Low Level Carbon Monoxide Monitor

780

The Value Leader™

www.tpi-thevalueleader.com

Contents

TPI 780
Low Level Carbon Monoxide (CO) Monitor
Instruction Manual

Read and understand instructions before use.

⚠ **Warning:** To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

⚠ **Warning:** To reduce the risk of ignition of a flammable atmosphere, batteries must only be changed in an area known to be nonflammable.

CE

EMC Directive (2004/108/EC)
EN 61000-4-2:1995, EN 61000-4-3:2002, EN 55011:2007

SAFETY INFORMATION

⚠ 1. **IMPORTANT:** Read and understand this manual prior to use.

⚠ 2. **IMPORTANT:** CO instruments may show high readings for up to 30 minutes if taken from warm air to cold temperatures and vice-versa. For best results let them "soak" in the ambient conditions prior to use.

⚠ 3. **WARNING:** Substitution of components may impair operation.

⚠ 4. **WARNING:** This instrument contains alkaline batteries which may leak or leak or explode if improperly used. **DO NOT DISPOSE OF IN A FIRE.**

⚠ 5. **WARNING:** Only service in an area known to be free of combustible gases.

⚠ 6. **WARNING:** This iInstrument is not certified intrinsically safe.

⚠ 7. **WARNING:** Keep all openings free from dirt, debris and foreign objects.

⚠ 8. **WARNING:** Do not use a damaged or improperly operating instrument. Contact a service representative immediately.

⚠ 9. **WARNING:** ONLY zero the instrument in a gas free environment

GENERAL DESCRIPTION

The TPI 780 is a low CO monitor for use in work and living spaces. It can be set on a flat surface or mounted to a wall using the included hardware. The 780 displays the real time CO concentration, peak CO concentration in a 24 hour period, and COHb%. It has visual and audible alarms.

Unlike standard CO monitors that don't alert to low level carbon monoxide the 780 will display the level of CO from 0ppm and above and audibly and visually alert at 10ppm. Standard CO monitors designed to UL2034 don't alert until 70ppm is detected for up to 4 hours.

LOCATION OF THE TPI 780

Whether you are wall mounting the 780 or using it on a flat surface there are some items to consider regarding the location of the 780.

1. If wall mounting the 780 it is best to install it at head level.

2. If you are using a single 780 in a house it is best to locate the unit in the bedroom or within approximately 10 to 20 feet of the bedroom. Monitoring for CO while asleep is very important.

3. If you are using a single device and if you have an infant, young children, elderly person, or a person with lung or heart related health issues living in your household it would be best to locate the 780 near the area where they sleep because they are at much higher risk to low level carbon monoxide.

4. If using a single 780 in an office environment locating it in a central area is best. Mounting it near a thermostat is also an option if the thermostat is in a central area.

5. Using more than one 780 is a great way to ensure your entire living or work space is being monitored.

Do Not locate the 780 where it may be obstructed from sampling air like behind curtains.

Do Not locate the 780 near heat vents, chimneys, flues, or combustion appliances like stoves, furnaces, or fireplaces.

Do Not locate the 780 outside or anywhere temperatures could drop below 32ºF (0ºC) or above 104ºF (40ºC).

Do Not locate the 780 where it may come in contact with liquids or moisture of any kind.

MOUNTING THE TPI 780

If you are mounting the TPI 780 to a wall please follow the steps below. If you are not wall mounting the 780 please proceed to page 4.

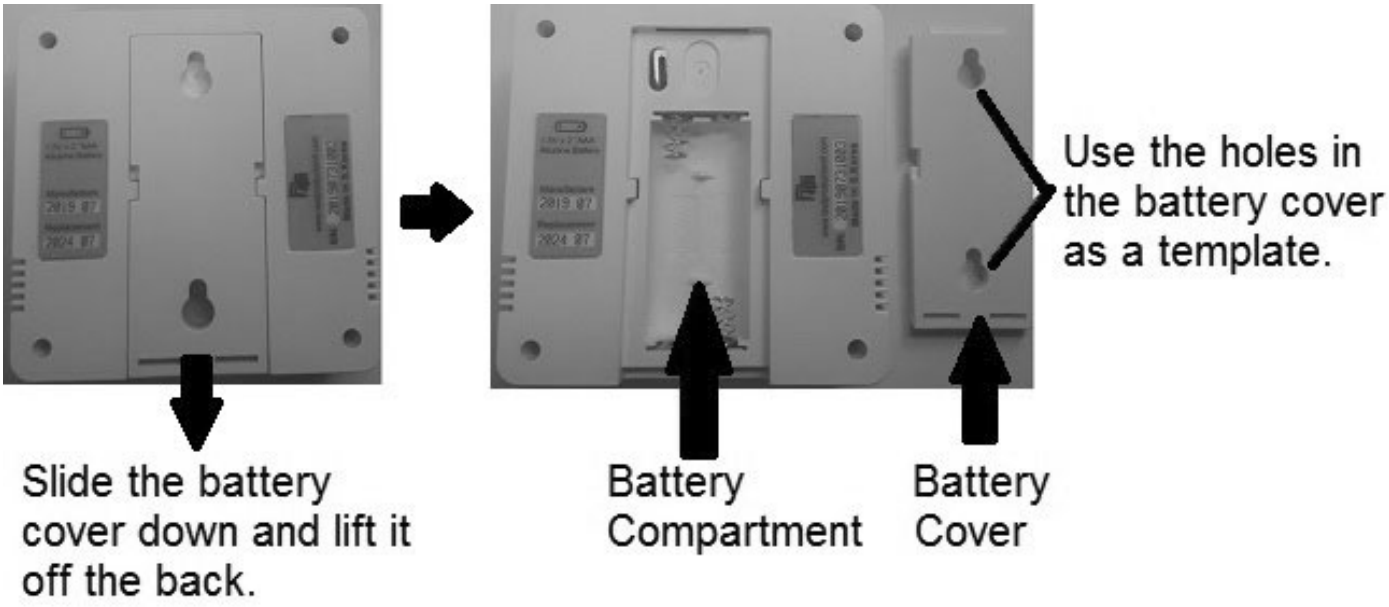
1. Remove the battery cover on the back of the instrument by sliding the cover down and then lifting it off from the bottom.

2. Using the battery cover as a template, mark where the holes are located for the screws to mount the 780 to the wall. (Alternately the hook and loop tape fasteners can be used to mount the 780 to the wall or other flat surface)

3. Drill holes for the plastic screw anchors. Insert the anchors into the wall and insert the screws into the anchors. (If using the hook and loop fastener tape, remove the backing from one piece and attach it to the 780 then remove the backing from the other piece and attach it to the wall or flat surface)

4. Tighten the screws into the anchors leaving enough room between the screw head and the wall to slide the battery cover on the screw heads.

5. Proceed to the next page and install the batteries.



INSTALLING BATTERIES AND TURNING THE 780 ON

1. Remove the battery cover on the back of the instrument by sliding the cover down and lifting it off from the bottom.

2. Observing proper polarity, install two AAA alkaline batteries (included) into the battery compartment of the 780.

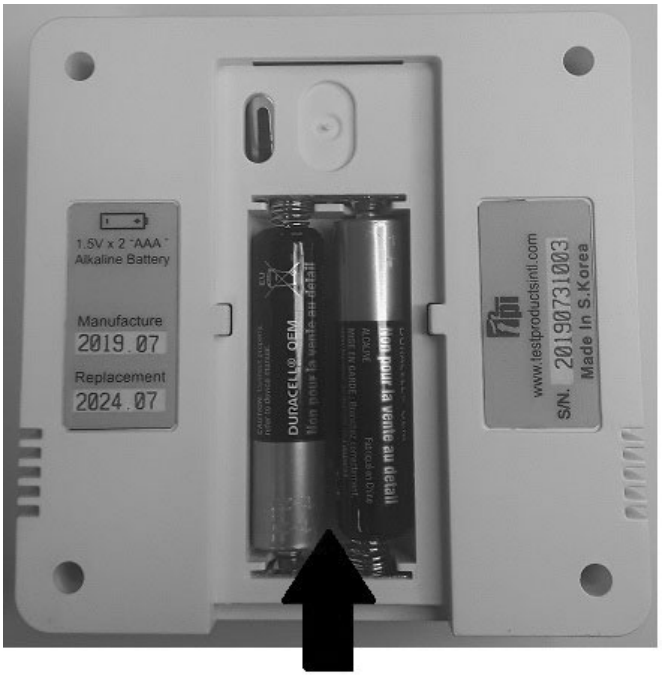
3. Re-install the battery cover by aligning the slots on the sides with the tabs on the back of the 780. Slide the cover to the top of the 780.

4. The battery cover will activate the internal on switch and the 780 will turn on. The 780 will countdown from 10 then all LED's will flash and the alarm will beep three times. **NOTE:** The beeps are very loud.

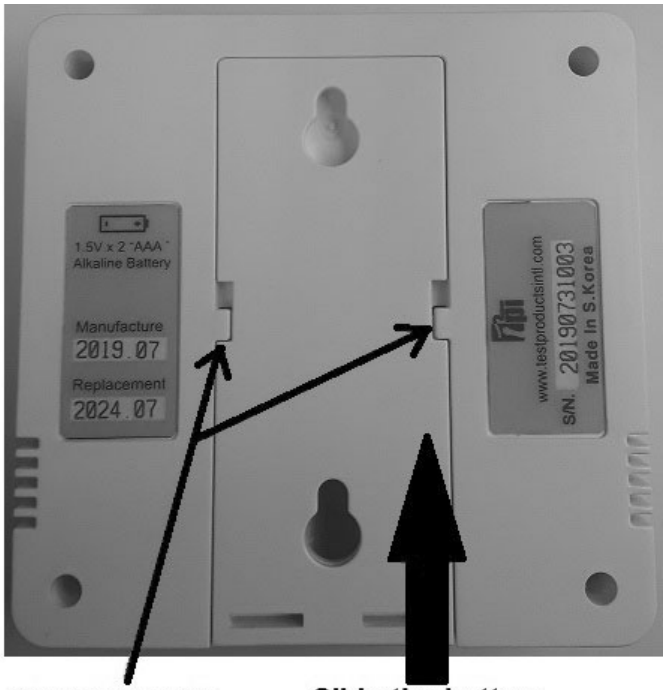
5. The 780 will set to zero ppm and is ready for use.

6. If mounting the 780 to a wall install it on the screws that were put into the wall on the prior page. (If using the hook and loop fastener tape attach the 780 to the piece of hook and loop on the wall or flat surface)

   Or set the 780 in the area to be monitored.



Observe polarity when installing batteries.

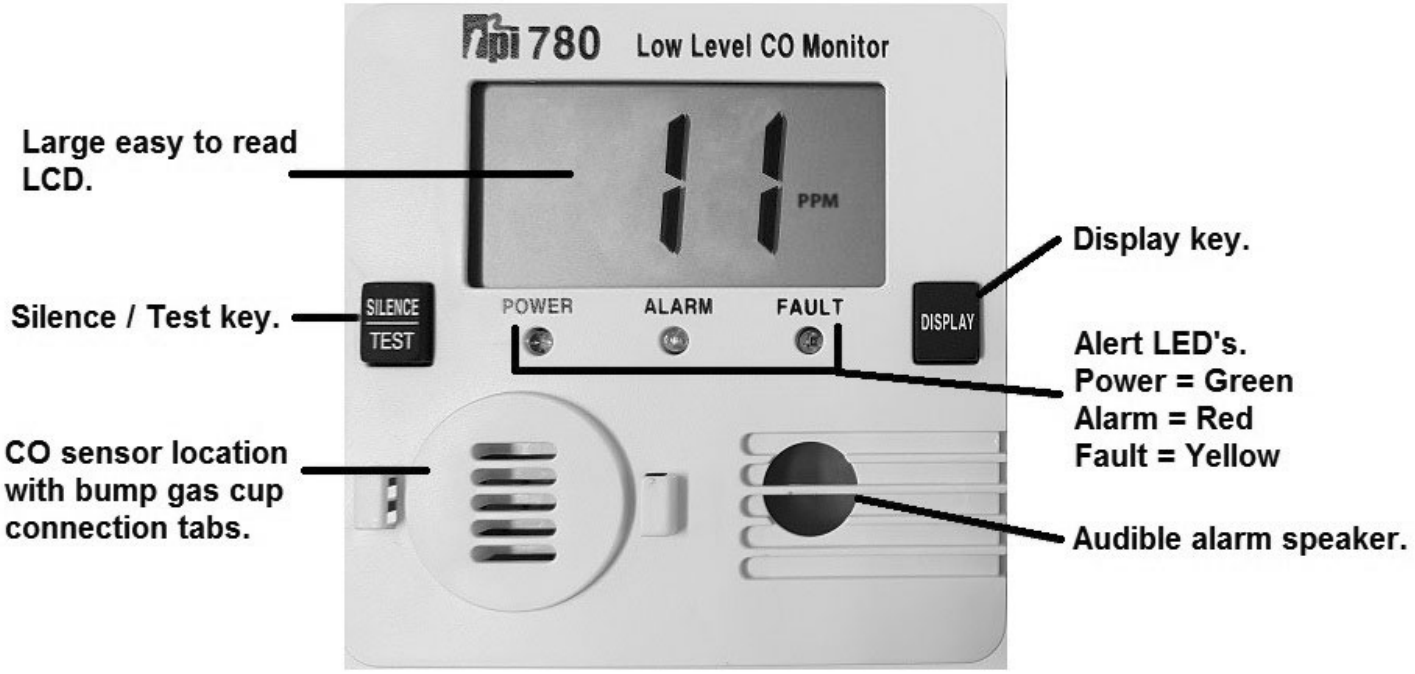


Align tabs with slots in the battery cover

Slide the battery cover towards the top of the 780 to close it and turn the instrument on.

FEATURES

The 780 is easy to use and has two key operation.



LCD Display Easy to read. Displays the real time, peak, and COHb% depending on display selection.

Silence / Test Key Press during normal operation to test the audible and visual alarms. Press during an alarm to silence the alarm for a specified period, See page 6 for additional information.

CO Sensor Location Area where CO is detected. Tabs enable the connection of the optional bump test gas cup. (Gas and cup sold separately)

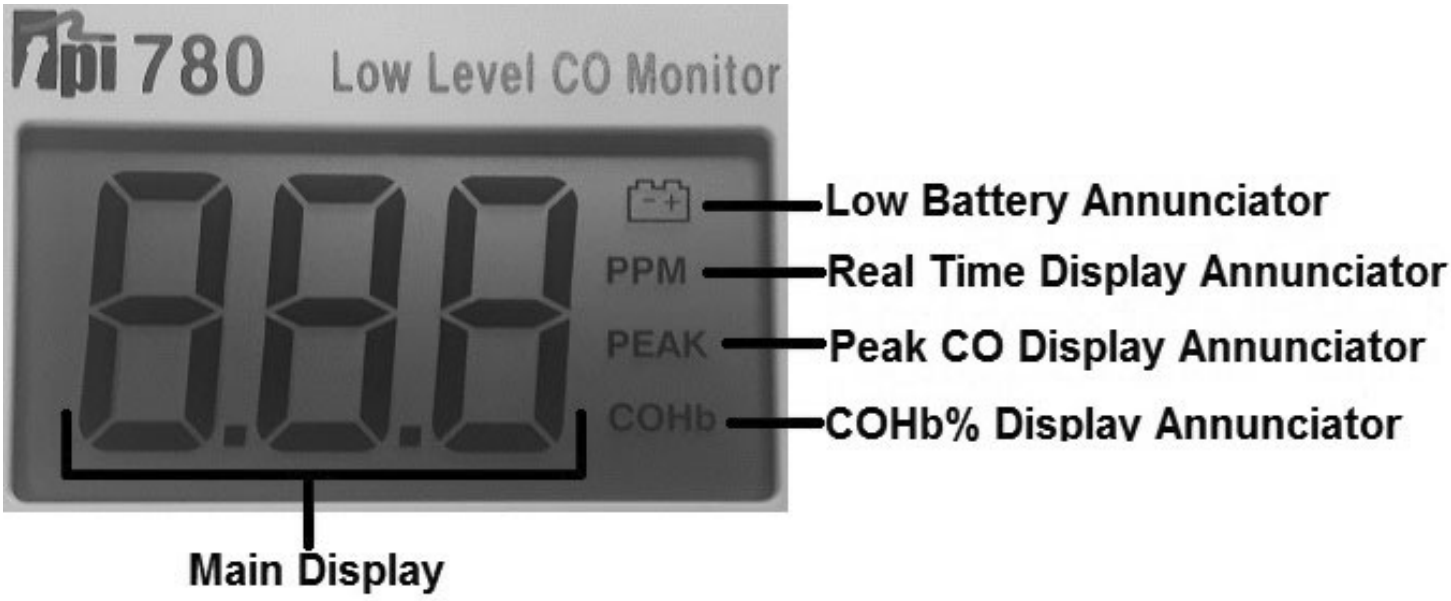
Display Key Press to cycle through real time (ppm), peak (peak), and COHb% (COHb) displays.

Alert LED's Power - Green LED flashes once per minute to indicate normal operation.
Alarm - Red LED flashes once every 10 seconds in alarm condition.
Fault - Yellow LED flashes, battery annunciator illuminates, and audible alert activates when the batteries are low (see page 9).
Yellow LED flashes and audible alert activates when the sensor is at the end of life or has a fault (see page 9).

Audible Alarm Speaker Location for loud 85dB piezo alarm speaker.

DISPLAY & ANNUNCIATORS

The 780 has an easy to read display with annunciators.



Main Display — Displays the CO level in real time, peak, and COHb% depending on display selection.

Low Battery Annunciator — The low battery annunciator illuminates to indicate the batteries require replacement. The Fault LED will flash once per minute and the audible alarm will chirp once per minute when the batteries are low as well.

Real Time Display — During normal operation this annunciator will indicate what level the CO is in ppm (part per million). The Display Key is used to change the display mode.

Annunciator Peak CO Annunciator — When the Display Key has been pressed this annunciator will illuminate to indicate the display is showing the highest amount of CO recorded in the last 24 hours. Peak CO can be cleared by pressing the Display and Silence/Test keys down at the same time. (See page 8 for more information)

COHb Annunciator — When the Display Key is pressed this annunciator will illuminate to indicate the display is showing the COHb percentage. Carboxyhemoglobin (COHb) is a stable complex of carbon monoxide that forms in red blood cells when carbon monoxide is inhaled. (See page 8 for more information)

ALARMS (Audible & Visual)

Visual Display Range

0 to 200ppm then “HI” displays above 200ppm

Visual Alarm Warning

Red Alarm LED flashes once every 10 seconds during an alarm condition.

Audible Warning Levels

10 to 24 PPM … ONE Series of four beeps ONCE every Minute
25 to 34 PPM … ONE Series of four beeps ONCE every Minutes
35 to 50 PPM … ONE Series of four beeps every 30 seconds
Above 50PPM … ONE Series of four beeps every 20 Seconds

Alarm Silence Feature

If the user is present when the audible alarm sounds they can push the "Test / Silence" button to activate the Silence Feature. If the user is not present when the audible warning sounds the Silence Feature automatically activates after 4 minutes to conserve battery life.

The Alarm Silence periods are as follows:

10 to 24 PPM … Silence … 24 Hours with RED L.E.D. FLASHES once a minute
25 to 34 PPM … Silence … 8 Hours with RED L.E.D. FLASHES once a minute
35 to 50 PPM … Silence … 1 Hour with RED L.E.D. FLASHES Twice a minute
Above 50 PPM … Silence….4 Minutes with RED L.E.D. FLASHES Three Times a minute
Above 70 PPM … Silence 2 minutes with RED L.E.D. FLASHES Four Times a minute
Above 150 PPM … Silence 1 minute with RED L.E.D. FLASHES Five Times a minute
Above 200 PPM … Silence 15 seconds silence with RED L.E.D. FLASHES Six Times a minute

DISPLAY MODES

Real Time CO Display

The default start up display is real time CO. This display will show the current real time CO measurement. Pressing the DISPLAY key allows you to cycle through other display modes.

Peak CO Display

Pressing the DISPLAY key cycles through available displays. When the "PEAK" annunciator is illuminated the 780 will display the maximum CO level measured in the last 24 hours.

To clear the PEAK CO display, press and hold the SILENCE/TEST and DISPLAY keys down at the same time for 6 seconds and then release the keys. The PEAK display will set to 0ppm.

Pressing the DISPLAY key will cycle the display back to normal operation ("PPM").

COHb Display

Pressing the DISPLAY key cycles through available displays. When the "COHb" annunciator is illuminated the 780 will display the COHb percentage.

Carboxyhemoglobin (COHb) is a stable complex of carbon monoxide that forms in red blood cells when carbon monoxide is inhaled. COHb% represents the CO Poisoning accumulated effect in the human blood stream. This is the amount of the CO exposure that you would have experienced if you had been exposed to that same CO PPM level during that same period of time.

(COHb% is calculated based on Coburn equation 218[1-e –(t/2398b)] [0.003 +(ppmco/1316)] where B=0.0404. The timings used for calculation in each ppm band is tabulated in the following ppm bands:
7 to 19 ppm, 20 to 39 ppm, 40 to 59 ppm, 60 and over.

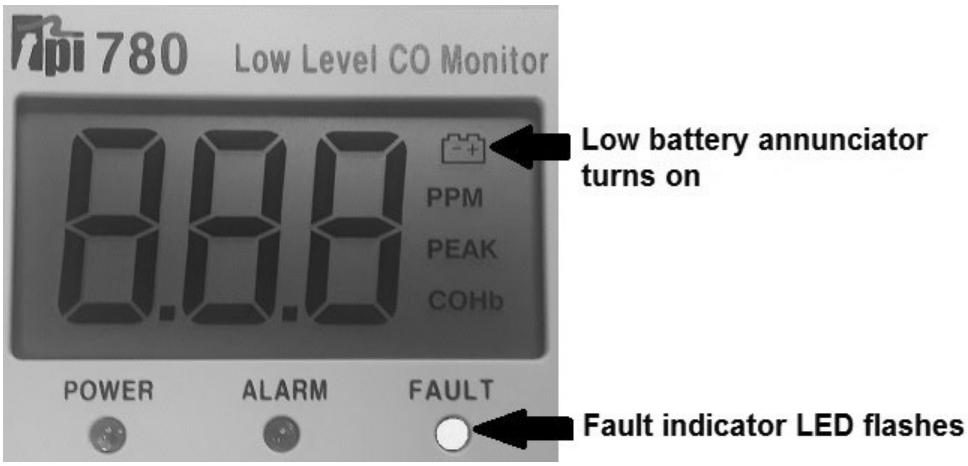
Time resolution is one minute. Duration of display is the total ppm time of exposure. Pressing the DISPLAY key will cycle the display back to normal operation ("PPM").

LOW BATTERY & SENSOR END OF LIFE / FAULT INDICATION

Low Battery Indication

When the batteries are low the 780 will indicate that the batteries need to be changed. The battery annunciator will illuminate, the fault LED will flash once per minute, and an audible beep will sound once per minute.

When a low battery is indicated change the batteries as soon as possible to ensure proper operation. Please see page 4 to see how to access the batteries. The 780 uses two AAA alkaline batteries.

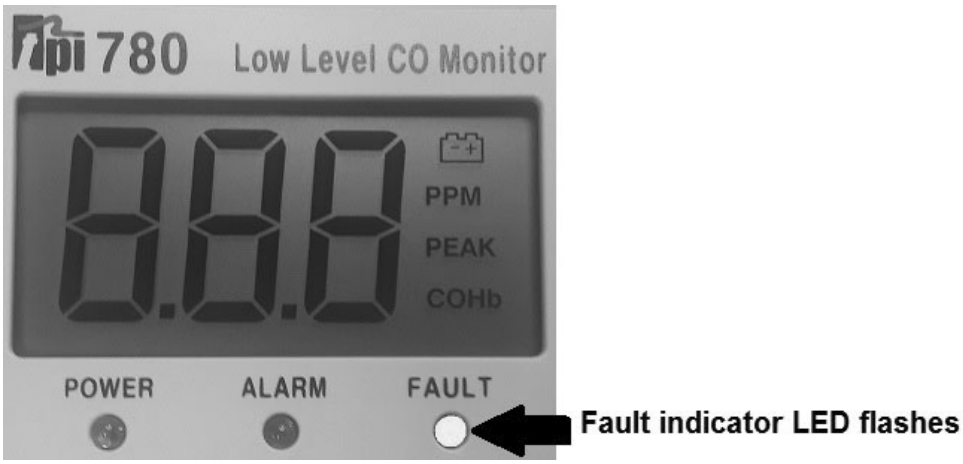


Sensor End of Life / Failure Warning

In the event of the end of life of the sensor or a sensor fault the fault LED will flash once per minute and an audible beep will sound once per minute.

If the sensor failed within the 2 year warranty period please send it back to Test Products International, Inc for service.

If the sensor is beyond the two year warranty it is at the end of life and it is time to replace the 780. If you are unsure of the age of your 780 please reference the manufacture date on the back of the unit.



BUMP TESTING

The 780 can be tested for proper operation as required using CO bump gas. The 777K1 bump test kit can be purchased separately to perform this test. The 777K1 contains the 777BGAS 100ppmCO gas, 777CUP cup attachment, and A600 carrying case.

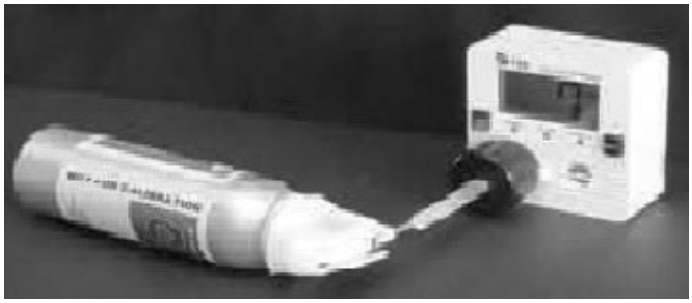
Bump Gas & Calibration Cup

Bump Test Procedure

With the 780 on and the display set to real time (ppm) connect the 777CUP calibration cup to the CO sensor area by setting the cup on the 780 and then turning the cup to the right to lock the cup's tabs under the tabs on the 780.

Put the nozzle of the 777BGAS bump gas can into the tubing on the 777CUP calibration cup. Depress the trigger briefly to apply a quick dash of CO to the sensor. The alarm should activate within approximately 20 seconds.

Remove the nozzle from the tubing then remove the calibration cup from the 780 and allow the displayed reading to return to 0ppm.



SPECIFICATIONS

Sensor Type: Electrochemical (5 year life expectancy)
Measured Gas: Carbon Monoxide (CO)
Measurement Range: 0 to 200ppm (Displays "Hi" over 200ppm)
Display Resolution: 1ppm
Accuracy: 0 ppm ~ 69 ppm : ±3 ppm at 73ºF +/-10ºF (23.0℃ ±5w℃)
70 ppm ~ 200 ppm : ±5ppm or 5% or reading, whichever is greater at 73ºF +/-10ºF (23.0℃ ±5℃)
Visual Indicators: Normal Operation (green LED)
Alarm Indication (red LED)
Fault Indication (yellow LED)
Audible Indicator: Piezo buzzer - 85dB at 10 feet away
Display Modes: Real time (ppm), Peak, and COHb%
Batteries: AAA Alkaline batteries (2)
Battery Life: Three years typical (Alarm condition impacts battery life)
Operating Temperature: 32ºF to 104ºF (0ºC to 40ºC)
Operating Humidity: 30% to 90% non-condensing

MAINTENANCE

Test your 780 - Once per month by pressing the Silence/Test key. Each alarm LED will flash once and 4 quick beeps will sound to let you know the 780 alarm is functioning properly.

Test your 780 - A minimum of once per year with the 777K1 bump gas test kit. This will confirm the sensor and alarm is functioning properly. To perform this test follow the instructions on page 10.

Clean your 780 - Keep your 780 free from dust and particulates. Periodically wipe the 780 down using a lint free cloth. Use of a damp cloth is acceptable but do not use chemicals or sprays.

TROUBLESHOOTING

Symptom	Possible Cause	Corrective Action
Alarm LED flashes / alarm sounds once per minute and the Low battery annunciator is on.	Low batteries	Replace batteries (See page 4)
Alarm LED flashes / alarm sounds once per minute	Sensor at end of life.	Replace the 780 or send it to TPI for service. (See page 13).
	Sensor faulty.	

CARBON MONOXIDE LEVELS and EFFECTS

Note: The chart below contains general information concerning acceptable carbon monoxide levels from various sources. It is recommended you check with local state government concerning acceptable levels in your area.

Concentration of CO in air (ppm=parts per million)	Exposure Times and Toxic Symptoms
9ppm	The maximum allowable concentration for short term exposure in a living area according to ASHRAE.
35ppm	8 hour exposure limit in a TWA (time weighted average) as recorded by NIOSHA (National Institute of the Occupational Safety and Health Administration) of the CDC (Center for Disease Control).
50ppm	The maximum average level for continuous exposure in any 8 hour period according to US federal law. (OSHA)
100ppm	Employees shall be removed from the enclosed space if the carbon monoxide concentration exceeds a ceiling of 100ppm (0.01%) according to OSHA. At this level symptoms include slight headaches, fatigue, dizziness, and nausea after 2 to 3 hours.
200ppm	NIOSH (National Institute for Occupational Safety & Health Administration) states that a worker will not be exposed to more than this amount.
400ppm	At this level symptoms include headache, dizziness, and nausea within 1 to 2 hours. Life threatening after 3 hours of exposure.
800ppm	At this level symptoms include headache, dizziness, nausea, and convulsions within 45 minutes of exposure. Unconsciousness within 2 hours and death within 2 to 3 minutes after.
1600ppm	At this level symptoms include headache, dizziness, and nausea within 20 minutes of exposure. Death within 1 hour.

ACCESSORIES

Part Number	Description
777K1	Bump gas test kit. Contains 100ppm CO (777BGAS), calibration cup (777CUP), and carrying case (A600)
777BGAS	Replacement 100ppm CO test gas
777CUP	Replacement calibration cup
A600	Carrying case for 777K1 kit

WARRANTY & SERVICE

Your TPI 780 is warranted to be free from defects in materials and workmanship for a period of 2 years after purchase (excluding calibration). If within the warranty period, your instrument should become inoperative from such defects, the unit will be repaired or replaced at our option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, mis-use, abuse, neglect or improper maintenance. Proof of purchase may be required before warranty is rendered.

Units out of warranty or returned for calibration will be serviced for a cost. Internal repair of maintenance must be completed by a Test Products International authorized technician. Violation will void warranty. Units must be returned post-paid to the address below:

TPI ATTN: SERVICE
9615 SW ALLEN BLVD
SUITE 104
BEAVERTON, OR 97005

Test Products International, Inc.
9615 SW Allen Blvd., Ste. 104
Beaverton, OR 97005
Tel: 503-520-9197 Fax: 503-520-1225
www.testproductsintl.com

Test Products International, Ltd.
342 Bronte Road South, Unit #9
Milton Ontario Canada L9T5B7
Tel: 905-693-8558 Fax: 905-693-0888
www.testproductsintl.com

Test Products International Europe Ltd.
Longley House, International Drive
Southgate, Crawley, West Sussex RH10 6AQ
Tel:: +44 (0) 1293 530196 Fax: +44 (0) 1293 531870
www.tpieurope.com