INSTRUCTION MANUAL
FOR
MINIMUM/MAXIMUM EXCITATION LIMITER
Model: EL 200

Part Numbers: 9 1747 00 110
9 1747 00 113
9 1747 00 114
9 1747 00 115

Basler Electric

Publication Number: 9 1747 00 995
Date: September, 1992
Revision: C 10/97

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.

CONFIDENTIAL INFORMATION

of Basler Electric Company, Highland, IL. It is loaned for confidential use. Subject to return on request and with the mutual understanding that it will not be used in any manner detrimental to the interests of Basler Electric Company.

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.

REV C
ECA 16371

SECTION 1
GENERAL INFORMATION

1-1. DESCRIPTION

a. The Basler Electric Minimum/Maximum Excitation Limiter (Model: EL 200) performs two functions. As a maximum excitation limiter, it senses the field current output of the voltage regulator or static exciter and limits the field current to prevent overheating of the field. As a minimum excitation limiter, it senses the leading volt-ampere-reactive (VAR) output of the generator and limits any further decrease in excitation (as necessary) to prevent loss of synchronization and end iron heating during parallel operation.

b. The EL 200 Excitation Limiter has circular characteristic that is compatible with typical generator reactive capabilities as shown by Figure 1-1.

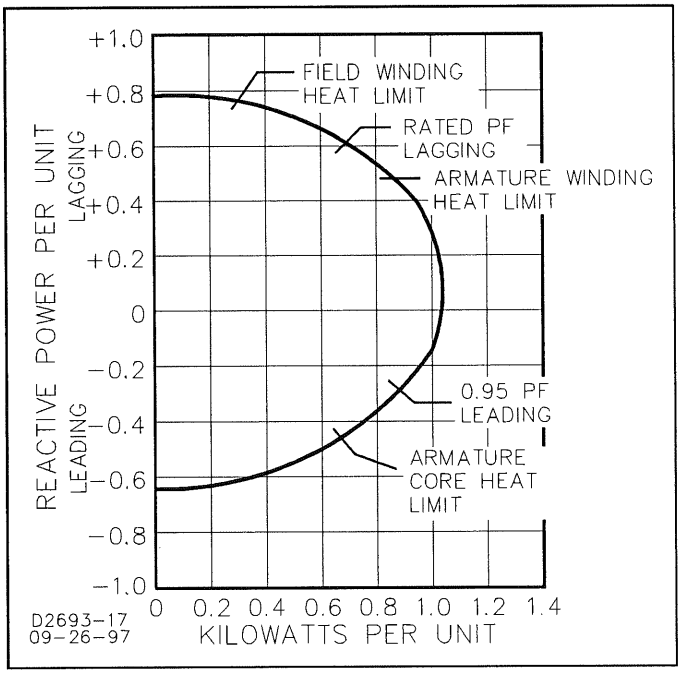

Figure 1-1. Typical Generator Reactive Capability.

1-2. APPLICATION

The EL 200 Excitation Limiter can be used with the following Basler voltage regulators and excitation systems: SSR, XR2001, XR2002, XR2003, SR-A Series, SR-F Series, SR-E Series, SR-H Series, SSE, and SER-CB. The EL 200 is designed for use on generating systems and can be used on a synchronous motor or condenser if the procedures in Chapter 4 are followed exactly. Additionally, the Basler Electric EL 300 has been designed to fulfill most motor applications and is preferred over the EL 200 for this type of application.

1-3. SPECIFICATIONS

Refer to Table 1-1 for the electrical specifications and to Table 1-2 for the physical specifications.

Table 1-1. Electrical Specifications.

Input Voltage:	90 - 139/180 - 264/342 -528/540 - 660 Vac, ±10%, 50/60 Hz.
Burden:	12 VA maximum.
Current Transformer Input:	2.5 to 5.0 A full-rated load, 0.8 pf, 5 VA Burden.
Output:	±8 Vdc.
Drift:	Less than 5% of nominal per 50°C change.
Field Current: **EL 200-2:** **EL 200-7:** **EL 200-20:** **EL 200-36:**	 0.5 to 2 A (P/N 9 1747 00 115) 2 to 7 A (P/N 9 1747 00 110): below 36 A use appropriate EL200 without external transducer. 36 to 100 A use multiple pri turns. 100 to 200 A use transducer P.N. BE14968-001. 200 to 400 A use transducer P.N. BE15681-001. 5 to 20 A (P/N 9 1747 00 113) 10 to 36 A (P/N 9 1747 00 114)
Output Contacts Rating:	10 A @ 24 Vdc/240 Vac/120 Vac; 0.5 A @ 125 Vdc.
Time Delay:	0 to 60 seconds.

Table 1-2. Physical Specifications.

Overall Dimensions:	8.2 inches (208 mm) X 11.5 inches (292 mm) X 4.2 inches (107 mm).
Weight:	10 lbs (4.6 kg) net.
Storage Temperature Range:	-65°C (-85°F) to +85°C (+185°F)
Operating Temperature Range:	-40°C (-40°F) to +70°C (+158°F)
Vibration:	Withstands the following: 2 to 27 Hz. at 1.3 G's; 27 to 52 Hz. at 0.036 inch double amplitude; 52 to 1000 Hz. at 5.0 G's.
Shock:	Withstands up to 15 G's in each of three mutually perpendicular axes.

SECTION 2

THEORY OF OPERATION

(Refer to Figure 2-1)

2-1. POWER SUPPLY

a. The EL 200 senses the generator voltage through transformer T2. This transformer has taps for use with the following input voltages: 90-139, 180-264, 342-528, and 540-660 Vac, ±10%, 50/60 Hz.

b. A portion of the transformer (T2) output feeds the regulated power supply to produce a +14 Vdc and a -14 Vdc output for operating the limiter circuitry. The transformer (T2) also provides reference signals to the VAR detector, the watt detector, and power to the dc transducer (transformer T3).

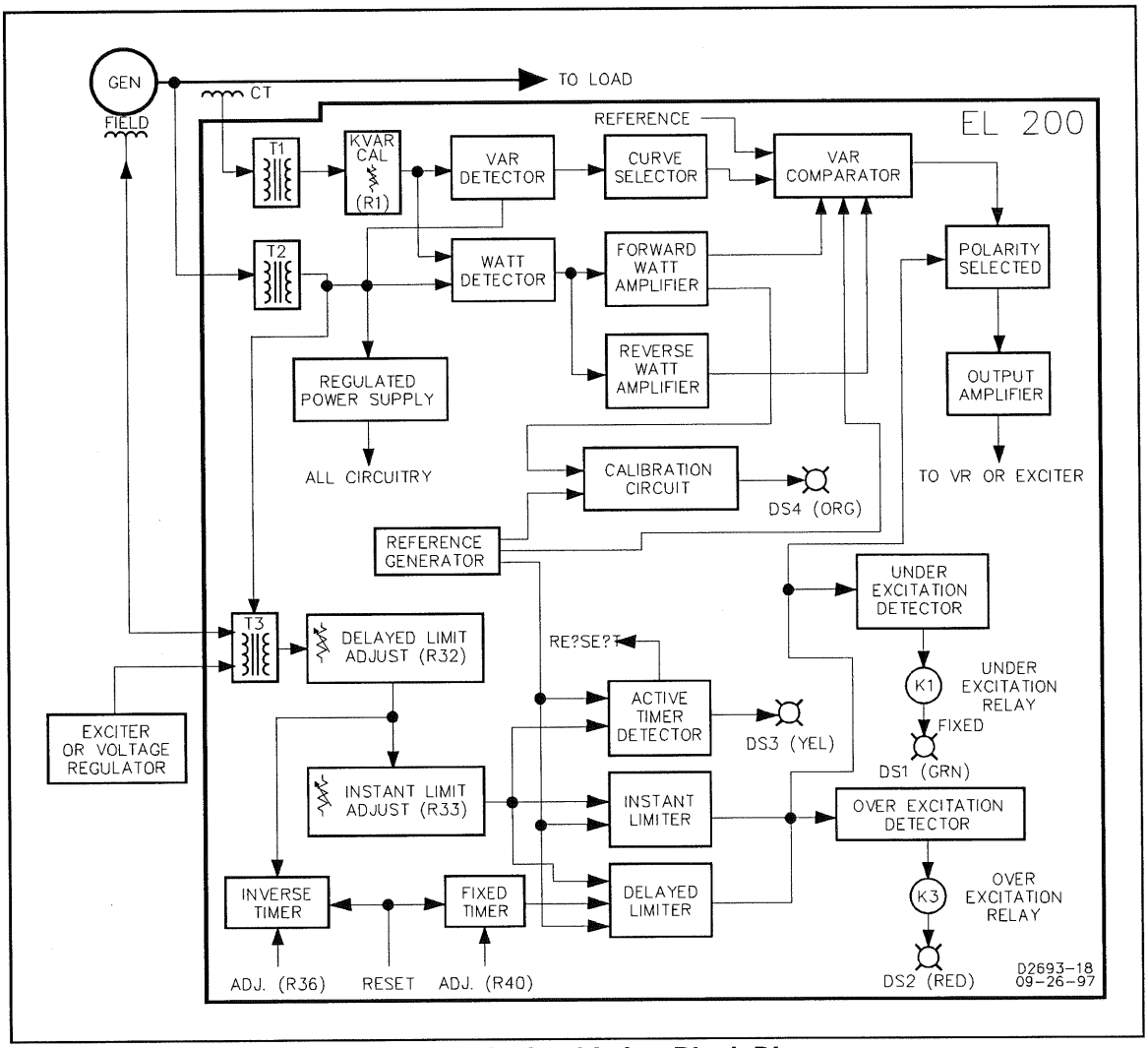

Figure 2-1. Excitation Limiter Block Diagram.

2-2. VAR LIMITING CIRCUITRY

a. Transformer T1 receives a 0 to 5 A signal from an external current transformer (CT) which senses the generator output current. The output of T1 is passed to the VAR and Watt detectors.

b. The VAR and Watt Detectors convert the ac inputs to dc outputs which represent (by polarity and amplitude) the VAR and Watt components of the generator output current. The output of the VAR detector passes through a tapped resistor network (Curve Selector) to the VAR Comparator. The VAR Comparator makes a comparison of the Curve Selector output with a dc reference voltage. If the leading VAR component (generator current) is higher than the reference voltage, the Comparator outputs a signal through the voltage regulator/exciter that will cause an excitation limiting and thus, prevent operation outside the limit. This VAR limiting action would normally produce a limiting threshold (Refer to Figure 1-1) that would approach being a horizontal line at the -0.4 to -0.6 per unit level. To produce the desired output curve, a Watt signal is passed through the Forward Watt Amplifier (non-linear) to the VAR Comparator. To assure proper operation, a calibration circuit is provided to set up the proper levels of operation for a wide range of input current levels.

2-3. OUTPUT CIRCUITRY

The output amplifier produces either positive or negative signals to drive the regulator or exciter (as required). The polarity of this signal is determined by the appropriate jumpering of the A-B Polarity Fanning Terminal Strip.

2-4. OVER-EXCITATION LIMITING

a. Over-excitation limiting provides an initial fast acting limit of the field current at a pre-selected high level (allowing for motor-starting, fault clearing, etc.). After a set period of time (0 to 60 seconds), the limit will drop to a lower level to prevent field overheating.

b. The dc current output of the exciter or regulator will pass through a winding of the dc transducer (T3). The ac output of T3 will always be proportional to the input. This ac output is rectified, adjusted, and applied to the Inverse Timer.

c. If an inverse time characteristic is desired, the Inverse Time Adjustment is set for the desired time and the Fixed Time Adjustment is set fully counter-clockwise (CCW) to zero time. Figure 2-2 illustrates the inverse time characteristics for three different settings of the Inverse Time Adjustment (fully CW, Mid-Range, and fully CCW).

d. If fixed time characteristic is desired or required, the Inverse Timer is set fully CCW to zero time, while the Fixed Timer is set to the desired time. After the selected timer has timed out, the field current becomes limited at the delayed threshold limit.

2-5. RELAY AND INDICATORS

a. When the under-excitation portion is functioning, the Under-Excitation Detector will illuminate a green LED on the printed circuit board and energize relay K1. Relay K1's form C contacts are connected across terminals 10, 11, and 12.

b. When the over-excitation portion is functioning, the Over-Excitation Detector will illuminate a red LED on the printed circuit board and energize relay K2. Relay K2's form C contacts are connected across terminals 20, 21, and 22.

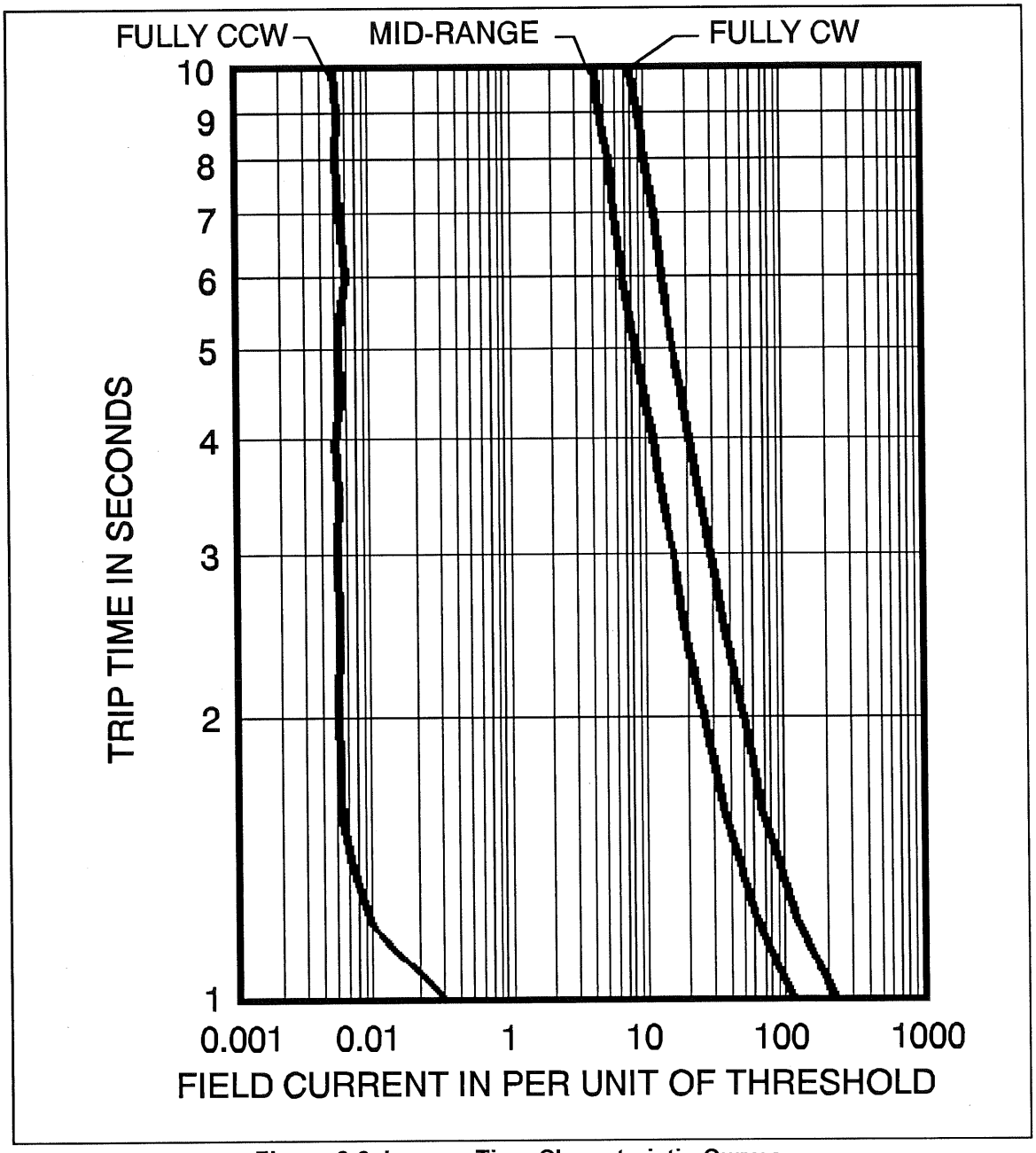

Figure 2-2. Inverse Time Characteristic Curves.

SECTION 3
CONTROLS AND INDICATORS

3-1. CONTROLS

For the controls and their functions, refer to Figure 3-1 and Table 3-1.

Table 3-1. Controls.

Control	Function
Potentiometer R1:	Used to calibrate the KVAR signal.
Potentiometer R32:	Used to adjust the Delayed Limiter threshold current (Field Current Calibration).
Potentiometer R33:	Used to adjust the Instant Limiter threshold current.
Potentiometer R36:	Used to adjust the Inverse Timer.
Potentiometer R40:	Used to adjust the Fixed Timer.

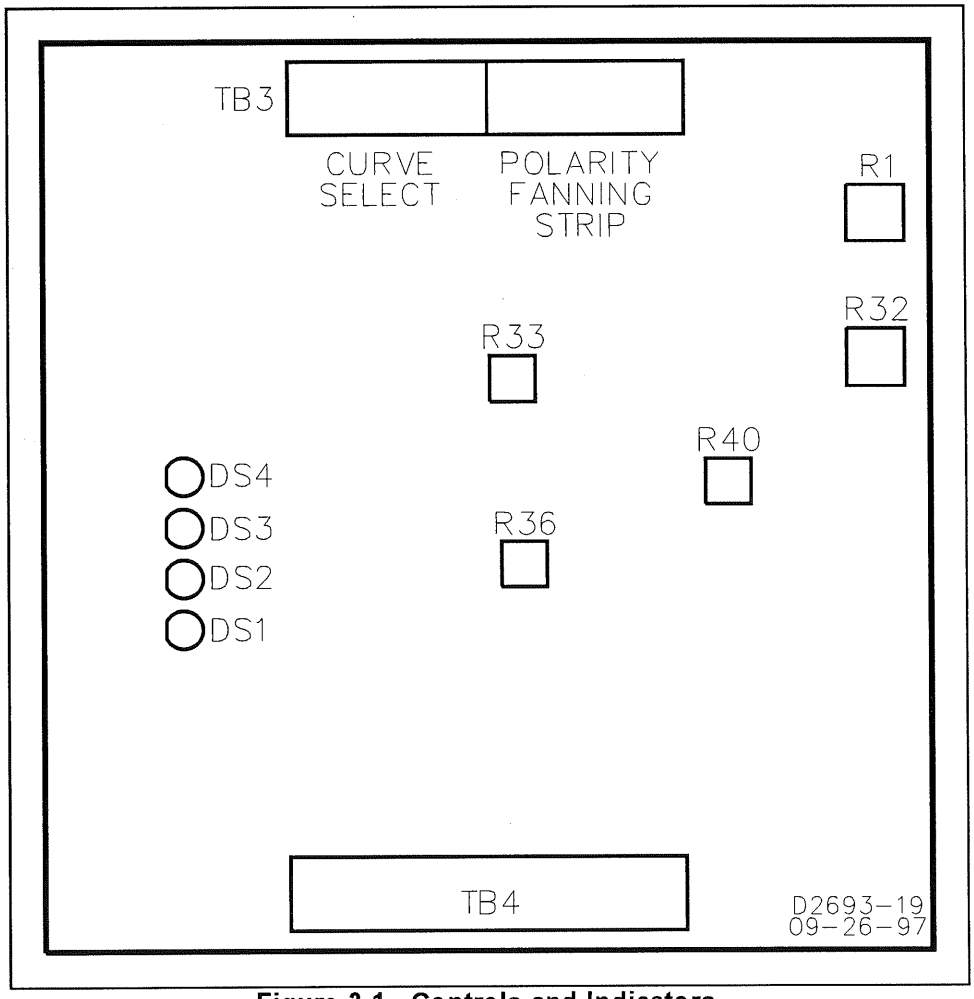

Figure 3-1. Controls and Indicators.

3-2. INDICATORS

For the indicators and their functions, refer to Figure 3-1 and Table 3-2.

Table 3-2. Indicators.

Indicator	Function
LED DS1 (Green):	Illuminates to indicate an under-excitation condition exists.
LED DS2 (Red):	Illuminates to indicate an over-excitation condition exists.
LED DS3 (Yellow):	Illuminates to indicate that the Timers are activated.
LED DS4 (Orange):	Illuminates to indicate that the leading kVAR curves are calibrated.

SECTION 4

INSTALLATION AND CALIBRATION

4-1. MOUNTING

The EL 200 Excitation Limiter should be mounted in a vertical position for maximum convection cooling. Refer to Figure 4-1 for mounting holes and dimensions.

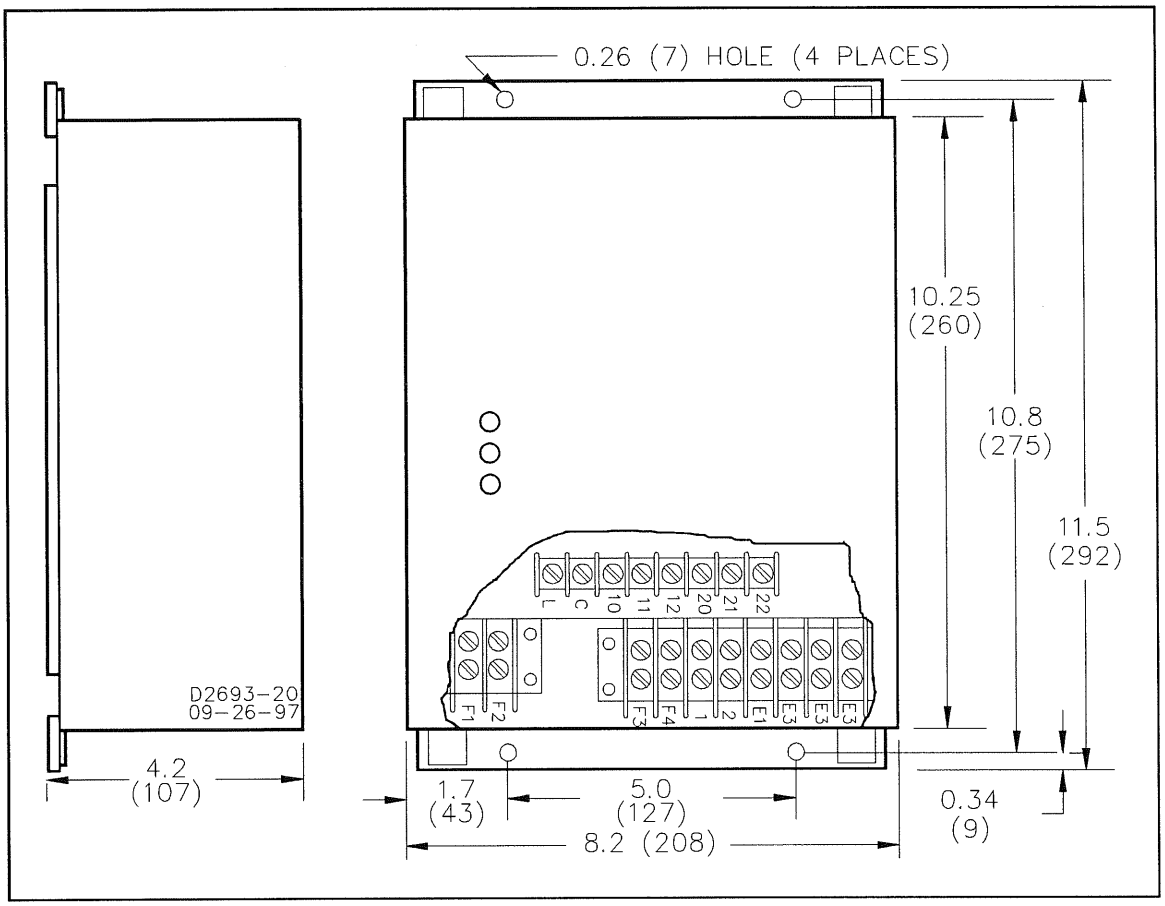

Figure 4-1. Outline Drawing.

4-2. INTERCONNECTION

Connect the EL 200 Excitation Limiter and other equipment in accordance with either Figure 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, or 4-10 as applicable.

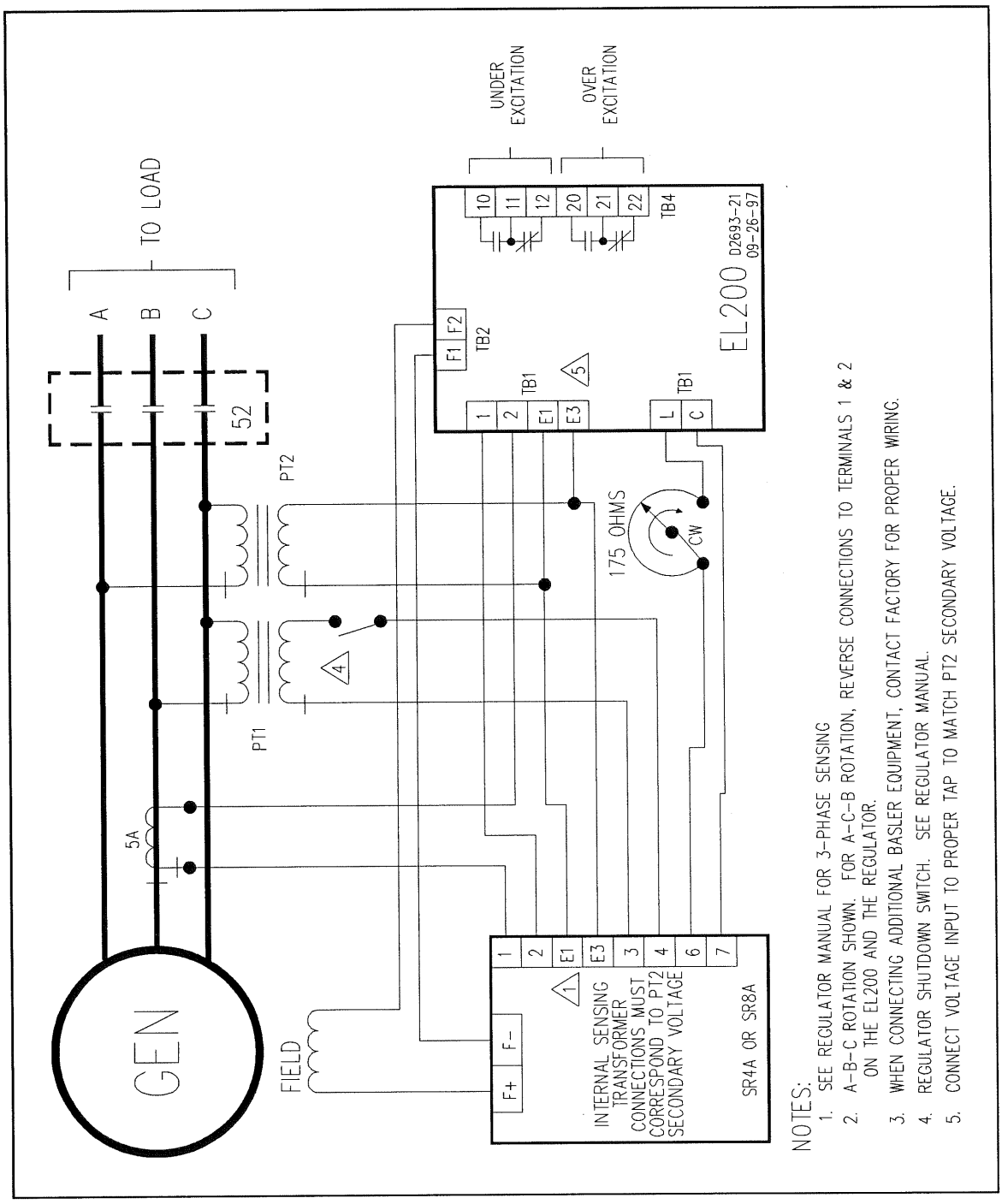

Figure 4-2. SR-A Voltage Regulator Interconnection Diagram.

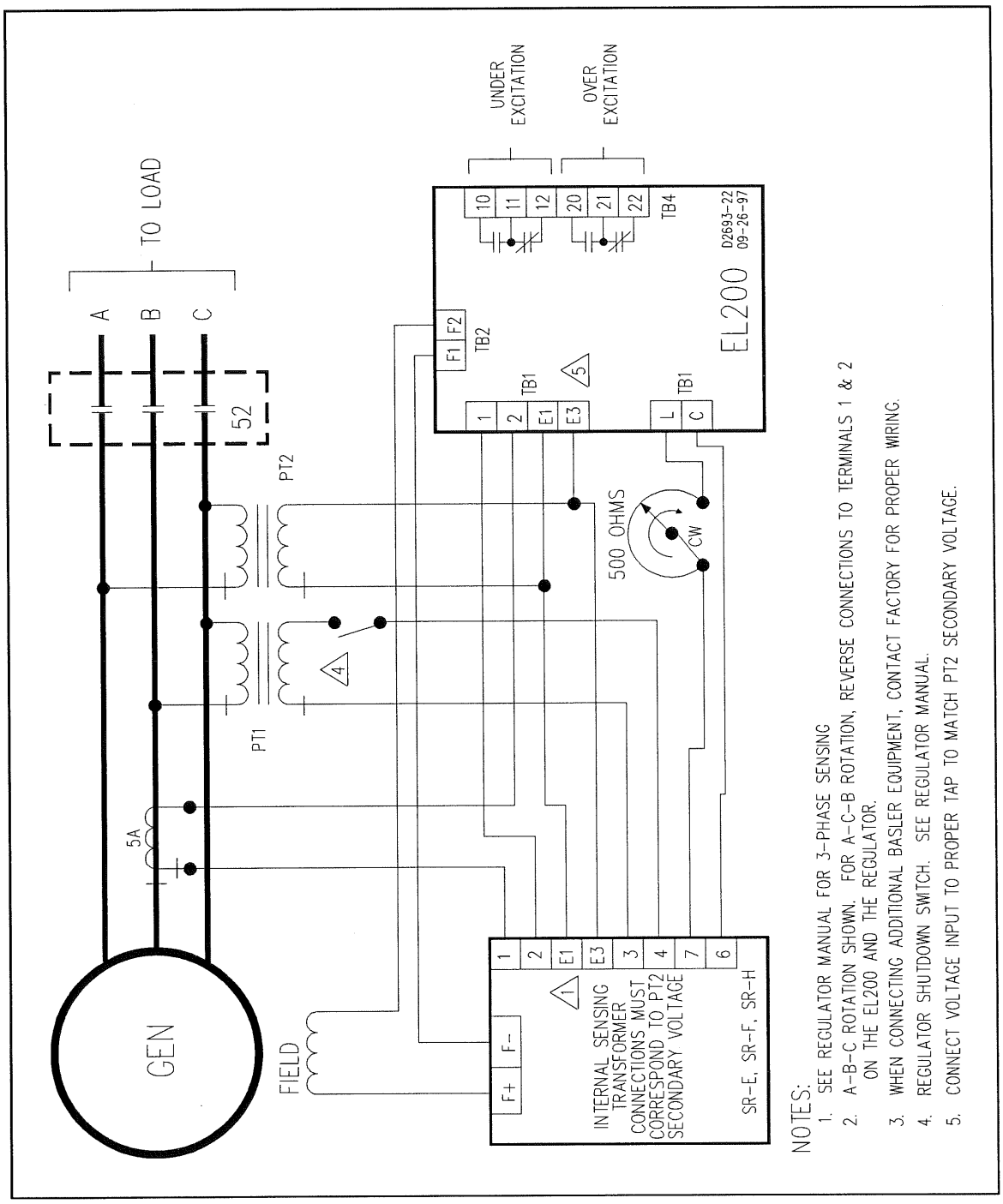

Figure 4-3. SR-E, SR-F, SR-H Voltage Regulators Interconnection Diagram.

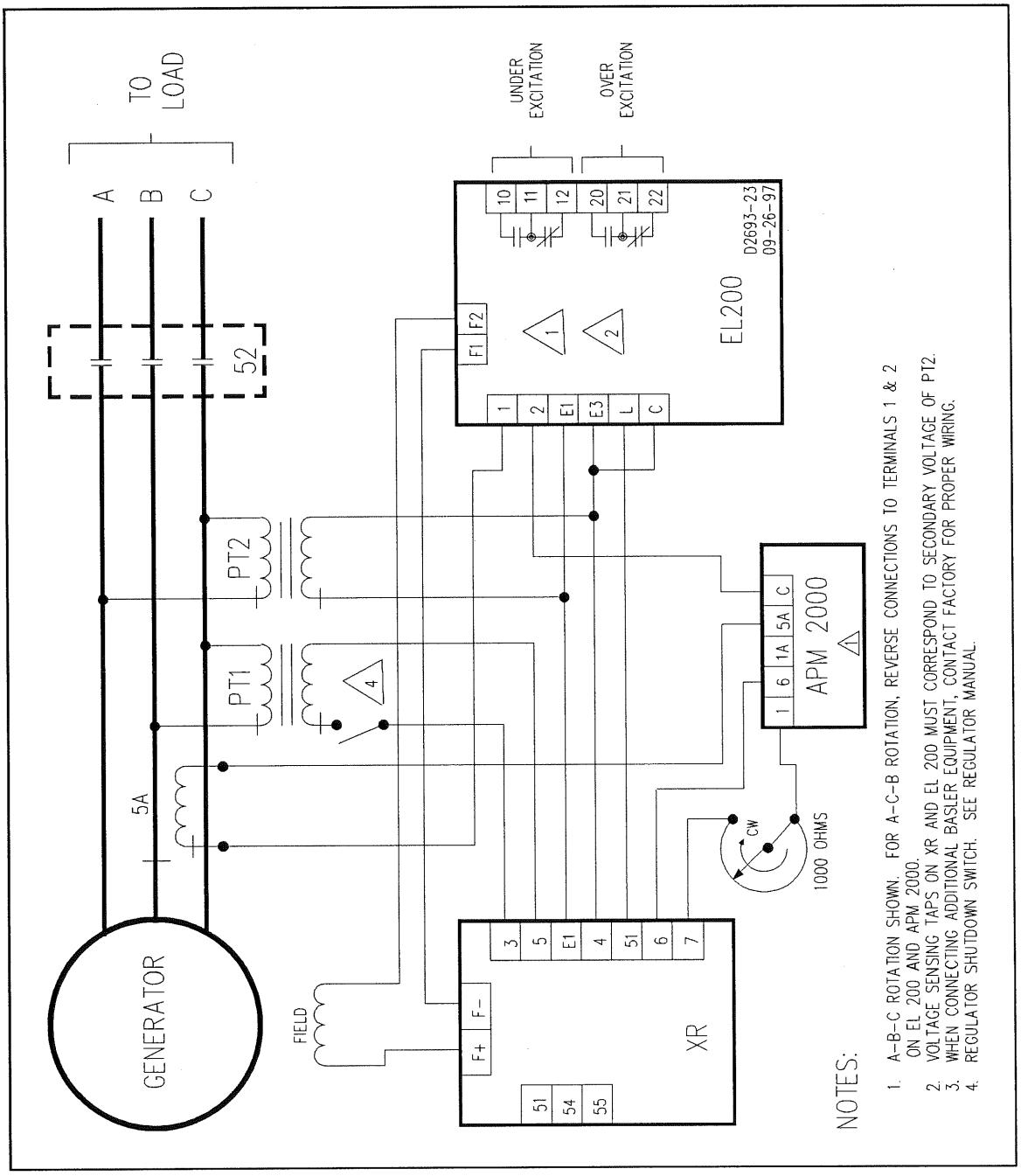

Figure 4-4. XR2001, XR2002, and XR2003 Voltage Regulators Interconnection Diagram.

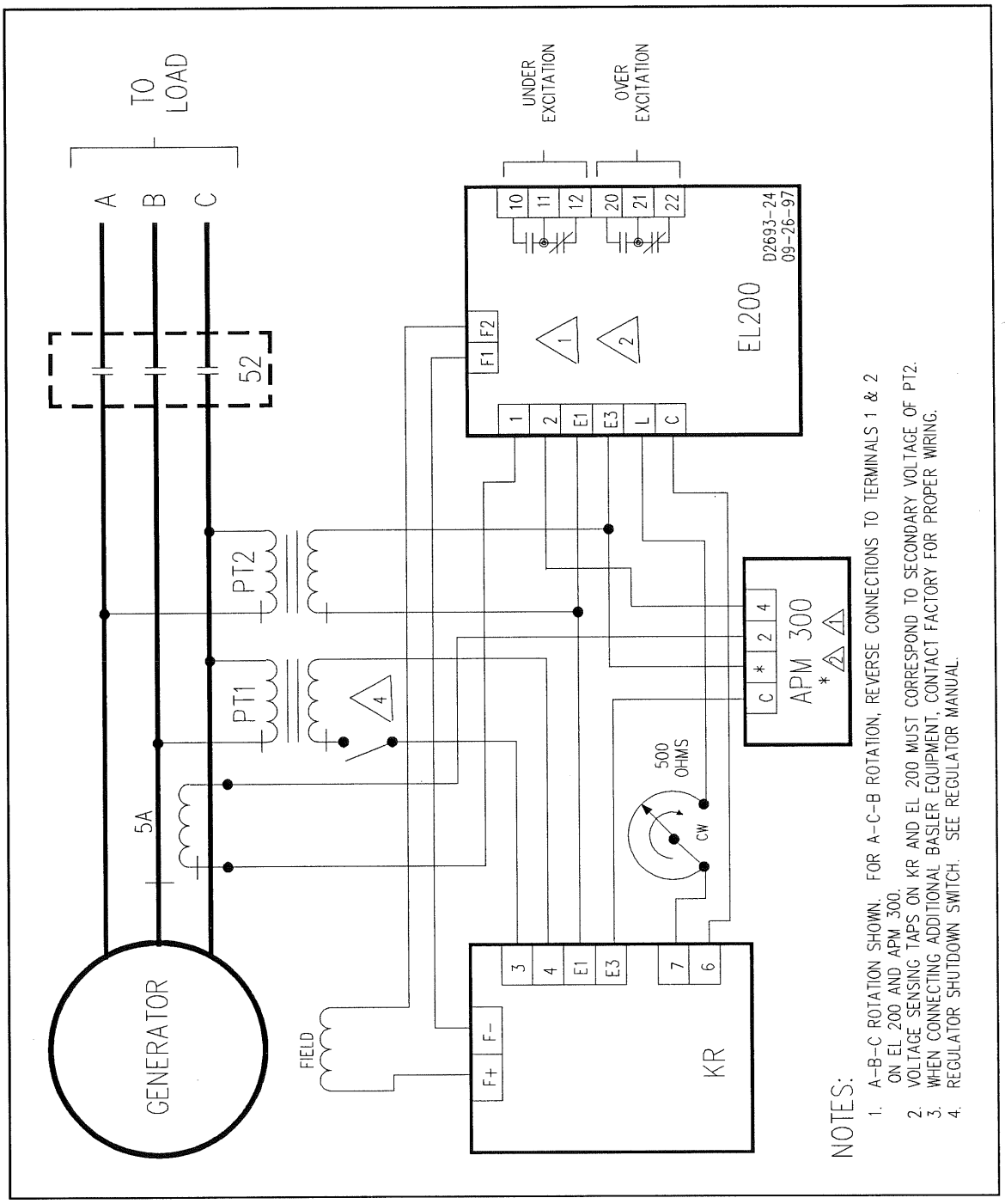

Figure 4-5. KR-F Voltage Regulator Interconnection Diagram.

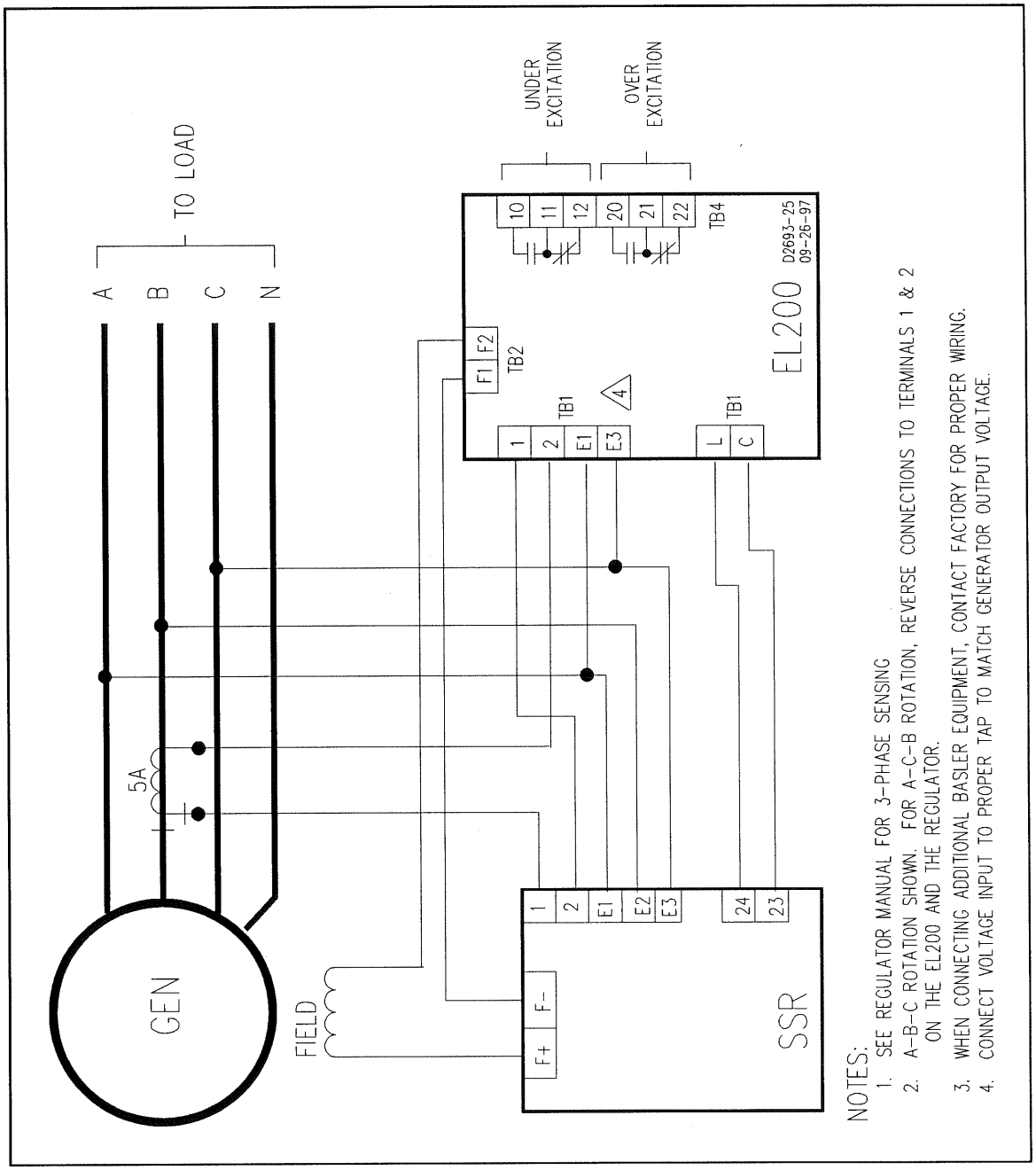

Figure 4-6. SSR Voltage Regulator Interconnection Diagram.

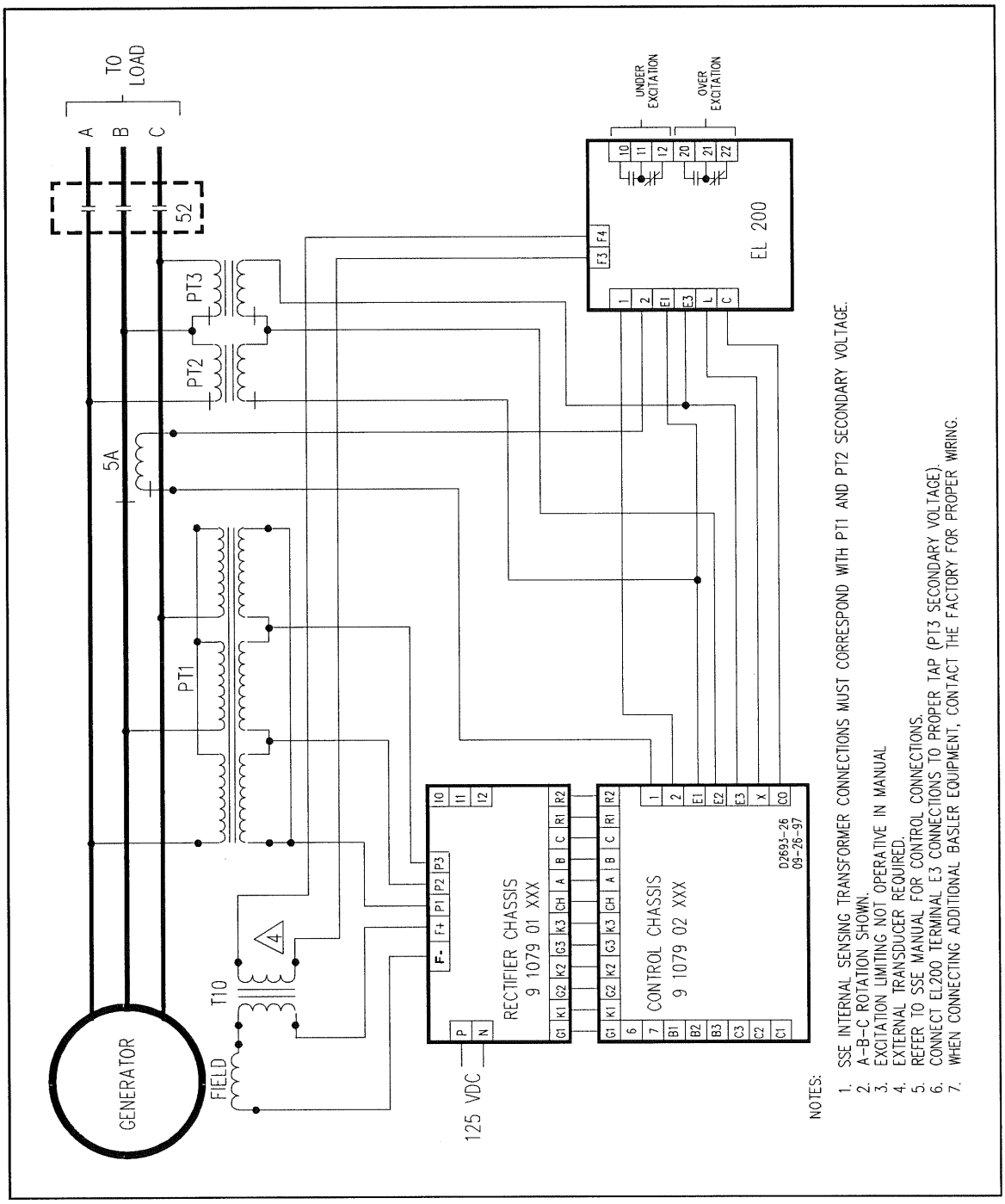

Figure 4-7. Shunt Static Exciter (SSE & SER-CB) Interconnection Diagram. (36 A to 400 A)

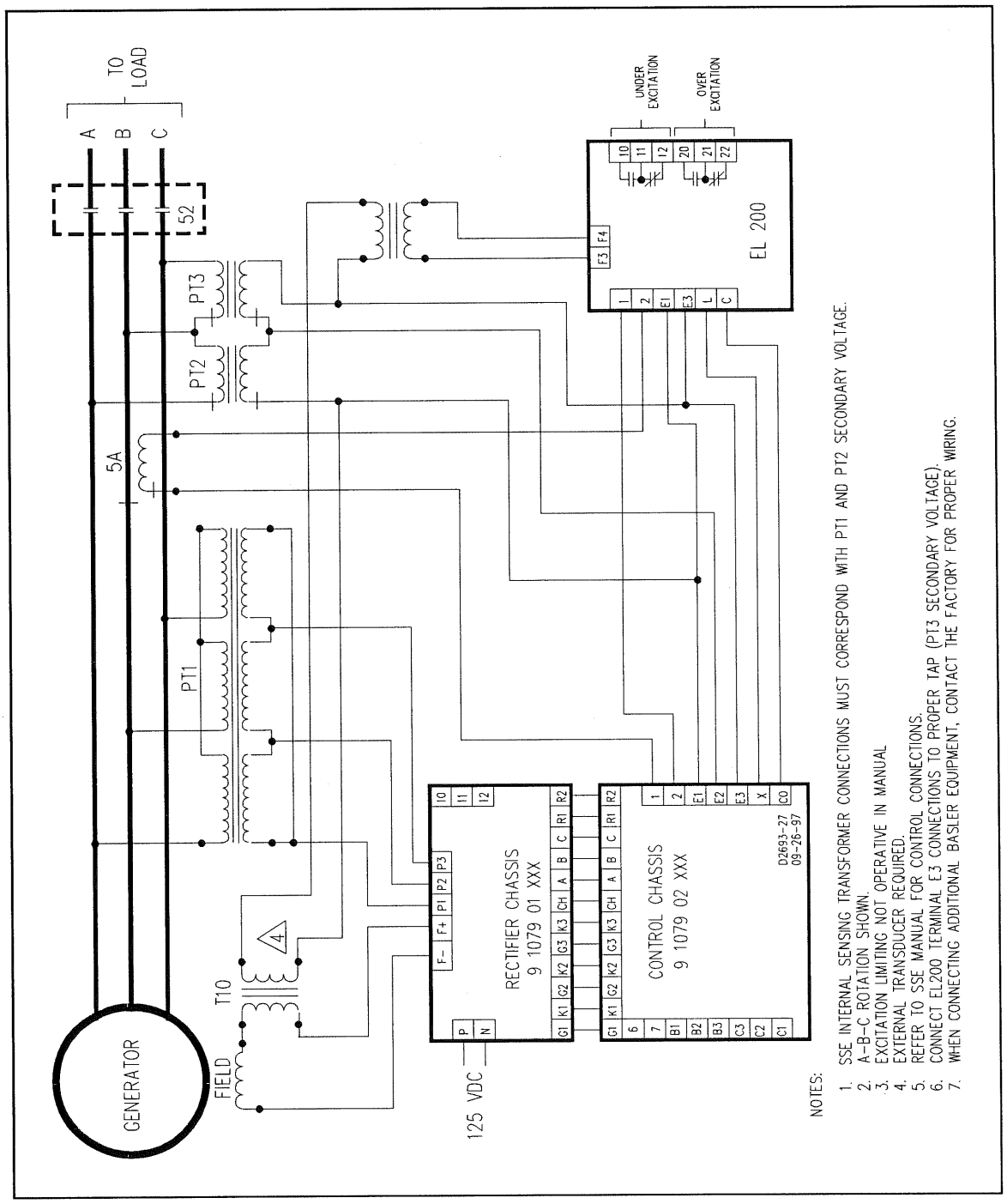

Figure 4-8. Shunt Static Exciter (SSE & SER-CB) Interconnection Diagram. (400 A to 1000 A)

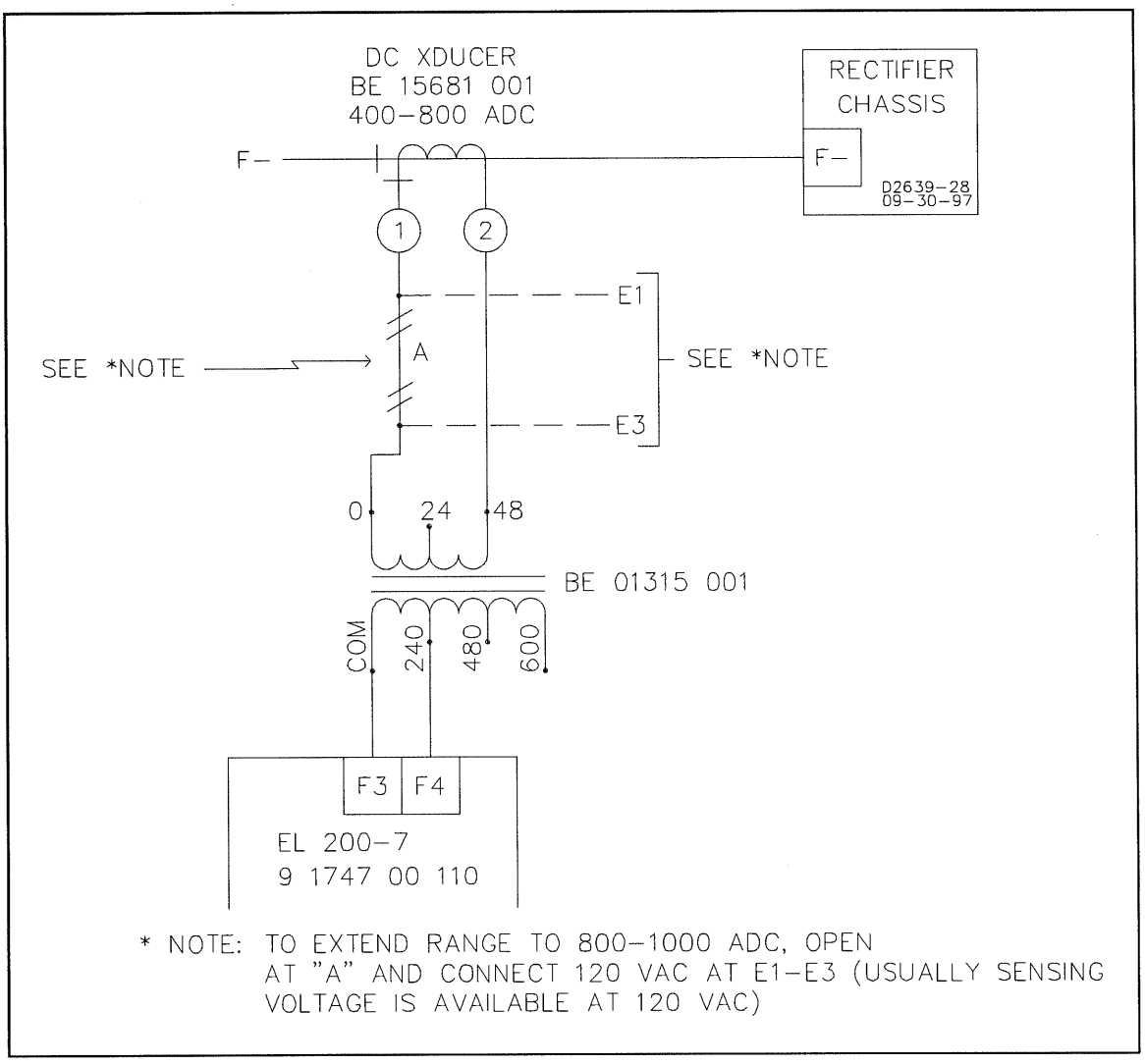

Figure 4-9. Interconnection Diagram For EL200-7, DC Transducer (400-800 Adc and 800-1000 Adc), and Auxiliary Transformer.

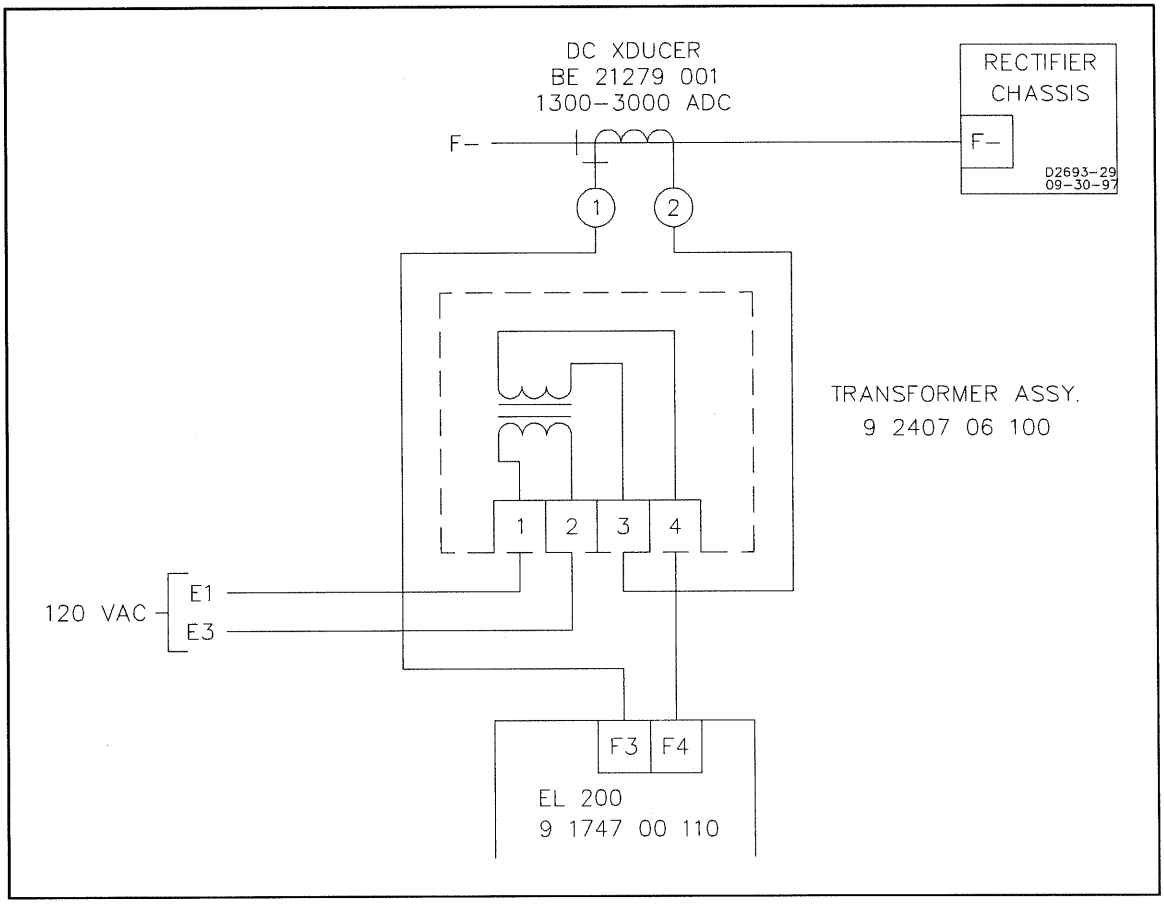

Figure 4-10. Interconnection Diagram For EL200-7, DC Transducer (1300-3000 Adc), and Auxiliary Transformer.

4-3. PRELIMINARY SET-UP

To prepare the EL 200 Excitation Limiter for calibration, proceed as follows:

a. Set the KVAR Adjust potentiometer (R1) fully clockwise.

b. Set the Delayed Current Limiter Threshold Adjust Potentiometer (R32) fully clockwise.

c. Set the Instant Current Limiter Threshold Adjust potentiometer (R33) fully clockwise.

d. Set the Inverse Timer Adjust potentiometer (R36) fully counter-clockwise.

e. Set the Fixed Timer Adjust potentiometer (R40) fully counter-clockwise.

f. Connect the curve selecting jumper from terminal TS3-4 to terminal TS3-1, TS3-2, or TS3-3 depending on the desired leading kVAR curve (refer to Figure 4-11).

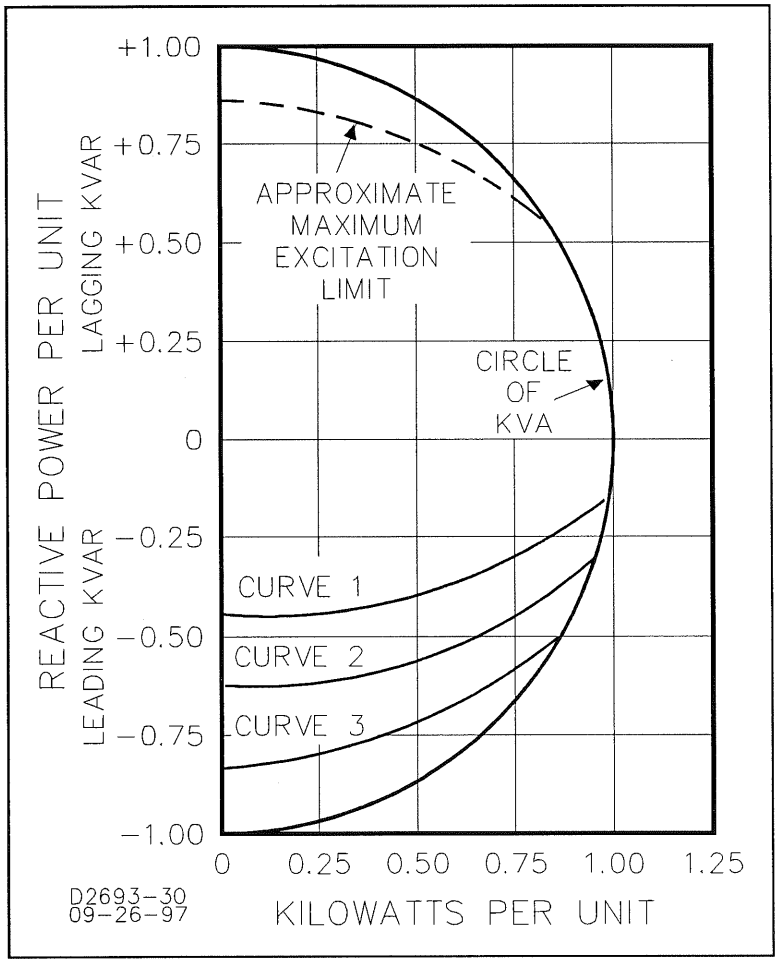

Figure 4-11. Leading kVAR Curves.

g. Place the polarity fanning strip (TB3) in either the A or B position depending on the polarity required by the voltage regulator. (Refer to Table 4-1).

Table 4-1. Fanning Strip (TB3) Selection.

Position A	Position B
SBSRN	SER-CB
SR-A	SR-E
XR2001	SR-H
XR2002	KR-F
XR2003	SSE
SSR	

NOTE

When using the SPM 2000 sensing module with any XR series voltage regulator, consult with the factory.

h. Tag and disconnect the leads from terminals TB1-L and TB1-C.

i. Tie the leads together.

j. Start the generator and parallel to the bus in the normal manner. Test for normal operation.

k. Rotate the voltage regulator/exciter Voltage Adjust rheostat clockwise to increase field excitation.

Result: Lagging kVAR should flow from the generator into the bus. Field current from TB2-F1 of the EL 200 or through the primary of the external transducer should increase.

l. Rotate the voltage regulator/exciter Voltage Adjust rheostat counter-clockwise to decrease field excitation.

Result: Leading kVAR should flow from the generator into the bus. Field current from TB2-F1 of the EL 200 or through the primary of the external transducer should decrease.

m. Check that the governor can be adjusted to produce any amount of kW between zero and rated.

n. If operation is normal, unparallel and then shutdown the generator.

o. Reconnect the wires to terminals TB1-L and TB1-C per the tagged identification.

4-4. OVER-EXCITATION CALIBRATION

NOTE

If a runaway event occurs during the following test, it is probably caused by either a reversed polarity of the A-B fanning strip, or reversed connections at terminals TB1-L and TB1-C.

a. ***Delayed Current Limit (Field Current) Calibration.*** The following procedure will set the maximum continuous allowable field current and is performed as follows:

(1) To avoid stressing the generator system, the calibration procedure in this paragraph and that contained in sub-paragraph b. tests the limiting action at field current levels less than those generally selected for delayed current limiting and instant current limiting. In the final steps of each procedure, potentiometer adjustments are performed to shift the thresholds to the selected levels.

(2) Begin the calibration by selecting a field current level for testing that is approximately equal to the full-load field current. Divide the test current level by the current level selected for delayed current limiting.

EXAMPLE:

$$\frac{\text{Chosen Test Current Level}}{\text{Selected Delayed Current Level}} = \frac{5A}{7A} = 0.714$$

(3) With R32 fully clockwise, parallel the generator with the bus and set it for 10% of rated kW output.

(4) Set the voltage regulator's voltage adjust until the field current is equal to the test current chosen in step (2).

CAUTION

Continuously monitor the generator system to ensure that the system is not overstressed.

(5) Rotate R32 counterclockwise until indicator DS3 (yellow) illuminates. Continue turning R32 until indicator DS2 (red) is illuminated and the field current just begins to decrease.

(6) Measure the dc voltage at TP1 with respect to TB4-C.

(7) Multiply the voltage measured in step (6) by the percentage calculated in step (2).

EXAMPLE:

4.8 V X 0.714 = 3.43 V

(8) While maintaining the field current at the test level, rotate potentiometer R32 clockwise until the dc voltage at TP1 is the value calculated in step (7).

b. ***Instant Current Limit Calibration.*** This procedure will set the maximum instantaneous field forcing current and is performed as follows:

(1) Calibrate the delayed current limiter first (sub-paragraph a. above).

(2) Divide the value of the desired delayed current limit (sub-paragraph a., step (2) above) by the desired instant current limit.

EXAMPLE:

$$\frac{\text{Selected Delayed Current Limit}}{\text{Desired Instant Current Limit}} = \frac{7A}{10A} = 0.7$$

(3) Multiply the answer found in the previous step (step (2)) by 0.9.

EXAMPLE:

0.7 X 0.9 = 0.63

(4) With the field current at the test current level, measure the voltage between TP1 and TB4-C.

EXAMPLE:

3.43 V

(5) Multiply the voltage measured in the previous step (step (4)) by the value found in sub-paragraph b., step (3).

EXAMPLE:

3.43 X 0.63 = 2.16 V

(6) With the field still at the test level, adjust R33 such that the voltage measured between TP2 and TB4-C is equal to that calculated in the previous step (step (5)).

c. ***Final Timer Setting.***

(1) If a Fixed Timer characteristic is desired, set potentiometer R36 counter-clockwise, and then set potentiometer R40 to the desired time. Potentiometer R40 provides an increasing delay factor when rotated in a clockwise direction.

(2) If an Inverse Timer characteristic is desired, set potentiometer R40 fully counter-clockwise, and then set potentiometer R36 clockwise for the desired time delay. Rotating R40 clockwise will increase the time delay.

4-5. UNDER-EXCITATION CALIBRATION

NOTE

If a runaway event occurs during the following test, it is probably caused by either a reversed polarity of the A-B fanning strip, or reversed connections at terminals TB1-L and TB1-C.

If the generator is capable of operating at full-rated kW load, the preferred calibration procedure is given in sub-paragraph a. below. If the generator must be operated at less than full-rated kW (25% minimum), perform the calibration procedure given in sub-paragraph b. below.

a. ***Full-Rated kW Calibration Procedure.*** To calibrate the Excitation Limiter under-excitation (minimum) circuitry when full-rated kW loading is possible, proceed as follows:

(1) With the generator paralleled and the Excitation Limiter calibrated for over-excitation (maximum), adjust the voltage regulator Voltage Adjust rheostat for zero kVARs.

(2) Adjust the governor for rated kW.

(3) Adjust the Excitation Limiter potentiometer R1 until DS4 (orange) just illuminates.

(4) Adjust the governor for about 10% kW.

(5) Rotate the voltage regulator Voltage Adjust rheostat in the direction of leading kVAR output until indicator DS1 (green) just illuminates. Further movement of the Voltage Adjust rheostat should produce no further increase of leading kVAR flow. If the leading kVARs are not at the desired value, shutdown the system and select a different curve. Repeat the entire procedure.

b. ***Less Than Full-Rated kW Calibration Procedure.*** To calibrate the Excitation Limiter under-excitation (minimum) circuitry when less than full-rated kW loading is possible, proceed as follows:

(1) With the generator paralleled and the Excitation Limiter calibrated for over-excitation (maximum), adjust the voltage regulator Voltage Adjust rheostat for zero kVARs or slightly lagging.

(2) Connect the positive lead of a digital dc voltmeter to bottom of R9 (opposite side of TP3). Connect the negative lead to terminal C.

(3) Apply a 25% to 100% kW load to the generator.

EXAMPLE:

25% kW, 1 pf (unity)

(4) Adjust the KVAR CAL (potentiometer R1) until indicator DS4 (orange) illuminates.

(5) Measure and record the negative voltage indicated on the digital voltmeter.

EXAMPLE:

Meter reads -1.3 Vdc

(6) Multiply the percentage of load from step (3) by the voltage recorded in step (5).

EXAMPLE:

25% X -1.3 V = -0.325 Vdc

(7) Adjust potentiometer R1 until the digital dc voltmeter indicates the voltage calculated in step (6).

EXAMPLE:

Meter reads -0.325 Vdc

(8) Adjust the generator for about 10% kW.

(9) Rotate the voltage regulator Voltage Adjust rheostat in the direction of leading kVAR output until indicator DS1 (green) just illuminates. Further movement of the Voltage Adjust rheostat should produce no further increase of leading kVAR flow. If the leading kVARs are not at the desired value, shutdown the system and select a different curve. Repeat the entire procedure.

4-6. MOTOR CALIBRATION AND OPERATION

The Minimum/Maximum Excitation Limiter (EL 200) can be used with synchronous motors and condensers provided special precautions are taken. The EL 200 requires a special calibration procedure to ensure proper operation with synchronous motors. The following calibration and operation procedures must be carefully followed. Failure to do so may result in damage to the motor.

a. Calibration (Refer to Figure 4-12). Calibration can be accomplished by connecting the EL200 as shown in Figure 4-12. *(The difference between Figures 4-12 and 4-13 is the CT connections to the EL 200. Be sure to follow the interconnects exactly.)* The contact across Terminals 1 and 2 (EL 200) disable the minimum excitation limit operation during the starting and synchronization of the motor. Without this contact, the EL 200 will experience both a minimum and maximum limit simultaneously. With the contact closed, the limiter can still react to and limit a maximum excitation condition. Once the motor has synchronized, this contact will open.

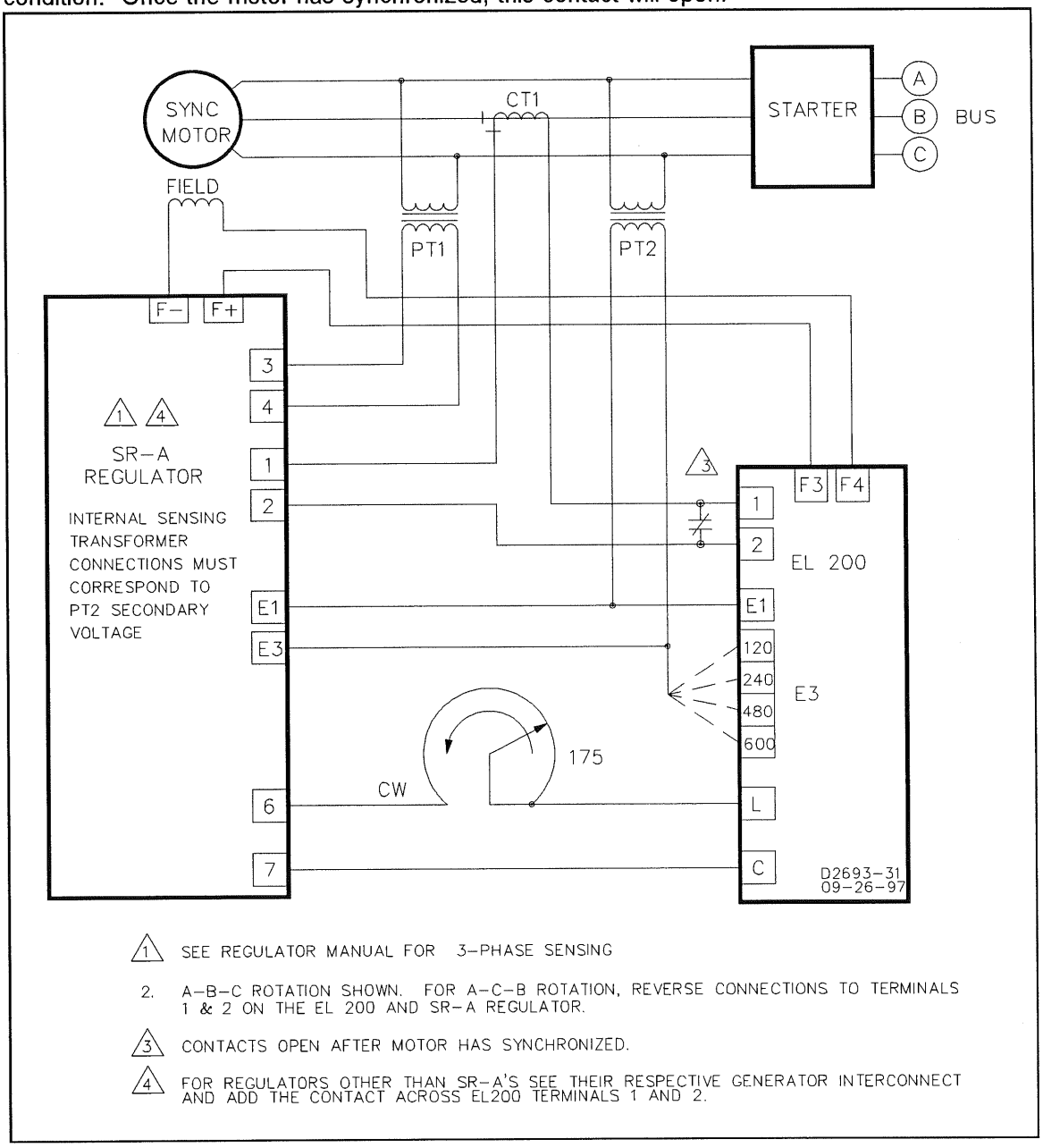

Figure 4-12. EL 200 and Motor Calibration Interconnection Diagram.

(1) Start the motor.

(2) Connect the positive lead of a digital dc voltmeter to TP3 (junction of R9 and R10) on the EL 200 printed circuit board. Connect the negative lead to Terminal C of the EL 200.

(3) Once the motor has been synchronized and the contact across Terminals 1 and 2 of the EL 200 has opened, apply a 25 to 100% load (slightly leading).

EXAMPLE:

25% Load

(4) Adjust the **KVAR CAL** (potentiometer R1) until **DS4** (orange) illuminates.

(5) Measure and record the negative voltage indicated on the digital voltmeter.

EXAMPLE:

Meter reads = -1.3 Vdc

(6) Multiply the percentage of load from Step (3) by the voltage recorded in Step (5).

EXAMPLE:

25% X -1.3 V = -0.325 Vdc

(7) Adjust potentiometer R1 until the digital dc voltmeter indicates the voltage calculated in Step (6).

EXAMPLE:

Meter reads = -0.325 Vdc

(8) This concludes the calibration.

b. Operation (Refer to Figure 4-13). Operation can now be made using the interconnection shown in Figure 4-13. As before, the contacts across the EL 200 Terminals 1 and 2 disable the minimum excitation limit during motor starting. This prevents the possibility of both a minimum and maximum limit condition occuring during motor start (inrush current and maximum field current occuring simultaneously). The limiter will still react to and limit a maximum excitation condition during motor start. Once the motor has synchronized, the contact across the line current input (Terminals 1 and 2) opens and the limiter will now react to both maximum and minimum excitation conditions.

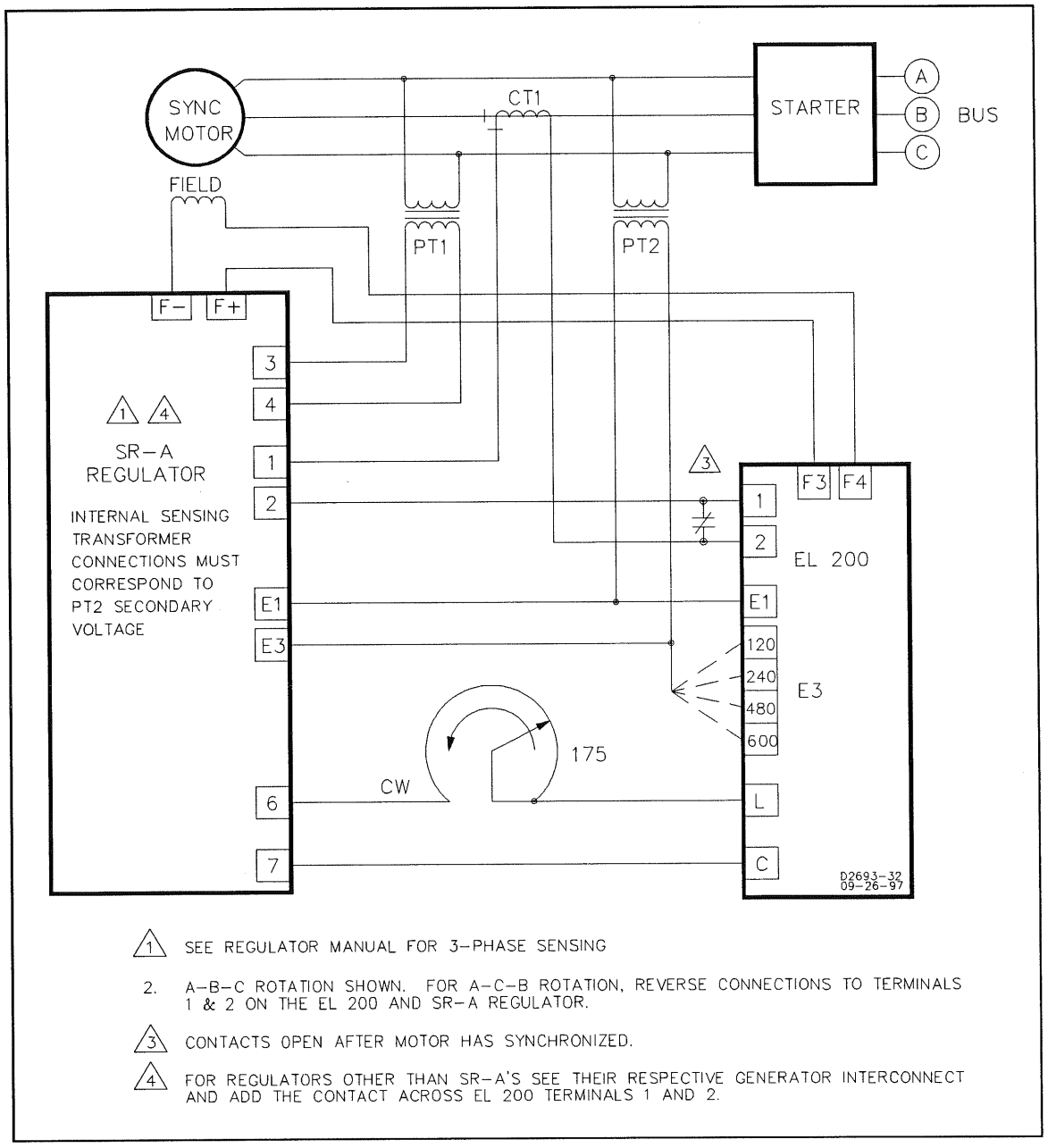

Figure 4-13. EL 200 and Motor Operation Interconnection Diagram.

SECTION 5
MAINTENANCE INSTRUCTIONS

5-1. PREVENTIVE MAINTENANCE

Periodic inspections of the EL 200 Excitation Limiter should be made on a regular basis to ensure that the unit is clean and free from accumulations of dust and moisture. When inspecting the unit, check that all parts are securely mounted and that all electrical connections are clean and secure.

5-2. CORRECTIVE MAINTENANCE

If a malfunction is detected in the system, use the troubleshooting table in paragraph 5-3. Repair is limited to the replacement of those parts listed in Table 5-2.

5-3. TROUBLESHOOTING

The more common malfunctions and their appropriate repair procedures are listed in Table 5-1.

Table 5-1. Troubleshooting Chart.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. EL 200 EXCITATION LIMITER CAUSES AVR TO GO TO MAXIMUM OUTPUT.

Step 1. Check the fanning strip (TB3) for proper polarity connection per Table 4-1.

If the polarity is incorrect, reconnect the polarity jumper on the fanning strip.

If the polarity is correct, proceed to step 2.

Step 2. Check for the proper voltage input phasing and connections at terminals TB1-E1 and TB1-E3 per Figures 4-2 through 4-8.

If the voltage input is reversed or improperly connected, reconnect properly.

If the voltage input is connected properly, replace the EL 200 printed circuit board.

2. ORANGE KVAR LIGHT (DS4) WILL NOT TURN ON WHEN CALIBRATING MINIMUM EXCITATION LIMITER FOR 100% kW.

Check for proper connection of the current sensing transformer (CT) to TB1-1 and TB1-2 in accordance with Figures 4-2 through 4-8.

If the current sensing transformer (CT) is connected improperly, or if the leads are reversed, reconnect the transformer properly.

Table 5-1. Troubleshooting Chart - Continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. THE EL 200 DOES NOT MATCH THE GENERATOR CAPABILITY CURVE.

Check that the EL 200 is jumpered (TB3) for the correct curve (Figure 4-9) in accordance with paragraph 4-3f.

If the EL 200 is not jumpered properly, reconnect the jumper per paragraph 4-3f. and then recalibrate per paragraphs 4-4 and 4-5.

4. THE SYSTEM BECOMES UNSTABLE WHEN THE EXCITATION LIMIT IS ATTAINED.

Adjust the voltage regulator Stability potentiometer(s) for maximum stability per the voltage regulator instruction manual.

5. MAXIMUM EXCITATION LIMITER DOES NOT TRIP THE DELAY LIMIT OR THE INSTANTANEOUS LIMIT.

Recalibrate the unit per paragraph 4-4.

6. SYNCHRONOUS MOTOR OPERATION APPEARS FAULTY.

Step 1. Check that the contacts across Terminals 1 and 2 (EL 200) are closed during motor start and open after the motor is synchronized.

If contacts are not operating as specified, repair contacts/wiring as required.

If contacts are operating as specified, proceed to Step 2.

Step 2. Verify that all connections (especially the CT) are proper per the interconnection diagrams.

If all wiring connections are proper, re-calibrate the EL 200.

If the above steps fail to correct the problem, replace the EL 200 printed circuit board.

5-4. REPLACEMENT PARTS

The following list (Table 5-2) describes the only assembly of the EL 200 Excitation Limiter that has maintenance significance. When ordering any part from Basler Electric Company, always specify the description of the item, the part number, and the quantity required.

Table 5-2. Replacement Part List.

Basler Part Number	Qty	Description
9 1747 01 102	1	Printed Circuit Board

P.O. BOX 269, HIGHLAND, ILLINOIS 62249, U.S.A. PHONE 618-654-2341 FAX 618-654-2351