

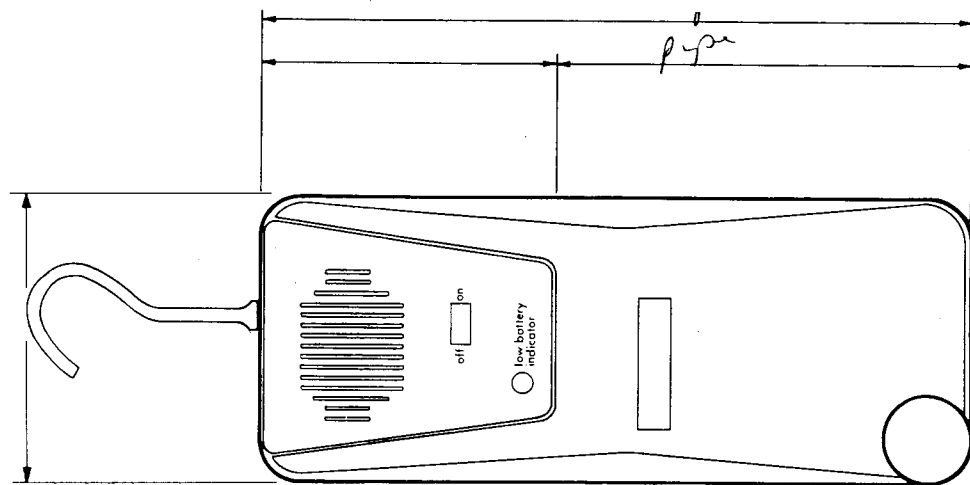


4000

Electronic Sight Glass

OWNER'S MANUAL

**Automobile/Truck
Air Conditioning System**



Warning:

This instrument should be used only by competent personnel who are familiar with, and follow good work and safety practices of the air conditioning and refrigeration trade. It is not intended as a substitute for the usual safe procedures. Do not add refrigerant without measuring the high side pressure. Serious injury can result to personnel if pressure becomes excessive due to mechanical defect.

This instrument is not for use on defective systems.

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The TIF4000 Electronic Sight Glass

is a portable, battery operated electronic sight glass. This instrument operates on the following principle: The TIF4000 "sees" into refrigerant tubing by means of ultrasonics. The method is somewhat related to the SONAR principle. Two sensors are used, one for transmitting and one for receiving. These sensors are in the form of clamps for ready attachment to the outside of any **metallic refrigeration tubing**. No mechanical penetration of the tubing is necessary for the ultrasonic waves to pass through the walls of the tubing in order to "see" what is inside. The TIF4000 is used in different

applications depending on whether the refrigeration system uses an expansion valve, or a capillary tube or orifice. Until now there has never been a reliable method for ascertaining whether a refrigeration system is properly charged. Some manufacturers advocate dumping the charge completely and then refilling with the amount of refrigerant specified on the nameplate. However, this method is not only time consuming and expensive, but it unnecessarily contaminates the environment.

Charging Automobile Air Conditioning Systems.

Discussion:

A correctly charged air conditioning system will have high pressure, liquid refrigerant flowing from the condenser to the evaporator thru the liquid line. A properly charged system will form a liquid seal at the orifice tube or expansion valve. When a liquid seal cannot be achieved at the expansion valve or the orifice tube the system is not properly charged.

How to Test for Proper Refrigerant Charge:

1. Attach your manifold gauge set to the system.
2. Attach the electronic sightglass sensors to the liquid line and turn on instrument. See drawings #1 and 2.
3. Set idle speed at 900-1000 RPM and turn on A/C system. Wait 5 minutes.
4. Spray condenser with water continuously before checking or charging system. (See Fig. 3 for water spraying method.) Instrument will signal either 2 second beeps or ringing.
5. Listen for the ringing. Ringing means bubbles in the liquid line—an indication of a **low refrigerant charge**

Important:

During testing the car is stationary (at rest). The air conditioning system does not operate efficiently when the car or truck is stationary. In a moving car the ram action of the air over the condenser cools and condenses the hot gas to form high pressure

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liquid. In a stationary car this air movement is missing. When testing it is necessary that the hot refrigerant vapor in the upper 2/3rds of the condenser be condensed so that the liquid line contains warm high pressure liquid refrigerant to form a liquid seal at the orifice tube or expansion valve. One way to do this (especially on GM cars & other makes with orifice tube systems) is to spray the condenser with water (see drawing #3). This will eliminate flash gas and will help keep the condensing pressure at approximately 150 p.s.i. and load the liquid line with high pressure **liquid** refrigerant.

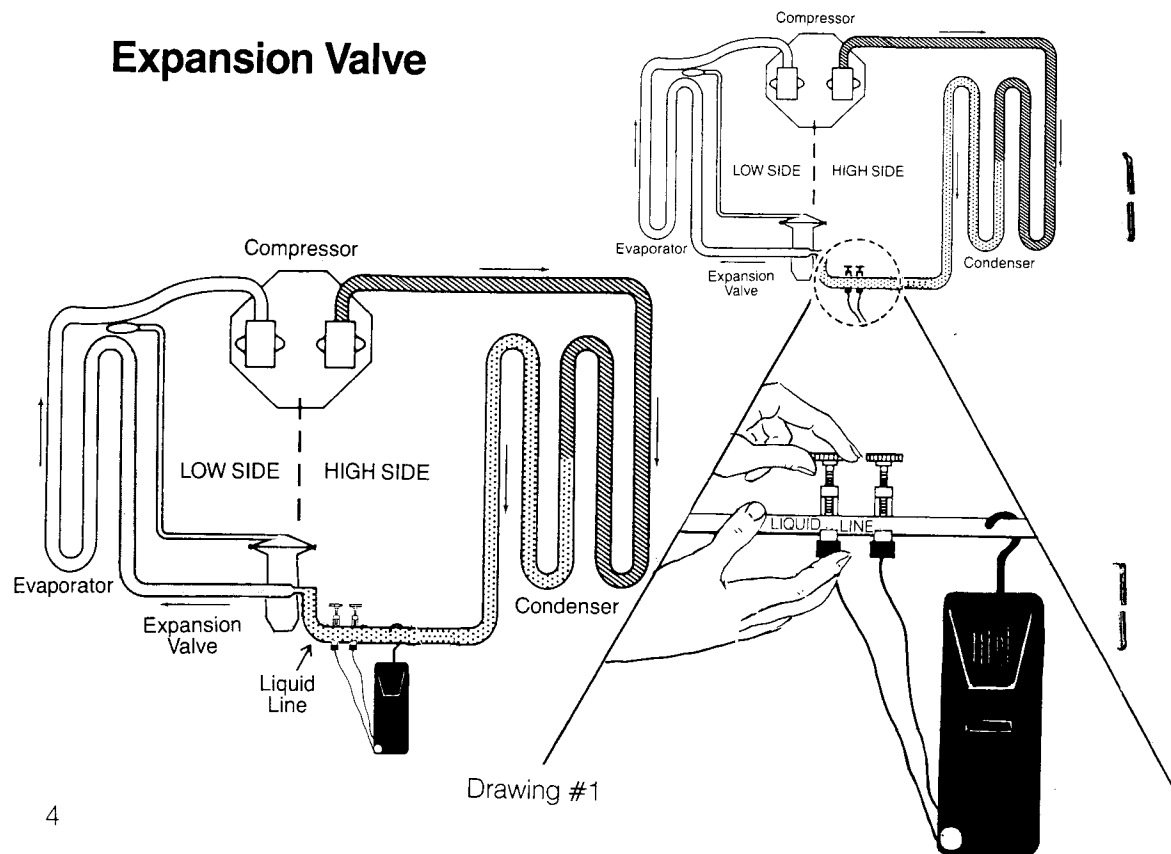
How to Add Refrigerant:

1. Follow steps 1, 2, 3, & 4 above. To be certain high pressure gauge reading is approximately 150 p.s.i., carefully follow step 4.
2. Add refrigerant slowly (i.e. 1/4 lb./5 mins.) until ringing ceases and is replaced by a steady 2-second beep. If compressor is cycling very fast, add refrigerant until cycling ceases, then add small amounts of refrigerant until a steady 2-second beep is heard. System is now properly filled. Add a small amount (1/2 lb.) of refrigerant for reserve.

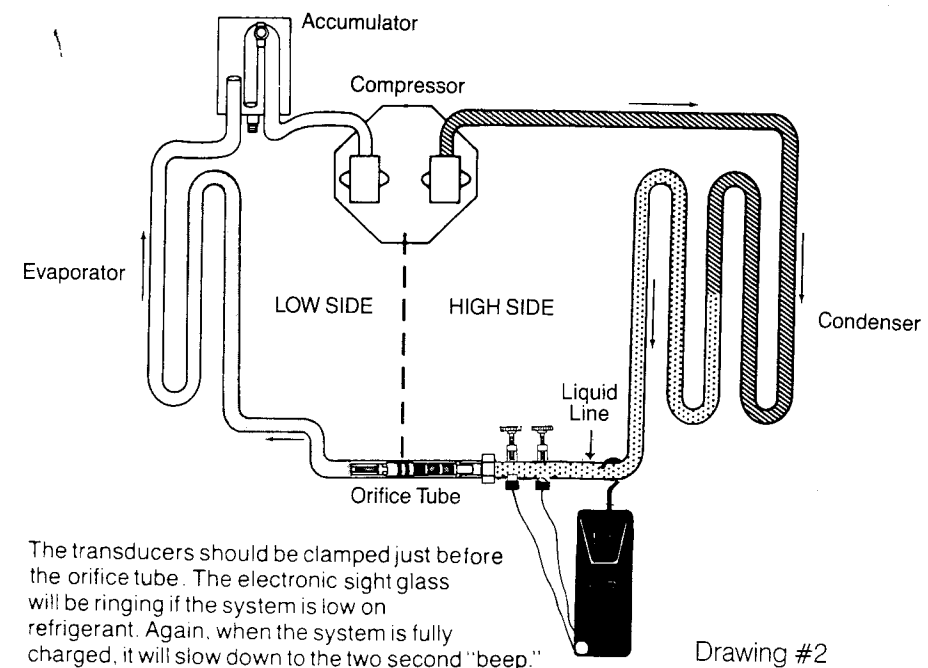
NOTE: Instrument will signal in two (2) different ways...

- (a) Steady ringing or irregular ringing—this means bubbles in the liquid line. System needs more refrigerant.
- (b) Two-second periodic beeps—system is properly filled. A small amount (1/2) of refrigerant may be added for reserve.

Expansion Valve



CCOT-Fixed Orifice Tube



The transducers should be clamped just before the orifice tube. The electronic sight glass will be ringing if the system is low on refrigerant. Again, when the system is fully charged, it will slow down to the two second "beep."

Important: Be sure that the engine is running at 900-1000 RPM and gauge pressure 150 p.s.i.

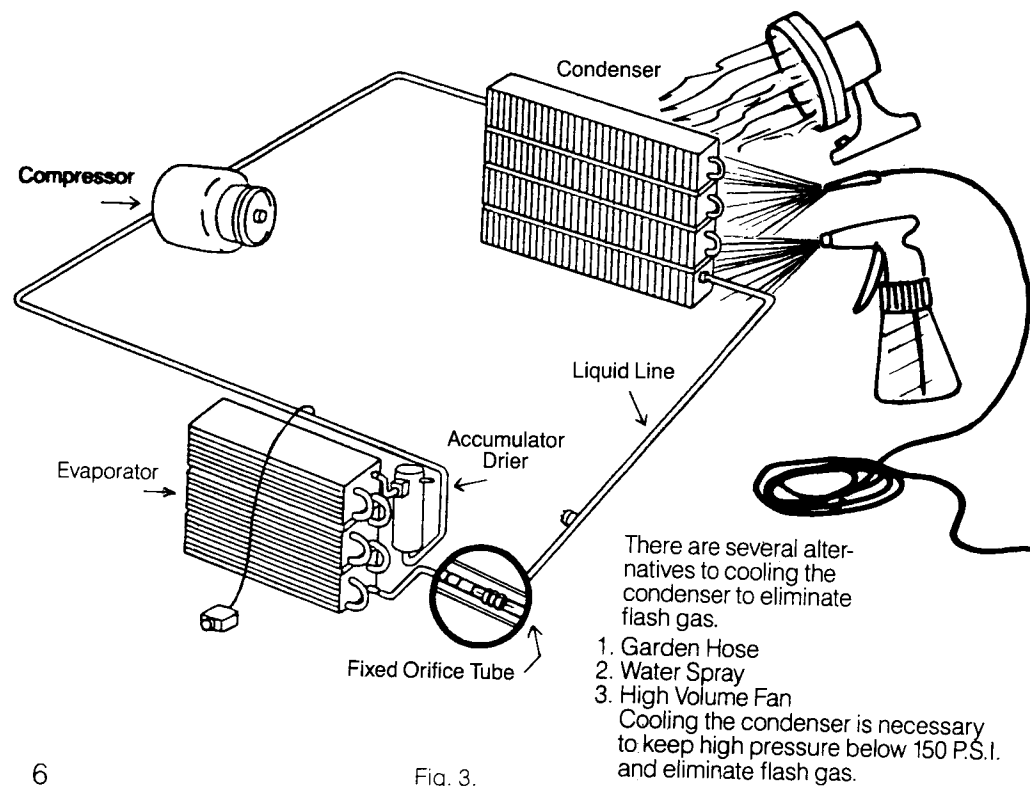


Fig. 3.

TIF4000 SENSOR REPLACEMENT:

In the event of damage to a cable or sensor, please follow these instructions for removal:

1. Remove battery cover and observe placement of wires.
2. Lift cable-strain-relief out of slot in case.
3. Separate the white cable connector. (Take care not to break any wires.)
4. Ship cables with sensors to TIF.

When new cables and sensors arrive, replace in the reverse order.

Maintenance

The 4000 is equipped with a low battery indicator (red LED). When the instrument is turned on, the red LED should not be lit. If the LED is on, the battery should be replaced for reliable operation. Approximately 30 hours of operation can be expected from an ordinary transistor battery: alkaline batteries may be used for longer life.

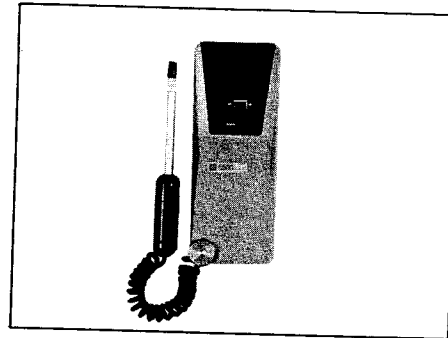
Replacement Parts

Service Hook	TIF4001
Matched Set of "C"	
Shaped Sensors	TIF4004
Carrying Case	TIF4007

Specifications

Weight: 14 ounces
(392 grams) with battery
Dimensions: 8" x 3" x 1.8"
(20.32cm x 7.62cm x 4.6cm)
Sensor cord length: 42 inches
maximum
Warm-up time: Instantaneous
Response time: 4 seconds initially
Power supply: One 9-volt
transistor battery
Battery: 30 hours continuous
operation
Operating Temperature:
32°F to 105°F

Other TIF Products



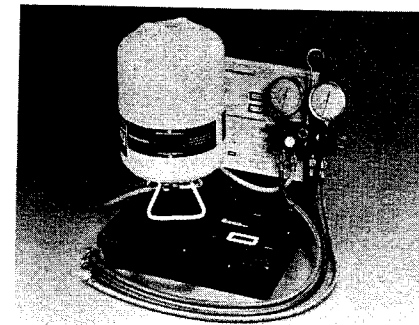
One step ahead of it's time, the TIF5500 pump-style Automatic Halogen Leak Detector. The magic wand detaches from the instrument while the instrument is strapped to your belt or hand-held. Super, super-sensitivity and the magic wand lets the 5500 detect leaks where other leak detectors simply can't. Our newest leak detector and we're proud of the world's first battery powered pump.

Ask for a new TIF5500

U.S. Patents #3,742,475 4,281,521

Limited Warranty and Repair/Exchange Policy

This instrument is designed and produced to provide unlimited service. Should the unit be inoperative after the user has performed the recommended maintenance a no-charge repair or replacement will be made to the original purchaser. This applies to all repairable instruments which have not been tampered with or damaged. The claim must be made within one year from the date of purchase. For repair of your instrument have your local Industrial, Electrical, Automotive or AC&R Wholesaler send the instrument to TIF Instruments. An additional 90-day warranty will cover the repaired or replaced unit.



Another first from TIF. It's the TIF9000 Electronic Charging Meter. For use when charging AC&R systems, the TIF9000 reads like a gasoline pump for all refrigerants. The digital readout lets you measure in the correct amount (in lbs. & ounces) for a measured charge. The TIF9000 is portable, battery operated with a platform capable of holding a 30 lb. refrigerant cylinder.

Ask for the new TIF9000