

Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

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MADDOX™
SUPERIOR AUTOMOTIVE TOOLS

MD1-1

Combustion Leak Detector



Visit our website at: <http://www.harborfreight.com>
Email our technical support at: productsupport@harborfreight.com

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When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

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No portion of this manual or any artwork contained herein may be reproduced in any shape or form without the express written consent of Harbor Freight Tools. Diagrams within this manual may not be drawn proportionally. Due to continuing improvements, actual product may differ slightly from the product described herein. Tools required for assembly and service may not be included.

⚠WARNING

Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.

IMPORTANT SAFETY INFORMATION

1. **TO PREVENT STEAM BURNS, DO NOT OPEN CAP OF HOT RADIATOR.**
2. **Block drive wheels before use. Set parking brake and put gear selector in neutral for manual transmission or park for automatic transmission. Risk of sudden vehicle movement!**
3. **Read vehicle's service manual before use.**
4. **Keep away from hot or moving engine parts.**
5. **Inspect before every use; do not use if parts loose or damaged.**
6. **Wear ANSI-approved impact safety goggles and heat resistant work gloves when working on gasoline or diesel engines.**
7. **Use the Leak Detector only in well-ventilated areas.** A running gasoline or diesel engine produces carbon monoxide. **Carbon monoxide is a colorless, odorless, gas that can cause serious injury or death.**
8. Do not overreach. Keep proper footing and balance at all times. This enables better control of the product in unexpected situations.
9. Keep bystanders out of the area during set up and use.
10. Do not operate when tired or when under the influence of drugs or medication.
11. This product is not a toy. Do not allow children to play with or near this product.
12. Maintain product labels and nameplates. These carry important safety information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
13. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure. Caution is necessary when near coil, spark plug cables, or distributor of running engine. Engine should be off during distributor adjustment.
14. The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

Instructions



Read the **ENTIRE IMPORTANT SAFETY INFORMATION** section at the beginning of this document before set up or use of this product.

1. **WARNING! DO NOT OPEN CAP OF HOT RADIATOR.** Make sure engine is cool and remove radiator cap.
 2. Remove excess coolant so level is 2–3 inches below radiator neck.
 3. With cap off, run engine until it reaches normal operating temperature. Remove coolant as needed to maintain level at 2–3 inches below neck.
WARNING! Avoid carbon monoxide poisoning! Never run a gasoline or diesel engine in an enclosed garage or other contained area.
 4. Confirm that the Maddox test fluid (sold separately) is good to use. A blue color indicates it is OK. If the color is green or yellow, replace with fresh fluid.
 5. Use a twisting motion to remove the Bulb from the Top Cap. Pour test fluid into the Leak Detector up to the fill line through opening in Top Cap. Reinstall Bulb by twisting back into opening in Top Cap with the metal check valve facing out.
 6. Install the Leak Detector by inserting the Universal Cone Adapter into the filler neck of the radiator using a rotating motion. Make sure Adapter is pushed in as far as it will go to achieve an adequate seal.
 7. With the engine idling at normal operating temperature to circulate engine coolant, squeeze and release the Bulb continuously for one minute to draw radiator gases through the test fluid. Be careful not to draw engine coolant into the Leak Detector as this will contaminate the test fluid.
- Note:** To accurately detect leaks, this test must be done with the engine warm enough to allow the coolant to circulate. Otherwise, the coolant that contains the exhaust gases will remain in the engine.
8. If the test fluid turns yellow in gasoline engines or green in diesel engines, it indicates the engine has a combustion leak. If the test fluid remains blue, no combustion gas is present in the coolant indicating there is no combustion leak. If leaks are detected, have engine repaired by a qualified repair technician.
- Note:** If testing indicates a leak is present, a more precise location may be determined to aid in repair as follows:
- a. Remove the spark plug wire from one cylinder at a time, and let engine idle to remove combustion gases from previous test.
 - b. Retest by repeating steps 5–7, then reconnect spark plug wire.
 - c. Continue testing each cylinder following this procedure to identify all leaks in engine.
9. Remove Leak Detector from radiator immediately after testing to avoid drawing test fluid into radiator as engine cools. Whether test result was positive or negative, discard used test fluid in accordance with local regulations.
 10. Refill radiator to proper level using appropriate coolant mixture.
 11. Flush Leak Detector with clean water and allow to air dry, then store in its Case in a clean, dry, safe location out of reach of children.

Maintenance and Servicing



Procedures not specifically explained in this manual must be performed only by a qualified technician.

WARNING

TO PREVENT SERIOUS INJURY FROM TOOL FAILURE:

Do not use damaged equipment. Have the problem corrected before further use.

1. **BEFORE EACH USE**, inspect the general condition of the Leak Detector. Check for loose fittings, cracked or broken parts, and any other condition that may affect its safe operation.
2. **AFTER USE**, clean external surfaces with clean cloth and flush with clean water. Allow to air dry, then store the Leak Detector in its case in a clean, dry, safe location out of reach of children.

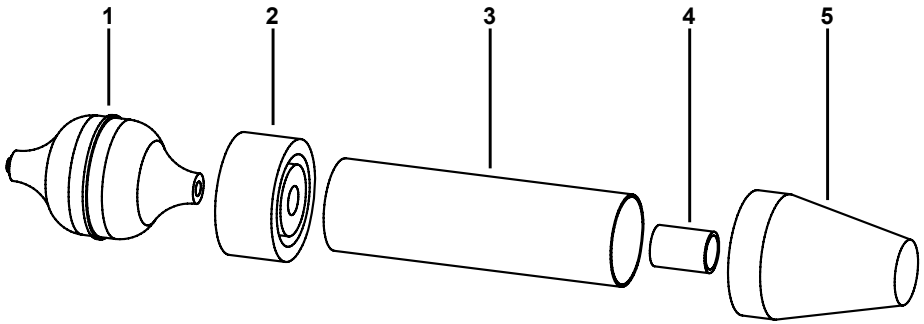
PLEASE READ THE FOLLOWING CAREFULLY

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Parts List and Diagram

Part	Description
1	Bulb
2	Top Cap
3	Tube

Part	Description
4	Check Valve
5	Universal Cone Adapter
6	Case (not shown)



Record Serial Number Here:

Note: If product has no serial number, record month and year of purchase instead.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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