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PPM Formaldemeter™ *htV-m*

**3 Parameter IAQ Monitor
with built-in Memory
Operation Manual**

Manual Part Number

80012-020

MCN-15-003, 10/12/15

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1.0 Introduction

The **PPM Formaldemeter™ *htV-m*** is a precise 3 parameter indoor air quality monitor suitable for monitoring low level concentrations of hazardous formaldehyde vapors under extremes of temperature and humidity, in parts per million (ppm) and mg/m³. Fast and easy to use, pressing a single button gives an immediate indication of concentration levels.

The *htV-m* has a built in non-volatile memory and real time clock. It can be used as a manual hand held device or a continuous data logger capable of over 7 days (optional) continuous monitoring and thus has the option of being mains or battery powered. A PC can automate the sampling and logging of data at specific times by a direct USB/RS232 interface or via a wireless connection. The SPC-2 program can be used to monitor the instrument continuously using the USB/RS232 interface on the Formaldemeter™ *htV-m*.

Please read these instructions carefully and familiarize yourself with the instrument before use. The operating manual will provide you with all the necessary information for the correct use of your Formaldemeter™ *htV-m*.

Please note that PPM Technology Limited shall not be liable for errors that may appear herein or for incidental or consequential damages in connection with or arising from the use of this material.

NOTE: *All specifications stated in this manual may change without notice.*

1.1 Unpack

Your PPM Formaldemeter™ *htV-m* kit has been packaged carefully and includes all the components necessary for full operation. Immediately upon receipt, please examine the kit contents carefully to ensure that you have received the following items in good condition.

Kit Contents:

- Formaldemeter™ *htV-m* instrument with stand
- Formaldemeter Calibration Standard
- CD Formaldemeter™ *htV-m* Downloader Software
- USB Cable
- AC/DC Adapter with Universal Input Plugs
- Vial of phenol filters (10)
- Certificate of Calibration
- Quick sett-up Guide, and Full Operation Manual

Regarding Damaged Shipments

NOTE: It is your responsibility to follow these instructions. If they are not followed, the carrier will not honor any claims for damage.

- ☐ This shipment was carefully inspected, verified and properly packaged at our company and delivered to the carrier in good condition.
- ☐ When it was picked up by the carrier at **ENMET**, it legally became your company's property.
- ☐ If your shipment arrives damaged:
 - Keep the items, packing material, and carton "As Is." Within 5 days of receipt, notify the carrier's local office and request immediate inspection of the carton and the contents.
 - After the inspection and after you have received written acknowledgment of the damage from the carrier, contact **ENMET** Customer Service for return authorization and further instructions. Have your Purchase Order and Sales Order numbers available.
- ☐ **ENMET** either repairs or replaces damaged equipment and invoices the carrier to the extent of the liability coverage, usually \$100.00. Repair or replacement charges above that value are your company's responsibility.
- ☐ The shipping company may offer optional insurance coverage. **ENMET** only insures shipments with the shipping company when asked to do so in writing by our customer. If you need your shipments insured, please forward a written request to **ENMET** Customer Service.

Regarding Shortages

If there are any shortages or questions regarding this shipment, please notify **ENMET** Customer Service within 5 days of receipt at the following address:

ENMET
680 Fairfield Court
Ann Arbor, MI 48108
734-761-1270 734-761-3220 Fax

2.0 Features

2.1 PPM Formaldemeter™ *htV-m* elements

See Figure 1 for location of features:

Feature	Description
Display	The liquid crystal display (LCD) shows the formaldehyde concentration of the sample in 0.01ppm increments. The display also shows messages during certain operations.
Sampling Port	The brass sampling port is the inlet through which the sample is drawn into the sensor.
Power Port	The DC Power Port gives the option of the instrument to be AC powered.
USB/RS232 Port	The USB/RS232 allows direct connection to PC to be used with PPMonitoring software.
Battery Compartment	The battery compartment is located beneath a cover at the bottom rear of the instrument. To gain access to the battery, simply remove the cover by unscrewing the two screws. A low battery is indicated by the display flashing: bAt
Keypad	Four buttons operate the instrument; some of which have multiple functions. The button switches are located beneath the membrane and are operated by pressing firmly where indicated.

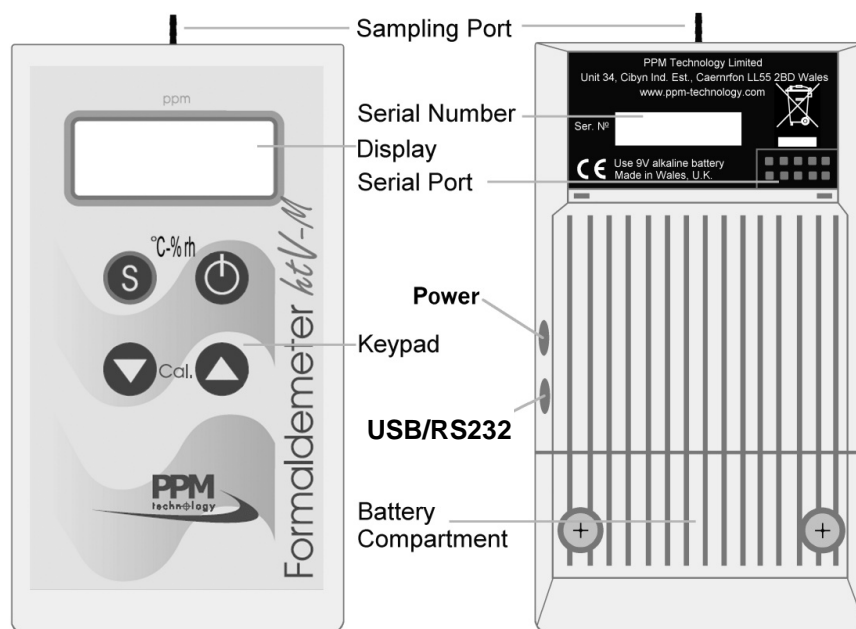


Figure 1: PPM Formaldemeter™ *htV-m* Features

2.2 PPM Formaldemeter™ *htV-m* Display Key

Display	Description
- - - -	Sensor recovering
0.00	Sensor ready
run	Sampling
CAL	Taking calibration sample
Set	Set calibration level
bAt	Replace battery
Set CAL	Instrument not calibrated
FULL	Memory full
Schd	Schedule

3.0 Operation

Unlike other formaldehyde monitoring devices such as color stain tubes and badges, the Formaldemeter™ *htV-m* is capable of measuring many samples consecutively without the need for inconvenient ancillary equipment. Being ultra compact and battery operated, the instrument is truly field portable. It can also be mains powered suitable for continuous monitoring. It can be connected directly to a manager PC for automation via the USB/RS232 interface.

3.1 Principle of Operation

Electrochemical Formaldehyde Sensor

The Formaldemeter™ *htV-m* uses proven electrochemical sensing technology for determining the concentration of formaldehyde in air samples. The instrument contains an electrochemical formaldehyde sensor comprising two noble metal electrodes and a suitable electrolyte.

When air is drawn into the sensor by means of the internal sampling system, a small voltage is generated which is directly proportional in magnitude to the concentration of formaldehyde in the sample.

This voltage is produced as a result of the electro-oxidation of formaldehyde at one of the catalytically active electrodes.

The signal is fed to a precision electronic amplifier and output on the instrument's display, when calibrated, as formaldehyde concentration in ppm (parts-per-million by volume).

All the electronic systems are based on modern, integrated circuitry employing the latest surface mount technology to ensure that the Formaldemeter™ *htV-m* is an exceptionally robust and reliable instrument.

3.2 Interferents

Phenol and Resorcinol

The presence of phenol in the air can give a reading on the Formaldemeter™ *htV-m*. When monitoring formaldehyde in situations where phenolic resins are used. These fit onto the sampling port of the instrument. The filters will completely remove phenol from the sample at concentrations in excess of 1000ppm without affecting the formaldehyde concentration.

Alcohols and Aldehydes

As is found with other portable detection equipment, the meter is not totally specific to formaldehyde alone, being susceptible to a degree of interference from a small range of other chemicals. Other aldehydes and alcohols such as methanol and ethanol in the atmosphere can cause cross-interference effects.

Sensor Background Reading

Due to the high sensitivity of the sensor: a background reading can often be produced even when sampling in an atmosphere considered to be free of interference. Background interference can be reduced using the new features on the Formaldemeter™ *htV-m*, please contact PPM Technology Ltd for details.

Humidity Extremes

As the sensor is very sensitive, it is possible that extremes of humidity (generally, anything outside 40-60% RH) may cause a background reading on Formaldemeter instruments. The Formaldemeter™ *htV-m* is specially designed to reduce the effect. A list of common chemicals, which can cause interference, is available on request.

3.3 Using the Formaldemeter™ *htV-m*

The Formaldemeter™ *htV-m*, is set to function as a handheld.

3.3.1 Taking a Sample

Power On

Press the POWER button once. The display will show - - - -

Followed by: 0.00

This indicates that the instrument is ready to take a sample.

Power Off

Switch the instrument off by pressing and holding down the ON-OFF button for 3 seconds until display shows

OFF

Then release. A click is heard, your instrument is now off.

Sampling

Turn instrument on; hold the instrument in the atmosphere to be sampled. Press and release the SAMPLE button.

The display will show run

The internal pump should be heard running for a short period as it samples the air.

The display will next flash between the following two screens for 10 seconds

- . - - and 0.00

The display will then show - . - - flashing, as the sample is analyzed. After 60 seconds, the display will show a non-flashing value, which is held until the instrument is switched off. This indicates the formaldehyde concentration in parts per million (ppm).

By holding down the ▲ button the instrument will show the reading in mg/m³ alternating with the following screen:

Alt =

By holding down the ▼ button, the display will show the time taken to reach the displayed concentration in seconds. In the event that high levels of an interferent is present, the instrument will give a reading in around 10 seconds, to avoid the sample being affected by the interference.

Alternative Settings

The two durations listed above (10 and 60 seconds), may vary depending on the specifications of the supplier or customer. These values are the default set by the instruments manufacturer. For further details please contact your local distributor.

3.3.2 Sensor Recovery Period

Between samples, the instrument should be left switched off for a few minutes to allow the sensor to clear of any residual formaldehyde. As a general rule, the higher the reading obtained, the longer it takes for the sensor to clear.

If the instrument is switched on before the sensor has cleared, the pump will not operate and the display will flash:

- - - -

The cell is clear only when the following display is shown for three seconds without interruption: 0.00

The instrument is now ready to take the next sample.

If the instrument does not clear after approximately 5 minutes, then refer to troubleshooting section of the manual.

3.3.3 Memory Full

Since the *htV-m* has a built in memory system, every sample taken either manually or continuously will be recorded, eventually after many samples (minimum 2000) have been taken the memory will become full and the display will show: FULL

This means further samples cannot be taken since the memory is full. The display will continue to show: FULL, until the memory is downloaded and cleared or the over write option is selected.

The memory is cleared using the download software included in your *htV-m* kit.

Option – Alternatively it is possible to set to over write the oldest sample in the memory with the latest. (See section 5.4 Stop on Full Mode or use the download software to change the settings).

4.0 Calibration check and Adjustment

Please read this section thoroughly before attempting to check or adjust calibration. Users are strongly advised to familiarize themselves with the instrument before attempting to adjust the calibration and should follow the instructions carefully.

General Information

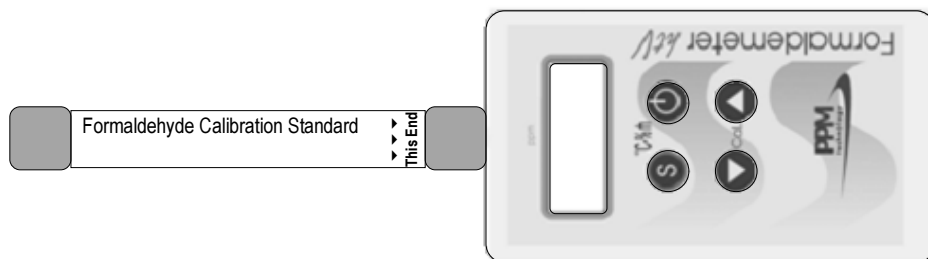
Sensor sensitivity can change very gradually with time; so periodic recalibration may be required. It is advisable to check calibration regularly to ensure that the instrument is functioning correctly.

A quick calibration check can be carried out by drawing a formaldehyde vapor sample of known concentration into the instrument's sensor and noting whether the displayed reading agrees with the expected concentration value.

The PPM Formaldemeter™ *htV-m* is supplied complete with a formaldehyde calibration standard and has a built in thermometer essential for calibrating the instrument.

It is recommended that calibration check or adjustment be carried out at the approximate operational temperature.

4.1 Temperature & Humidity Sensor



1. Hold down the SAMPLE button and press the ON-OFF button once. Release the SAMPLE button.
2. The Instrument will briefly display: HEAt
3. The instrument will then show the temperature reading in oC, followed by: oC
4. The instrument will then display the humidity (in % RH), followed by: %rH
5. The instrument will cycle through these four screens until it is either switched off manually, or it will switch itself off after 30 seconds.

The Sensor used for the temperature and humidity readings is accurate to within $\pm 3.0\%$ Rh for humidity, and ± 0.4 oC for temperature, within the operational limits for the instrument. To ensure the accuracy of the instrument the temperature & humidity sensor is replaced with the instruments annual service.

4.2 The PPM Formaldemeter™ *htV-m* Calibration Standard

The PPM Formaldehyde Calibration Standard consists of formaldehyde absorbed on a substrate in a glass tube from which a headspace vapor sample can be drawn. Each standard is carefully manufactured to a high tolerance.

Effect of Temperature

The concentration of formaldehyde vapor generated in the calibration standard varies with temperature and for this reason, the instrument has a built in thermometer and a temperature / concentration table is supplied.

Due to the effect of body temperature, handle the calibration standard only by the yellow end caps, to ensure temperature equilibrium.

Temperature Equilibrium

The calibration standard should always be allowed to stabilize within the recommended temperature range of 15-29°C for at least 1 hour before use.

Calibration Standard Expiration

Each calibration standard may be used for a maximum of 6 months (as indicated by the given expiry date), or a maximum of 100 samples. New calibration standards can be ordered from **ENMET**. See Section 8.4 for reorder part numbers.

4.2.1 Calibration Check Procedure

Place the instrument and calibration standard together in a place where the temperature is stable for at least one hour before commencing the calibration check to allow thermal equilibration.

Before carrying out a calibration check, the sensor must be clear of formaldehyde vapor from any previous samples. The Temperature sensor must be read (as described earlier) and a note taken as this is vital for the calibration procedure.

Procedure

1. Place the calibration standard and the instrument on a work surface. Handle the calibration standard as little as possible to avoid heating the tube, holding it by the yellow caps. Remove both end plugs.
2. Switch the instrument on by pressing the ON-OFF button once. Wait for the display to show: 0.00
3. Insert the nozzle into the sampling end of the tube. Ensure a good seal around the instrument nozzle by pushing the calibration standard tube firmly against the instrument when taking a sample.
4. Press the SAMPLE button and wait until the internal sampling pump stops before removing the standard from the instrument. Replace the end plugs in the calibration standard securely.
5. The display will flash between the following two screens for 10 seconds: -. - - and 0.00
6. The display will then show a flashing, -. - - as the sample is analyzed. After 60 seconds, the display will show a non-flashing value, which is held until the instrument is switched off. This indicates the formaldehyde concentration in ppm.
7. Refer to the Temperature/Concentration look-up table on the standard tube. If the reading is within 5% of the value shown in the table, then no re-calibration is required.
8. If re-calibration is required, follow the calibration adjustment procedure that follows.

Leave the instrument switched off for approximately 5 minutes to recover before commencing another calibration check, adjustment or taking a sample.

4.2.2 Calibration Adjustment Procedure

Please read this section thoroughly before attempting to check or adjust calibration. Users are strongly advised to familiarize themselves with the instrument before attempting to adjust the calibration and should follow the instructions carefully.

Under normal operating conditions, instrument calibration should require only minimal periodic adjustment. To see whether a full recalibration is required, perform a calibration check first. Leave the instrument and calibration standard in a room where the temperature is constant for at least one hour before calibrating to allow thermal equilibration.

Procedure

1. Place the instrument and calibration standard on a work surface
2. Handle the calibration standard only by the yellow end caps.
3. Press the ON-OFF button to switch the instrument on.
4. Wait for the display to show: 0.00
5. Remove the yellow plugs from both ends of the calibration standard.
6. Insert the instrument nozzle into the sampling end of the calibration standard. To maintain airtight contact between the nozzle and the standard, push the standard firmly against the instrument.
7. Simultaneously depress and release both Cal ▲ and ▼ buttons.
8. The pump will be heard drawing a vapor sample and the screen will briefly show: CAL
9. When the pump stops, remove the calibration tube and replace both yellow end plugs.
10. The display will show an increasing, flashing value for 60 seconds, followed by: SEt 1.750
11. Read the temperature noted down recently and determine the required concentration reading from the lookup table on the calibration standard, for example:
Temperature: 21°C
Reading: 2.13 ppm
12. Now use the Cal ▲ and Cal ▼ buttons to adjust the display reading to the required concentration.
13. Press the SAMPLE button to store this calibration value.
The display will show: CAL
Followed by: End

The Formaldehyde™ *ht/-m* will then switch off automatically. The instrument has now been recalibrated.

4.3 Additional Features

4.3.1 Data Retrieval

This function enables the user to view the last 10 manual samples. Use the download software to retrieve all data required.

Accessing the Data

1. Hold down the **SAMPLE** button and press the **ON-OFF** button once. Release the **SAMPLE** button.

2. The Instrument will briefly display: **HEAt**

The instrument will then flash between displaying the following two screens: Temperature reading and °C

3. Once the instrument is in this mode press the **Cal ▲** and **Cal ▼** buttons at the same time and release. The display will briefly show: **dAtA**

4. The display will then flash between the following two screens (as an example): **run0** and **0.08**

The first screen indicates which previous sample is being displayed, the most recent first, from **run0** (most recent), to **run9** (the oldest).

Use the **Cal ▲** and **▼** buttons to move to the desired sample reading.

By pressing the **SAMPLE** button when viewing a reading, the instrument will display the reading in mg/m³, as shown below:

RLt0 and **0.56**

Press the **ON-OFF** button when done to turn the instrument off.

4.3.2 Clearing the Non FRAM Memory

As with the older *htV* model, the *htV-m* has sufficient memory capacity to log the last 10 samples as well as the FRAM memory.

While viewing the data, hold down both the **Cal (▲ and ▼)** buttons at the same time, until the display has run through all the following screens:

CLr3 CLr2 CLr1 CLr0 []

The non-FRAM memory will now be clear.

5.0 Using the Formaldemeter™ *htV-m* as a Continuous Monitor

The built in memory and real time clock enables the instrument to log all 3 parameters at corresponding times, allowing improved monitoring and analysis opportunities. A schedule must be set up using the download software enclosed in order for continuous monitoring.

Real Time Clock

The Real Time clock is an internal clock, which can only be set up and viewed via a USB/RS232 link and using the download software program. The clock cannot be displayed on the Formaldemeter™ *htV-m* screen. It is used internally.

Schedule Mode

In order for continuous monitoring to take place a Schedule must be set up. A schedule allows the user to control every aspect of the monitoring e.g. set start time, how often you want to sample, for how long and on which days.

A schedule can only be set up via a PC using the download program software and USB/RS232 port to transfer the information to the Formaldemeter™. However, once a schedule has been programmed into the instrument, it can be started at any time without a PC being present.

5.1 Switching the Formaldemeter™ *htV-m* from a Handheld Device to a Continuous Monitor.

Press **POWER**, **SAMPLE** and **CAL ▲** at the same time, the screen will display:

Conf briefly, followed by **Schn** which means Schedule NO

Press the arrow key **CAL ▲** to change to

Schy which means Schedule YES

Press **SAMPLE** to select.

If a schedule has been set in the memory using the download software program, the schedule has now been activated.

5.2 Starting a Schedule

Switching the *htV-m* on again, after activating a schedule (as done above), this will start the schedule. The screen will display:

0.00 until the set schedule begins as previously set by a PC.

Then **run** will be displayed when the schedule is set to take a sample.

Then **Schd** flashes intermittently with . . .

Until the instrument has finished analyzing the sample. The sample reading will then be displayed until the next scheduled sample. During continuous sampling the display will show **Schd** flashing intermittently with the previous stored reading.

The schedule has now been set up and is running.

Once a schedule is running, all buttons on the Formaldemeter™ *htV-m* are disabled apart from the **POWER** button.

If no schedule has been set up on a PC, using the specialist software, the Default Schedule will run. The Default Schedule is set to sample continuously for as long as the instrument is turned on, at intervals of every 2 minutes.

The instrument can be scheduled to sample as often as required: as soon as the instrument has cleared after taking the previous sample; once a minute; once an hour and / or anything in between.

5.3 Ending a Schedule

If a schedule is running the instrument must be turned off first, then turned on again by pressing:

POWER, SAMPLE and CAL ▲ at the same time, the screen will display:

ConF briefly, followed by

SchY which means Schedule YES

Press arrows to select SchN which means Schedule NO

Press the SAMPLE button to select then hold down the POWER button.

Schedule Mode is now off.

5.4 Stop On Full Mode

If Stop On Full Mode is on, and the internal FRAM *ht/-m* memory is full, the *ht/-m* will not sample until memory is cleared.

If Stop On Full Mode is off, and the internal FRAM *ht/-m* memory is full, the oldest readings will be overwritten by the newest readings.

Either mode may be selected by pressing:

POWER, SAMPLE and CAL ▲ at the same time, screen will display:

ConF briefly, followed by:

Sch Y or Sch n

Select the required setting by pressing SAMPLE to confirm choice. The display will now show:

SoF Y Stop On Full Yes or SoF n Stop On Full No

Use arrow keys to navigate between the two settings pressing SAMPLE to select the required option.

When the FRAM memory is full the message FULL is shown when the instrument is turned on and if a sample is taken. If Stop On Full Yes is set, then sampling is prohibited when memory is full.

Various Instrument Modes, Limits and the Optional Alarms may also be set up in a similar way see detailed flow chart that follows.

5.5 Flow Chart

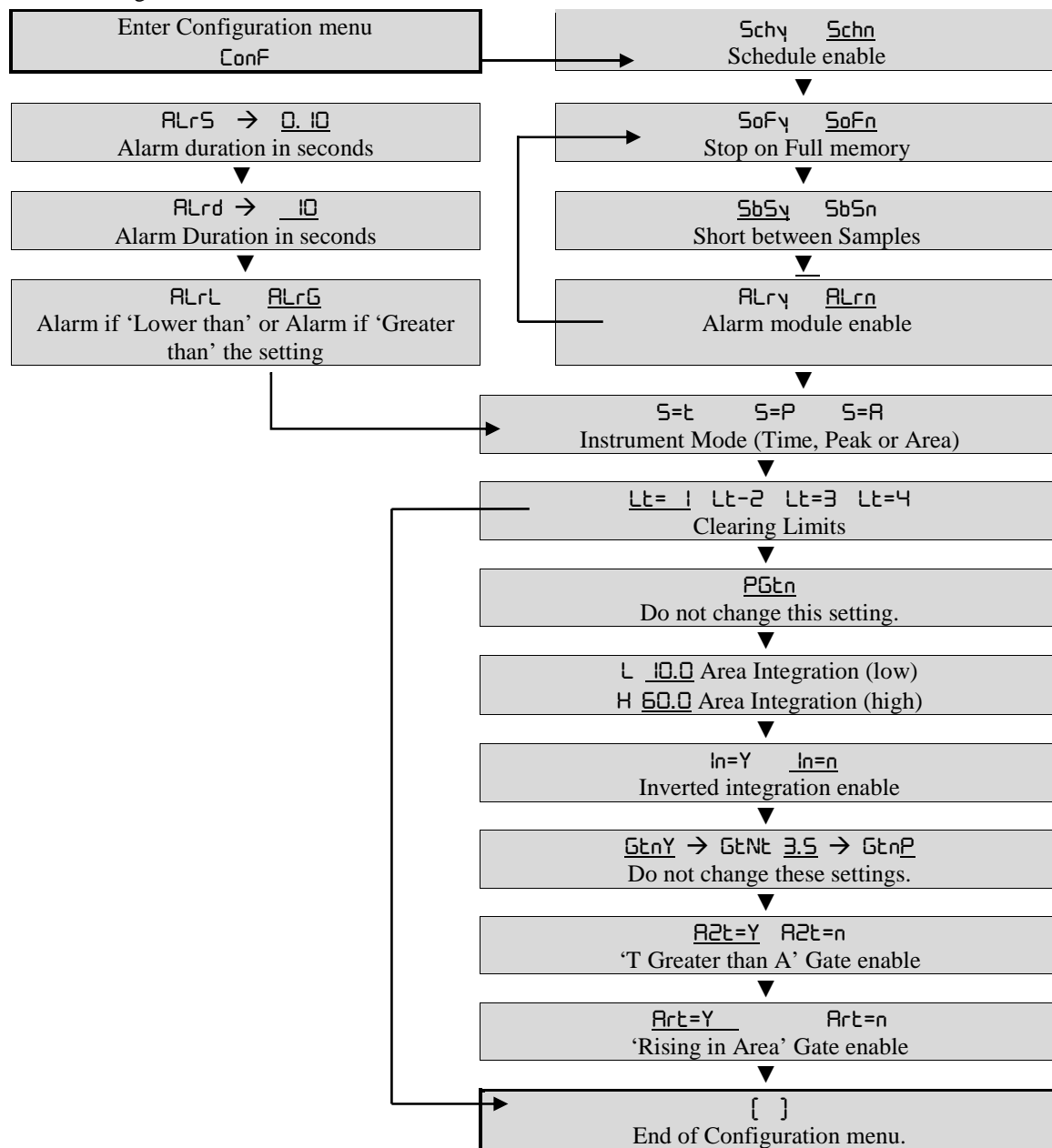
PPM Formaldemeter *ktV-m*

Press POWER, SAMPLE & CAL ▲ at the same to enter the menu.

Press SAMPLE to confirm your selection and to continue on to the next step. CAL ▲ & ▼ allow you to navigate and adjust the settings.

Once option has been selected and you do not want to change any ore settings you may hold down the POWER button to switch off. Your settings will have been saved.

Default Settings are Underlined.



5.5.1 Schedule Selection

- **Schedule Yes** – The user wishes to start a schedule (for using Formaldemeter™ *htV-m* as a continuous monitor).
- **Schedule No** – The user does not wish to start a schedule (for using the Formaldemeter™ *htV-m* as a handheld device)

Stop On Full Selection

See earlier section 5.4 for more detailed information.

5.5.2 Mode Selection

- **Time Mode** – The sample value is given at the calibration time to peak. For further details contact **ENMET**.
- **Peak Mode** – The sample value is given at the highest sensor output.

For further details contact PPM Technology.

- **Area Mode** - This is the Default Setting. The sample value given is at the higher area-time limit.

5.5.3 Limit Selection

This mode governs how quickly the instrument takes to clear before another sample can be taken. The default limit for the Formaldemeter *htV-m* is **Lt = 1**, which means that the fuel cell must be very stable before the instrument allows the user to take another sample.

To change Limit, the *htV-m* must first be RE-SET (see section 6.3), before following the Flow Chart instructions on previous page.

- **Limit 1 (Lt=1)** The normal Formaldemeter *htV-m* mode.
- **Limit 2 (Lt=2)** The normal Glutaraldemeter mode (do not use on *htV-m*).
- **Limit 3 (Lt=3)** The medium concentration Formaldemeter™ *htV-m* mode. If the Formaldemeter™ *htV-m* is used regularly in atmospheres where the concentration of formaldehyde is often well over 2ppm, it is advised to change the limit to 3. This will allow the user to sample at more regular intervals. Please note that when using limit 3, the readings at very low concentration are less accurate, due to the fact that some residual formaldehyde from the previous sample may still be present in the sensor.
- **Limit 4 (Lt=4)** The high ppm Formaldemeter *htV-m* mode.

Please contact the manufacturers regarding this limit as changing the limit to 4 require additional changes to settings.

5.5.4 Alarm Selection

- **Alarm Yes** – The user wishes to set alarms.
- **Alarm No** – The user does not want to set alarms.
- **Alarm Greater Than** – The alarm will sound if the reading is higher than the set threshold.
- **Alarm Less Than** – The alarm will sound if reading is lower than the set threshold.

5.6 How to use Data Mode with your Formaldemeter *htV-m*

Note Read and understand this section if you do not intend to use the PPM download software that was supplied with your kit. If you intend using the PPM download software please ignore this section and read the help file/manual supplied with the CD.

You will need a PC with a USB/RS232 port; your *htV-m* and the USB or RS232 cable.

1. Connect the *htV-m* instrument to the PC port using the cable – you will need to know the port number you have connected, to if you only have one then this is probably called “COM 1” – using the Device Manager tool will help. If in doubt then seek the advice of your computer administrator.
2. Once the instrument has been connected enter the Operation Settings menu by holding down all three buttons at the same time as turning the instrument on – release all the buttons and then use the sample button to scroll through the entries until you get to 232 options which you must set to read 232Y. Press sample again to save your choice and the next item should be dRt..... this needs to be set to dRtY in order to enable the Data Mode.
3. Pressing sample will save you choice and turn the instrument off as this is the last item.

Hyper Terminal

In order to receive the downloaded data you will need a piece of software known as a Terminal Emulator or Serial Capture – there are many available applications such as ProComm, WinComm & Minicom. However, most Windows installations come with a Terminal Emulator preinstalled called HyperTerminal. It can be found on the Start menu under Accessories > Communications > HyperTerminal..

Creating a new connection

Start the application and you will be prompted to enter a description for a new connection. Enter a useful name for the new connection we're about to create – something like 'htvMData' – and then click on OK.. You will now be prompted to select the connection type – from the dropdown list select the COM port connected to the instrument to and press OK.

You'll then be prompted for the connection properties for the connection – select a baud rate of 9600; 8 data bits; one stop bit and no parity or flow control:

Click on OK to open the connection. You may optionally alter some of the more advanced settings for the connection. Use the button at the top of the screen to disconnect before opening the Properties box and selecting the ASCII Setup button. Adjust the settings so that there is a tick in each of the boxes.

Close all the property boxes and save the connection for use later on. In future you will find a new submenu in the Start menu which contains all the previously saved connections: Accessories > Communication > HyperTerminal >.

Connecting to the *htV-m*

If you have previously created a connection for the *htV-m* and saved it then you may click either select it from the Start menu or open HyperTerminal; cancelling the initial dialogue and then using the File menu to open your connection. If HyperTerminal does not open the connection for you (check for a timer in the status bar) then you can click on the Call button at the top of the screen to connect to your instrument.

Typing a single X into the screen will start the memory download – soon you will see the screen fill up with data. Type any character into the screen to stop the transfer.

Saving Data to a File

HyperTerminal has the facility to save the downloaded data directly into a file – to use this make sure that any transfer has been stopped and select Transfer > Capture Text... from the menu. This will bring up a dialogue where you may enter a file name to save the data to – edit the path and file name to suit your system but ensure that you use a CSV extension as this will allow the data file to be opened directly by applications that support the CSV data format. Click on Start to open the file and to return to the main screen. Once there type in an X to start the transfer – which will be placed into the file. Once the transfer is over click through to Transfer > Capture Text > Stop menu to close the file and save your data. You may now open the file you specified in, for example, a spreadsheet package such as Excel or OpenOfficeCalc.

6 Troubleshooting

6.1 Diagnosing the problem

' -- -- -- ' flashes on display and the instrument will not sample.

The three main reasons for this problem are:

1. The instrument has been accidentally calibrated when no calibration standard was present.
2. The calibration standard used for calibration has expired.
3. The instrument has been damaged and will need to be repaired.

To determine which of the reasons applies to your case follow the procedures shown below
(Note - quoted values are for tests performed at 25oC):

1. Make sure that the instrument has been turned off for about 5-minutes.
2. Hold down the Left-hand calibration button whilst turning the *htV-m* on.
3. **tEst** will appear on the display. Release all the buttons.
4. A four-digit value will appear (**####**). Give the *htV-m* a few seconds to stabilize.
5. Note the initial value and an approximate rate of change over a minute. If the initial value or the rate of change is over 0.300 then it is likely that your sensor has been damaged - contact **ENMET** for further details.

If the readings look OK then continue with the *htV-m* still in the **tEst** mode:

1. With the sample nozzle inserted into a valid calibration standard take a sample.
2. The display should be set to **0.000** as the pump starts to run and then rise up to a maximum as the sample is drawn in.
3. Press and hold the Left-hand calibration button - the display will show a time value (**t #.#**). Make a note of this.
4. Press and hold the Right-hand calibration button - the display will show the peak value. Make a note of this too.
5. Turn the instrument off. Leave the instrument off for 5-minutes before repeating the tests.

If the peak value is less than 5.000 or has a time value less than 5 seconds then there may be problem with the sampling system or your sensor. Contact **ENMET** for further details.

6.2 Checking the Gain

1. Make sure that the instrument is turned off.
2. Hold down the Right-hand calibration button whilst turning the instrument on.
3. **GA In** will appear on the display. Release all the buttons.
4. A four-digit value will alternate with a two-digit exponent on the screen: (**#### → IE: ##**)
5. Note both numbers. The instrument will power down after a few seconds.

If the Exponent value is between **IE: 15** and **IE: 13** then you may have used an expired standard - check your standard expiry date and re-read Section 4.4 on how to calibrate the instrument. When you are ready carry out a **RE-SET**, as described below, and recalibrate the instrument.

If the Exponent value is less than **IE: 13** then you may have accidentally calibrated without a calibration standard being present. Carry out a **RE-SET** as described below.

6.3 Performing a full re-set of the instrument

Make sure that you have a valid calibration standard to hand before performing this procedure as your current calibration will be deleted, and there is no way of 'undoing' the **RE-SET** procedure once it has been performed.

1. Make sure that the instrument is turned off.
2. Hold down both Cal (**▲** and **▼**) buttons whilst turning the instrument on.
3. **rSEt** will appear on the display. Release all the buttons.
4. **-no-** will appear on the display. Change the **-no-** to a **YES** by pressing Cal **▲**. To complete the re-set press the **SAMPLE** button.
5. **rSEt** will appear on the display.
6. **SEt → CAL** will now appear on the display followed by the normal **0.00** display. Switch the instrument off and then back to calibrate.

If, after a re-set, you are still experiencing problems then contact **ENMET** to arrange a service.

7. MAINTAINANCE

With the exception of the battery, your PPM Formaldemeter™ *htv-m* has no user serviceable components. It is important that no attempt is made to open the instrument other than to replace the battery. Any evidence of tampering with the instrument will invalidate the warranty.

If you find that your instrument requires service or repair, please return it to **ENMET**. See Section 9.0 for warranty information and return instructions.

7.1 Cleaning the Formaldemeter™ *htv-m*

On no account should the Formaldemeter™ *htv-m* be immersed in liquid. Any fluid entering the instrument will destroy the sensor and the electronic circuitry.

If the instrument's enclosure requires cleaning, it should be wiped with a damp cloth. Never use abrasive or solvent based cleaning agents.

7.2 Storage

When not in use, your Formaldemeter™ *htv-m* should be stored in the supplied carrying case in a clean, dry environment and away from extremes of temperature.

7.3 Instrument Battery -Low battery indicator

When the battery voltage becomes too low, and the battery needs replacing the display will flash: **bAt**

7.4 Battery Replacement

The instrument requires a 9V PP3 type alkaline battery.

To replace the battery, simply remove the battery compartment cover at the bottom rear of the instrument by unscrewing the two screws and place the battery in the compartment.

8.0 Replacement Part Numbers

8.1 Calibration Standard and Filter Replacements

ENMET replacement part numbers

Calibration Standard, Formaldehyde	02700-001
Filter, phenol (pack/10)	02700-002

Table 1: of Known & Tested Interferents for the Formaldemeter™

The Formaldemeter™ is known to experience some cross-sensitivity by other volatile Aldehydes and Alcohols.

- Interference factors may differ between fuel cell sensor to fuel cell sensor.
- Never calibrate the Formaldemeter™ using interference gases.

Gas	Concentration required to give a 1 ppm reading	Response	Removal of interfering gas using a phenol filter
Acetaldehyde	12	Linear	60%
Ethanol	24	Linear	45%
Formic Acid	26	Linear	100%
Formaldehyde	1	Linear	15%
Glutaraldehyde	7	Linear	70%
Methanol	60	Linear	30%
Phenol	7	Linear	100%
Resorcinol	250	Linear	100%

- Phenol filters are extremely efficient at removing Phenol along with other Alcohols and Aldehydes from the air.
- Phenol Filters can be fitted over the sampling nozzle of the Formaldemeter™ prior to taking a sample. PPM Technology recommends that phenol filters be changed around every 10 samples since they can become saturated which will give high readings. Phenol filters can be ordered through your distributor.
- Users should be aware that phenol filters reduce the concentration of Formaldehyde by around 10% so should only be used in conditions where there are suspected interferences.
- Please be aware that Ozone causes Formaldehyde to be broken down into Carbon Dioxide, Water and Oxygen therefore in Ozone-rich environments Formaldehyde levels can be reduced.

Research carried out under controlled conditions in an incubator set at 25°C.

A wide range of suspected interfering gases have been tested including (NH₃, CO, CO₂, NO₂, Acetone, Isobutylene) table shows only those which caused interference below LEL levels.

9.0 WARRANTY

ENMET warrants new instruments to be free from defects in workmanship and material under normal use for a period of one year from date of shipment from **ENMET**. The warranty covers both parts and labor excluding instrument calibration and expendable parts such as calibration gas, filters, batteries, etc... Equipment believed to be defective should be returned to **ENMET** within the warranty period (transportation prepaid) for inspection. If the evaluation by **ENMET** confirms that the product is defective, it will be repaired or replaced at no charge, within the stated limitations, and returned prepaid to any location in the United States by the most economical means, e.g. Surface UPS/FedEx Ground. If an expedient means of transportation is requested during the warranty period, the customer is responsible for the difference between the most economical means and the expedient mode. **ENMET** shall not be liable for any loss or damage caused by the improper use of the product. The purchaser indemnifies and saves harmless the company with respect to any loss or damages that may arise through the use by the purchaser or others of this equipment.

This warranty is expressly given in lieu of all other warranties, either expressed or implied, including that of merchantability, and all other obligations or liabilities of **ENMET** which may arise in connection with this equipment. **ENMET** neither assumes nor authorizes any representative or other person to assume for it any obligation or liability other than that which is set forth herein.

NOTE: When returning an instrument to the factory for service:

- Be sure to include paperwork.
- A purchase order, return address and telephone number will assist in the expedient repair and return of your unit.
- Include any specific instructions.
- For warranty service, include date of purchase
- If you require an estimate, please contact **ENMET**.

There are Return for Repair Instructions and Form on the last pages of this manual. This Form can be copied or used as needed.

Manual Part Number

80012-020

June 2010

MCN-463, 05/11/12

MCN-471, 01/14/13

MCN-15-003, 10/12/15

Notes:



PO Box 979
680 Fairfield Court
Ann Arbor, Michigan 48106-0979
734.761.1270 Fax 734.761.3220

Returning an Instrument for Repair

ENMET instruments may be returned to the factory or any one of our Field Service Centers for regular repair service or calibration. The **ENMET** Repair Department and Field Service Centers also perform warranty service work.

When returning an instrument to the factory or service center for service, paperwork must be included which contains the following information:

- A purchase order number or reference number.
- A contact name with return address, telephone and fax numbers
- Specific instructions regarding desired service or description of the problems being encountered.
- Date of original purchase and copy of packing slip or invoice for warranty consideration.
- If a price estimate is required, please note it accordingly *and be sure to include a fax number.*

Providing the above information assists in the expedient repair and return of your unit.

Failure to provide this information can result in processing delays.

ENMET charges a one hour minimum billing for all approved repairs with additional time billed to the closest tenth of an hour. All instruments sent to **ENMET** are subject to a minimum evaluation fee, even if returned unrepared. Unclaimed instruments that **ENMET** has received without appropriate paperwork or attempts to advise repair costs that have been unanswered, after a period of 60 days, may be disposed of or returned unrepared COD with the evaluation fee.

Service centers may have different rates or terms. Be sure to contact them for this information.

Repaired instruments are returned by UPS/FedEx Ground and are not insured unless otherwise specified. If expedited shipping methods or insurance is required, it must be stated in your paperwork.

Note: Warranty of customer installed components.

If a component is purchased and installed in the field, and fails within the warranty term, it can be returned to **ENMET** and will be replaced, free of charge, per **ENMET's** returned goods procedure.

If the entire instrument is returned to **ENMET** with the defective item installed, the item will be replaced at no cost, but the instrument will be subject to labor charges at half of the standard rate.



Repair Return Form

Mailing Address:

ENMET

PO Box 979

Ann Arbor, Michigan 48106

Shipping Address:

ENMET

Attn: Repair Department

680 Fairfield Court

Ann Arbor, Michigan 48108

Phone Number: 734.761.1270

FAX Number: 734.761.3220

Your Mailing Address:

Your Shipping Address:

_____	_____
_____	_____
_____	_____
_____	_____

Contact Name: _____ Your Phone: _____

Your PO/Reference Number: _____ Your FAX: _____

Payment Terms: ☐ COD

(Check one) ☐ **VISA / MasterCard** _____
Card number Expiration Card Code

☐ **American Express** _____
Card number Expiration Card Code

Name as it appears on the credit card _____

Return Shipping Method:

☐ UPS: ☐ Ground ☐ 3 Day Select ☐ Next Day Air ☐ ND Air Saver ☐ 2-Day Air
☐ UPS Account number: _____

☐ Federal Express: ☐ Ground ☐ Express Saver ☐ P-1 ☐ Standard ☐ 2-Day Air
☐ FedEx Account number: _____

Would you like **ENMET** to insure the return shipment?

☐ No ☐ Yes Insurance Amount: \$ _____