

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G85.145.1
Issue 1, May, 1953
AT&T Co Standard

PRESSURE TESTING

B LEAK LOCATOR—DESCRIPTION

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1. GENERAL

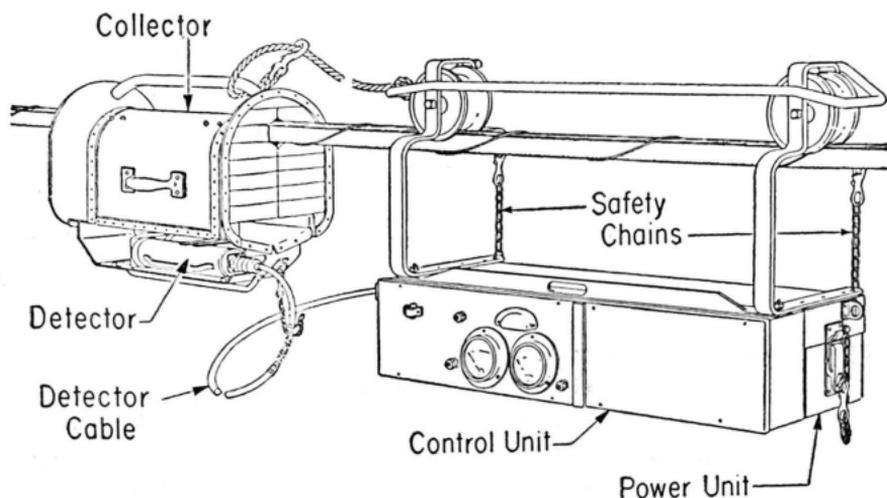
1.01 This section describes the B Leak Locator and covers the method of setting up, adjusting and operating the apparatus.

1.02 The B Locator is used to detect leaks in aerial cables after charging with Freon gas.

1.03 The description and maintenance of each of the main units comprising the B Leak Locator is covered in a separate section.

2. DESCRIPTION

2.01 The B Leak Locator illustrated below consists of four main units: the Collector, Detector, Control Unit and Power Unit, each of which is described briefly.



2.02 **The Collector** is a metal hood that fits around the cable and strand, and serves as the Freon collector and wind-shield. The hood is equipped with two skids and is drawn along the strand from pole to pole by means of a rope. The lower part of the collector is hinged and latched so that it can be placed and locked in position around the cable as illustrated.

2.03 **The Detector** is a unit consisting of a sensitive element and two electrically driven blowers so arranged that air is drawn from the collector and passed through the sensitive element. The detector can be removed from its chamber beneath the collector to accurately locate leaks in the sheath and for checking terminals, loading coil cases and other items.

2.04 **The Control Unit** is an electrical system which responds to the detector and controls the operation of an alarm bell. A three position switch marked HIGH, MEDIUM and LOW sensitivity is provided in the control unit to control the response of the detector, depending on the strength and direction of the wind, and the size of leak. The HIGH setting provides maximum degree of response; MED and LOW reduce the response to 1/5 and 1/10, respectively.

2.05 **The Power Unit** consists of a wooden box that holds three 6-volt lead-acid storage batteries which supply heating current for the sensitive element and power for operat-

ing the blowers. The power unit is equipped with catches for quick attachment or removal from the carrier. Four power units are furnished with the locator.

2.06 Each power unit will operate the locator for about four hours. Two power units will normally be used each day. These can be recharged in approximately 24 hours as outlined in the section covering the power unit. The other two power units are used on alternate days.

2.07 **Carrier:** The Power and Control units are mounted on a carrier as illustrated, so they can be drawn along the strand with the collector. The carrier is equipped with wing-nut operated wheel brakes to prevent free rolling on the strand.

2.08 If conditions permit, the power and control units can be carried along the ground by hand or in a truck. An extension cord is provided for this purpose.

3. PRECAUTIONS

3.01 **Storage Batteries:** The storage batteries should be kept upright to avoid spilling the acid electrolyte. Spilled acid is injurious to the wooden carrier and to clothing. Dripping electrolyte will likewise injure auto finishes. If allowed to come in contact with the hands or other parts of the body, skin burns may result.

3.02 If any electrolyte is accidentally spilled on the body, clothing or on painted surfaces, it should immediately be rinsed off with water. When practicable, a sodium bicarbonate solution should be used to neutralize the acid, followed by a water rinse.

3.03 **300 Volt Dry Battery:** While the No. 493 Eveready battery used in this set is small, the voltage and power output is high enough to cause severe shock and flesh burns if the workman comes in contact with the terminals or battery leads.

3.04 This battery is equipped with a safety receptacle and insulated plug connections to prevent contact. In testing the voltage of the battery use only an approved voltmeter equipped with appropriately insulated test probes. **Do not use ordinary insulated wire, test clips nor improvised test probes** as it may result in serious shock.

4. OVER-ALL TESTS

4.01 The following describes the procedure for setting up the B Locator preparatory to running down gas leaks in a cable, making sensitivity tests or over-all operating tests.

4.02 The tester should assure himself that the storage batteries are adequately charged. If the apparatus has been idle for several weeks it is advisable to have a new set of dry batteries on hand.

4.03 For making tests before placing on the cable, arrange the collector and control unit side by side to facilitate testing and adjustment. For leak locating work on the cable, raise the equipment and assemble on the cable as covered in the related Pressure Testing Sections.

4.04 **A Preliminary Warm-up** is necessary after connecting the units together, as follows:

- (1) Connect the Detector Cable to the detector.
- (2) Insert the detector in the chamber beneath the collector and connect the detector to the control unit.
- (3) Loosen the locking nut on the HEATER CURRENT control and turn the control to the extreme counter-clockwise position. Then set the ON-OFF switch at ON.
- (4) Allow a 5 to 10-minute warm-up period. Then reset the heater current to 3.1 amps., if practicable. (With new batteries the current may temporarily run as high as 3.2 amps. Operation of the heater at less than 2.9 amps. is ordinarily not advisable.)
- (5) Turn the SIGNAL CURRENT control clockwise to give maximum current. Then back off the control to **1/2-milliamp. below maximum current**; this is the best operation setting.
- (6) Tighten the locking screws on the heater and signal current controls.
- (7) The apparatus is now ready for over-all testing or for leak location.

4.05 **Simulated Leak Tests** are made to ensure that the apparatus is operating properly and that it has the desired sensitivity. This test should be made under the following conditions:

- (a) Before running down leaks on a cable, particularly if the apparatus has been idle for some time.
- (b) After changing dry batteries, replacing vacuum tubes, filter or detector element, changing cords, or making other major repairs.
- (c) When it is uncertain whether the apparatus is detecting leaks. (Older cables often show as many as 3 or 4 small leaks per mile. If leaks are not being found, a sensitivity test is desirable.)

4.06 The procedure for making this test is as follows:

- (1) Use the test leak made in accordance with Section G85.145.6.
- (2) Insert the test leak into the collector at normal cable level.
- (3) Carry the test leak at uniform speed from the rubber shield at one end to the shield at the opposite end and back, allowing 4 or 5 seconds for the operation.
- (4) If the apparatus is operating properly, the milliammeter pointer will become unsteady after a few seconds; the current will then drop sharply and cause operation of the alarm bell.
- (5) The bell should ring while the test leak is in the collector or within 30 seconds after removal from the collector, and should continue ringing for a period of at least 5 seconds to a maximum of 2 minutes, depending on wind conditions, sensitivity of the detector, condition of batteries, tubes, etc.
- (6) As the Freon clears out of the hood and detector, the signal current should rise to its original value and the bell stop ringing.
- (7) Longer operation than 2 minutes will occur if an excessive quantity of Freon is introduced into the collector. This condition should clear itself by allowing the detector to operate for 5 to 10 minutes with intake hole facing the prevailing wind.

4.07 If the response is not definite, readjust the signal current to 1/2-milliamperes below maximum and repeat the test. If it is still indefinite, remove the detector from the hood and direct the flow from the standard test leak at the inlet tube for approximately 1 second. The bell should ring fairly promptly.

4.08 **Detector Element Test:** If the above tests indicate very low sensitivity or other irregularity, make the following tests to check the condition of the detector element:

- (1) Test the control unit with the B Leak Locator Test Set as outlined in G85.145.3. If the control unit is satisfactory remove the test set and proceed with step (2).
- (2) Connect the detector cord (without detector) and the storage battery cord to their respective receptacles in the control unit. The SIGNAL CURRENT control should provide the normal range of current adjustment. The bell should ring when the signal current is lowered to approximately 3.5 ma.

(3) Then disconnect the power unit cord and connect the detector to the control unit. If the bell rings, the sensitive element lead may be grounded or the sensitive element is shorted. If the latter, the detector element must be replaced. If the bell does not ring in this test, again connect the battery cord to the control unit.

(4) If the bell now rings and cannot be stopped by adjusting the SIGNAL CURRENT to maximum value, the detector element probably needs replacement.

5. MAINTENANCE

5.01 **Trouble Symptoms:** The following list of trouble symptoms and the probable causes are included to facilitate maintenance:

- | | |
|---|--|
| (a) No heater current. | Defective cords; blown fuse in power unit; loose connections; heater filament burnt out. |
| (b) No current indication on milliammeter. | Defective 1L4 tube; broken battery connections in control unit. |
| (c) Maximum signal current setting less than 5.5 ma. | Sensitive element subjected to excessive Freon; worn 45-volt batteries; defective 1L4 tube. |
| (d) Signal current, but no control with adjustment screw; also, no response to test leak. | Defective 1U4 tube. |
| (e) Inadequate sensitivity. | Worn batteries; defective tubes; sensitive element may need replacement. |
| (f) Gradual loss of sensitivity. | Normal, but will eventually require replacement of sensitive element. |
| (g) Continuous bell signal. | Incorrect signal current adjustment; grounded sensitive element lead or shorted sensitive element.
(Refer to 4.08). |
| (h) No bell signal, but normal signal current action. | U52 relay contacts need cleaning. |

5.02 **Power Unit Replacement:** Always lower the carrier to the ground before replacing the power unit. Then proceed as follows:

- (1) Rest the control and power unit assembly on a level surface.
- (2) Disconnect the battery cord from the control unit. Remove the safety snap hooks and disengage the battery box.
- (3) Carefully raise the carrier vertically to free it from the battery box.
- (4) Lay the replacement battery on the level surface making sure that the wood battery cover is in place on the new battery.
- (5) Carefully lower the carrier vertically into position on the new battery and secure the catches and safety snap hooks.

5.03 The wheels of the carrier should be lubricated occasionally, using a light engine oil. An oil hole is provided in the wheel hub for this purpose. An occasional light application of oil is also desirable on the thread of the wheel brake control screws.

5.04 **The Connecting Rope** should be replaced when it becomes worn. The standard listing follows:

Rope, Connecting, for B Leak Locator