Westinghouse

Type RX-1 Photo-Troller

Instructions for Installation

The purpose of this instruction book is to give the reader the maximum of useful information and suggestions concerning construction, installation, operation and maintenance of Westinghouse Type RX-1 Photo-Troller.

The material contained herein has been assembled with a view toward facilitating installation and operation of the equipment and this book is intended to serve as a guide to installation and operating personnel so that the maximum useful life of the apparatus can be obtained.

Westinghouse Electric Corporation
Buffalo, N. Y.

Supersedes
I.B. 5670-44-A

INDEX

LIST OF ILLUSTRATIONS

Westinghouse

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Instructions for Installation

(1) **PREFACE**

The RX-1 photo-troller is one type of a line of general purpose photo-electric relays operated by an increase or decrease in the amount of light falling on a phototube. They are arranged to initiate an electrical sequency in response to changes of illumination caused by partially or completely interrupting a light beam. A few installations are shown which are representative of the great variety of applications.

In order that maximum flexibility of application may be obtained, various types of light sources and phototube housings may be used. Several types of photo-trollers are available, each of which is best adapted for particular applications.

LIST OF APPLICATIONS

Limit or "flag" switch where a mechanical switch is undesirable such as for

Paper mills — break indicator
Automatic weighing
Sheet catcher in steel mill
Oscillating grinder belt
Paper and cellophane bag machines
Registering wrapper trademark on packaging machines
Stopping mechanical devices at accurate position
Liquid level control
Initiating flying shear
Door opening.

Counting

Parts on production lines such as crankshafts, boxes, tin sheets
People entering or leaving buildings
Automobile traffic.

GENERAL DATA

The RX-1 photo-troller is arranged with a steel panel which is hinged at the bottom of the case and held in place by one screw at the top. The indoor units are provided with a rectangular knockout in the door which may be removed to serve as a light aperture if the phototube is mounted in the cabinet.

A type SG relay is operated directly from the tube circuit. Thus, no interposing sensitive relays, such as are usually needed if radio amplifiers are used, are required. This relay has two pairs of contacts which can be arranged to give two normally closed contacts or one normally open and one normally closed contact.

The RX-1 photo-troller provides the power supply for a light source with either a 6–8 volts, 32 candlepower lamp or a 6 volt, 5 ampere lamp, Style 849085.

A terminal board is provided at the rear of the panel for all connections except to the relay contacts which are on the relay itself in front of the panel. The terminal board is readily accessible for installation, since the removal of a single screw permits swinging the panel down on hinges to hang from the bottom of the cabinet.

The type RX-1 is equipped with a phototube, an amplifier tube and a thyratron tube. The output of the WL-868 phototube is amplified by a 6SL7 tube. This output, in turn, operates a WL-629 thyratron which energizes the SG relay.

A switch is provided so that the unit may be used to energize the SG relay, when light on the phototube is either increased or decreased. For either arrangement, a minimum of 1.0 foot-candle light intensity is required to operate the relay. The light intensity must be reduced at least 50% to insure positive operation of the relay.

At least 0.2 second should be allowed between centers of light impulses, corresponding to 300 operations per minute. At this speed of operation, the 0.2 second must be divided equally between the "on" and "off" period. The maximum recommended rate of operation is 150 per minute. However, the approximate time of light change required to operate the relay is 0.05 second.

If the phototube is mounted in a separate housing, it may be located up to 25 cable feet distance, although standard housings are furnished with 10 feet of cable, which is usually sufficient. Distances beyond 10 feet slow down the speed of response 25%, and longer times than those given for operation must be allowed. The footcandle rating of the unit is then also increased to 1.5 footcandles.

(2) HOW TO SELECT AND APPLY PHOTO-TROLLERS

The first fundamental in application of photo-trollers is that it is desirable to have as much excess illumination as possible beyond that required by the rating, in order that the safety factor will be increased.

Photo-trollers operate by variation of the **quantity** of light falling on the phototube. Ratings are given in terms of light intensity for greater convenience in application, and these ratings in terms of light intensity are based on the assumption that the full phototube or lens opening of the photo-troller will be used. Therefore, if the photo-troller is used in such a manner that only a portion of the phototube or lens opening is open, proportionately greater light intensity must be allowed.

If photo-electric equipment is to be operated in the vicinity of smoke, fog, dirt, steam or other similar conditions, it is necessary to add the best possible estimate of light loss factor so that adequate safety margin will be insured.

Since photo-trollers operate by variation of the quantity of light falling on the phototube, it follows that the method of obtaining this variation is important. Two methods of varying illumination are in general use — variation of transmission and variation of reflection.

Transmission is varied by arranging an opaque, or partially opaque, object to intercept the beam of light which normally passes from light source to phototube. This is the most common method of operation and may be used for automobiles, people, paper sheets, steel sheets, packages, etc. Clear cellophane is obviously not very opaque and, therefore, does not vary the light beam much when intercepted by it. When operating with material of this nature whose opacity is not high, it is very important to know what this opacity is. Such applications are usually more difficult and it is recommended that they be referred to the nearest Westinghouse Sales Office for recommendations.

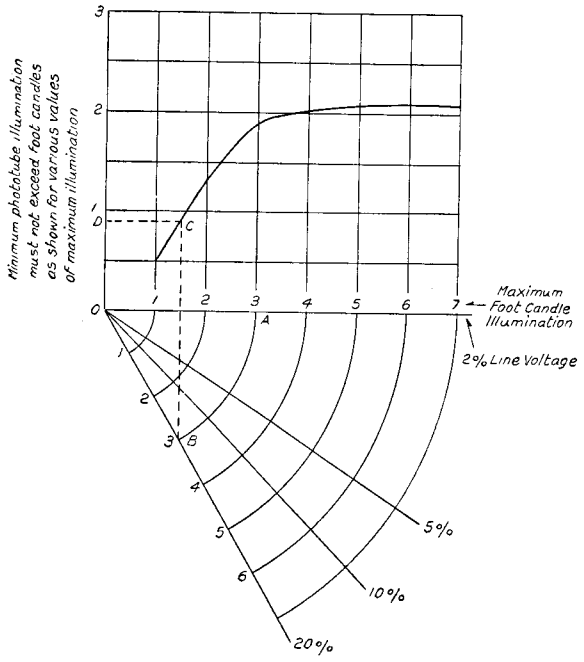

FIG. 1—CURVE SHOWING HOW MUCH THE PHOTOTUBE ILLUMINATION MUST BE DECREASED FOR VARIOUS VALUES OF A-C. LINE VOLTAGE VARIATION

Reflection is varied by arranging the optical system so that the light beam is reflected from the material to the photo-tube and the extent of this reflection is varied by the character of the surface of the material.

The actual procedure to be used in selecting the proper photo-trollers and light source is:

(1) Determine what portion of the light beam will be available under maximum illumination conditions.

(2) Determine what portion of the illumination will be intercepted by the controlling object.

(3) Select a photo-troller having the general characteristics desired, and then

(4) Select a combination of photo-troller and light source such that at the distances and operating conditions determined under paragraphs (1) and (2), adequate sensitivity will be obtained,

(5) Re-check all variable factors to make certain that adequate safety margin is proceeded in the selection.

(3) Phototube Housings

The RX-1 photo-troller is arranged so that the phototube may be mounted inside the case. When this is done the knock-out in the case door should be pressed out to permit the light to reach the phototube. In many applications it is preferable to mount the phototube in a separate housing.

(4) Various light sources except the type L, can be used with the type RX-1 phototroller. In selecting the light source care must be taken that the minimum illumination on the phototube must not exceed the values given in Fig. 1.

In this figure are shown different scales for the maximum illumination for different percentage changes in a-c line voltage. Using, for example, the

basic 2 per cent curve, it is seen that if the maximum illumination is 3 foot candles, the minimum illumination must not exceed 1.9 foot candles. If, however, the maximum line voltage variation is 20 per cent and the maximum illumination is 3 foot candles at maximum a-c voltage, then the minimum illumination 0.9 foot candles is found by following the circle from A to B, then to C and to D. By using the curves in Fig. 1 in combination with the light source curves in Fig. 2, the required percentage reduction in illumination can be determined.

Example: Light Source: Type F
Voltage Variations: 10%
Operating Distance: 30 feet

From Fig. 2 is found, 2 footcandles.

From Fig. 1, 2 footcandles at 10 per cent voltage gives 0.8 footcandles. Minimum illumination.

Consequently: The illumination must be decreased from 2 footcandles to 0.8 footcandles, or 60 percent.

(5) PRINCIPLE OF OPERATION

The RX-1 photo-troller as shown in front cover of cabinet consists essentially of two different control circuits, namely the phototube-amplifier circuit and the Thyratron control circuit.

The Phototube-Amplifier Circuit

The purpose of this circuit is merely to amplify the variations in voltage caused by changing illumination on the phototube. The circuit consists of a d-c source supplied by the rectox rectifier connected between 16 and 17. A voltage divider, consisting of a 5000 ohm potentiometer and two 22000 ohm resistors, is connected across this d-c source. The phototube circuit consists of the WL-868 phototube connected between A and C and the 10 MEGOHM resistor C-16. If the illumination on the phototube is increased, an increasing amount of current flows through the tube, thus making Lead C more positive relative to the potentiometer tap G. The voltage between C and G is the grid control voltage for the 6SL7 amplifier tube. This tube consists of a cathode connected to G, a control grid connected to C and an anode connected to 15.

Continued on Page 6

CURVES SHOWING LIGHT OUTPUT IN TERMS OF DISTANCE FROM THE LIGHT SOURCE

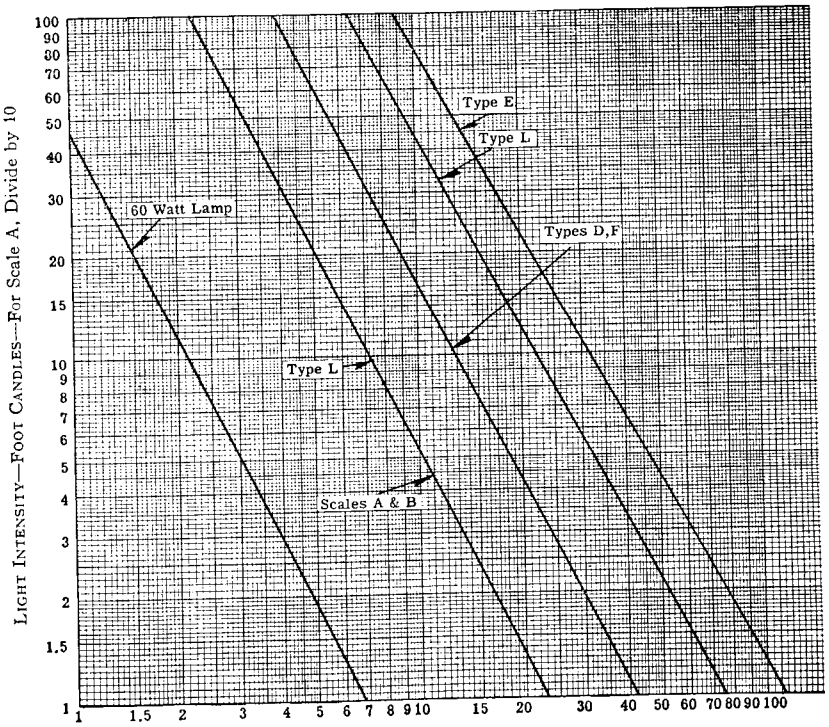

Fig. 2—Distance—Feet
For Scale B, Multiply by 10

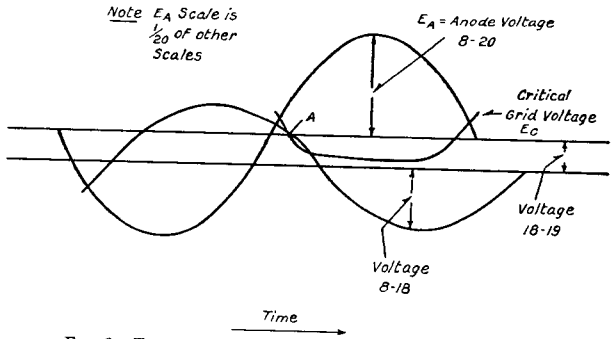

FIG. 3—THYRATRON TUBE OPERATING CHARACTERISTICS

The characteristics of the 6SL7 tube are such that the tube will pass no current if the voltage between C and G is more negative than approximately 2 volts. If the grid voltage is made less negative the current through the tube will increase and will reach its maximum value when the grid voltage is approximately zero.

When the current through the 6SL7 tube is zero the potential of 15 is positive in relation to the potential of A. As the 6SL7 current is increased the potential difference between 15 and A is decreased to zero and then again increased so that the potential of 15 becomes negative relative to the potential of A.

From the preceding discussion it may be seen that when the illumination on the phototube is low the potential of 15 is positive relative to A, whereas with the phototube highly illuminated the potential of 15 is negative relative to A.

The Thyratron Control Circuit

The WL-629 Thyratron tube consists of a heater connected to 8–10, a cathode connected to 10, an anode connected to 20 and a control grid connected to the .022 MEG resistor connecting to lead 19. The anode is connected in series with the SG relay coil to lead 7, and the cathode is connected to lead 10. When the tube becomes ionized the resistance of the tube between 20 and 10 changes from an infinite value to a low value, and rectified a-c current flows from 7 through the relay coil to 20, through the tube and to 8. The voltage between the grid and the cathode determines whether the tube conducts current or not.

If this voltage is more negative than approximately 6 volts, the tube does not become ionized, no current flows, and the SG relay is deenergized. If the grid voltage is made more positive, the tube conducts current and the relay is closed.

The control voltage for the WL-629 is a combination of a 135 degree phase shifted a-c voltage component obtained from capacitor 10–18, and a d-c component obtained from the amplifier tube circuit 15-A, and which is applied to the grid circuit 18–19 by means of the double pole reversing switch.

The control voltage characteristics for the WL-629 tube are shown in Fig. 3 in which E_c represents the critical grid voltage needed. It will be seen that when voltage 18–19 is made more positive the WL-629 tube breaks down at A at the beginning of the a-c voltage wave, and conducts current during the remainder of the half cycle.

The purpose of the reversing switch is to reverse the operation of the relay relative to the change of phototube illumination. With the switch in the "UP" position the relay is closed when the phototube is illuminated. With the switch in the "down" position the relay is energized when the phototube is dark.

INSTALLATION

(6) Mounting

Mount the photo-troller with the panel in a vertical position. If the phototube is to be mounted inside the photo-troller case, remove the knockout in the case door to permit light to reach the phototube. If the phototube is mounted in a separate housing, the housing may be mounted in any convenient position, up to 10 feet distant from the photo-troller, or 25 feet if the photo-troller is derated as outlined in paragraph 1.

The light source may be mounted in any position except that the lamp base must not be higher than the lamp filament.

(7) Temperature Limits

The photo-troller should be mounted in a location where the ambient air temperature does not exceed 110°F. If the photo-troller is mounted near furnaces or other equipment radiating an excessive amount of heat, the photo-troller should be shielded by means of a suitable shield. The maximum air temperature at the location of the phototube housing should not exceed 150°F.

(8) A-C Voltage Variations

The a-c supply voltage should be within ± 10 per cent of rated voltage. If the a-c voltage varies more than 2 per cent. total, the conditions outlined in paragraph 4 should be considered.

(9) External Connections

Connect the photo-troller as shown in front cover of cabinet, making sure that connections to terminals 1 to 4 are made as shown in the table in this figure. Connect the light source to terminals 5–6, using cable with 30 amperes capacity. When an extended photo-tube is used, do not place the photo-tube in the socket inside the case, but connect the phototube housing to terminals A-C by means of cable PDS-7415-2 as supplied with the phototube housing. Make sure that terminal A on the photo-troller terminal board is connected to terminal A in the phototube housing.

Run the cable in grounded metallic conduit, with no other leads in this conduit. The length of the phototube cable must not exceed 10 feet unless the photo-troller is derated as outlined in paragraph 1, in which case cable up to 25 feet long may be used. Do not splice the phototube cable, and use no friction tape or other types of tape at the ends of the cable.

Ground terminal G inside the photo-troller case to a waterpipe.

Run leads connecting to the relay contacts directly to the knockouts on the left hand side of the photo-troller case. Do not run relay leads across the photo-troller either in front or in rear.

(11) Operation

With the switch in "up" position the relay is closed when the phototube is illuminated. With the switch in the "down" position, the relay is closed when the phototube is dark.

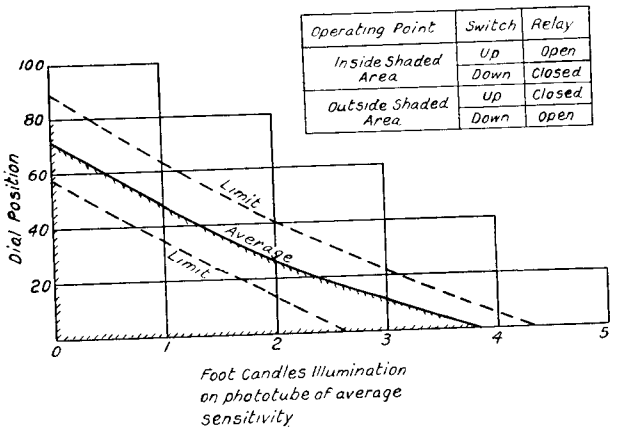

FIG. 4—CURVES SHOWING DIAL POSITION AS A FUNCTION OF PHOTOTUBE ILLUMINATION

(12) Sensitivity

With the phototube dark the relay will operate as shown in Fig. 4, when the dial of the potentiometer is approximately at position 70. With one foot-candle illumination on the phototube the dial position is approximately 45 when the relay operates, and at dial position 0 approximately 4 foot-candles are required to operate the relay. The sensitivity of the photo-troller conservatively rated, is, therefore, 1 foot-candle. Due to this high sensitivity it is preferable to limit the maximum illumination on the phototube to 10 foot-candles in order to obtain long phototube life. To obtain reliable operation the illumination on the phototube when the light intensity is minimum should not exceed the values as indicated in Fig. 1.

The location of the curves vary considerably with varying phototube sensitivity as shown by the upper and lower limit curves in Fig. 4.

(10) Relay Characteristics

Contact Interrupting Capacity

	110 Volts A-C	220 Volts A-C	440 Volts A-C	125 Volts D-C	250 Volts D-C
One "Make"	20	12	7	2	0.7
One "Break"	10	6	3	1	0.4
*Two "Make" in series	30	20	10	3	1.

*Reverse left hand stationary contact.

Note: Two "Break" Contacts cannot be used.

Contact Carrying Capacity

One "make" contact: 12 amp. continuous.
One "break" contact: 6 amp. continuous.

Operations per Minute

Maximum 300. Recommended 150. (See paragraph 1.)

(13) **Adjustments:**

(1) Turn on power and allow unit to warm up 5 minutes.

(2) Focus light source.

(3) With phototube entirely dark turn potentiometer until relay operates. The dial position should now be approximately 70.

(4) With maximum a-c supply voltage and minimum illumination on the phototube adjust the dial until the relay operates. Observe dial position D max. If necessary reduce the illumination by throwing the light beam out of focus so that D max. is not less than 40. With minimum a-c supply voltage and maximum illumination on the phototube cut off ½ of the light by means of an opaque object in front of the phototube, and adjust the dial until the relay operates. Read the dial position D min. To assure reliable operation, D minimum should be at least 15 divisions less than D maximum. If 15 divisions are not obtained the intensity of illumination must be increased by moving the light source nearer the phototube, or the difference between maximum and minimum illumination must be increased. If, with one-half of maximum illumination, it is not possible to obtain relay operation, it is recommended that the illumination be decreased until the relay operates with the dial at the 0 position.

WHAT TO DO IF THE PHOTO-TROLLER DOES NOT OPERATE SATISFACTORILY

(14) **General Tests**

(a) Make sure that terminal G is grounded to a water pipe.

(b) Disconnect the ground wire from terminal G and measure by means of a Megger the resistance between terminal G and ground. This resistance should be 20 MEGOHMS or higher.

(c) Inspect the tubes to see that the filaments are heated.

(d) Make sure that the cable to the phototube housing is in a grounded metallic conduit with no other leads in the conduit.

(e) Make sure that terminal A on the terminal board is connected to terminal A in the phototube housing.

(f) Measure, by means of a d-c voltmeter with resistance 1000 ohms per volt, the voltage across 16–17. This voltage should be approximately 120 volts.

(15) **Special Tests**

I. The WL-629 tube does not break down.

(a) Replace the WL-629 tube.

(b) Measure the a-c voltage between 10 and 20. This voltage should be approximately 190 volts.

(c) Connect a clip lead between 8 and 19. If the tube breaks down with this clip lead connected, but does not break down without the clip lead connected the trouble is either in the reversing switch or in the amplifier tube circuits.

(d) Check amplifier circuit as outlined in III.

II. The WL-629 tube breaks down regardless of phototube illumination or potentiometer position.

(a) Replace the WL-629 tube.

(b) Check to see that the circuit from 18, through the switch to 19 to grid is not open.

(c) Check the amplifier circuit as outlined in III.

III. Amplifier circuit does not operate properly.

(a) Remove the phototube from its socket and insert a milliampere meter in lead 15.

Adjust the potentiometer to position 100. The current through the milliampere meter should now be 0.3 MA or more. Turn the potentiometer towards zero. The current should now decrease and should be less than 0.05 MA with the potentiometer in position 40. If this condition is not obtained make the following tests:

(b) Replace the 6SL7 amplifier tube.

(c) Measure the voltage across the potentiometer. This voltage should be approximately 12 volts. Use a d-c voltmeter with resistance 1000 ohms per volt for this test.

(d) Inspect circuit 16-C to see that the circuit is not open, and that C is not grounded.

(e) Make sure that resistor 15–17 is not open.

IV. The SG relay does not open when de-energized.

(a) Inspect resistor 10-20 to see that this resistor is not open.

(b) Inspect to see that the relay leads do not rub against the armature.

V. The sensitivity is lower than when the equipment was originally installed.

(a) Clean lens in light source.

(b) Replace the lamp in the light source.

(c) Replace the phototube and the amplifier tube.

(d) Inspect the phototube housing to see that there is no leakage between terminals A and C or between the terminals and ground.

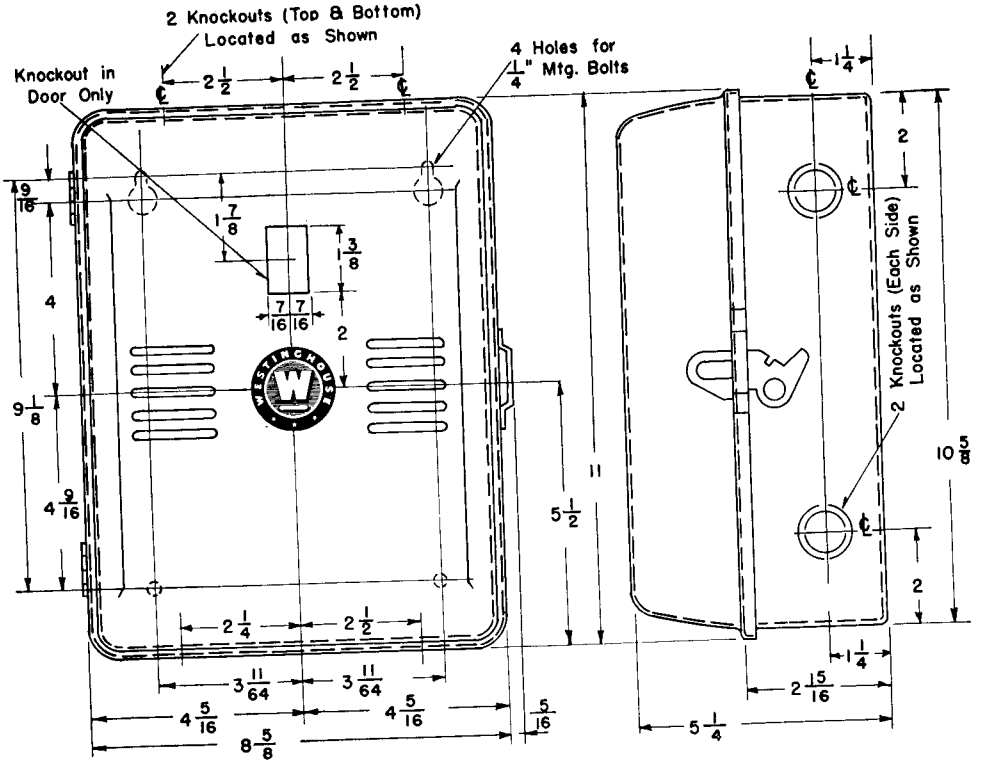

FIG. 5—OUTLINE DRAWING FOR 60 CYCLE

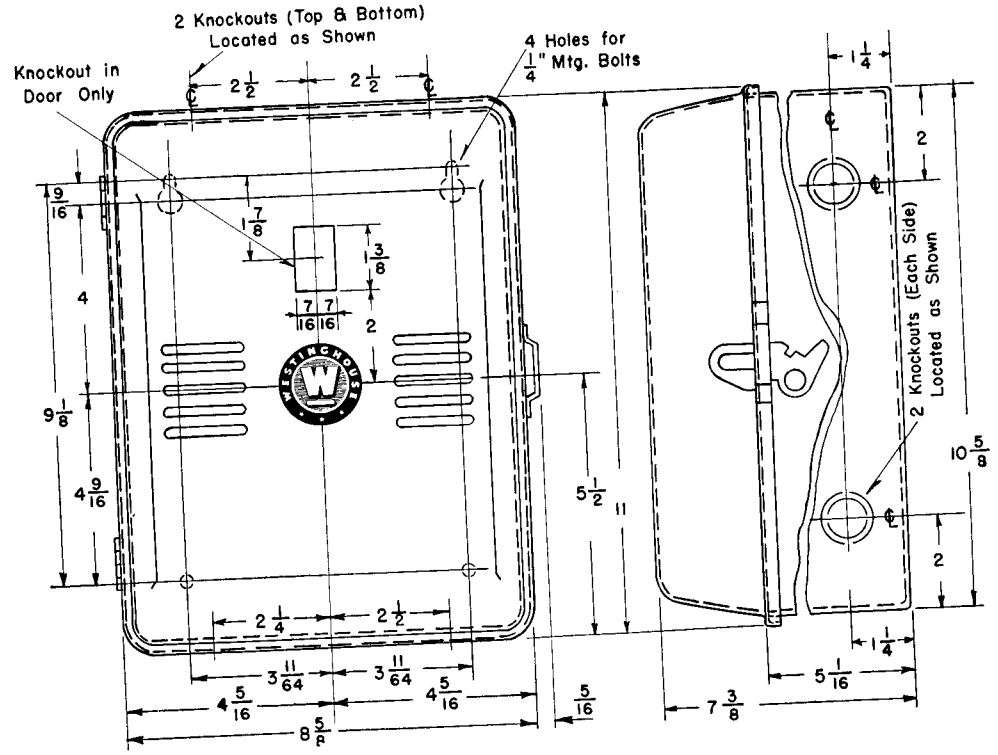

FIG. 6—OUTLINE DRAWING FOR 25 CYCLE

(16) Spare Tubes

1 — Phototube WL-735.
1 — RCA-57 Amplifier Tube.
1 — WL-629 Thyratron Tube.

(17) RENEWAL PARTS

Part	Style
4 Prong Socket	1039847
5 Prong Socket	1073482
8 Prong Socket	1405438
Shield	1073478
Capacitor 0.001 MF	1039933
Capacitor 0.01 MF	1039935
Capacitor 2 MF	1039932
Rectox Rectifier	1039843
Relay 60 cycle	1003884
Relay 25 cycle	1009786
Potentiometer 5000 ohms	1249080
Potentiometer Dial	869654
Switch	966576
Resistor 1000 ohms	1250332
22000 ohms	1496899
0.1 MEGOHMS	1496903
0.22 MEGOHMS	1496886
10 MEGOHMS	1441770
Transformer 115/230 volts, 60 cycles	1039904
220/440 volts, 60 cycles	1039905
115/230 volts, 25 cycles	1039906
220/440 volts, 25 cycles	1039907

MEMORANDUM

WESTINGHOUSE ELECTRIC CORPORATION

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TULSA 3, OKLA., 619 S. Main St.
UTICA 1, N. Y., 113 N. Genesee St.
WASHINGTON 6, D. C., 1625 K St., N.W.
WATERLOO, IOWA, 300 West 3rd St.
WHEELING, W. VA., 1803 Eoff St., P.O. Box 329
WICHITA 2, KANSAS, 301 South Market St.
WILKES-BARRE, PA., 267 N. Pennsylvania Ave.
WILLIAMSPORT 1, PA., 348 W. Fourth St.
WORCESTER 8, MASS., 507 Main St.
YORK, PA., 11 W. Market St., P.O. Box 1466
YOUNGSTOWN 3, OHIO, 25 E. Boardman St.

MANUFACTURING AND REPAIR DEPARTMENT OFFICES

ATLANTA 2, GA., 1299 Northside Drive, N. W., P.O. Box 4808
AUGUSTA, MAINE, 9 Bowman St.
BALTIMORE 24, MD., 4015 Foster Ave.
BATON ROUGE, LA., 555 Choctaw Drive
BOSTON 27, MASS., 235 Old Colony Ave., So. Boston
BRIDGEPORT 8, CONN., 540 Grant St.
BROOKLYN 6, N. Y., 1 Harrison Pl. (Windsor)
BUFFALO 10, N. Y., 1132 Seneca St.
CHARLOTTE 1, N. C., 210 East Sixth St.
CHICAGO 9, ILL., 2211 W. Pershing Road, P.O. Box 1103, Zone 90
CINCINNATI 2, OHIO, 207 West Third St.
CLEVELAND 2, OHIO, 5901 Breakwater Ave.
DENVER 4, COLORADO, 988 Cherokee St.
DETROIT 31, MICH., 5757 Trumbull Ave., P.O. Box 828
EL PASO, TEXAS, 450 Canal St.
EMERYVILLE 8, CALIF., 5915 Hollis St.
FAIRMONT, W. VA., 10th and Beltline, P.O. Box 1147
HOUSTON 10, TEXAS, 5730 Clinton Dr.
HUNTINGTON 1, W. VA., 1029 Seventh Ave., P.O. Box 1150
INDIANAPOLIS 2, IND., 551 West Merrill St., P.O. Box 1535
JOHNSTOWN, PA., 107 Station St.
LOS ANGELES, CALIF., 3383 E. Gage Ave., Huntington Park
MILWAUKEE 3, WIS., 424 North Fourth St.
MINNEAPOLIS 13, MINN., 2303 Kennedy St., N.E.
NEWARK 1, N. J., Haynes Ave. & Lincoln Hwy.
PHILADELPHIA 4, PA., 3001 Walnut St.
PITTSBURGH 8, PA., 543 N. Lang Ave.
PORTLAND 12, ORE., 626 North Tillamook St.
PROVIDENCE 3, R. I., 16 Elbow St.
ST. LOUIS 10, MO., 1601 S. Vandeventer Ave.
SALT LAKE CITY 7, UTAH, 346A Pierpont Ave.
SEATTLE 4, WASH., 3451 East Marginal Way
SPRINGFIELD 1, MASS., 395 Liberty St.
SUNNYVALE, CALIF. (Sunnyvale Plant)
SYRACUSE 4, N. Y., 700 W. Genesee St.
UTICA 1, N. Y., 113 N. Genesee St.
WILKES-BARRE, PA., 267 N. Pennsylvania Ave

DISTRICT ENGINEERING AND SERVICE DEPARTMENT OFFICES

ATLANTA 2, GA., 1299 Northside Drive, N.W., P.O. Box 4808
BALTIMORE 2, MD., 118 E. Lombard St.
BALTIMORE 3, MD., 3601 Washington Blvd. (Ind. Electronics Div.)
BLUEFIELD, W. VA., 704 Bland St., P.O. Box 848
BOSTON 10, MASS., 10 High St.
BRIDGEPORT 8, CONN., 540 Grant St.
BUFFALO 3, N. Y., Ellicott Square Bldg.
CHARLOTTE 1, N. C., 210 East Sixth St.
CHICAGO 6, ILL., 20 N. Wacker Drive, P.O. Box B, Zone 90
CINCINNATI 2, OHIO, 207 West Third St.
CLEVELAND 13, OHIO, 1370 Ontario St.
DALLAS 1, TEXAS, 209 Browder St.
DENVER 2, COLORADO, 910 Fifteenth St.
DES MOINES 8, IOWA, 1400 Walnut St.
DETROIT 31, MICH., 5757 Trumbull Ave., P.O. Box 828
DULUTH 2, MINN., 10 East Superior St.
EL PASO, TEXAS, Oregon and Mills Sts.
GRAND RAPIDS 2, MICH., 148 Monroe Ave., N.W.
HOUSTON 2, TEXAS, 1314 Texas Ave.
HUNTINGTON 1, W. VA., 1029 Seventh Ave., P.O. Box 1150
INDIANAPOLIS 9, IND., 137 S. Pennsylvania St.
KANSAS CITY 6, MO., 101 W. Eleventh St.
LOS ANGELES 13, CALIF., 420 S. San Pedro St.
LOUISVILLE 2, KY., 332 West Broadway
MEADVILLE, PA., P.O. Box 465 (Ind. Heating—T & G Div.)
MEMPHIS 3, TENN., 130 Madison Ave., Exchange Bldg.
MILWAUKEE 2, WIS., 538 N. Broadway
MINNEAPOLIS 13, MINN., 2303 Kennedy St., N.E.
NEW ORLEANS 13, LA., 238 South Saratoga St.
NEW YORK 5, N. Y., 40 Wall St.
NORFOLK 10, VA., 915 W. 21st St.
PHILADELPHIA 4, PA., 3001 Walnut St.
PHOENIX, ARIZ., 11 West Jefferson St.
PITTSBURGH 30, PA., 306 4th Ave., Box 1017
PORTLAND 4, OREGON, 309 S.W. Sixth Ave.
PROVIDENCE 3, R. I., 16 Elbow St.
RICHMOND 19, VA., 1110 East Main St.
ST. LOUIS 1, MO., 411 North Seventh St.
SALT LAKE CITY 1, UTAH, 235 W. South Temple St.
SAN DIEGO 1, CALIF., 861 Sixth Ave.
SAN FRANCISCO 8, CALIF., 410 Bush St.
SEATTLE 4, WASH., 3451 East Marginal Way
SPOKANE 8, WASH., 1023 W. Riverside Ave.
SPRINGFIELD 3, MASS., 26 Vernon St.
SYRACUSE 4, N. Y., 700 W. Genesee St.
TOLEDO 4, OHIO, 245 Summit St.
UTICA 1, N. Y., 113 N. Genesee St.
WASHINGTON 6, D. C., 1625 K Street, N.W.
WILKES-BARRE, PA., 267 N. Pennsylvania Ave.
YOUNGSTOWN 3, OHIO, 25 E. Boardman St.