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**8500
CARBON MONOXIDE
ANALYZER**

OWNER'S MANUAL

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INTRODUCTION

Thank you for purchasing a TIF8500 Carbon Monoxide Analyzer. The TIF8500 is a professional grade service tool for accurate measurements of Carbon Monoxide (CO) levels in any environment or application. The 0-2000ppm range allows measurement of most areas including ambient, appliance surroundings and furnace flues.

Convenience features such as the large LCD readout, backlit display, leather carrying case and long search probe, permit operation in many areas in and around homes, offices and plant facilities.

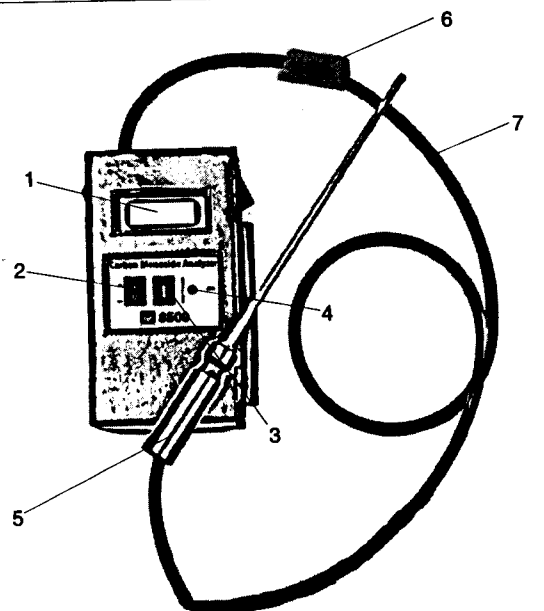
Rapid response and relatively high accuracy make this an ideal tool for Heating and Appliance contractors interested in ensuring safety and performance.

In order to gain the fullest benefits of your purchase, please carefully read and review the information in the following pages. If you have further questions, or need additional assistance, please contact the TIF Customer Service Hotline at 1-800-327-5060.

FEATURES

- LCD Readout displays 0-1999 parts per million (ppm)
- Backlit display for low light areas
- Proven electrochemical sensor technology
- Rapid warm-up
- High efficiency sample draw pump
- 15" (375 mm) Stainless steel flue probe with 5 foot (1.5m) hose and particulate/moisture filter
- Overrange indication
- Low battery indication
- Cordless and Portable
- Multiple applications
- Leather carrying case with belt loop and shoulder strap
- One Year Warranty

PARTS AND CONTROLS



1. LCD readout
2. ON/OFF switch
3. Backlight switch
4. Zero adjustment screw

5. Flue Probe
6. Particle/Moisture filter
7. Sampling Hose

Fig.1

OPERATING INSTRUCTIONS

SET UP PROCEDURE

NOTE: Refer to the Maintenance section for battery installation or replacement.

1. Remove the unit and flue probe assembly from the Styrofoam packaging.
2. Connect the Flue probe with rubber hose and filter element to the silver fitting on the upper left of the unit.

ALWAYS CHECK THE FILTER BEFORE USE, IF THE ELEMENT IS BADLY DISCOLORED OR CONTAINS WATER, REPLACE THE FILTER. ALSO ENSURE THAT THERE IS NO MOISTURE IN THE SAMPLING HOSE OR PROBE.

3. Switch on the instrument with the On/Off switch, and allow approximately 1 minute for the sensor to stabilize.
 4. In clean air (i.e. Outdoors) set the instrument to ZERO with the zero pot on the front of the unit, using the small screwdriver provided.
- The instrument is now ready for use.

OPERATING INSTRUCTIONS

AMBIENT MEASUREMENTS

1. Enter the area to be measured with the unit switched on (and stabilized as described above in Set Up Procedures).
2. Place the probe near the center the area to be measured.
3. Allow approximately 30 seconds for the sample to be drawn over the sensor and the reading to reach equilibrium.
4. If Carbon Monoxide is present the TIF8500 will display CO from 0-2000 ppm.
5. In bad light conditions switch on the backlight facility.
6. Move the probe to different locations, pausing slightly, to see if the reading changes in other parts of the area.
7. If a reading of over 25ppm is obtained, then safety checks should be carried out to determine the reason, and the problem resolved

CHECKING FOR CO SPILLAGE

1. Follow the Set Up Procedure on page 3 before entering the area in which the appliance rests.
2. Allow the appliance that you are testing to operate for 10-15 minutes with all the windows and doors closed (to simulate poor ventilation).
3. Slowly move the probe around the sides, top, vents and above the radiants of the appliance for approximately 4-5 minutes (remember it takes about 30 seconds for the pump to suck the sample over the sensor).
4. If Carbon Monoxide is present the TIF8500 will display CO from 0-2000 ppm.
5. In bad light conditions switch on the backlight facility.
6. If a reading of over 25ppm is obtained, then safety checks on the appliance should be carried out to determine the reason, and the problem resolved.

FLUE GAS MEASUREMENTS

1. Follow the Set Up Procedure on page 3 before entering the area of the flue.
2. To check the levels of CO within a flue, it may be necessary to make a small hole in the flue wall.
3. Place the probe into the flue. **DO NOT INSERT THE PROBE HANDLE OR RUBBER HOSE INTO THE FLUE AT ANY TIME.**
4. After approximately 30 seconds, if CO is present, the CO level will be indicated on the display. Allow approximately 1 minute for the reading to stabilize.
5. Should the readings indicate above 400ppm, a complete combustion efficiency test should be performed.

CAUTION! : The stainless probe will become quite hot when placed in the flue. Use care when removing the probe. Pay close attention to where the hot probe is placed when removed, and allow sufficient time for it to cool before storing. The probe handle may also become hot if left in the flue for extended periods.

OPERATING INSTRUCTIONS

OVERRANGE INDICATION

If the unit is exposed to concentrations above 2000ppm, an Overrange indication will be indicated by a display of "1" on the left-hand side of the display.

MAINTENANCE

BATTERY INSTALLATION/REPLACEMENT

When battery voltage becomes insufficient for correct operation, the unit will display a small letter "L" in the upper left hand side of the display.

To install or replace batteries:

1. Remove the unit from the protective leather carrying case.
2. Slide off the battery cover on the back of the unit as indicated by the embossed arrows.
3. If applicable, remove the old batteries.
4. Install 4 new or tested "AA" size batteries, carefully noting the polarity indications in the compartment.
5. Replace the battery cover.
6. Replace the unit into the protective leather case.

FILTER REPLACEMENT

If the disposable particle/moisture filter appears at any time to be dirty (anything other than a clean white), or contains signs of moisture or water, it must be replaced.

To replace the filter (See Fig. 2):

1. Make certain you have a replacement filter before beginning. See the replacement parts section below for part numbers.
2. Remove the old filter by firmly grasping the filter with one hand and slowly pulling off the rubber hose from each end.
3. Dispose of the old filter.
4. Make certain there is no moisture or dirt in the hose before installing the new filter.
5. Connect the new filter by firmly grasping with one hand and slowly sliding the rubber hose over the barb fittings on each end.

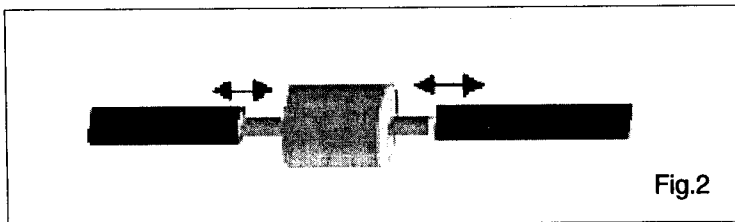


Fig.2

MAINTENANCE

SENSOR FAILURE

In the event of a sensor failure, you will be unable to stabilize the reading, and random, nonsensical numbers will be displayed. In this case, the unit must be returned to the factory for servicing.

REPLACEMENT PARTS

Disposable Particle/Moisture Filter
Flue Probe assembly, includes sample hose
Leather Carrying Case
Zero Adjustment Screwdriver

TIF8501
TIF8502
TIF8503
TIF8504

SPECIFICATIONS

Range -	0 - 1999ppm CO
Resolution -	1 ppm
Accuracy -	+/- 5% of reading
Sensor -	Electro- Chemical
Sensor Life -	2 - 3 years typically (One Year Warranty)
Response time -	30-40 Seconds
Power Supply -	4 AA Cells
Battery Life -	6 Hours continuous use (without backlight)
Ambient Operating Temp -	0 to 40°C
Probe -	15" (375mm) Long with 5' (1.5 meter) Hose, including disposable cotton filter assembly.

WARRANTY AND REPAIR

Limited Warranty and Repair/Exchange Policy

This instrument has been designed and manufactured to provide unlimited service. Should the unit be inoperative, after performing the recommended maintenance, a no-charge repair or replacement will be made to the original purchaser if the claim is made within one year from the date of purchase. This warranty applies to all repairable instruments that have not been tampered with or damaged through improper use. This warranty does not cover batteries or probe if damaged by contamination or improper use.

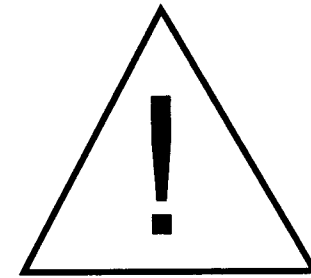
Before returning your instrument please make sure that you have carefully reviewed the **Maintenance** section of this manual to determine if the problem can be easily repaired. Make sure that the **battery** is working properly **BEFORE returning the unit**. If the unit still fails to work properly send the unit to the repair facility address on the back cover of this manual. Repaired or replaced tools will carry an additional 90 day warranty. For more information please call (800) 327-5060.

FACTS ABOUT CARBON MONOXIDE

Carbon Monoxide (CO) is colorless and odorless toxic gas which is a byproduct of incomplete combustion. CO is readily absorbed by the blood if present in the lungs, and will displace the oxygen, causing many harmful effects, including the possibility of death. In fact hundreds of people die each year as a result of CO poisoning.

The effect of CO is cumulative. Meaning that even exposure to small amounts over a period of time can be harmful. There are many standards defining allowable exposure levels to CO. A few of these, as well as the effects and symptoms at various points, are documented in the table below.

Concentration in Air	Symptom and , if applicable Standard
9 ppm	Maximum allowable concentration in a living space per ASHRAE Standard 62-1989
25 ppm	Maximum limit for 8 hours of continuous exposure per California OSHA (Occupational Health and Safety Administration)
35 ppm	Maximum limit for 8 hours of continuous exposure per US OSHA (Occupational Health and Safety Administration)
200 ppm	Slight headache within 2-3 hours, dizziness, nausea also possible
400 ppm	Maximum concentration in flue gas per the US EPA and AGA (American Gas Association). Also frontal headache within 1-2 hours, life threatening beyond 3 hrs.
800 ppm	Headache, dizziness and nausea within 45 minutes, Unconsciousness within 2 hours and Death within 2-3 hours.
1600 ppm	Headache, dizziness and nausea within 20 minutes, Death within 1-2 hours.
3200 ppm	Headache, dizziness and nausea within 5-10 minutes, Death within 30 minutes.
6400 ppm	Headache, dizziness and nausea within 1-2 minutes, Death within 10-15 minutes.
12800 ppm	Death within 1-3 minutes.



CAUTION

The tool described in this manual is designed to measure Carbon Monoxide, a dangerous and poisonous gas.

Therefore, this device should only be operated by competent trained personnel after thoroughly reviewing this manual.