CENTURY
SRT-1
IN-CIRCUIT
OUT-OF-CIRCUIT
RECTIFIER TESTER

IN-CIRCUIT SELENIUM RECTIFIER TESTER

Model SRT-1

INSTRUCTION MANUAL

Century Electronics Co., Inc.

manufacturers of electronic equipment

111 ROOSEVELT AVE.,
MINEOLA, N. Y.

Warranty

This instrument is made of the finest components and has been carefully tested before leaving the factory. It carries the standard RETMA warranty against defects in material and workmanship for a period of 90 days from the date of purchase.

Should any such defect occur within the warranty period, return the unit to where it was purchased together with a letter giving details of the defect.

Any questions or complaints in regard to this instrument should be referred directly to us for prompt attention and complete satisfaction.

Be sure to fill out and mail the Warranty Registration Card immediately to register your unit with the factory.

CENTURY ELECTRONICS CO., INC.
MINEOLA, N. Y.

CENTURY ELECTRONICS CO., INC.
MINEOLA, N. Y.

I. INTRODUCTION

A. WHAT IT IS

The SRT-1 tests all popular 117-volt power rectifiers in-circuit for quality and life expectancy. The test is performed right in the receiver, with no need to disconnect any leads.

The rectifier to be tested can be selenium, germanium, silicon or other type, and it can be of the flat fin type, the tubular type or other style. The SRT-1 tests them all in the same manner. The only requirement is that it be rated for regular 117-volt A.C. power line service.

B. HOW IT WORKS

The SRT-1 draws a carefully controlled amount of excess load current through the rectifier under test. The in-circuit design allows for the division of rectifier output current between the SRT-1 load and the receiver load. Results have proven the SRT-1 to be accurate no matter what type of receiver power supply circuit is being tested.

C. RANGE OF OPERATION

The SRT-1 will test the quality of all the sizes of power rectifiers popularly in use today. Working under normal in-circuit conditions, the SRT-1 is designed to indicate the quality of any rectifier even with the presence of a second rectifier, also regardless of the nature of the load circuit connected across the rectifier under test. The instrument is designed to work at a power line voltage of 117 V., 60 cycles, with a tolerance of plus or minus 10%.

1. In-Circuit Features:

The SRT-1 will test all rectifiers in-circuit for QUALITY (current emission)...FADING (falling emission after warm-up)...SHORTS...OPENS... ARCING...LIFE EXPECTANCY.

2. Out-of-Circuit Features:

The SRT-1 will test rectifiers out of circuit too. The features are the same as for the in-circuit checks, with the procedure essentially the same. There is a separate meter scale for out-of-circuit tests, which provides the same accuracy under the different load conditions.

D. SAFETY FEATURES

The SRT-1 is direct-connected to the 117-volt power line, but shock hazard and short-circuit hazard have been eliminated by careful engineering of the many safety features:

1. The SRT-1 will not blow fuses even when connected to a dead short!

2. The internal fuse in the SRT-1 is rated at 5 amps. Dead short current is only just over 2 amps. Under laboratory tests, the SRT-1 withstood a dead short (such as would be the case if you were testing a shorted rectifier) for 10 seconds without the fuse blowing or any overheating.

3. The main filter condenser in the SRT-1 is rated for A.C. operation so that when testing a bad rectifier which has high reverse current, the presence of large A.C. in the output will not cause either breakdown or overheating.

4. The large meter in the SRT-1 is accurate to 3%... sensitive and yet rugged. The meter circuit is designed carefully so that the meter cannot normally overload or be burned out as the result of testing a shorted rectifier, setting the dials wrong, or any other error in test procedure.

5. Shock hazard to the technician is minimized as no voltage appears across the test clips until the "Test" switch is depressed. The tip and the clips are insulated and the instrument case is isolated from the power line.

II. TEST PROCEDURES

A. PRELIMINARY

1. Disconnect the receiver line cord before making any tests with the SRT-1. If the chassis is grounded, either through a direct connection or via the antenna, this ground should be disconnected.

2. During in-circuits tests, the receiver will be energized. If the tube filaments are powered by a filament transformer or filament winding on a power transformer, the tubes will light up. In a voltage doubler TV power supply of this type, only about 70% of normal power will be supplied to the receiver, since the SRT-1 loads only one rectifier at a time. The technician should keep in mind that the TV set is actually running, and that the high voltage is about 50% of full value.

B. IN-CIRCUIT TEST FOR SINGLE RECTIFIER POWER SUPPLIES

1. Disconnect the receiver from the power line and from any ground connection.

2. Plug SRT-1 into A.C. line. Turn the instrument on. The jewel should light up.

3. Use upper meter scale for all in-circuit tests.

4. Determine the current rating of the rectifier.
   a. This value is usually in MA. (milliamperes) and is stamped on one side of the rectifier.

   b. If the rating is not known it can be estimated by using the chart of Section III., Paragraph B entitled "How to Identify Rectifier Current Rating."

5. Set the SRT-1 selector to the rated current value of the rectifier.

6. Plug the test leads into the SRT-1 jacks. Always plug the red lead into the red (positive) jack. It is extremely important to observe polarity for these tests.

7. Clip the red test lead to the positive (cathode) terminal of the rectifier and the black lead to the negative (anode) terminal.
   a. If you can't determine which rectifier terminal is positive, refer to Section 3, Paragraph A entitled "How to Tell Rectifier Polarity."

8. Depress "Test" switch and read meter...then release "Test" switch.

NOTE: Normally, test switch need be held down only long enough to get a steady reading on the meter. This will be about 5 to 10 seconds.

C. RESULTS OF IN-CIRCUIT TEST FOR SINGLE RECTIFIER POWER SUPPLIES

1. If meter needle quivers at the zero mark, goes slightly off scale to the left, or if the rectifier smokes or sparks, release the "Test" switch instantly. The trouble is one of the following:

   a. The rectifier is shorted. If this is so, the set must have shown the same symptoms (smoke, odor, sparking, etc.) when you tried to operate it on its own power.

   b. If set had been operating normally before the SRT-1 test, then you may have connected the test leads with wrong polarity. If so, reverse them and repeat the test.

   c. The receiver has a short somewhere in its load circuit. If this is so, the receiver would not have been playing before the test.

Once a short circuit is known to exist, unsolder the rectifier and make an out-of-circuit test on it, following the procedure as shown in Section II, Paragraph "F" entitled "Out of Circuit Tests for All Types of Power Rectifiers." If the rectifier now tests "Good", then the short is elsewhere in the set. Keep in mind that a shorted

receiver may cause its rectifier to go bad, so that by the time the technician arrives to trouble-shoot the set, both the rectifier and the set are shorted.

2. If the meter reads in the "Good" zone the rectifier is O.K. and may be tested for life expectancy.

3. The Life Expectancy test may be performed on good rectifiers. A rectifier with good life expectancy can deliver rated current over a prolonged period. If the rectifier has only short life expectancy, it will start to "fade" within a few seconds after the rated current is being drawn.

To make this test, press down the "Test" switch again and hold it down for 10 to 20 seconds. If there is fading, the needle will fall, reaching the yellow or red zone. Such a rectifier should be replaced.

Slight fading means the rectifier has FAIR life expectancy.
Rapid fading means the rectifier has POOR life expectancy.

4. If the meter reading is in the "?" (yellow) zone, the rectifier should be replaced even if it still operates the set.

In table radios, a weak rectifier may cause the oscillator to quit after the set has been playing a while. This has been especially notable in FM radios and in portable radios using 1-volt tubes.

5. A meter reading in the "Bad" (red) zone means the rectifier should definitely be replaced.

6. If absolutely no movement of the meter needle can be seen when the "Test" switch is depressed the rectifier is open.

D. IN-CIRCUIT TEST FOR DOUBLE RECTIFIER POWER SUPPLIES

(two or more rectifiers)

This test is essentially the same as for single rectifiers regardless of the number of rectifiers in the same set. The SRT-1 gives accurate results for each rectifier separately, except when one of the rectifiers is shorted, in which case the "Quality" reading of the other rectifier will be reduced by about 30%.

Therefore, when testing doubler-type power supplies, test both rectifiers before deciding which to replace. The one which checks the poorest should be replaced first. Then test the remaining one again. If it still checks weak or bad, then replace it also.

1. Disconnect the receiver from the power line and from any ground connection.

2. Plug SRT-1 into A.C. line. Turn the instrument on. The jewel should light up.

3. Use upper meter scale for all in-circuit tests.

4. Determine the current rating of the rectifier to be tested.

   a. This value is usually in MA. (milliamperes), and is stamped on one side of the rectifier.

   b. If the rating is not known it can be estimated by using the chart shown in Section III., Paragraph B entitled "How to Identify Rectifier Current Rating."

5. Set the SRT-1 selector to the rated current value of the rectifier to be tested.

6. Plug the test leads into the SRT-1 jacks. Always plug the red lead into the red (positive) jack. It is extremely important to observe polarity for these tests.

7. Clip the red test lead to the positive (cathode) terminal of the rectifier being tested, and the black lead to the negative (anode) terminal.

a. If you can't determine which rectifier terminal is positive, refer to Section III., Paragraph A entitled "How to Tell Rectifier Polarity".

8. Depress "Test" switch and read meter... then release "Test" switch.

NOTE: Normally, test switch need be held down only long enough to get a steady reading on the meter. This will be about 5 to 10 seconds.

9. Repeat the steps of this test for each rectifier in the set.

E. RESULTS OF IN-CIRCUIT TESTS FOR DOUBLE RECTIFIER POWER SUPPLIES

1. If meter needle quivers at the zero mark, goes slightly off scale to the left, or if the rectifier smokes or sparks, release the "Test" switch instantly. The trouble is one of the following:

a. The rectifier is shorted. If this is so, the set must have shown the same symptoms (smoke, odor, sparking, etc.) when you tried to operate it on its own power.

b. If set had been operating normally before the SRT-1 test, then you may have connected the test leads with wrong polarity. If so, reverse them and repeat the test.

c. The receiver has a short somewhere in its load circuit. If this is so, the set could not have been playing before the test.

Once a short circuit is known to exist, unsolder the rectifier and make an out-of-circuit test on it, following the procedure shown in Section II, Paragraph "F" entitled "Out of Circuit Tests for All Types of Power Rectifiers." If the rectifier now tests "Good", the short is elsewhere in the set. Keep in mind that a shorted receiver may damage its own rectifiers if left running, so that when the technician arrives to do troubleshooting, he finds both the set and the rectifiers are shorted.

2. If smoke, sparks, or odor, are given off by the other rectifier, but not by the one being tested, then the other rectifier is definitely bad. Replace the bad one, and then repeat the test on the original one.

3. If the meter reads in the "Good" zone, the rectifier is O.K., and may be tested for "Life Expectancy".

4. The "Life Expectancy" test may be performed on good rectifiers. A rectifier with good life expectancy can deliver rated current over a prolonged period. If the life expectancy is poor, the rectifier output will fall off noticeably within a few seconds after rated current is being drawn. This effect is known as "fading".

   To make this test, press the "Test" switch down again and hold it down for 10 to 20 seconds. If there is "fading", the needle reading will fall back into the yellow or red zone on the scale. Such a rectifier should be replaced.

   Slight fading means the rectifier has FAIR life expectancy.
   Rapid fading means the rectifier has POOR life expectancy.

5. If the meter reads in the yellow zone, it may be weak. Remember to check the second rectifier also, before deciding. Always replace the weakest one first, and then check the remaining one again. If it still checks weak, replace it.

6. If the meter reads in the red zone, the rectifier is bad and should be replaced.

7. If there is little or no movement of the meter needle, the rectifier is open.

F. OUT-OF-CIRCUIT TESTS FOR ALL TYPES OF POWER RECTIFIERS

1. Make sure rectifier does not have any connection to the power line or to a ground.

2. Plug SRT-1 into A.C. line. Turn the instrument on. The jewel should light up.

3. Use the lower meter scale for all out-of-circuit measurements.

4. Determine the current rating of the rectifier.

   a. This value is usually in MA. (milliamperes), and is stamped on one side of the rectifier.

   b. If the rating is not known it can be estimated by using the chart shown in Section III, Paragraph B entitled "How to Identify Rectifier Current Rating".

5. Set the SRT-1 selector to the rated current value of the rectifier.

6. Plug the test leads into the SRT-1 jacks. Always plug the red lead into the red (positive) jack. It is extremely important to observe polarity for these tests.

7. Clip the red test lead to the positive (cathode) terminal of the rectifier, and the black lead to the negative (anode) terminal.

   a. If you can't determine which rectifier terminal is positive, refer to Section III, Paragraph "A", entitled "How to Tell Rectifier Polarity."

8. Depress "Test" switch and read meter...then release "Test" Switch.

NOTE: Normally, test switch need be held down only long enough to get a steady reading on the meter. This will be about 5 to 10 seconds.

G. RESULTS OF OUT-OF-CIRCUIT TESTS OF POWER RECTIFIERS

1. If meter needle quivers at the zero mark, goes slightly off scale to the left, or if the rectifier smokes or sparks, release the "Test" switch

instantly. The trouble is either:

a. Rectifier is shorted.

b. Test clips connected wrong. If so, reverse connection and test again.

2. If the meter reads in the "Good" zone, the rectifier is O.K. and may be tested for "Life Expectancy".

3. The "Life Expectancy" test may be performed on good rectifiers. A rectifier with good life expectancy can deliver rated current over a prolonged period. If the life expectancy is poor, the rectifier output will fall off noticeably within a few seconds after rated current is being drawn. This effect is known as "fading".

To make this test, press the "Test" switch down again and hold it down for 10 to 20 seconds. If there is "fading", the needle reading will fall back into the yellow or red zone on the scale. Such a rectifier should be replaced.

Slight fading means the rectifier has <u>FAIR</u> life expectancy.
Rapid fading means the rectifier has <u>POOR</u> life expectancy.

4. If the meter reading is in the yellow zone, the rectifier is weak.

5. If the meter reading is in the red zone, the rectifier is bad.

6. If there is absolutely no movement of the meter needle, the rectifier is open.

III. APPENDIX

A. HOW TO TELL RECTIFIER POLARITY

a. If the rectifier polarity is unmarked, look for the rectifier symbol: 

The positive (+) terminal (called the cathode) is indicated by the straight line (⊢) and the negative (-) terminal (called the anode) is indicated by the triangle (⊳).

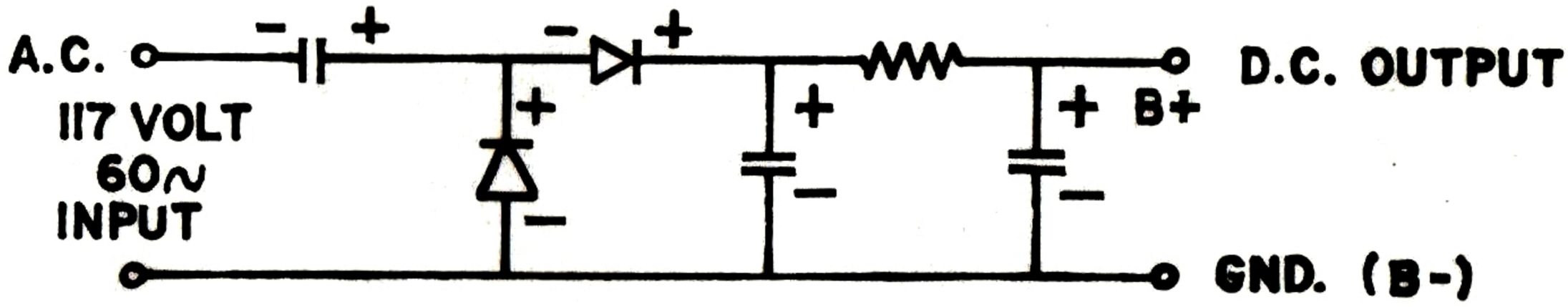
b. Some manufacturers stamp the letter "K" on the positive terminal.

c. Most manufacturers stamp their name, the part number, or the code number on the positive side of the rectifier.

d. If polarity markings have been obliterated on one rectifier in a set with a double rectifier power supply, look on the second rectifier to see if it has polarity markings. Two rectifiers in the same set are usually identical.

e. If it is a single rectifier wired in a set, you will find that the positive terminal will usually be connected to the positive terminal of a filter condenser. And if standard RETMA color coding has been used by the set manufacturer, the positive terminals will have red or orange wired connections.

f. In double rectifier circuits, connections are usually as shown in this typical doubler power supply:



NOTE: Where polarity cannot be identified, it will be necessary to take a guess at it. In such a case, select the right test procedure in the preceding pages, and set up the connections. Then depress the "Test" switch for only an instant. If meter needle goes off scale in the wrong direction (to the left) then the polarity is connected in reverse. By making just a momentary test you avoid damage to the rectifier or to the SRT-1 meter.

B. HOW TO IDENTIFY RECTIFIER CURRENT RATING

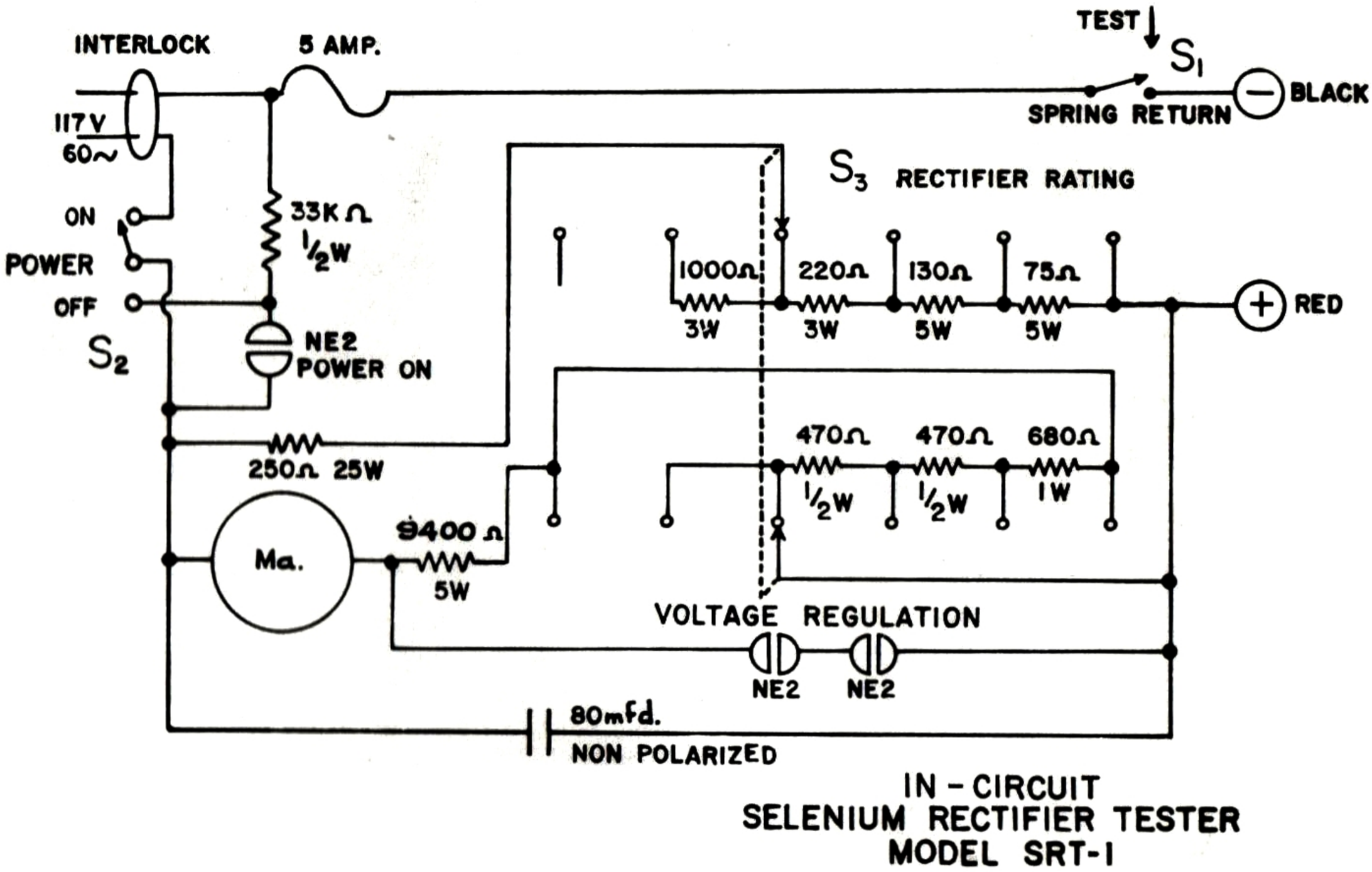
1. Most rectifiers in popular use today conform to the physical specifications in the chart below.

No. of Plates	Approximate Plate Size	Approximate Plate Spacing	Approximate Current Rating	SRT-1 Dial Setting
8	½" x ½" or smaller	close-packed	40 ma. or less	10-40 ma.
8	1" x 1" or smaller	" "	65 " " "	65-100
Tubular	½" dia. x ⅝" long	" "	40 " " "	10-40
6	1" x 1" or smaller	" "	40 " " "	10-40
6	1" x 1"	1/32" to 1/16"	65 to 100	65-100
6	1-3/16" x 1-3/16"	1/16"	150	150-200
6	1½" x 1½"	1/8"	250	250-300
6	1½" x 1½"	1/4"	300	250-300
6	1⅝" x 1⅝"	1/4"	350	350-400
6	2" x 2"	1/8"	450	450-500
6	2" x 2"	3/16"	500	450-500

2. OTHER TYPES

Many newer shapes and styles are appearing today, including the small tubular 500 ma. types, and the types with odd-shaped cooling fins. These include the germanium and silicon types. Where their rating is not indicated, the following table may be helpful. It lists the most likely current rating used for power rectifiers in various sets.

Type of Service	Typical Current Rating
Single rect., small radio	65-75 ma.
Single rect., medium-size radio	100-150 ma.
Single rect., TV Set	250-300
Double rect., TV Set	350-500



IN - CIRCUIT
SELENIUM RECTIFIER TESTER
MODEL SRT-1


CENTURY