TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST FOR LEAK DETECTOR TYPE H-10 (GENERAL ELECTRIC) (4940-00-825-0198)

HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 1981

TECHNICAL MANUAL
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HEADQUARTERS
DEPARTMENT OF THE ARMY,
WASHINGTON, DC, 14 *May 1981*

OPERATION'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST

FOR

Leak Detector
Type H-10
(NSN 4940-00-825-0198)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished directly to you,

NOTE.

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this leak detector is issued.

Manufactured by: General Electric
40 Federal Street
Lynn, Mass 01910

Procured under Contract No. DAAA09-77-M-8777

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

INSTRUCTIONS FOR REQUISITIONING PARTS

NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

1 - Manufacturer's Federal Supply Code Number - 97424

2 - Manufacturer's Part Number exactly as listed herein.

3 - Nomenclature exactly as listed herein, including dimensions, if necessary.

4 - Manufacturer's Model Number - Model Type H-IO

5 - Manufacturer's Serial Number (End Item)

6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.

7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

(a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number - followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:
Noun: (nomenclature of repair part)
For: NSN: 4940-00-825-0198
Manufacturer: General Electric

Model: Type H-10
Serial: (of end item)

Any other pertinent information such as Frame Number, Type, Dimensions, etc.

READ BEFORE OPERATING

WARNING

DO NOT USE IN COMBUSTIBLE OR EXPLOSIVE ATMOSPHERE

1. For first use only, remove screw from reference leak.
2. Plug power cord into any 120-volt, 60-cycle outlet.
3. Warm-up leak detector for 1 minute.
4. Check airflow.
5. Check sensitivity switch setting.
6. Adjust flashing rate of probe lamp.
7. Check operation of detector at reference leak.

a. Probe for leaks at approximately 1 inch per second.

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SPECIFICATIONS

Power Supply	GRAY CASE, 110-127 volts, 60Hz, 12 watts.
	BROWN CASE, 220-247 volts, 50/60Hz, 12 watts.
Sensitivity	0.5 oz/yr. R-12 on HIGH; 1.0 oz/yr. R-12 on LOW.
Response Time	Approximately 1 second.
Reference Leak	R-11 (refillable) approximately 1 yr. life.
Warm-Up Time	Approximately 1 minute.
Temperature	Operating range: OC to 45C; storage 75C maximum.
Dimensions	8.5 X 4.50 X 2.60 inches.
Weight	2.2 pounds

WARNING

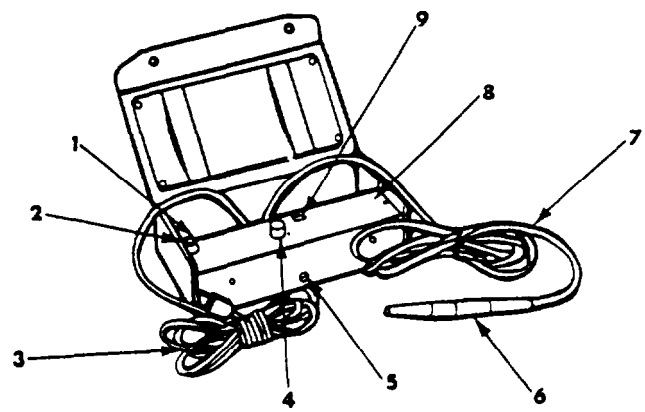
DO NOT USE THIS LEAK DETECTOR IN A COMBUSTIBLE OR EXPLOSIVE ATMOSPHERE.

DESCRIPTION

The Type H-10 Leak Detector consists of a control unit, probe, 6-foot hose, and a 6-foot power cord housed in a shock resistant vinyl case: gray case for 11O-volt unit and brown case for 240-volt unit.

The control unit contains a printed circuit board amplifier, plug-in sensitive element, air pump, and power transformer housed beneath a chassis cover. A reference leak, sensitivity switch and a balance control are located on the top of the control chassis cover. (See fig. 1.)

The probe, consisting of a nozzle with a transparent tip, airflow ball and neon leak-signal lamp is connected to the control chassis by a length of flexible tubing.



1. Refrigerant Liquid-Level Window in Control-Unit Chassis.
2. REFERENCE LEAK
3. Power Cord
4. BALANCE Control Knob
5. Chassis Retainer Screw
6. Probe
7. 6-Foot Hose for Probe
8. Control-Unit Chassis
9. SENSITIVITY (LOW-HIGH) Switch

Figure 1. Leak Detector Components.

The reference leak assembly is a built-in bottle containing a refrigerant gas (R-11) and is calibrated to provide a leak equivalent to approximately 1/2 ounce of refrigerant gas (R-12) per year.

The accessories provided with the leak detector consist of a maintenance kit (filters and airflow balls).

APPLICATION

The Type H-10 leak detector was designed primarily for use as a serviceman's tool. Although it can be used for production-line leak checking, it was not designed for this type of service,

Normally the serviceman will use it for leak checking automobile air conditioning, home and/or for commercial air conditioning or refrigeration equipment.

WARNING

THE TYPE H-10 LEAK DETECTOR SHOULD NOT BE USED IN AN EXPLOSIVE OR COMBUSTIBLE ATMOSPHERE SINCE THE AMBIENT ATMOSPHERE IS DRAWN THROUGH THE PROBE AND OVER THE ELEMENT WHICH OPERATES AT APPROXIMATELY 1800F. THE RESULTING COMBINATION OF AIR AND GAS MIXTURES COULD CAUSE AN EXPLOSION.

Contamination of the testing area may cause erratic operation of the leak detector. This can occur when the leak in the system is very large and there is little or no ventilation in the testing area. Contamination of an area may also occur where excessive amounts of refrigerant gases are used. The leak detector cannot differentiate between atmospheric contamination and an actual leak, because it will respond to any halogen gas passing over the sensitive element.

A contaminated condition can be greatly reduced by ventilating the area or isolating the leak-check area.

CAUTION

TO PROLONG THE LIFE OF THE SENSITIVE ELEMENT, NEVER PLACE THE PROBE IN A STREAM OF REFRIGERANT AS THIS WILL DRASTICALLY SHORTEN-ELEMENT LIFE.

NOTE

Variations in the line voltage may cause the same leak detector reactions as mentioned for atmospheric contamination. If this is a problem, a voltage stabilizing device must be used.

OPERATION

The condensed operating instructions appear on the front page.

WARNING
DO NOT OPERATE IN AN EXPLOSIVE OR COMBUSTIBLE ATMOSPHERE,

To operate the Type H-10 leak detector, proceed as follows:

1. Before using the Type H-10 leak detector for the first time, remove the screw from the cap on the REFERENCE LEAK assembly (2, fig. 1) and allow 15 minutes for the leak rate to stabilize. This screw is used for shipping only and should not be replaced. Be certain that the leak reference bottle contains a quantity of refrigerant gas (R-11). The liquid level can be observed through the window 1, fig. 1) provided in the chassis. (This bottle is filled with enough refrigerant to last approximately 1 year.)

2. Plug the power cord (3, fig. 1) into a 120-volt, 60-cycle outlet (gray case only); or plug the power cord into a 240-volt, 50/60-cycle outlet (brown case only).

CAUTION
DO NOT ATTEMPT TO OPERATE THE DETECTOR AT VOLTAGES ABOVE OR BELOW THE VALUES GIVEN ON THE RATING PLATE. THE LEAK DETECTOR COULD BE DAMAGED.

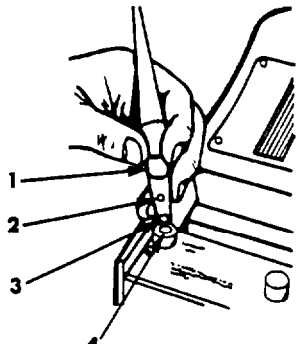
3. The leak detector will start to, warm-up immediately after the power cord is plugged into an outlet.

4. Check for sufficient airflow by pointing the probe tip toward the floor and observing the airflow ball (in the probe). If the airflow is correct, the ball will rise and float above the tip of the probe. (See fig. 2.) The height the ball rises to is not important as long as it rises. If the airflow ball does not rise, tap the probe lightly to make sure the ball isn't sticking.

5. Place the SENSITIVITY switch (9, fig. 1) in either the HIGH or LOW position.

The LOW range position is used to detect large leaks and is used when the elements are new. The HIGH range position is used to detect small leaks.

After the leak detector has been in use for some time, the response of the element will decrease and it will be necessary to place the SENSITIVITY switch in the HIGH range position for all leak checking. This can be determined by placing the SENSITIVITY switch on the LOW range position and turning the BALANCE control (4, fig. 1) until the lamp (1, fig. 2) just ceases to flash; then hold the probe to the REFERENCE LEAK. Observe whether the light can be made to flash. If no flash occurs, or if the flashing rate decreases when the probe is continually held at the REFERENCE LEAK, the SENSITIVITY switch must be placed at the HIGH range position and the unit rebalanced.



1. Neon Lamp

2. Airflow Ball

3. Filter

4. REFERENCE LEAK (screw removed)

Figure 2. Checking Leak Detector Operation.

NOTE

In a highly contaminated area, the flash rate will not be stable and it will be almost impossible to balance the detector. Under these conditions, leak checking would not be possible.

6. The flashing rate of the neon lamp in the probe is adjusted by rotating the BALANCE control (4, fig. 1) so that the neon lamp just ceases to flash. If adjusted properly, the light will flash and continue to flash when the probe is held at the REFERENCE LEAK. When the probe is removed from the REFERENCE LEAK, the flashing rate will slow down and stop.

NOTE

On some of the Type H-10 leak detectors, the flashing light may not shut off when the sensitivity switch is on the HIGH range position. This is not a defect, but indicates a very sensitive element, in which case the leak detector should be operated in the LOW range position until the element wears in.

7. The REFERENCE LEAK may be used as often as necessary to assure proper operation of the leak detector, or as a comparing means to assist in determining the size of the leak. The response when probing the REFERENCE LEAK is approximately the same as a leak of 1/2 ounce of refrigerant gas (R-12) per year. A leak which causes a flashing rate equal to that produced by the REFERENCE LEAK would indicate a leak rate of approximately the same size.

8. Hold the probe as closely as possible to the area being tested and move the tip at 1 inch per second along seams or joints suspected of leaking. When the probe encounters a leak, the flashing rate of the neon lamp will increase and will continue to flash at the faster rate as long as the probe is held at the leak.

MAINTENANCE

The Type H-10 leak detector is designed for long life with little or no maintenance. A maintenance kit which contains the necessary replacement parts is supplied with each leak detector.

Instructions for replacing these expendable items are described on the following sections.

Filter Replacement

To protect the air pump from damage from foreign particles and moisture, replace the filter (3, fig. 2) often. Once a month with moderate use (15-30 minutes per day) is not too often.

To replace the filter, pick out the old filter with a pin or tweezers. The fine screen will remain in the tip. Insert the new filter in the tip and make sure it is firmly seated against the fine screen.

Sensitive Element Assembly Replacement

The sensitive element is a plug-in unit that is to be thrown away when expended. The element will need replacement when the leak detector will no lonqer respond to the REFERENCE LEAK with the SENSITIVITY switch in the HIGH position. '(Make sure the reference leak assembly contains R-11 refrigerant gas.)

To replace the plug-in element assembly proceed as follows:

1. Unplug the power cord and remove the screw (5, fig. 1) holding the chassis to the vinyl case and remove chassis. The element assembly is at the opposite end of the chassis from the REFERENCE LEAK.

2. Make sure the element assembly is cool before attempting its removal.

3. Insert a new element assembly.

4. Replace chassis in vinyl case and secure in place with screw removed in step 1.

Reference Leak

The refrigerant gas (R-11) contained in the reference leak will last for approximately 1 year under normal operating conditions. To refill the assembly, proceed as follows:

1. Remove the chassis from the vinyl case as described in previous section.

2. Hold the bottle firmly in place and remove cap.

NOTE
Make sure discs remain in position in the cap.

3. Remove the bottle and fill with refrigerant gas (R-11) (approximately 7/8ths full).

NOTE
Refilling the reference leak bottle with refrigerant gas (R-11) will be easier if done at temperatures below 75F.

4. Replace the bottle in chassis. The rubber O-ring on the bottle holds the bottle assembly in place on the mounting plate. The O-ring should be pulled back on the bottle while the cap is tightened. Tighten cap, making sure discs remain in position in the cap. After the cap has been tightened, push the O-ring up to the mounting plate and seat in the neck of the bottle.

5. Replace chassis into vinyl case and secure in place with screw.

TROUBLESHOOTING

If the Type H-10 leak detector performance is not satisfactory, refer to the chart below:

SYMPTOM PROBABLE CAUSE	REMEDY
1. NO RESPONSE TO REFERENCE LEAK.	
Reference leak empty.	Refill REFERENCE LEAK.
Sensitive element exposed to excessive amounts of refrigerant.	Remove probe to clean atmosphere and allow unit to run several minutes while sensitive element purges itself.
Water in probe.	Blow clean air into the probe tip for approximately 1 minute (5 psig) or blow (by mouth) as hard as possible into probe tip for 1 or 2 minutes.
2. BALANCE CONTROL WILL NOT STOP PROBE LIGHT FROM FLASHING ON BOTH SENSITIVITY RANGES.	
Dirt in element.	Remove sensitive element and blow out with clean air (not over 10 psig) and/or remove dirt with long thin tool.

TROUBLESHOOTING--Continued

SYMPTOM PROBABLE CAUSE	REMEDY
2. BALANCE CONTROL WILL NOT STOP PROBE LIGHT FROM FLASHING ON BOTH SENSITIVITY RANGES.--Continued	
Short circuit in the sensitive element.	Remove sensitive element from detector. Using a long thin tool or tweezers, reach through the hole in the cover and center the electrode in the heater coil. If not successful, replacesensitive element assembly.
3. BALANCE CONTROL UNIT WILL NOT STOP PROBE LIGHT FROM FLASHING ON HIGH, BUT WILL FLASH ON LOW.	
Extra sensitive element.	Use on LOW range until sensitive element ages for a few hours or until balance can be achieved on HIGH range.
4. PROBE LAMP CAN NOT BE MADE TO FLASH.	
Damaged lamp.	Replace probe.

SERVICING

Repairs described in the maintenance section of this instruction book should be performed by the user to avoid unnecessary charges.

PARTS LIST

The parts listed below are recommended to enable the user of the Type H-10 Leak Detector to make rapid substitution of plug-in, or easily replaced components when troubleshooting.

DESCRIPTION	CAT. NO.	REMARKS
Maintenance Kit	477K45G700	Airflow balls and filters
Plug-in sensitive element	12OK46G700	.....
Reference leak assembly	1654K42G700	.....
R-11 refill for reference leak	4777K46G700	.....
Probe tip	8511K41G700	Clear plastic

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