock washer
2. Contact spacer
3. Stationary contacts
4. Armature and movable-contact assembly
   a. 10-32 nut
   b. No. 10 lock washer
   c. No. 10 flat washer
   d. Contact spring retainer
   e. Contact spring
   f. Movable contact
   g. Shim
   h. Movable-contact carrier
   i. Stationary-contact support
   j. Armature
   k. Spiral return spring
5. Magnet frame
6. Coil
7. Base

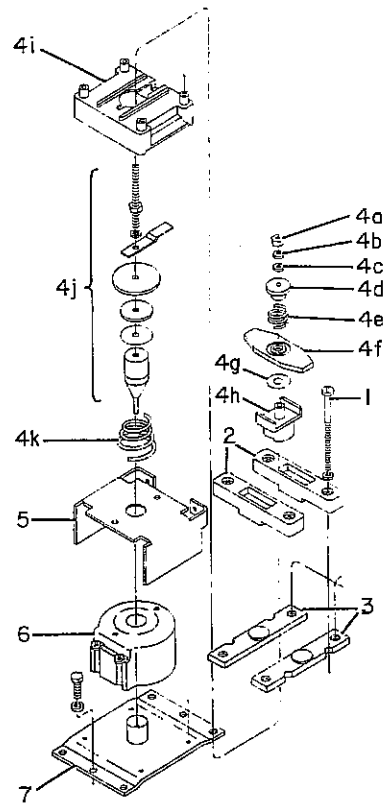


Fig. 3. Assembly of single-pole, single-throw type

ASSEMBLY

(Refer to Fig. 2, page 2 for exploded view and parts index).

Before assembly, all parts should be cleaned, inspected for wear and replaced if required. Assembly is performed in reverse order from disassembly with the following precautions required:

1. Force the small end of the spiral spring over the small diameter on the armature assembly. See Fig. 4, page 3.

2. Reassemble the armature parts 6a to 6k and tighten the 10-32 nut to 14 to 18 inch-pounds torque (1.6 to 2.0 Newton meters).

3. Locate the projections on the magnet frame in the indentations on top of the coil with frame oriented as in Fig. 2.

4. Add the armature and moveable-contact assembly.

5. Properly seat the stationary contacts in the slots of the molded stationary contact support and add the two contact spacers.

6. Add the two top stationary contacts and top contact retainer. Insert bus connector before proceeding to Step 7.

7. Tighten the four long bolts in a uniform manner using a diagonal tightening sequence. Tighten the bolts with 14 to 18 inch-pounds torque (1.6 to 2.0 Newton meters).

DISASSEMBLY AND ASSEMBLY

Single-pole, Single-throw Type (One Normally Open Contact)

DISASSEMBLY

(Refer to Fig. 3, page 2 for exploded view and parts index).

1. Remove all electrical connections and remove the contactor from the vehicle for easier servicing.

2. Loosen the four long bolts in each corner and remove the two contact spacers.

3. Remove the two stationary contacts.

4. Remove armature and movable-contact assembly.

5. Remove magnet frame and coil from the base.

6. Loosen and remove the 10-32 nut from the armature and movable contact assembly using a 3/8-inch socket or nut driver. Note the order in which the parts are removed from the stud. See Fig. 3, page 2.

ASSEMBLY

(Refer to Fig. 3, page 2 for exploded view and parts index).

Before assembly all parts should be cleaned and inspected for wear and replaced if required. The assembly is performed in the reverse order from the disassembly with the following precautions required:

1. Force the small end of the spiral spring over the small diameter on the armature assembly. See Fig. 4, page 3.

2. Reassemble the armature parts 4a to 4k and tighten the 10-32 nut to 14 to 18 inch-pounds torque (1.6 to 2.0 Newton meters).

3. Locate the projections on the magnet frame in the indentations on top of the coil with frame oriented as in Fig. 3.

4. Add the armature and moveable-contact assembly.

5. Properly seat the stationary contacts in the slots of the molded stationary-contact support and add the two contact spacers.

6. Tighten the four long bolts with 14 to 18 inch-pounds torque (1.6 to 2.0 Newton meters).

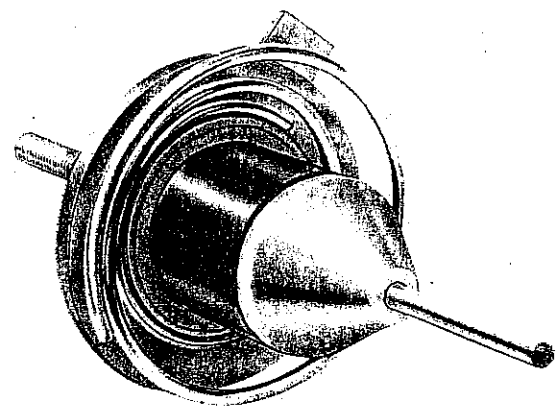


Fig. 4. Spiral spring attached to small diameter on cone head

AUXILIARY CONTACTS

Auxiliary contacts or electrical interlocks are available for the contactors as shown mounted on the contactor in Fig. 5. The auxiliary contact block is operated by de-energizing the contactor. Figures 6 and 7, page 4, illustrate the operations.

To obtain proper operation of the contact block, the gap between the auxiliary contact operator and the button on the contact block should be as shown in Fig. 7. This gap can be obtained by loosening the adjustment screws and moving the interlock support. The slots in the support permit this adjustment. The screws should be retightened to 14 to 18 inch-pounds torque (1.6 to 2.0 Newton meters).

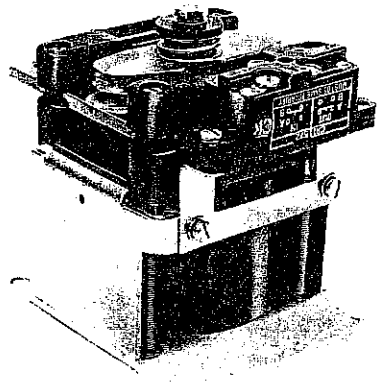


Fig. 5. Contactor with an auxiliary contact

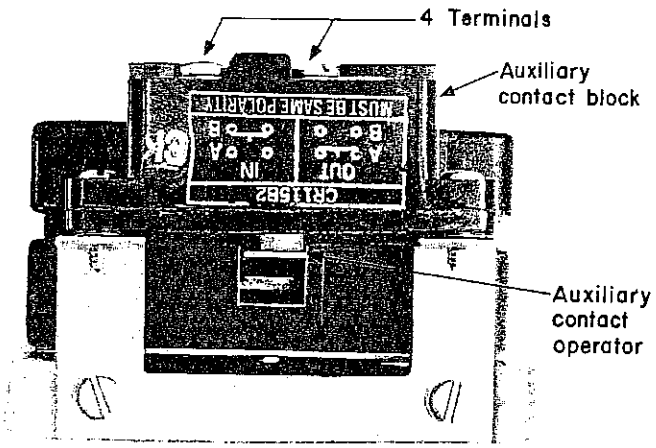


Fig. 6. Auxiliary contact shown in the operated position by the de-energized contactor

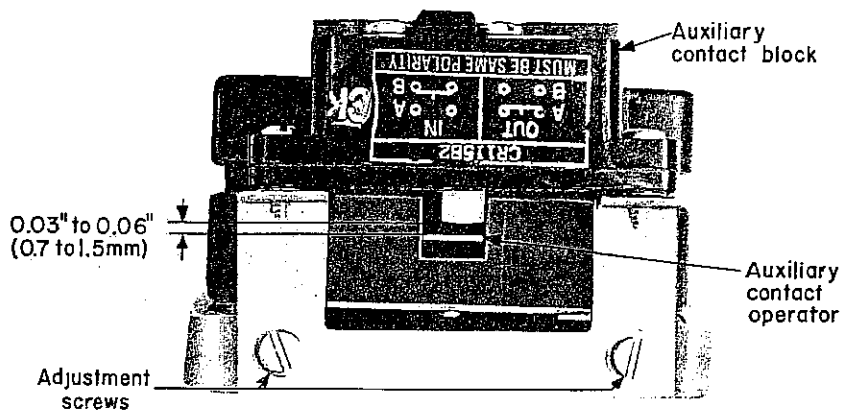


Fig. 7. Auxiliary contact shown in the normal position by the energized contactor

Maintenance And Inspection Of Parts

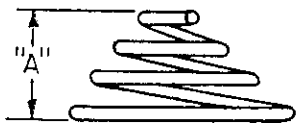
CONTACTS

Contacts must be replaced before they have worn through contact button to the base copper material.

SPIRAL RETURN SPRING

The free length should be between the limits shown in the table and should be replaced if it shows signs of corrosion.

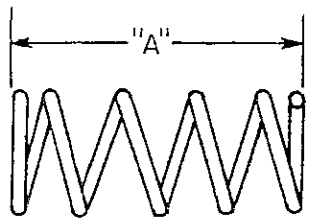
Contactor	Free Length "A" In inches (mm)
700, 710	0.73 to 0.79 (18.5 to 20.1)
701, 711, 712, 801, 702, 802, 811, 812	0.67 to 0.73 (17.3 to 18.5)
800, 810	0.80 to 1.00 (20.3 to 25.5)



CONTACT SPRING

The free length should be between the limits shown in the table and should be replaced if it shows signs of having been overheated or of corrosion.

Contactor	Free Length "A" In inches (mm)
700, 701, 711, 712, 801, 702, 802, 811, 812	0.38 to 0.40 (9.6 to 10)
800, 810	0.37 to 0.39 (9.4 to 9.9)



COILS

CAUTION: *The coils have voltage suppression cast integral with the coil. If a test voltage is applied in the wrong direction or if the coil is connected backwards, permanent damage may result. Observe the polarity mark on the coil during maintenance.*

If the contactor fails to operate, measure the voltage being applied to the coil terminals. The coils on the contactor have been designed to actuate the contactor on reduced battery voltage and with approximately three volts drop in the electronic circuit so that all contactors should operate at or below 65 percent of rated battery voltage. Replace the coil if the contactor does not operate to the full stroke on 65-percent voltage or if the coil shows signs of being overheated.

RENEWAL PARTS

Only factory specified parts should be used. These parts should be obtained from the truck manufacturer through his normal service channels.

INSTRUCTIONS

EV-1* SCR CONTROL
ACCELERATOR SWITCH
IC4485ACC1

Before any adjustments, servicing, parts replacement or any other act is performed requiring physical contact with the electrical working components or wiring of this equipment, JACK WHEELS OFF FLOOR, DISCONNECT THE BATTERY AND DISCHARGE CAPACITOR(S).

DESCRIPTION

The IC4485ACC1 is a family of accelerator master switches that may be either foot-operated through a pedal and linkage system or hand-operated by a suitable handle arrangement. This master switch offers a wide variety of options so that it may be customized to fit the user requirements. The master switch contains a switchette which closes at the beginning of travel to energize the control circuit, a switchette at the end of travel to bypass the control for maximum speed and torque, and a unique unidirectional potentiometer to vary the speed in between. The potentiometer is controlled by mechanical linkage to turn in only one direction so that it is independent of handle movement. This feature simplifies the setting of the potentiometer to provide consistent performance in both directions.

A single molded cam is used for the foot-operated CW and CCW forms. Direction of rotation can be changed in the field by changing the position of the start switchette and relocating the OFF-position stop.

A different molded cam is used for the hand-operated forms.

INSTALLATION

A conduit plate can be located on either side. The four mounting holes are symmetrical relative to the shaft; only three need be used.

When an external linkage is used, a separate external return spring is required. Any external linkage that can be operated forcibly should also have an external mechanical stop.

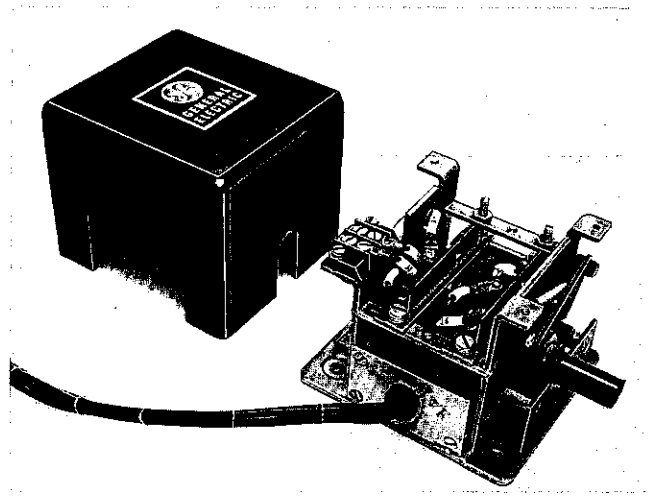


Fig. 1. IC4485ACC1 master switch with cover removed

TABLE 1

CURRENT RATING OF SWITCHETTES

Voltage Inductive	Current-Amperes	
	Make and Break	Carry
6	10.0	10
12	6.0	10
18	4.0	10
24	3.5	10
30	3.0	10
36	2.5	10
48	2.0	10
72	1.0	10

The ratings in Table 1 are for single circuits (i.e., normally open contact only). Voltages above 72 require capacitor-type filters, in accordance with factory recommendations.

MAINTENANCE

Oil-less bearings are used on both ends of the main operating shaft and thus eliminate the need for any lubrication of the switch.

* Trademark of General Electric Company

SWITCHETTE ADJUSTMENT

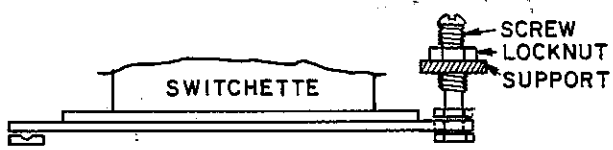


Fig. 2. Switchette adjustment, view from shaft end

Unlock locknut (see Fig. 2) and turn screw CW to make the normally open switchette close at less travel. The start switch should close at 5 to 8 degrees and reset at a minimum of 1-degree travel from the OFF position. The 1A switch should close at 26 to 29 degrees and reset at a minimum of 22 degrees travel from the OFF position. Total travel is 30 degrees.

POTENTIOMETER ADJUSTMENT

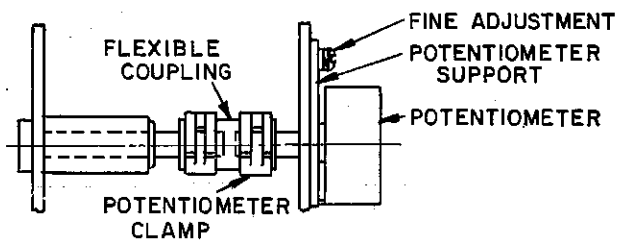


Fig. 3. Potentiometer and clamps

To remove the potentiometer, remove the wires from the terminal board, loosen the clamps on the flexible coupling with duck-bill pliers, and move both clamps to the left (see Fig. 3). Remove the potentiometer and its support by removing the two "fine-adjustment" screws. Retain the potentiometer support.

To replace, mount the new potentiometer on the support, locating the tab in the hole of the support, and secure with the lockwasher and nut. With an ohmmeter on the potentiometer terminals (R x 100 scale), turn the shaft clockwise until the point where the resistance starts to reduce below the level (4800- to 6000-ohm) portion of the curve (see Fig. 4). This corresponds to the START position. Rotate the potentiometer shaft CCW 14 degrees to the OFF position.

The width of the potentiometer locating tab is equivalent to 14 degrees. This may be used as a guide when rotating the potentiometer shaft from the START to the OFF position.

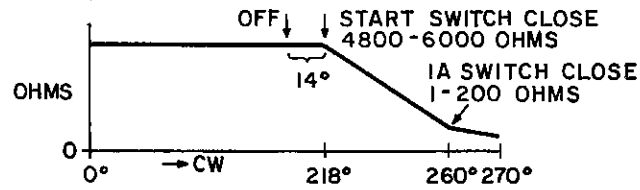


Fig. 4. Potentiometer resistance curve

With the potentiometer clamp moved to the left and the master switch in the OFF position, line up the potentiometer shaft with the flexible coupling and center the fine-adjustment slots with the fine-adjustment tapped holes. Push the potentiometer until the support is against the frame. Assemble, but do not tighten, the fine-adjustment screws. Release the coupling clamp with duck-bill pliers and slide the clamp into position.

Rotate the master switch shaft until the START switchette operates (a slight click at about 7 degrees). The ohmmeter should be 4800 to 6000 ohms. Continue rotating the shaft until the 1A switchette operates (a slight click at about 28 degrees). The ohmmeter should be less than 200 ohms and remain above 1 ohm, when the shaft is rotated fully.

If the ohms are too low when the start switch closes, loosen the fine-adjustment screws and rotate the potentiometer support CCW.

If the ohms are too high when the 1A switch closes, loosen the fine-adjustment screws and rotate the potentiometer support CW.

If the fine adjustment is not enough to bring the resistance values within limits, return the master switch to the OFF position, release the potentiometer clamp with duck-bill pliers, and turn the potentiometer shaft with needle-nose pliers a slight amount. (Clockwise from shaft end of potentiometer to reduce ohms.) Recheck resistances at START and 1A and use fine adjustment as described previously if necessary.

Check that coupling clamps are in position and the fine-adjustment screws are tight.

* Trademark of General Electric Company

FIELD MODIFICATION OF FOOT-OPERATED SWITCH

If the direction of rotation of a foot-operated switch needs to be changed, the location of the OFF-position stop and the location of the switchette must be changed. (See Figs. 5 and 6 and the Table 2.)

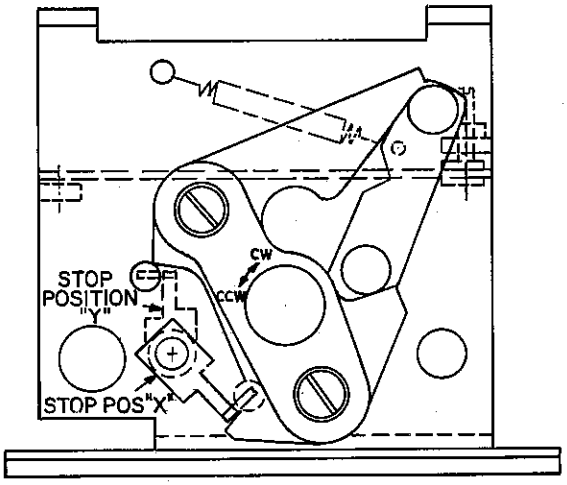


Fig. 5. OFF-position stop

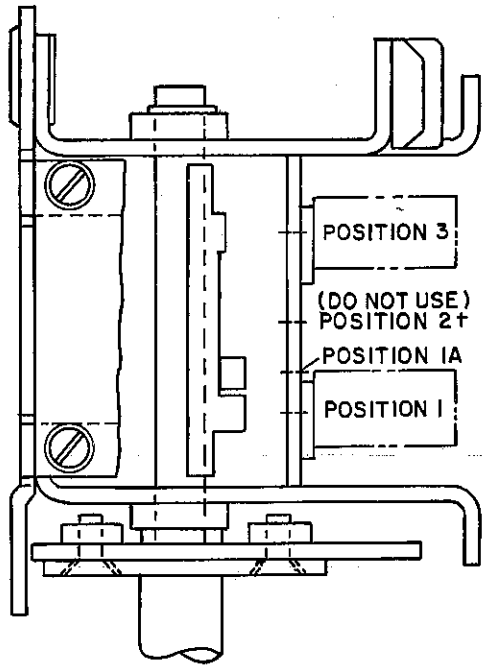


Fig. 6. Switchette position

TABLE 2

OFF-POSITION STOP AND SWITCHETTE POSITION

Item Designation	Item Position	
	CW	CCW
CW Start Switchette	1A	Omit
CCW Start Switchette	Omit	1
1A Switchette	3	3
OFF-position Stop	Y	X

* Trademark of General Electric Company

GENERAL ELECTRIC COMPANY, U.S.A.
INDUSTRIAL CONTROL DEPARTMENT

GENERAL ELECTRIC

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12–75

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EVC*

ELECTRIC VEHICLE CONTROL

RENEWAL PARTS BREAKDOWN

IC3645WB

2 - TRACTION
5 - PUMP
7 - TRACTION
9 - PUMP

EV-10 AND EV-10 PLUS SCR CONTROLS

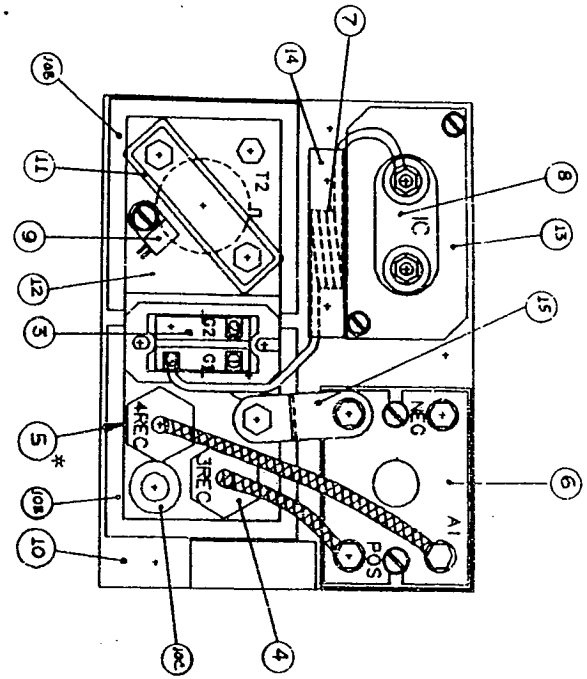
* TRADEMARK OF THE GENERAL ELECTRIC COMPANY

EV10/10+ RENEWAL PARTS LIST

IC3645WB2**AC
PARTS LIST

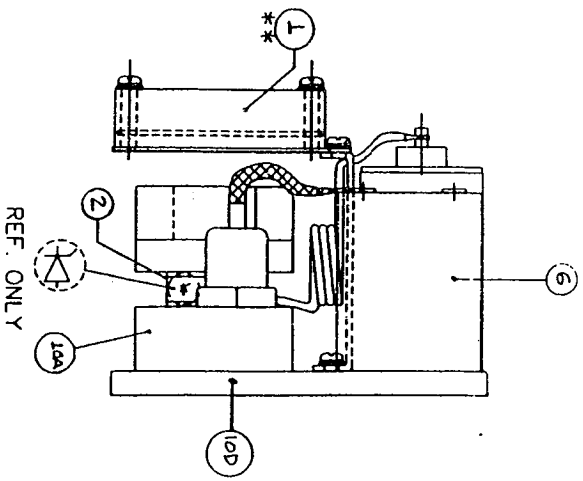
ITEM NO.	QTY	CATALOG NUMBER	DESCRIPTION
1	1	171B3784G4	CARD ASSEMBLY
2	1	44A723525-G01	1 REC ASSEMBLY
3	1	44A717074-001	2 REC/5 REC PACKAGE
4	1	259A9211PXCR	3 REC
5	1	259A9211PYCR	4 REC
6	1	** OPTION	TRANS/REACTOR OPTION
7	1	44A717485-G01	CHOKE
8	1	219A4543P1	CAPACITOR
9	1	44A727009-G02	TP ASM
10	1	116C6940G4	BASE ASM
10A	1	116C6937P3	HEAT SINK
10B	2	273A2523P3	CO-THERM
10C	4	259A3290P1	BUSHING
10D	1	116C6938P1	BASE
11	1	259A9444P1	CLAMP
12	1	44A723546-001	1 REC HEAT SINK
13	1	188A5137P1	CAP. BRACKET
14	1	171B6513P2	U BRACKET
15	3	195B6250P3	STRAP

** OPTION	TRANS/REAC CAT NUMBER
A4	44B396056-G04
A5	44B396056-G03



TOP VIEW

* NOT SHOWN SIDE VIEW.



SIDE VIEW

** NOT SHOWN TOP VIEW.

REF. ONLY

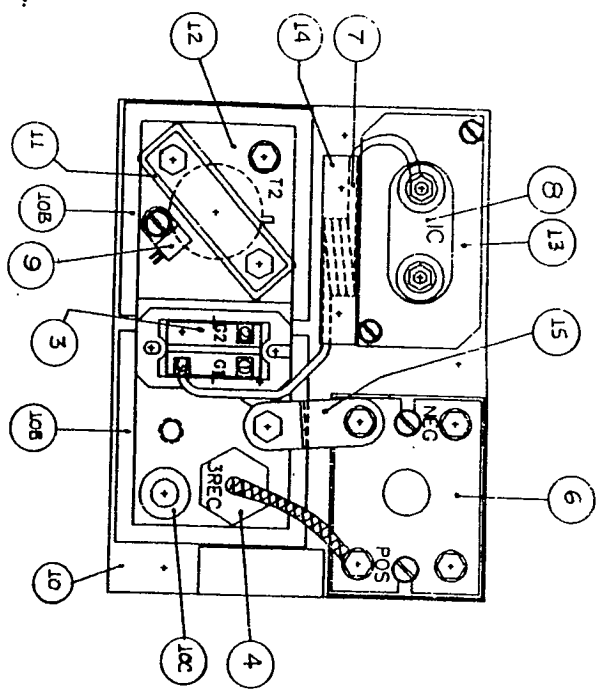
IIC3645

EV10/10+ RENEWAL PARTS LIST

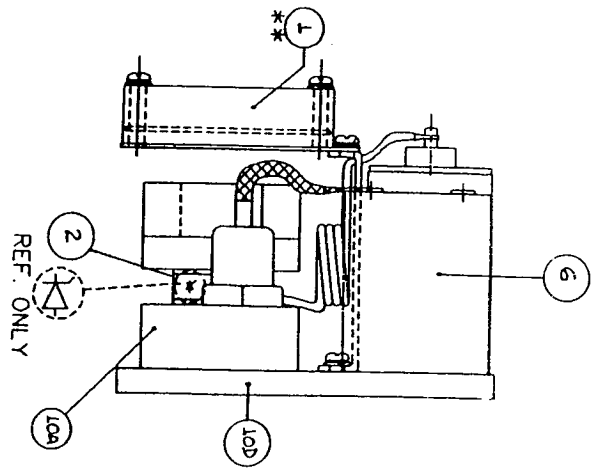
IC3645WB5**AC PARTS LIST

ITEM NO.	QTY	CATALOG NUMBER	DESCRIPTION
1	1	** OPTION	CARD OPTION
2	1	44A723525-G01	1 REC ASSEMBLY
3	1	44A717074-001	2 REC/5 REC PACKAGE
4	1	259A9211PXCR	3 REC
6	1	** OPTION	TRANS/REACTOR OPTION
7	1	44A717485-G01	CHOKE
8	1	219A4543P1	CAPACITOR
9	1	44A727009-G02	TP ASM
10	1	116C6940G4	BASE ASM
10A	1	116C6937P3	HEAT SINK
10B	2	273A2523P3	CO-THERM
10C	4	259A3290P1	BUSHING
10D	1	116C6938P1	BASE
11	1	259A9444P1	CLAMP
12	1	44A723546-001	1 REC HEAT SINK
13	1	188A5137P1	CAP. BRACKET
14	1	171B6513P2	U BRACKET
15	3	195B6250P3	STRAP

** OPTION	CARD CAT NUMBER	TRANS/REAC CAT NUMBER
A3	171B3920G4	44B396056-G04
A5	171B3920G3	44B396056-G03



TOP VIEW



SIDE VIEW

** NOT SHOWN TOP VIEW.

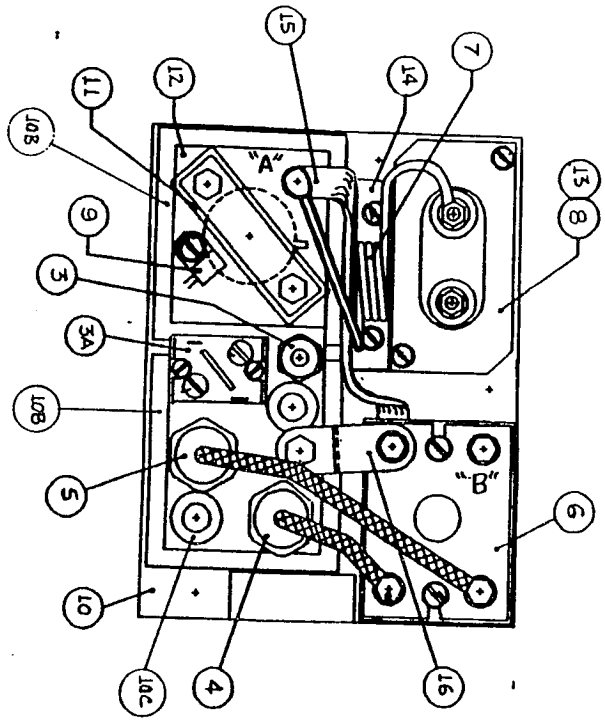
EV10/10+ RENEWAL PARTS LIST

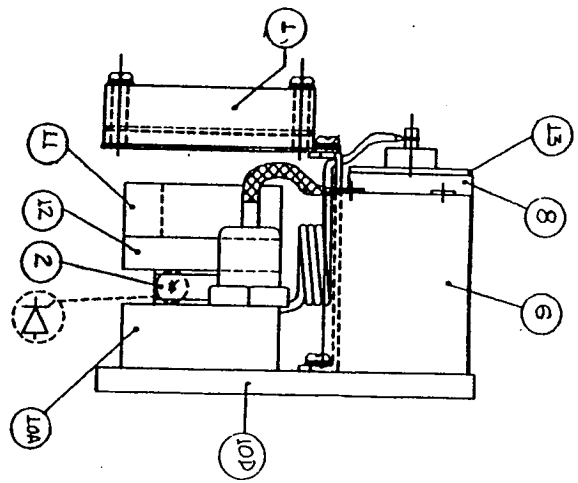
IC3645WB7**AC
PARTS LIST

ITEM NO.	QTY	CATALOG NUMBER	DESCRIPTION
1	1	171B3784G4	CARD ASSEMBLY
2	1	44A723525-G02	1 REC ASSEMBLY
3	1	259A2135G4	2 REC
3A	1	44A717067-001	5 REC
4	1	259A9211PXCR	3 REC
5	1	259A9211PYCR	4 REC
6	1	** OPTION	TRANS/REACTOR OPTION
7	1	44A717485-G02	CHOKE
8	1	219A4543P1	CAPACITOR
9	1	44A727009-G03	TP ASM
10	1	116C6940G3	BASE ASM
10A	1	116C6952P1	HEAT SINK
10B	2	273A2523P3	CO-THERM
10C	4	259A3290P1	BUSHING
10D	1	116C6936P1	BASE
11	1	259A9444P2	CLAMP
12	1	44A723546-001	1 REC HEAT SINK
13	1	188A5137P1	CAP. BRACKET
14	1	171B6513P2	U BRACKET
15	1	** OPTION	CABLE/TUBING OPTION
16	3	195B6250P3	STRAP

** OPTION	TRANS/REAC CAT NUMBER	CABLE/TUBING CAT NUMBER
A3	44B396056-G04	259A8139P11
A5	44B396056-G03	44A723568-G01

CABLE/TUBING NOTE: ITEM 15 "A3 OPTION" TUBING A5 SHOWN. FOR "A5 OPTION", CABLE IS CONNECTED FROM POINT "A" TO POINT "B".





EV10/10+ RENEWAL PARTS LIST

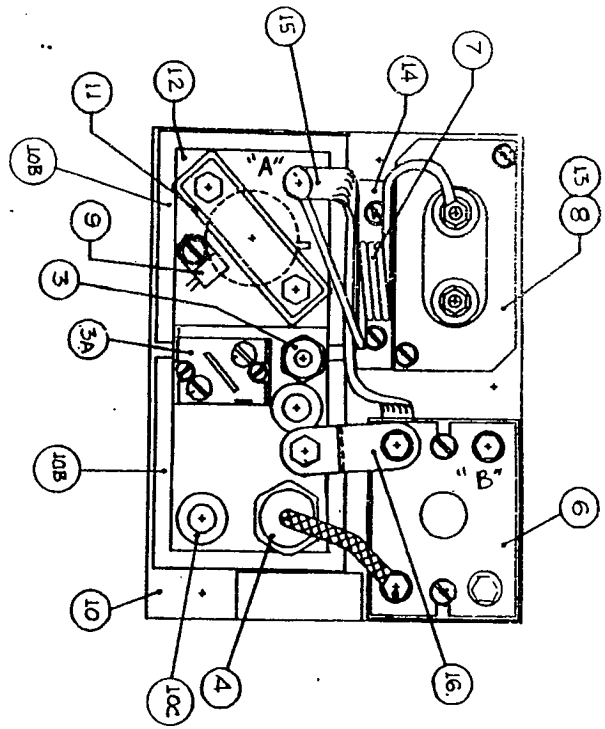
IC3645WB9**AA
PARTS LIST

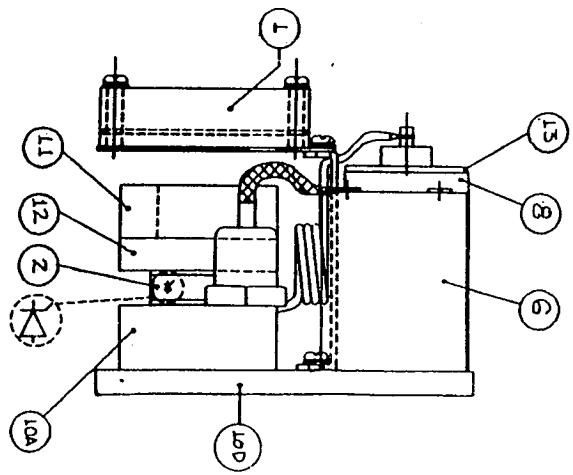
ITEM NO.	QTY	CATALOG NUMBER	DESCRIPTION
1	1	** OPTION	CARD OPTION
2	1	44A723525-G02	1 REC ASSEMBLY
3	1	259A2135G4	2 REC
3A	1	44A717067-001	5 REC
4	1	259A9211PXCR	3 REC
6	1	** OPTION	TRANS/REACTOR OPTION
7	1	44A717485-G02	CHOKE
8	1	219A4543P1	CAPACITOR
9	1	44A727009-G03	TP ASM
10	1	116C6940G3	BASE ASM
10A	1	116C6952P1	HEAT SINK
10B	2	273A2523P3	CO-THERM
10C	4	259A3290P1	BUSHING
10D	1	116C6938P1	BASE
11	1	259A9444P2	CLAMP
12	1	44A723546-001	1 REC HEAT SINK
13	1	188A5137P1	CAP. BRACKET
14	1	171B6513P2	U BRACKET
15	1	** OPTION	CABLE/TUBING OPTION
16	3	195B6250P3	STRAP

** OPTION	CARD CAT NUMBER	TRANS/REAC CAT NUMBER
A3	171B3920G4	44B396056-G04
A5	171B3920G3	44B396056-G03

** OPTION	CABLE/TUBING CAT NUMBER
A3	259A8139P11
A5	44A723568-G01

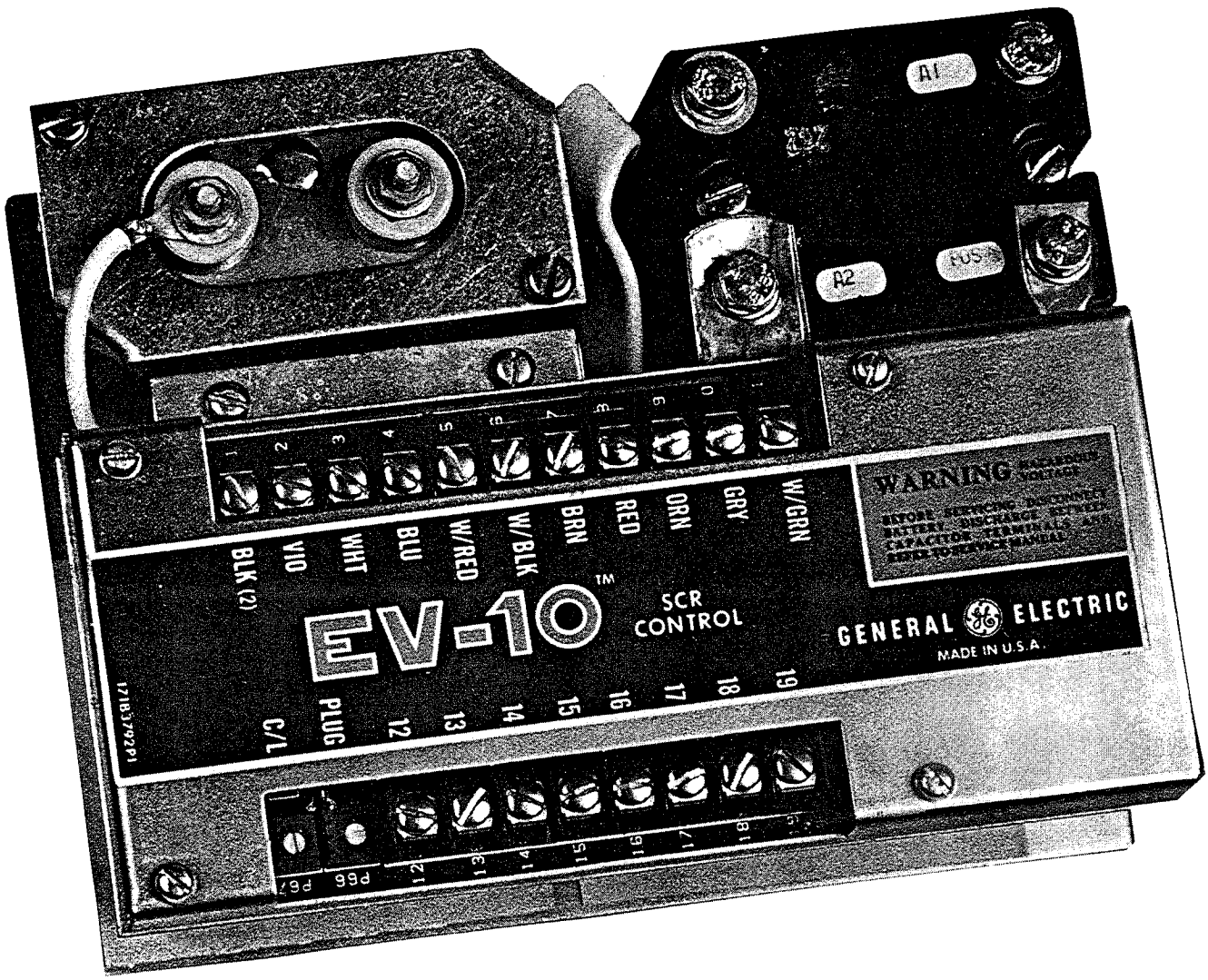
CABLE/TUBING NOTE: ITEM 15 "A3 OPTION" TUBING AS SHOWN. FOR "A5 OPTION", CABLE IS CONNECTED FROM POINT "A" TO POINT "B".





RENEWAL PARTS

EV-10* SCR CONTROL
IC3645WB2
24-48 VOLTS DC



CATALOG NUMBER STRUCTURE

IC3645WB2	A3	AA

BASIC NUMBER
VOLTAGE RANGE
REVISION LEVEL

*Trademark of General Electric Co.

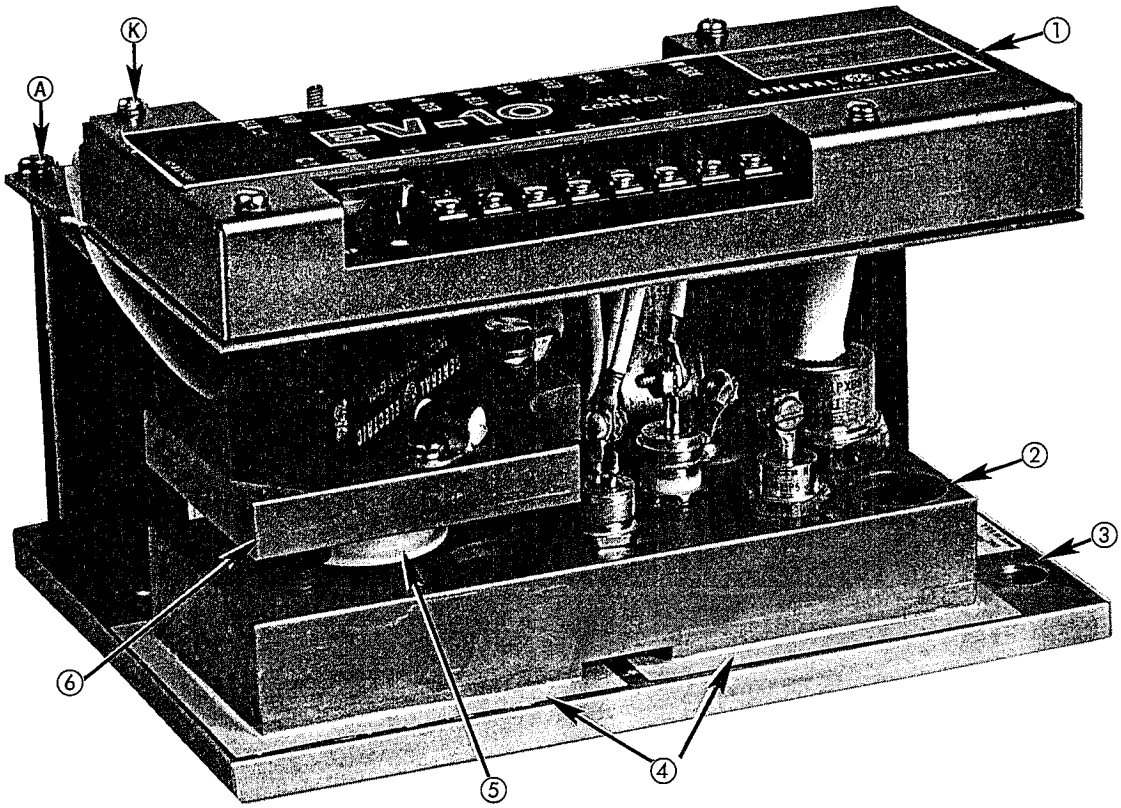
When ordering renewal parts, give quantity, catalog number, description of each item required, and complete nameplate reading.

GENERAL ELECTRIC

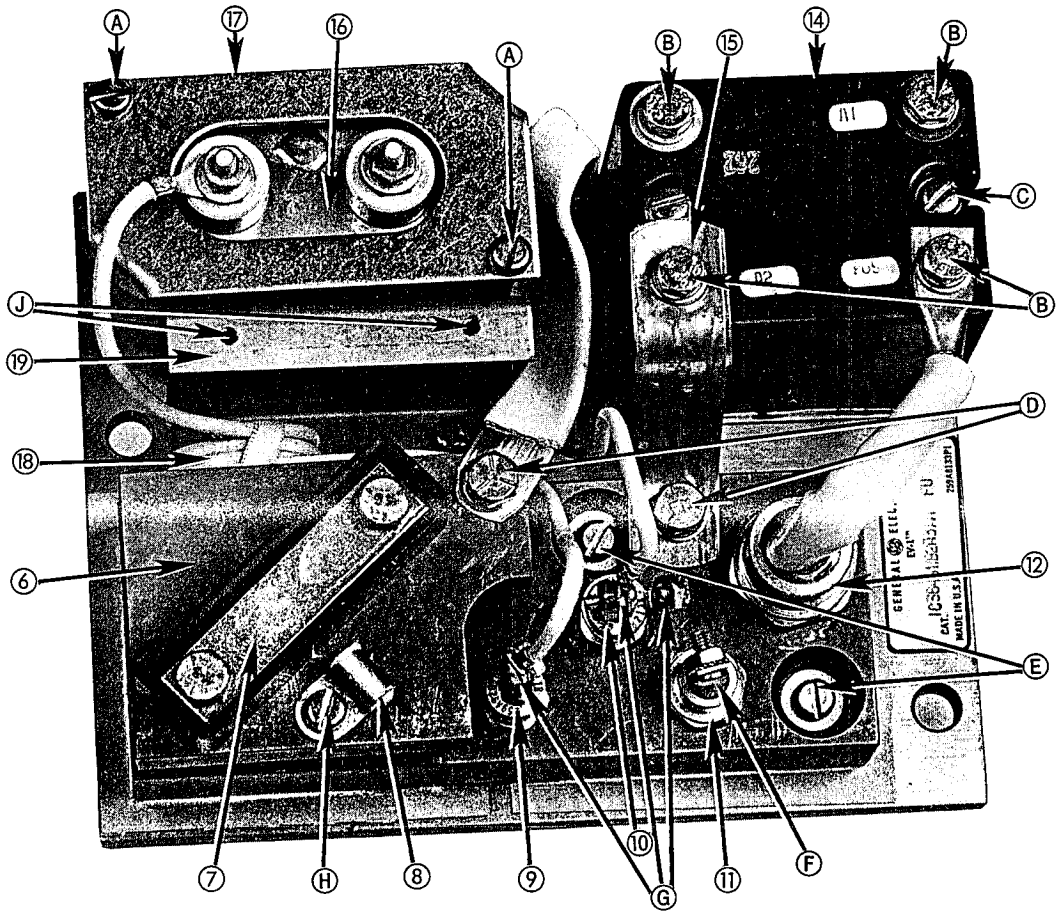
Data subject to change without notice.

IC3645WB2/EV-10 SCR CONTROL

SIDE VIEW



TOP VIEW WITH CONTROL CARD REMOVED



IC3645WB2/EV-10 SCR CONTROL

PART LIST

REF. NO.	FORM A3AA	FORM A4AA	CATALOG NUMBER	DESCRIPTION
1	1	1	171B3784G1	EV-10 Control Card
2	1		116C6937P1	Heat Sink (#1—#5 Rect.)
2		1	116C6937P2	Heat Sink (#1—#5 Rect.)
3	1	1	116C6938P1	Base
4	2	2	273A2523P3	Co-Therm Insulation
5	1	1	259A9204PYC	#1 Rectifier
6	1	1	44A717441-001	Heat Sink Top, (#1 Rect.)
7	1	1	259A9444P1	Spring Asm., (#1 Rect.)
8	1	1	44A717475-G01	Thermal Protector
9	1	1	259A9209PXM	#2 Rectifier
10	1	1	259A9209PYD	#5 Rectifier
11	1		219A4533P5	#4 Rectifier
11		1	259A9211PYBR	#4 Rectifier
12	1		44A717477-G01	#3 Rectifier
12		1	259A9211PXBR	#3 Rectifier
14	1	1	44B396056-G01	Transformer
15	1	1	195B6250P3	Bus A2 to Heat Sink
16	1	1	188A5137P1	Capacitor Bracket
17	1	1	219A4543P1	Capacitor
18	1	1	44A717485-G01 P2	Choke
19	1	1	171B6513P1	Bracket, Control Card
Δ	1	1	WH7130R19G1	Wire Harness
Δ	1	1	118C8388P1	Torque Gauge for #1 Rect.

Δ—Not Shown

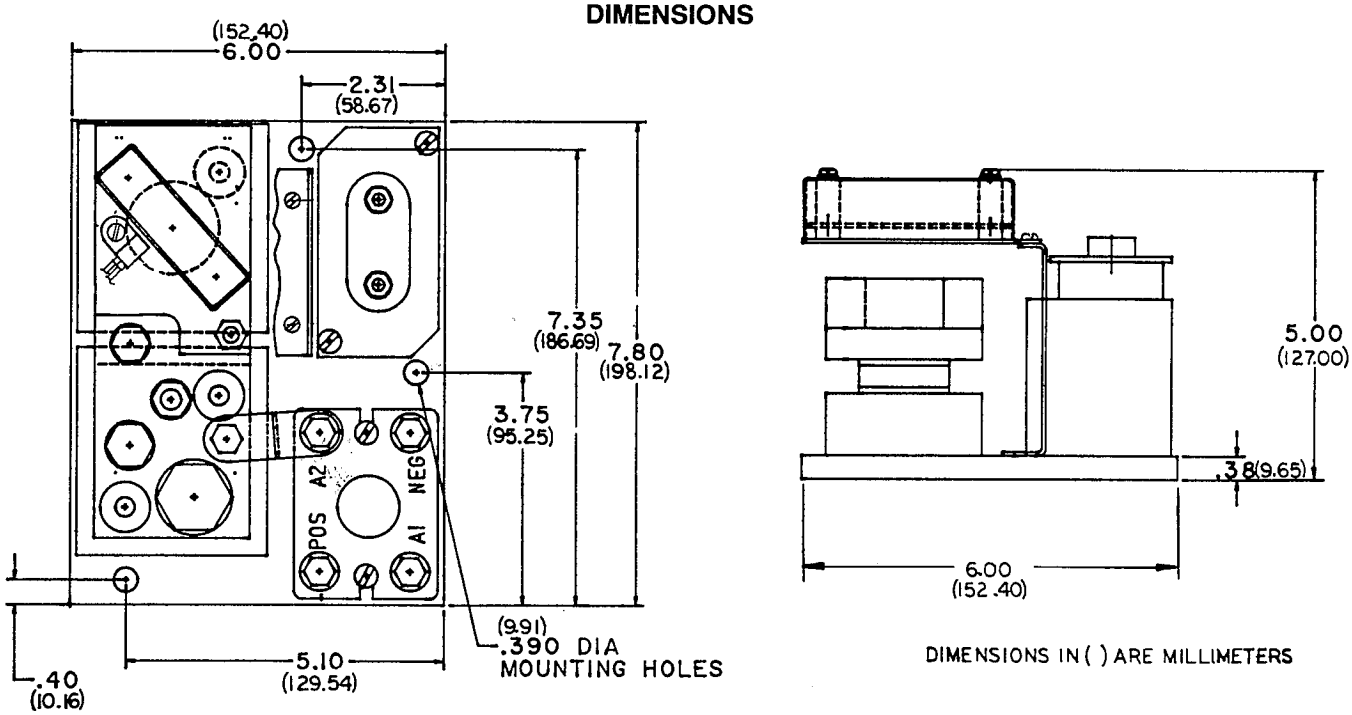
HARDWARE

REF.	FORM A3AA	FORM A4AA	CATALOG NUMBER	DESCRIPTION
A	2	2	N57P16056B6	Screw/10-32, 3-1/2 in. Pan HD
	2	2	N405P39B6	Lock Washer/for No. 10 Screw
	2	2	N402P39B6	Flat Washer/for No. 10 Screw
B	4	4	L14P15014B33	Bolt/M6×1, 14mm, Hex HD
	4	4	L401P26B33	Lock Washer/for M6 Bolt
	4	4	L400P8B33	Flat Washer/for M6 Bolt
C	2	2	N57P16048B6	Screw/10-32, 3 in. Pan HD
	2	2	N405P39B6	Lock Washer/for No. 10 Screw
	2	2	N402P39B6	Flat Washer/for No. 10 Screw
D	2	2	N22P21010B6	Bolt/1/4-20, 5/8 in. Hex HD
	2	2	N405P41B6	Lock Washer/for 1/4 in. Bolt
	2	2	N402P11B6	Flat Washer/for 1/4 in. Bolt
E	4	4	N57P16014B6	Screw/10-32, 7/8 in. Pan HD
	4	4	N405P39B6	Lock Washer/for No. 10 Screw
	4	4	N402P39B6	Flat Washer/for No. 10 Screw
F	1	1	N57P15006B6	Screw/8-32, 3/8 in. Pan HD
	1	1	N238P15B6	Keps Unit/for No. 8 Screw
G	3	3	N57P13005B6	Screw/6-32, 5/16 in. Pan HD
	3	3	N238P15B6	Keps Unit/No. 6 Screw
H	1	1	N144P16006B6	Screw/10-32, 1/2 in. Pan HD
J	2	2	N144P15006B6	Screw/8-32, 3/8 in. Pan HD
	2	2	N405P8B6	Lock Washer/for No. 8 Screw
K	4	4	N144P13004B6	Screw/6-32, 1/4 in. Pan HD
	4	4	N405P37B6	Lock Washer/for No. 6 Screw

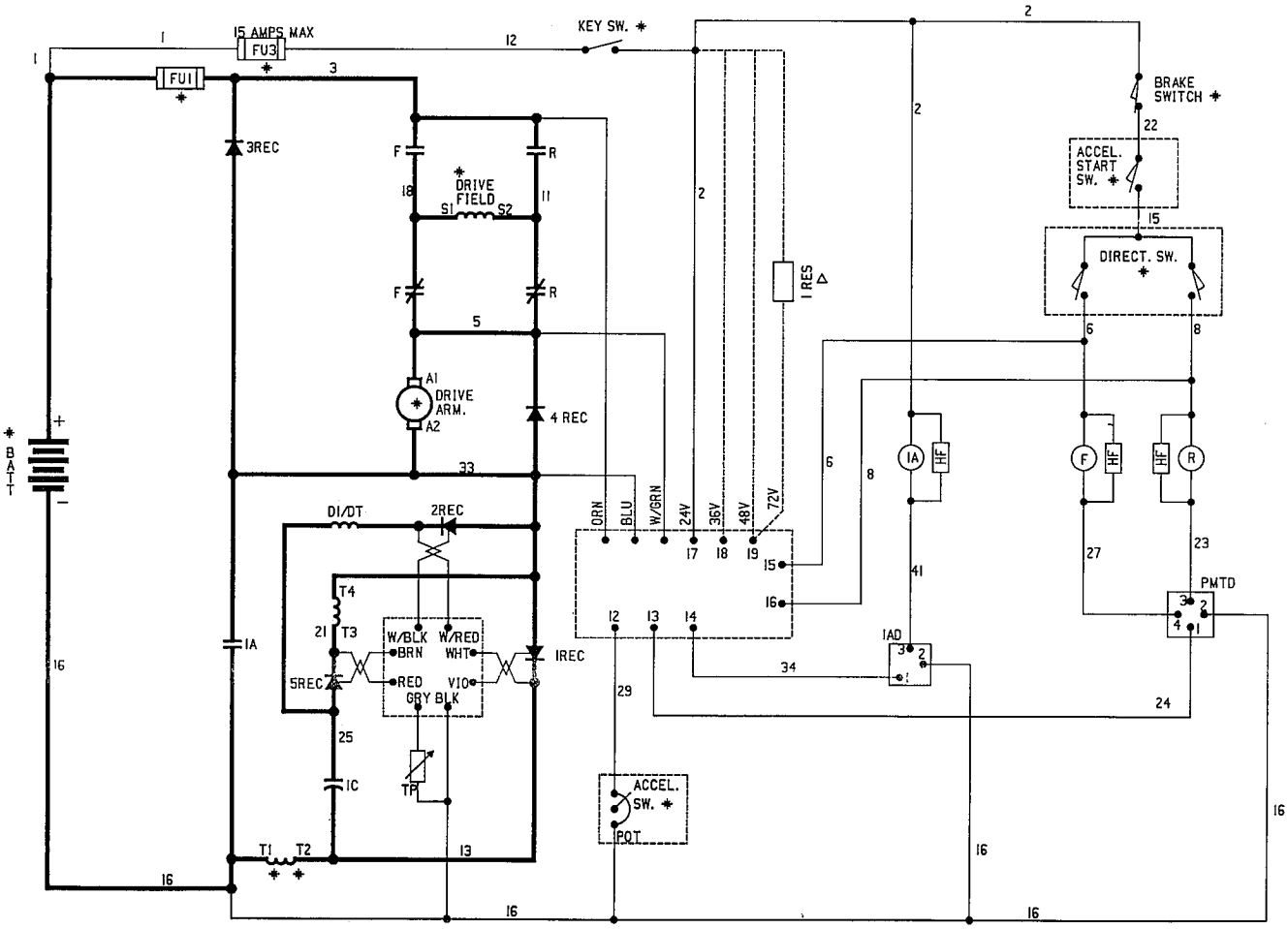
GEF-4663

IC3645WB2/EV-10 SCR CONTROL

DIMENSIONS



ELEMENTARY



* SUPPLIED BY CUSTOMER
* * T1-T2 WINDING OMITTED ON 72V CONTROL.
△ 1RES. SUPPLIED AS A SEPARATE ITEM, TYPICALLY ON CONTACTOR PANEL.