# *AMS-2*
# *Aldehyde Monitoring Station*

# Operation Manual

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# 1 INTRODUCTION

## 1.1  AMS-2 Capabilities

The AMS·2 is a portable self·contained data·logging unit that automates the operation of PPM handheld held gas detectors, enabling them to be used as semi·continuous monitors.

Results are shown on the AMS·2's digital display, and stored in its memory. Values are also determined for Peak, Short Term Exposure Level (STEL) and Time· Weighted Average (TWA) concentration, which can be displayed on demand. Limit alarms for each of these values can be set by the operative, as required, to give an immediate warning of potential overexposures. It also features an integral printer to output session concentration history and summary concentration data. Some parameters on the AMS·2 are preset for your convenience, but can be easily changed as required via the keypad.

The AMS·2 can be connected to a PC via RS232 for data download allowing for further processing and storage.
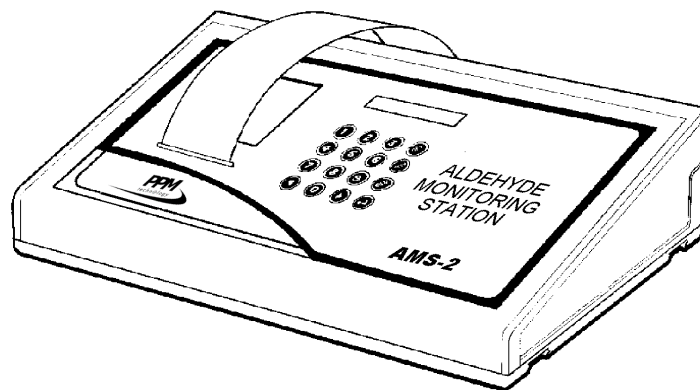


**Fig 1.1  The AMS-2 Aldehyde Monitoring Station**

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## 1.2 Design Features

**Case**
The AMS-2 is housed in a rugged enclosure made of ABS plastic, ensuring that the unit is robust enough to withstand the harshest of working environments.

**Fascia Panel**
The fascia panel of the AMS-2 (Fig 1.2) is protected by a membrane overlay that incorporates a keypad for controlling and adjusting the unit's functions. This makes the unit particularly hygienic and easy to clean and suited for use in a wide range of environments.

**LCD Display**
The AMS-2 features a clear, easy-to-read, two-line 16 digit alphanumeric display. The LCD displays readings and important messages, and also guides the user through the AMS-2 menu-driven user interface.

**Integral Printer**
The AMS-2 features an integral thermal printer to output information and data from sampling sessions. This is particularly useful for giving a graphical output of the session concentration history.

**Audible Alarm**
An internal piezo audio indicator is fitted to give a loud audible warning of potentially hazardous conditions. Additional Alarm outputs are available see Accessories on P25.

**Back Panel**
All electrical and communication connectors are located on the AMS-2's back panel (Fig 1.3). The external power supply unit is connected to the 8 pin mini-DIN Socket and the handheld meter is connected to the Instrument Connector Socket using the supplied ribbon cable. The RS232 connector is used for downloading logged data to a PC with the optional Data Download software.

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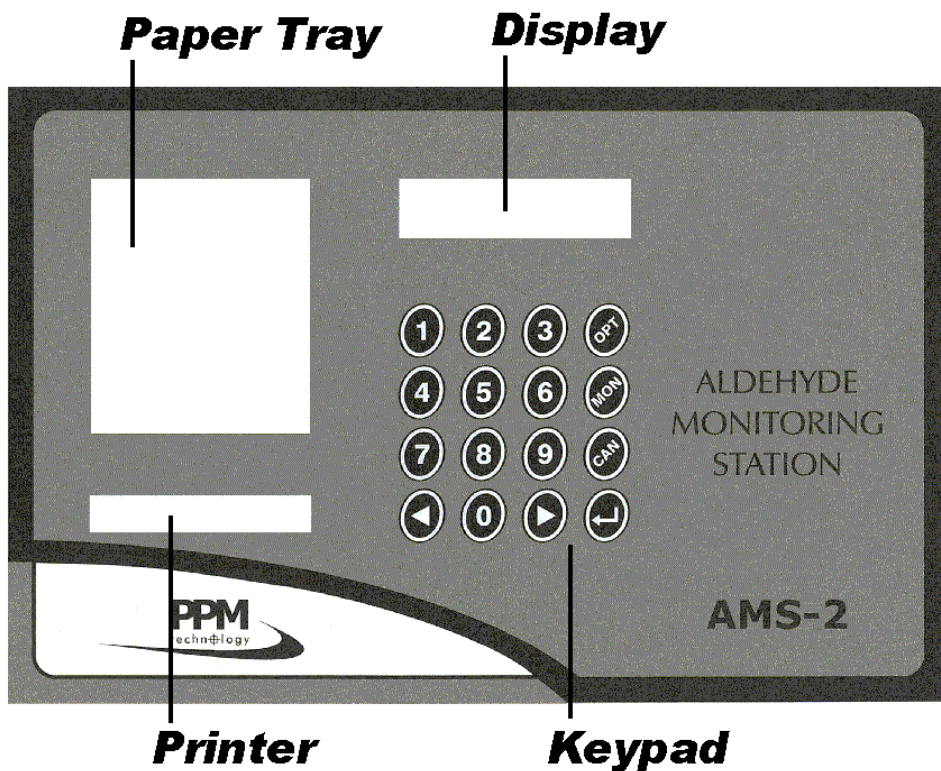
**Fig 1.2 AMS-2 Fascia Panel**
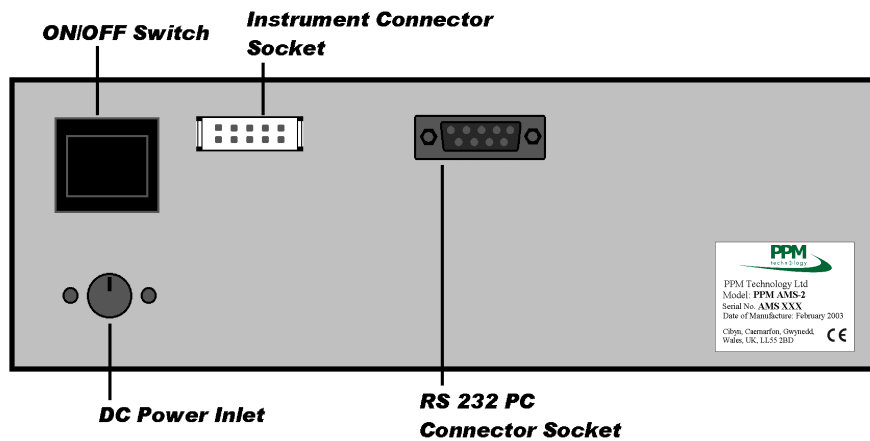


**Fig 1.3 AMS-2 Back Panel**

# 2 STARTING UP AND BASIC SETUP

## 2.1 Starting Up the AMS-2

**Powering up**    Insert the lead from the external power supply unit into the 8 pin DC receptacle at the rear of the unit, which will only fit one way. Turn the AMS-2 on at the switch at the rear of the unit.

The display will initially read (this may be different for some agent supplied units, contact your agent for details):

```
PPM Technology
    AMS-2
```

followed by:

```
Time:    00:00:00
Date:    00/00/00
```

This **Default Screen** is displayed whenever the AMS-2 is not performing any tasks.

## 2.2 The Options Menu

To enter the Options Menu press the **OPTION (OPT)** key. The screen will show the following:

Enter the desired option by either using the ◄ and ▶ to move the flashing cursor, or use the corresponding numerical key for the desired option. Press **ENTER (↵)** to confirm.

The following table gives a summary of the Option Menu functions:

| No. | Function | Page Reference |
|-----|----------|----------------|
| 1 | Set Time | 7 |
| 2 | Set Date | 7 |
| 3 | Paper Feed | 8 |
| 4 | Datalogging | 9 |
| 5 | Alarm Settings | 10 |
| 6 | PC Data Link | N/A |
| 7 | View Data | 18 |

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## 2.3 Date and Time Adjustment

**Setting the time**

To change the time, from the Options Menu, select **1 - Set time** followed by **ENTER (↵)**.

The display will read:

```
Set the time
Time:   ■0:00:00
```

Enter the correct time, in 24 hour format, using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary.

To store the new time, press **ENTER (↵)**.

To quit this screen without storing the new time, press **CANCEL (CAN)**.

**Setting the date**

To change the date, from the Options Menu, select **2 - Set date** followed by **ENTER (↵)**.

The display will read:

```
Set the date
Date:   ■0/00/00
```

Enter the correct date using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary.

**Changing the date format**

The date is displayed in mm/dd/yy or dd/mm/yy format. Use the **OPTION (OPT)** key to toggle between the two formats.

To store the new date, press **ENTER (↵)**.

To quit without saving the new date, press **CANCEL (CAN)**.
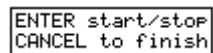
## 2.4 Loading the Printer Paper

The AMS-2 features an integral thermal printer for output of graphical information and other data. Thermal printer rolls are supplied and should be loaded before commencing monitoring. The printing side of the paper faces outermost on the roll.

To load the paper, press the **OPTIONS (OPT)** key. From the Options Menu, select **3 - Paper feed**.

The display will show:

```
ENTER start/stop
CANCEL to finish
```

Ensure that the paper is cut straight, then place the paper roll into the tray. With the printing side facing downwards, feed the paper into the back of the printer by hand as far as it will go.
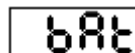
Press **ENTER (↵)** and the printer will feed the paper through automatically. When enough paper has fed through, press **CANCEL (CAN)** to stop the printer and return to the **Default Screen**.

## 2.5 Connecting the Handheld Meter

The AMS-2 is supplied with a length of ribbon cable for connecting the PPM handheld instrument. Connect one end of the cable to the port on the rear of the handheld meter, and the other end to the socket on the back of the AMS-2.

When connected to the AMS-2, the display on the handheld meter will show:

```
bAt
```

Because the meter is controlled by the AMS-2 after connection, operation of the buttons on the meter is not necessary.

# 3 MONITORING

⚠ Before starting a monitoring session, ensure that there is sufficient paper in the printer (Section 2.4) and the handheld meter is connected (Section 2.5).

## 3.1 Datalogging Options

The AMS-2 has sufficient memory capacity to log up to sixteen 8-hour sampling sessions, or sixty four 8-hour sampling sessions if the additional memory module is present. If the memory becomes full during a sampling session, the datalogger can:

- Overwrite the oldest data in the memory

    or

- Stop logging data when the memory is full

The factory default setting is **Overwrite When Full**.

To change the setting, press the **OPTION (OPT)** key. From the Options Menu, select **4 - Datalogging**.

The display will read:

```
Overwrite/Stop
when memory full
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

You will then be prompted to clear the memory of any existing data:

```
Clear Log?
Yes/No
```

Use the ◀ and ▶ keys to move the cursor, and press **ENTER (↵)** to select the option.

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## 3.2 Alarm Settings

The AMS·2 can determine values for Peak, STEL and TWA concentration during a monitoring session. Limit alarms for each of these values can be set by the operative as required. The AMS·2 features two alarm modes, Standard and Monitor. The difference between these two will be explained below. The alarm settings below will effect both of these modes.

To change alarm settings, press the **OPTION (OPT)** key. From the Options Menu, select **5 - Alarm settings**.

The first screen will prompt the user to set a **Peak Alarm** level:

```
Set Peak Alarm?
     Yes/No
```

Use the ◄ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

If **No** is selected, the Peak Alarm will be disabled.

If **Yes** is selected, the next screen will enable the alarm limit to be set:

```
Ceiling Limit
Peak = 2·00 PPM
```

Use the ◄ and ▶ keys to change the value up or down and press **ENTER (↵)** to store the value. The Ceiling Limit may be set between 0.10 and 2.50, and is adjusted in increments of 0.10.

Subsequent screens will prompt the enabling/disabling of STEL and TWA alarms in the same way.

**Standard Alarm**

The Standard Alarm will sound for a period of one minute when the alarm condition is met.

**Monitor Alarm**

The Monitor Alarm will sound continually once the alarm condition is met, and will not stop until the alarm condition is no longer met, such as a subsequent sample reading being below the ceiling limit. More information, and settings, for this function can be found on P23.

## 3.3 Starting a Monitoring Session

To start a new monitoring session, press the **MONITOR (MON)** key, while in the **Default Screen.**

The AMS·2 will communicate with the handheld meter and verify the instrument settings. During this time, the display will read:

```
HHU Connected...
Parameter Check
```

followed by:

```
SER Reception OK
Configuring.....
```

followed by:

```
Communication OK
bASE now on LCD
```

This will be accompanied by "clicking" sounds from the handheld meter as it is activated by the AMS·2. The display on the handheld meter will read:

```
bASE
```

As the meter is controlled by the AMS·2 after connection, operation of the buttons on the meter should be avoided as this will interfere with the operation of the unit.

The AMS·2 gives the option of using the same settings as the last monitoring session or enter new settings:

```
Keep Last Setup?
Yes/No
```

Select **Yes** to retain existing settings. An option will be displayed to print the existing settings and a final opportunity will be given to change the settings as shown on P14.

Select **No** to change any settings. The display will guide you through the settings menu step by step. A Flow Chart for this setup process is shown in **Section 5.4**, on P29.

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**_Set session duration_**

Enter the required session duration on the next screen:

```
Session Duration
     00h 15m
```

Use the ◀ and ▶ keys to adjust the time between fifteen minutes and eight hours. Press **ENTER (↵)** to store. The session duration may be set anywhere between 15 minutes and 8 hours, adjusted in increments of 15 minutes.

**_Periodic Reports_**

The AMS-2 can be set to print summary reports periodically during a sampling session. This option can be enabled/disabled on the next screen:

```
Print Periodic
Reports?  Yes/No
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

If **No** is selected, the AMS-2 will not print periodic reports during the session.

If **Yes** is selected, the option of printing a graph with the report will be displayed:

```
Graph With
Report?   Yes/No
```

followed by entering the desired report interval:

```
Report Interval
    15 min
```

Use the ◀ and ▶ keys to change the value up or down and press **ENTER (↵)** to store the value. The Interval value increments are as follows (in minutes): 5, 10, 15, 20, 30, 60, 120, 240.

**_Session Summary and Concentration History Graph_**

The AMS-2 can be set to print a Session Summary at the end of the session. This option can be enabled/disabled on the next screen:

```
Print Session
Summary?  Yes/No
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

If **No** is selected, the AMS-2 will not print a Session Summary.

If **Yes** is selected, the option of printing a graph with the Session Summary will be displayed:

```
Graph With Final
Session?   Yes/No
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

*Session*
*autorepeat*

The maximum duration of one monitoring session is eight hours. However, the AMS-2 can be set to start a new session immediately after one has ended. Once set, the session will be repeated indefinitely, with the same settings, until interrupted by the operative (**Section 3.6**).

This option is enabled/disabled at the next screen:

```
Autorepeat
Session?   Yes/No
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

The option to print the session parameters will then be displayed on the next screen:

```
Print Settings?
      Yes/No
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

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Example of a typical Settings Printout:



```
Time : 11:51:27
Date : 08/01/04

Base Station Settings:
Continuous Sampling
Duration 1h 00m
Meter Mode : TIME
Peak Time  8.5 Seconds
Pump Run : 1.7 Seconds
RH Filter ENABLED
Graph with reports
Reports issued once
every 1 minutes
Summary Print Every
Session.
Auto-repeat disabled.
Overwrite On Full
```
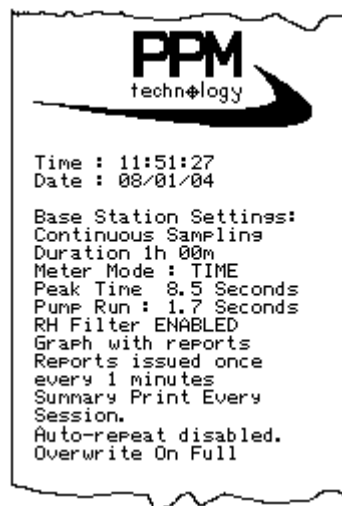
A final opportunity will be given to change the settings before starting the monitoring session:

```
Accept Settings?
    Yes/No
```

Use the ◀ and ▶ keys to move the cursor and press **ENTER (↵)** to select the option.

Ensure that the datalogging options are set correctly as shown on page 9 so that logged data is not overwritten unintentionally.

If **Yes** is selected, the monitoring session will start with these settings.

If **No** is selected, the settings cycle will start again for changing as necessary.

To change the alarm settings, follow the steps shown in **3.2 Alarm Settings** as well as those in **4 System Setup.**

Examples of typical Periodic Reports:



Time : 14:31:18
Last STEL    = 0.013 PPM
Peak Conc.   = 0.019 PPM
No samples over 2.0PPM
Periodic Min Temp 18.8
Periodic Max Temp 19.4
Periodic Min Rh 47.4
Periodic Max Rh 48.3

Time : 14:31:18
Last STEL    = 0.013 PPM
Peak Conc.   = 0.019 PPM
No samples over 2.0PPM
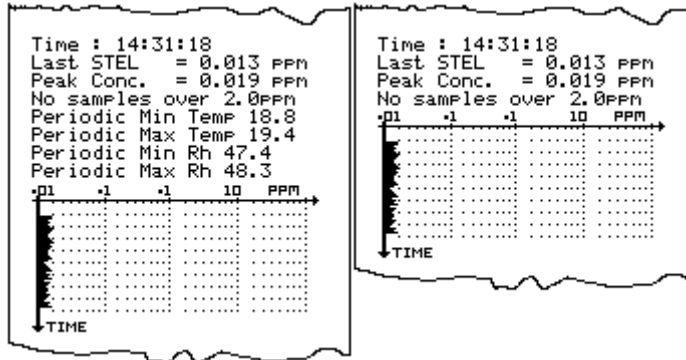
Examples of typical Final Summaries:



FINAL SUMMARY

Time : 19:54:13
Date : 08/01/04

Statistical summary:-
Sampling commenced at
Time : 11:51:27
Date : 08/01/04

Duration 8h 00m
Peak Conc.   = 0.026 PPM
Last STEL    = 0.013 PPM
8 hour TWA   = 0.018 PPM

No Samples over 2.0PPM
Session Min Temp 13.8
Session Max Temp 20.0
Session Avg Temp 16.1
Session Min Rh 47.4
Session Max Rh 53.8
Session Avg Rh 51.6

FINAL SUMMARY

Time : 19:54:13
Date : 08/01/04

Statistical summary:-
Sampling commenced at
Time : 11:51:27
Date : 08/01/04

Duration 8h 00m
Peak Conc.   = 0.026 PPM
Last STEL    = 0.013 PPM
8 hour TWA   = 0.018 PPM

No Samples over 2.0PPM

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## *3.4  Operation During a Monitoring Session*

When the monitoring session starts, the display will initially read:

```
 ┌─────────────┐
 │  Starting   │
 │  Session    │
 └─────────────┘
```

The handheld will then be heard drawing a sample and the sample concentration will be displayed:

```
 ┌─────────────────┐
 │Conc:  1.435 ppm │
 │pTWA:    x   ppm │
 └─────────────────┘
```

The second line of the display indicates the predicted time-weighted average (pTWA) concentration for the session. pTWA values are calculated by projecting the current exposures over the entire session (normally eight hours). A pTWA concentration will not be calculated until the AMS-2 has been monitoring for at least 1 hour. During the first hour of a monitoring session, the pTWA screen will display an 'x'. At the end of the session the TWA will be given, unless the session is ended manually before the end.

The 'p' on the display indicates that the value is calculated from exposures projected over an eight hour period.

The AMS-2 also calculates values for peak and short-term exposure level (STEL) concentration.

Pressing the ◀ key will display the STEL screen, for a period of 5 seconds:

```
 ┌─────────────────┐
 │Conc:  1.435 ppm │
 │STEL:    x   ppm │
 └─────────────────┘
```

The STEL value is the average concentration of the most recently completed 15 minute period of operation. During the first 15 minutes of a monitoring session, the STEL screen will display an 'x'.

Pressing the ▶ key will display the PEAK screen, for a period of 5 seconds:

```
 ┌─────────────────┐
 │Conc:  1.435 ppm │
 │PEAK:  2.004 ppm │
 └─────────────────┘
```

The PEAK screen displays the highest concentration measured during the session.

Pressing the **1** key will display the date and time, for a period of 5 seconds.

Pressing the **3** key will display the time remaining on the session for a period of 5 seconds.

Pressing the **4** key will display the current highest and lowest readings.

Pressing the **5** key will display the current highest and lowest readings since the last printout.

Pressing the **6** key will display the current Peak, Time To Peak, Temperature and Humidity.

## 3.5  Alarm Indications

When the concentration exceeds the alarm setpoints (see **3.2  Alarm Settings**), the internal audible alarm is activated. The alarm will continue to sound until levels fall below the setpoint concentration or the alarm is acknowledged.

***Alarm acknowledge***

To silence the alarm, press the **ENTER (⏎)** key. If the concentration of the next sample is found to be above the alarm setpoint, then the audible alarm will be activated again.

## 3.6  Manually Ending a Monitoring Session

If the AMS-2 is set to monitor for a prescribed duration, monitoring will automatically stop at the end of the session.

To abort monitoring mid-session or to stop a monitoring session on an **Autorepeat** cycle, press the **CANCEL (CAN)** key and the following screen will be displayed for a few seconds, as well as the alarm sounding briefly:

```
Cancel Pressed
Please Wait..
```

The command must then be confirmed:

```
Cancel Session?
    Yes/No
```

Use the ◀ and ▶ keys to move the cursor, and press **ENTER (↵)** to select the option.

**No** will continue with the current session.

**Yes** will end the session and the display will read:

```
Session Aborted
```

This will be followed by the alarm sounding briefly again and then the following screen will be displayed for a few seconds before the display returns to the **Default Screen**:

```
End of sampling
 Saving Data...
```

A printout can then be made of the data logged up to the point of aborting the session (Note that this option will not be given if the option to print a Session Summary was not selected (**Section 3.3**) . The printout will also indicate that the session was ended manually.

## 3.7  Data Retrieval

The AMS-2 has sufficient memory capacity to log data from up to sixteen 8-hour sampling sessions, or sixty four 8-hour sampling sessions if the additional memory module is present. Depending on the datalogging settings (see **3.1 Datalogging Options**), datalogging will either stop, or the oldest data will be overwritten when the memory is full.

To retrieve stored sessions and view the logged data, from the Options Menu, select **7 - View Data** followed by **ENTER (↵)**. While this is being loaded the AMS-2 will display the following two screens for a few seconds:

```
┌─────────────────┐
│    Reaeding     │
│    Directory    │
└─────────────────┘
```

```
┌─────────────────┐
│     Select      │
│     Session     │
└─────────────────┘
```

The session selection screen will be displayed:

```
┌─────────────────┐       ┌─────────────────┐
│Session    01/16 │       │Session    01/64 │
│12/02/03   10:45 │  or   │12/02/03   10:45 │
└─────────────────┘       └─────────────────┘
```

Sessions are displayed in the order they were logged. The starting time and date of each session is also displayed.

Use the ◀ and ▶ keys to scroll through the sessions and press **ENTER (↵)** to select the desired session.

When a session is selected, the logged data will be displayed:

```
┌─────────────────┐
│SAMPLE     1     │
│ 0.066ppm   6.3s │
└─────────────────┘
```

Use the ◀ and ▶ keys to scroll through the logged data.

To view the session start time, press **9**.
To view the sample number, press **8**.
To view the session date, press **7**.
To view the sample temperature and humidity, press **5**.
To print the session data as a bar graph, press **2**. The display will read:

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```
┌─────────────────┐
│   Plot Graph    │
│     Yes/No      │
└─────────────────┘
```

Select **Yes** to print a graph of the data.
Select **No** to return to the previous screen.

Logged data can also be downloaded to a PC using the optional Data Download Kit. Separate instructions are included with the kit.

Pressing the **CANCEL (CAN)** key will return to the session selection screen.

# 4 SYSTEM SETUP

*Autostart*

To enter the System Setup, hold down the **OPTION** (**OPT)** button while turning the AMS-2 on with the power switch at the back. For a few seconds the display will show:

```
 SYSTEM
 SETUP
```

The display will then guide you through the System Setup step by step. This is summarized in the flow chart on P30.

The AMS-2 may be configured to start automatically when it is turned on, this option is selected on the next screen:

```
 Autostart?
 Yes / No
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

If the Autostart option is used the next screen will give the option to print out the current session settings upon startup, prior to the automatic commencement of the session:

```
AS Print Setting
 Yes / No
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

*Printing*

The printing function on the AMS-2 may be disabled on the next screen:

```
Enable Printing?
 Yes / No
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

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If printing is enabled then the option to automatically print out the session settings will be given on the next screen:

```
Setting Printout
Always/Optional
```

Enter the desired option using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

The default date format may be altered on the next screen:

```
Set Date Format
m/dd/yy dd/m/yy
```

**Date Format**

Enter the desired option using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store. This option may also be adjusted from the **Default Screen**, see P6.

The TWA (Time Weighted Average) Period may be adjusted on the next screen:

```
TWA Period
8 Hours/Session
```

**TWA Period**

Enter the desired option using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store. The default setting for this option is 8 Hours, as this is the default session duration.

The Diagnostic Print is enabled on the next screen:

**Diagnostic Print**

```
Diagnostic Print
Yes / No
```

This option should not be enabled by end users as it is for diagnostic and repair purposes only, and will prevent the standard operation of the AMS-2. It should therefore be left on the default 'No' option, unless instructed by authorised PPM service personnel.

This option will also not be displayed if printing is not enabled.

The option to modify the operation of the alarm systems may be selected on the next screen:

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*Modify Alarms*

```
Modify Alarms?
  Yes / No
```

Enter the desired option using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

On the next screen you must select whether the AMS-2 has an External Alarm Module fitted at the back:

```
External Sounder
   Yes / No
```

Enter the desired option using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

If there is no External Alarm fitted then this option should not be selected, as this will give incorrect options on the following screens.

If there is an External Alarm Module fitted and **Yes** was selected in the previous screen then the option to select the alarm emitter will be given on the next screen (shown are two examples of the options on this screen):

```
Peak Alarm     Peak Alarm
 Internal     Ext. Channel 1
```

Enter the desired option by pressing the appropriate number for the external channels **1-3**, or **0** for internal. Press **ENTER (↵)** to store.

If **No** was selected for the External Sounder option or when the emitter is selected the option to test the alarm will be given on the next screen:

```
STEL Alarm Test?
  Enter/Cancel
```

Enter the desired option using the keypad. Use the ◀ and ▶ keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store.

These options will be repeated for the TWA and STEL functions (for more information on these functions see

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P16) if the external alarms are enabled. For a summary of these displays see the Flow Chart on P30.

Once the alarms have been set the option to change the settings for the Monitor Alarm (see P10) can be selected on the next screen:

**Modify
Monitors**

```
┌─────────────────┐
│Modify Monitors? │
│   Yes / No      │
└─────────────────┘
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store. If the option to modify the Monitor Alarm is selected then the following twelve screens will be Monitor settings.

The Monitor may be turned on or off on the next screen:

```
┌─────────────────┐
│  Peak Monitor?  │
│   Yes / No      │
└─────────────────┘
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store. If 'no' is selected then options for the Peak Monitor will not be given and the display will move on to the STEL options.

Whether the ceiling limit (see P10) functions as a maximum or minimum can be set on the next screen:

```
┌─────────────────┐
│ Peak Monitor ON │
│ When Over/Under │
└─────────────────┘
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (↵)** to store. The default setting is **Over**, but if **Under** is selected then the alarm will sound if it under the ceiling limit (P10).

The Monitor Alarm can be set to send a signal to an external channel rather than the internal alarm, and this may be selected on the next screen:

```
┌─────────────────┐
│  Peak Monitor   │
│ Ext. Channel 1  │
└─────────────────┘
```

Enter the desired option by pressing the appropriate number for the external channel **1-3**. Press **ENTER (↵)** to store.

If the AMS-2 is not fitted with an external alarm unit then the external channel options will not function and should not be selected.

The Monitor Alarm may also be specified to start sounding as soon as the AMS-2 is turned on, and to not stop sounding until a sample is taken which does not meet the alarm conditions, this option is selected on the next screen:

```
Peak Mon Default
   On / Off
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (⏎)** to store.

Subsequent screens will prompt the setup of STEL and TWA alarms in the same way. For a summary of these displays see the flow chart on P30.

*Sense Battery*

The AMS-2 may be set to detect if it is connected to either a battery pack or a mains supply on the following screen:

```
Sense Battery?
   Yes / No
```

Enter the desired option using the keypad. Use the ◄ and ► keys to move the flashing cursor as necessary. Press **ENTER (⏎)** to store.

If the option to detect a battery is chosen and the AMS-2 detects a battery then it will engage energy saving systems, which will prevent printing and some other operations. The screen will then return to the **Default Screen.**

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# 5 APPENDIX

## 5.1 MAINTENANCE

The PPM AMS-2 has no user-serviceable components. It is important that no attempt is made to open the instrument, as any evidence of tampering will invalidate the warranty.

If you find that your unit requires service or repair, please return it to the factory or an authorised PPM Service Centre.

**Cleaning The AMS-2**

On no account should the AMS-2 be immersed in liquid as this will damage the unit's internal circuitry.

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

**Accessories and Spare Parts**

The accessory box supplied with the AMS-2 contains:

| Qty | Description | PPM Part # |
|---|---|---|
| 2 | Thermal Paper Roll | BTP01 |
| 1 | Adhesive Rubber Feet (x4) | RFT01 |
| 1 | AMS-2 to Instrument Cable | CABLE06* |
| 1 | Power Supply With Plug | CABLE10 +country |

Other spare parts and accessories available include:

| Description | PPM Part # |
|---|---|
| Data Download Software | SOFT01 |
| External Alarms | ??? |
| Power Pack | ??? |

*NOTE: The standard length of this cable is 110 mm. Longer lengths of this cable are available on request, for example if sampling needs to be undertaken in a different location to the AMS-2 itself. Please state the required length when ordering.

## 5.2 AMS-2 Power Pack

The AMS-2 Power Pack is designed to power the AMS-2 where mains power is not available or likely to be disrupted.

***Operating The Power Pack***

Making sure that both the AMS-2 and the Power Pack are turned off and that the Power Pack charger is not connected, plug in the Power Pack Outlet Cord at the rear of the AMS-2. Turn on the Power Pack followed by the AMS-2. If the Power Pack contains enough charge, the **Default Display** will appear and you may now continue to use the AMS-2 as usual.

A fully charged Power Pack, which has been used as described in this section, will operate the AMS-2 under minimal functions, sampling continuously, for at least eight 8-hour sessions.

If the AMS-2 fails to power up then the most likely cause is that the Power Pack has become discharged. To re-charge the Power Pack, disconnect from the AMS-2 and switch off. Connect the provided charger to the Power Pack and switch on the supply.

The charger has two LED's on the front, one red and the other green. The state of the Power Pack can be discerned from the LED's as follows:

***Charging***

| Green | Red | Power Pack State |
|:---:|:---:|:---|
| Off | On | **Discharged** No power remains in the pack. |
| On | On | **Charging** Some power remains but not fully charged. |
| On | Off | **Full** The power levels are at a maximum. |

The AMS-2 can still be used whilst the Pack is charging but avoid starting or ending the charge cycle whilst the AMS-2 is connected.

**Hints**

To maximize the amount of time the Power Pack can be used it is recommended that users should avoid use of the thermal printer or downloading whilst the AMS-2 is operating under minimal functions. The AMS-2 may be set to detect the presence of a Power Pack (see P23), which will automatically prevent the use of these functions.

Where possible the Power Pack should only be stored in a fully charged state.

To reduce the memory-effect, which shortens the life span and reduces maximum power capacity, it is strongly recommended that the Power Pack be fully discharged before being put to charge.

**Safety**

The charger inlet is connected directly to the power source and is not protected. Shorting this terminal can induce high currents, producing arcs, which burn and could also damage the Power Pack.

Although the power source is fully sealed, some gas may be produced during the charging process. As a precaution, charging should be carried out in a well-ventilated area. If the Power Pack does leak or stop functioning in any way, then cease use immediately and arrange for the unit to be returned to the manufacturer.

## 5.3 Connecting External Alarms

To connect devices to the Module first make sure that the Module output (12v at 0.3A) conforms to the device input, so that the voltage provided by the Module is not too high and that the device won't draw too much current from the Module. You may need to use a buffering device or a relay to prevent this. Ensure that the AMS-2 is not connected to the mains by removing the power lead before commencing the connection.

Next select a channel for the device to connect to from the three at the back. Attach the negative wire of the device to the channel terminal at the rear of the AMS-2. Now attach the positive wire of the device to the corresponding 12v terminal.

Now switch on the AMS-2 and enter the System Setup menu (see section 4) to enable and test the channel to make sure that the device works with the module.

If you are unsure about any step above then contact a professional engineer. PPM Technology cannot be held responsible for any damage caused to your equipment by incorrect installation or connection of the AMS-2 or the External Sounder Module or the deliberate misuse of these products.
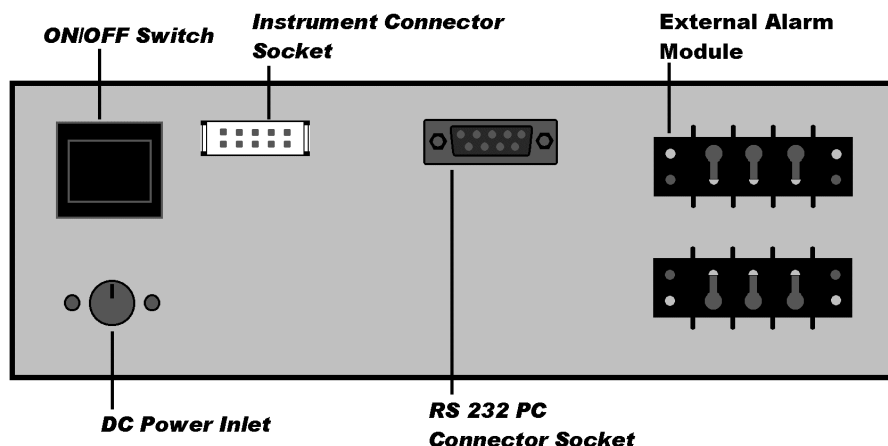


Fig 1.4 AMS-2 Back Panel With External Alarms

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## 5.4 Monitoring Session Setup Flow Chart

```
                        ┌─────────────────────┐
                        │  Keep Last Setup?   │
                        │      Yes/No         │
                        └─────────────────────┘
                 Yes │                    │ No
                     ▼                    ▼
         ┌──────────────────┐   ┌──────────────────────┐
         │ Print Settings?  │   │  Session Duration    │
         │     Yes/No       │   │     00h 15m          │
         └──────────────────┘   └──────────────────────┘
            │ Yes                          │
            ▼                              ▼
         ┌──────────────────┐   ┌──────────────────────┐
         │    Printing      │   │  Print Periodic      │
         │    Settings      │   │  Reports?   Yes/No   │
         └──────────────────┘   └──────────────────────┘
                         │ No              │ Yes
                         │                 ▼
                         │      ┌──────────────────────┐
                         │      │  Graph With          │
            ▼            │      │  Report?     Yes/No  │
         ┌──────────────────┐  └──────────────────────┘
         │ Accept Settings? │    No   │ Yes/No
         │     Yes/No       │         ▼
         └──────────────────┘  ┌──────────────────────┐
          │ Yes      │ No      │  Report Interval     │
          ▼                    │      15 min          │
         ┌──────────────────┐  └──────────────────────┘
         │    Starting      │      │         │
         │    Session       │      ▼         ▼
         └──────────────────┘  ┌──────────────────────┐
                               │  Print Session       │
                               │  Summary?   Yes/No   │
                               └──────────────────────┘
                                       │ Yes/No
                                       ▼
                               ┌──────────────────────┐
                               │  Graph With Final    │
                               │  Summary?   Yes/No   │
                               └──────────────────────┘
                                       │ Yes/No
                                       ▼
                               ┌──────────────────────┐
                               │  Autorepeat          │
                               │  Session?   Yes/No   │
                               └──────────────────────┘
                                       │ Yes/No
```
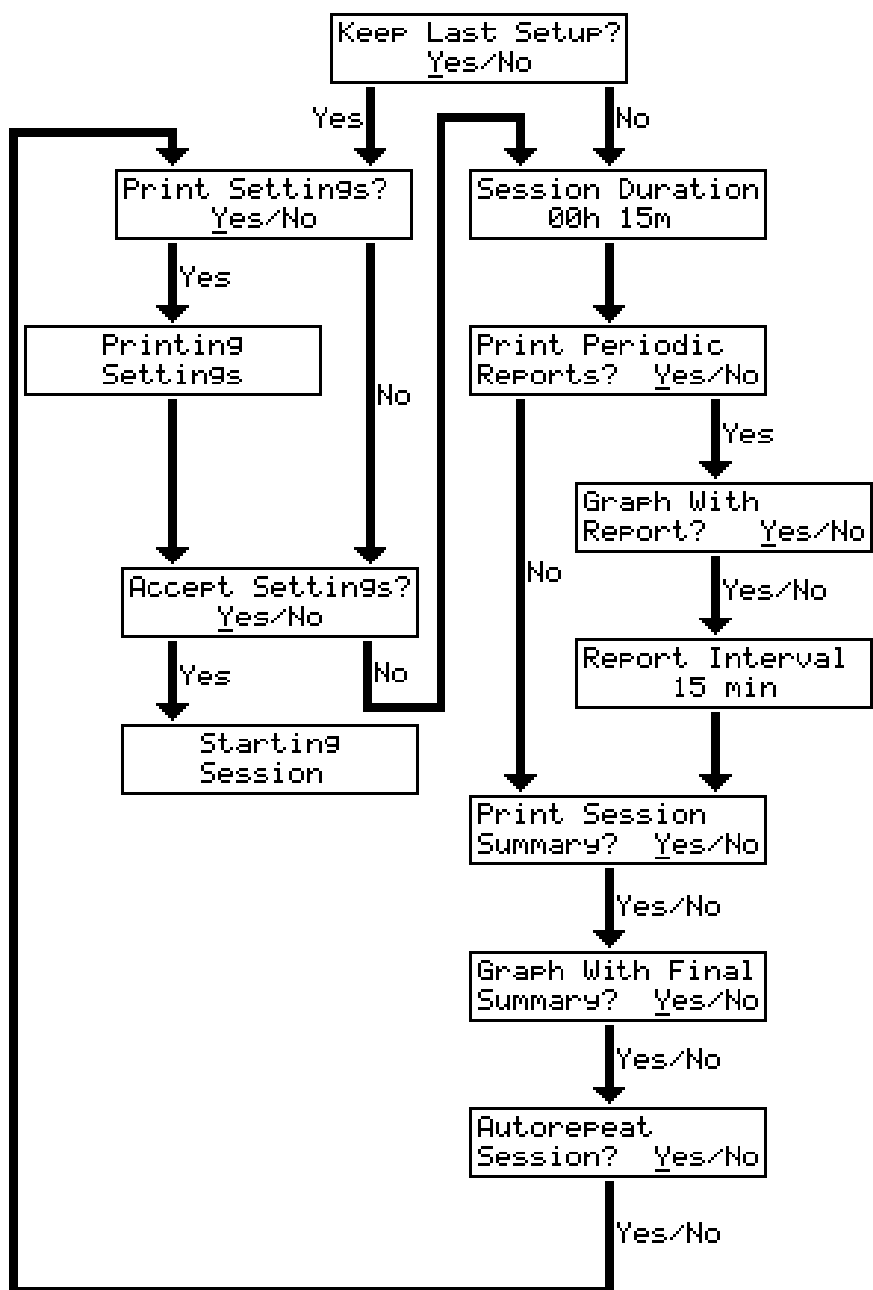
## 5.5 System Setup Flow Chart

```
                        Autostart?
                        Yes / No
            Yes|                    |No
          AS Print Setting
            Yes / No
                |                      |
          Enable Printing?
            Yes / No
          No|              |Yes
     Set Date Format      Setting Printout
     n/dd/yy dd/n/yy       Always/Optional

          TWA Period
        8 Hours/Session

        Diagnostic Print
           Yes / No

        Modify Alarms?
          Yes / No
       Yes|         No|
   External Sounder    Peak Alarm Test?
      Yes / No           Enter/Cancel

  Peak Alarm       STEL Alarm       TWA Alarm
 Ext. Channel 1     Internal         Internal

  Peak Alarm Test?  STEL Alarm Test?  TWA Alarm Test?
   Enter/Cancel      Enter/Cancel     Enter/Cancel

        Modify Monitors?
           Yes / No
        Yes|        No|
  Peak Monitor?    STEL Monitor?    TWA Monitor?
    Yes / No         Yes / No         Yes / No
   Yes|   No|       Yes|   No|       Yes|   No|
 Peak Monitor ON  STEL Monitor ON  TWA Monitor ON
 When Over/Under  When Over/Under  When Over/Under

  Peak Monitor     STEL Monitor     TWA Monitor
 Ext. Channel 1  Ext. Channel 1   Ext. Channel 1

 Peak Mon Default STEL Mon Default TWA Mon Default
    On / Off         On / Off        On / Off

        Monitor Defaults
        Session/Power On

        Sense Battery?
           Yes / No

      Time:   00:00:00
      Date:   00/00/00
```

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## *WARRANTY*

The PPM AMS-2 is warranted to be free of defects in materials and workmanship under proper and normal use and service for a period of 1 year from the date of purchase. This warranty is limited to repair or replacement (at our option) of any part that proves defective in material or workmanship under normal use and service, provided the product is returned to PPM Technology Limited, shipment charges prepaid.

Damage due to defacement, misuse, tampering, lack of prescribed maintenance or use in violation of the instructions furnished by PPM Technology Limited is not covered.

This warranty is in lieu of all other warranties, express or implied, including but not limited to merchantability or fitness for a particular purpose. In no event shall we be liable for any incidental or consequential damages of any nature.