

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G85.145.4
Issue 1, May, 1953
AT&T Co Standard

PRESSURE TESTING
B LEAK LOCATOR—CONTROL UNIT

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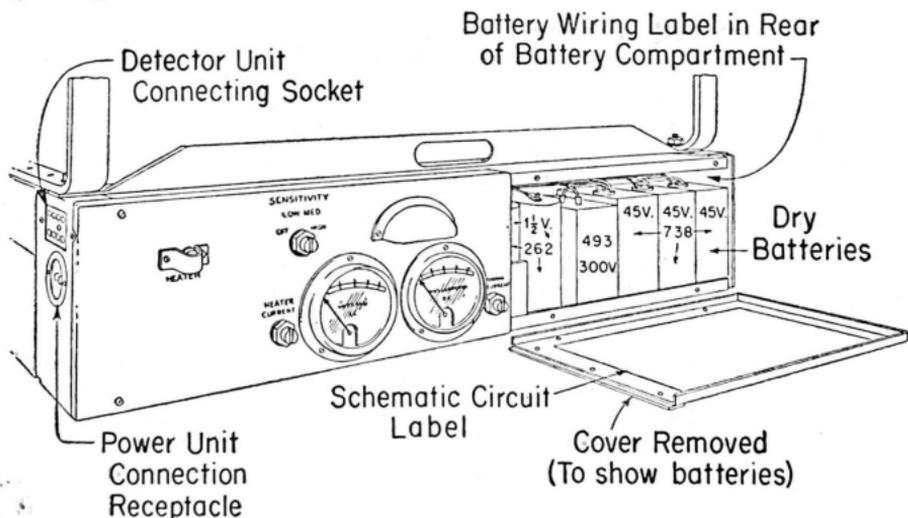
1. GENERAL

1.01 This section describes the Control Unit of the B Leak Locator and outlines its operation and maintenance.

1.02 The maintenance operations covered are those that can be handled in the field. If other repairs are necessary the unit should be returned in accordance with local routine.

2. DESCRIPTION

2.01 The illustration shows the control unit with the dry battery compartment open to indicate the position of the various batteries.

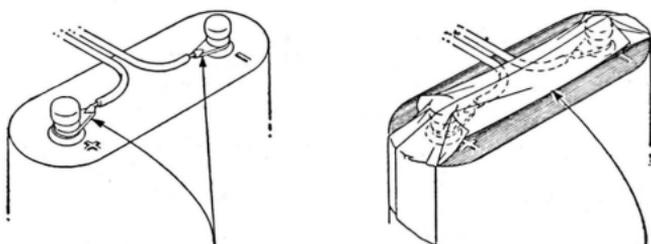


2.02 This unit is basically a two-stage d-c amplifier with a relay in the output of the second stage. It amplifies the small current changes produced in the sensitive element of the detector by the Freon gas, and energizes the relay that operates the alarm bell. The d-c milliammeter indicates the current flow through the relay winding and thus serves as a visual signal.

2.03 For reliable alarm operation under both calm and windy conditions, the unit is equipped with an adjustment switch that provides three ranges of sensitivity.

2.04 **Dry Batteries:** The battery compartment holds three 45-volt and two 1-1/2-volt dry batteries for vacuum tube operation, and one 300-volt dry battery for operating the sensitive element in the detector unit. These batteries must be ordered separately as they are not furnished with the apparatus.

2.05 To install the batteries, remove the 4 screws in the battery compartment cover and connect the batteries as shown on the label inside the battery compartment, using the plugs provided. Then place each battery in the position illustrated, the 300-volt battery being placed last.

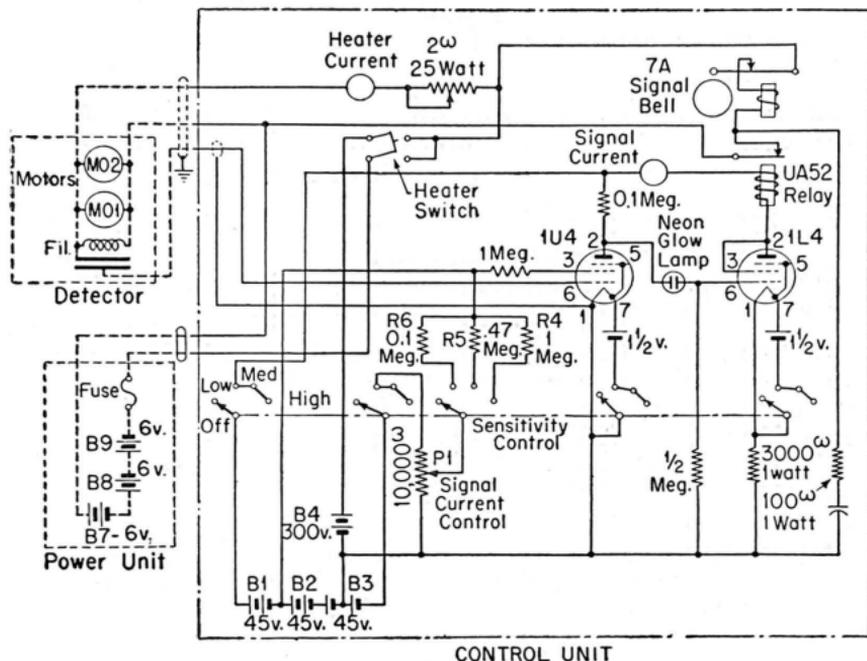


Arrange Connecting Lugs on 1 1/2 Volt Batteries as shown and protect with Scotch Tape, to prevent grounding on metal case.

2.06 **Cords:** The control unit and the detector are normally connected by using the shielded 3-conductor Detector Cable 9 feet long which has plug connectors at each end. If the control and power units are not to be carried on the strand, the 20-foot Extension Cord with appropriate terminating plug and socket connectors is added to permit handling the control units on the ground.

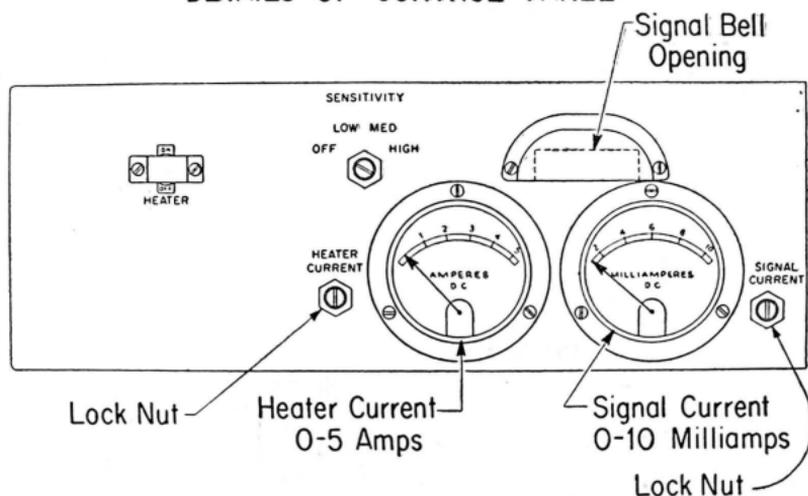
2.07 The control unit is connected to the power unit by a short cord that is permanently attached to power unit.

2.08 **Circuit Diagram:** The following is a schematic circuit diagram of the Control Unit, with the schematic circuit of the Detector and Power Unit included to show how the three units are related. Note that the power for operating the heater and the two blowers of the detector is carried from the power unit to the control unit and then to the detector.



- 2.09 **The external controls and meters** on the panel illustrated below serve the following purposes:

DETAILS OF CONTROL PANEL



- (a) **HEATER**—A toggle switch by which power is connected to the heater of the detector element and the two blowers of the Detector. This switch also opens the 300-volt battery circuit when the heater is turned off.
- (b) **HEATER CURRENT**—A variable resistor with screwdriver adjustment for setting the heater current to the required value of 3.1 amperes.
- (c) The **AMMETER** at the left measures this current.
- (d) **SENSITIVITY**—Four-position switch that connects A and B battery to the tubes and provides three sensitivity ranges which permit satisfactory operation under various conditions.
- (e) **SIGNAL CURRENT**—A variable resistor with screwdriver adjustment for setting the signal current to the appropriate valve.
- (f) The **MILLIAMMETER** at the right measures the signal current for operating, set maintenance and B battery testing purposes. It also serves as a visual indicator under conditions in which the alarm bell cannot be heard or is otherwise unsuitable.
- (g) The **SIGNAL BELL** is mounted inside the control unit but has a protected opening to provide adequate sound.

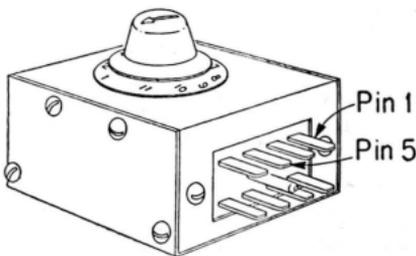
3. OPERATING TESTS

3.01 The following operating tests should be made before using the B locator, if there is any question whether the locator is operating satisfactorily.

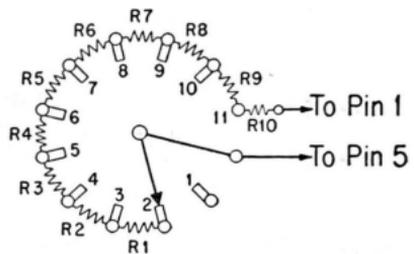
3.02 The tester should assure himself that the storage batteries, dry batteries and vacuum tubes are satisfactory before making these tests.

Control Unit

3.03 The **B Leak Locator Test Set** illustrated is required in testing the control unit as outlined:



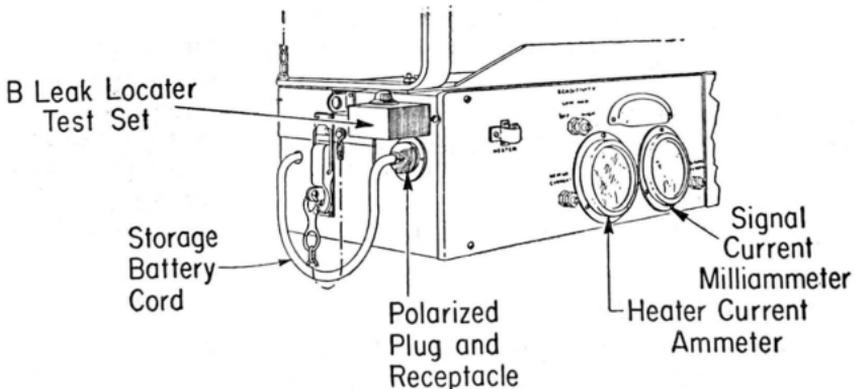
B Leak Locator
Test Set



Note:-Resistors R1 to R10 -
10 Megohms $\pm 10\%$ 1/2 Watt.

SCHEMATIC DIAGRAM

(1) Plug the storage battery supply into the polarized receptacle and connect the test circuit to the control unit as illustrated. The unit should be in its normal operating position, with the control panel vertical.



(2) Set the control knob at Position 2, as indicated above. Turn the ON-OFF SWITCH to ON.

- (3) Turn the SIGNAL CURRENT rheostat clockwise as far as possible.
- (4) Set the SENSITIVITY successively at LOW, MED and HIGH; the milliammeter should read between 5.0 and 7.0 ma.

Low Sensitivity Test

- (5) Set the SENSITIVITY at LOW and adjust the SIGNAL CURRENT rheostat to give maximum current; then back off the control to give 1/2 ma below maximum. Turn the control to Positions 3, 4, 5, etc., in succession. The milliammeter will generally show a drop in signal current on each of these steps.
- (6) Then move the control to Positions 6, 7, 8 and 9. At 7, 8 or 9 the signal current should drop to about 1 milli-ampere; at the same time, the signal bell should ring.
- (7) The bell should stop ringing by turning the ON-OFF switch to OFF or by turning the control to Position 2. The latter should cause the signal current to return to the initial value of 1/2 ma below maximum value.

Medium Sensitivity Test

- (8) Set the SENSITIVITY at MED and adjust the SIGNAL CURRENT to 1/2 ma below maximum. Turn the control successively to Positions 3, 4, etc. The current should drop and reach about 1 ma at Position 4, 5 or 6, at which time the signal bell should ring.
- (9) The bell should stop ringing by turning the ON-OFF switch to OFF or by turning the control to Position 2. The latter should return the signal current to approximately 1/2 ma below maximum.

High Sensitivity Test

- (10) Set the SENSITIVITY at HIGH and adjust the SIGNAL CURRENT to 1/2 ma below maximum. Turn the control knob successively to Positions 3, 4, etc. The current should drop and reach about 1 ma at Position 3 or 4, at which time the signal bell should ring.
- (11) The bell should stop ringing by turning the ON-OFF switch to OFF or by turning the control to Position 2. The latter should return the signal current to 1/2 ma below maximum.

4. MAINTENANCE

4.01 **Batteries:** The number and type of dry batteries used in the control unit and their approximate life under normal use are indicated below:

<u>Number of Batteries</u>	<u>Voltage</u>	<u>Suitable Types</u>	<u>Use</u>	<u>Approx. Life</u>
2	1-1/2	Bright Star No. 262	Tube Filaments	2 weeks
3	45	KS-14196 Eveready No. 738 Burgess Z 30	B Supply	1-2 weeks
1	300	Eveready No. 493 Burgess 2FBP	Gas Detector Element	6 months

4.02 If the condition of the dry batteries is uncertain at the start of a job or if operating difficulty indicates possible trouble due to low voltage, the batteries can be tested as indicated below and replaced if necessary. These tests should be made with the detector connected to control unit, after a 1 or 2-minute warm-up period with both detector and control unit turned on.

4.03 The battery voltage should be tested under load with a voltmeter having a resistance of at least 1000 ohms per volt.

<u>Nominal Voltage</u>	<u>Discard if Voltage is below</u>
1.5	1.2
45	40
300	225-250*

* The detector element draws very little current and the discard voltage of the batteries is not critical.

4.04 To remove these batteries, either for testing or replacement, take off the battery compartment cover and remove the 300-volt battery first. Then remove the other batteries by tilting them toward the vacant space.

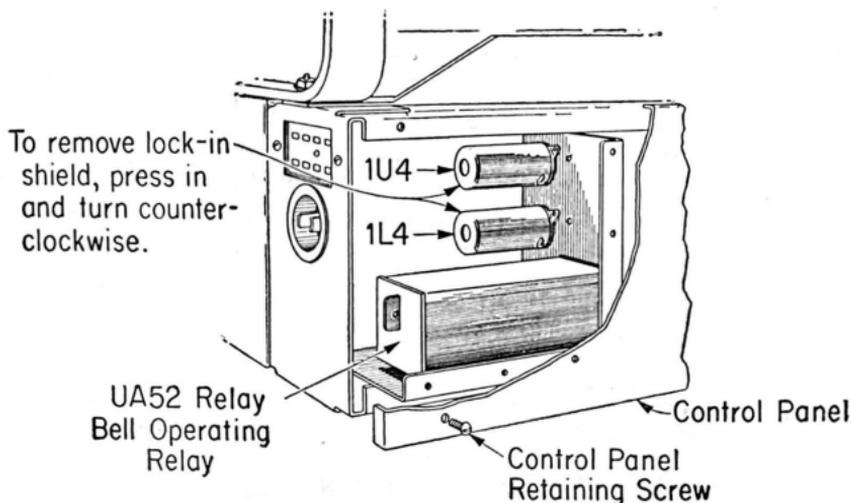
4.05 To test the 45-volt and 300-volt batteries, partially raise the battery plug to expose the pins; then connect the voltmeter to the pins carefully, to avoid shorting the battery.

4.06 The batteries should be installed in reverse order, placing the 300-volt battery last.

4.07 **Vacuum Tubes:** The control unit uses one 1U4 and one 1L4 vacuum tube. These are commercial type radio tubes. Normal replacements should be made in accordance with local routine.

4.08 To replace the tubes, first remove the battery compartment cover; then remove the two screws that hold the control panel in position and withdraw the panel as illustrated. Remove the 300-volt battery and disconnect the battery leads before removing the tubes.

TUBES AND RELAY



4.09 Remove the tubes carefully to avoid damaging the connecting pins.

4.10 **The UA52 Relay** operates the signal bell. If this relay requires attention, it is advisable to have it examined by a central office equipment attendant who has the necessary facilities for cleaning, and adjusting it if necessary.

4.11 When necessary the contacts can be cleaned by removing the cover and burnishing with a flat steel burnisher. If the contacts are pitted they can be smoothed with 8-0 sandpaper (not emery cloth) or a contact cleaning file.

5. REPLACEMENT PARTS

5.01 The following are replacement parts:

- | | |
|---|---------------------------------------|
| Battery, Bright Star No. 262 | (Tube Filaments) |
| Battery, KS-14196 (or equivalent) | (Plate Battery. See Par. 4.01) |
| Battery, Eveready No. 493
(or equivalent) | (Gas Detector Element. See Par. 4.01) |
| Cord, Detector, for B Leak Locator | |
| Cord, Extension, 20 Ft., for B Leak Locator | |
| Tube, Vacuum, 1U4 | |
| Tube, Vacuum, 1L4 | |