ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION
SERVICE DEPARTMENT

MAINTENANCE INSTRUCTION

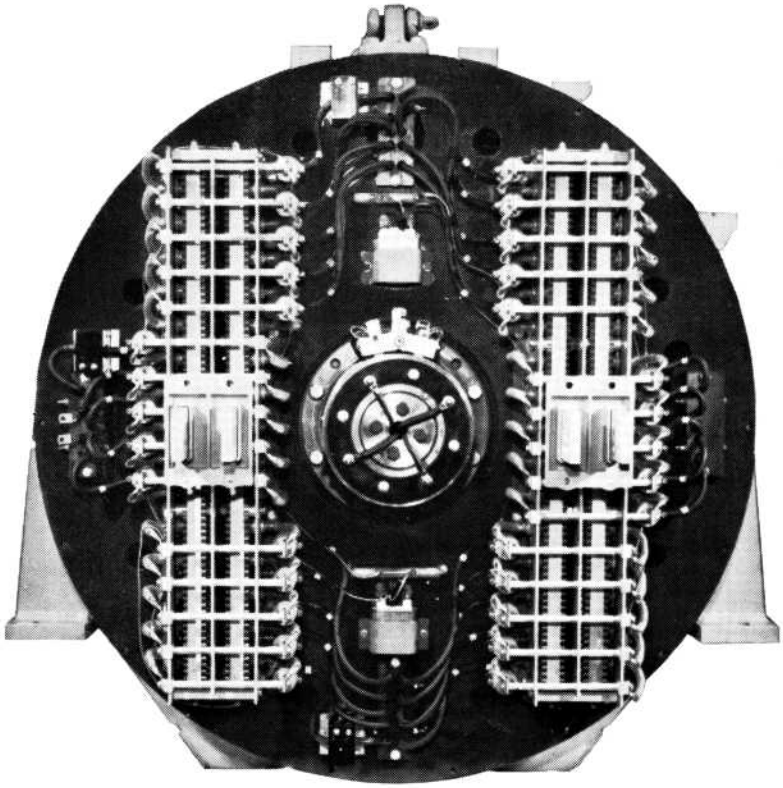
AR10—D14 TRACTION GENERATOR— RECTIFIER BANK ASSEMBLIES AND SUPPRESSION CIRCUITS

DESCRIPTION

The AR10 traction generator is a 3-phase alternator, the rotor of which makes up a 10 pole DC excited field. Two sets of "Y"-connected windings make up the alternator stator. The arrangement results in two separate sources of 3-phase AC output, each independently rectified by an assembly of heat-sink mounted silicon diodes, Fig. 2.

Fuses are provided to isolate diodes that may become shorted, and the operating coil of a protective relay is connected across the neutral points of the stator windings to detect a single phase condition. The relay coil is also connected through resistance to ground to detect generator or locomotive grounds.

At the slip ring end of the machine, one rectifier bank assembly is to the left and



15548

Fig. 1 — Rectifier Bank Assemblies

Fig. 2 — Rectifier Assembly

the other to the right of the slip rings. Each assembly consists of:

1. A positive and a negative heat sink, and a positive and a negative bus.
2. A mounting frame.
3. An equal number of positive base diodes and negative base diodes.
4. Interrupting fuses.

Capacitors and resistors for suppression of voltage spikes of a transient nature are located within the generator airbox, either on the airbox wall or on the generator end housing.

DIODE CLASSIFICATION

For service purposes the following classifications of AR10 diodes are significant.

1. Polarity with respect to the diode base (threaded stud). A color code is used to assist in identification.
2. Type with respect to forward voltage drop. Identification is assisted by color code and by type number impressed into the base.
3. Voltage class in respect to repetitive and non-repetitive peak inverse voltage rating. Identification is assisted by color code.

A table that relates diode service part numbers to other identifying characteristics is provided in this maintenance instruction.

THE DIFFERENCE BETWEEN POSITIVE AND NEGATIVE BASE DIODES

The direction in which conventional electrical current flows through a diode determines its polarity. The graphical arrow symbol, Fig. 3, is oriented to indicate diode polarity.

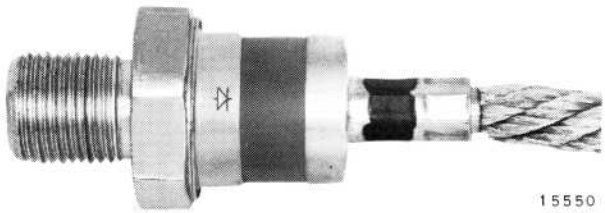


Fig. 3 — Rectifier Polarity Symbol — Negative Base Diode Shown

For the diode to conduct, a positive voltage must be applied coincident with the tail of the arrow, and a negative voltage applied coincident with the point of the arrow. In order to conduct electrical current, positive base diodes require a positive voltage on the flexible lead and a negative voltage on the stud. Negative base diodes require a positive voltage on the stud, and a negative voltage on the flexible lead. If the voltages are reversed, the diodes will block and only small leakage current will pass through the diode.

To provide a permanent method of identification, the ceramic cases of the diodes are permanently colored as follows:

TABLE A - DIODE POLARITY	
Positive Base Diode	White Ceramic
Negative Base Diode	Pink Ceramic

THE DIFFERENCE BETWEEN DIODE TYPES

Because of the high DC current requirements for locomotive tractive power, diodes must be connected in parallel conducting paths. When parallel operation of silicon diodes is undertaken, means must be provided to ensure a reasonable degree of current sharing. Each diode in a parallel group must share the load to prevent overloading of diodes in parallel with it.

Current sharing of AR10 diodes is accomplished by paralleling only diodes whose forward characteristics (forward voltage drops) are a near match.

At the time of manufacture, diodes are segregated under specific test conditions according to their forward characteristics and are assigned a type number that is permanently impressed in the metal at the flat end of the threaded stud. In addition, a color code band is applied where the flexible lead is crimped to the diode body, Fig. 4.

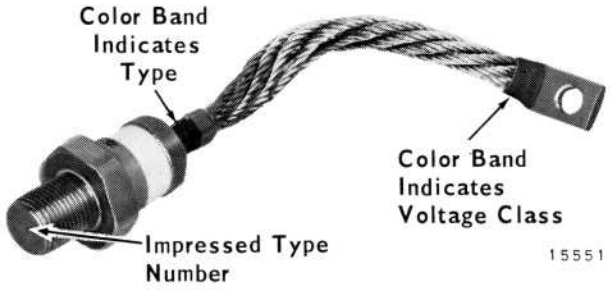


Fig. 4 — Impressed Type Number And Color Bands Indicating Type And Voltage Class

TABLE B - DIODE TYPES	
Diode Type Number	Body Crimp Color Band
1*	None
2	Red
3	Black
4**	Yellow

*Not used on new equipment and not available as replacement part.
**Special Use Only.

DIODE VOLTAGE CLASSES

Two voltage classes are available for AR10 diodes, but special voltage classes have been applied under special conditions to a few AR10 generators. The class identification is indicative of repetitive and non-repetitive peak inverse voltage capabilities under specific test conditions. A color band around the barrel at the lug end of the flexible lead indicates the diode voltage class.

TABLE C - DIODE VOLTAGE CLASSES	
Color Band At Lug Barrel	Voltage Class
None	1600/2000
Green	2000/2400
**Blue	2200/2800
**White	2200/3000

**Special Use Only

The voltage class used in a particular AR10 generator is dependent upon the type of locomotive in which the AR10 is installed and upon specific characteristics of the control system that the locomotive

uses. The table of diode identification, Fig. 7, shows applicability of diodes by voltage class and generator model.

MANUFACTURER'S QUALIFICATION MARKS

Various phases of diode qualification testing have occurred in the past and will continue to occur in the future. A variety of qualification marks have been placed upon diodes by the manufacturer. For example; small color dots on the diode body, large color spots (not bands) on the diode body or lug, color marks at the edge of the lug, and numbers stamped onto the diode body. These marks are for manufacturer's identification only.

The only significant marks for service purposes are:

1. The color band 360 degrees around the lug barrel at the end of the flexible lead.
2. The color band 360 degrees around the crimp at the flexible lead and diode body.
3. The service part number printed on the cap of the diode body.
4. The color of the ceramic insulator.
5. The diode type number stamped into the flat end of the threaded stud.

ALL OTHER COLOR SPOTS AND STAMPINGS ARE IRRELEVANT FOR SERVICE PURPOSES AND ARE TO BE DISREGARDED COMPLETELY.

PROTECTIVE FUSES

Current limiting fuses, Fig. 5, are provided to isolate shorted diodes. The fuses are a bolted lug type, with the lugs affixed to a tubular insulating body made of reinforced melamine. Fast acting silver

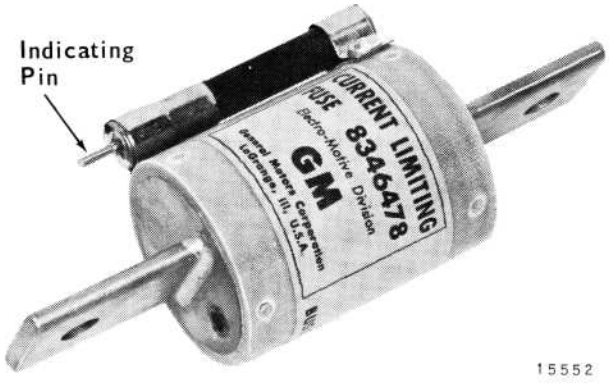


Fig. 5 — Current Limiting Fuse

alloy fusible links within the tube connect the fuse lugs. The fusible links are surrounded with silicon sand that acts to absorb arc energy.

A small indicating fuse is affixed to the main fuse body and is connected in parallel with the main fuse elements. When the main elements burn open, the element of the indicator also burns open. A spring in the indicator drives an indicating pin to protrude about 3/16" from the end of the indicator.

Note that the internal-hex screw on one end of the fuse is provided only for insertion of sand by the manufacturer. The screw is staked to prevent its removal. The fusible elements cannot be renewed, and a blown fuse cannot be repaired.

DIODE MATCHING

Fig. 6 shows the AR10 rectifier assembly with the air box removed. The illustration shows how diodes and fuses are paralleled in groups of five by use of paralleling bars. A comparable group arrangement is seen if the assembly is viewed from the right-hand side. Fig. 7 is a table of diode identification; Fig. 8 illustrates diode identification codes.

Diodes used in the AR10 generator must be matched as follows:

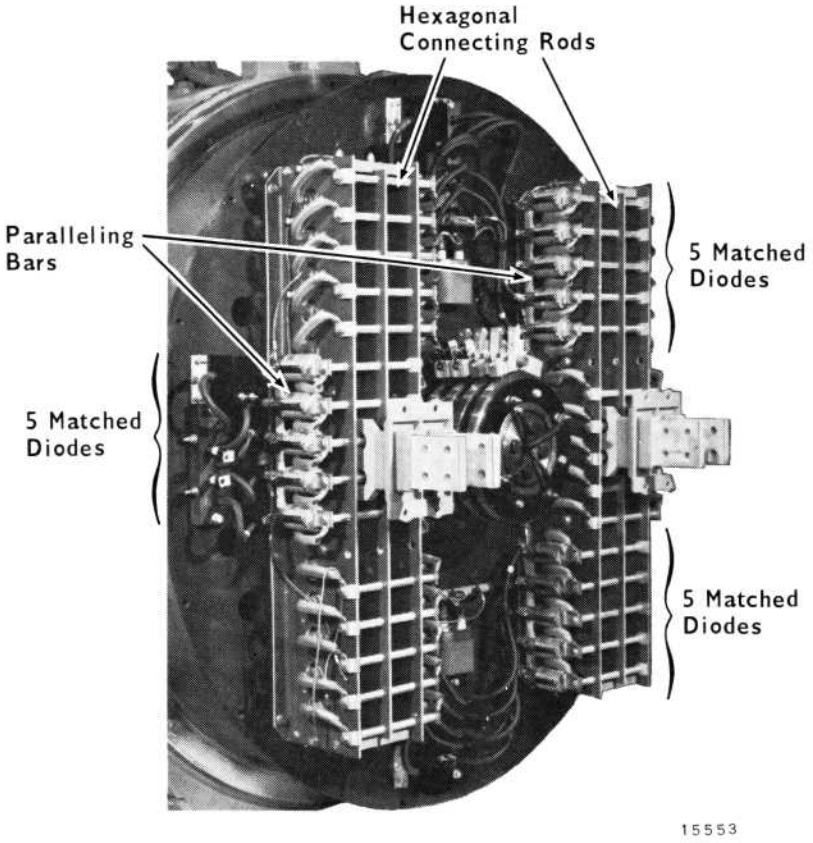


Fig. 6 — Diode Matching Within Groups

1. Polarity

   All diodes in any paralleled group of five diodes must be of the same polarity (ceramic cases must be of the same color), and the diodes must be applied to the proper heat-sink bus. Negative base (pink) diodes to negative bus, and positive base (white) diodes to positive bus. Bus polarity is stamped into the end of the bus.

2. Type

   All diodes in any paralleled group of five diodes should be of the same type (same impressed type number and same type color band at the lower crimp). MIXING OF TYPES WILL CAUSE UNEQUAL LOAD SHARING. Observe that hexagonal connecting rods do not connect diodes in parallel; therefore, diodes connected by rods do not necessarily match by type.

NOTE: Some AR10 generators are equipped with Type 1 diodes, but only Type 2 and Type 3 diodes are used in new production of the AR10 generator, and only Type 2 and Type 3 diodes may be obtained as replacement parts. If replacement for a Type 1 diode is needed, remove all diodes from the affected paralleled group of five diodes and renew with five Type 2 or Type 3 diodes. Test and retain all good Type 1 diodes for use as replacement parts.

TABLE OF DIODE IDENTIFICATION

	DIODE IDENTIFICATION SERVICE	ORIGINAL EQUIPMENT	USED IN GENERATOR	POLARITY OF BASE	CERAMIC COLOR	DIODE TYPE	COLOR BAND AT LOWER CRIMP	COLOR BAND AT UPPER LUG	VOLTAGE CLASS
*	8365633	8346479-1	AR10A	Positive	White	1	None	None	1600/2000
	8365632	8346479-2	AR10A	Positive	White	2	Red	None	1600/2000
	8379519	8346479-3	AR10A	Positive	White	3	Black	None	1600/2000
*	8365631	8346480-1	AR10A	Negative	Pink	1	None	None	1600/2000
	8365630	8346480-2	AR10A	Negative	Pink	2	Red	None	1600/2000
	8379517	8346480-3	AR10A	Negative	Pink	3	Black	None	1600/2000
*	8379518	8364554-1	AR10B	Positive	White	1	None	Green	2000/2400
	8368466	8364554-2	AR10A3 - AR10B	Positive	White	2	Red	Green	2000/2400
	8368467	8364554-3	AR10A3 - AR10B	Positive	White	3	Black	Green	2000/2400
*	8379520	8364555-1	AR10B	Negative	Pink	1	None	Green	2000/2400
	8368468	8364555-2	AR10A3 - AR10B	Negative	Pink	2	Red	Green	2000/2400
	8368469	8364555-3	AR10A3 - AR10B	Negative	Pink	3	Black	Green	2000/2400
**		8418231-3	Special Use	Positive	White	3	Black	Blue	2200/2800
**		8418231-4	Only	Positive	White	4	Yellow	Blue	2200/2800
**		8418232-3	Special Use	Negative	Pink	3	Black	Blue	2200/2800
**		8418232-4	Only	Negative	Pink	4	Yellow	Blue	2200/2800
**	8407850	8407727-3	Special Use	Positive	White	3	Black	White	2200/3000
**	8407849	8407727-4	Only	Positive	White	4	Yellow	White	2200/3000
**	8407852	8407728-3	Special Use	Negative	Pink	3	Black	White	2200/3000
**	8407851	8407728-4	Only	Negative	Pink	4	Yellow	White	2200/3000

* Not used as new equipment and not available as replacement part.

** Special Use Only.

Fig. 7 — Table Of Diode Identification

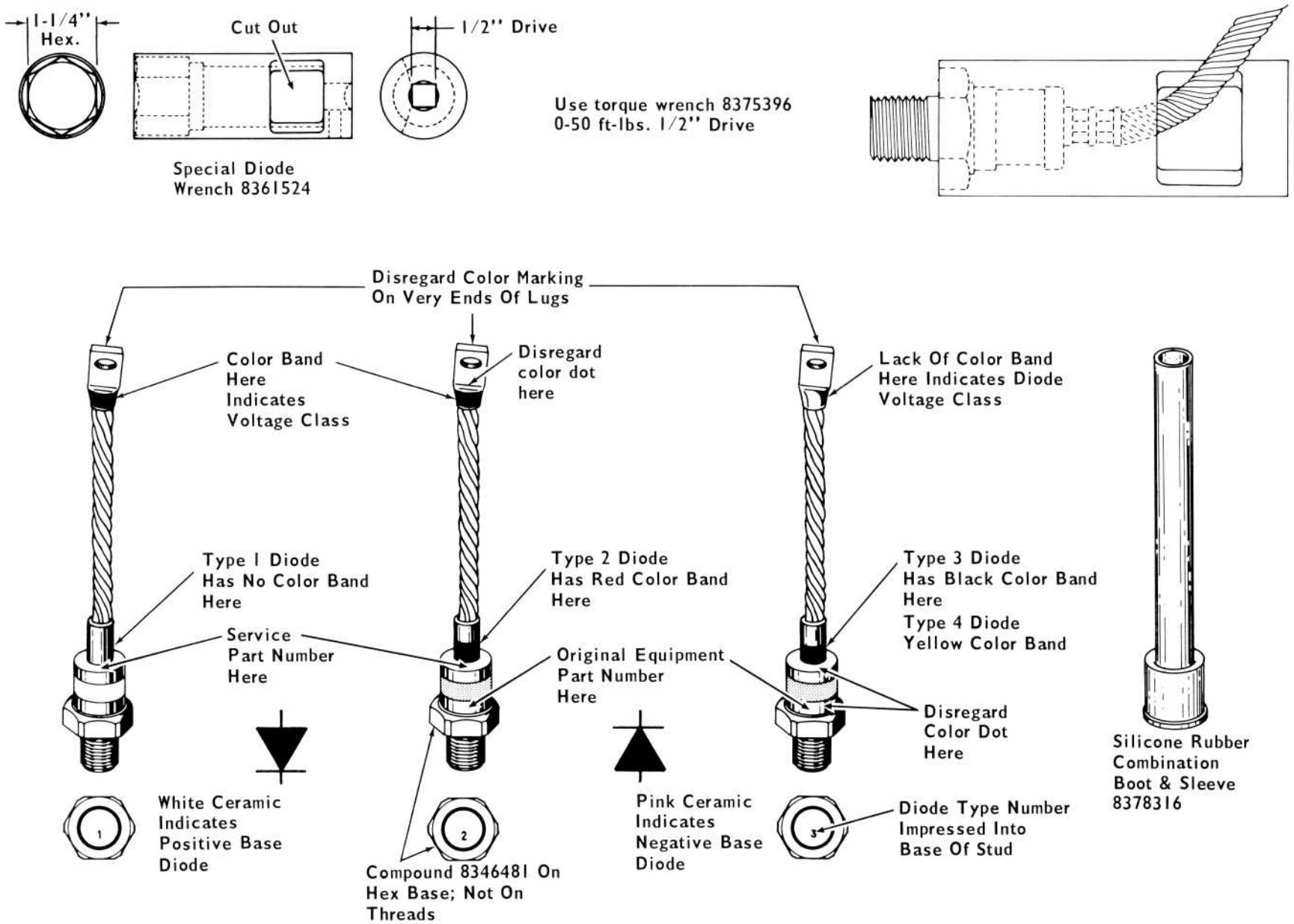


Fig. 8 — Illustrated Diode Replacement Data

15508

If due to operating conditions, mixing of types cannot be avoided, a replacement diode of the next higher type number may be used for a temporary emergency fix. This diode should be replaced with the proper type diode at the earliest opportunity.

3. Voltage Class

Diodes of different voltage classes may be mixed in an AR10 generator, but all diodes in any AR10 must equal or better the inverse voltage rating (voltage class) required for the particular AR10 application. For example, diodes of the 2000/2400 voltage class (green color band at upper lug barrel) may be mixed with diodes of the 1600/2000 voltage class (no color band at upper lug) in the AR10A generator, but diodes of the 1600/2000 voltage class must not be used in the AR10B generator, because the AR10B requires diodes of a higher voltage class.

DIODE INSPECTION AND REPLACEMENT

Figs. 9 and 10 illustrate AR10 airbox inspection and provide information regarding diode and fuse testing and replacement.

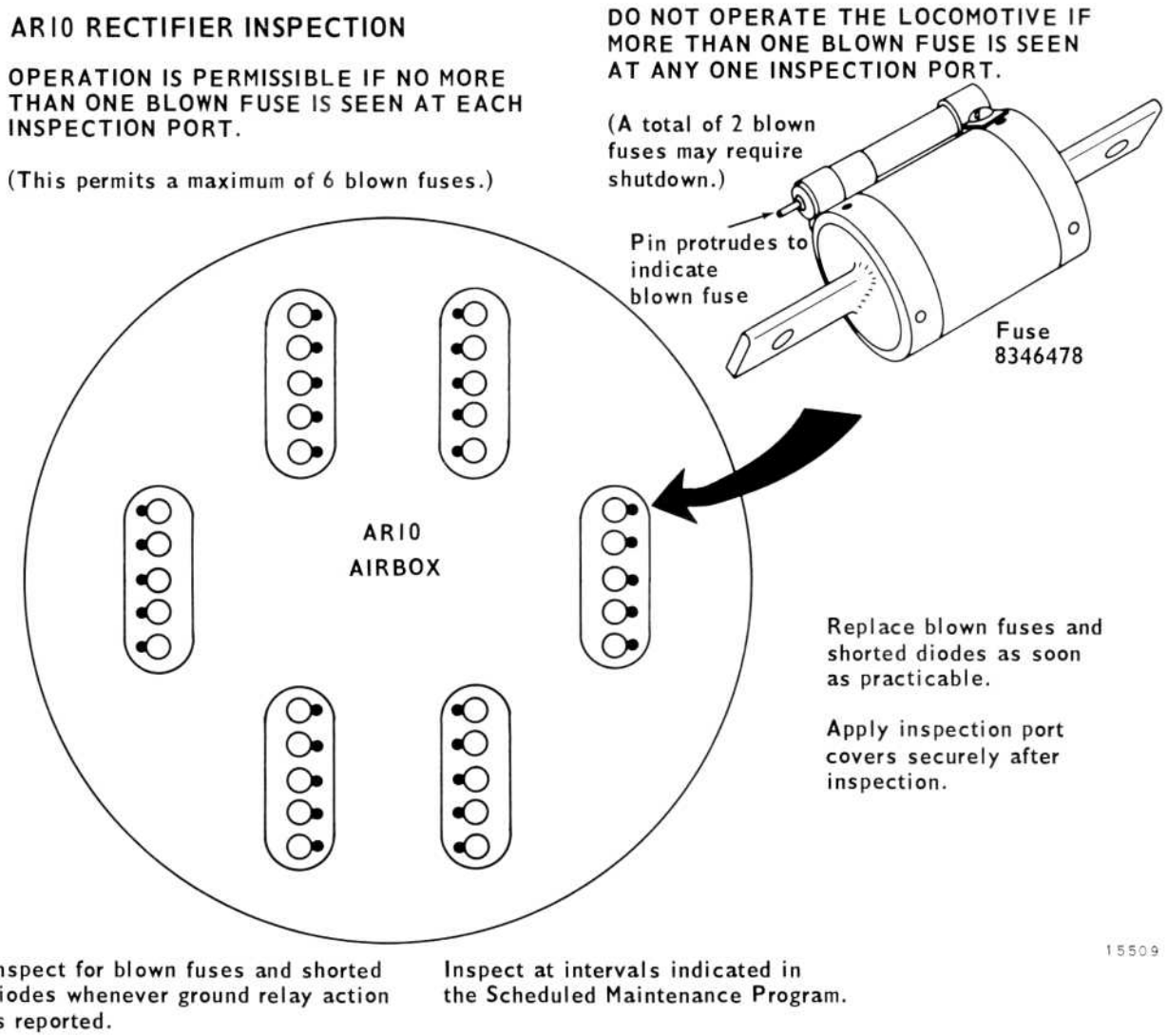
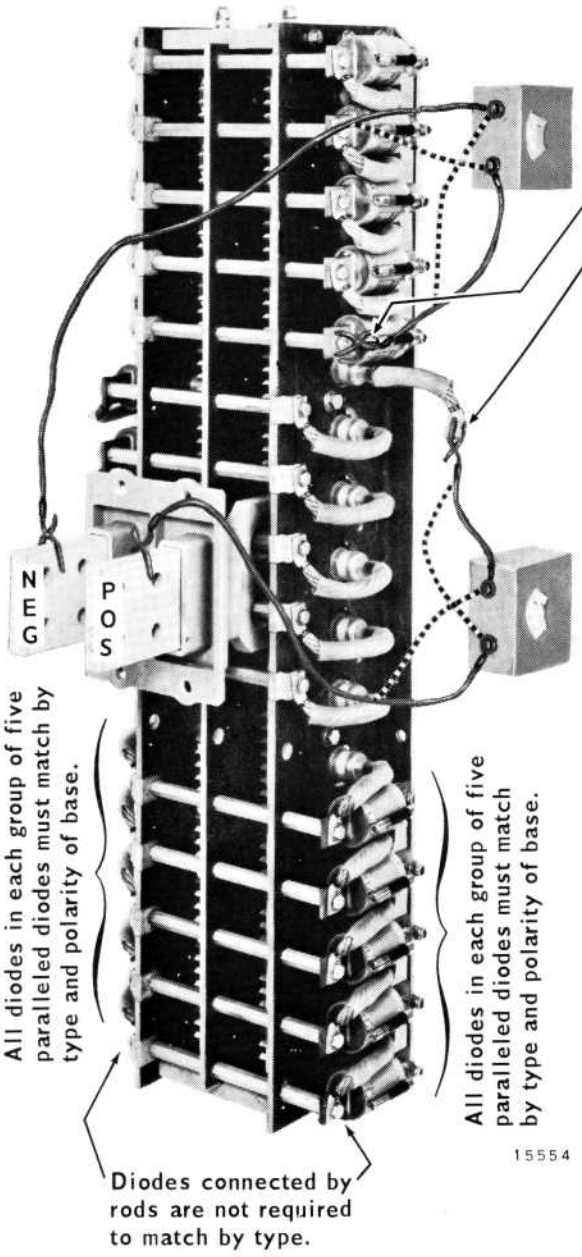


Fig. 9 — AR10 Rectifier Inspection



DIODE INSPECTION AND REPLACEMENT

1. Indicating pin protrudes.
2. Remove nut and unfasten diode lead. Check fuse continuity.

NOTE: If multiple failures have occurred in a single group of 5 diodes, or if repeated failures have been observed in a single group of 5 diodes, isolate and check all diodes in the group.

3. Place continuity tester across negative bus and connecting rod, then switch the tester leads. This checks one of the diodes protected by the fuse.

   If diode is good, the meter registers 10 to 20 ohms in one direction and nearly infinity when leads are reversed.

4. Place continuity tester across positive bus and diode lead, then switch the tester leads. This checks the other diode protected by the fuse.
5. Replace blown fuse with a good fuse.
6. Remove faulty diodes, using special diode wrench 8361524.
7. Clean the mounting surface of the heat-sink bus.
8. Replace shorted diodes with good diodes of identical type, polarity, and voltage class (or higher voltage class). Apply compound 8346481 to the base of the diode hex in sufficient quantity to cover the surface. Do not apply on threads.
9. With special diode wrench and 0-50 ft-lb torque wrench 8375396, torque diodes to 35 ft-lbs. Make certain that the wrench is properly seated when torquing.
10. Replace and securely fasten all airbox panels and inspection covers.

Fig. 10 — Diode Inspection And Replacement

GENERAL CHECK OF ALL DIODES AND FUSES IN AN AR10 GENERATOR

GENERAL TEST SETUP

Before performing the general check of the AR10 diodes and fuses, make the following test setup.

1. Place the throttle in idle, center the reverser, place the isolation switch in isolate position, stop the diesel engine, and remove the starting fuse.

2. Allow the main battery switch and the control and fuel pump switch, and the local control and control circuit breakers to remain closed.

3. Insert a 7/32" metal or wood rod into the positive test jack. This is to isolate transition, wheel slip, motor field protection, and field current transductor circuits as applicable.

4. On units equipped for dynamic brakes, index the selector lever for dynamic brake operation. Check that the "B" transfer switches pick up to disconnect the wheel slip bridge circuit resistors from across the main generator.

5. On SD and FP type units not equipped with dynamic brakes, remove the fiber dust covers from the right side RVF1, RVF2, and RVF3 reversing switches. Insert a thin piece of insulating material between the stationary No. 5 and the movable No. 6 contacts (right front). This is to isolate the wheel slip bridge circuit resistors. This step is not necessary on GP type units.

The following text and Fig. 11 details a short method of checking all diodes and fuses in the AR10 generator without disconnecting any leads. The checks should be performed after any maintenance is performed on the AR10. If the check indicates a failed diode or fuse, isolate the suspected part and related parts and check them in the conventional manner.

If multiple failures have occurred among the diodes associated with a single group of five fuses, or if repeated failures are observed among the diodes associated with a single group of five fuses, isolate all diodes in the group and perform the conventional continuity check. This is necessary because a diode may be stressed by high current without blowing the associated fuse. Such stressing can result in a diode with high forward resistance. Since the associated fuse remains intact, providing a parallel path around the diode, the general check made without disconnecting diode leads will not detect the bad diode.

Fig. 12 is a simplified pictorial wiring diagram of the AR10 stator connected to simplified locomotive wiring. The various parallel paths in effect during the described checks can be followed on the diagram.

The indicated tests should be performed in sequence, and all defective parts replaced with qualified parts before continuing with the checks. Perform the check in the sequence listed.

1. Check all 60 diodes for shorts, and replace all shorted diodes.
2. Check all 60 diodes for opens and replace all open diodes.
3. Check all 30 fuses for opens, and replace all open fuses.

TEST FOR SHORTED DIODES

1. Using a high scale (1000X), connect an ohmmeter lead of positive polarity to the left rectifier bank positive bus.

Perform Checks At Both Left And Right Banks
Use High Ohmmeter Scale To Check For Shorted Diodes
Use Low Ohmmeter Scale To Check For Open Diodes And Fuses

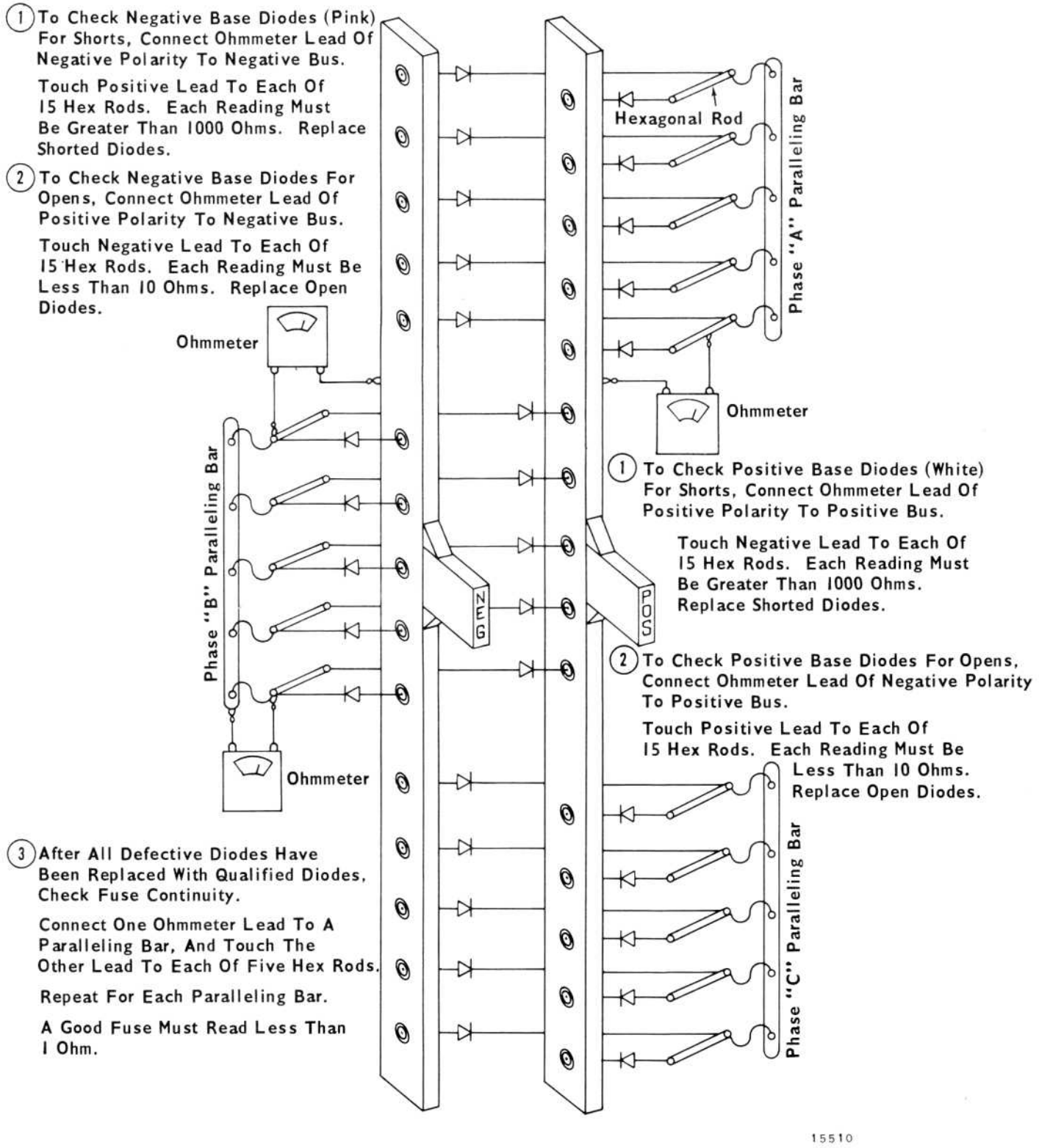
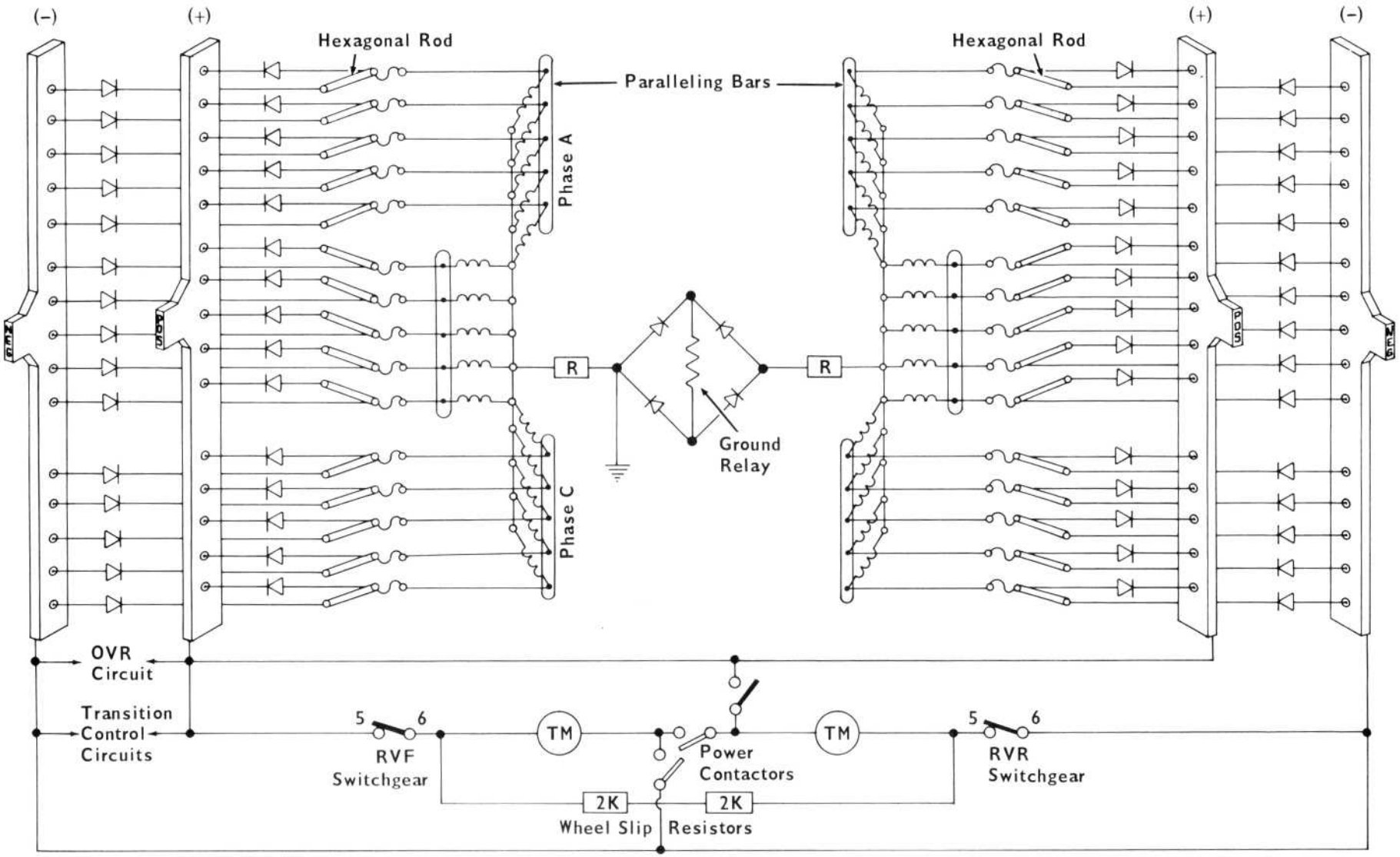


Fig. 11 — General Rectifier Assembly Check Without Disconnecting Diodes Or Fuses



15511

Fig. 12 — Simplified Pictorial Wiring Diagram — AR10 And Typical Locomotive Circuit

NOTE: On some multi-meters the indicated negative or common terminal may be of positive polarity when used as an ohmmeter. Verify the polarity of the meter before making the diode checks.

2. Touch the ohmmeter negative lead successively to each of the 15 hexagonal rods of the assembly. Each reading must be greater than 1000 ohms (no maximum). A shorted diode will result in a zero or near zero reading when the negative lead is touched to its connecting rod.

3. Connect ohmmeter lead of negative polarity to the left rectifier bank negative bus.

4. Touch the ohmmeter positive lead successively to each of the 15 hexagonal rods of the assembly. Each reading must be greater than 1000 ohms. A shorted diode will result in a zero or near zero reading when the positive lead is touched to its connecting rod.

5. At the right rectifier bank assembly, repeat the checks given above in Steps 1 through 4.

6. Replace all defective diodes in both left and right assemblies.

EXPLANATION OF THE TEST FOR SHORTED DIODES

The 1000 ohm value for diode acceptability is determined from the fact that diodes and certain locomotive circuits are connected in parallel. Usually the blocking resistance of a diode is in the order of several hundred thousand ohms, but a good diode may have blocking resistance as low as 30,000 ohms. Since 15 diodes in a rectifier assembly are connected in parallel through the negligible resistance of the AR10 stator windings, the resistance of 15 good diodes in parallel can be as low as 2000 ohms. However, during checks described, the overvoltage relay OVR circuit is connected in parallel with the rectifiers, and the second bank of rectifiers parallels the first through generator neutral and the ground relay circuit. The minimum possible resistance reading across a good diode in an AR10 generator connected in a locomotive under the described test conditions is 1000 ohms.

A shorted diode will be detected only when the ohmmeter lead is connected at the diode's hexagonal connecting rod. The shorted diode will not be detected at any other point during the test, and it will not significantly affect the readings. This is so because the diode's associated fuse will always blow open to isolate the shorted diode.

NOTE: Always qualify diodes and fuses before applying them in an AR10 generator.

TEST FOR OPEN DIODES

1. Using a low scale (1 X), connect an ohmmeter lead of negative polarity to the left rectifier bank positive bus.

2. Touch the ohmmeter positive lead successively to each of the 15 hexagonal rods of the assembly. Each reading should be less than 10 ohms. An open diode will result in a reading of infinity when the positive lead is touched to its connecting rod.

3. Connect ohmmeter lead of positive polarity to the left rectifier bank negative bus.

4. Touch the ohmmeter negative lead to each of the 15 hexagonal rods of the assembly. Each reading should be less

than 10 ohms. An open diode will result in a reading of infinity when the negative lead is touched to its connecting rod.

5. At the right rectifier bank assembly, repeat the checks given above in Steps 1 through 4.

6. Replace all defective diodes in both left and right assemblies.

EXPLANATION OF THE TEST FOR OPEN DIODES

Open diodes occur as follows:

1. True Open Diode

   The diode is open as a result of a previous short. A blown fuse will be associated with this diode. If the fuse indicating pin fails to indicate the blown fuse, the general check for open diodes will detect the bad diode and open fuse.

2. High Forward Voltage Drop Across The Diode

   The diode may be degraded as a result of carrying excessive current. The fuse associated with this diode may remain intact. Probable events in these circumstances are:

   a. The high resistance of the diode is a result of high current due to multiple failure of paralleled diodes in a single group. Whenever multiple failures occur in a group, all diodes in the group should be isolated and checked. The bad diode will be detected.

   b. If the high resistance diode is allowed to remain in the generator, it must still function to block reverse current flow. Since it is degraded it will soon short out. The associated fuse will blow, and the diode will be detected.

   c. If failures repeat in a single group of diodes, all diodes in the group should be isolated and checked. The bad diode will be detected.

TEST FOR OPEN FUSES

1. Test for and replace all shorted diodes before testing for open fuses.

2. Connect one lead of an ohmmeter to a phase paralleling bar.

3. Connect the other ohmmeter lead successively across each fuse connected to the paralleling bar. A good fuse should indicate less than 1 ohm.

4. Repeat the procedure at each of the paralleling bars and at each fuse.

EXPLANATION OF THE TEST FOR OPEN FUSES

The presence of an undetected open fuse means that four diodes have been carrying the load of five. The extra load over a period of time can lead to premature failure of the diodes.

Fuse blow can occur without damage to associated diodes, and in extremely rare instances the indicating pin may fail to protrude from a blown fuse. The fact that good diodes are connected to a fuse that appears good does not ensure a good fuse.

TEST DISCONNECT

After the tests, remove insulation that may have been placed at transfer switch contacts, and replace the dust covers. Return locomotive circuits to normal standby condition.

CAUTION: Make certain that AR10 inspection covers are securely applied.

AR10 COMMUTATION TRANSIENT VOLTAGE SUPPRESSION

INTRODUCTION

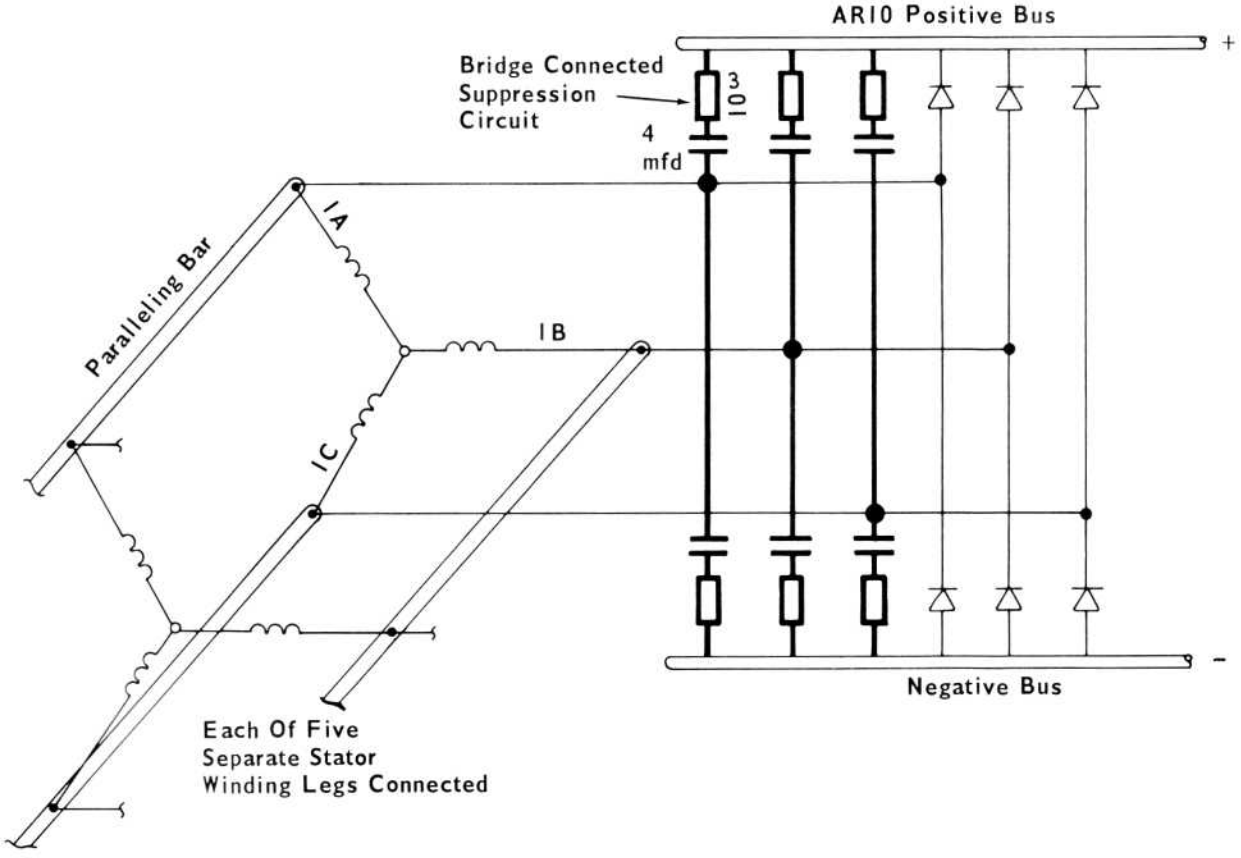
During commutation voltage transients are produced. The action of diodes switching from a conducting to a blocking state in the AR10 generator is called commutation. During commutation high reverse current flows in the diodes for a few microseconds, after which time the value of reverse current flow in the diode suddenly drops to almost zero. The rate at which current flow changes from a high value to almost zero, multiplied by circuit inductance determines the magnitude of the transient voltage spike. If this transient voltage exceeds the reverse rating of the diode, the diode will immediately fail.

The AR10 generator is provided with a system for capacitive storage of energy from circuit inductance during commutation. The system is called the commutation transient voltage suppression system.

SUPPRESSION SYSTEM DESCRIPTION

Two different suppression systems have been applied to protect AR10 rectifiers from commutation transients. Both provide equal reliability and protection when properly connected.

The first of these systems, Fig. 13, uses a 4 microfarad capacitor and a 10 ohm resistor connected in series and parallel with each group of five diodes. Thus, since the AR10 DC buses are paralleled, there are 12 series resistor-capacitor circuits connected in parallel with the AR10 diodes.



15512

Fig. 13 — Bridge Connected Suppression Circuit — Simplified Diagram

The second system, Fig. 14, for suppression of commutation transients uses a 2 microfarad capacitor and a 5 ohm resistor connected in series. These in turn are connected between the "A," "B," and "C" phase paralleling bars on both the left and right banks of the generator.

INSPECTION OF THE SUPPRESSION SYSTEM

An inspection of the commutation transient voltage suppression system should be made every time a faulty or failed diode is detected and replaced. The required inspection is basically visual. The following checks should be made.

1. Check that all connections are tight and are electrically correct. See Figs. 15 through 18 for wiring diagrams.
2. Examine all resistors for evidence of overheating and open turns.
3. Examine all capacitors for oil leaks or deformation of the container. (The container top may be badly pushed out.)

TESTS AND CORRECTIVE MEASURES

LOOSE OR IMPROPER CONNECTIONS

Tighten any loose connections in accordance with the applicable wiring diagram.

DAMAGED RESISTORS

Any resistors that appear to be burned or damaged should be disconnected and continuity checked. Faulty resistors must be immediately replaced with qualified resistors.

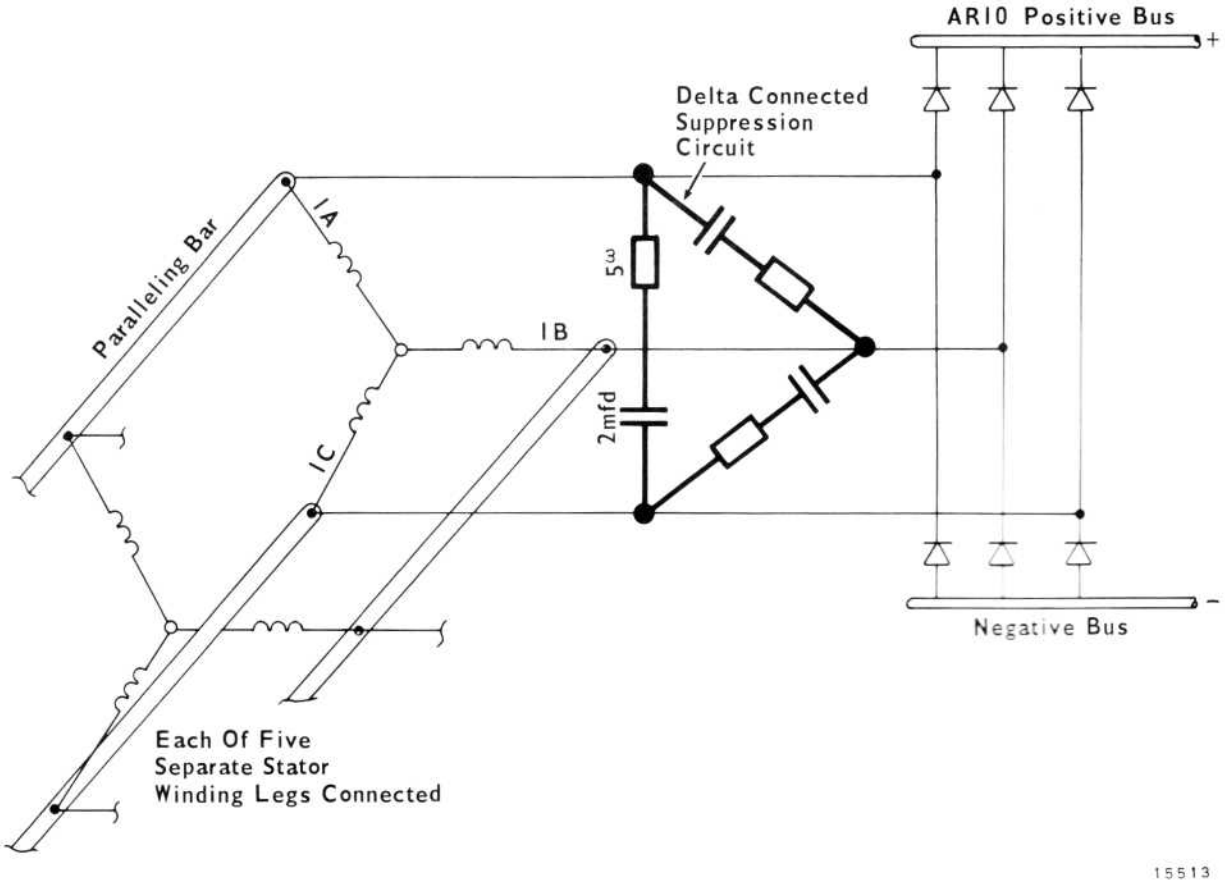


Fig. 14 — Delta Connected Suppression Circuit — Simplified Diagram

DEFECTIVE CAPACITORS

If a capacitor is suspected faulty, it should be disconnected and checked in the following manner.

1. Checks with a 500 or 1000 volt megger.

   a. Short circuit the capacitor terminals and connect the positive lead from the megger to the terminals. Connect the megger negative lead to the capacitor case, and turn the megger. The reading should be 25 megohms or more. Disconnect the megger and shorting jumper.

   b. Connect one megger lead to one capacitor terminal and connect the other megger lead to the other capacitor terminal, and turn the handle. If the capacitor is good, there will be a definite meter needle deflection toward zero (indicating capacitor charging current) followed by a drift toward infinity as the capacitor charges. Failure of the meter needle to deflect toward zero is an indication that the capacitor is open internally.

      If the capacitor is shorted, the megger will read zero when the handle is turned. If the capacitor is open, it will read infinity immediately upon turning the handle, and the reading will drop to zero when the turning stops.

CAUTION: Carefully discharge the capacitor after the check by using an insulated handled screwdriver to short across the capacitor terminals.

2. If only a 500 volt megger is available, and megger checks indicate a good capacitor, but the condition of the capacitor is still suspect (burned spots appear on resistors associated with the capacitor), use a 64 V DC input, 1200 V DC output MG set as a high potential tester to induce possible flashover within the capacitor.

   a. Connect the positive output lead from the MG set to one terminal of the capacitor. Connect the negative output lead from the MG set to the other capacitor terminal. Connect a 0-1500 V DC meter to read MG set output voltage. Connect MG set input to a 64 or 74 V DC source.

   b. Advance MG set output voltage. The meter needle will advance as the MG set handle is turned. If a flashover is induced in the capacitor, the meter will dip toward zero, indicating a bad capacitor. Immediately reduce voltage to zero, then turn off the MG set.

      If the capacitor is good, voltage will remain at the high output value from the MG set. Reduce MG set voltage to zero, then turn off the set.

CAUTION: Carefully discharge the capacitor after the check by using an insulated handled screwdriver to short across the capacitor terminals.

MODELS OF THE AR10 GENERATOR

Three characteristics determine the particular model number given to an AR10 generator.

1. The type of suppression circuit employed.

2. The use or lack of current transformers.

3. The voltage class of the diodes employed.

Table D provides a breakdown by characteristic and model number. Diagrams of the rectifier assemblies and suppression systems are provided in Figs. 15 through 18.

TABLE D - AR10 MODEL NUMBER BREAKDOWN

Generator Model Number	Commutation Transient Suppression		Current Transformers		Voltage Class Diodes	
	Bridge Type	Delta Type	Yes	No	1600/2000	2000/2400
AR10A - D14	X			X	X	
AR10A1 - D14		X		X	X	
AR10A2 - D14		X	X		X	
AR10A3 - D14		X		X		X
AR10B - D14	X		X			X
AR10B2 - D14		X	X			X

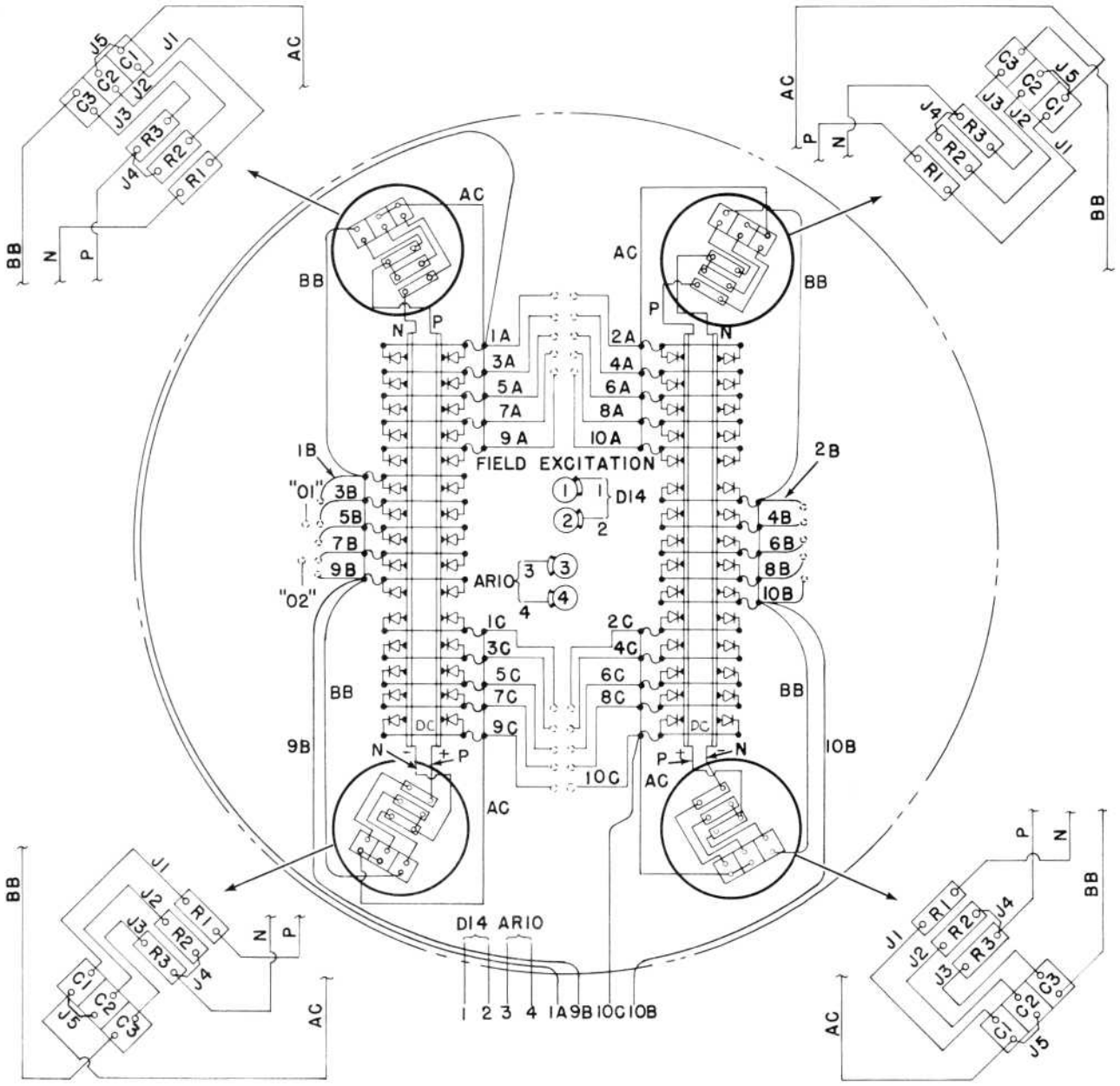
CAUTION

When ordering replacement AR10 generators as well as when replacing generators, verify that the replacement generator bears the same model number as the generator being replaced. The suffix letter and numeral following the basic AR10 identification have significance.

Do not perform high potential tests on diodes, either individually or collectively.

If a high potential test is to be performed on the locomotive or generator, all positive and negative generator buses must be shorted together, and the brushes at the slip rings connected together to prevent high potential from being applied to the controlled rectifier assembly SCR.

VIEW FACING SLIP RING END OF ALTERNATOR



SUPPRESSION CIRCUIT COMPONENTS

8355837 FILTER ASSEM. - LOWER LEFT & UPPER RIGHT
8352224 RESISTOR BANK – R_1, R_2, OR R_3

8352261 CAPACITOR - C_1, C_2, OR C_3

8359406 FILTER ASSEM. - LOWER RIGHT & UPPER LEFT
8352224 RESISTOR BANK - R_1, R_2, OR R_3

8352261 CAPACITOR - C_1, C_2, OR C_3

15514

Fig. 15 — AR10A Rectifier Banks And Suppression Circuits, Simplified Diagram

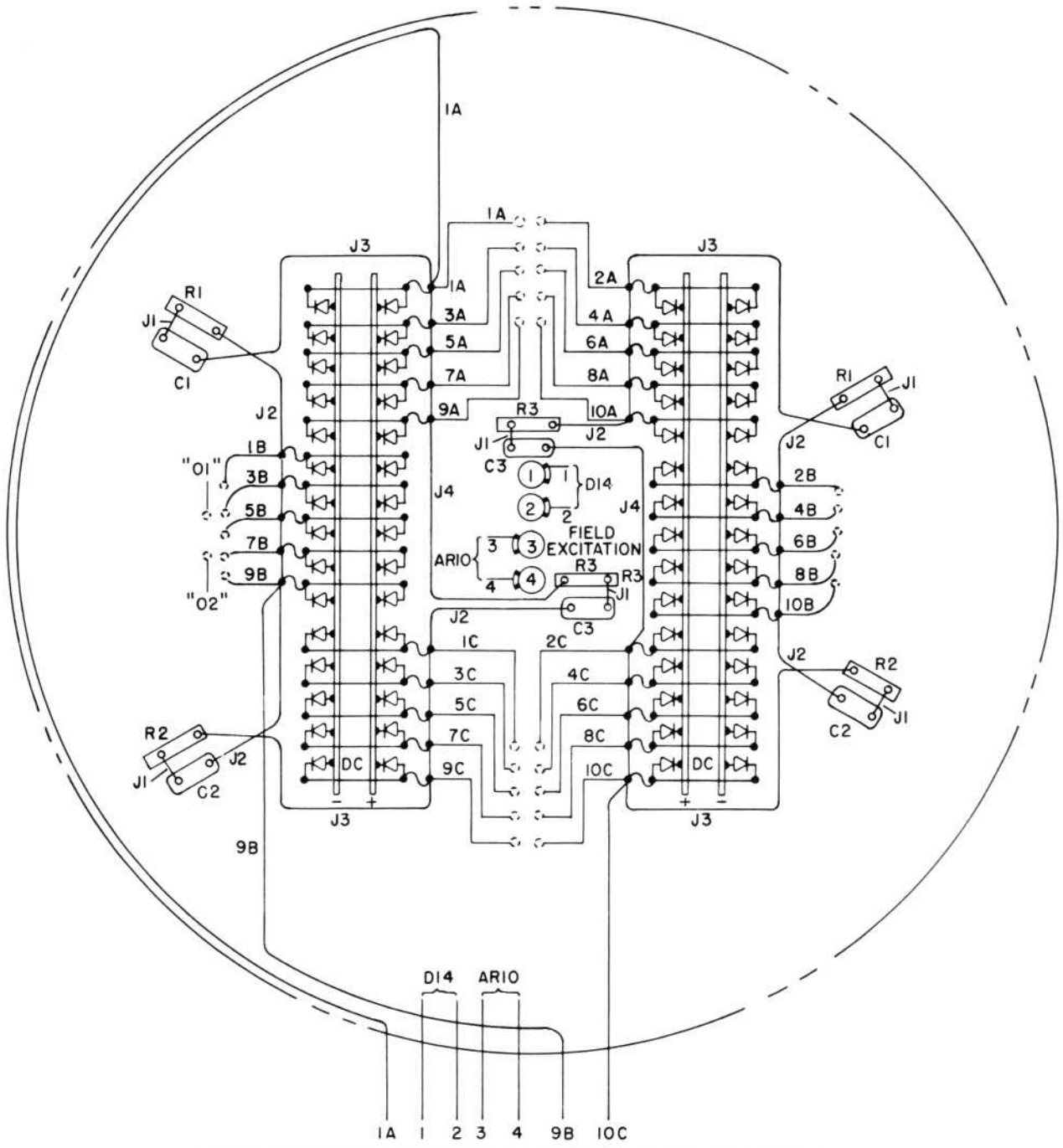
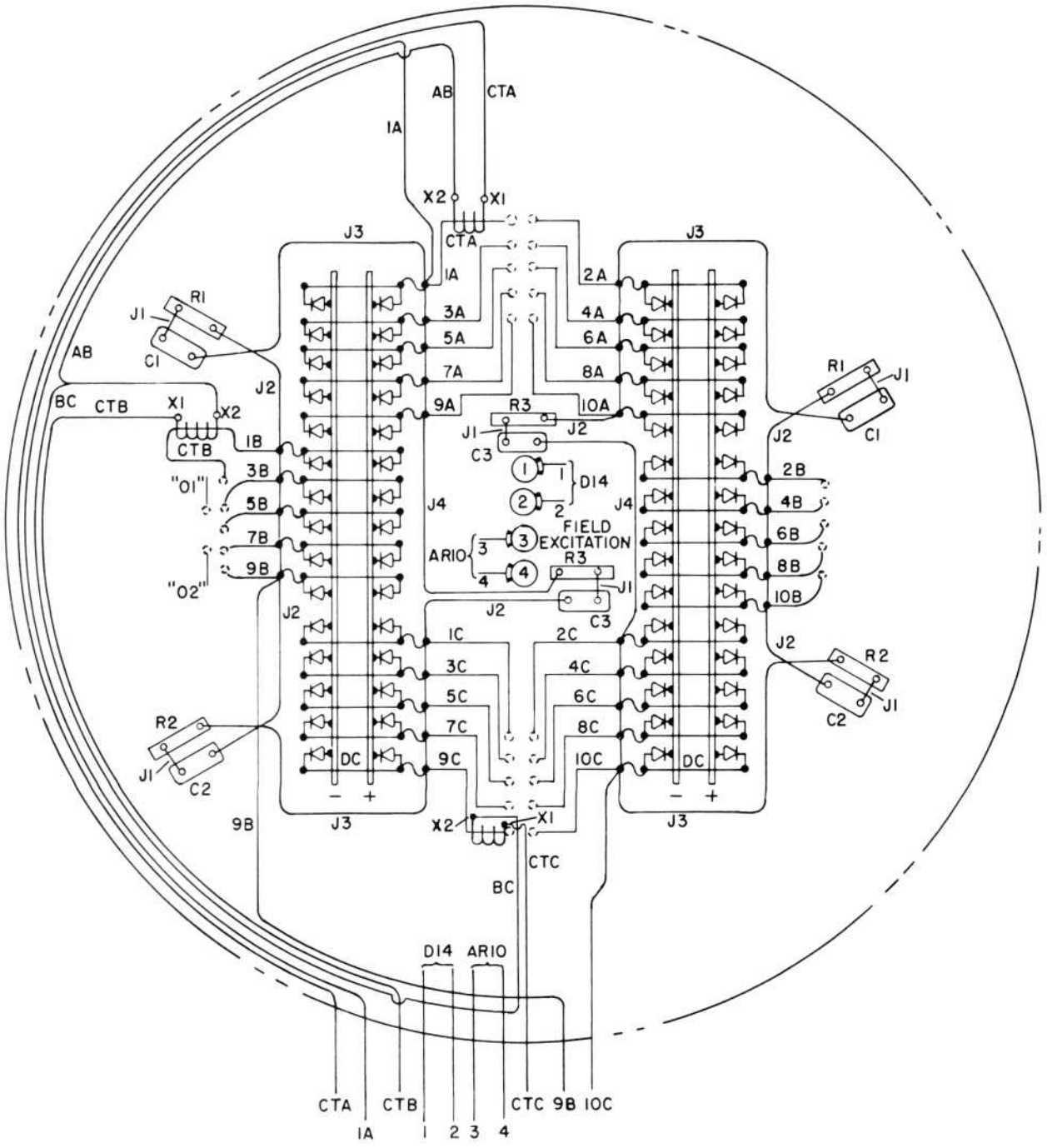


Fig. 16 — AR10A1 - AR10A3 Rectifier Banks And Suppression Circuits, Simplified Diagram

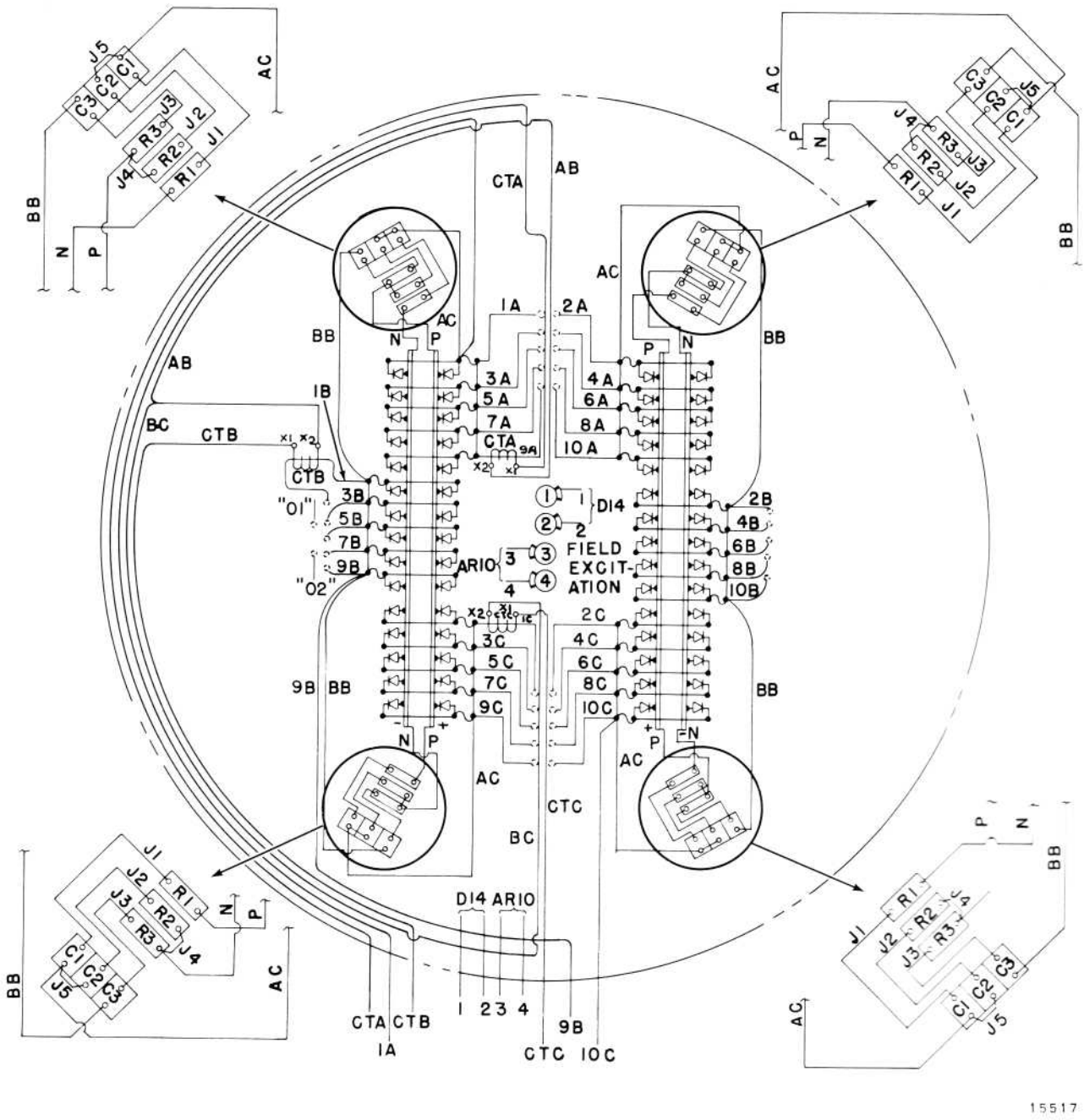
VIEW FACING SLIP RING END OF ALTERNATOR



NOTE: SAME SUPPRESSION CIRCUIT COMPONENTS AS AR10A1 SHOWN IN FIGURE 16

15516

Fig. 17 — AR10A2 - AR10B2 Rectifier Banks And Suppression Circuits, Simplified Diagram



NOTE: SAME SUPPRESSION CIRCUIT
COMPONENTS AS AR10A
SHOWN IN FIGURE 15

Fig. 18 — AR10B Rectifier Banks And Suppression Circuits, Simplified Diagram

MAINTENANCE DATA

Weight Of Rectifier Bank Assembly . . . . . 100 lbs.

Tools And Meters

Special Diode Socket Wrench 8361524

Torque Wrench, 0-50 Ft. Lb. - 1/2" Drive 8375396

Compound - Joint 8346481
(Apply to diode hex contact area prior to mounting. Do not apply to threads.)

Multi-meter 8276478

500 V DC Megohmmeter (Megger) 8173880

Dynamotor (MG Set) 1200 V DC Output - 64 V DC Input 8218499

Litho in U.S.A.