

# CO Analyzer

## 706

Rev. 6.X Analyzers



The Value Leader™

## Contents

- Specifications
- Product Features
- General Description
- Controls and Push Buttons
- Operating Instructions
- Battery Replacement
- Appendix A : Calibration and Accessories
- Appendix B : Guarantee
- Appendix C : Error Codes & Troubleshooting
- Appendix D : CO Alarm & Auto Off Settings
- Appendix E : Manually Initializing the CO Sensor
- Appendix F : CO Chart

## Specifications

Power Supply:	4 "AA" Alkaline Batteries
Sensor:	Long Life Electrochemical
Range:	0 to 9.999%ppm
Resolution:	1ppm (0 to 9999ppm) 0.001% (> 9999ppm)
Accuracy:	+/-5 ppm or 5% of reading whichever is greater
Warm up:	Approx 30 seconds
Response time:	90% of reading < 120 seconds
Duty Cycle:	30 minutes
Battery Life:	Approx. 30 hrs.
Size:	3.75" x 8.0" x 3.0" (95 x 203 x 76) mm
Weight:	1.1 lbs (500g)
Probe Length:	9" (230mm)
Tube Length:	5 feet (152.4cm)
Hot air probe:	700 degrees F @ 5 minutes



# CARBON MONOXIDE the SILENT KILLER!

<i>Concentration of CO in air</i>	<i>Exposure times and toxic symptoms</i>
<b>9ppm</b>	The maximum allowable concentration for short term exposure in a living area according to ASHRAE
<b>35ppm</b>	The maximum allowable concentration for continuous exposure in any 8 hour period, according to federal law. (US federal law)
<b>200ppm*</b>	Maximum concentration allowable any time according to OSHA. Slight headaches, fatigue, dizziness, nausea after 2-3 hours.
<b>400ppm*</b>	Frontal headaches within 1-2 hours, life threatening after 3 hours. Maximum allowable limit in flue gas according to EPA and AGA.
<b>800ppm*</b>	Headache, dizziness, nausea, and convulsions with 45 minutes. Unconsciousness within 2 hours. Death within 2-3 minutes.
<b>1600ppm*</b>	Headache, dizziness, and nausea within 20 minutes. Death within 1 hour.
<b>3200ppm*</b>	Headache, dizziness, and nausea within 5-10 minutes. Death within 30 minutes.
<b>6400ppm*</b>	Headache, dizziness, and nausea within 1-2 minutes. Death within 10-15 minutes.
<b>12800ppm*</b>	Death within 1-3 minutes.

## Product Features and Benefits

- Completely portable, hand-held instrument allows access to any location.
- Large, easy to read LCD
- Backlight to illuminate the LCD in dimly lit environments.
- Flue probe for CO measurement in stacks.
- 50 storage locations for saving data for future reference or printing (optional A740 IR printer required).
- Peak CO reading during measurement period.
- Built in CO alarm (resettable, factory set at 2000ppm)
- Field calibration available.

## General Description

The 706 is an advanced state-of-the-art carbon monoxide (CO) gas analyzer designed to provide part per million readings from 0-10,000 ppm. The 706 is capable of performing ambient as well as flue gas checks with its hot air probe and internal pump.

The 706 utilizes an advanced long life electrochemical sensor that can be field calibrated and has a low replacement cost.

Features include IR printer port to print hard copy of data, 10 storage locations, Flow block indication, peak reading for test period as well as date and time.

**CAUTION:** *The 706 is not designed as a personal monitor. The display must be in view to determine gas concentration.*

# Appendix A: CALIBRATION & ACCESSORIES

It is recommended that the instrument be calibrated every 12 months. Please consult Test Products International for further details.

The following are consumable parts for the instrument:

In-Line Filter Element (pkg of 5)	User Replaceable	A794F
Mini Pump Protection Filter Assem.	User Replaceable	A763
**Carbon Monoxide Sensor	User / Factory Replaceable	A792
<i>**Sensor replacement requires calibration gas.</i>		

The following are accessories for the instrument:

Flue Probe	Standard	A769
Exhaust Extension	Standard	A785
In-Line Filter Complete	Standard	A794
In-Line Filter Element (pkg of 5)	Optional	A794F
Mini Pump Protection Filter Assem.	Standard	A763
Rubber Boot	Standard	A765
Infrared Printer	Optional	A740
Soft Carrying Case	Standard	A787
Exhaust Spigot	Standard	A764

# Appendix B: GUARANTEE

Your TPI 706 Carbon Monoxide Analyzer is guaranteed free from defects in materials and workmanship for 3 Years from the date of purchase. This guarantee does not affect your statutory rights. For additional information please refer to the included warranty card or contact TPI at 800-368-5719.

To obtain warranty performance or maintenance on your analyzer: - Include with the product your name, address, phone number, written description of the problem and proof of purchase date. Carefully package and return to:

TPI / Attn. Repair  
9615 SW Allen Blvd. Suite 104  
Beaverton, OR 97005

## H. Recalling Saved Data

1. Press the Recall button once.
2. The display will show "Stor" and "Cal". Use the Arrow buttons to select the desired function.

**Stor** - Selecting "Stor" allows you to display the information in a memory location.

1. Press the Recall button once. The display will show "Stor" and "Cal". Using the Arrow buttons select "Stor" by making it blink. Press the Scroll/Enter button.
2. "Addr" will be displayed and a number from 0 to 49 will flash.
3. Using the up and down arrows, select the memory location of the readings you want to display.
4. Press the Scroll/Enter key once. The 706 will display the date and time screen showing when that reading was stored.
5. Use the up and down arrows to scroll through the CO and Peak readings that were saved.
6. Press the Scroll/Enter button and "End" will be displayed and "Yes" will flash. Press the Scroll/Enter button if you are finished recalling data or use the Arrow buttons to select No to recall data from other locations.

**CAL** - Selecting "CAL" allows you to display the last date of calibration.

1. Press the Recall button once. The display will show "Stor" and "Cal". Using the Arrow buttons select "Stor" by making it blink. Press the Scroll/Enter button.
2. "CAL" will blink and the last calibration date will be displayed in DD/MM.YYYY format.
3. Press the Scroll/Enter button, "End" will be display and YES will blink. Press the Scroll/Enter button to return to normal operation.

## I. Displaying Peak CO Measurement

1. Press the Scroll/Enter button, "P-r" and the peak CO reading measured since power on will be displayed.
2. Press and hold the Down arrow button to zero the peak value.
3. Press the Scroll/Enter button to return to normal operation.

## Appendix C: ERROR CODES & TROUBLESHOOTING

The 706 analyzer will display certain codes to let you know of a malfunction.

Code Displayed	Code Definition	Possible Causes	Corrective Action
<b>Flo Err</b>	Pump not drawing sample at correct flow rate.	Blockage / kink in flue probe hose. Dirty or blocked filter(s). Worn pump.	Check and rectify. Replace filter(s). Return to TPI for service.
<b>Inlt CO Err</b>	Carbon monoxide sensor failed to initialize.	Flue probe connected to 706 prior to power up. 706 did not purge completely from last sample. Worn or defective carbon monoxide sensor.	Disconnect probe and restart. Purge for 20 minutes and restart. Return to TPI for sensor replacement or install new sensor.* Try manually initializing the sensor. See Appendix G.
<b>Lo bat</b>	Low battery.	Battery needs to be charged.	Charge battery. If the battery won't hold a charge, replace the battery.
<b>oFL</b>	Overflow indication. The carbon monoxide being measured is above the instruments capability.	CO being measured is too high or low.	Remove the CO source and allow the 708 to purge.

\*Sensor replacement requires calibration gas.

### D. Measuring CO in Flue Gas

1. Complete steps A and B above.
2. Attach the hose from the flue probe to the Mini Pump Protection Filter.
3. Place the shaft of the flue probe into the flue.
4. 706 will measure the CO. Empty water/air filter as needed.

### E. Measuring CO in exhaust

1. Complete steps A and B above.
2. Attach the hose from the flue probe to the Mini Pump Protection Filter. Connect the exhaust probe extension (flexible metal tube) to the end of the flue probe.
3. Place the extension into the exhaust stream.
4. 706 will measure the CO. Empty water/air filter as needed.

NOTE: The instrument has an auto shut off after 10 minutes should no keys have been pressed for this period and as mentioned above that the CO is below 15ppm. Should the CO be above 15ppm then the 10 minute auto shut off countdown will not begin till the CO has gone below 15ppm.

### F. Activating the Backlight

1. Follow the procedure in "A" above.
2. Press and hold down the Func button for 2 seconds. The backlight will come on and the icon will appear on the LCD.
3. Light will automatically turn off after 20 seconds to preserve battery life.

### G. Saving Data

1. Once you have obtained a reading and want to save it, press the Store button once.
2. The display will show "Stor". Press the Scroll/Enter button and "Addr" and a number from 0 to 49 will flash.
3. Using the up and down arrows, select the desired location to save the readings.
4. Press the Scroll/Enter key once. The 706 will store the readings, "End" will be displayed and "Yes" will flash. Press the Scroll/Enter button if you are finished printing or use the Arrow buttons to select No to print again.

## Appendix D: CO ALARM & AUTO OFF SETTINGS

### Setting the Carbon Monoxide Alarm Point and/or Auto Power Off Mode

The CO alarm and auto power off settings can be changed as necessary by performing the following procedure.

**WARNING :** Changing parameters in field calibration mode can adversely affect the operation of your analyzer. Follow the instructions carefully.

1. Press and hold the FUNC and Down Arrow keys for approximately 5 seconds until a beep is heard. Press and hold the Scroll/Enter Key down until 'FIELD CAL' is displayed. The 706 will cycle through a 30 second countdown then display 'CAL', 'Air', 'gAS'.
2. Use the Up Arrow Key to select 'Air' by making it blink. Press the Scroll/Enter Key to accept the selection.
3. 706 Display: 'CAL', 'FLo', 'oPEn'. Action : Press the Func Key to bypass.
4. 706 Display: 'CAL', 'FLo', 'CLos'. Action : Press the Func Key to bypass.
5. 706 Display: '0ppm', 'Co', 'rEF'. Action : Press the Func Key to bypass.
6. 706 Display: '2000', 'A-r', 'SEt'. Action : If you are not changing the CO alarm point press the Func Key. Otherwise press the Up and Down Keys to set the ppm level the alarm will sound at. Factory default is 2000ppm. Press the Scroll/Enter Key to accept the selection.
7. 706 Display: 'Auto', 'oFF', 'En'. Action : If you are not changing the auto power off mode press the Func Key. Otherwise press the Up and Down Arrow Keys to enable (En) or disable (dis) the auto off function. Factory default is enabled (En). Press the Scroll/Enter Key to accept the selection.
8. 706 Display: 'CAL', 'StoP', 'go'. Action : Press the Up Arrow Key to select 'StoP' by making it blink and press the Scroll/Enter Key to accept the selection. The 708 will return to normal operation

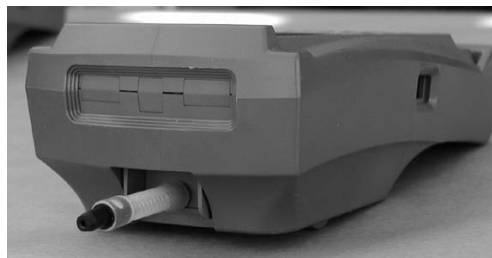
## Operating Instructions:

### A. Powering up the 706

1. Turn the unit on in an **uncontaminated environment** (clean air away from the system in question) by holding down the red ON/OFF switch for 2 seconds.
2. The 706 will power up and go through a 30 second self test to ensure the unit is operating properly.
3. When the display shows 0 ppm, you are ready to measure CO.

### B. Attaching Mini Pump Protection Filter

1. Obtain the pump filter assembly and push the open end of the tube onto the inlet at the top of the 706 (refer to figure below).



### C. Measuring CO in Ambient Air

1. Complete steps A and B above.
2. Place the 706 in any area to measure CO.
3. The 706 has an alarm that will sound at 500 ppm (factory set) for your safety.

NOTE: The instrument has an auto shut off after 10 minutes should no keys have been pressed for this period and as mentioned above that the CO is below 15ppm. Should the CO be above 15ppm then the 10 minute auto shut off countdown will not begin till the CO has gone below 15ppm.

## Controls and Push Buttons



Turns the 706 On (hold button in for 2 seconds) and Off



Toggles between CO reading and Peak Reading. Used to save, recall and print stored data.



Used for setting date, time and accessing data storage addresses



Used for setting date, time and accessing data storage addresses



Used to recall previously stored data in one of 50 data storage addresses or the last calibration date.



Used to store data in one of 10 data storage addresses.



Used to select CO measurement or date/time in main display. Hold down for 2 seconds to activate LCD backlight.



Sends real time or stored data to the IR printer port. Also used to print the last calibration date.

## Appendix E: MANUALLY INITIALIZING SENSOR

### Manually Initializing the Carbon Monoxide Sensor

If the CO sensor fails to initialize, this procedure can be performed to try and manually initialize the sensor.

**WARNING :** Changing parameters in field calibration mode can adversely affect the operation of your analyzer. Follow the instructions carefully.

1. Press and hold the FUNC and Down Arrow keys for approximately 5 seconds until a beep is heard. Press and hold the Scroll/Enter Key down until 'FIELD CAL' is displayed. The 706 will cycle through a 30 second countdown then display 'CAL', 'Air', 'gAS'.
2. Use the Up Arrow Key to select 'Air' by making it blink. Press the Scroll/Enter Key to accept the selection.
3. 706 Display: 'CAL', 'FLo', 'oPEn'. Action : Press the Func Key to bypass.
4. 706 Display: 'CAL', 'FLo', 'CLoS'. Action : Press the Func Key to bypass.
5. 706 Display: '0ppm', 'Co', 'rEF'. Action : Press the Scroll/Enter Key. After the 10 second countdown is complete press the Scroll/Enter Key twice.
6. 706 Display: '2000', 'A-r', 'SET'. Action : Press the Func Key to bypass.
7. 706 Display: 'Auto', 'oFF', 'En'. Action : Press the Func Key to bypass.
8. 706 Display: 'CAL', 'StoP', 'go'. Action : Press the Up Arrow Key to select 'StoP' by making it blink and press the Scroll/Enter Key to accept the selection. The 706 will return to normal operation

**If the 706 continues to fail to automatically initialize or this procedure fails to initialize the sensor, return your analyzer to Test Products International.**

## J. PRINTING DATA (Optional A740 Printer Required)

**WARNING:** - To operate correctly there must be a clear line of sight between the Infrared Window on the instrument (see 3.3) and the Infrared Window on the IR Printer (see Printer instructions). Place the printer so it is no closer than approximately 6 inches from the analyzer.

1. Press the Print Key once  
'rEAL', "Stor", and "Cal" will be displayed and 'rEAL' will be flashing. Selecting 'rEAL' will cause the 706 to print the test data currently on the display (real time data). Selecting 'Stor' will cause the 706 to print data stored in memory. Selecting "Cal" will cause the 706 to print the last date of calibration. Use the Up and Down Arrow Keys to select the desired print mode and press the Scroll/Enter Key.

**REAL Print Mode** - If rEAL print mode is selected, the analyzer will display 'Wait' 'out' and bars will change position on the LCD until printing is complete.

**STOR Print Mode** - If Stor mode is selected, 'Addr' will be displayed on the top line along with 'SA ' and a location number from 0 to 9 will be flashing on the screen. Select the required address location that you wish to print data from by pressing the Up and Down Arrow Keys and press the 'Scroll/Enter' Key. The analyzer will display 'Wait', 'out' and bars will change position on the LCD until printing is complete.

**CAL Print Mode** - If Cal print mode is selected, the analyzer will display 'Wait' 'out' and bars will change position on the LCD until printing is complete.

After printing is complete, 'End' will be displayed and 'YES' (or 'no') will blink. Selecting 'YES' will return the 706 to normal operation, selecting 'no' will return the 706 to the print selection screen so you can print again. Use the Up and Down Arrow Keys to make the selection and press the Scroll/Enter Key.

## K. Setting the Date and Time

1. Follow the power on procedure outlined earlier.
2. Press the Func button once. The current time, date and year are displayed. Please note that the time is on a 24 hour clock and the date is shown as DD/MM.
3. To change a value, press the Scroll/Enter button once. The minutes for the time will begin to flash.
4. Using the up or down arrow, set the display to the correct value.
5. Repeat steps 3 and 4 for hours, month, day and year until all items are set and there is nothing flashing on the LCD.
6. Press the Func button to return to CO measurement.

## Battery Replacement

1. Remove the battery compartment cover from the bottom of the handle by sliding the door away from the front side of the instrument.
2. Remove the batteries and replace by sliding the negative (-) end of the batteries in first.
3. Replace the battery cover by sliding the door into the slots provided in the handle and allow it to snap into place.
4. For best performance use quality alkaline batteries.