# INSTRUCTION MANUAL

*for*

# No. 5B TEST SET


## THE LIONEL CORPORATION

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APPROVED SERVICE STATIONS IN THE PRINCIPAL CITIES, UNITED STATES AND CANADA

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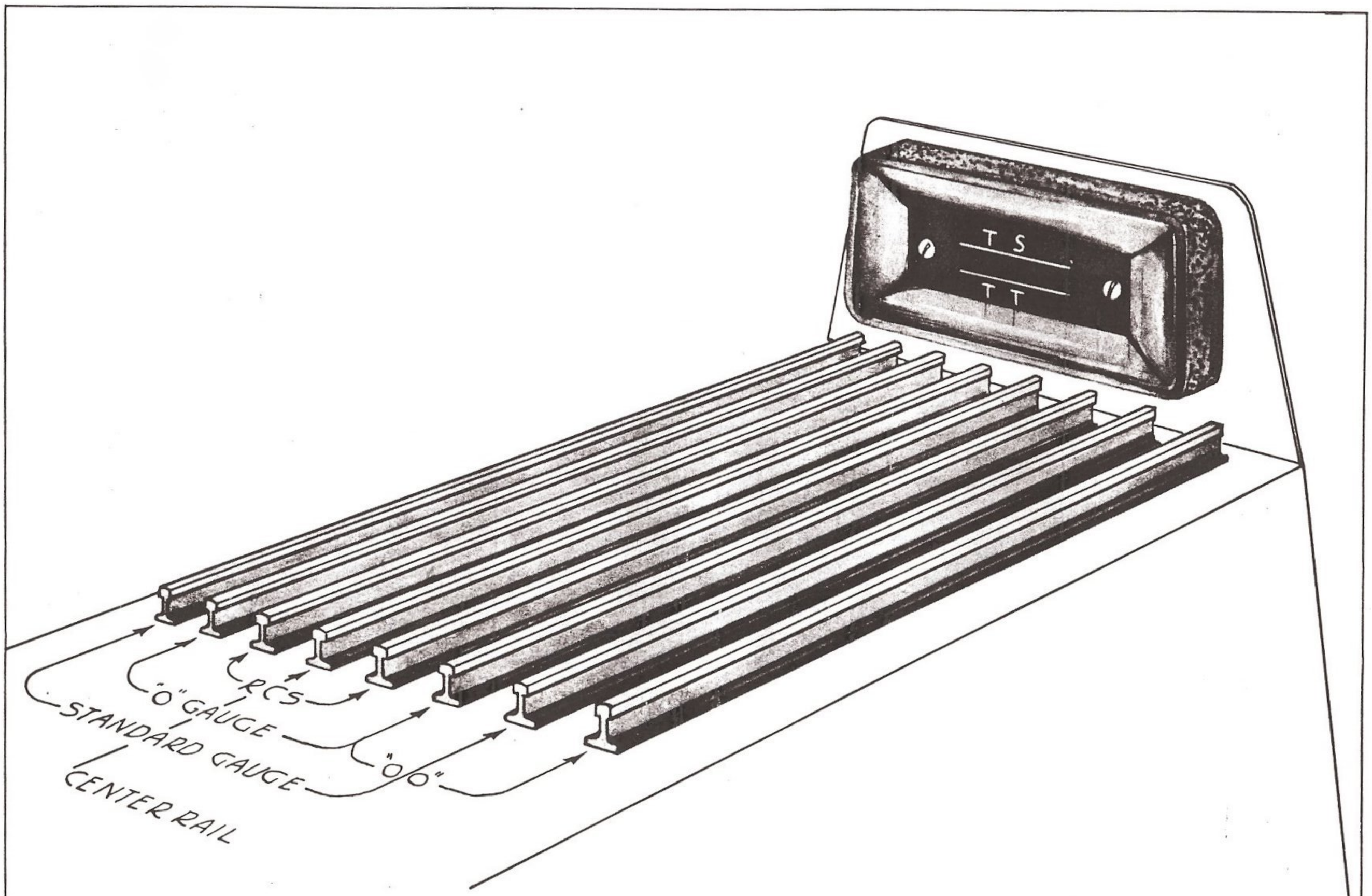
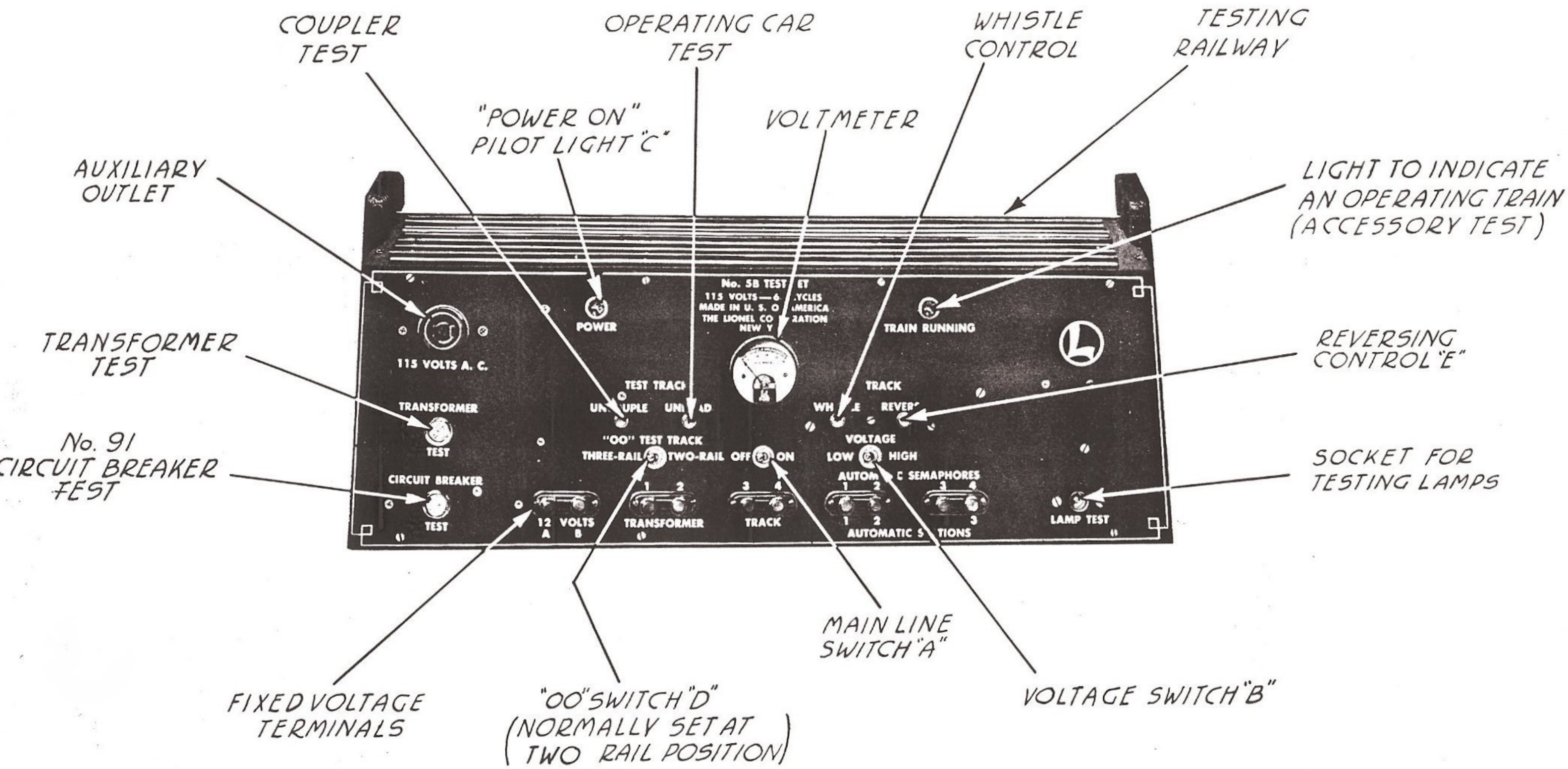



FIGURE 2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A
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TRACK
AUTOMATIC SEMAPHORES
AUTOMATIC STATIONS
LAMP TEST

FIGURE 1

## INSTALLATION

Connect No. 5B Test Set to current supply of 110-120 Volts, 50-60 Cycles, AC. The No. 5B-220 Test Set must be used on 220 Volts, 50 Cycles, AC only.

Plug the line cord into the nearest wall outlet having the rating specified on test panel.

The outlet in the upper left hand corner of the panel may be used as an auxiliary outlet for soldering iron, transformer or other electrical equipment. This outlet is independent of the rest of the set and can only be used when the line cord is connected. The voltage of the auxiliary outlet is the same as the main line.

Six Test Leads with attached clips are supplied with each instrument.

## SWITCH

Toggle Switch, indicated as "A" in Figure 1, controls the current to the Test Set.

## CIRCUIT BREAKER

This set has built-in, automatic, thermal circuit breaker to protect the instrument from damage when testing defective equipment. A short time interval occurs before breaker operates, and likewise before power comes on again. The circuit breaker not only cuts off the main line automatically, but also the "Power" pilot light, indicated as "C" in Figure 1.

## TEST TRACK

The test track has eight rails where all Lionel locomotives, tenders, and electric operating cars can be tested. The ends of these rails are protected with rubber bumpers and also have gauges for checking standard coupler heights.

Test track is connected to a built-in transformer and whistle controller

and is simply a small track layout combining all gauges and the RCS and No. 1019 remote control track sections.

The voltage applied to the rails may be changed to "Low" or "High" by means of voltage switch "B" located on the test panel.

Figure 2 shows the arrangement of the rails for the various gauges. Since the second and third rails are used for the "OO" as well as the "O" Gauge and Standard Gauge, a switch ("OO" Test Track) is provided to make the necessary changes.

CAUTION--WHEN USING THE TEST TRACK FOR OTHER THAN THREE-RAIL "OO" GAUGE, "OO" TEST TRACK SWITCH SHOULD BE IN THE TWO-RAIL POSITION.

Move Power Switch "A" to "OFF" position before placing any car, locomotive or tender on the test tracks, then snap "ON" again when all wheels are on rails. To avoid short circuits, exercise care when placing cars on track.

## "0-27", "O" GAUGE & STANDARD GAUGE LOCOMOTIVES

1. Set "OO" Gauge Switch ("D" in Figure 1) to the two-rail position.

2. Place locomotive on test track and snap Power Switch "ON".

3. Set Voltage Switch at LOW for "O" Gauge Locomotives and HIGH for Standard Gauge Locomotives. (Larger "O" Gauge equipment such as No. 700 and No. 763 Locomotives and No. 752W Power Cars may require HIGH voltage).

4. Check headlight and firebox lamps.

5. Set "E" Unit lever of locomotive to the "ON" position. Press "REVERSE" button on test panel. Every time the button is pressed, the "E" Unit should change the motor connections in this order: forward, stop, reverse, stop, forward, etc. If the locomotive does not operate in this manner, either the motor or "E" Unit is defective.

Switching locomotives having jacks in the cab for tender connections are grouped and tested as follows:

No. 201, 232, 233 and 1663 ("O" Gauge and "O-27" having three jacks)

1. Set "OO" Gauge Switch ("D" in Figure 1) to the two-rail position.

2. Place locomotive on test track facing left bumper and snap Power Switch "ON".

3. Set Voltage Switch at "LOW".

4. Check headlight.

5. Connect two test leads to "Transformer" binding posts No. 1 and 2 on panel.

6. Touch right-hand jack with No. 2 lead and a spark will be seen, but do not hold No. 2 lead against the jack.

7. Touch center jack with No. 1 lead and the reversing unit will operate provided the reversing unit lever is set in the "ON" position.

8. Touch left-hand jack with No. 1 lead and the front coupler hood will lift.

No. 203, 227, 228, and 1662 ("O" Gauge and "O-27" with two jacks)

Repeat steps outlined for No. 201 locomotive. Since these locomotives have but two jacks, step No. 7 is omitted.

No. 230 and No. 231(One-Jack)

Repeat steps outlined for No. 201 locomotive. Since these locomotives have but one jack, stepsNo. 7 and 8 are omitted.

## TABLE NO. 1

The following table should be used when checking the standard height of electric couplers on Lionel "0" Gauge and "0-27" cars and tenders. All passenger, freight cars and tenders are made in two sizes: "TS" and "TT". The "TS" size is generally used on all "0" Gauge equipment and the "TT" on the small cars used in the "0-27" outfits and frequently in the lower-priced "0" Gauge line. The testing gauges are located at the bumper ends of the test rails on top of the set and are clearly marked "TT" and "TS".

The necessity of lining up the coupler points is to insure that cars of the same type couple and uncouple with one another freely. The car to be checked is placed on the track and the point of the coupler hook lined up with the proper gauge. A simple hand-tool operation is the only adjustment required.

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## CORRECTION

Please correct the table below by interchanging the locomotives listed under "TS" for those under "TT".

No. 201 to 1663 inclusive are equipped with "TT" style couplers. No. 228 and 233 have "TS" height.

| "TS" COUPLERS | | | "TT" COUPLERS | | |
|---|---|---|---|---|---|
| FREIGHT | PASSENGER | TENDERS | FREIGHT | PASSENGER | TENDERS |
| 2810 | 2600 | 2226W | 2620 | 2630 | 2201T |
| 2811 | 2601 | 2228B | 2651 | 2631 | 2201B |
| 2812 | 2602 | 2228T | 2652 | 2640 | 2203T |
| 2813 | 2613 | 2231B | 2653 | 2641 | 2203B |
| 2814 | 2614 | 2231T | 2654 | LOCOMOTIVES | 2224T |
| 2814R | 2615 | 2245T | 2655 | | 2224W |
| 2815 | LOCOMOTIVES | 2245W | 2656 | 228 | 2225T |
| 2816 | | 2250W | 2657 | 233 | 2225W |
| 2817 | 201 | 2263W | 2659 | | 2226WX |
| 2820 | 203 | 2265T | 2660 | | 2227T |
| 3811 | 227 | 2265W | 2677 | | 2227B |
| 3814 | 232 | | 2679 | | 2230T |
| 3859 | 1662 | | 2630 | | 2230B |
| | 1663 | | 2682 | | 2232T |
| | | | 2954 | | 2232B |
| | | | 2955 | | 2235T |
| | | | 2956 | | 2235W |
| | | | 2957 | | 2689T |
| | | | 3651 | | 02689W |
| | | | 3652 | | |
| | | | 3659 | | |

## TESTING POWER CARS

Follow the same procedure for testing power cars with built-in whistle as for testing locomotives and whistle tenders separately.

### "O-27", "O" GAUGE & STANDARD GAUGE WHISTLE TENDERS

1. Set Voltage Switch at HIGH.
2. Press WHISTLE button on test panel and the whistle should blow.
3. Check height of coupler point with gauge. See Table No. 1.
4. In checking the whistle in some tenders it may be necessary to press the "Whistle" button only part way.

### "OO" GAUGE TWO-RAIL LOCOMOTIVES

1. Snap "OO" Switch to Two-Rail position.
2. Place locomotive on "OO" test rails, FACING THE LEFT BUMPER.
3. Set Voltage Switch "LOW" and Power Switch "ON".
4. Connect a test lead to No. 1 post of transformer terminals, and touch other end to jack in cab of locomotive. Every time contact is made with jack, the "E" Unit changes the motor connections in this order: forward, stop, reverse, stop, etc.

### "OO" GAUGE THREE-RAIL LOCOMOTIVES

1. Set "OO" switch to Three-Rail position.
2. Place locomotive on "OO" test rails.
3. Set Voltage Switch "LOW" and Power Switch "ON".
4. Check as for "O" Gauge and Standard Gauge locomotives making certain that "E" Unit switch screw is tight.

### "OO" GAUGE TWO-RAIL WHISTLE TENDERS

1. Set "OO" switch to Two-Rail position.
2. Place tender on "OO" test rails, facing right hand bumper.

3. Set Voltage Switch at "LOW" and Power Switch at "ON".

4. Hold plug to draw bar, press WHISTLE button on test panel and the whistle should blow.

## "OO" GAUGE THREE-RAIL WHISTLE TENDERS

1. Set "OO" Switch to the Three-Rail position.

2. Place tender on "OO" test rails.

3. Set Voltage Switch at "LOW" and Power Switch at "ON".

4. Press WHISTLE BUTTON on the test panel.

## SWITCHING TENDERS
## No. 2201T, 2201B, 2232T, 2232B and 2233B (Three Plugs)

The "T" model is the same as the "B" model except the bell and associated equipment are omitted.

1. Set "OO" Gauge Switch ("D" in Figure 1) to the Two-Rail position.

2. Place tender on test track facing left bumper and snap Power Switch "ON".

3. Set Voltage Switch at LOW.

4. Touch right plug to center rail, the light will go on and the bell will ring (provided the bell switch is in the "ON" position).

5. Repeating No. 4 and touching center plug (green lead wire) to outside rail, the light will blink and bell ring as the whistle button is pressed in and out.

6. Touch right-hand plug to center rail and the coupler head will lift.

7. Press "Uncouple" button and the coupler head will lift.

No. 2203T, 2203B, 2227T, 2227B, 2228T and 2228B, (Two Plugs)

Repeat steps outlined for No. 2201T and 2201B Tenders. Since these tenders have but two jacks, steps No. 5 and 7 are omitted.

Note: Any of these tenders having a center rail roller, in place of step No. 4, touch right hand plug to outside rail and a spark will be seen.

No. 700W, 2230T, 2230B, 2231T, 2231B, (One Plug)

Repeat steps outlined for No. 2201T and 2201B Tenders. Since these tenders have but one plug, steps No. 5 and 6 are omitted.

TESTING CARS WITH LIGHTS

1. To test Pullman Cars, Floodlight Cars and other illuminated cars for lights, collector shoes and lamp switches, set "OO" Test Track Switch in the Three-Rail position and place car on Test Track.

2. Set Voltage Switch at "LOW" and Power Switch at "ON".

3. Check height of coupler point with gauge.

REMOTE CONTROL COUPLERS AND ELECTRIC, OPERATING CARS

1. To test cars with electric couplers, set the "OO" Test Track Switch in the Three-Rail position and place the car on test track.

2. Set the Voltage Switch at "LOW" and the Power Switch at "ON".

3. Press the button on panel marked "UNCOUPLE" and the coupler heads on car should lift.

4. For electric, remote control operating cars, press the button marked "UNLOAD". The No. 3814 Merchandise Car is operated by a sequence and therefore the button must be pressed six times to complete the sequence. Cars should operate in accordance with instructions packed with each car.

5. Check height of coupler points with gauge.

## TESTING TRANSFORMERS

1. To test transformers for "shorts", set the Power Switch at "ON" and the Voltage Control switch at "HIGH".

2. Attach two leads to terminals marked "TRANSFORMER" on test panel and touch to the prongs of the transformer plug. A spark indicates the transformer is shorted. Do not plug into an outlet as you may blow a fuse.

3. To check the transformer secondary voltages, connect two leads from the terminals marked "TRACK" on test panel to any combination of two binding posts on the transformer. The voltmeter reading should be approximately the same as the voltage shown on the nameplate of the transformer. Then check the various other binding post combinations in the same way.

## TESTING NO. 91 CIRCUIT BREAKER

1. To test No. 91 Circuit Breaker, set Circuit Breaker on test panel to the "ON" position.

2. Connect one lead from each of the 12-Volt terminals "A" and "B" on test panel to binding posts "A" and "LOW" on the No. 91 Circuit Breaker.

3. Set lever on No. 91 Circuit Breaker at "ON". <u>If adjusted properly, the circuit breaker will not trip</u>.

4. Press button marked "91 TEST" on test panel to trip Circuit Breaker causing the red warning lamp on the Circuit Breaker to light.

5. Move the clip from the "LOW" position to "HIGH" on the Circuit Breaker.

6. Repeat No. 3 and No. 4.

## TESTING WHISTLE CONTROLLERS
## No. 65, 66, 67, 166 & 166X

1. To test these Controllers, connect terminals marked "TRANSFORMER" and "TRACK" on test panel to the corresponding terminals on Whistle Controller.

2. Set Power Switch on test panel at "ON" and Voltage Control switch at "HIGH". Note reading on voltmeter which should be approximately 17 volts.

3. Press center button on Whistle Controller marked "REVERSE". The indicator on the voltmeter should drop to zero. Release button and indicator will return to approximately 17 volts.

4. Press the two outside buttons on Whistle Controller simultaneously and whistle within the test set will blow. Release the two buttons and whistle will stop.

5. Press the two outside buttons and then slowly release the left button, marked No. 1. The indicator on voltmeter will drop slightly as the finger is removed and then rise again to its normal voltage.

## NO. 167 & 167X CONTROLLERS

1. Connect the "TRANSFORMER" No. 2 to "TRACK" post No. 3, then connect "TRANSFORMER" post No. 1 to either binding post of the Controller, next connect "TRACK" post No. 4 to the remaining binding post on the Controller.

2. Set Power Switch on test panel at "ON" and Voltage Switch at "HIGH". Note the reading on voltmeter which should be approximately 17 volts.

3. Press "REVERSE" button on Controller and voltmeter indicator should drop to zero. Release button and the indicator will return to approximately 17 volts.

4. Press "WHISTLE" button on Controller and the whistle within the test set should blow. When the button is released the whistle should stop.

## TESTING NO. 1030, NO. 1040 and NO. 1041 WHISTLE CONTROL TRANSFORMERS

1. Connect the terminals marked "TRACK" to the two terminals on transformer and move sliding lever on transformer to the "OFF" position.

2. Plug the transformer cord into the 110 volt receptacle on the panel.

3. Move the transformer control lever from "OFF" to the "HIGH" position. Note the reading on the voltmeter which should vary from approximately 7 to 12 volts as the lever is moved.

4. On No. 1041 Transformer, connect the "TRACK" terminals to either the "A" and "U" or the "B" and "U" posts and check for voltage specified on instruction sheet.

5. With transformer lever at "HIGH", press "TRANSFORMER TEST" button on panel and the red whistle control button on transformer. The whistle in the test set should blow.

## TESTING NO. 1230 AND 1241 WHISTLE CONTROL TRANSFORMERS

The No. 1230 and No. 1241 Transformers can be tested only on a No. 5B (220 volt 50-60 cycles) Test Set.

Test the same as for the No. 1030 and 1041 Whistle Control Transformers.

## NO. 82N TRAIN CONTROL

The built-in test circuit simulates in every respect the running of a train around an average size layout. The operation of a train is indicated by the pilot light marked "Train Running."

1. To test the 82N Train Control, connect wires marked No. 1, No. 2, No. 3, and No. 4 on accessory to the corresponding terminals on test panel.

2. Set Power Switch at "ON" and the lamp on the Semaphore will light.

3. Set the control lever on the 82N to the "CONTINUOUS" position and the illuminated indicator on the test panel marked "TRAIN RUNNING" will light. After a short interval the "TRAIN RUNNING" light will blink, and the semaphore arm will momentarily raise for a moment then return to its horizontal position.

4. Move the control lever from the "CONTINUOUS" to the "SLOW" position. After a short interval, the "TRAIN RUNNING" light will go out, and remain out

until the thermostat has heated up. Allow one or two minutes for the accessory to warm up. After this period the "TRAIN RUNNING" light will come on and the semaphore arm will rise to a vertical position. After a short interval, the light goes out and the arm drops to its horizontal position.

5. Move the control lever from the "SLOW" to "FAST" position. The sequence will then be the same as for the "SLOW" adjustment except the intervals will be much shorter.

## NO. 99N TRAIN CONTROL

1. To check the No. 99N Train Control connect the wires marked No. 1, No. 2, No. 3, and No. 4 to the corresponding terminals on the test panel.

2. Move the control lever to "CONTINUOUS" and the Power Switch to "ON". The amber light on the 99N and the "TRAIN RUNNING" light on the panel will go on. After a short interval the "TRAIN RUNNING" light flickers, the amber light goes out and the green light comes on. After another short interval, the green light goes out and the amber light returns.

3. Move the control lever to "SLOW" and the "TRAIN RUNNING" light will go out and the red light on the 99N comes on. After the thermostat heats up, the red light goes out and the green light and "TRAIN RUNNING" light come on. A moment later, the amber light replaces the green light. After another brief interval, both lights go out and the red light of the 99N returns.

## NO. 80N SEMAPHORE

1. To test No. 80N Semaphore, connect the No. 2 and No. 3 wires to the terminals marked "TRANSFORMER" on test panel, and set Voltage Control switch at "HIGH".

2. Set Power Switch at "ON" position and lamp in the No. 80N will light.

3. Touch the No. 1 wire to the No. 3 wire and the semaphore arm will rise. Remove the No. 1 wire and the arm drops down to its horizontal position.

## AUTOMATIC TRAIN CONTROL STATIONS

1. To check these stations, connect the wires marked No. 1, No. 2, and No. 3 to the corresponding terminals on the test panel.

2. Move the control lever to "CONTINUOUS" and the Power Switch to "ON". "TRAIN RUNNING" light on the panel will then flash on. After a short interval, the "TRAIN RUNNING" light flickers and goes on again.

3. Move the control lever to "SLOW" and the "TRAIN RUNNING" light will go out. After the thermostat heats up, the "TRAIN RUNNING" light will go on.

## TESTING FIXED VOLTAGE ACCESSORIES

Use the two terminals marked "A" and "B" on the test panel to test all Fixed Voltage accessories such as lamp posts, traffic signals, crossing accessories of the No. 45N, 47, 69N, 76, 77N, 79, 152, 153, 154 and 1045 type, No. 96 and 97 Coal Elevators, and No. 48W Whistle Station.

All these accessories should operate satisfactorily on 12 volts, except No. 76 and 152 which take slightly less voltage for best operation.

## TESTING NO. 168, 169 and 169X CONTROLLERS

1. Connect lead from one of the terminals marked "TRANSFORMER" to one of the terminals marked "TRACK".

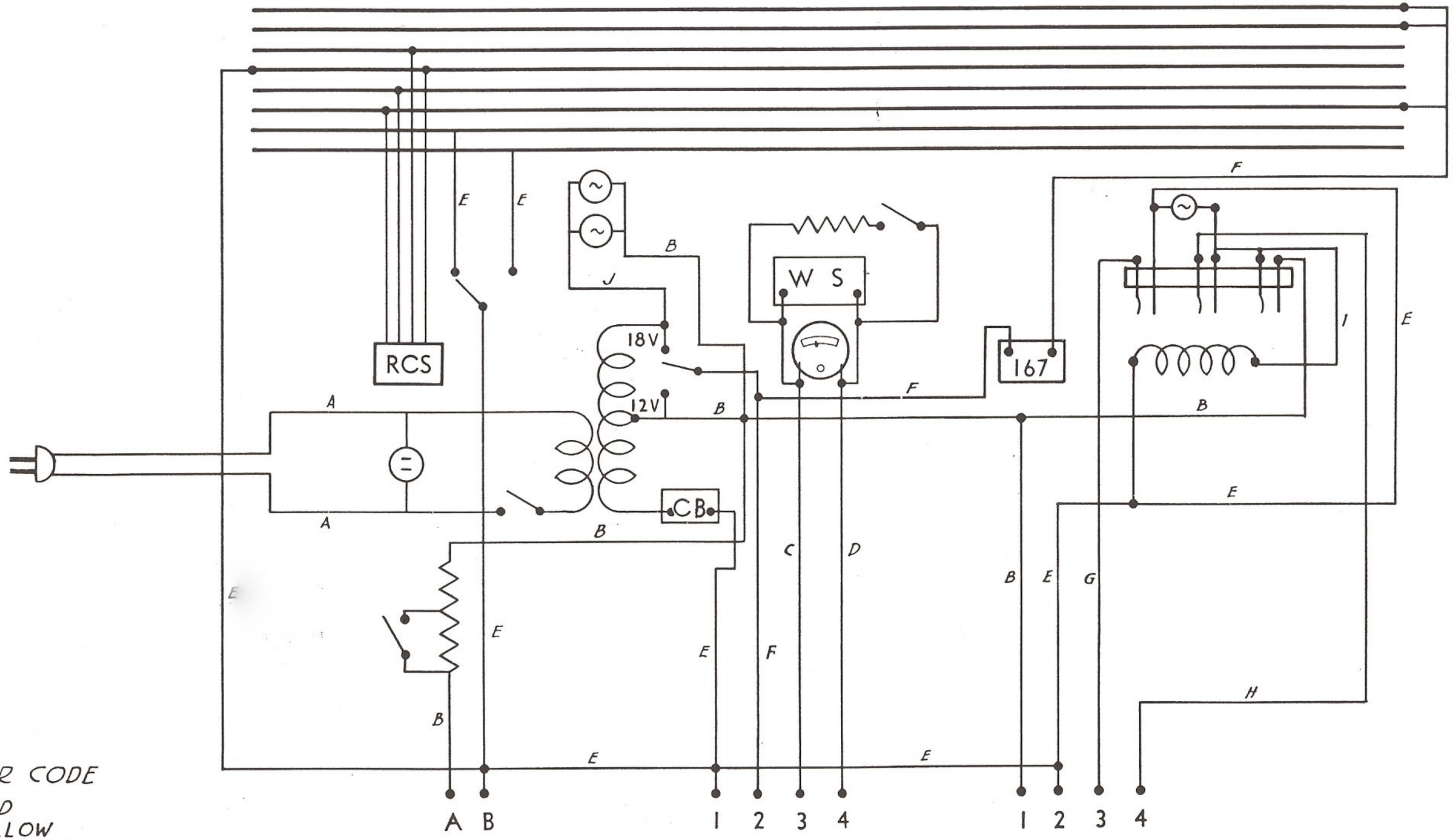
2. Connect a second lead from the other "TRANSFORMER" terminal to one of the binding posts on the No. 169 Controller.

3. Connect a third lead from the remaining terminal marked "TRACK" to the other binding post of the Controller.

4. Set the Voltage Switch at "HIGH" and the Power Switch at "ON".

5. Slowly press the UNCOUPLE button (or "Train No. 1" button of testing No. 168) on Controller and whistle in the test set should blow. When the button is fully pressed the whistle should stop blowing. Note--Whistle

# NO. 5B TEST SET



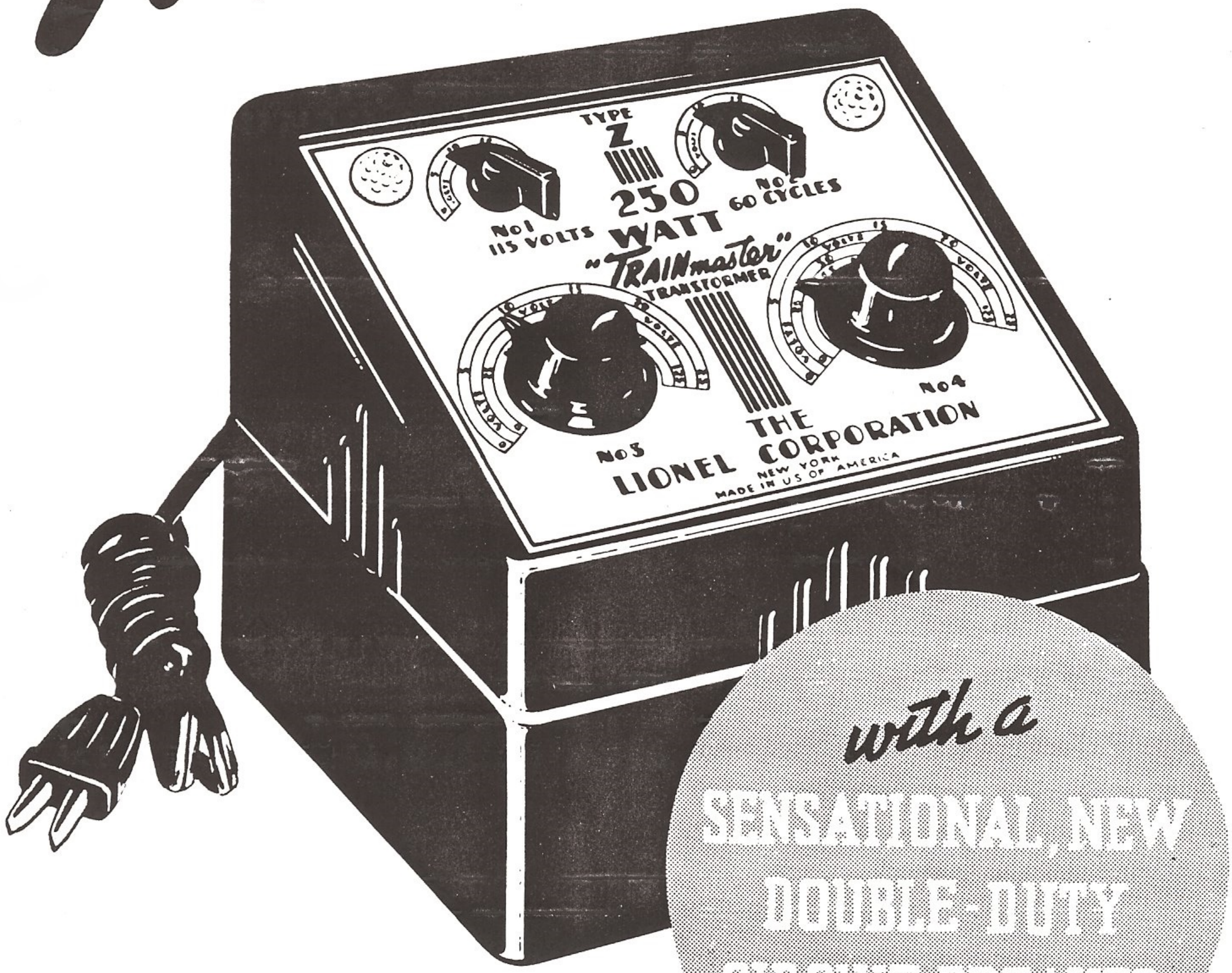

COLOR CODE

A - RED
B - YELLOW
C - WHITE
D - BLUE
E - BROWN
F - GREEN
G - ORANGE
H - GREEN & WHITE
I - GRAY
J - BLACK

FIGURE 3

# THE NEW

# "TRAINmaster"




with a

## SENSATIONAL NEW DOUBLE-DUTY CIRCUIT BREAKER

**VOLTAGE GAUGES**
**INPUT INDICATORS**
**MULTIPLE CIRCUITS**
**RHEOSTAT SENSITIVITY**
**BUILT-IN CIRCUIT BREAKERS**

## SERVICE INFORMATION

This Lionel No. 5B Test Set has been constructed of the best materials available and represents the result of several year's experience in analyzing the requirements of our service stations for a compact and efficient testing unit. Many of the features, in fact, were suggested by our service stations themselves after giving similar sets exhaustive tests.

For those who may desire to attempt repairs, the schematic wiring is shown on the opposite page. Such a diagram, of course, merely indicates the electrical connections and does not show the physical relationship of the various parts as they are actually assembled on the back of the panel. The connecting wires, however, have distinctive colors and it is possible with a little care, and by referring to the color code given on the opposite page, to trace through any desired connection.

We do not recommend that you attempt to repair or service this set unless you have had previous experience with similar instruments. Communicate with the Factory immediately upon experiencing difficulty, describing carefully the nature of the trouble. If possible, repair instructions will be forwarded promptly by us; otherwise, it will be necessary to return the set to Irvington, New Jersey. Be sure to pack carefully in the original corrugated carton and thus avoid possibility of damage.

Symbols used in diagram are as follows: "RC3"--buttons and contacts for Uncoupling and Unloading tests; "CB"--built-in circuit breaker; "WS"--whistle; "167"--buttons and contacts for whistle and reversing unit tests.