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HW4 Software version 3

Data Recording Function
AirChip 3000 Devices

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1 ORGANIZATION OF THE HW4 MANUALS

The HW4 manuals are organized in separate books so as to limit the size of the individual documents. A list of the HW4 manuals is provided in document **E-M-HW4v3-DIR**

HW4 Manuals	Contents
HW4 Main Book	General software description Installation, start-up and settings Device connection methods Functions common to all devices used with HW4
Device Specific Functions 1 (separate book for each device type or model)	Legacy devices (original HygroClip technology): o HygroLog NT data logger o HygroFlex 2, HygroFlex 3 and M3 transmitters o HygroLab 2 and HygroLab 3 bench indicators o HygroPalm 2 and HygroPalm 3 portable indicators o HygroClip DI digital interface o HygroClip Alarm programmable logic o HygroStat MB Device Manager (device configuration) and other device specific functions
Probe Adjustment 1	Humidity and temperature adjustment function common to all legacy devices (original HygroClip technology)
Device Specific Functions 2 (separate book for each device type or model)	Devices based on the AirChip 3000 technology: o HygroClip 2 (HC2) probes o HF3 transmitters and thermo-hygrostats o HF4 transmitters o HF5 transmitters o HF6 transmitters o HF7 transmitters o HL20 and HL21 data loggers o HP21, HP22 and HP23 hand-held indicators o Custom designed OEM products Device Manager (device configuration) and AirChip 3000 functions
Probe Adjustment 2	Humidity and temperature adjustment function common to all devices based on the AirChip 3000 technology
Data Recording Function	Data recording function common to all devices based on the AirChip 3000 technology

Both the HW4 manuals (software) and device specific manuals (hardware) are available on the HW4 CD. The manuals can also be downloaded from several of the ROTRONIC web sites.

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2   OVERVIEW

This section of the HW4 manual covers only the following HW4 modules:

HW4 Functional Modules for the HC2	Usage
Data Logging	Record data with the HC2 probe and other AirChip 3000 devices

o   The **Device Manager** module is used to configure a device and is separately described for each individual device. See document **E-M-HW4v3-DIR**

o   The **Probe Adjustment** module is used calibrate and adjust the probe humidity and temperature signals. This module is common to all probes and instruments based on the AirChip 3000 technology and is separately described in the HW4 manual **E-M-HW4v3-A2-001**

o   HW4 functions that are not device dependent are covered in the HW4 manual **E-IN-HW4v3-Main**.

When HW4 has detected a HC2 probe or other AirChip 3000 device, an icon appears in the left pane of the HW4 main screen (HygroClip 2 probe in this example). Click on the + sign to the left of the icon to display a list of the available functional modules.
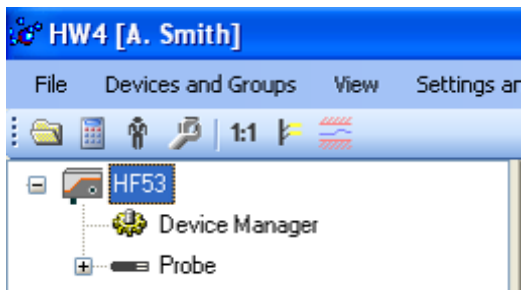
In the case of a HF53 or HF55 transmitter, HP22 indicator or similar device, HW4 displays a probe icon. This icon has the same functionality as the icon shown in the previous illustration.

Note: the probe icon is not available with the HF52 transmitter.

3   DATA LOGGING

The Data Logging module is used to program the HC2 probe to record data and to read recorded data from the probe.

To select the Data Logging module, click on it with the left mouse button. HW4 opens the Data Logging form.

Data Logging automatically interrogates the probe and downloads its current status and settings.

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The different sub-forms which are available within the Data Logging form are listed in a tree located on the left pane of the form. To select a sub-form, click on it with the left mouse button.

3.1 *Function overview*

Due to the fact that the AirChip 3000 does not have an internal real time clock, the probes and instruments based the AirChip 3000 are not the equivalent of a data logger: the data samples recorded by the AirChip 3000 are not stamped with a date and time. Adding a date and time stamp is done at the time the recorded data is downloaded to a file on the HW4 PC.

The main characteristics of the AirChip 3000 data recording function are as follows:

- Relative humidity values are recorded with a resolution of 0.1%RH
- Temperature values are recorded with a resolution of 0.05°C / 0.05°F
- Memory capacity: 2000 pairs of humidity and temperature values
- Adjustable log interval (multiples of 5 seconds, up to 23 h 59 m 55 s)
- Two data recording modes: Loop and Start-Stop

Note: Any recorded data present in the AirChip 3000 is automatically erased whenever a new recording session is started. Data recording is paused when the AirChip 3000 is not powered and resumes automatically as soon as power is re-established (see also Data Recording Modes).

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● **Data recording modes:**

Loop   : when the memory is full the AirChip 3000 dumps the oldest data sample and keeps recording. The memory retains the most recent 2000 pair of values.

Start-Stop : the AirChip 3000 stops recording data as soon as the memory is full (no recorded data is lost)

Both modes can be stopped at any time by sending a command to the AirChip 3000.

● **Recorded parameters:**

The AirChip 3000 records relative humidity and temperature. Calculated values such as dew point cannot be recorded.

● **Date and time:**

The AirChip 3000 does not have an internal real time clock and therefore does not keep track of the date and time. An internal time counter ensures that data is recorded at fixed intervals of time as configured by the user. The log interval must be entered as a multiple of 5 seconds. The value of the log interval is retained in the AirChip 3000 non-volatile memory.

When data recording is both started and stopped using HW4, the following information is automatically read from the PC clock and written to the AirChip 3000:

Data recorded in the Start-Stop mode: Date and time when the recording was started.

Data recorded in the Loop mode: Date and time when the recording was ended.

This information as well as the value of the log interval are used by the HW4 software to reconstruct the date and time associated with each individual pair of recorded values.

There is a tolerance on the accuracy of the AirChip 3000 internal clock. As a result, the actual log interval may differ slightly from the value specified by the user and this may cause an error on the time and date calculations when data is downloaded to a PC. Prior to using HW4 to download the recorded data, this error can be reduced by using the HW4 "Fine Tuning" function.

When data recording is either started or stopped by the user from the keypad of an instrument that does not have a real time clock, the date and time information corresponding to the recording mode must be noted by the user and entered manually in HW4 prior to downloading the recorded data from the AirChip 3000.

● **Log file format (data download to a PC with HW4):**

The recorded data can be saved as a file to a PC using either HW4 or another communications software. When using HW4, the file can be either formatted as a text file (extension TXT) or as an encrypted binary file (extension LOG). The LOG file format can only be read with HW4 and complies with the FDA / GAMP rules regarding electronic records and electronic signatures.

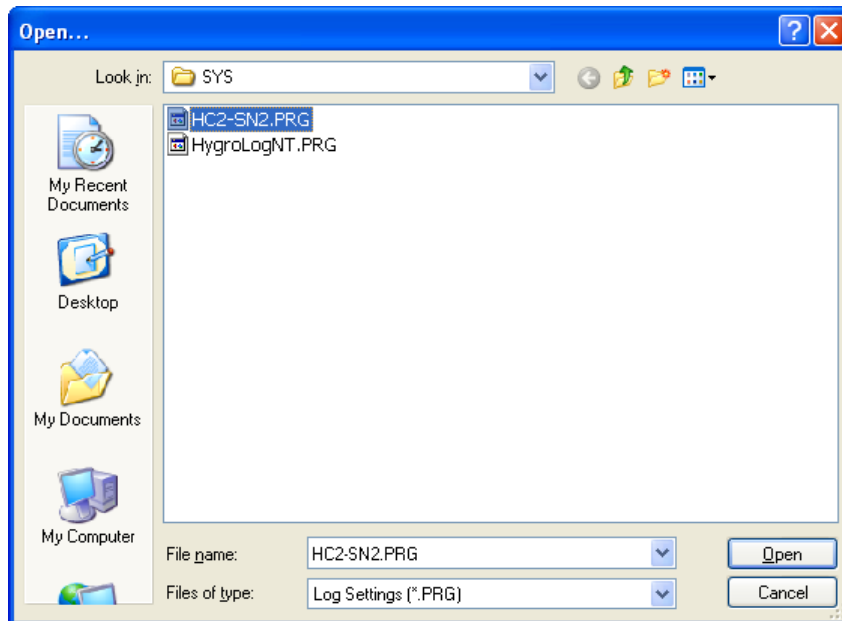| E-M-HW4v3-DR-001_10	Rotronic AG Bassersdorf, Switzerland	
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3.2 *Data Logging Menu Bar*

The Data Logging menu bar is located at the top of the form.

File

The file menu is used to save to the PC, or to retrieve from the PC, the settings of the AirChip 3000 data recording function. The settings are saved in an XML file with extension PRG). Saving the data recording settings to a file is useful when several AirChip 3000 devices must be quickly programmed in the same manner.

● **Open:**

Locate and select the appropriate file and click on Open in the explorer form. The contents of the file are loaded to the Record Data form. Review the results and click on the blue link labeled "start recording data". Click on the Close button to take no action, and leave the AirChip 3000 unchanged.

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● **Save As:** saves the current AirChip 3000 configuration to an XML file with extension PRG in the selected folder.
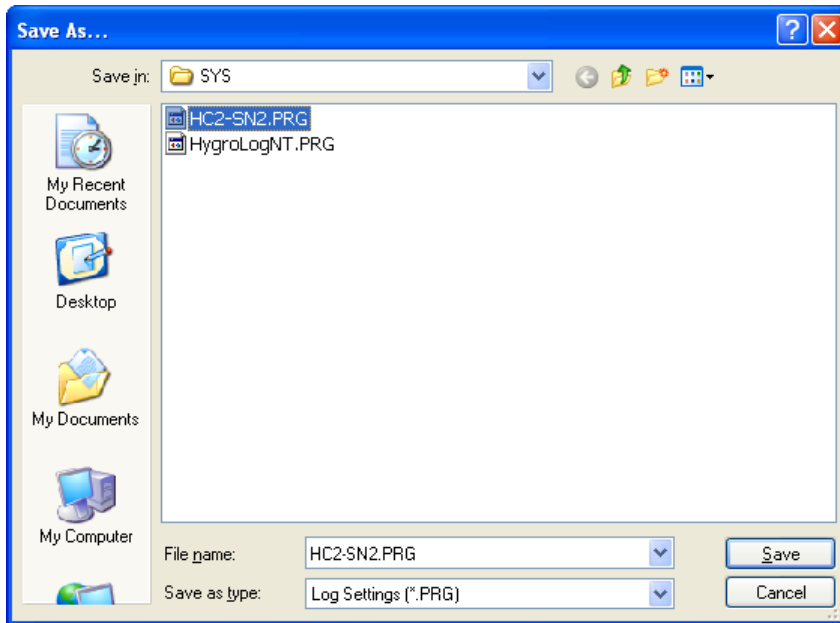
● **Close:** exits the Record Data form

Settings and Tools

● **Log file format:** prior to downloading recorded data to the HW4 PC, the file format should be specified here: text file format (TXT) or encoded binary format (LOG).

● **Generate Protocol:** generates a protocol reporting the data recording settings and the current status of the AirChip 3000. This text file is automatically saved in the directory specified in HW4 Global Settings - File Locations Tab. If so desired, any directory and any file type may be specified.

Help

● **HW4 Help:** Opens HW4 Help

● **About HW4:** Displays the version number and ID number of HW4

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3.3   *Record data*

- **Status:** shows if the AirChip 3000 is recording data or not

- **Recording Mode:** select from Start-Stop or Loop

- **Log Interval:** the log interval is always a multiple of 5 seconds, up to 23 h 59 m 55 s

- **Data Samples:** shows the number of value pairs currently in memory

- **Start Time:** shows when the last or current recording was started

- **Last Start/Stop:** shows the date and time or the last start or stop recording command

- **Start Recording or Stop Recording:** click on this link to start or stop recording data. Any previously recorded data is automatically erased prior to recording new data

Note: close and re-open this form to update the form data

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3.4   *Read data*
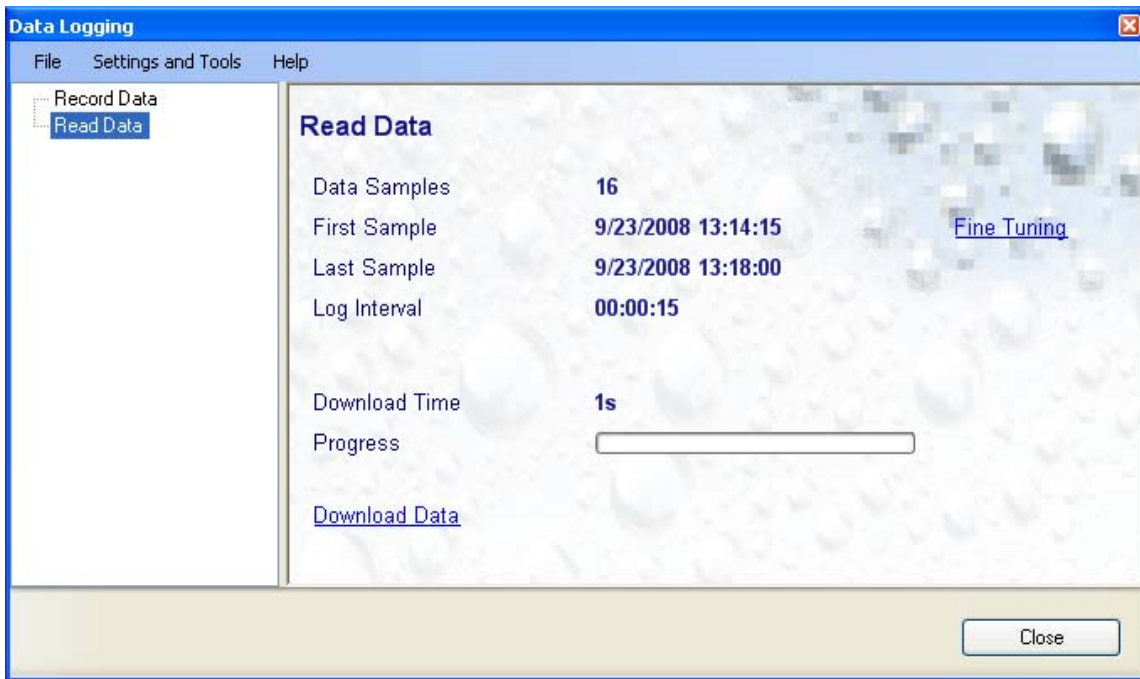
● **Fine Tuning:** whenever necessary, this link should be used prior to downloading the recorded data:

o   Data recording using HW4: The "Fine Tuning" link can be used to make a correction for the tolerance on the probe internal clock and the resulting error on the effective log interval.

o   Data recording using the keypad of an instrument without a real time clock: The "Fine Tuning" link is used to manually enter either the recording start date and time (Start/Stop recording mode) or the recording stop date and time (Loop recording mode).

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Clicking on the "Fine Tuning" link changes the form as illustrated below:
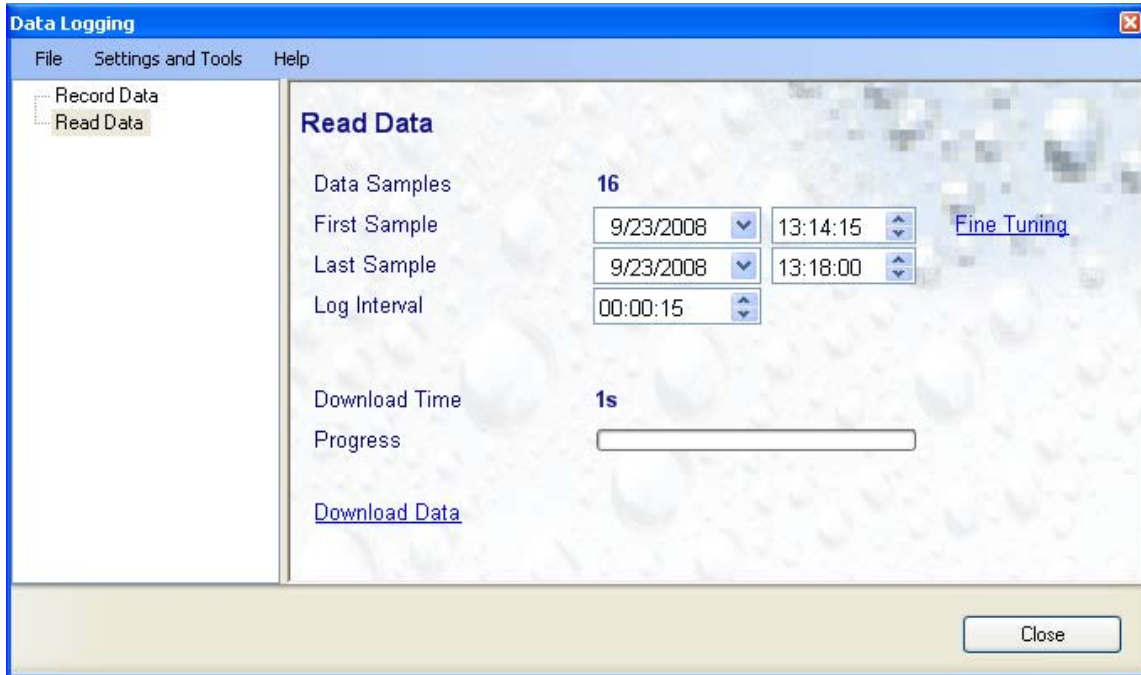
How to use the Fine Tuning link to adjust the log interval:

a) **Data recorded in the Start-Stop mode:** adjust the log interval up or down to change the time calculated by HW4 for the last sample to a value as close as possible to the actual recording stop time.

b) **Data recorded in the Loop mode:** set the time of the first sample to the actual recording start time. Adjust the log interval up or down to change the time calculated by HW4 for the last sample to a value as close as possible to the actual recording stop time.

● **Start downloading:** click on this link to immediately save the recorded data to the PC

  Note: Prior to downloading the data, select the file format that you want to use to save the data to the PC:
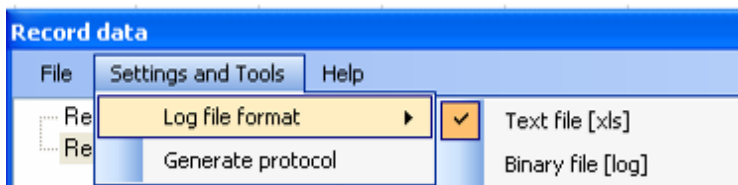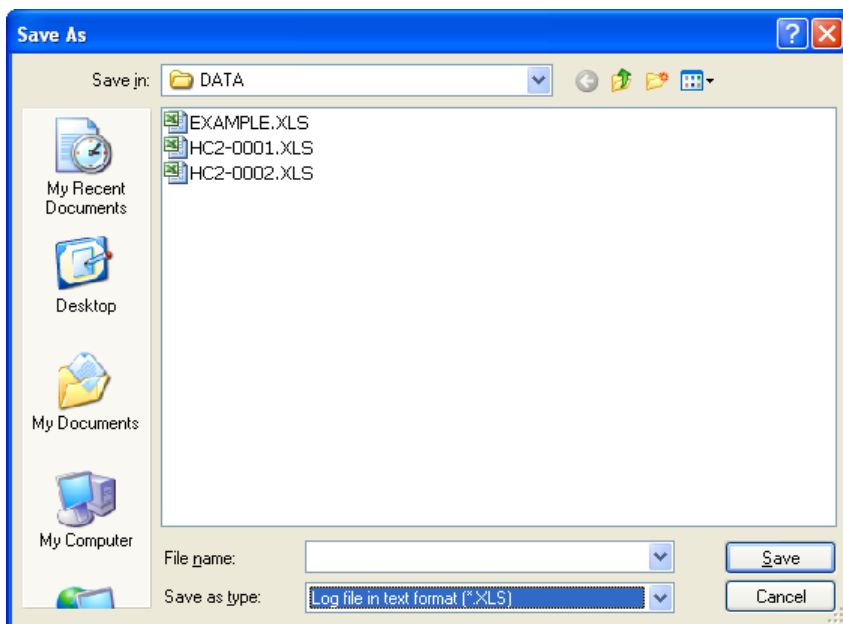

- Text file (XLS): HW4 does not verify this type of file when opening the file.

- HW4 binary file (LOG): files of this type can be opened with HW4 but not with an editor or with Microsoft Excel. When opening a protected file, HW4 verifies that the file has not been tampered with. Note that protected binary files use less disk space than unprotected files

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Select HW4 binary file to meet the FDA / GAMP requirements.
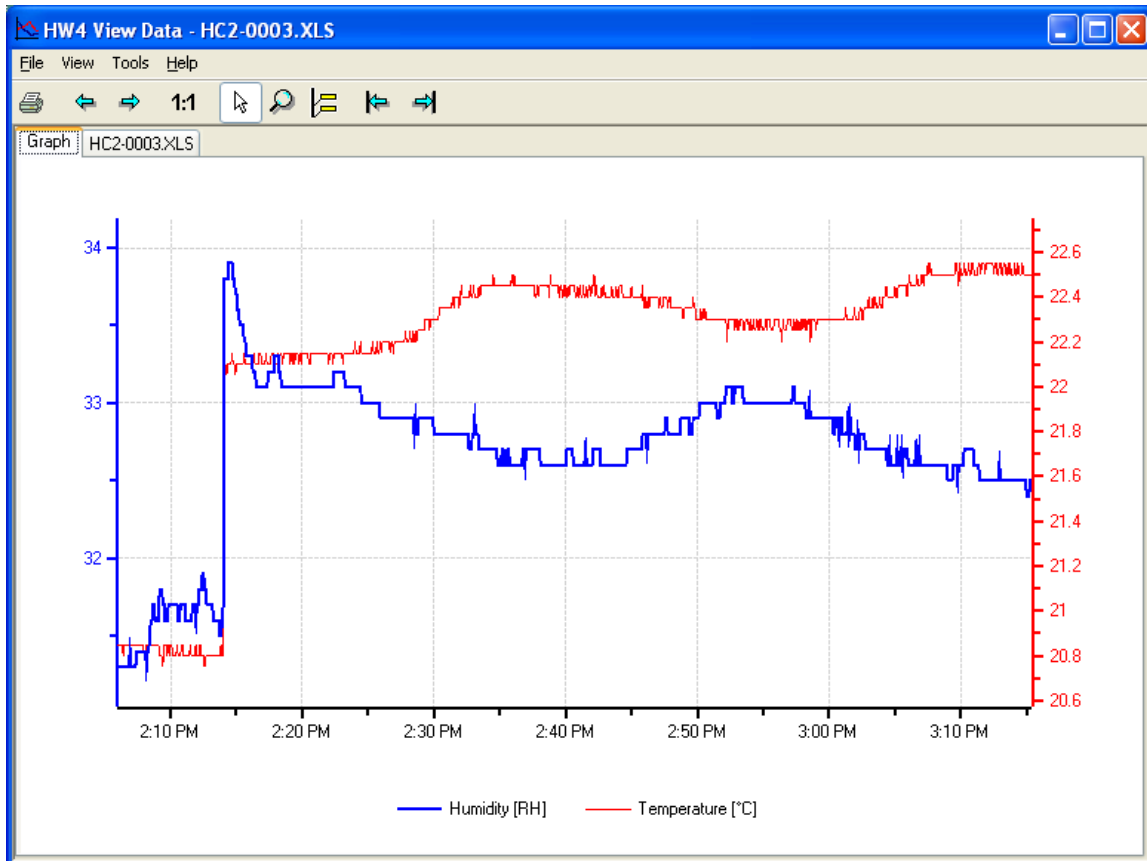
● **HW4 asks you to select a location and a name for the data file**:

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● **HW4 automatically opens HW4 View Data** (for more information about View Data, see **View / Sign a Log File** in document E-IN-HW4v2.1-Main)

Example of a data file:

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3.5   *Adding a calculated parameter to the log file*

HW4 View Data can be used to add a calculated parameter such as dew point to a log file comprised of relative humidity and temperature records. The parameter is calculated for each data record based on the relative humidity and temperature values.

HW4 View Data can also be used replace the calculated parameter in a log file with a different one.

HW4 View Data opens automatically after reading data from the AirChip 3000 device. Files that have already been downloaded can be opened from the HW4 main menu bar by selecting File > Open.
To access the "**Add / Change calculated parameter"** function, click on **Tools** in the HW4 View Data menu bar and select "Add / Change calculated parameter**"**. This opens the following form:

Use the form shown on the left to select one of the available calculated parameters.

NOTE: some parameters such as Enthalpy, Mixing Ratio etc. require barometric pressure as a calculation input. Be sure to enter the correct pressure value in the form.

Click on the OK button to add the selected calculated parameter or change the existing calculated parameter.

4   DOCUMENT RELEASES

Release	Software Ver.	Date	Notes
_10	3.0.0	Jun. 18, 2010	Original release