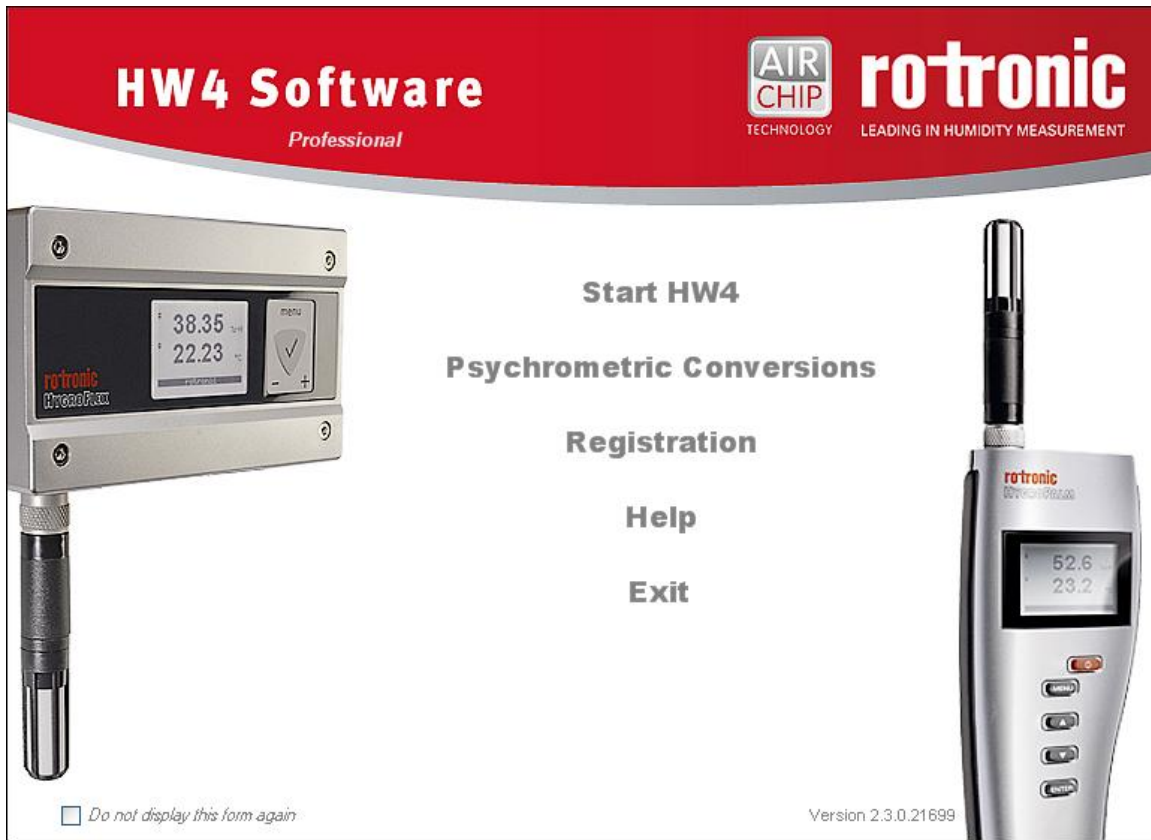


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## HW4 Software version 2

### General instructions and functions common to all 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-HW4v2-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): <ul style="list-style-type: none"> <li>○ HygroLog NT data logger</li> <li>○ HygroFlex 2, HygroFlex 3 and M3 transmitters (same icon in device tree)</li> <li>○ HygroLab 2 and HygroLab 3 bench indicators</li> <li>○ HygroPalm 2 and HygroPalm 3 portable indicators</li> <li>○ HygroClip DI digital interface</li> <li>○ HygroClip Alarm programmable logic</li> <li>○ HygroStat MB</li> </ul> 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 such as: <ul style="list-style-type: none"> <li>○ HygroClip 2 (HC2) probes</li> <li>○ HF3 transmitters and thermo-hygrostats</li> <li>○ HF4 transmitters</li> <li>○ HF5 transmitters</li> <li>○ HF6 transmitters</li> <li>○ HF7 transmitters</li> <li>○ HF8 transmitters</li> <li>○ HL20 and HL21 data loggers</li> <li>○ HP21, HP22 and HP23 hand-held indicators</li> <li>○ Custom designed OEM products</li> </ul> Device Manager (device configuration, 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

The HW4 software was developed by ROTRONIC AG for use with the ROTRONIC line of digital instruments and devices. HW4 is available in the following versions:

### 2.1 *HW4 Standard Edition*

- Unlimited number of instruments (depends on capabilities of PC and available ports)
- On-line display of the measured and calculated values (dew point or other), limited to one instrument at a time.
- Automatic retention of the most recent data in a temporary on-line buffer (multiple instruments).
- Logging of measured and calculated values to the PC (multiple instruments).
- Easy-to-read graphs and data tables.
- Statistical data tools: mean, standard deviation, minimum and maximum of the recorded data (off line only).
- Data print-out (table or graph)
- Automatic device/instrument recognition and identification
- Device/instrument configuration
- Access to the data recorded by a data logger and data transfer to the PC
- Adjustment (calibration) of the HygroClip digital probes
- Psychrometric Conversion Tool
- Built-in security to protect against data manipulation

### 2.2 *HW4 Professional Edition*

HW4 Professional edition complies with ERES regulations. This version of HW4 allows multiple users, with either administrator or standard rights and password protection.

- All the functionality of HW4 Standard Edition
- RS-485 multi-dropped sub-networks of up to 64 instruments per sub-network
- On-line display of the data from multiple instruments and probes
- Possibility to overlay and synchronize data from several log files into a single graph
- User Event Logging: automatically records user main operations.
- Multiple users distributed into two groups: administrator and standard, each with different rights
- Self Event Logging: automatically records any software problem to facilitate troubleshooting
- Logger Event Logging: automatically records the data logger internal events and configuration changes.
- Automatic creation of protocols detailing instrument configuration and programming changes as well as and probe adjustments.
- Optical or acoustical indication of an alarm condition, tracking of alarm conditions in a table, and possibility of printing a report, sending an e-mail, etc.
- Visual Indication an alarm conditions when viewing log file data
- Password protected log-in
- Meets the requirements of FDA 21CFR Part II for electronic records and electronic signatures
- Meets the EU GMP requirements regarding pharmaceuticals.

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### 2.3 *HW4 Lite*

HW4 Lite is a special version of HW4 Professional which includes all features of HW4 Professional while being restricted to devices of the HygroWin type.

### 2.4 *HW4 Professional with OPC Server*

HW4 Professional with OPC server is a special version of HW4 Professional which includes all features of HW4 Professional while also providing OPC tags that can be enabled for each individual device communicating with HW4. This allows transferring data with practically any OPC client (requires configuration / programming of the OPC client by the user).

### 2.5 *HW4 Professional with AwQuick*

HW4 Professional with AwQuick is a special version of HW4 Professional designed to facilitate measurement of the water activity (Aw) of foods, pharmaceuticals, etc. This version includes all the features of the regular HW4 Professional Edition. Two modes are available for measuring water activity: AwE and AwQuick. Both modes can be used with any of our instruments. In the AwE mode, HW4 monitors the natural equilibration of the product being measured and automatically stops the measurement process when equilibrium is reached. With most products, natural equilibrium requires from 45 to 90 minutes. The AwQuick mode reduces the time required to measure water activity to a few minutes, usually with almost the same accuracy as the AwE mode.

### 2.6 *HW4 Professional Trial Version*

HW4 Trial is a fully functional version of HW4 Professional, including the OPC server and water activity measurement functionality. A compressed installation file (zip) can be downloaded free of charge from the ROTRONIC website at:

[http://www.rotronic-humidity.com/software/humidity\\_software\\_download.php](http://www.rotronic-humidity.com/software/humidity_software_download.php)

*Note: this web page is subject to change*

Activation requires an HW4 product key which can be requested by filling a form on the ROTRONIC web site. A trial product key will be sent to your e-mail address. This must be entered in the registration form which appears when starting HW4 for the first time. After 30 days, the trial product key expires and HW4 can no longer be started.

### 2.7 *HW4 Validated*

HW4 Validated offers the same functionality as HW4 Professional with OPC server. Additionally, the "HW4 e-compliance Package" is available. This extensive collection of documents (including template of qualification documents) is designed to support the "regulated user" by qualifying/validating HW4-based solutions.

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### 3 NEW IN VERSION 2.1.0 OR HIGHER

#### 3.1 HW4 v 2.1.0

HW4 version 2.1.0 or higher includes all the functions and features of HW4 version 2.0.1 (last validated version) with the following modifications and additions:

- **Organization of the HW4 manuals**

Starting with HW4 version 2.1.0, the HW4 manuals are organized in separate books so as to limit the size of the individual documents:

- **Alarm-Test scheduling**

HW4 features a simulated alarm test that is used to automatically verify at regular intervals of time that the HW4 measurement system is currently operating and that an alarm notification will be issued whenever necessary.

Starting with version 2.1.0, HW4 adds the following options when scheduling the automatic simulated alarm test:

- Each hour
- Each 4 hours
- Each 8 hours
- Each 12 hours

The scheduling options offered by HW4 2.0.1 are still available.

- **Polling Synchronization (concurrent HW4 sessions on different workstations)**

Starting with version 2.1.0, HW4 includes a polling synchronization function designed to avoid conflicts when devices are being simultaneously polled by several workstations.

- **Probe Adjustment (AirChip 3000 devices)**

Starting with version 2.1.0, introduction of products based on the AirChip 3000 has made it necessary to add a new probe adjustment function.

Note: HW4 version 2 can also be used to adjust devices based on the original HygroClip technology (prior to the AirChip 3000).

- **Devices compatible with HW4**

**a) Legacy devices – original HygroClip technology**

- HygroLog NT data logger
- HygroFlex 2, HygroFlex 3 and M3 transmitters (same icon in device tree)
- HygroLab 2 and HygroLab 3 bench indicators
- HygroPalm 2 and HygroPalm 3 portable indicators
- HygroClip DI digital interface
- HygroClip Alarm programmable logic
- HygroStat MB

Note: HW4 version 2 can also be used to configure the HygroFlex 1, HygroLab 1, HygroPalm 1 and HygroPalm 0. These instruments are not designed to be used with HW4 for any other purpose.



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Recommended minimum firmware version for legacy devices:

HygroLog NT	: v 1.2 (v.1.3b or higher: HW4 2.2.0 is required)
Docking station for HygroLog NT	: v 1.4
HygroPalm, HygroLab, HygroFlex and M3	: v 4.1
HygroClip DI	: v 1.0
HygroClip Alarm	: v 2.1
HygroStat MB	: v 1.0

**b) Devices based on the AirChip 3000 technology (HW4 2.1.0 or higher):**

- HygroClip 2 (HC2) probes
- HF3 transmitters and thermo-hygrostats
- HF4 transmitters
- HF5 transmitters
- HF6 transmitters
- HP21, HP22 hand-held indicators
- Custom designed OEM products

### 3.2 HW4 v 2.1.1

• **Communication protocol options**

Starting with firmware version 1.3, a number of devices based on the AirChip 3000 offer several communication protocol options that can be used when the device is not communicating with HW4. For more details see document E-M-AC3000-CP

HW4 version 2.1.1, Device Manager supports the selection and configuration of the optional communication protocols.

### 3.3 HW4 v 2.2.0

• **Devices compatible with HW4**

HW4 v 2.2.0 adds support for the following devices:

**a) Legacy devices – original HygroClip technology**

HygroLog NT with firmware v.1.3b (backlit LC display)

**b) Devices based on the AirChip 3000 technology (HW4 2.1.0 or higher):**

- HF7 transmitter
- XB OEM transmitter
- XA OEM probes
- MP102H and MP402H meteorological probes

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### 3.4 HW4 v 2.3.0

#### • Alarm Table (HW4 Professional)

The alarm table View menu now includes two additional items:

- All Alarms: displays the entire contents of the alarm file
- Navigation: duplicates the function of the arrow buttons (go to the beginning of the alarm file, go to the end of the alarm file, etc.)

#### • HW4 main menu bar > Devices and Groups

The structure of the Devices and Groups menu (HW4 Main Menu Bar) has been modified as follows:

**1) Search for Master Devices:** this submenu now includes the new function Refresh Master Devices:

This function interrogates all PC connections (COM, USB and Ethernet) that are used by the master devices currently in HW4. When communication has been lost with any master device the function re-establishes the communication. Refresh Master Devices does not add any new device to the device tree and does not look for slave devices that may be connected to any of the master devices. Refresh Master Devices does not work with the AC3010 adapter and this adapter has its own refresh function (see below).

**2) Search for RS-485 Slave Devices:** this submenu is available with all versions of HW4 Professional and now offers the following options:

- Search for slaves connected to any master present in the device tree
- Search for slaves connected only to the master currently highlighted (selected) in the device tree
- Refresh all RS-485 networks
- Refresh RS-485 network attached to selected master
- Search for devices connected via AC3010 adapter
- Refresh devices connected via AC3010 adapter

When communication has been lost with a slave device already present in the device tree, the “Refresh” function re-establishes the communication. Refresh does not add any new device to the device tree.

Note: explanations about the AC3010 adapter are provided under “Devices compatible with HW4”

#### • Device tree > Device menu box

The device menu box can be opened by right clicking on any device present in the device tree. In the case of a master device the menu box now includes two new items:

- Search for RS-485 slave devices
- Refresh the RS-485 slave devices

These two items operate in the same manner as the equivalent items in the Search for RS-485 Slave devices submenu and are not available when a slave device has been selected.

#### • HW4 status line (bottom of the HW4 main screen)

The HW4 version and build number now appear at the bottom right corner of the HW4 main screen

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● **Current Values Tab > Column Headers**

The serial number of a probe or instrument based on the AirChip 3000 technology can be displayed as one of the columns in the Current Values tab, both in device or group view.

- The serial number of legacy instruments and probes cannot be displayed
- In the case of instruments such as the HP22, HP23 and HF5, the HC2 probe serial number is displayed but not the instrument serial number

● **HW4 Main Menu Bar > Shortcut Buttons**

The HW4 main menu bar now features a new button that is used to globally erase the contents of both the online buffer and online chart.

● **Log-to-PC files > File Header**

The header of the files generated with the Log-to-PC function now includes the HW4 version and build number.

● **RH sensor test (AirChip 3000 devices)**

The configuration and settings of the RH sensor test function have been modified and the function itself can be turned on or off. The RH sensor test function is not described in this document. For a description see the HW4 Device Manager manual available for each individual type of device.

● **Devices compatible with HW4**

HW4 v 2.3.0 adds support for the following devices:

- HP23 indicator
- AC3010 USB / RS-485 converter cable

Note: the AC3010 converter allows connecting one or several probes and instruments with a RS-485 port to the USB port of a PC, without requiring a master device.

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## 4 INSTALLATION

### 4.1 *Software Licensing Agreement*

#### 1) Rights to software, know-how and process

Without any specific agreement, the customer may make use of the available software HW4, the know-how, the data carriers and the documentation to the extent provided for, but must not pass it on to third parties.

Any improvement, amendment or copying of the software by the customer requires permission in writing from ROTRONIC. The customer must include the same property rights notations on all modifications and copies as there are on the original.

In all cases, ROTRONIC or its licensors retain the ownership of the software and the know-how and also retain the right to continued utilization, even if ROTRONIC supplies the source codes or if the customer subsequently makes amendments to the software programs or know-how recordings.

#### 2) Warranty against defects

The customer's warranty rights presume that he or she has fulfilled his or her legal obligation to examine and make a complaint in respect of a defect immediately on receipt of the goods as is required.

ROTRONIC shall be released from all obligations under all warranties either expressed or implied, if the software covered hereby is modified by persons other than its own authorized personnel, unless such modification by others is made with the written consent of ROTRONIC or unless such modification in the sole opinion of ROTRONIC is minor or unless such modification is merely the installation of a new ROTRONIC update or patch for the software. ROTRONIC makes no warranties which extend beyond the description of the software covered hereby other than as expressly stated herein, ROTRONIC expressly and specifically disclaims the implied warranty of merchantability and makes no warranty with respect to the fitness of the software covered hereby for any particular purpose or use unless such a warranty is expressly set forth.

The buyer or anyone claiming under any warranty relating to the software sold hereunder agrees that if ROTRONIC breached any such warranty, or any warranty implied either in fact or by operation of law, or if the software warranted hereunder proves defective in any manner whatsoever, ROTRONIC sole liability hereunder is limited to either replacement of the defective software or at the option of ROTRONIC, refunding to the buyer the purchase price paid for such defective software. The buyer and anyone else claiming under any warranty relating to the software sold hereunder expressly and specifically agree that ROTRONIC is not responsible for, and the buyer or such other claimant or claimants shall assume, any liability for property damage, prospective profits, special, indirect, or consequential damage, or other commercial or economic loss arising out of use or possession of the software sold hereunder. ROTRONIC shall not be liable for, and a buyer or anyone else claiming under any warranty relating to the software sold hereunder further agrees, and shall assume, any liability for personal injury arising out of use or possession of the software sold hereunder. Representations and warranties made by any person, including dealers and representatives of ROTRONIC which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of ROTRONIC as set forth above), shall not be binding upon ROTRONIC unless given in writing and approved by an expressly authorized representative of ROTRONIC.

### 4.2 *HW4 requirements*

#### 4.2.1 *Computer/Operating System Requirements*

The following are the minimum values required to install and run HW4 on a computer. It is highly recommended to exceed these values.

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- Processor: Pentium II, 450 MHz
- RAM: 128 MB
- Available hard disk space: 50 MB
- Monitor: SVGA, 1024 x 768, 256 colors
- Ports: one free serial (COM) port or one free USB port or Network Interface Card / Ethernet LAN with one free port (RJ45 connector)

#### 4.2.2 Operating System Compatibility

- Windows XP, NT4 with SP 6a or higher, Vista
- Windows 2000 with SP 2 or higher
- Windows Server 2003

HW4 was written for the Microsoft .NET framework (version 2.0) and requires this framework to be installed on the computer.

The .NET framework offers significant improvements in the areas of networking and user security. When new software is being installed, the .NET framework also eliminates the potential problem of conflicting dynamic library files (DLL). According to Microsoft, the .NET framework will be used by all future Microsoft operating systems.

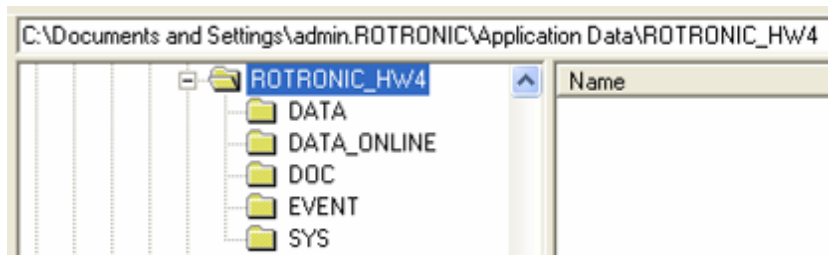
#### 4.2.3 Important information to review prior to installing HW4

##### Microsoft .NET framework

Prior to installing HW4 you should verify that the Microsoft .NET framework (version 2.0) is installed on the PC. To do this, open Control Panel in Windows and select Add or Remove Programs. Windows displays an alphabetical list of installed programs. If Microsoft .NET framework is not listed it is not installed on the PC. Microsoft .NET framework v. 2.0 is included in the HW4 CD-ROM and can be installed as part of the HW4 installation procedure.

##### Location of the HW4 User Folder

During the initial startup, HW4 creates a User Folder named ROTRONIC\_HW4. By default, this folder is created in C:\Documents and Settings\*Windows User*\Application Data, where *Windows User* is the name that was used to log into the current Windows session.



This folder is used to hold the HW4 configuration file as well as the different data, event and protocol files created by HW4.

Windows automatically gives *Windows User* **exclusive access** to the directory C:\Documents and Settings\*Windows User* and subfolders. For this reason, the default path for the HW4 user folder may not be suitable for the intended use of HW4.

**For instructions about changing the path of the HW4 User Folder, see [Relocating the HW4 User Folder](#) before installing HW4.**

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### Running HW4 from several workstations with a Windows 2003 server

Generally, we do not recommend installing HW4 directly on a Windows 2003 file server. When you wish to run HW4 on multiple workstations viewing and sharing the same data, you should proceed as follows:

- Log in on one of the workstations as an administrator of the Windows 2003 server.
- Install HW4 on the workstation following the procedure described under **Installing HW4**
- After installing HW4 and prior to starting HW4, go to the HW4 installation directory on the workstation and change the path used by HW4 to locate the **HW4 User Folder** to the root directory of a file server drive that is mapped on each workstation (see [Relocating the HW4 User Folder](#)).
- Start HW4 following the procedures described in this manual under **Initial Startup**
- Close HW4 before installing HW4 on the next workstation
- Repeat this procedure for each workstation

**Note:** It is important to distinguish between a Windows workstation user and a HW4 user. It is equally important to distinguish between the Windows permissions to a folder and HW4 rights. When the HW4 User Folder is located on the File server and is shared by all workstations, you should give all Windows users sufficient permissions to the HW4 User Folder and subfolders (Folder Properties - Security).

### 4.3 Installing HW4

Insert the HW4 CD-ROM into the CD drive or your PC. The installation program should start automatically. If the installation program does not start, use My Computer in Windows to open the CD drive and double click on the file start.exe located in the root directory of the CD.

HW4 Software






1. **INSTALL Microsoft .NET Framework V2.x**
2. **INSTALL ROTRONIC HW4**
3. **Exit**

**Note:**  
HW4 requires the Microsoft .NET framework V2.x to be installed

- [ROTRONIC Website](#)
- [Humidity and Temperature measuring systems](#)
- [Online Support](#)



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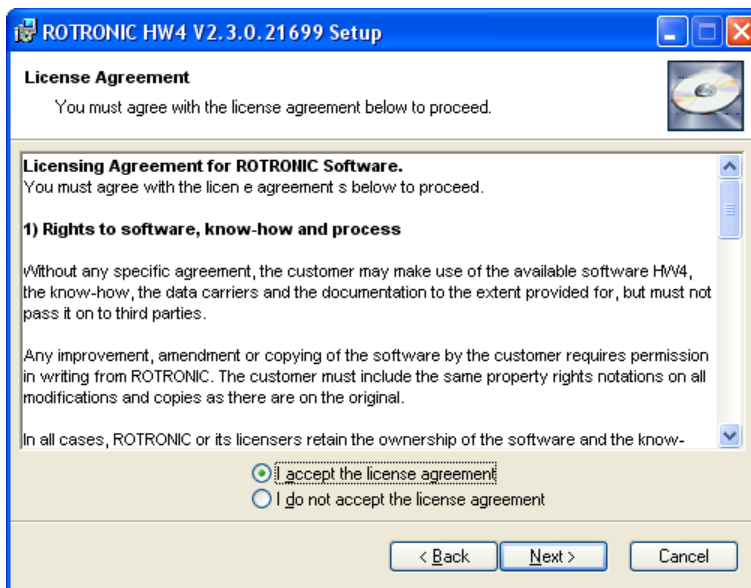
**IMPORTANT:** HW4 requires a PC with the Microsoft .NET Framework version 2.0 or higher installed. If the Microsoft .NET Framework is not already installed on your PC, please click with the mouse on step 1 to install the framework.

Note: save your work and close all open files because the computer will have to restart to complete the installation process.

After installing the Microsoft .NET Framework, click on step 2 with the mouse to install HW4. Installation begins with the following form:



Click on the NEXT button:



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Click on the NEXT button to move through the different installation steps and follow the instructions provided on the screen.

The choice made above determines how the HW4 install program will make entries in the Windows registry (entries for all users or for the current user only).

The default installation directory is C:\Program Files\HW4 and can be changed during installation.

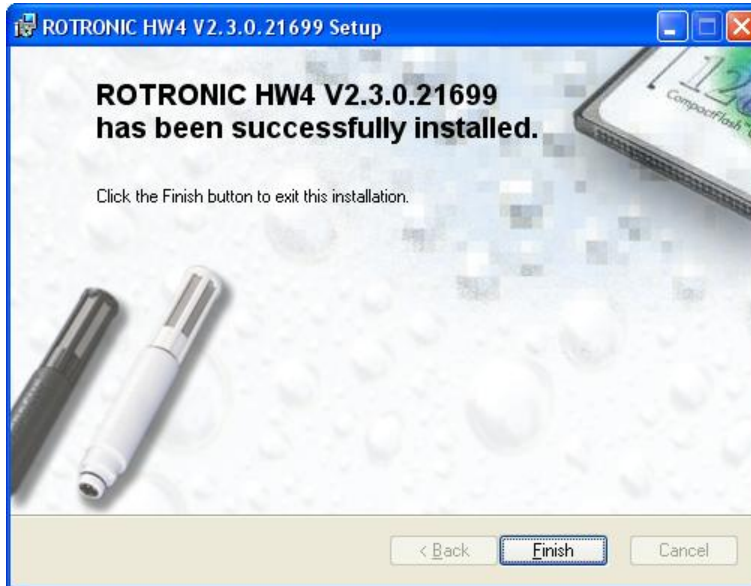
The shortcut HW4 is automatically created on the desktop during installation:



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Note: Upon starting HW4 for the first time, the folder ROTRONIC\_HW4 will be automatically created in C:\Documents and Settings\Windows User\Application Data, where *Windows User* is the name that was used to log into the current Windows session.

When installation is complete, the following screen should appear:



## STOP HERE!

Do not start using HW4 without reading the following:

- [Relocating the HW4 User Folder](#)
- [Preparing for device connection](#)

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#### **4.4 Updating HW4 to a newer version**

When updating HW4 to a newer version, two distinct situations may present themselves. In both cases, it is advisable to make a note of your old HW4 product key prior to updating, even if in principle re-entering this information and registering the new version of HW4 are not required.

##### **4.4.1 Partial update: HW4.exe**

In the case of a partial update, simply copy the new HW4.exe file over the old file, normally located in the directory C:\Program Files\HW4.

##### **4.4.2 Full update: Install\_HW4.exe**

In the case of a full update, you should first uninstall the old version of HW4. To do this properly, click on Start in Windows and open the Control Panel. Select Add or Remove Programs. ROTRONIC HW4 should be listed as one of the installed programs. Select ROTRONIC HW4 and click on the Remove button.

Note: uninstalling HW4 from the Windows Control Panel does not delete the HW4 User Folder.

**IMPORTANT: do not delete the HW4 User Folder (ROTRONIC\_HW4) created by the old HW4 version.** Unless otherwise mentioned, this folder can be used with the updated HW4.

The default path of the HW4 User Folder is C:\Documents and Settings\XXXX\Application Data, where XXXX is the Windows user who initially installed HW4.

Deleting the HW4 User Folder would erase all users, all configuration and measurement data as well as all event tracking and protocols. It is advisable to make a temporary back-up copy of this folder.

#### **4.5 Uninstalling HW4 (full uninstall)**

**IMPORTANT:** Not following this procedure may result in problems if HW4 is installed again.

To properly uninstall HW4 and remove its main components, you should click on Start in Windows and open the Control Panel. Select Add or Remove Programs. ROTRONIC HW4 should be listed as one of the installed programs. Select ROTRONIC HW4 and click on the Remove button.

To complete a full uninstall you should manually delete the HW4 User Folder (ROTRONIC\_HW4). The default path of the HW4 User Folder is C:\Documents and Settings\XXXX\Application Data, where XXXX is the Windows user who initially installed HW4.

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## 5 CONNECTING DEVICES TO THE HW4 PC

### 5.1 *Definition: masters and slaves (HW4 Professional)*

HW4 Professional makes use of the following definitions:

**Master:** any device / docking station that is directly connected either to a physical or to a virtual port of the PC or that is directly connected to an Ethernet port (TCP/IP) either by cable or by wireless.

**Slave:** any device / docking station that is connected to a master by means of an RS-485 multi-drop. Slaves cannot be used in conjunction with HW4 Standard Edition.

### 5.2 *Connection methods for master devices*

All versions of HW4 are compatible with the following methods for connecting devices to the HW4 PC:

- **Physical serial port**
- **Bluetooth serial port (virtual COM port)**
- **USB port**
- **LAN (TCP/IP)** - cable or wireless connection

### 5.3 *Devices used as RS-485 slaves (HW4 Professional)*

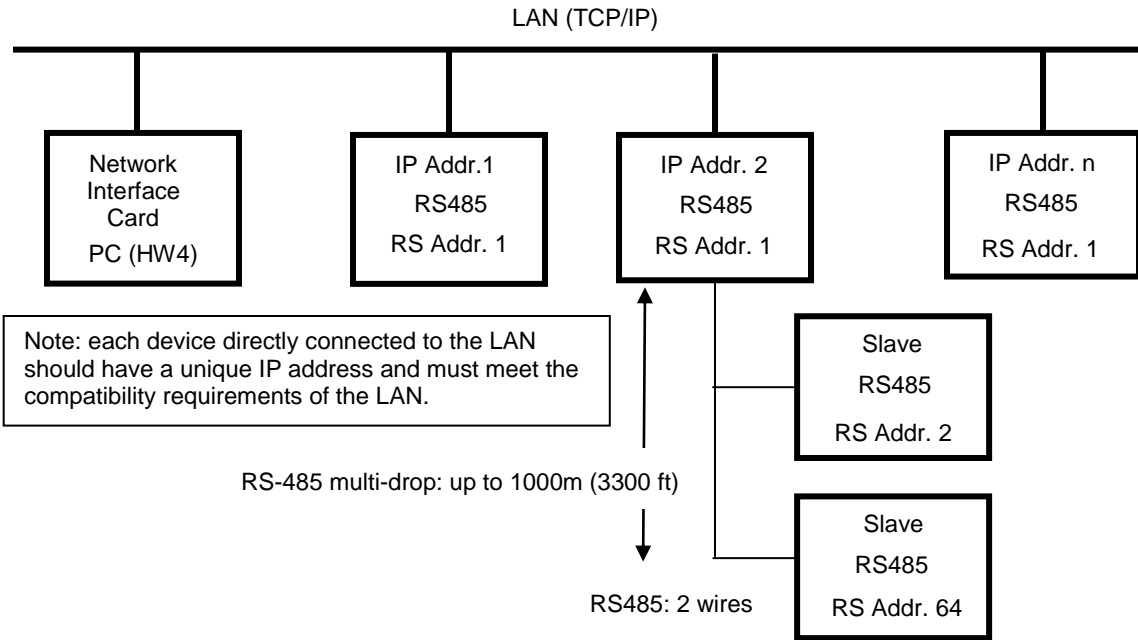
HW4 Professional allows the use of one RS-485 multi-drop with each master device. Any RS-485 multi-drop is limited to a maximum of 64 devices (1 master and up to 63 slaves). Any device with a RS-485 port can be used either as a master or a slave, without special configuration.

#### **IMPORTANT:**

- **RS-485 compatibility:** the communications protocol used by the products based on the AirChip 3000 technology is not compatible with the protocol used by the previous generation of ROTRONIC products. Do not connect legacy products and AirChip 3000 products to the same RS-485 multi-drop network. HW4 is compatible with both AirChip 3000 products and legacy products as long as these products are connected to separate RS-485 multi-drop network.
- **Baud rate:** unlike legacy products, the 19200 Baud rate used by all products based on the AirChip 3000 cannot be changed

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**Example:** slaves connected to an Ethernet master



See [RS-485 slaves: address and Baud rate requirements.](#)

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## 6 PREPARING FOR DEVICE CONNECTION

### NOTE:

- The HygroLog NT requires a docking station to provide an interface with the PC.
- If you want to run HW4 on multiple workstations connected to a Windows 2003 file server, use only devices connected by Ethernet (wired or wireless) because this is the only type of connection that can be shared by all workstations. Devices connected by RS-485 to an Ethernet device can also be shared.

### 6.1 *Physical serial port*

Connecting an instrument or device to a physical COM port of the HW4 PC does not require any preparation. Simply connect the device to any available serial (COM) port on the PC.

### 6.2 *Bluetooth virtual serial port*

Note: This connection method is available only with some HygroLog NT models. Check the local menu of the HygroLog NT - Settings, and make sure that Bluetooth is on.

Communication via Bluetooth requires the HW4 PC to be equipped with an internal or external Bluetooth transceiver. Connect your Bluetooth transceiver to the HW4 PC and install the driver supplied with the transceiver as per the instructions of the transceiver manufacturer.

Typically, the Bluetooth driver has provisions for defining one or several Bluetooth serial ports (look for Local Services and / or Bluetooth Client Applications). Bluetooth serial ports are virtual COM ports and should be given a number that is distinct from the physical COM ports already present on the PC. Both the transceiver attached to the PC and the HygroLog NT should be given a unique COM port number.

In addition, it is usually necessary to “pair” the transceiver with the Bluetooth enabled HygroLog NT. For security reasons, the process of “pairing” requires a password to be entered. By default, all ROTRONIC Bluetooth devices are identified as HygroBlue and use 1234 as the pairing password.

In order to allow detection by HW4, any Bluetooth serial port must be manually declared in **HW4 Global Settings – General Tab** in the text box labeled **Bluetooth serial ports**, and then discovered manually using **Search for RS-232 masters** under **Devices and Groups** in the HW4 main menu bar.

HW4 detects and displays a Bluetooth device in the same manner as any device connected to the PC by way of a physical serial port.

### 6.3 *USB port*

Prior to connecting any ROTRONIC device to a USB port you should install the **ROTRONIC USB driver** on the HW4 PC.

**IMPORTANT: do not run HW4 while installing the USB driver on the PC.**

The ROTRONIC USB driver (ROTRONIC USB Option) can be installed before or after installing HW4.

The following example shows how to install the driver with Windows XP.

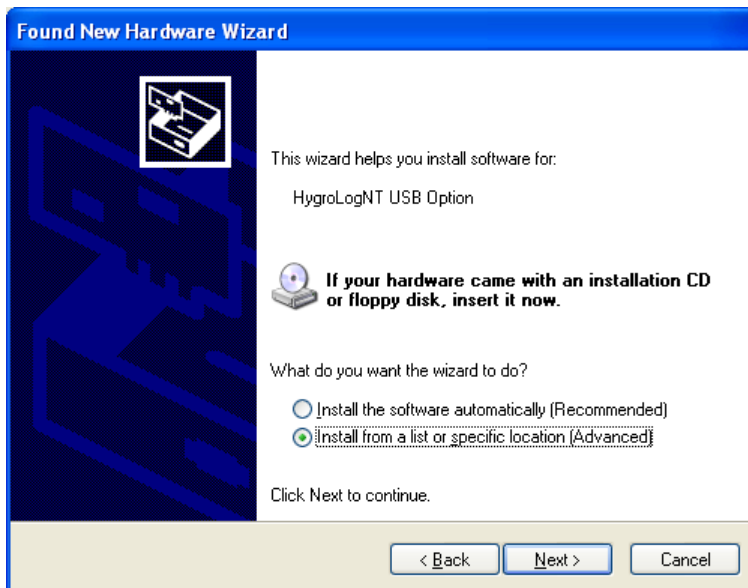
1. Prior to connecting the device to the PC, insert the HW4 CD-ROM in any available PC drive. The HW4 installation screen starts automatically. Exit this screen.
2. Connect the instrument or docking station to any available USB port. Upon detecting the presence of a device connected to the USB port, Windows XP automatically starts the following wizard:

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If you are using Windows XP Professional SP2, the following screen appears. Select “No, not this time” and click on Next. This screen does not appear if you have not installed SP2.



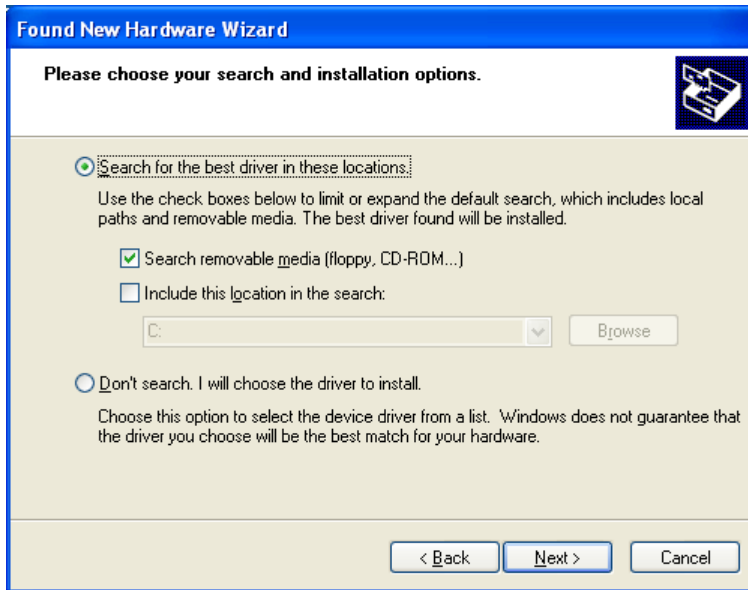
3. The following screen appears:



Select “Install from a list or specific location” and click on Next.

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4. Select “Search for the best driver in these locations”. Note that at this time the HW4 CD\_ROM should have been already inserted in the PC.



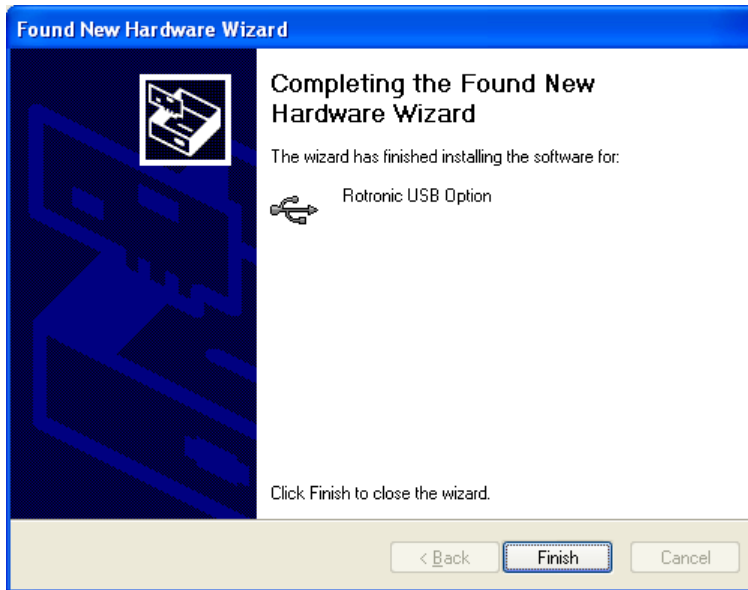
Click on Next

5. You will receive the following warning. Disregard this warning and click on “Continue anyway”.



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6. Windows copies the USB driver located on the HW4 CD-ROM and displays the following message when done:



Click on "Finish" to complete the process.

Note: If your device has only a serial port and the PC has a USB port but no COM port, you can install a USB Serial Adapter on one of the PC USB ports. In this situation, install the driver supplied with the USB serial adapter (not the driver supplied with HW4) and connect the device to this adapter. HW4 will assume that the device is connected to a serial (COM) port.

## 6.4 Ethernet (TCP/IP) connection

### NOTES:

- ROTRONIC devices with an Ethernet interface require configuration of the TCP/IP settings to ensure compatibility with the LAN to which the HW4 PC is connected (IP address, sub-net mask, gateway, etc.). Detailed instructions for configuring a ROTRONIC device with Ethernet (TCP/IP) interface are provided separately in document **IN-E-TCPIP-Conf\_11**. A PDF version of this document can be downloaded from our web site. You may also want to read "**Basic TCP/IP concepts**" in this manual or consult with your network administrator prior to connecting any device to your local area network.
- ROTRONIC devices with an Ethernet interface (both wired and wireless) are shipped with a Device Configuration Certificate that provides information about the factory configuration settings of both the Ethernet module and device.



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Before configuring the device TCP/IP settings, you should make sure that the following is available to you:

- An unused static IP address that is compatible with your network
- The subnet mask of your network
- The local IP address of the router used on the same LAN as the HW4 PC, the default gateway used by all devices on the LAN

In addition, the following information is required for a wireless connection:

- The wireless network name (SSID)
- The security mode (WAP, WEP or other) used by the HW4 network and the key or keys used by the security mode.

#### 6.4.1 Wired TCP/IP connection

A device discovery utility (**Digi Device Discovery**) is provided in the HW4 installation directory (usually, C:\Program Files\HW4). The name of the corresponding file is **dgdiscvr.exe**. The Digi Device Discovery utility can be started by double clicking with the mouse on the file.

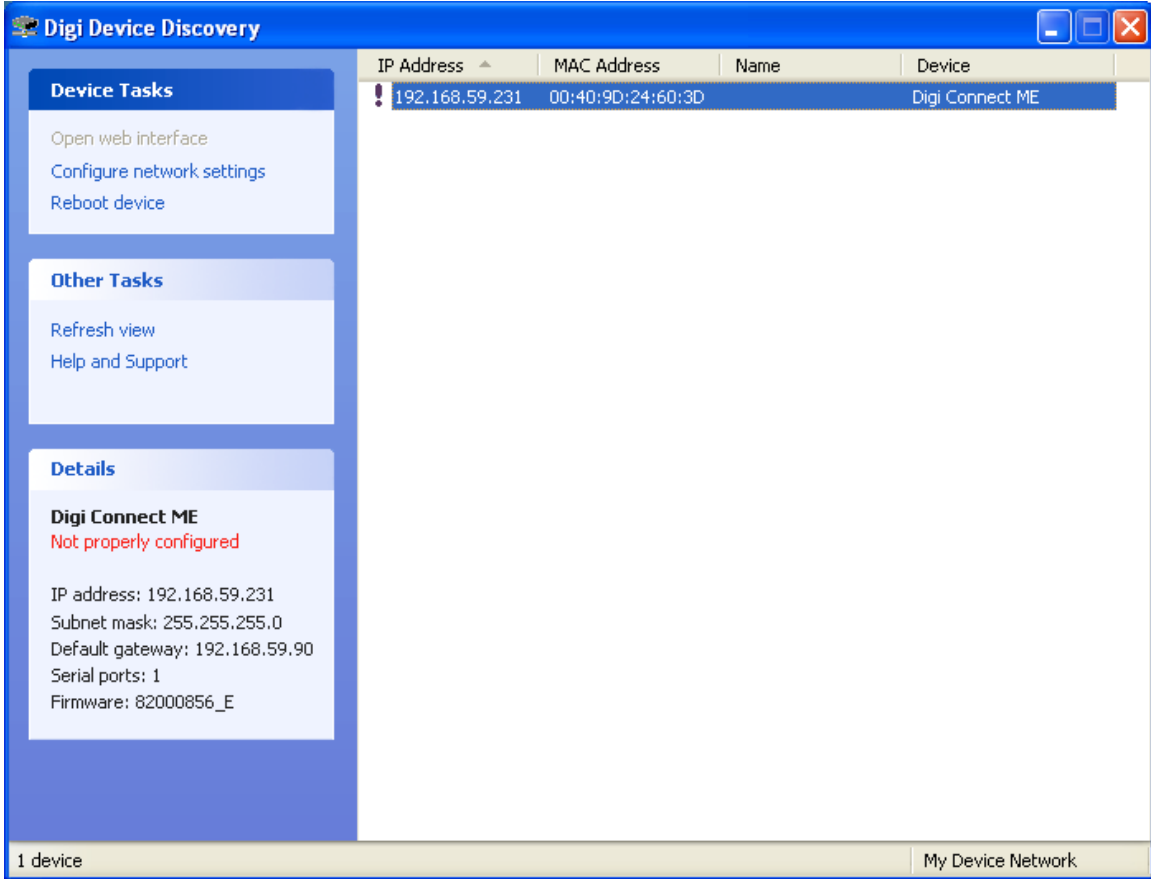
Digi Device Discovery detects only products from Digi International such as the internal Ethernet module currently used by ROTRONIC for devices with an Ethernet interface.

Connect the device to be configured to your LAN and double click with the mouse on dgdiscvr.exe to start Digi Device Discovery.

When activated, Digi Device Discovery automatically detects any ROTRONIC device present on the LAN and provides a list of all such devices.

The following example shows the initial screen for a device with TCP/IP settings that are not compatible with the LAN. Note the red warning that appears on the left side of the screen when the device is selected (highlighted).

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With the device highlighted, click on “Configure network settings” to open the dialog box shown below.

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**Configure Network Settings**

The network settings can be assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate network settings.

Device: Digi Connect ME  
MAC Address: 00:40:9D:24:60:3D

Automatically obtain network settings via DHCP  
 Manually configure network settings

IP Address: 192 . 168 . 59 . 231  
Subnet Mask: 255 . 255 . 255 . 0  
Default Gateway: 192 . 168 . 59 . 90

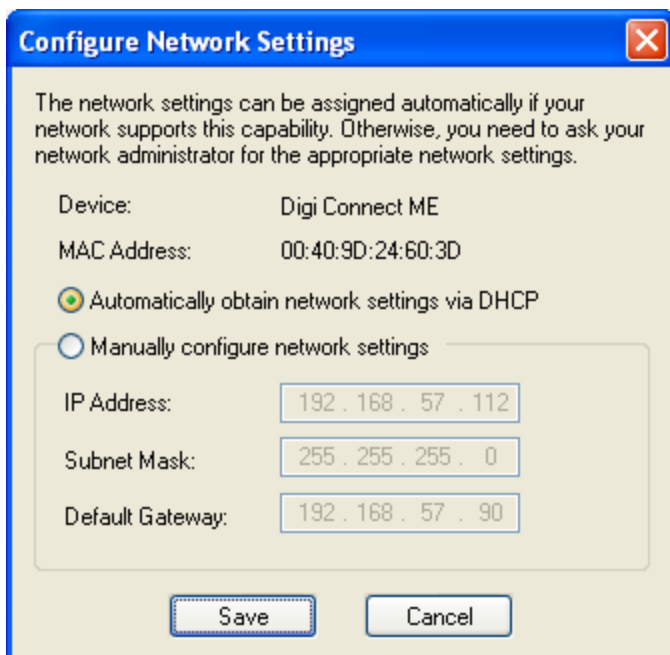
Save Cancel

When in doubt as to which setting to enter manually, select “automatically obtain network settings via DHCP” (requires a LAN with DHCP server such as a router). Using DHCP ensures that the device settings that are compatible with the LAN (subnet mask and default gateway) and that the IP address does not generate any conflict.

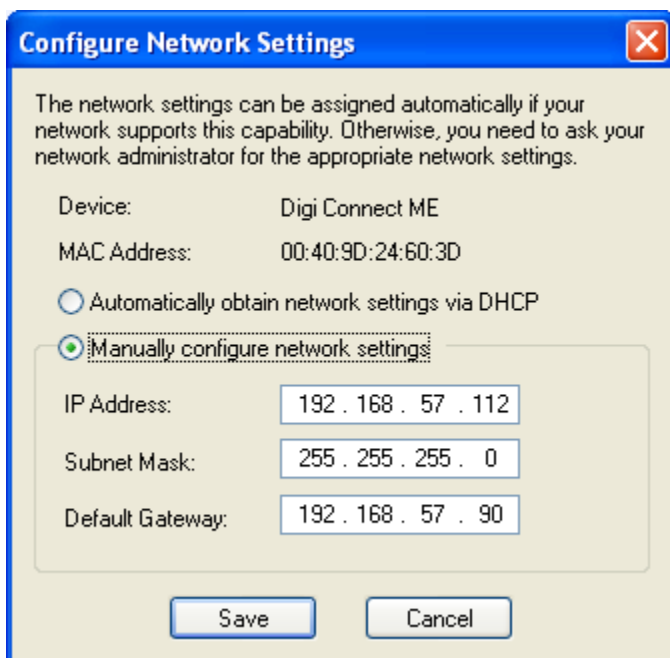
Click on Save, Reboot the device and click on Refresh View.

A dynamic IP address is subject to change whenever the device is powered down and then powered up. For this reason, you should now change the device configuration from dynamic IP address (DHCP) to static IP address. To do this, click again on “Configure network settings”. The current settings of the device (IP address, subnet mask, etc.) appear in light gray.

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Click on "Manually configure network settings".



Change the device IP address to an address that is both currently unused on the LAN and outside of the range of dynamic IP addresses used by the DHCP server. To select a proper address, you may want to consult your network administrator.

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#### 6.4.2 Wireless TCP/IP connection

The internal Digi module WI-ME used by wireless ROTRONIC devices does not allow a wired connection to a LAN and must be configured using a wireless connection.

To allow a new wireless device to connect, the HW4 network wireless router has to be temporarily reconfigured and the wireless network security disabled. This is clearly not practical for most users and we recommend using a dedicated wireless router for the purpose of configuring a wireless ROTRONIC device.

Detailed instructions for configuring a wireless Ethernet ROTRONIC device are provided separately in document **IN-E-TCPIP-Conf\_11**. A PDF version of this document can be downloaded from our web site.

### 6.5 RS-485 slaves: address and Baud rate requirements

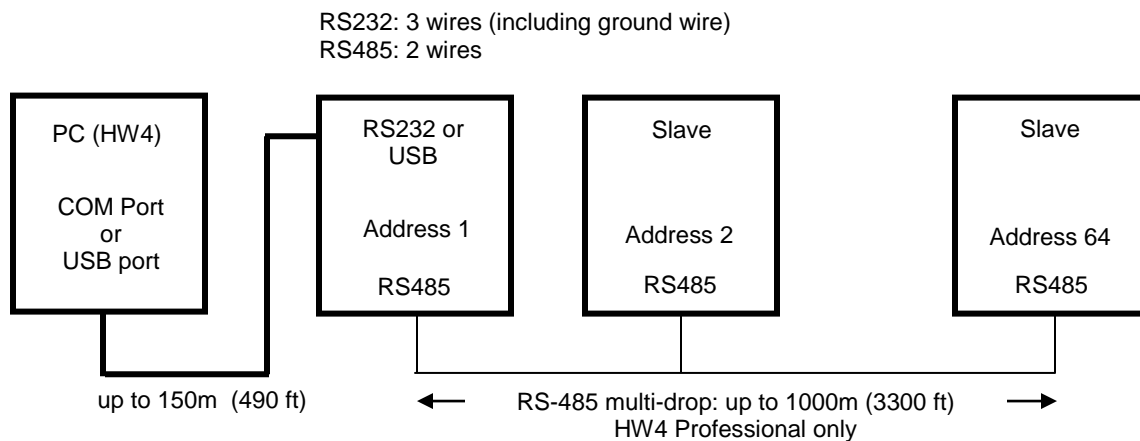
#### IMPORTANT:

- **RS-485 compatibility:** The communications protocol used by the products based on the AirChip 3000 technology is not compatible with the protocol used by the previous generation of ROTRONIC products. Do not connect legacy products and AirChip 3000 products to the same RS-485 multi-drop network.
- **Baud rate:** the 19200 Baud rate used by all products based on the AirChip 3000 cannot be changed

All devices that are compatible with HW4 have an internal RS-485 address ranging from 0 to 64. The factory default for the RS-485 address is 0. Similarly, devices are configured at the factory to use a specific Baud rate for all serial communications. In the case of devices with an internal Ethernet (TCP/IP) module, serial communication includes communication between the device proper and its internal Ethernet module.

The RS-485 address is part of the communications protocol used by HW4 and is always included in the command sent to a device and in the device response. In the case of an RS-485 multi-drop, this address is used to identify each device and should be unique within the same multi-drop.

**Example:** slaves connected to a COM or USB master



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When searching for RS-485 slaves, HW4 automatically changes the factory default RS-address of both masters and slaves as explained below:

- **Masters:** HW4 automatically changes the RS-485 address of any new device that is directly connected to the PC (master) from 0 to 1. As a result, all masters discovered by HW4 end up having the same RS-485 network address (1).
- **Slaves:** in the situation where an RS-485 multi-drop is detected during a search, HW4 automatically changes the address of each slave with address 0 to a unique address ranging from 2 to 64. The same address range (2 to 64) is used again when there is more than one RS-485 multi-drop.

**IMPORTANT:**

- Avoid changing manually the factory default RS address (0) of new devices. Allow HW4 to change this address automatically.
- Change manually the RS address to 0 in the following situations:
  - A master will now be used as a slave
  - A slave is being moved from one multi-drop to another.

The change of address should be done prior to changing the physical connection (use HW4 Device Manager). If you forgot to do this, temporarily connect the device as a master to do the address change.

- Duplicate RS addresses are not permitted within the same RS-485 multi-drop (with the exception of temporary address 0). Duplicate addresses may prevent communication with the devices or give unpredictable results. It is OK to use the same RS address in different multi-drops.
- All devices within a multi-drop must use the same baud rate. Different Baud rates will prevent communication between the devices and the HW4 PC.

**Master with Ethernet (TCP/IP) interface:** any change to Baud rate of the device done with HW4 Device Manager should also be reflected in the configuration of the internal Digi International module used by the device to connect to the LAN.

See: [Changing the baud rate of an Ethernet device](#)

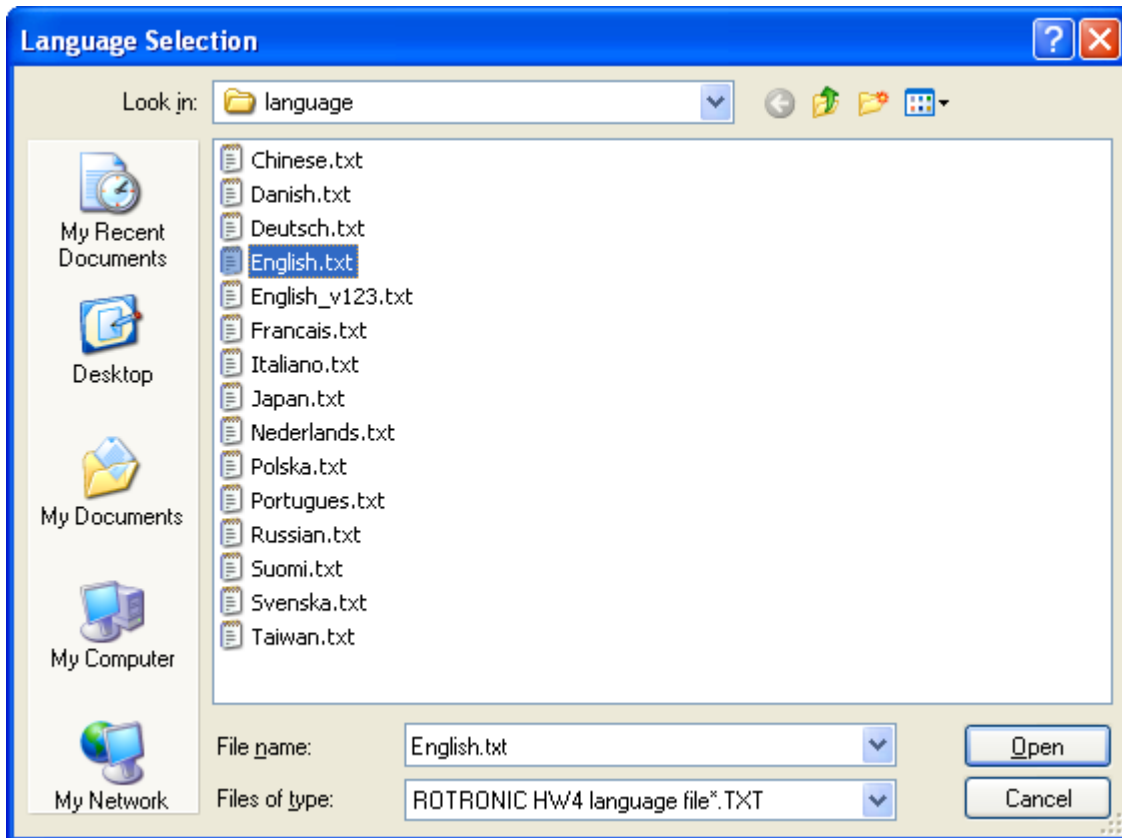
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## 7 INITIAL START-UP

Click on the HW4 shortcut created on your desktop by the installation program.

### 7.1 *Language selection*

The first form to open lists the different language files available within HW4:



Use the mouse to highlight the desired language and click on Open.

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## 7.2 Product key and registration

The next form is the HW4 start-up form:



First Time Users: HW4 requires you to register and you should now click with the mouse on the underlined Registration link. This opens the following form:



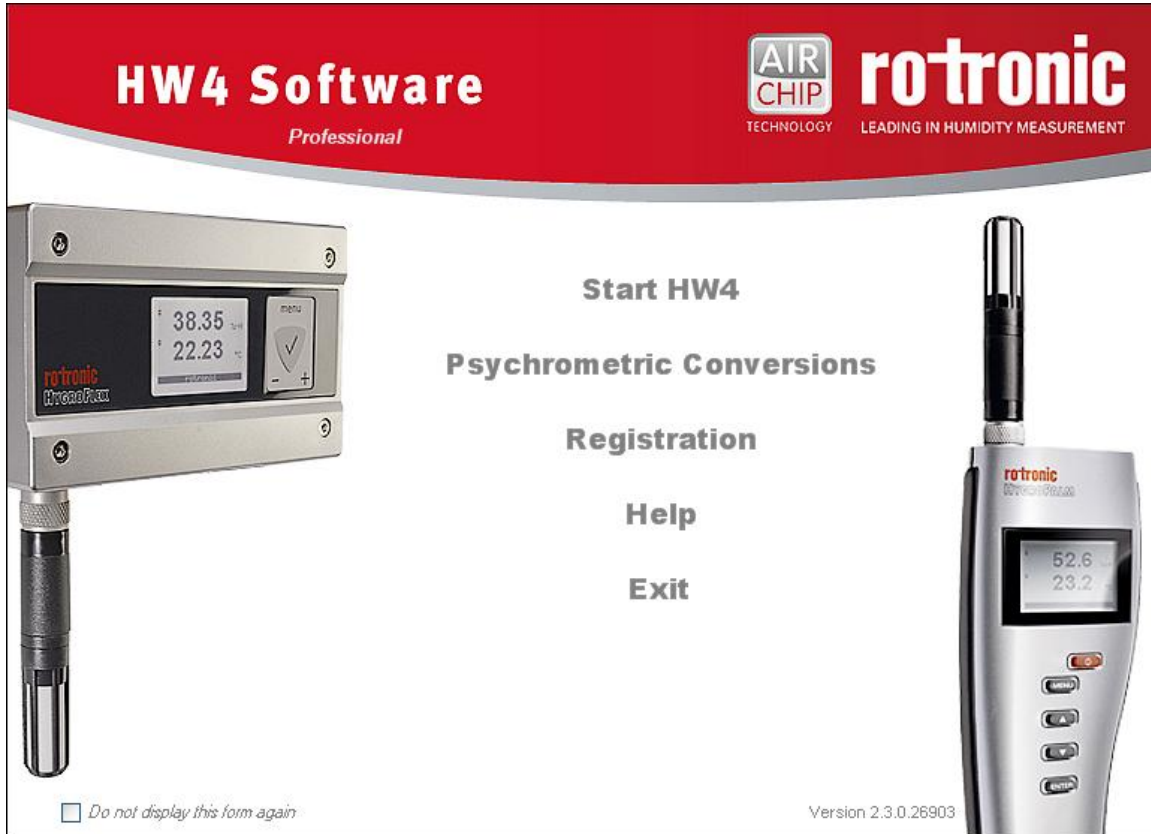
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Enter the HW4 product key, which is printed on a sticker affixed to the protective cover of the HW4 CD. Fill in the required information. If the box Register on-line is checked, clicking on Continue will connect you to the ROTRONIC web site, where your registration data will be automatically entered. If you do not have an internet connection or if you have already registered your copy of HW4, uncheck the Register on-line box and click on Continue.

Registering on-line offers benefits such as free updates / patches and product information.

Upon completing the registration, HW4 returns to the Start-up Screen. Depending on the HW4 product key entered in the previous form, the edition of HW4 that you are using is shown on the screen (in the example below: the validated edition of HW4 Professional).

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To open the HW4 main screen, click with the mouse on the blue link labeled Start HW4.

### 7.3 Automatic device discovery during initial start-up

During the initial start-up, HW4 automatically searches for any device that is connected either to a **COM port** or to a **USB port** of the PC. HW4 stops searching after finding one such device. Devices connected by any other method must be searched manually.

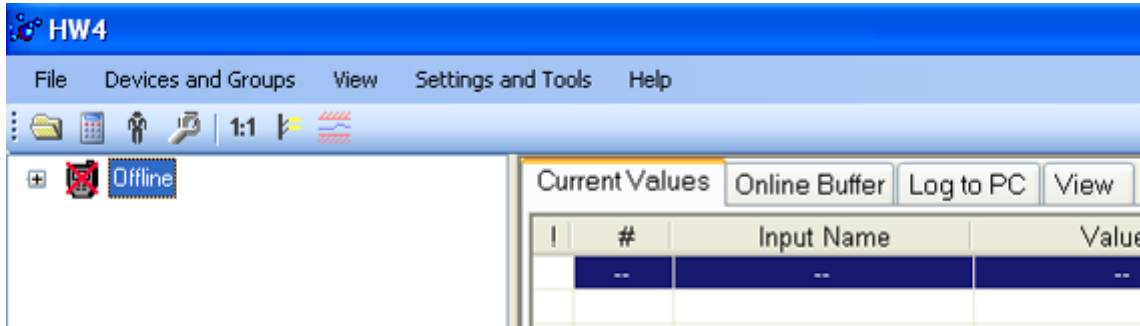
**IMPORTANT:** see also the following

[Preparing for device connection](#)

[Searching for devices with HW4](#)

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When there is no device connected to the PC either by a COM port or by a USB port, HW4 stops searching after a single pass. In that situation, HW4 creates a fictitious HygroLog NT in the device tree (see "**HW4 main screen overview**"). This instrument is named "Offline" and should be deleted after manually discovering the actual devices connected to the PC. The red cross on top of the device icon indicates that there is no communication with the device.



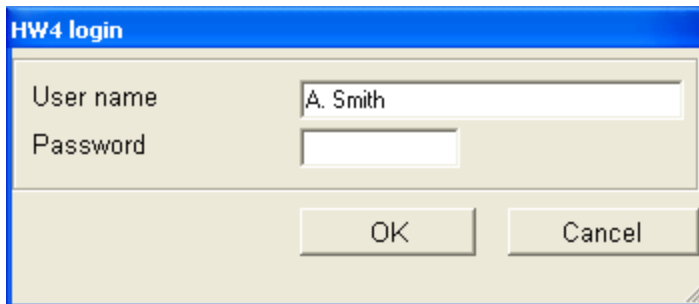
Note: whenever the device tree is empty HW4 automatically does the same search as during the initial start-up.

#### 7.4 **Creating the first user (HW4 Professional)**

If you are using HW4 Professional, you should create at least one user with administrator rights and a password in order to comply with ERES regulatory requirements.

See: [Users and passwords.](#)

Once the first user has been created, you will need to log in each time that you open HW4.



#### 7.5 **Access to functions and screens (HW4 Professional)**

In all versions of HW4 Professional, access to most functions and screen views requires the current user to have sufficient rights. Whenever a function is not accessible or a screen view is not available, please verify that you have been granted the necessary rights.

For an overview of user rights, including details for each individual right, please refer to the chapter [Users and Passwords.](#)

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## 8 SEARCHING FOR DEVICES WITH HW4

### IMPORTANT:

The following instructions assume that all necessary preparations have been made prior to connecting the different devices to the HW4 PC. See [Preparing for device connection](#).

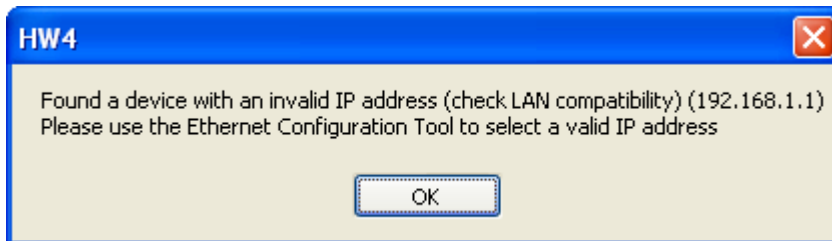
### 8.1 Searching for master devices

Depending on the connection method used for the master, use the following commands available in the HW4 main menu bar under [Devices and Groups](#):

- o Physical COM (serial) port : Search for RS-232 masters
- o Bluetooth virtual COM port : Search for RS-232 masters
- o USB port : Search for USB masters
- o Ethernet (TCP/IP) - cable or wireless connection : Search for Ethernet masters  
: Search for Specific IP Address

**Search for Ethernet masters:** this command searches only for devices that are directly connected to the same local area network as the HW4 PC (both cable and wireless connection). The IP address of the device(s) does not have to be specified by the user.

When the TCP/IP settings of a device are not compatible with the local area network, HW4 displays the following message box:



**Search for Specific IP Address:** use this command to search for Ethernet devices that are connected to a different network (eventually via Internet). The IP address of the device must be specified by the user.

### 8.2 Searching for RS-485 slaves (HW4 Professional)

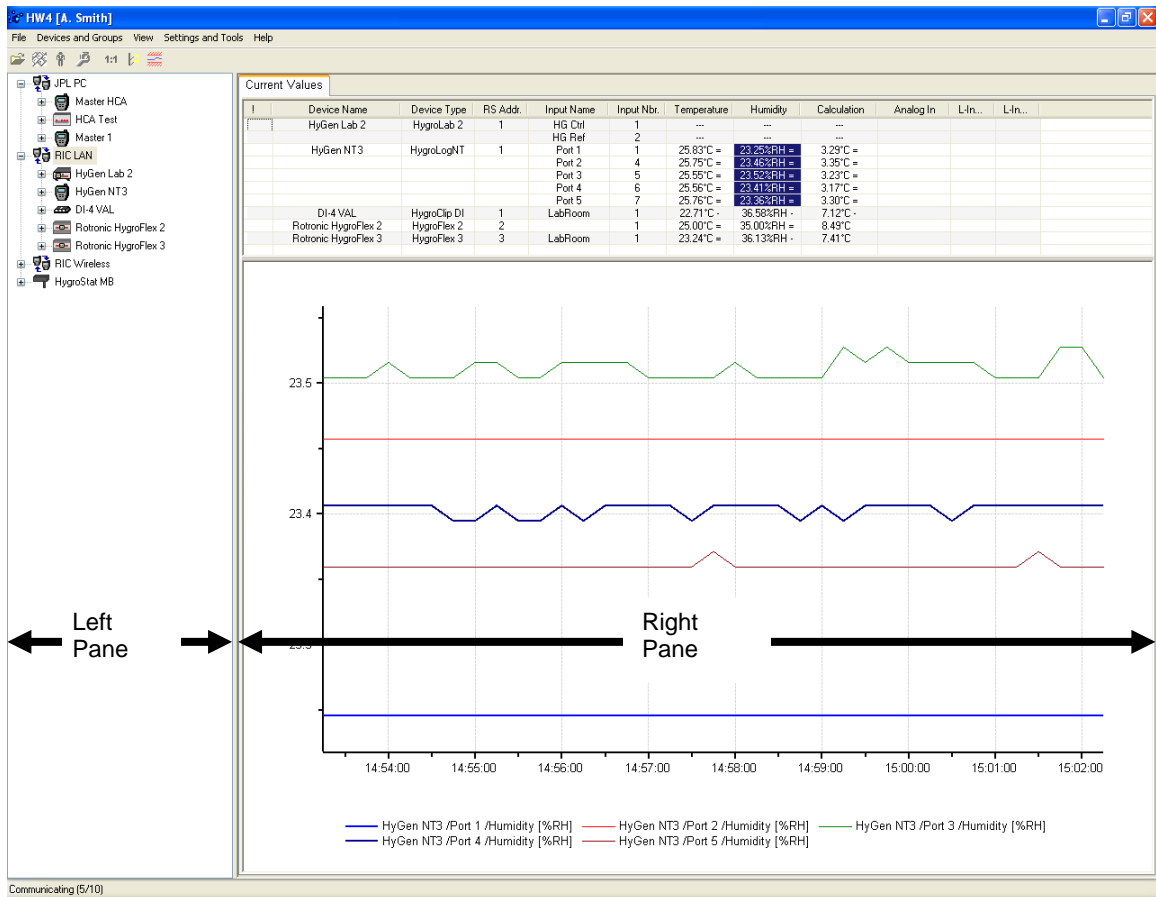
Use the **Search for RS-485 slave devices** command located in the HW4 main menu bar under [Devices and Groups](#).

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## 9 HW4 MAIN SCREEN

The HW4 main screen varies slightly depending on which edition of HW4 is running. The following description applies to the Professional edition which has more menu items and screens than the standard edition.

The HW4 main screen is subdivided into a left pane and a right pane. The width of each pane can be adjusted with the mouse. The height of the two sub-panes located in the right pane (table and graph) can also be adjusted with the mouse. To change the size of a pane, go over the separation line with the mouse cursor. When the cursor changes, click and hold with the mouse. Drag the separation line where you want it to be.

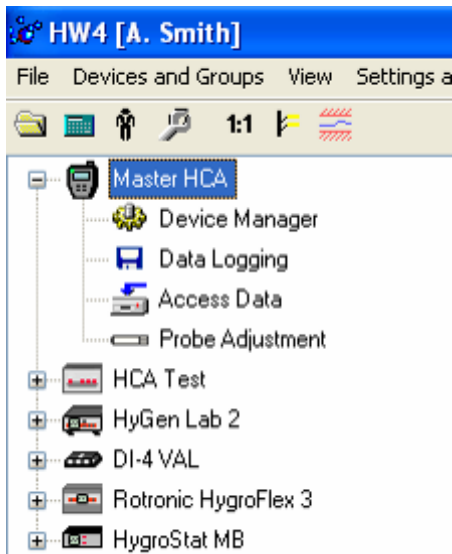


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## 9.1 Device Tree (left pane)

### 9.1.1 Tree populated with individual devices

All versions of HW4 display on the left pane of the screen a tree listing the devices that have been discovered by HW4.

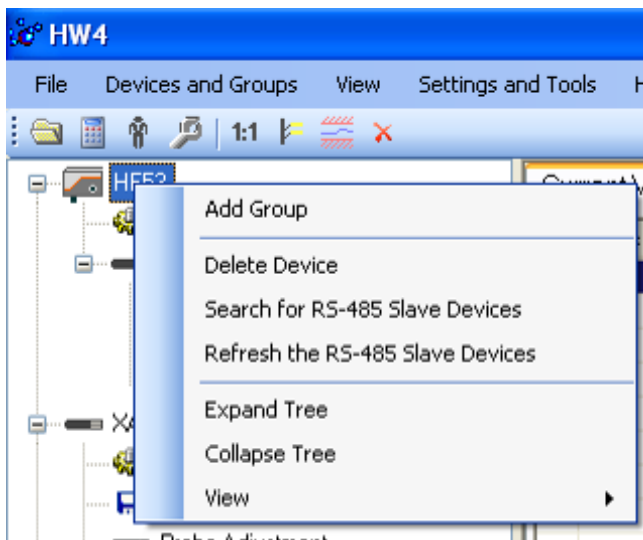


Each individual device is displayed in the left pane (for example: Master HCA, HCA Test, etc.). This is the default view for all versions of HW4 and the only view available with HW4 Standard edition

Functions available for each device can be seen when the tree is expanded. These functions are specific of each type of device.

To select a device or a function, click on it with the left mouse button.

Right clicking with the mouse on a device opens the following menu:



Most items present in this menu are described in chapter 10: HW4 Main Menu Bar, under Device and Groups and under View.

The following menu items are present only in the case of a master device:

- Search for RS-485 Slave Devices
- Refresh the RS-485 Slave Devices

Search adds to the device tree any device connected to the RS-485 interface of the master

Refresh does not add any new devices and is used to re-establish a lost connection with slave devices already present in the tree.

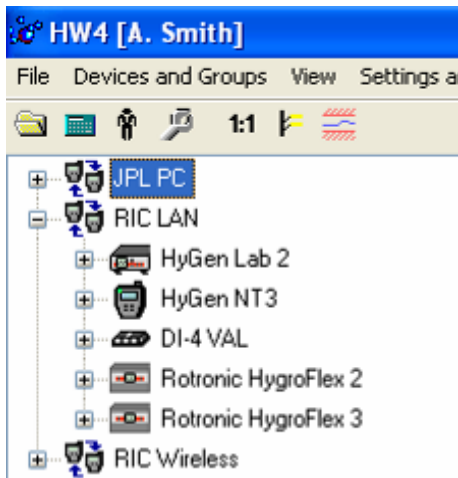
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### 9.1.2 Tree populated with device group(s) - HW4 Professional

A device group is a logical grouping of devices (as opposed to a physical grouping) created and defined by the user. Both masters and slaves can be part of a group, with no restriction other than not duplicating devices. Individual devices can be moved to any existing group or removed from the group (see “**Devices and Groups**”).

In addition to facilitating network management within HW4, using device groups makes it possible to simultaneously display selected data from several individual devices within a group. The data can be viewed either as a table or as a live graph.

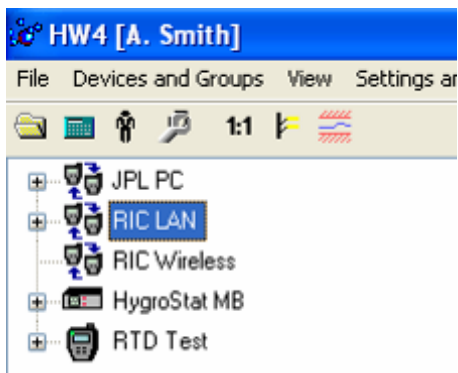
By default HW4 displays a device group as opposed to displaying each individual device in the group. Individual devices can be displayed by expanding the group.



HW4 Professional edition allows the creation of device groups. When one or more groups have been created (example JPL PC, RIC LAN and RIC Wireless), and all devices have been moved to a group, the left pane displays a tree listing only groups.

A group can be expanded to show the devices within the group and each device can be expanded to show its functions.

To select a group, a device or a function, click on it with the left mouse button.



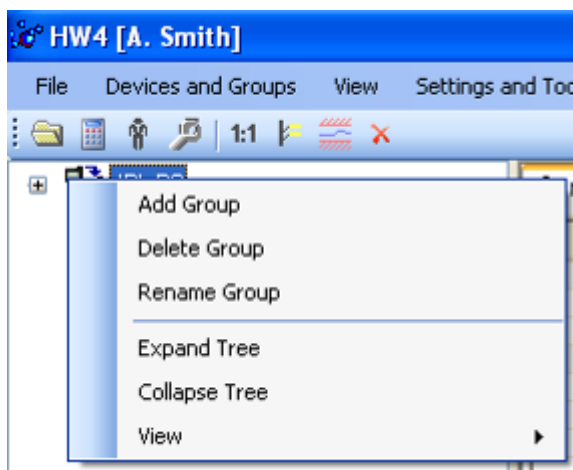
The left pane can also display one or several device groups (JPL PC, RIC LAN and RIC Wireless) as well as individual devices that are not part of any group (HygroStat MB, RTD Test).

Note: after being detected, devices appear individually in the tree regardless of the manner in which they are connected to the PC (master or slave).

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### 9.1.3 Instrument group: renaming and changing the contents

The following menu can be opened by right clicking on a group:



**Rename Group:** after creating a group, the group can be renamed in the same manner as a file can be renamed in Windows.

#### ► Add a device to a group:

After creating a group, individual devices can be moved to the group. Click on the device with the mouse and hold. A small rectangle appears next to the device. Drag the small rectangle on top of the group. Release the mouse when the name of the group is highlighted. Instruments within a group are displayed in the reverse order in which they were added to the group.

#### ► Remove a device from a group:

Expand the group to display all devices within the group. Click on the device with the mouse and hold. A small rectangle appears next to the device. Drag the small rectangle to the bottom of the device tree, clear of any group and release the mouse.

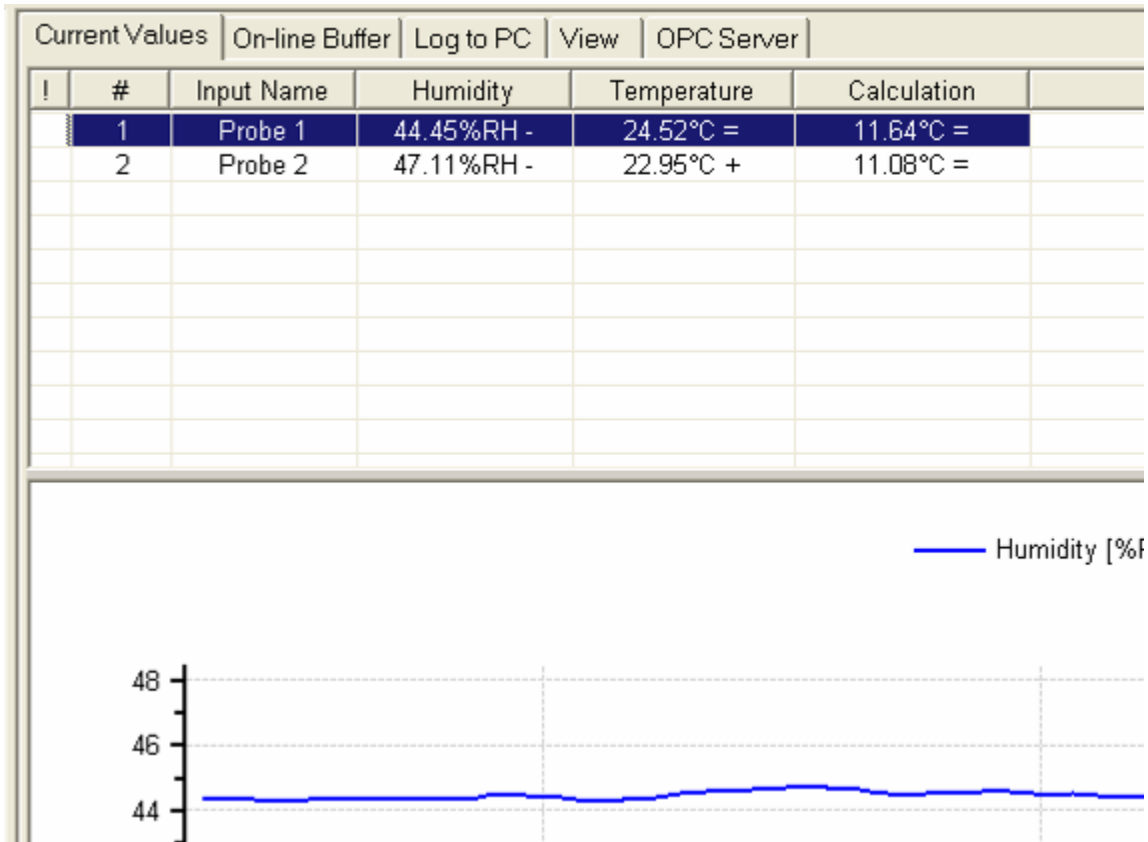


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## 9.2 Right pane in Device View mode

The right pane is in the **Device View mode** whenever an individual device is selected in the device tree (left pane).

In the Device View mode, the right pane is as illustrated below. To select any of the available tabs, click on the corresponding label with the mouse left button.



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### 9.2.1 Current Values tab

With this tab selected, the top of the right pane displays a table of the most recent values for the device currently selected in the device tree. The values are continuously updated according to the device polling interval set in **HW4 Global Settings > General tab**.

The table shows data from the different probe inputs of the device, as well as other information. Click and drag a column header with the mouse to change in which order fields are being displayed.

Current Values							On-line Buffer	Log to PC	View	OPC Server
I	#	Input Name	Humidity	Temperature	Calculation					
	1	Probe 1	44.45%RH -	24.52°C =	11.64°C =					
	2	Probe 2	47.11%RH -	22.95°C +	11.08°C =					

The table displayed in the Current Values tab can be customized.

#### 9.2.1.1 Customizing the Current Values tab

##### ► Data columns in the Current Values tab

Depending both on the type of device and on the configuration of the device, HW4 can display a number of data elements in the Current Values tab. Different types of data appear in different columns of the Current Values table as explained below:

Data	Column Headers	Notes
Humidity digital	Humidity Value 1	HygroClip probe digital output
Humidity analog	Value 1	HygroClip probe analog output (channel 1)
Temperature digital	Temperature Value 2	HygroClip probe digital output
Temperature analog	N/A	Our instruments accept only single channel analog probes (channel 1 = humidity)
Calculation	Calculation	Dew point, humidity ratio, etc.
Analog probe (single channel)	Analog Input Value 1	3d party analog probe
Pressure probe	Analog Input Value 1	3d party analog pressure probe
Custom Calculation	Custom Calc. Value 1	Requires an instrument that can be configured to perform a user defined calculation such as the difference between two temperatures.
Logical input 1	L-Input 1 Value 1	Logical input used to monitor an external contact (1 = closed / 0 = open)
Logical input 2	L-Input 2 Value 2	Logical input used to monitor an external contact (1 = closed / 0 = open)

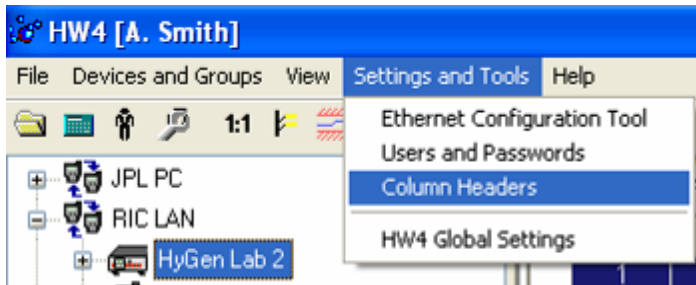
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Data	Column Headers	Notes
Relay 1 to Relay 4	Relays Value 1	Status of relay outputs 1 to 4 (1 = energized / 0 = de-energized)

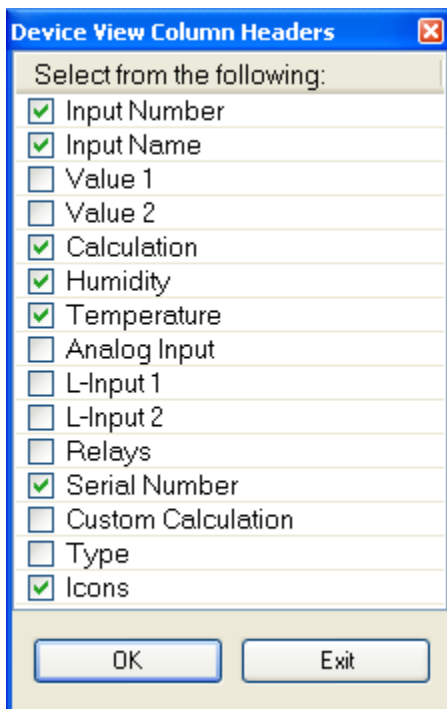
**Note:** the columns “Value 1” and “Value 2” are provided for users who wish to minimize the number of columns in the data table.

► **Column selection in the Current Values tab**

To make HW4 display only specific data columns in the Current Values tab, select any individual device present in the device tree (for example HyGen Lab 2 in the left pane). In the HW4 main menu bar, click on **Settings and Tools** and on **Column Headers**.



HW4 opens the following form. Make your selection using the mouse. **The selection applies globally to all devices displayed in the Current Values tab.**



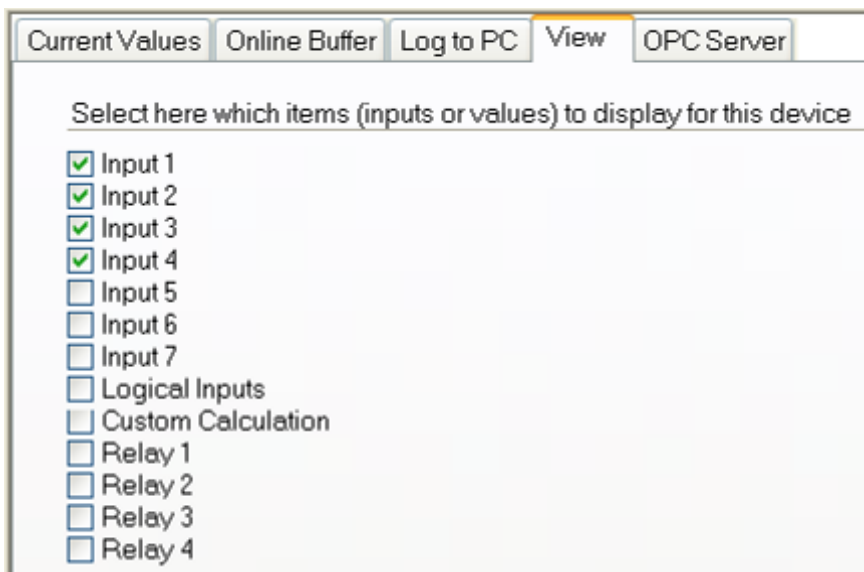
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► **Order of the columns in the Current Values tab**

The order of the columns in the Current Values tab can be changed. To move a column to the right or to the left, left click with the mouse on the column header and drag it to its new position.

► **Row selection in the Current Values tab**

Select a device present in the device tree and use **View Tab** to select the rows to be displayed in the Current Values tab. The row selection applies only to the device currently selected in the device tree.



**NOTES:**

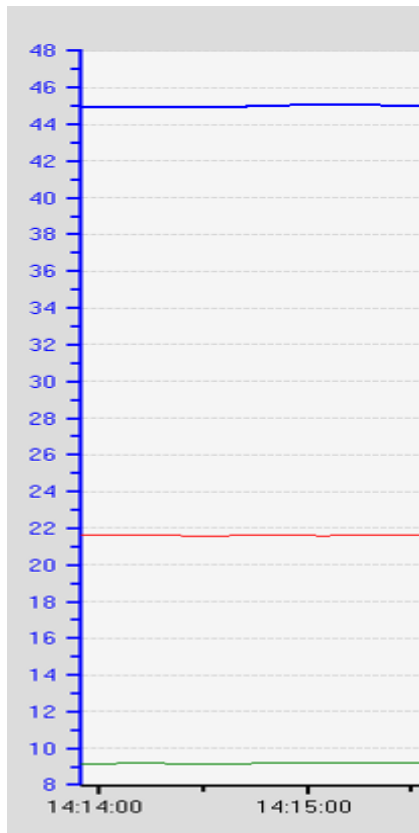
- The selections made in the View Tab affect the Current Values Tab in the Group View mode.
- The selections made in the View Tab also affect the following tabs and forms: On-line buffer tab, Log to PC tab, Device Manager form, Data Logging form and Probe Adjustment form.

If you do not see an input, a contact, etc. in any of these tabs and forms, remember to check the selections made in the View Tab.

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### 9.2.2 Online graph

By default, the bottom of the right pane displays data in graphic form. The graph is constantly updated according to the time interval selected in HW4 Global Settings > General tab for the online buffer. Depending on the selection made in **HW4 Global Settings > Graph Settings tab > Automatic scaling**, the scale of the graph is automatically selected by HW4 or can be changed manually on the graph.



The following selections can be made with the mouse:

To display all the parameters associated with a probe, left click on the desired probe number in the table located above the graph.

To display only one probe parameter at a time, left click on the desired parameter in the table.

To display only one parameter for all probes, left click on the header of the parameter.

If so desired, the graph can be hidden so as to provide more room for the probe data table (see HW4 Global Settings - View Tab).

The appearance of the graph can be customized. For details see “**Settings and Tools - HW4 Global Settings – Graph Settings tab**”.

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To adjust the height of the data table and the height of the graph, bring the mouse cursor over the horizontal edge separating the graph and the table. When the mouse cursor changes, left click, hold and drag to the desired location.



Click on this button to erase the contents of both the online buffer and online graph

Select a specific probe input and a parameter such as humidity. Click on this button to show or hide an alarm band on the graph corresponding to the programming of the probe input.

Click on this button to show or hide the Data Cursor on the graph. The Data Cursor displays numerical data from the graph. Move the mouse cursor to any location in the graph. Click to make the Data Cursor jump to that location. Bring the mouse cursor to the left or to the right of the graph. The Data Cursor moves with each mouse click.

To zoom in: left click with the mouse and hold to draw a rectangle in the graph.  
  
Click on the 1:1 button to restore the graph to its original scale.

### 9.2.3 Online Buffer tab

With this tab selected, the right pane displays a table that shows the most recent historical data (limited to humidity, temperature and the calculated parameter). The time interval used to capture data to the on-line buffer is the value specified in **HW4 Global Settings > General tab**. This tab is also used to specify the maximum number of lines in the buffer. When the table is full, the oldest data are dumped from the bottom of the table as the most recent data is added to the top of the table.

The probe input to be displayed is selected from the text box located on top of the data table (left click on the arrow to the right of the box to display a list of the inputs that can be viewed – this list depends on the selections made in the View tab). The on-line graph is based on the contents of the on-line buffer.

Current Values		On-line Buffer	Log to PC	View	OPC Server
Input 1					
Date	Time	Humidity %RH	Temperature °C	Calculation [Dp] °C	
10/6/2005	12:25:45	60.70	24.80	16.70	
10/6/2005	12:25:30	60.94	24.80	16.76	
10/6/2005	12:25:15	60.48	24.77	16.62	
10/6/2005	12:25:00	60.39	24.80	16.62	
10/6/2005	12:24:45	60.50	24.75	16.59	
10/6/2005	12:24:30	60.86	24.71	16.66	
10/6/2005	12:24:15	60.55	24.75	16.61	
10/6/2005	12:24:00	60.54	24.75	16.60	
10/6/2005	12:23:45	60.26	24.69	16.48	
10/6/2005	12:23:30	60.19	24.70	16.47	

► The contents of the on-line buffer are lost upon exiting HW4.

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### 9.2.4 Log to PC tab

Current Values	On-line Buffer	Log to PC	View	OPC Server		
Input	Description	Log Interval	Log File Management	Log File Name	File Location	
<input type="checkbox"/> 1	Probe 1	00:00:15	No file size limit			
<input type="checkbox"/> 2	Probe 2	00:00:15	No file size limit			
<input type="checkbox"/> 3	Probe 3	00:00:15	No file size limit			
<input type="checkbox"/> 4	Probe 4	00:00:15	No file size limit			
<input type="checkbox"/> 5	Probe 5	00:00:15	No file size limit			
<input type="checkbox"/> 6	Probe 6	00:00:15	No file size limit			
<input type="checkbox"/> 7	Probe 7	00:00:15	No file size limit			
<input type="checkbox"/> External Contacts	Contacts 1/2	00:00:15	No file size limit			
<input type="checkbox"/> Custom Calc.	Custom Calc.	00:00:15	No file size limit			
<input type="checkbox"/> Relay						

The Log to PC tab is used to record data directly on the PC from any type of instrument that is selected in the Device Tree. All input types recognized by HW4 are listed in this tab, whether they exist or not on the actual device. When the list of inputs is either empty or incomplete, please go to the **View Tab** and check the selections (see Right Pane: Device View Mode). Only those items selected in the View Tab are visible in the Log to PC tab.

The log interval and the logging mode (for example one file per day) are entered from within this tab. The data file name, its path, and the type of the file (protected or unprotected) are also entered here. Data from more than one input can be recorded, using a different file for each individual input.

Instructions for using this tab are provided in this manual under [Data Logging – directly on the PC.](#)

HW4 Professional: when a HygroLog NT is selected in the device tree is a HygroLog NT, the bottom part of the Log to PC tab is used to enable the automatic downloading of log files to the PC:

Automatic Log File Download

Status	Disabled
Download Interval	
Download Path	
Downloaded Files	
Last Download	
Next Download	

For instructions regarding this function see **Automatic File Download** in document E-IN-HW4v2.1-F1-001

### 9.2.5 View tab

The View tab is used to select which items (inputs, custom calculation, and status of optional relays) are displayed by HW4 in the Current View, On-line buffer and Log to PC tabs.

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Current Values | On-line Buffer | Log to PC | **View** | OPC Server

Select here which items (inputs or values) to display for this device

- Input 1
- Input 2
- Input 3
- Input 4
- Input 5
- Input 6
- Input 7
- External Contact
- Custom Calculation
- Relay 1
- Relay 2
- Relay 3
- Relay 4

Use the mouse to select the fields that correspond to your actual use of the various device inputs.

**IMPORTANT:** the selections made in this tab also affect what can be seen in the following forms: Device Manager, Data Logging and Probe Adjustment.

### 9.2.6 OPC Server tab

This tab is available only with HW4 Professional with OPC server. Unless your HW4 product enables this edition of HW4, you cannot use the OPC feature of HW4. With OPC server enabled, HW4 can communicate with any OPC client application to the purpose of bringing together data from HW4 and data from other sources. The OPC client application needs to be configured / programmed to read or write to the OPC tags provided by HW4.

Enabled Tag ...	Tag Group Name	Tag Group Description
<input type="checkbox"/> 1	DeviceInfo	Device information tags
<input type="checkbox"/> 2	MeasuringInfos	Data tags
<input type="checkbox"/> 3	Alert	Alarm tags (device condition, out-of-limits values and s
<input type="checkbox"/> 4	File	Log file tags

A full description of the HW4 OPC server is available in the following document, available from ROTRONIC: **IN-E-OPC HW4-V2\_10.pdf**

### 9.2.7 AwQuick / AwE Mode tab

This tab is available only with HW4 Professional with AwQuick. Unless your HW4 product key enables this edition of HW4, you cannot use the water activity functions of HW4.

HW4 features two modes for measuring water activity:



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● **AwE mode:**

In this mode HW4 monitors the stability of both temperature and humidity. The measurement is automatically ended as soon as both humidity and temperature reach equilibrium. The natural (or static) equilibration of most products typically requires from 45 to 60 minutes and can take as long as a couple of hours.

The criteria used to determine that temperature and humidity have reached equilibrium can be modified by the user.

Input	Input Name	Probe S/N	Humidity [Aw]	Temperature [°C]	Elapsed Time	Water Activity [Aw]	Status
<input checked="" type="checkbox"/> 1	Port 1		0.170 <=>	24.65 <=>	00:00:00		Running
<input type="checkbox"/> 4	Port 2		0.171	24.58			
<input type="checkbox"/> 5	Port 3		0.172	24.47			
<input type="checkbox"/> 6	Port 4		0.171	24.41			
<input type="checkbox"/> 7	Port 5		0.170	24.61			

Buttons: Settings, Generate report

● **AwQuick mode:**

This mode accelerates the measurement of water activity and provides a result in typically 5 minutes. When temperature conditions are stable (both at the product and probe), the measurement obtained with the AwQuick mode is generally within  $\pm 0.005$  aw of the measurement that would be obtained by waiting for full equilibration.

Input	Input Name	Probe S/N	Humidity [Aw]	Temperature [°C]	Elapsed Time	Water Activity [Aw]	Status
<input checked="" type="checkbox"/> 1	Port 1		0.169 <=>	24.54 <=>	00:01:35		Dwell Phase
<input type="checkbox"/> 4	Port 2		0.170	24.51			
<input type="checkbox"/> 5	Port 3		0.170	24.33			
<input type="checkbox"/> 6	Port 4		0.170	24.31			
<input type="checkbox"/> 7	Port 5		0.169	24.54			

Buttons: Settings, Generate report

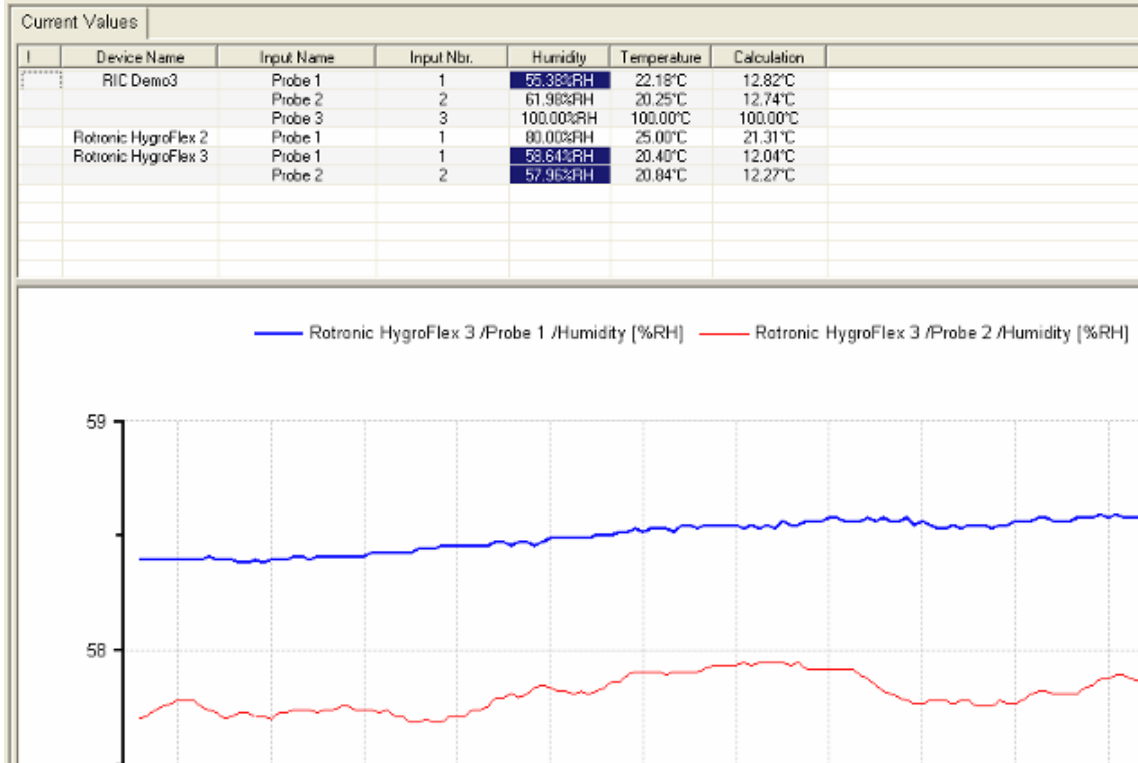
For instructions for using either mode, see [Water Activity Measurement with HW4](#)

### 9.3 Right pane in Group View mode

Note: device groups are available only HW4 Professional edition.

The right pane is in the **Group View mode** whenever a group of devices is selected in the device tree (left pane). In the Group View mode, the right pane is as illustrated below.

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### 9.3.1 Current Values tab

The top of the right pane displays a table of the most recent value for the different parameters associated with the devices in the group selected in the device tree. The values are continuously updated according to the device polling interval set in **HW4 Global Settings > General tab**.

#### 9.3.1.1 Customizing the Current Values tab

##### ► Data columns in the Current Values tab

Depending both on the type of device and on the configuration of the device, HW4 can display a number of data elements in the Current Values tab. Different types of data appear in different columns of the Current Values table as explained below:

Data	Column Headers	Notes
Humidity digital	Humidity Value 1	HygroClip probe digital output
Humidity analog	Value 1	HygroClip probe analog output (channel 1)
Temperature digital	Temperature Value 2	HygroClip probe digital output
Temperature analog	N/A	Our instruments accept only single channel analog probes (channel 1 = humidity)
Calculation	Calculation	Dew point, humidity ratio, etc.

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Data	Column Headers	Notes
Analog probe (single channel)	Analog Input Value 1	3d party analog probe
Pressure probe	Analog Input Value 1	3d party analog pressure probe
Custom Calculation	Custom Calc. Value 1	Requires an instrument that can be configured to perform a user defined calculation such as the difference between two temperatures.
Logical input 1	L-Input 1 Value 1	Logical input used to monitor an external contact (1 = closed / 0 = open)
Logical input 2	L-Input 2 Value 2	Logical input used to monitor an external contact (1 = closed / 0 = open)
Relay 1 to Relay 4	Relays Value 1	Status of relay outputs 1 to 4 (1 = energized / 0 = de-energized)

**Note:** the columns “Value 1” and “Value 2” are provided for users who wish to minimize the number of columns in the data table.

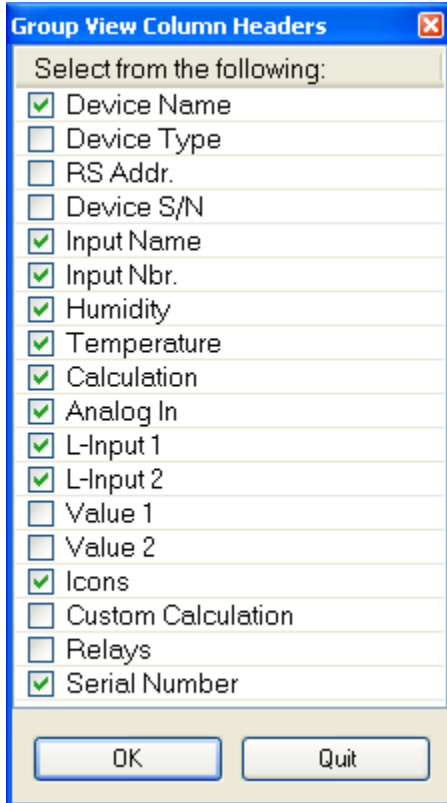
► **Column selection in the Current Values tab**

To make HW4 display only specific columns in the Current Values tab, select a device group that is present in the device tree (for example RIC LAN in the left pane). In the HW4 main menu bar, click on **Settings and Tools** and on **Column Headers**.



HW4 opens the following form. Make your selection using the mouse. **The selection applies globally to all groups displayed in the Current Values tab.**

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► **Order of the columns in the Current Values tab**

The order of the columns in the Current Values tab can be changed. To move a column to the right or to the left, left click with the mouse on the column header and drag it to its new position.

► **Row selection in the Current Values tab**

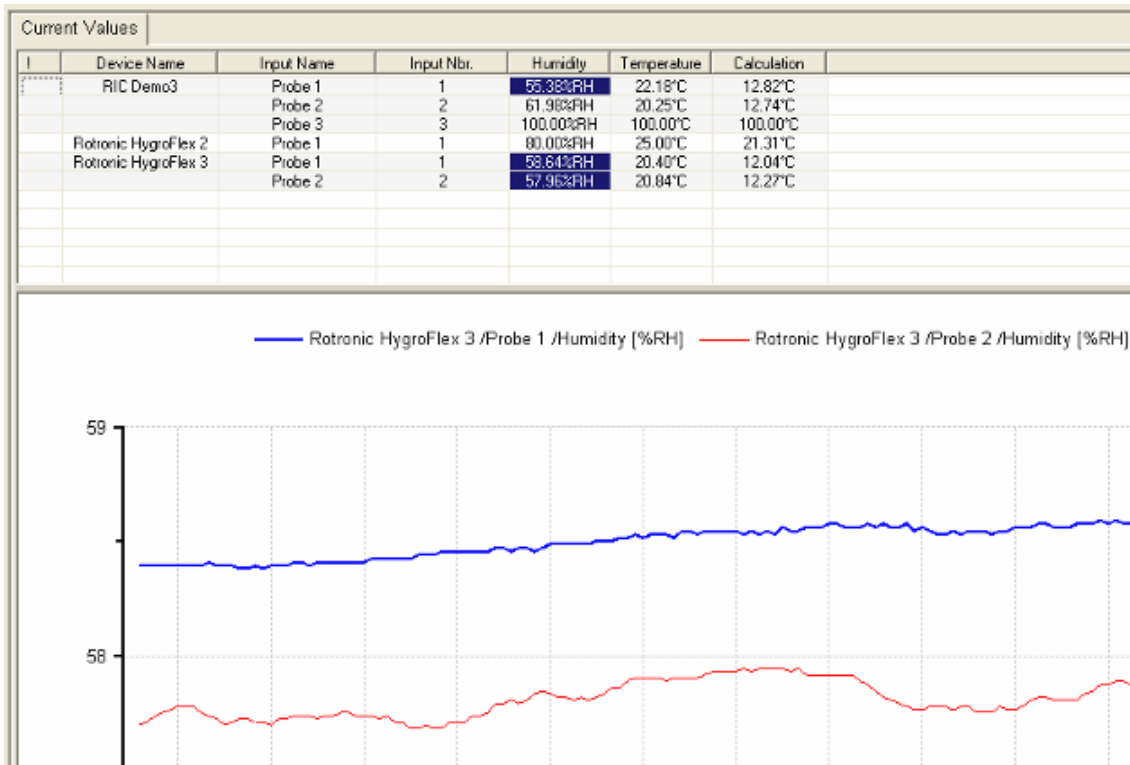
The rows displayed in the current values table depend on the selections made for each individual device. See "**Right pane in Device View mode - View Tab**".

### 9.3.2 On-line graph

One of the reasons for creating an instrument group is the ability to display a graph showing data from different instruments within the group. For example, to display relative humidity for all instruments and probes within a group, click on the Humidity header in the data table. To select other data for the graph, press the CONTROL key and click on any desired parameter(s) in the data table.

The graph is constantly updated according to the time interval selected in HW4 Global Settings > General tab for the online buffer. Depending on the selection made in **HW4 Global Settings > Graph Settings tab > Automatic scaling**, the scale of the graph is automatically selected by HW4 or can be changed manually on the graph.

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The appearance of the graph can be customized. For details see “**Settings and Tools - HW4 Global Settings – Graph Settings tab**”.

## 10 HW4 MAIN MENU BAR

The Main Menu Bar is located at the top of the HW4 main screen.

### 10.1 File

- **Open**

Used to open any file present on the PC such as a log file or an event file without having to open any individual instrument in the device tree (see also HygroLog NT Functions - Access Data). By default File - Open points to the default directory used by HW4 when creating files during the initial start-up (first time use): C:\Documents and Settings\Windows User\Application Data\ROTRONIC\_HW4.

- **Send HW4 to the Windows notification area**

Sends / minimizes HW4 as a shortcut icon to the Windows notification area. This area is located on the taskbar, immediately to the left of the clock. HW4 keeps running.

- **Exit** exit HW4

Note: if you attempt to exit HW4 while Log to PC is active, you will get a warning from HW4.

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## 10.2 *Devices and Groups*

### 10.2.1 Add master devices to the device tree

Select Search for Master Devices and click on one of the following submenu items:

- **USB Masters** - HW4 searches for devices directly connected to a USB port (does not apply to the AC3010 adapter)
- **RS-232 Masters** - HW4 searches for devices directly connected to either a physical COM port or to a Bluetooth virtual serial port.
- **Ethernet Masters** - HW4 searches for devices directly connected to the same local area network as the PC (cable and / or wireless connection).
- **Search a Specific IP Address** - HW4 searches for a master device at a specific IP address specified by the user.



### 10.2.2 Add RS-485 slave devices to the device tree (HW4 Professional)

Select Search for RS-485 Slave Devices and click on one of the following submenu items:

- **All RS-485 networks** - HW4 searches all master devices already present in the device tree for RS-485 slaves
- **RS-485 network attached to selected master** – to select the master device, left click on it in the device tree. HW4 searches for RS-485 slaves only for the selected master device.
- **Search for devices connected via AC3010 adapter** – the AC3010 cable allows connecting one or more devices with a RS-485 port to a USB port of the HW4 PC, without requiring a master device. Because there is no master, all devices connected in this manner are seen by HW4 as slaves. To detect the slave devices, HW4 interrogates all USB ports that are not currently used by a master device.

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### 10.2.3 Manual device addition

Manually adding devices to the device tree can save time in some situations. Select Add Device to open the following form:

All information required to fill-in the form must be known beforehand.

Click with the mouse on the arrow located to the right of a box to display a drop down menu of available choices. Note that if the device is not connected or if the wrong information is entered, HW4 will put a red cross over the device icon in the device tree.

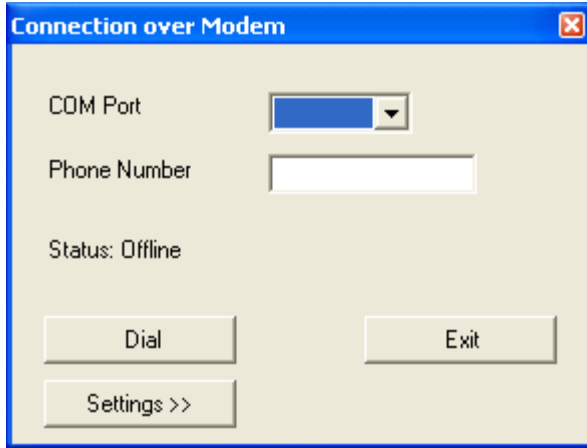
### 10.2.4 Remove devices from the device tree

- **Delete Device** - deletes the selected device from the left pane tree (this command is grayed out when no device is selected). Use this menu item after device has been disconnected
- **Delete all Devices from the Tree** – globally deletes all devices from the left pane tree. This function should be used with caution

### 10.2.5 Connection over Modem

HW4 allows a single connection over a modem connected to one of the PC COM ports. In this manner, a device connected by RS-232 to the COM port of a remote modem can communicate with HW4. Additional remote devices can be connected as well, using an RS-485 multi-drop.

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Select the COM port to which the modem is connected and enter the remote phone number. The local modem can be configured after clicking on the Settings button. These settings should be:

Baud Rate : 57,600  
 Data bits : 8  
 Stop bit : 1  
 Parity : none

Be sure to configure the remote modem in the same manner.

### 10.2.6 Refresh command

In the event that communication is lost with either a master or a slave, the refresh command can be used to re-establish the connection as long as the device is still present in the device tree. The refresh command does not add new devices to the device tree.

Depending on the type of connection, use the following menu items:

- **Master devices:**

**Search for Master Devices > Refresh Master Devices** – HW4 refreshes all master device connections present in the device tree

- **Slaves connected to a master device (HW4 Professional):**

**Search for RS-485 Slave Devices > Refresh all RS-485 networks** – HW4 refreshes the slave device connections for all masters present in the device tree

**Search for RS-485 Slave Devices > Refresh RS-485 network attached to selected master** – to select the master device, left click on it in the device tree. HW4 refreshes all slave device connections to the selected master

- **Slaves connected via AC3010 adapter (HW4 Professional):**

**Search for RS-485 Slave Devices > Refresh devices connected via AC3010 adapter** – HW4 refreshes the slave device connections for all AC3010 adapters



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### 10.2.7 Groups (HW4 Professional)

A group is a logical grouping of devices (as opposed to a physical grouping) created and defined by the user. Both masters and slaves can be part of a group, with no restriction other than not duplicating devices. Individual devices can be moved to any existing group or removed from the group (see “**Devices and Groups**”).

In addition to facilitating network management within HW4, using device groups makes it possible to simultaneously display selected data from several individual devices within a group. The data can be viewed either as a table or as a live graph.

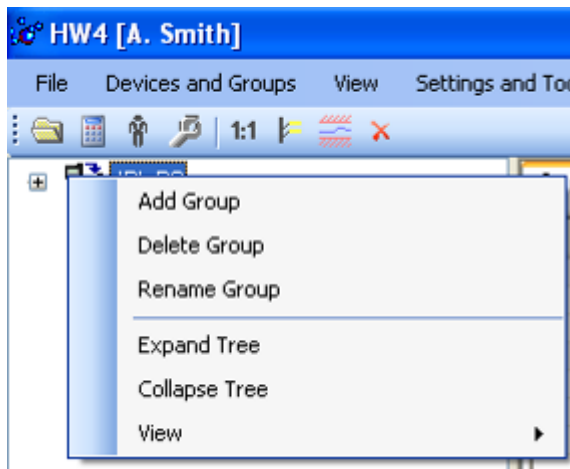
#### 10.2.7.1 Create / delete a Group (HW4 Professional)

Adding and deleting Groups is done from the **HW4 main menu bar > Devices and Groups**

- **Add Group** - creates a new empty group of instruments in the left pane tree (see below)
- **Delete Group** - deletes the instrument group that is currently selected in the left pane. The instruments from the group are not deleted.

#### 10.2.7.2 Rename a group

After creating a group, a menu box can be opened by right clicking on a group. The group can be renamed with the **Rename Group** command in the same manner as a file can be renamed in Windows.



#### 10.2.7.3 Add a device to a group

After creating a group, individual devices can be moved to the group. Click on the device with the mouse and hold. A small rectangle appears next to the device. Drag the small rectangle on top of the group. Release the mouse when the name of the group is highlighted. Instruments within a group are displayed in the reverse order in which they were added to the group.

#### 10.2.7.4 Remove a device from a group

Expand the group to display all devices within the group. Click on the device with the mouse and hold. A small rectangle appears next to the device. Drag the small rectangle to the bottom of the device tree, clear of any group and release the mouse.

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### 10.3 View

- **Alarm Table**<sup>1</sup> – displays the alarm table
- **User Events**<sup>1</sup> – displays the contents of the user event file for the current session
- **Psychrometric Conversions** – opens the Psychrometric Conversions Tool
- **Expand Tree** - expands all items in the tree (left pane)
- **Collapse Tree** - collapse all items in the tree (left pane)
- **Device Name** - show the device name in the tree (left pane)
- **Device Type** - show the device type in the tree (left pane)
- **Device Address** - show the device port / IP address and RS-485 address in the tree (left pane)
- **Device Serial Number** - show the device serial number in the tree (left pane)

<sup>1</sup> available only with HW4 Professional edition

For details, see the following

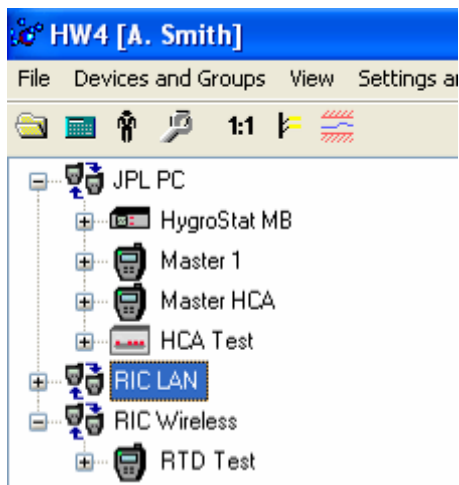
[Alarm Table](#)

[User Events](#)

[Psychrometric Conversions](#)

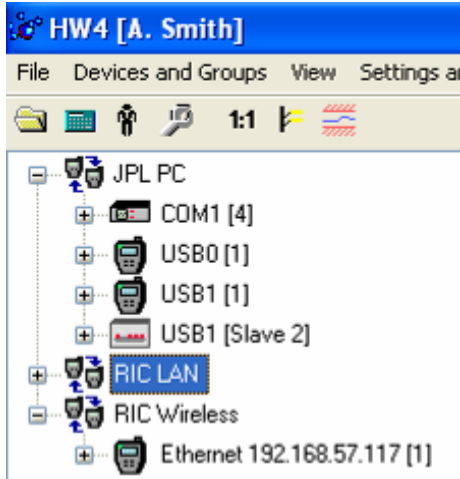
Example:

#### View - Device Name



#### View - Device Address

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## 10.4 Settings and Tools

For details click on the following links:

- [Ethernet Configuration Tool](#)
- [Users and Passwords](#)<sup>1</sup>
- [Column Headers](#) - selects the columns to be displayed in the current values table (right pane)
- [HW4 Global Settings](#)

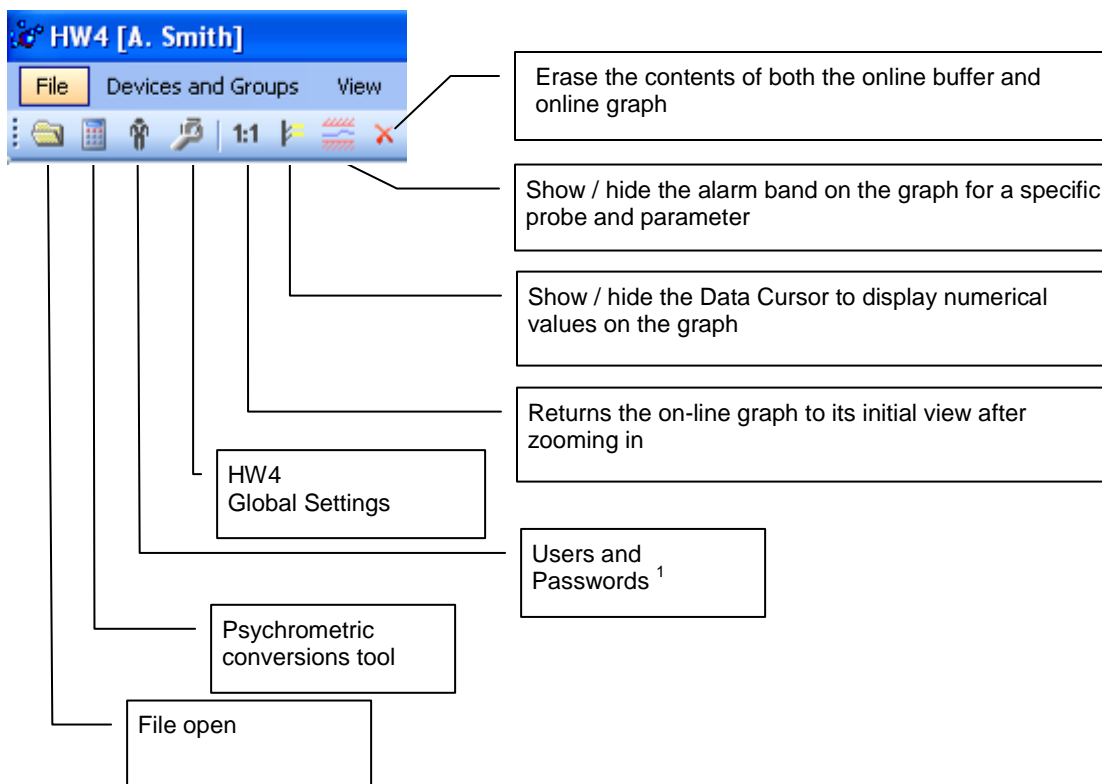
<sup>1</sup> available only with HW4 Professional

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## 10.5 Help

- **HW4 Help:** Opens HW4 Help
- **On-line Services:** When an internet connection is available, this menu item accesses the ROTRONIC web site where technical support, updates and product information are available.
- **About HW4:** Displays the version number and ID number of HW4

## 10.6 Shortcut buttons



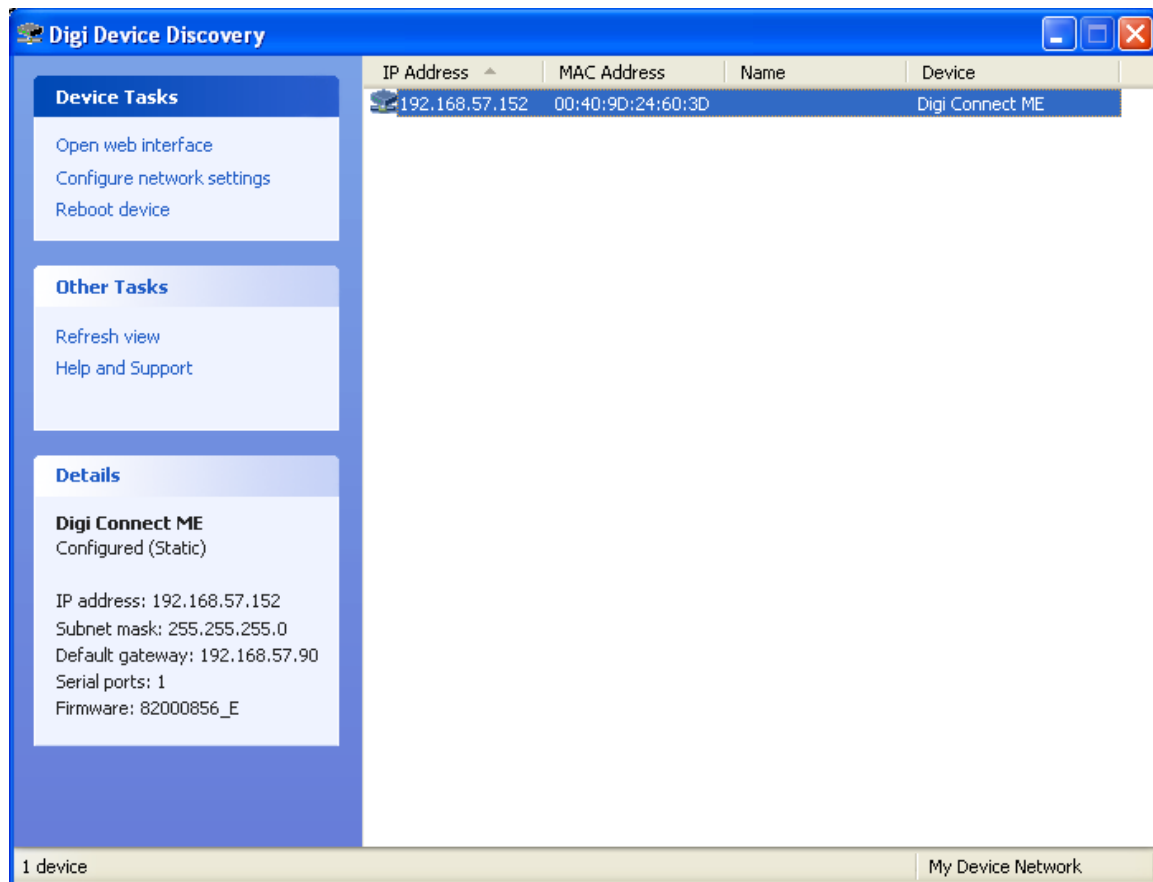
<sup>1</sup> Available only with HW4 Professional

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## 11 ETHERNET CONFIGURATION TOOL

**Warning:** use of this tool requires basic knowledge of your LAN. If necessary, consult your network administrator.

HW4 comes with an Ethernet device discovery and configuration tool (Digi Device Discovery). When activated, the configuration tool automatically detects any ROTRONIC device present on the LAN (both cable and wireless connections) and provides a list of all such devices. The following example shows the initial screen with just one device.



For detailed instructions see [Ethernet \(TCP/IP\) connection](#)

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## 12 USERS AND PASSWORDS (HW4 Professional)

HW4 Professional allows the creation of several user accounts each with a unique user name. Each user must have a password but passwords do not have to be unique. At any time only one user can be logged on to an HW4 session.

### 12.1 *Minimum user rights*

All HW4 users have automatically the following minimum rights, which essentially allow the user to view information and data without being able to change anything important:

- Start / Exit HW4
- Log off from HW4 without exiting
- HW4 main menu bar - Send (minimize) HW4 to the Windows notification area
- Select which information is displayed next to the devices in the tree: name, serial number, etc.
- Expand / collapse the device tree.
- Access to Device Manager, Data Logging and Probe Adjustment - functionality limited to viewing data and other information.
- View data in the Current Values tab (both in Device View or Group View mode)
- View data in the On-line Buffer tab.
- Access Data (HygroLog NT function) : limited to opening files located on the PC and viewing the file contents
- HW4 Settings and Tools – HW4 Global Settings - General tab: clear both the online buffer and online graph
- Users and Passwords: functionality is limited to changing own password
- HW4 Settings and Tools – Users and Passwords: functionality is limited to changing own password
- HW4 Settings and Tools – View user events
- HW4 Settings and Tools – Psychrometric conversions
- HW4 Settings and Tools – View Alarm table – the table can be viewed but alarms cannot be acknowledged

The following is not available to users with minimum rights

- Device tree: modification of the content of device groups
- Device tree - Device Manager: any change to the configuration of a device.
- Device tree – Data Logging: any kind of programming of a device log function.
- Device tree – Access Data: opening, copying, moving or deleting files present on the logger. Copying, moving or deleting files present on the PC.
- Device tree – Probe Adjustment – ADJUST button
- HW4 main menu bar - File – Open
- HW4 main menu bar - Devices and Groups menu: the entire menu is disabled
- HW4 main menu bar - View menu: the Column Headers menu item is disabled both in Device View or Group View mode.
- HW4 main menu bar - HW4 Settings and Tools menu - HW4 Global Settings: the functionality of all tabs is disabled
- HW4 main menu bar: Settings and Tools – Ethernet configuration tool
- Right pane of the HW4 main screen in Device View mode: any change to the Log to PC tab, View tab and OPC Server tab. These tabs can be selected for viewing but have no other functionality

Note: when no user has been created or when no user is logged in, HW4 gives only minimum rights to whoever is using the PC.

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## 12.2 Additional user rights

Any user can be given a combination of the following additional rights:

User Right	Definition
Manage user accounts	<b>Create, modify and delete user accounts</b>
Add / Remove devices	Access to <b>HW4 main menu - Devices and Groups</b> - (add / remove devices and groups to or from the device tree). Access to <b>HW4 Settings and Tools - Ethernet Configuration Tool</b>
HW4 global settings and view settings	Access to <b>HW4 Global Settings</b> . Ability to change the following: <b>Device Tree, View Tab and Column Headers</b> (Group or Device View).
Log-to-PC function	Start and stop <b>Log to PC</b> operations
Change OPC settings	Enable, disable the <b>OPC tags</b> for individual devices (OPC version of HW4 required)
Device configuration / Log function	Access to <b>Device Manager</b> (configure individual devices). Access to <b>Data Logging</b>
Adjust probes	Access to the <b>Probe Adjustment</b> function.
Acknowledge alarms	<b>Acknowledgement of alarms</b> . The following two rights are required for defining the conditions that trigger an alarm: HW4 Global Settings and Device Configuration / Log function.
Read / Copy / Sign files	<b>HW4 Main menu – File – Open</b> (enables all operations on files located on the PC)  <b>HygroLog NT - Access Data: Open and copy / or just copy files</b> from the HygroLog NT to the PC.  <b>Sign log files and protocols</b>  See also notes (1) and (2) below.
Delete files	<b>Delete files</b> (HygroLog NT or PC)  See also notes (1) and (2) below.

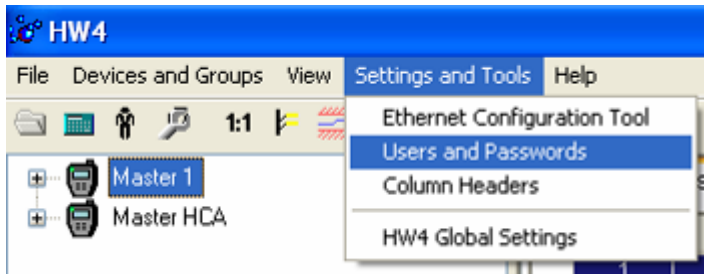
(1) HW4 cannot fully protect files located on the PC, since it is always possible to use Windows to open, delete or move any file unless adequate security is organized within Windows, based on the Windows user login and Windows directory access rights.

(2) **Moving files** from a device to the PC disk requires both the Read / Copy and Delete rights.

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### 12.3 *Creating and logging-on the first user*

From the HW4 main menu, click on the following menu item:



Because no user has been created yet, HW4 automatically opens an empty user form:

**HW4**

User name:

User description:

Password valid until:

Password:

Confirm password:

**User Rights**

Manage user accounts

Add / remove devices

HW4 global settings and view settings

Log-to-PC function

Change OPC settings

Device configuration / log function

Adjust probes

Acknowledge alarms

Read / Copy / Sign files

Delete files



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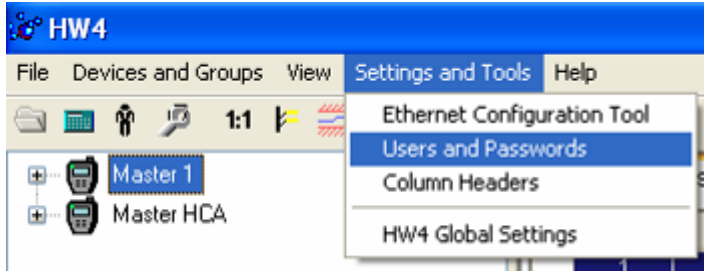
Enter the name of the user, the user password and click on the box next to each additional right that the user will have. Be sure to make a note of the password. The user form may now look as follows:

Click on the Add button to complete the process.

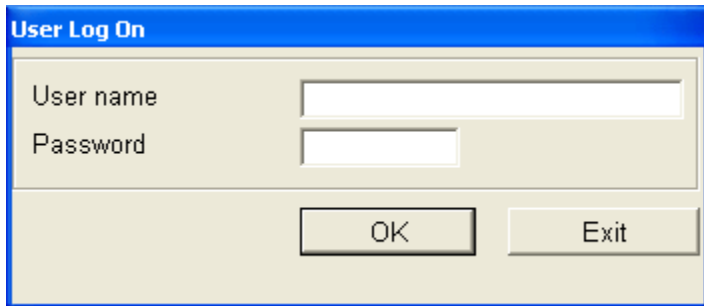
**IMPORTANT:** the first user created in HW4 should as a minimum have the right to manage user accounts.

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Creating a new user does not result in HW4 automatically logging on this user. To log on the first user, select again Users and Passwords:



HW4 automatically opens the following box:

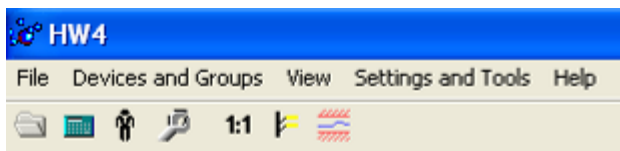


Enter the name of the newly created user and the password for this user. Click on OK to log on the user.

HW4 acknowledges this by displaying the name of the current user above the main menu bar:



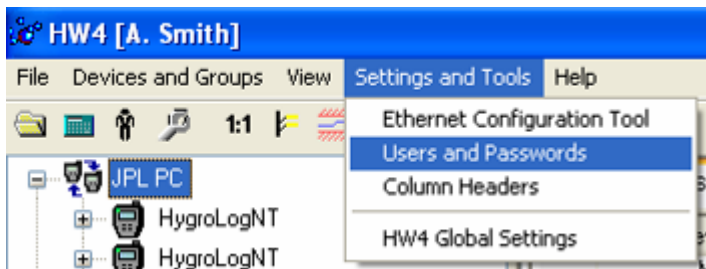
**Note:** when no user is logged in, there is no user name above the main menu bar. HW4 gives only minimum rights to whoever is using the PC.



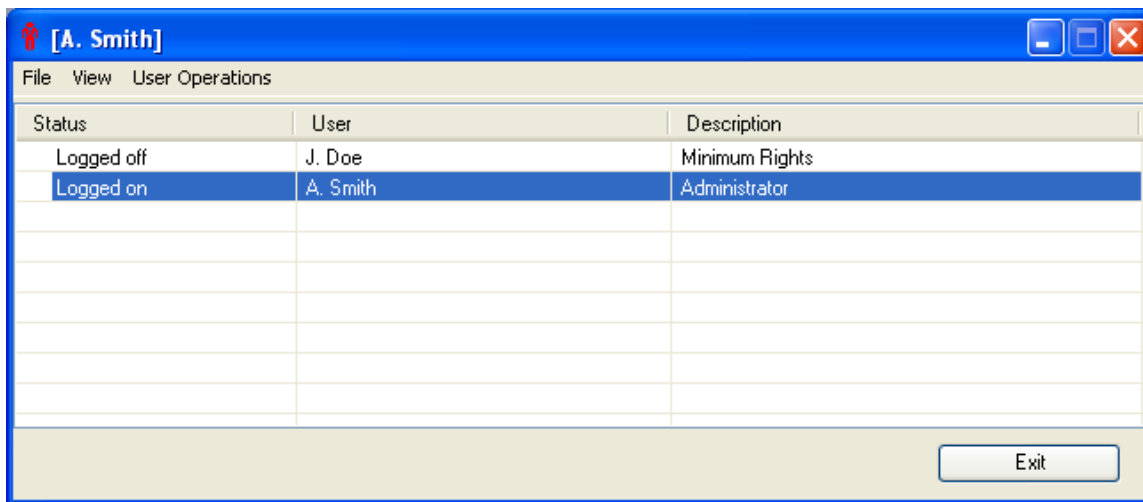
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## 12.4 User table form

The user table form is available only when as at least one user exists in HW4. To open the table, click on User and Passwords:



HW4 opens the user table form. When the current user has the right to manage user accounts, the table shows a list of all users currently known to HW4. When the current user does not have this right, only the current user is shown:



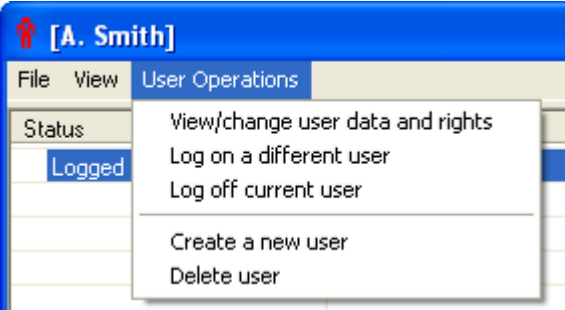
## 12.5 Menu bar

► **View:** use the View menu on the form to change the contents of the form by selecting one of the options shown below:

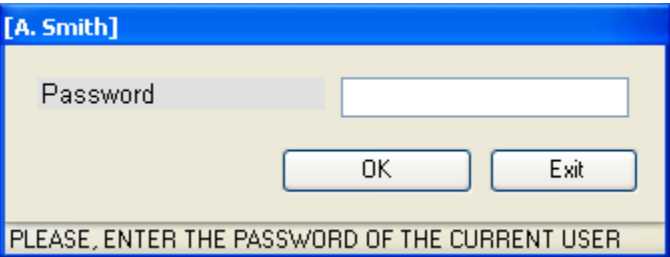


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► **User Operations:** this menu item gives access to the following:



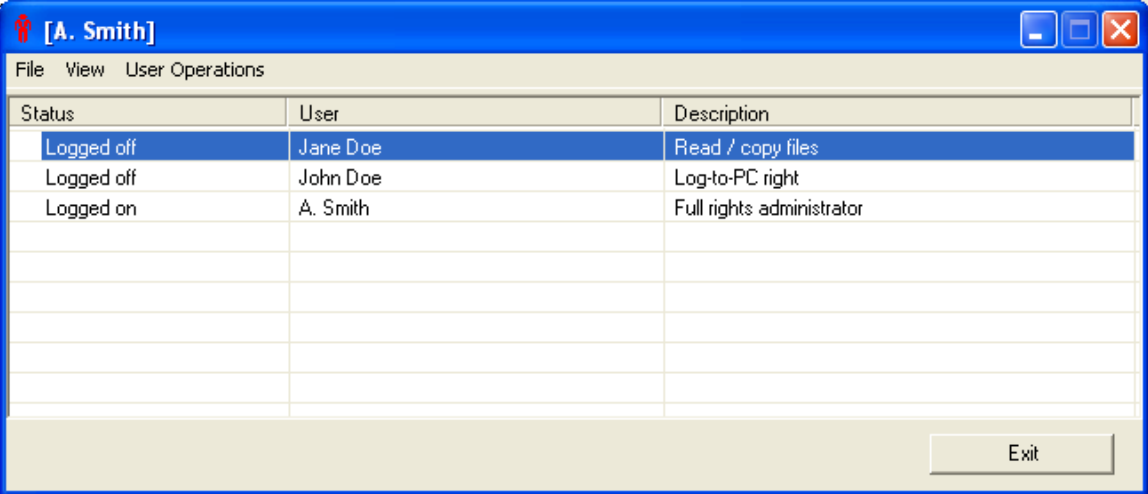
► **View / change user data and rights, Create a new user and Delete user:** Any of these selections will require the current user to re-renter his / her password:



► **View / change user data and rights:** full access to this function requires the current user to have the right to manage user accounts. For other users, the function is limited to being able to change the current user password.

► **Create a new user and Delete user:** any of these selections require the current user to have the “manage user accounts” right.

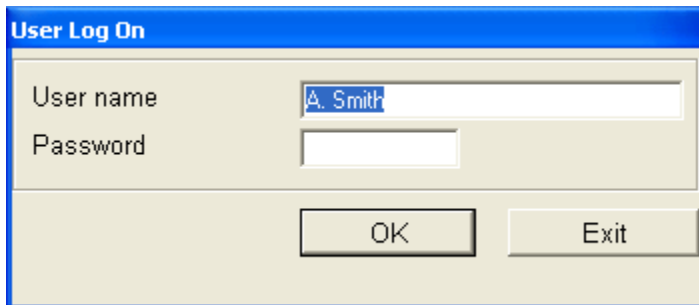
Creating a new user is done in the same manner as creating the first user. When changing or deleting a user, use the mouse to select the user from the list provided by the user table form:



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**IMPORTANT:** HW4 keeps track of all users that have been created, even users that have been subsequently deleted. **Please note that the name of a user that has been deleted cannot be used again.**

- **Log-on a different user:** selecting this item open the user log-on form. By default, the form shows the name of the user that is currently logged-on. To change the user, use the mouse to highlight the user name and type in the name of the user to be logged-on. Enter the password for that user. Click on the OK button. The current user is logged off and the new user is logged on.



The image shows a 'User Log On' dialog box with a blue title bar. It contains two input fields: 'User name' with the text 'A. Smith' and 'Password' which is empty. Below the fields are two buttons: 'OK' and 'Exit'.

Note: clicking on the Exit button logs off the current user but does not log on the new user.

- **Log off current user:** selecting this item logs off the current user, without logging on any specific user. When using HW4 Professional, selecting this menu item without logging-on a user may prevent access to most of the HW4 functions and screen views. To return HW4 to the desired level of functionality, log-on as a user with sufficient rights.

## 12.6 User login security

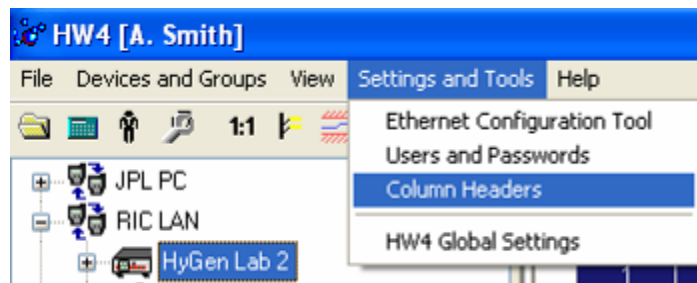
- Attempts to login with the wrong password are now being recorded.
- HW4 startup will be aborted after 3 attempts with the wrong password

## 13 COLUMN HEADERS

Column Headers is used to customize the Current Values Tab both in the Device View Mode and in the Group View Mode.

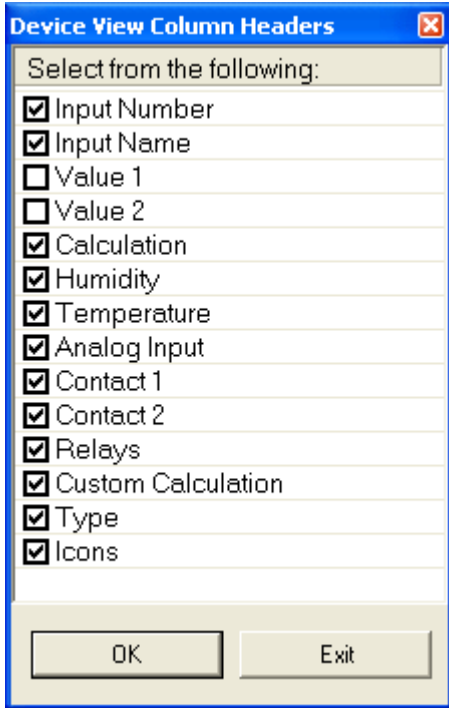
To make HW4 display only specific columns in the Current Values tab:

- **In Device View Mode:** select any individual device present in the device tree (for example HyGen Lab 2 in the left pane). In the HW4 main menu bar, click on **Settings and Tools** and on **Column Headers**.



HW4 opens the following form. Make your selection using the mouse. **The selection applies globally to all devices displayed in the Current Values tab.**

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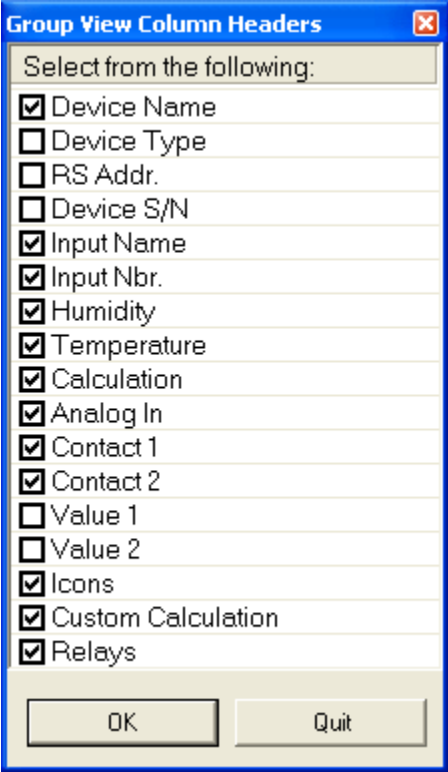


- **In Group View Mode:** select a device group that is present in the device tree (for example RIC LAN in the left pane). In the HW4 main menu bar, click on **Settings and Tools** and on **Column Headers**.



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HW4 opens the following form. Make your selection using the mouse. **The selection applies globally to all groups displayed in the Current Values tab.**



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## 14 HW4 GLOBAL SETTINGS

This menu item opens the HW4 Global Settings Form.

### 14.1 View Tab

**HW4 Global Settings Form**

View | General | Language/Unit System | File Locations | Graph Settings | Alarm Settings | Events

**Start-up Form**

Bypass

**General**

Online graph

HW4 background pictures

**Start-up Tab**

Current Values     Online Buffer

Enable trend indicators

10 Font size in the Current Values data table [10...50]

After starting HW4, send as a shortcut icon to the Windows notification area

OK    Cancel    Help

#### **Start-up Form:**

- Bypass: display or bypass the HW4 start-up form (log-in with password is still required)

#### **General:**

- On-line graph: shows or hide the graph in the Current Values tab
- HW4 background pictures: select or deselect to modify the appearance of several forms used in Device Manager, HW4 Explorer, etc.



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**Start-up Tab:**

- Current Values / On-line Buffer: select the desired default tab for the right pane of the HW4 main screen
- Trend Indicators: HW4 can display to the right of each current value an indicator that shows if the value is stable (equal symbol), increasing (+ symbol) or decreasing (- symbol). The status of this indicator is read by HW4 directly from the device/instrument being monitored.

Note: this function works only for instrument models that send the status of the trend indicator <sup>1</sup> to HW4 and is not available in Group View mode.

<sup>1</sup> Instruments such as the HygroFlex and HygroLab send the status of the trend indicator only for the two parameters that are being shown on the local LC display.

- Font Size in the Current Values data table: the default value is value 10. Use a value of 20 or larger to make it easier to read the PC monitor from a distance. Use the mouse to resize each column of the data table as required.

Probe	Description	Measurement 1
1	Probe 1	45.40%RH
2	Probe 2	45.30%RH

Probe	Description	Measurement 1
1	Probe 1	45.60%RH
2	Probe 2	46.29%RH

- After starting HW4, send as a shortcut to the Windows notification area: The Windows notification area is located on the taskbar, immediately to the left of the clock. HW4 can now be sent (minimized) as a shortcut icon to the Windows notification area while it is still keeps running. The alarm table will still appear on the PC monitor when HW4 is running in this mode.

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## 14.2 General Tab

### Communication:

- **Enable Device Polling:** Put a check mark in this box to enable HW4 to establish the initial (start-up) communication with the devices present in the device tree and to read / update data from these devices at regular intervals of time (polling interval). The data read by HW4 is used to populate the right pane of the HW4 main screen (current values table, on-line buffer and on-line graph).

If you are going to use HW4 only to the purpose of configuring or programming instruments and are not interested in any measurement data, you may want to temporarily uncheck this box by clicking on it with the mouse. HW4 will no longer read and update the data from the devices in the tree and the right pane of the HW4 main screen will be blank. We recommend restoring the check mark prior to closing HW4 so as to allow HW4 to communicate at least once with the devices in the device tree during the next start-up.

- **Polling interval:** enter here the time interval to be used by HW4 when polling the devices connected to the HW4 PC. The minimum value of 5 seconds is also the HW4 default.

**Note:** the other adjustable time intervals used by HW4 (on-line buffer / graph update and log-to-PC) should be a whole multiple of the polling interval and should be at least equal to the polling interval. When enabled, OPC tags are updated as per the polling interval.

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- **On-line buffer time interval:** enter here the time interval to be used by HW4 when writing data to the on-line buffer. The minimum value is 5 seconds. The on-line graph is updated using this time interval.
- **On-line buffer size:** specify here the number of lines for the on-line buffer. The size of the on-line buffer also determines the amount of data shown in the on-line graph.
- **Clear both the online buffer and online graph:** click on this link to clear both the buffer and the graph. After clicking on the link, you can exit HW4 Global Settings by clicking on the Cancel button (HW4 will not generate a protocol).

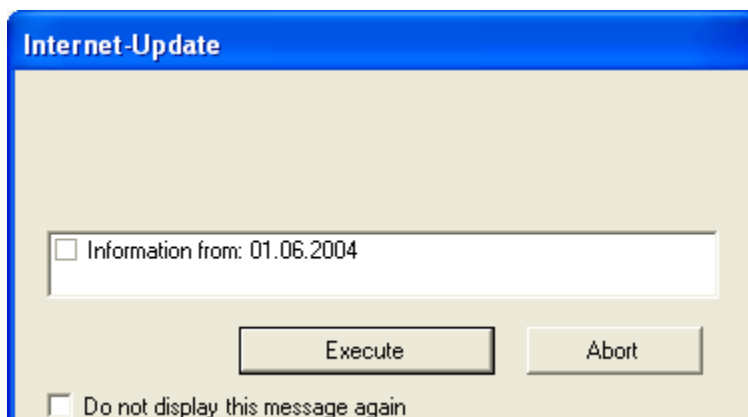
When adjusting a probe, clear the online buffer when the probe appears to have reached equilibrium. This forces the automatic scale of the graph to the highest resolution.

#### Bluetooth serial ports:

- The Bluetooth serial ports text box is used to declare the virtual serial port(s) used by Bluetooth enabled devices. Only the number of the serial port should be entered in the box (example: enter the number 8 for COM8). When several Bluetooth devices are used, enter each Bluetooth serial port number, separating each number with a semi-column. Do not use a space in between numbers (example: 8;10).

#### Automatic Functions:

- **Enable system monitoring:** check this box to have HW4 keep a record of any software problem that may occur. Keeping this type of record is an ERES regulatory requirement. HW4 event files have the extension ERR and are located in the subfolder EVENT of the HW4 user folder. When support is required from ROTRONIC, troubleshooting the problem is greatly facilitated when the corresponding HW4 event file is available.
- **Force password change:** this feature is only available with HW4 Professional. Enable this feature to force users to change their password on a regular basis.
- **Enter password again after 30 minutes:** this feature is only available with HW4 Professional. Enable this feature to force users to enter their password again after the time indicated. This is an ERES regulatory requirement which provides additional protection in the event that HW4 is running and left unattended for a period of time.
- **HW4 updates notification:** check this box to be automatically notified of new updates. This feature works only if the PC has access to the Internet.



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- **ROTRONIC NEWS:** check this box to be automatically notified of new issues of ROTRONIC NEWS. This feature works only if the PC has access to the Internet.
  
  - **Automatic synchronization with PC clock:** Enable this feature to allow HW4 to automatically synchronize any device internal clock with the HW4 PC clock. Synchronization takes place daily at 2:00 am and each time that HW4 is started. In order to be synchronized, the clock of the device must differ from the PC clock by at least 1 minute.
- Do not use this function when the PC and some of the polled devices are located in different time zones. See also: [Device Protection](#)
- **HW4 auto-start mode:** the auto-start mode allows HW4 to start without requiring a user to log in. HW4 logs-in the fictitious user "autostart". This user does not have to be created in HW4 and is given only the minimum HW4 rights. The auto-start mode can be used to allow a client application that connects to the HW4 OPC-server (OPC tags) to automatically start HW4. For more details, see document **IN-E-OPC HW4-V2**, available from ROTRONIC.

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### 14.3 Language/Unit System Tab

The screenshot shows the 'HW4 Global Settings Form' with the 'Language/Unit System' tab selected. The form is divided into several sections:

- HW4 Settings:**
  - Language Selection: [English](#)
  - Unit System (applies only to Psychrometric Conversion Tool):
    - [Use metric system](#)
    - [Use English system](#)
- Measurement Units:**
  - Humidity: % (dropdown), RH (checkbox)
  - Temperature: Celsius (dropdown)
  - Pressure: hPa (dropdown)
  - Enthalpy: kJ/kg (dropdown)
  - Density per volume: g/m<sup>3</sup> (dropdown)
  - Density per weight: g/kg (dropdown)
  - Elevation (ref. sea level): m (dropdown)
- Constants:**
  - Fixed pressure value: 1013.25 (text input)
  - Activation Energy [kJ/mole]: 83 (text input)

Buttons for 'OK', 'Cancel', and 'Help' are located at the bottom right of the form.

The selections and values entered in this tab affect only the language used in HW4 menus and the unit system and fixed pressure value used by the Psychrometric Conversion Tool. This tab has no effect on the instruments and devices in the tree. When HW4 displays or records data from any instrument, both the unit system and any fixed pressure value are determined by the configuration of the instrument.

- Language:** click on the underlined link to change the language used in the HW4 menus and forms to one of the available languages. The link opens the folder where the language files are located (these files have the extension .txt as in English.txt). To change the language, simply click on the appropriate file. The selection made here has no effect on the devices in the tree.

**Note:** After changing the language selection, you should close and re-open HW4 to ensure a complete updating of all HW4 texts.

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- **Unit System:** use the underlined links to the right of the form to globally change the unit system used within the HW4 Psychrometric Conversion Tool. The English the unit system offers two choices: In Hg or PSI for pressure. Choose a unit by clicking on the arrow to the right of each text box. Relative humidity: the symbol to be used after the % symbol (RH) should be typed in the text box.

- **Constants:**

**Fixed pressure value:** enter here the default fixed pressure value that will be used within the HW4 Psychrometric Conversion Tool to compute calculated parameters such as wet-bulb temperature, mixing ratio, etc. The barometric pressure value can be temporarily changed from within the Tool but it reverts to the default value each time the Tool is opened.

The numerical value entered here should be consistent with the pressure unit that was selected under Unit System.

**Activation energy:** enter here the value to be used in the calculation of the mean kinetic temperature (MKT). MKT is part of the statistical data that can be seen when using the HW4 log file viewer.

The activation energy should always be entered in kJ/mole, regardless of which unit system (metric or English) is being used. Typically, a value between 60 and 100 kJ/mole may be used for liquids and solids.

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## 14.4 File Locations Tab

The screenshot shows the 'HW4 Global Settings Form' with the 'File Locations' tab selected. The form is organized into three main sections:

- Measurement Data:**
  - Logger Data Files: C:\ROTRONIC\_HW4\DATA
  - Log to PC Files: C:\ROTRONIC\_HW4\DATA\_ONLINE
- Configuration Data:**
  - User Folder Path: C:
  - Device Configuration Files: C:\ROTRONIC\_HW4\SYS
- Protocols and Events:**
  - Protocols: C:\ROTRONIC\_HW4\DOC
  - Device Event Files: C:\ROTRONIC\_HW4\EVENT
  - Alarm Records: C:\ROTRONIC\_HW4\ALARM
  - HW4 Event Files: C:\ROTRONIC\_HW4\EVENT
  - User Event Files: C:\ROTRONIC\_HW4\EVENT

At the bottom of the form are three buttons: OK, Cancel, and Help.

Use this tab to review or change the location of the files created by HW4. Bring the mouse cursor on top of any file path to display the full path. Left click on any file path to open HW4 Explorer and change the path.

- **Logger data files:** log files copied from the logger to the PC. These files have either the extension XLS (unprotected) or LOG (protected binary format)
- **Log to PC files:** log files directly recorded on the PC. These files have either the extension XLS (unprotected) or LOG (protected binary format)
- **User Folder Path:** This folder is used to hold the HW4 configuration file (HW4.ini) as well as the data, event and protocol files created by HW4. If you wish to change the path of the HW4 User Folder, see: [Relocating the HW4 User Folder](#).

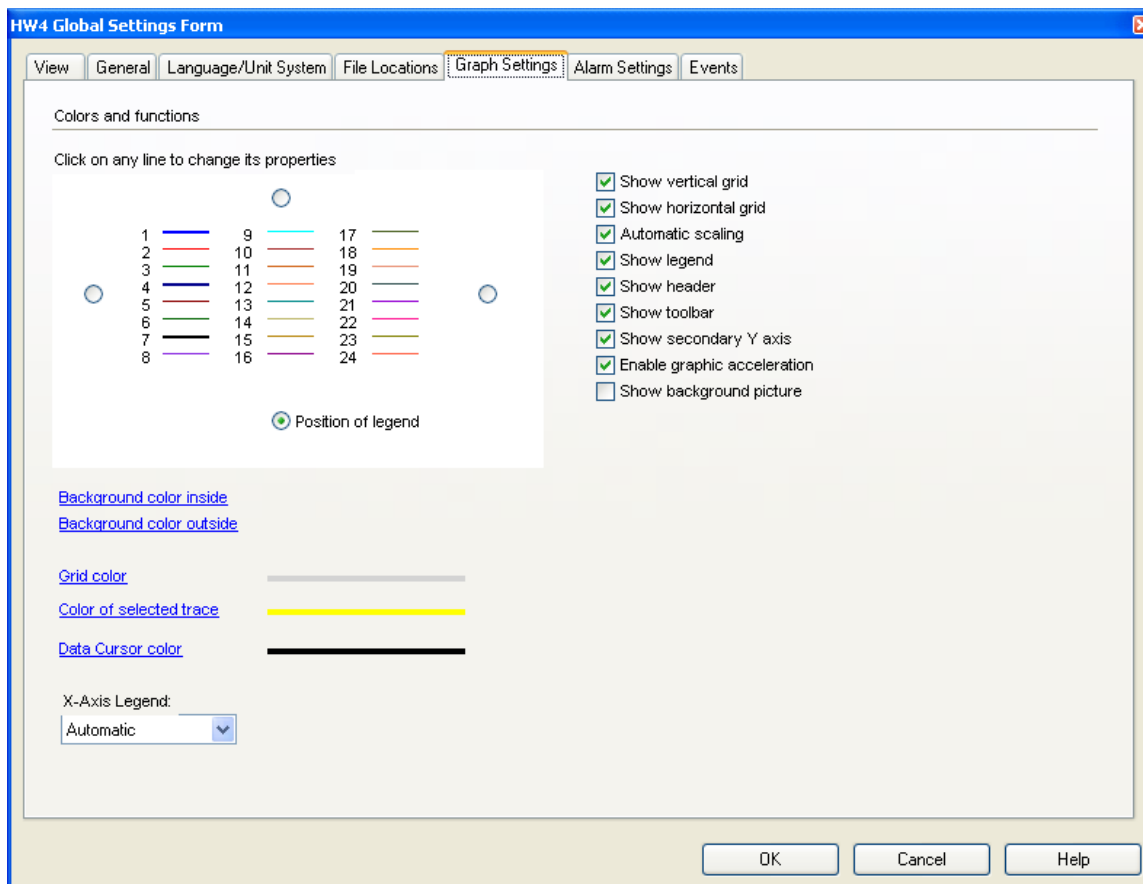
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- **Device configuration files:** these files have the extension DAT and are used to retain typical instrument configuration data so as to be able to quickly configure a number of instruments.
- **Protocols:** these files have the extension TXT and keep track of configuration changes to an instrument, instrument programming (such as data logging) and probe adjustments.
- **Device event files:** these files have the extension EVT and are generated by the data logger to keep track of the main internal logger events.
- **Alarm records:** HW4 maintains a file named HW4Alarm.alr to hold all alarm record.
- **HW4 event files:** these files have the extension ERR and keep track of any software problem encountered by HW4.
- **User event files:** these files have the extension EVT and keep track of the main operations performed by each HW4 user (HW4 Professional only). See also [Record keeping by HW4](#)



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## 14.5 Graph Settings Tab



Use this tab to customize the default appearance of the graphs generated from log files. Graphs settings can also be customized for each individual log file when it is being displayed in HW4 View Data. Most of the settings in this tab do not apply to the on-line graph displayed in the Current Values tab.

- Show Background Picture: enables the background picture.
- Line box: when generating a graph, HW4 uses lines 1 to 24 as follows: line 1 = humidity probe 1, line 2 = temperature probe 1, line 3 = calculated parameter probe 1, line 4 = humidity probe 2, etc. If a probe is not connected or if a parameter is not present on the graph, HW4 does not make use of the corresponding line. The properties of each line (type, color, weight, etc.) can be customized after right clicking with the mouse on the line.

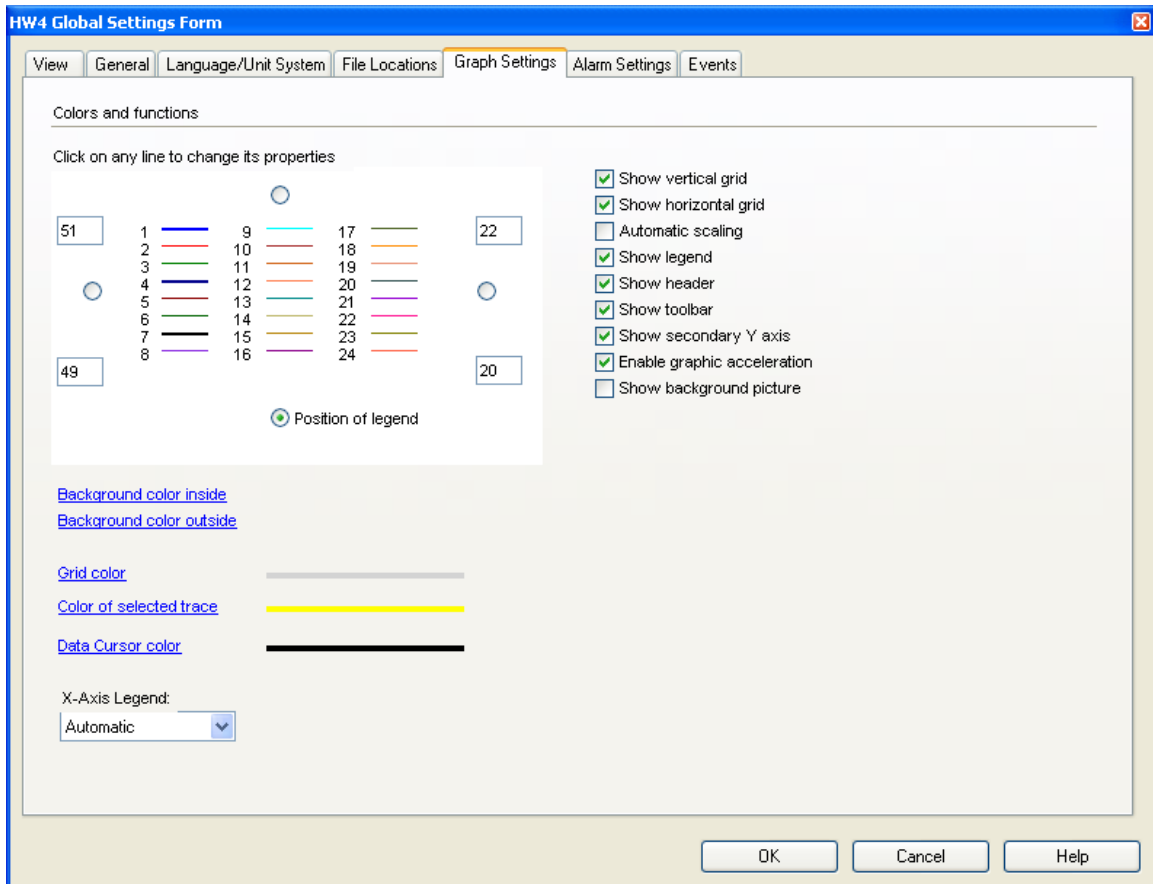
When the box Show legend is checked, use one of the four radio buttons around the line box to set the position of the legend on the graph.

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- The color of the grid, selected trace and data cursor can be changed after clicking with the mouse on the corresponding line.
- Automatic scaling: leave this box unchecked if you wish to manually define the scale for the primary and secondary Y axis of the graphs. Each axis can have its own scale. The secondary axis is used for temperature and the calculated parameter (see example below) and is not available with the on-line graph.

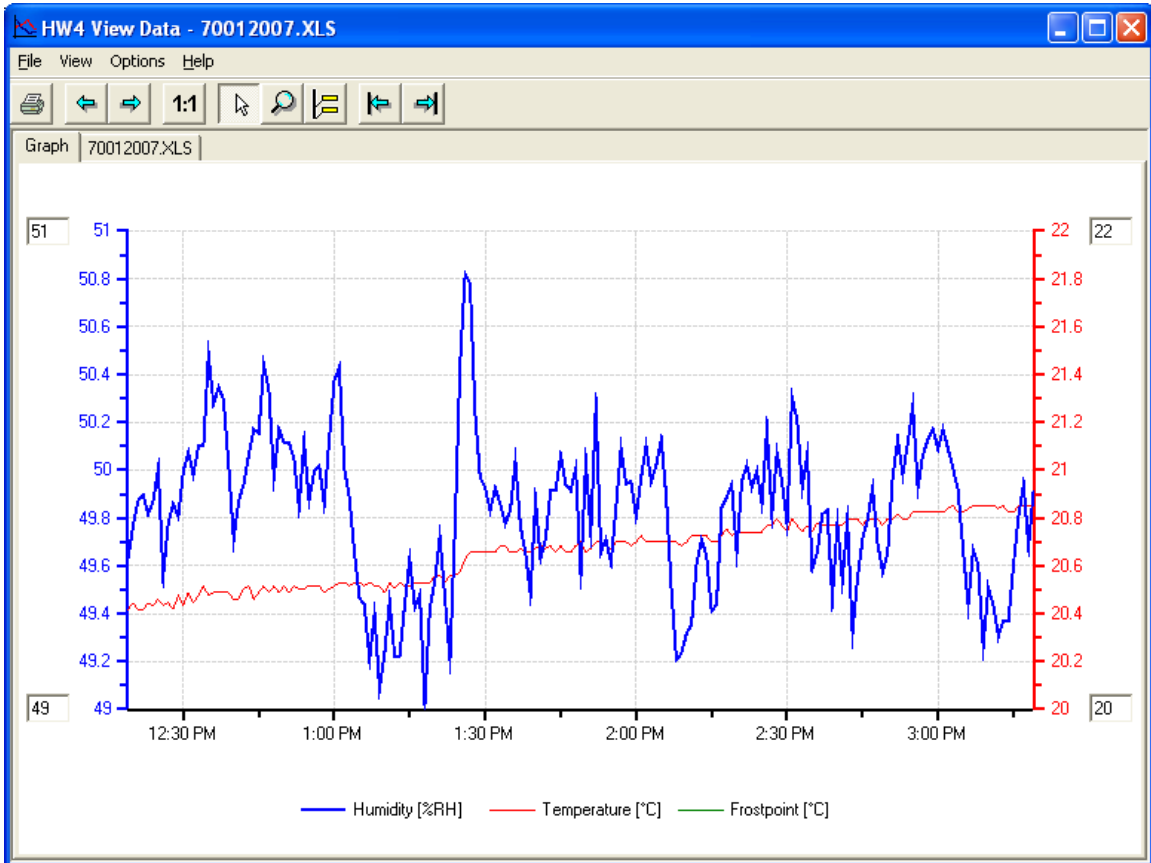
Example of manual scaling:

When the box “Automatic scaling is unchecked”, the form changes and two sets of two test boxes appear to let the user specify the minimum and maximum values for the scale of the primary Y axis (left) and for the scale of the secondary Y axis (right).



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The results may be as illustrated in the graph below:



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## 14.6 Alarm Settings Tab (HW4 Professional)

For a complete overview, see “Alarm indication and reporting by HW4” in this manual.

**HW4 Global Settings Form**

View | General | Language/Unit System | File Locations | Graph Settings | **Alarm Settings** | Events | AwQuick Mode

Trigger an alarm for the following:

<input type="checkbox"/> No communication with device	Priority	High	Time delay [hh:mm:ss]	00:00:00
<input checked="" type="checkbox"/> Measured values out of limits or N/A	Priority	High	Time delay [hh:mm:ss]	00:00:00
<input type="checkbox"/> Device alarm	Priority	High	Time delay [hh:mm:ss]	00:00:00
<input type="checkbox"/> Unavailable log-to-PC or HW4 path	Priority	High		
<input type="checkbox"/> HW4 software errors	Priority	High		
<input type="checkbox"/> Alarm Test	Priority	Low	Interval	Daily

[Run an alarm test now](#)

Time limits for the alarm function

Enable workdays only [Mo-Fr]

Enable during limited hours    Enable time [HH:mm]    00:00    Disable time [HH:mm]    00:00

When an alarm is triggered:

<input type="checkbox"/> Send e-mail	For priority	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
<input type="checkbox"/> Print report	For priority	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
<input type="checkbox"/> Give acoustic signal on PC (once)	For priority	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
<input checked="" type="checkbox"/> Display the alarm table				

E-mail settings

Recipient: asmith@aol.com

MAPI

SMTP: mail.optonline.net

OK    Cancel    Help

This tab is used to set HW4 to track and report conditions and events that are deemed to be abnormal, such as:

- Loss of communication with any device present in the device tree
- Measured values that are out limits or are not available (see Device Manager - Input and Optional Input)
- Device alarm: depends on the type of alarm conditions that are monitored by each specific device connected to the PC. Examples: bad sensor, bad memory card, etc.
- Unavailability of the file location (path) used by HW4 while recording data to the PC (example: disconnected network drive)
- Internal HW4 software errors / malfunctions

Click on the box next to each type of event to have HW4 trigger an alarm.

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- **Alarm Test:** this function allows you to verify the proper operation and reporting of alarms

Click on the box labeled Alarm Test to have HW4 simulate an alarm at regular intervals of time:

Daily : a test is run each day at 00:00 (midnight, PC time)  
Weekly : a test is run each week at 00:00 on Mondays  
Monthly : a test is run on the first day of each month at 00:00

Additional choices include "Each hour", "Each 4 hours", "Each 8 hours" and "Each 12 hours". In all cases a test is run at the top of the hour.

Click on the link "Run an alarm test now" to have HW4 simulate an alarm right away.

- **Priority:** select from low, medium or high to fine tune the way HW4 displays alarms in the alarm table and the different actions that HW4 may take.
- **Time delay:** specify here the amount of time during which an event must be on before HW4 triggers an alarm.
- **Time limits for the alarm function:** disables the entire alarm function outside of the specified days and time limits.

**CAUTION:** When the alarm function is disabled no entries are made in the file underlying the alarm table and an alarm condition could go unnoticed / unreported.

- **Optional actions:** when an alarm is triggered, HW4 can be set to take any of the following:

▶ **Send an e-mail:** HW4 sends an email to the address entered in the Recipient box.

**MAPI:** HW4 will use Microsoft Outlook to send an email. Recent versions of Microsoft Outlook require a manual authorization each time that a third party software attempts to use Outlook to send a message. This will prevent HW4 from sending mail when the PC is unattended.

**SMTP:** HW4 will send an email directly to an outgoing-mail (SMTP) server. This can be done automatically, even when the PC is unattended.

▶ **Print report:** HW4 sends a short report to the default printer selected in Windows.

▶ **Give acoustic signal:** HW4 causes the PC to emit a one time bell sound

**For priority:** specify here for which priority level(s) each of the above actions should be carried out.

- **Display the alarm table:** HW4 automatically records the alarm into the alarm table (see HW4 settings and tools - View alarm table) and displays the table on the PC monitor.

Even when none of the above actions is enabled, HW4 either displays a brief message or an alarm indication on the PC monitor (such as change to the color red in the device tree) in the event of an alarm condition. Abnormal conditions and events which are selected in this tab are always recorded to the file that underlies the alarm table (see **HW4 settings and tools - View alarm table**).

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## 14.7 Events Tab (HW4 Professional)

- **Authentication stamp:** HW4 Professional automatically generates an authentication stamp at the end of protocols and this stamp is cross referenced in the user event files. Check this box to have HW4 validate the authentication stamp when opening a protocol (file with the extension TXT): instrument configuration, instrument programming and probe adjustment. HW4 uses the authentication stamp to verify that the protocol file has not been altered.
- **Enable monitoring of user events:** check this box to have HW4 generate and maintain a user event file keeping track of the main operations performed by any user. This is an ERES regulatory requirement.
- **View user events:** click on this link to view the contents of the user events file.

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- **Generate and Save Protocols:** check this box to have HW4 automatically **generate and save to disk** a protocol file recording the details of the following operations: device configuration, log function programming (except log-to-PC) and probe adjustment.

HW4 generates protocols in simple text format (Editor / Microsoft Notepad - file extension TXT).

- **Display Protocols on the PC Monitor:** This selection causes HW4 to automatically display the protocol on the PC monitor. This option cannot be selected without selecting **Generate and Save Protocols**.

Note: for a complete overview, see "[Record keeping](#)" in this manual.

## 15 USER EVENTS (HW4 Professional)

When HW4 is enabled to do so (HW4 Global Settings – Events Tab), a user event file is created and maintained. For more information, see "[Record keeping by HW4](#)" in this manual.

The following are examples of user events:

- User login / logout
- Changes to the HW4 Global Settings
- Instrument configuration
- Log function operations, etc.

Proceed as follows to view the user event file for the current session of HW4:



HW4 opens the user event form. By default, HW4 displays only the events of the current session:

File			
Date	Time	Event	Description
4/25/2006	13:37:50	Start HW4 ID#	12 00000002 V1.2.2.28258
4/25/2006	13:37:55	User Log on	A. Smith
4/25/2006	13:37:55	Electronic signature of language file not valid	C:\Program Files\HW4\language\English.txt
4/25/2006	14:13:20	User log off	A. Smith
4/25/2006	14:15:30	User Log on	A. Smith

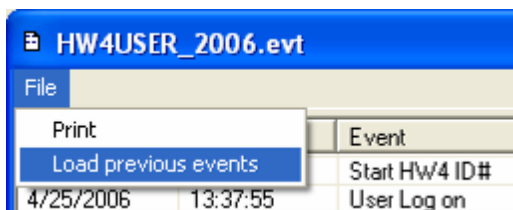
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## 15.1 Menu bar

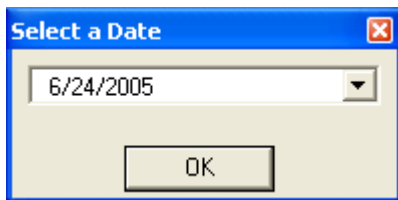
### 15.1.1 Load previous user events:

To view every user event recorded by HW4 since a specific date, proceed as follows:

In the menu bar of the user events form, click on File and then on Load previous user events.



HW4 displays the following dialog box:



Click on the arrow to the right of the date field to open a calendar.

Select the oldest date from which you want to see all user events on record and click on the OK button. HW4 loads in the user event form all user events on record since the selected date.

Note: the next time that the user event form is opened, HW4 will display again only the events of the current session.

### 15.1.2 Print:

This command prints the current contents of the user event form (current session only or every event starting from a specific date).

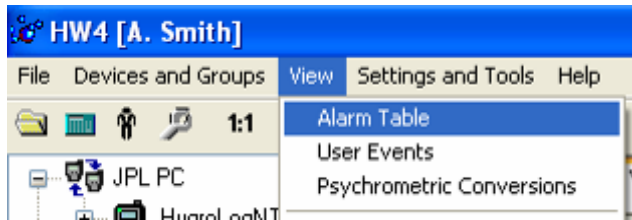


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## 16 ALARM TABLE (HW4 Professional)

For an overview of the alarm function in HW4 see [Alarm indication and reporting](#).

The HW4 alarm table can be displayed on the PC monitor at any time from the HW4 main menu bar:



### Notes:

- The HW4 alarm table remains empty until the tracking of alarm conditions is enabled in HW4 Global Settings – Alarm Settings Tab.
- The Alarm Settings Tab in HW4 Global Settings offers the option of having HW4 automatically display the alarm table on the PC monitor whenever a new alarm condition occurs.
- A general overview of alarm indication and reporting by HW4 is provided under “Alarm indication and reporting by HW4”.

By default, HW4 initially displays only alarms that have occurred during the current session. Alarms from previous sessions can be displayed by clicking on **View** in the alarm table menu bar.

Alarm conditions that are presently in effect are shown with a red exclamation mark. The red exclamation mark is automatically removed when the alarm condition no longer exists.

	Start Time	End Time	Device	Device name	Input name	Alarm Description
●	11/24/2006 4:11 PM		HygroLogNT	Upstairs		No communication with device
✓ ●	11/24/2006 3:54 PM	11/24/2006 3:54 PM	HygroLogNT	Upstairs		No communication with device
● !	11/24/2006 3:51 PM		HygroLab 2	HyGen Lab 2	HG Ctrl	No communication with probe
●	11/24/2006 3:49 PM	11/24/2006 3:49 PM	HW4 Software			Alarm Test

Acknowledgement Text	Value	Threshold	Acknowledged by	Acknowledged
Wireless problem	... %RH	...	A. Smith	11/24/2006 3:58 PM

**Note:** the alarm table is quite wide and is split in two parts in the above representation.

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## 16.1 Alarm acknowledgement

Acknowledging an alarm requires the current user to have to the right to do so.

To acknowledge an alarm, double click on the alarm line in the table. The following dialog box opens:

**Acknowledge Alarm**

**Alarm**

Name	No communication with device
Status	Ended
Priority	Low
Acknowledged	No
Start Time	11/24/2006 4:11 PM
End Time	11/24/2006 4:12 PM

**Device**

Device	HygroLogNT
Name	Upstairs
Address	
Serial number	0033414009

**Input**

Number	
Name	
Serial number	
Value	
Threshold	

Enter acknowledgement text here...

OK    Print    Exit

Prior to clicking on the OK button, you may want to enter a comment in the acknowledgement text box.

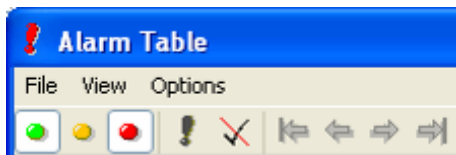
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When the alarm has been acknowledged, this is shown in the table with a check mark as illustrated below:

	Start Time	End Time	Device	Device name	Input name	Alarm Description
●	11/24/2006 4:18 PM	11/24/2006 4:19 PM	HygroLogNT	Upstairs		No communication with device
✓ ●	11/24/2006 4:11 PM	11/24/2006 4:12 PM	HygroLogNT	Upstairs		No communication with device

Acknowledging an alarm or clicking on the EXIT button does not reset the alarm. The acknowledged check mark simply means that a qualified user knows about the alarm and may have entered a comment. An alarm that is current (active) remains visualized in the main HW4 screen (using the color red in the group / device tree and in the current values table).

## 16.2 Alarm table menu bar and buttons



### 16.2.1 File

- **Print Summary Report:** prints the current contents of the alarm table as a report
- **Save As:** saves the current contents of the alarm table in the Microsoft Excel format
- **Exit:** closes the alarm table

### 16.2.2 View

Use **View** to change the contents of the alarm table and to view alarms selectively:

- **Alarms from the current HW4 session**
- **Alarms for one day**<sup>1)</sup>
- **Alarms for one week**<sup>1)</sup>
- **Alarms for one month**<sup>1)</sup>
- **All alarms**
- **Navigation**
- **Low priority alarms**
- **Medium priority alarms**
- **High priority alarms**
- **Current alarms only** (shows only the alarms that are in effect)
- **Non acknowledged alarms only**

<sup>1</sup> Use either the arrow buttons or the Navigation menu item to change the day, week or month:



The information line at the bottom left corner of the table shows the number of alarm records and the date range presently covered in the table:

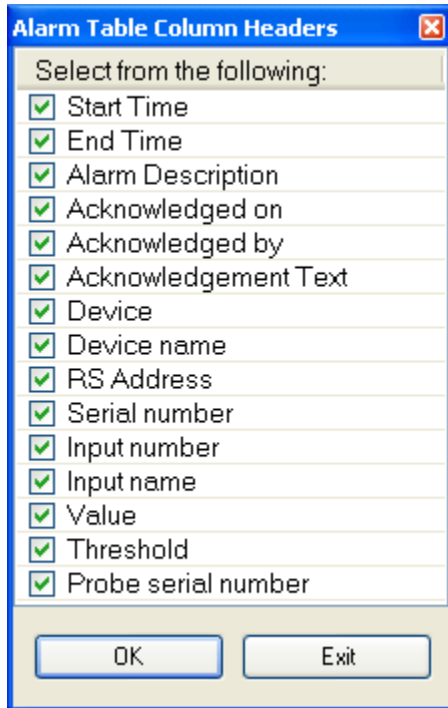
5 Entries on 11/24/2006

81 Entries from 11/20/2006 to 11/26/2006

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### 16.2.3 Options

- **Customize contents:** the information appearing both in the alarm table and in the alarm report can be customized. Clicking on “Customize contents” opens the following form:



The selected items appear as columns in the alarm table and as lines in the alarm report.

The order of the columns within the alarm table can be changed by clicking and dragging them with the mouse.

When the value that triggers an alarm is a calculated parameter such as dew point, the symbol for that parameter appears in front of the numerical value in both the alarm table and alarm report.

Example: Fp: -16.58°C

Alarm Description	Input name	Threshold	Value
Relay Output Alarm	Relay D	1.00	1
Relay Output Alarm	Relay C	1.00	1
Value out-of-limits	Probe 2	-25.00	Fp -16.58°C

### 16.2.4 Alarm table buttons



Change the date or date range of the alarm events to be displayed

Display only non-acknowledged alarms

Display only current alarms

Select which alarm priority levels are to be displayed in the alarm table (white background = selected)

Green : low priority  
 Yellow : Medium priority  
 Red : High priority

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## 17 PSYCHROMETRIC CONVERSIONS

This menu item opens a form that can be used to convert humidity parameters. To change the parameter to be converted, click on Input Parameter and choose from the list.

Parameter	Symbol	Value	Unit
Humidity	H	35.00	%RH
Temperature	T	23.00	°C
Pressure	P	1013.25	hPa
Elevation (ref. sea level)		0.00	m
Wet-bulb temperature	Tw	13.98	°C
Psychr. difference	T-Tw	9.02	°C
Dew point	Dp	6.73	°C
Frost point	Fp	N/A	°C
Vapor concentration (moist)	Dv	7.19	g/m <sup>3</sup>
Specific humidity (moist)	Q	6.06	g/kg
Mixing ratio by Wt. (dry)	R	6.09	g/kg
Vapor partial pressure	E	9.83	hPa
Vapor saturation pressure	Ew	28.08	hPa
Saturation vapor concentration	Dvs	20.54	g/m <sup>3</sup>
Enthalpy	H	38.60	kJ/kg
Volume Mixing Ratio (dry)		9795.44	ppm

Calculation: WMO World Meteorological Organization  
Status: OK

- Click on the blue arrow to compute
- Click on the diskette symbol to transfer the results to the default Windows text editor (such as Notepad) and eventually save the data to a text file.

Note: to change the unit system, go to the HW4 main screen. In the menu bar, click on Settings and Tools and on HW4 Global Settings. In the HW4 Global Settings form, select the tab "Language / Unit System".

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## 18 DEVICE PROTECTION

This function is used to protect a device <sup>1</sup> against malicious users. This is particularly useful when the device is exposed to the Internet. When a device is protected, the following functions are disabled:

- All Device Manager functions
- Log function programming
- Probe adjustment
- Deletion of files from the device memory card

<sup>1</sup> Availability of this function depends on the firmware version of the device.

**Warning:** The following HW4 automatic functions are also disabled for the protected device:

- Automatic address change when adding new devices to a RS-485 multi-drop network
- Automatic synchronization with the HW4 PC clock

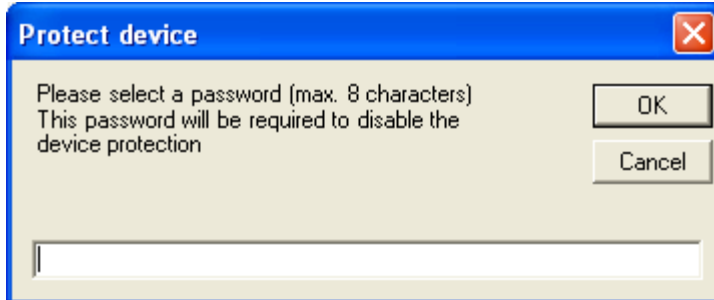
The procedure used to protect or unprotect a device is described, using the HygroClip DI as an example:

Select the device in the device tree and open Device Manager > Device Information:



To protect the device, click on the underlined link. HW4 opens the following form where a password can be entered (maximum 8 characters):

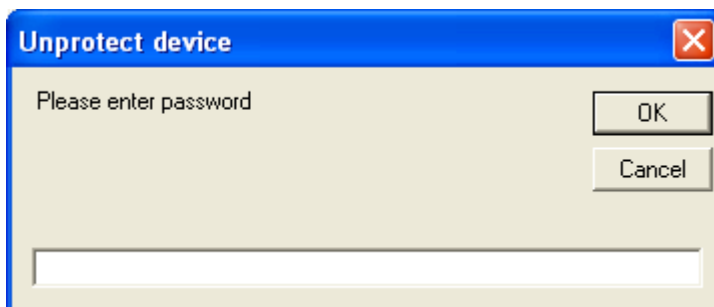
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Enter the password and click on the OK button. HW4 confirms that the device is now protected:



To unprotect the device and enable all functions, click on the underlined link. HW4 opens the password form:



Enter the password and click on the OK button. HW4 confirms that the device is now unprotected.



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**FORGOT THE PASSWORD?** - should you forget the password, remove power from the device (HygroLog NT: remove the battery). After restoring power to the device, you have about one minute to use the default password **!resume!** (include the exclamation marks). After one minute the default password is no longer accepted.

## 19 DATA LOGGING - directly on the PC

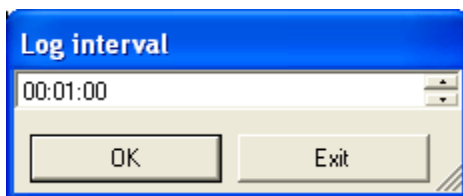
The Log to PC tab is used to record data directly on the PC from any type of instrument that is selected in the Device Tree (left pane of the HW4 main screen). The Log to PC tab lists all input types recognized by HW4, regardless of whether they exist or not on the actual instrument. When the input list is either empty or incomplete, please go to the **View Tab** and check the selections. Only those items selected in the View Tab are visible in the Log to PC Tab.

Data from more than one input can be recorded, using a different file for each individual input.

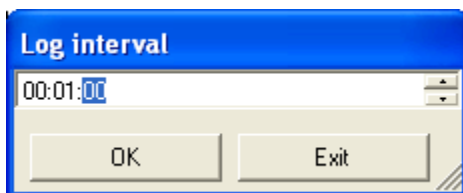
Input	Description	Log Interval	Log File Management	Log File Name	File Location
<input type="checkbox"/> 1	Probe 1	00:00:15	No file size limit		
<input type="checkbox"/> 2	Probe 2	00:00:15	No file size limit		
<input type="checkbox"/> 3	Probe 3	00:00:15	No file size limit		
<input type="checkbox"/> 4	Probe 4	00:00:15	No file size limit		
<input type="checkbox"/> 5	Probe 5	00:00:15	No file size limit		
<input type="checkbox"/> 6	Probe 6	00:00:15	No file size limit		
<input type="checkbox"/> 7	Probe 7	00:00:15	No file size limit		
<input type="checkbox"/> External Contacts	Contacts 1/2	00:00:15	No file size limit		
<input type="checkbox"/> Custom Calc.	Custom Calc.	00:00:15	No file size limit		

### 19.1 Start logging data to the PC

1. Select an instrument in the Device Tree. Click on the field "Log Interval" in the line corresponding to the input to be recorded. The following dialog box opens.



Click on the hours, minutes or seconds to highlight. In the following example, the seconds are highlighted. At this time, click on either the up or the down arrow to the right of the box to change the value.

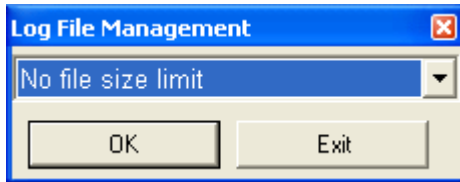


Click on OK when done.

2. Click on the field "Log File Management" in the line corresponding to the probe. The following dialog box opens.



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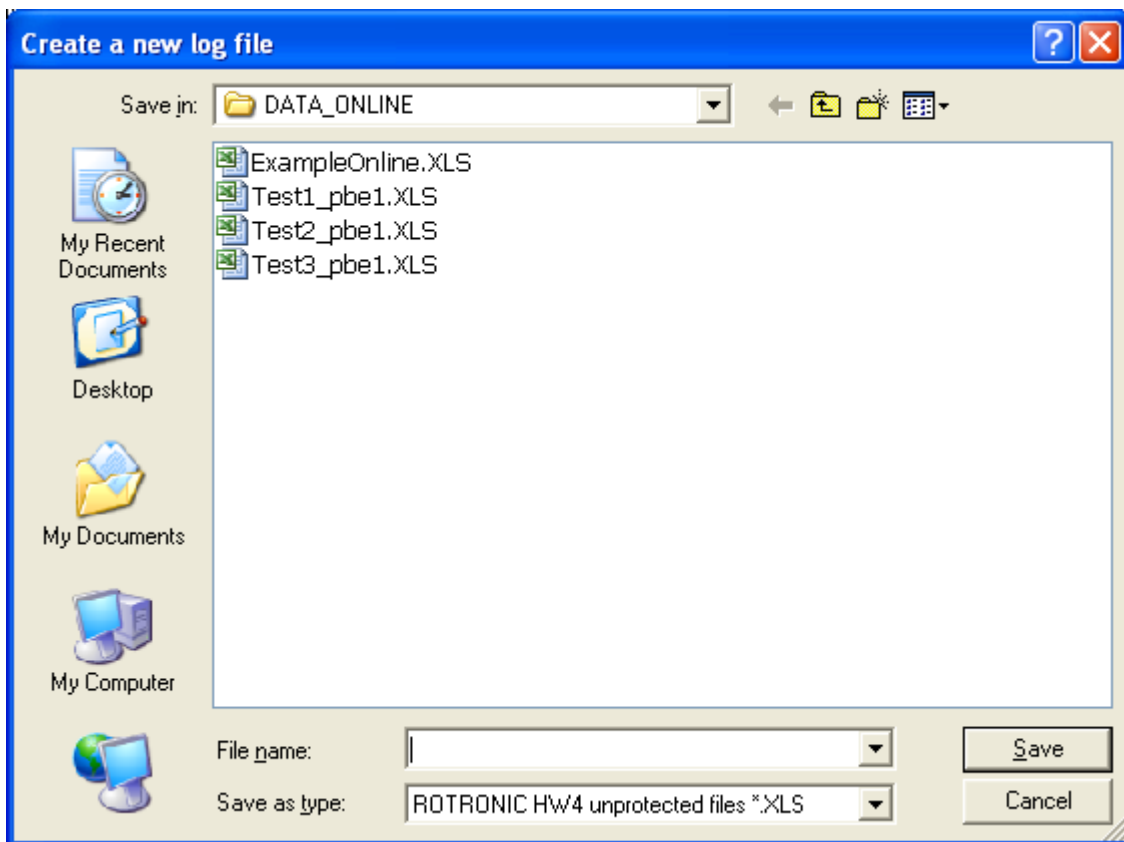


Click on the arrow to the right of the box to display a pull down menu of the available log modes:

- No file size limit : log file of unlimited size (must be closed manually) <sup>1</sup>
- Every hour : start a new file at the top of each hour.
- Every day : start a new at 00:00 (midnight) each day.
- Every week : start a new file at 00:00 each Monday.
- Every month : start a new file at 00:00 on the first day of each month.

<sup>1</sup> As far as possible avoid using the unlimited size mode. With any of the other selections, HW4 automatically starts a new file after closing the current file. The name of the new file is generated by HW4 by appending a 3-digit number to the original file name.

**3.** To start logging, click on the box located to the left of the line corresponding to the probe. The following box opens:



Enter the file name and select the file type: XLS for an unprotected data file or LOG for a protected (binary encoded) data file that meets ERES regulatory requirements.

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Note: if you attempt to use the name of an open or active file (logging in progress), you will get a warning from HW4.

Unprotected files (XLS) are not verified when they are opened with HW4. These files can also be opened and altered with an editor or with Microsoft Excel. Protected files (LOG) 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.

When logging is active, a check mark appears in the box corresponding to the probe or probes.

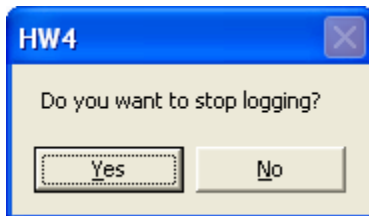
Input	Description	Log Interval	Log File Management	Log File Name	File Location
<input checked="" type="checkbox"/> 1	Internal	00:00:15	No file size limit	Test_Pbe3.XLS	C:\Document:
<input type="checkbox"/> 2	External 2	00:00:15	No file size limit		
<input type="checkbox"/> 3	External 3	00:00:15	No file size limit		

A diskette symbol also appears to the left of the probe in the Current Values tab.

!	#	Description	Temperature	Humidity
	1	Internal	24.28°C -	56.02%RH -
	2	External 2	--.	--.

## 19.2 Stop logging data to the PC

In the Log to PC tab, click on the line corresponding to the probe. The following dialog box opens:



Click on Yes.

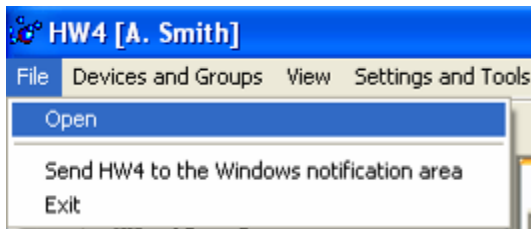
Note: if you attempt to exit HW4 while Log to PC is active, you will get a warning from HW4.

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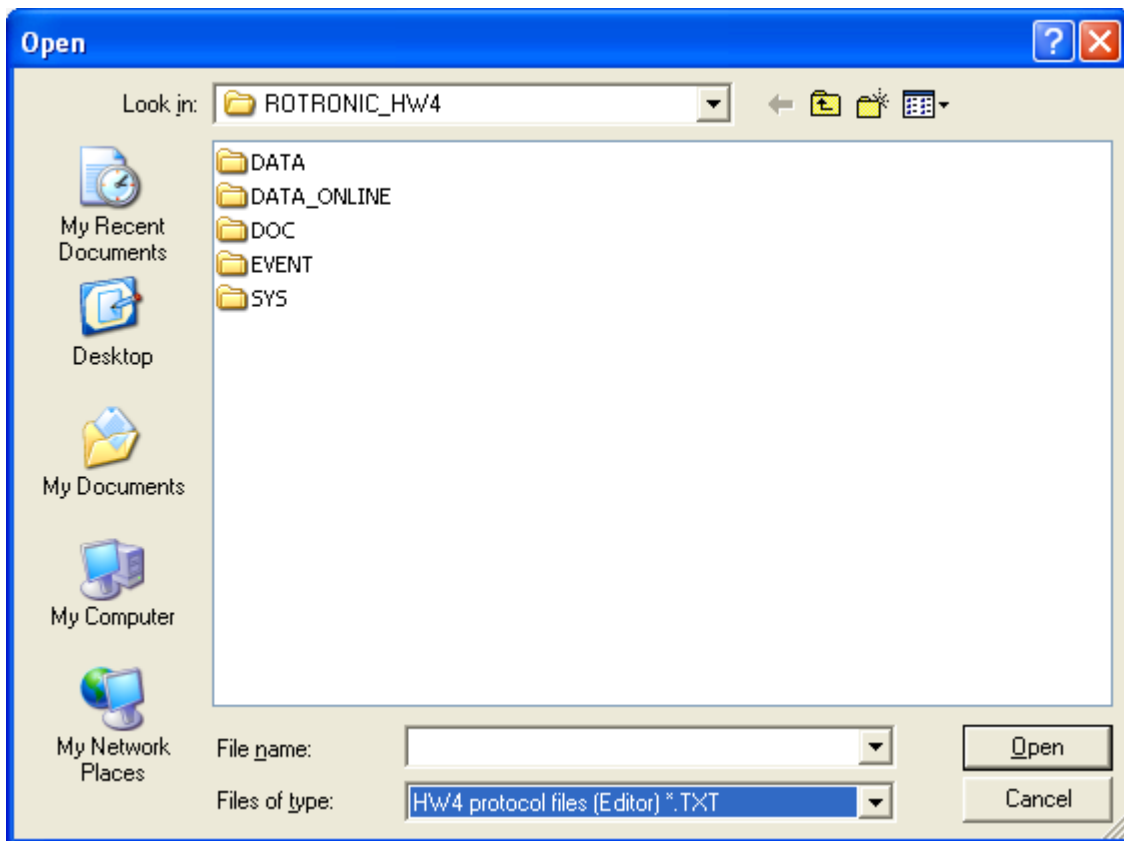
## 20 ACCESSING LOG FILES, PROTOCOLS AND EVENT FILES

All files generated by HW4 can be accessed from the HW4 main menu bar provided that they reside on the PC.

1. Select **File** and **Open**:



2. HW4 opens the following form



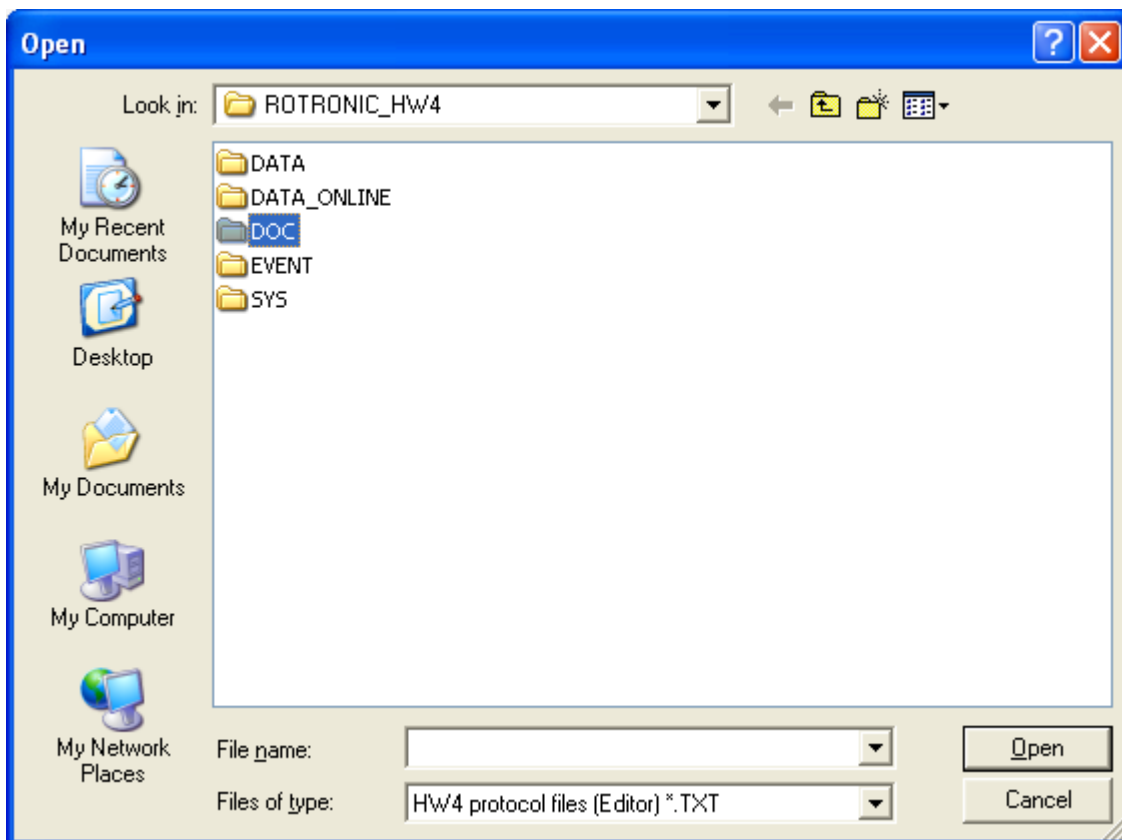
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By default, the menu item File - Open (HW4 main menu bar) points to the directory C:\Documents and Settings\Windows User\Application Data\ROTRONIC\_HW4. When the location of the files has been changed from the default location, you will have to manually look in the proper folder.

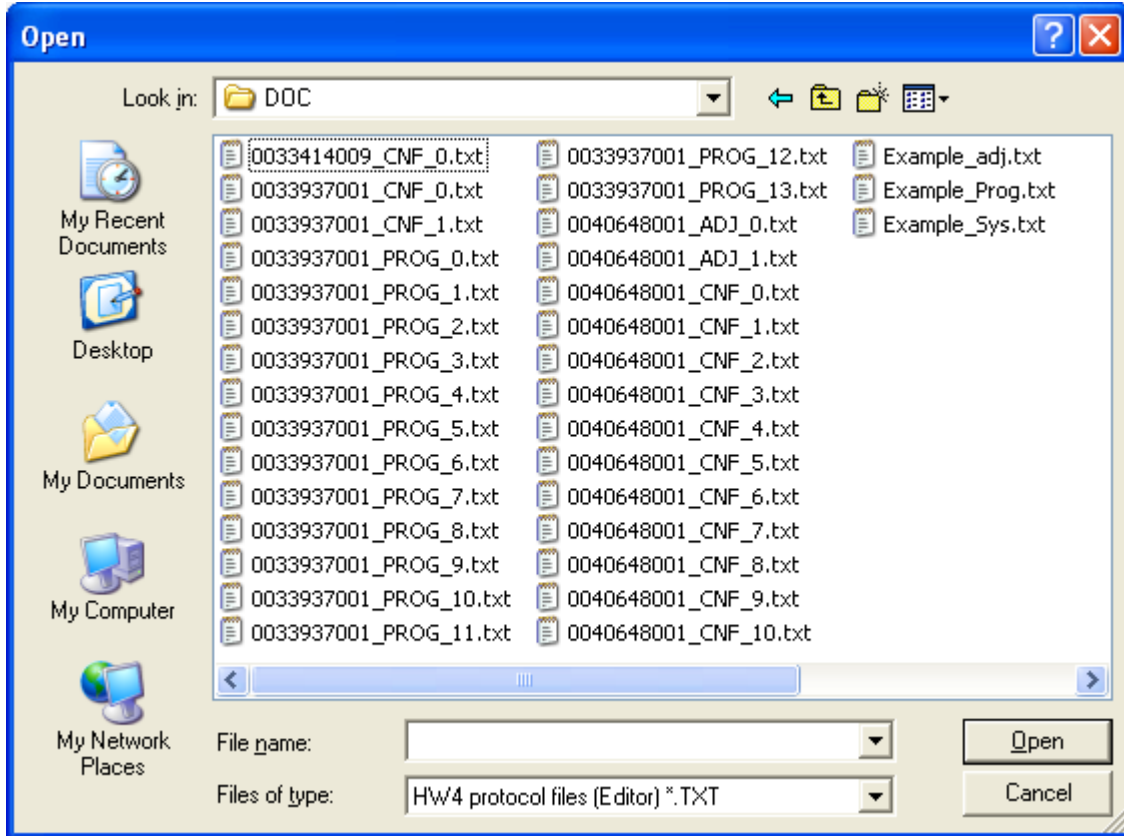
3. Select the folder where the type of file that you want to open is located:

- DATA: log files that have been copied or transferred (moved) from the data logger to the PC.
- DATA\_ONLINE: log files directly created on the PC (Log to PC).
- DOC: protocol files (device configuration, logger programming and probe adjustment).
- EVENT: user event files as well as HW4 event files.
- SYS: frequently used device configuration files for future use with Device Manager

Example: Protocol files folder



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4. Select the proper file extension for the type of file you want to open, or select All files \*.\*.  
If you do not see any file, check the folder and file extension selections.

5. Select a file with the mouse and click on the “**Open**” button.

Depending on the type of file, HW4 uses different file viewers.

Log files : see [View / Sign a Log File](#)

Protocols : see [View / Sign a Protocol](#)

## 21 VIEW / SIGN A PROTOCOL

HW4 uses the following viewer to display protocols on the monitor screen.

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Example:

```

C:\ROTRONIC_HW4\DOC\0019236002_ADJ_0.txt
File View
PROBE ADJUSTMENT PROTOCOL

Adjustment Date and Time
Date: Friday, November 24, 2006
Time: 20:39:58

Device Information
Device type: HygroClip DI
Device name: DI-4 VAL
Serial number: 0019236002
Firmware: V1.0a

Input 1
LabRoom / 32337246
Parameter to be adjusted: Temperature
Reference value: 20.77°C
1-point adjustment (global offset)

Readings prior to adjustment
Temperature: 20.75°C =
Humidity: 33.64%RH =

Readings after adjustment
Temperature: 20.77°C
Humidity: : 33.64%RH =

Probe adjustment completed

Adjusted by
HW4 User name: A. Smith
User description: Administrator
User ID: 27378

HW4 Information
Version: 2.0.0.31736
HW4 ID: 12 00000002

User event file
C:\ROTRONIC_HW4\EVENT\HW4USER_2006.evt

Authentication Stamp
763BA3&F

AUTHENTICATION STAMP OK

```

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HW4 always checks the authentication stamp of a protocol when opening the file. The result of this verification appears on the bottom left corner of the form used to display the file contents:

AUTHENTICATION STAMP OK

WARNING: THIS IS NOT AN ORIGINAL HW4 FILE

## 21.1 Protocol viewer menu bar

### File

- **Print:** opens the Windows printer form and prints the protocol on the specified printer.
- **Sign document:** use this menu item to add your HW4 user name and a comment text to the protocol. For authentication purposes you will need to enter your password.

**Sign the document**

Document name: 0019236002\_ADJ\_0.txt

Software: HW4 V2.0.0.31736

Date: Friday, November 24, 2006

HW4 user name: A. Smith

Password:

**Text**

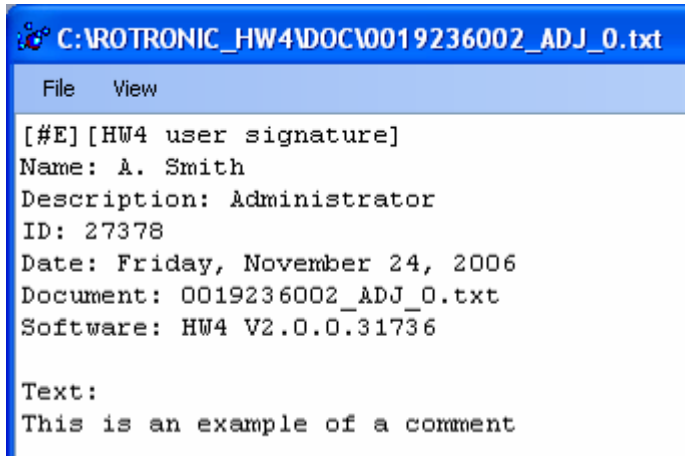
Sign Cancel

- **Exit:** closes the viewer.

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## View

- **Document:** displays the entire document in the viewer.
- **Signature:** displays only the signature area of the document.



C:\ROTRONIC\_HW4\DOC\0019236002\_ADJ\_0.txt

```

File  View

[#E] [HW4 user signature]
Name: A. Smith
Description: Administrator
ID: 27378
Date: Friday, November 24, 2006
Document: 0019236002_ADJ_0.txt
Software: HW4 V2.0.0.31736

Text:
This is an example of a comment

```

## 22 VIEW / SIGN A LOG FILE

View Data is the graphic module of HW4.

### 22.1 Opening a log file in HW4 View Data

A log file that is located on the PC can be opened in View Data from the File menu in the HW4 main menu bar.

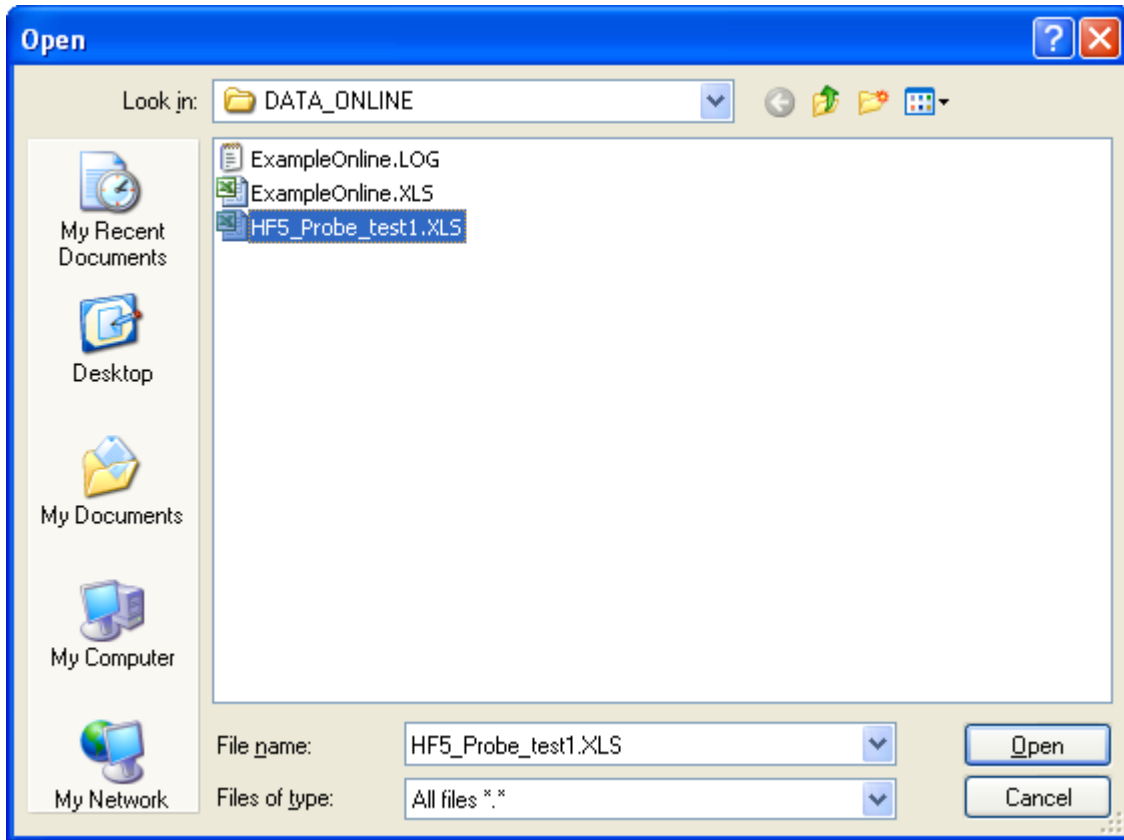
Select **File** and **Open**:





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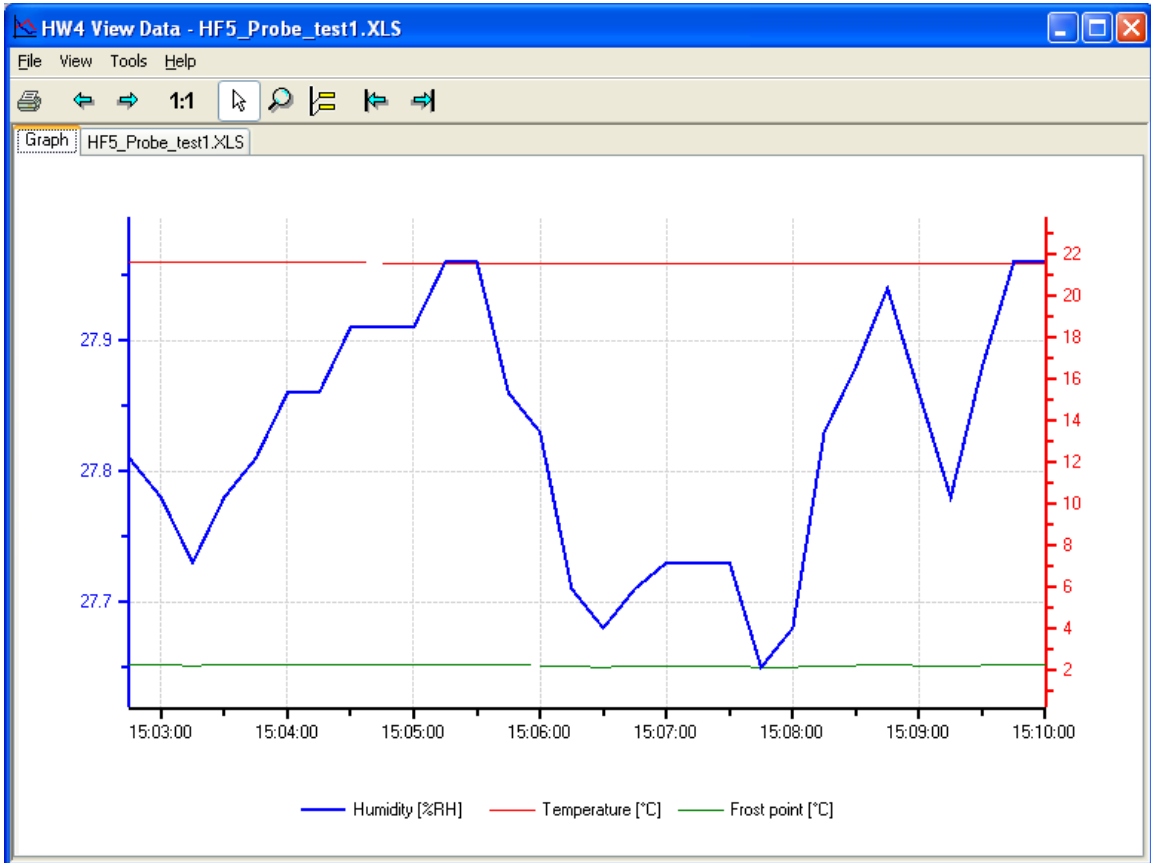
HW4 opens the following form



Select the folder where the file is located (DATA or DATA\_ONLINE) as well as the type of log file (file with .LOG or .XLS extension). If you do not see the file, check the folder and file extension selections. Click on the “**Open**” button.

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HW4 immediately opens the file in View Data:



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Click with the mouse on the tab with the file name to view the data in a table.

The screenshot shows a software window titled "HW4 View Data - HF5\_Probe\_test1.XLS". The window has a menu bar (File, View, Tools, Help) and a toolbar with various icons. Below the toolbar, there is a "Graph" tab labeled "HF5\_Probe\_test1.XLS". The main content area is divided into two sections: a text area at the top and a data table below.

The text area contains the following information:

- [#I]Device Name: HF53
- [#P]PROCESS DESCRIPTION: Log to PC, HW4-Version V2.3.0.26903
- [#S]Device information: Version = V1.1-1, Serial number = 0099000002, File name = HF5\_Probe\_test1.XLS, Log Interval = 00:00:15, Type = V1.3-0 / 0000000007, Input Name = Probe 1

The data table below has the following columns: Num., Date, Time, Humidity %RH, Temperature °C, and Frost point °C. The table contains 17 rows of data, all recorded on 3/30/2009.

Num...	Date	Time	Humidity %RH	Temperature °C	Frost point °C
1	3/30/2009	15:02:45	27.81	21.58	2.217
2	3/30/2009	15:03:00	27.78	21.58	2.202
3	3/30/2009	15:03:15	27.73	21.57	2.168
4	3/30/2009	15:03:30	27.78	21.58	2.202
5	3/30/2009	15:03:45	27.81	21.57	2.209
6	3/30/2009	15:04:00	27.86	21.56	2.225
7	3/30/2009	15:04:15	27.86	21.55	2.217
8	3/30/2009	15:04:30	27.91	21.55	2.242
9	3/30/2009	15:04:45	27.91	21.54	2.233
10	3/30/2009	15:05:00	27.91	21.54	2.233
11	3/30/2009	15:05:15	27.96	21.51	2.233
12	3/30/2009	15:05:30	27.96	21.53	2.250
13	3/30/2009	15:05:45	27.86	21.52	2.191
14	3/30/2009	15:06:00	27.83	21.52	2.176
15	3/30/2009	15:06:15	27.71	21.53	2.124
16	3/30/2009	15:06:30	27.68	21.52	2.100
17	3/30/2009	15:06:45	27.71	21.53	2.124

Click with the mouse on the Graph tab to view the data again in a graph.

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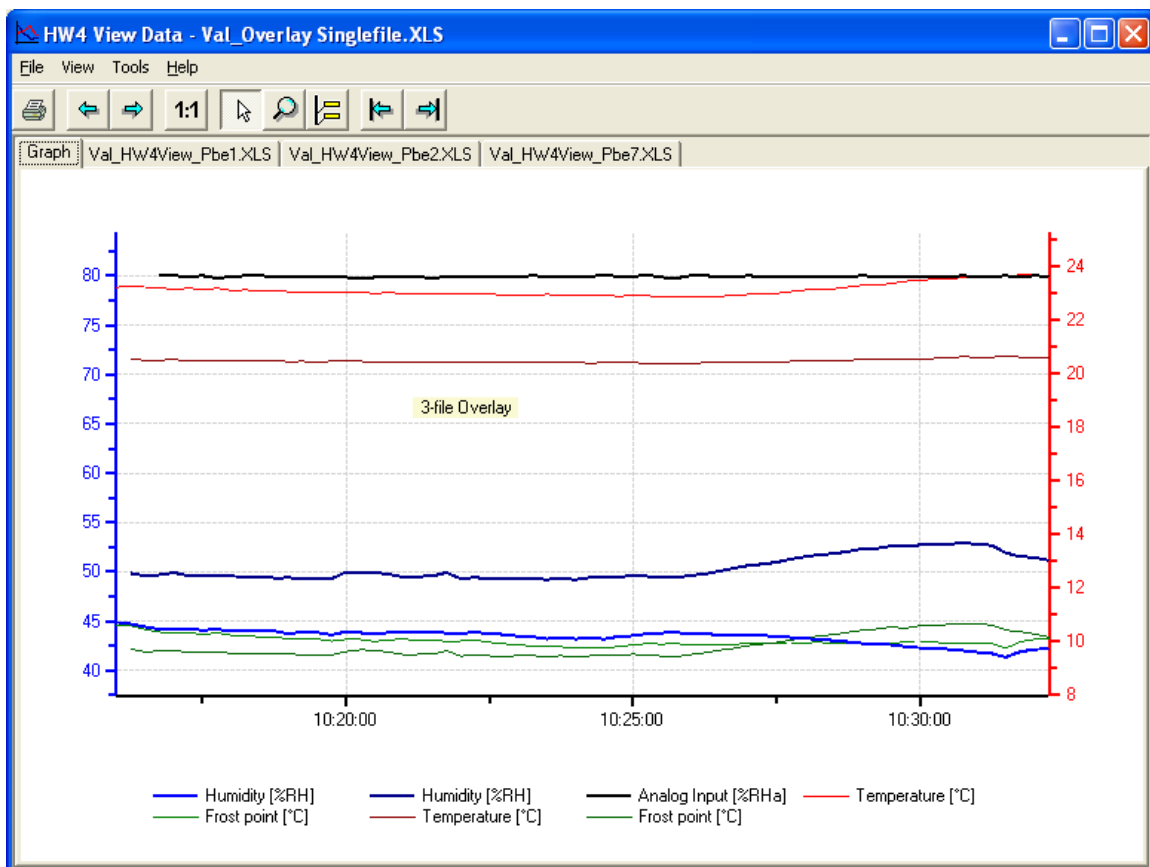
## 22.2 View Data menu bar

### 22.2.1 File

- **Overlay another file:** this menu item is available only with HW4 Professional and allows bringing several log files into a single graph (the maximum number of files depends on the size of the files). Note that the files to be overlaid must be present on the PC (if necessary, begin by copying the desired files from the logger to the PC). The files being overlaid can be a mixture of the LOG and XLS format.

Note: Files recorded with the HygroLog NT can be started all at the exact same time. By contrast, this is not possible when recording several inputs on the PC as illustrated in the picture below.

- The **Save As** command offers the possibility of saving the overlaid data under a new file name. The new file is always in the XLS format and it separately retains the file header and the data from each original file. The new file is not write protected. After overlaying two or more files, it sometimes makes sense to view the data with a common time origin. For instructions, see **Options – Overlay synchronization**.



- **Save:** Saves a file located on the PC to its original location under the original file name. This command will not work when the file is Write protected and therefore cannot be used with the original files created by HW4.
- **Save As:** saves a copy of the file to any location on the computer. The file is always saved in the .XLS format. This command can be used to do the following:

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- Convert a binary log file (LOG) to the text format (XLS) and save the converted file to disk, under a new name (the original LOG file is still available)
  - Save a write protected file under a new name after adding notes, text boxes, etc.
  - Save the results of overlaying several files under a new file name. The new file separately retains the file header and data of each original file.
- **Print:** the effect of this menu item depends which tab (Graph or File Name/Data Table) is selected in HW4 View Data. The command opens the Windows printer form and prints the graph or table on the specified printer.
    - ▶ **Graph:** the log file name is added to the top of the graph when the graph is being printed.
    - ▶ **Data table:** the file header is always printed before the table. It is possible to select with the mouse a number of lines from the data table, prior to printing. Depending on the selection made within the Windows printer form, either all of the data or just the selected lines will be printed.
  - **Sign document:** use this menu item to add your HW4 user name and a comment text to the log file. For authentication purposes you will need to enter your password

**Sign the document**

**Document name** HF5\_Probe\_test1.XLS

**Software** HW4 V2.3.0.26903

**Date** Monday, March 30, 2009

**HW4 user name** A. Smith

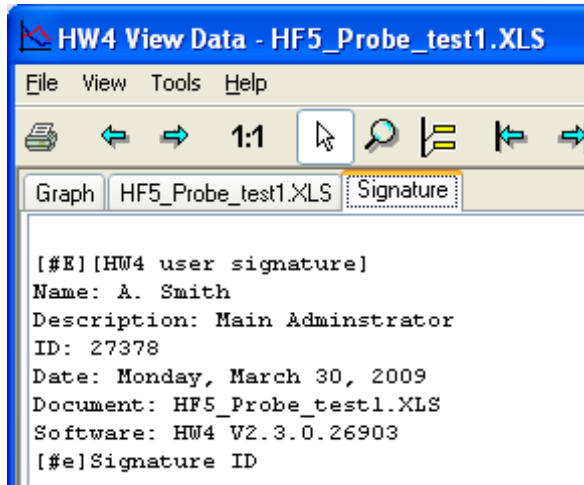
**Password**

**Text**

Sign Cancel

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Signing a log files creates an additional tab in View Data:



- **Exit:** exits HW4 View Data

### 22.2.2 View

- **Initial View**<sup>1</sup>: returns the graph to the view used by HW4 View Data when opening the file
- **Previous View**<sup>1</sup>: after using the magnifying glass or zooming on a graph area several times, returns the graph to the previous view<sup>2</sup>
- **Next View**<sup>1</sup>: changes the graph to the next view when the magnifying glass or zoom has been used several times<sup>2</sup>
- **Graph time window**<sup>1</sup>: used to select the time window corresponding to the graph X axis. The available selections appear in a submenu: Hour, Day, Week, Month or Year. For example, selecting Day, makes the X axis correspond to a 24-hour time window.
- **Next time window**<sup>1</sup>: used to increment the origin of a time window (X axis) by one time window unit. For example, if the graph is displaying a week worth of data, this command changes the graph to the following week.
- **Previous time window**<sup>1</sup>: used to decrement the origin of a time window (X axis) by one time window unit. For example, if the graph is displaying a week worth of data, this command changes the graph to the previous week.
- **Toolbar:** shows or hides the toolbar (the toolbar shortcut buttons are used only in graph view and duplicate a number of items of the View menu).
- **Notes:** shows or hides the Notes tab. This tab allows extensive notes to be associated with the log file. To retain these notes, a write protected file should be saved under a new name

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<sup>1</sup> this item is grayed out when the Graph tab is not selected

<sup>2</sup> this item is context sensitive and is grayed out when not applicable

### 22.2.3 Tools

• **Merge the overlays** <sup>1</sup>: when several log files have been opened using the HW4 View Data File menu and Overlay another file, this menu item merges the files into a single file (single data table and a single graph). Merging the overlays should be used only when there is no overlapping time between the log files (otherwise the merge results will not make sense). The new file created with this command can be saved in .XLS format, under a new name, using **File – Save As**.

<sup>1</sup> This menu item is available only with HW4 Professional

#### Example:

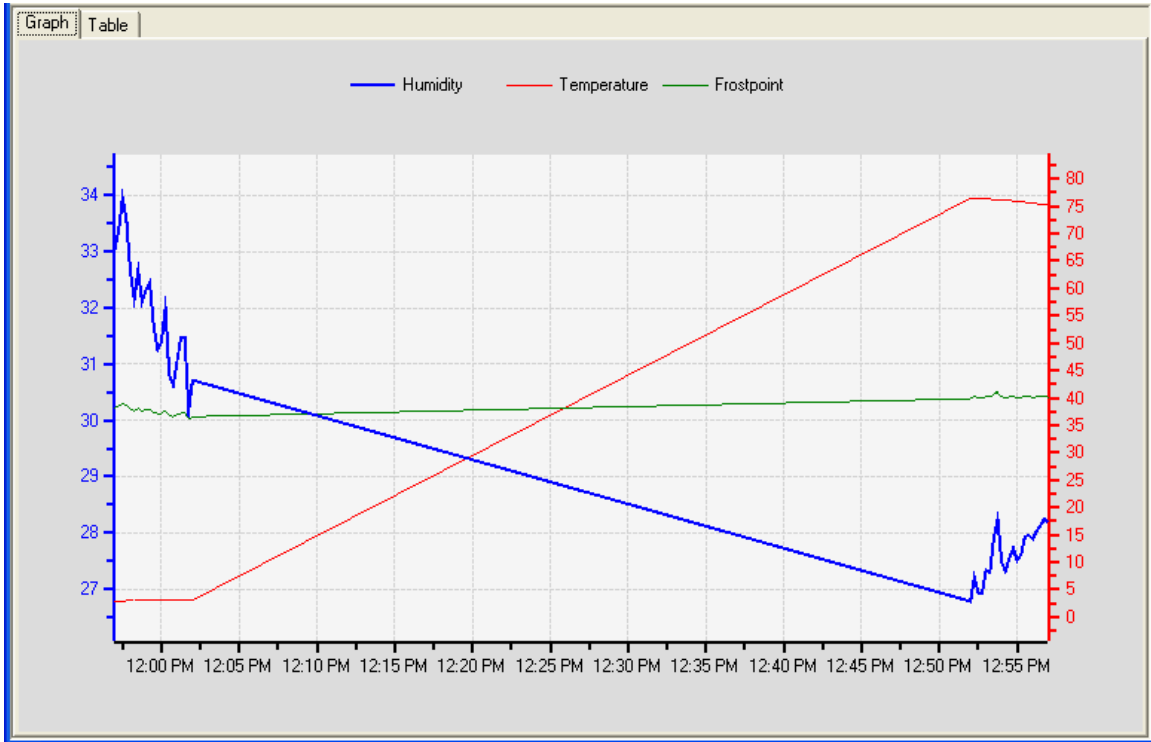
Two log files are overlaid into a single graph, prior to being merged into a single file.

Note: the recording time of the two files does not overlap.



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The results of merging data from the same two log files into a single file:



The two tabs with the original file names have been replaced with a single tab labeled Table. Data points that were initially separated by a time interval are now joined.

**Note:** The header of the merged file is the header of the first file that was opened. The headers of the other files are lost. For example, if the other files have alarm settings that are not the same as the first file, this information will be lost.



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• **Overlay synchronization**<sup>1</sup>: when the data from different files was not all recorded starting at the exact same time, it is sometimes useful to use a common time origin for viewing view all traces after overlaying the files in a single graph. The effect of this menu item is to shift some of the traces data along the graph time (X) axis. The actual time corresponding to a number of data points is lost as far as the graph is concerned, but this can be reversed.

<sup>1</sup> This menu item is available only with HW4 Professional

This command opens the following sub-menu:

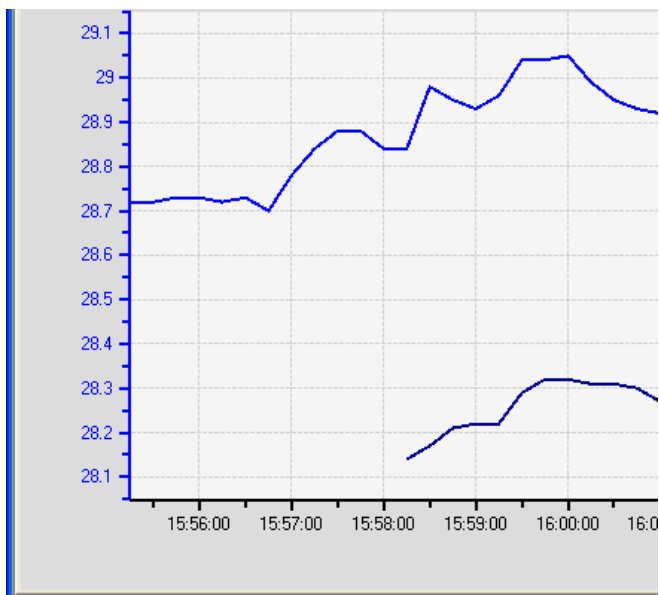
- Earliest time
- Hour
- Day
- Week
- Month
- Year
- Undo

Earliest time: causes HW4 to use the earliest time found in the log files as a common time origin for all data in the graph.

Hour, Day, Week, Month or Year: causes HW4 to use the top of an hour (such as 11:00) or the beginning of a day, week, month or year as the common time origin for all data. Using any of these selections makes sense only when the log data spans a sufficient length of time. For example, do not select Day if the log data does not cover more than a day.

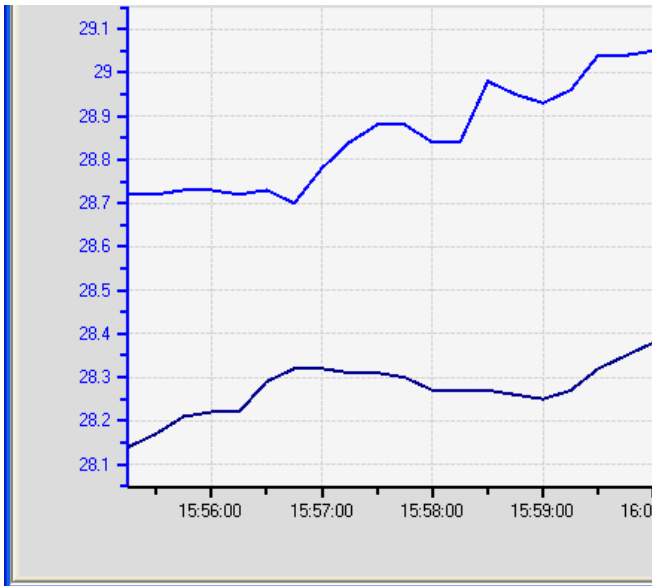
Undo: reverses the current synchronization and must be used before applying a different synchronization method.

Example: Initial result after overlaying two files started at a different time



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After synchronizing the files based on “earliest time”, both traces start at the exact same time.



- **Statistical data:** this menu item opens a new tab in HW4 View Data that displays the number of data points, minimum, maximum, average and standard deviation for each parameter that was recorded. A sub-menu offers the choice of displaying statistical information only for the data currently shown on the graph (for example after zooming) or for an entire log file. When the graph consists of more than one log file (overlays), all of the data is being used regardless of its origin.

Mean kinetic temperature: this additional data element is given only for temperature and uses the value of activation energy entered in HW4 Global Settings – Language / Unit System tab.

```

Graph 70011053.LOG Statistical data
70011053.LOG
Process description: HygroGen / HygroClip 35/80/10/35
Device name: HyGen NT3
Firmware version: V1.2b
Device serial number: 0034277001
Type: V2.0/33220033
Total: 61 Data Points

Humidity %RH
Minimum: 21.68 (11/24/2006 18:26:05)
Maximum: 21.73 (11/24/2006 18:26:55)
Average: 21.690
Standard deviation: 0.008

Temperature °C
Minimum: 22.99 (11/24/2006 18:26:55)
Maximum: 23.07 (11/24/2006 18:26:25)
Average: 23.035
Standard deviation: 0.019
Mean Kinetic Temperature: 23.035

```

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When high and low alarm values have been programmed for an input, each individual occurrence of an alarm condition is reported in a separate block (Alarm 1, Alarm2, etc.). A separate block is also used for each recorded parameter, even when alarm conditions occur simultaneously. Contiguous data points which are out-of-limits values are reported as one block. Statistical information is provided for each block.

```

Alarm 1
Humidity
Number of data points: 9
From: 10/18/2005 14:54:00
To: 10/18/2005 14:56:00
Minimum: 47.75 (10/18/2005 14:56:00)
Maximum: 88.71 (10/18/2005 14:54:30)
Average: 71.410
Standard deviation: 14.922

Alarm 2
Temperature
Number of data points: 4
From: 10/18/2005 14:54:00
To: 10/18/2005 14:54:45
Minimum: 25.98 (10/18/2005 14:54:00)
Maximum: 28.59 (10/18/2005 14:54:30)
Average: 27.483
Standard deviation: 1.093

```

- **Graph settings:** this menu item opens the HW4 Global Settings form with Graph Settings Tab selected. For details, see Settings and Tools, HW4 global settings.

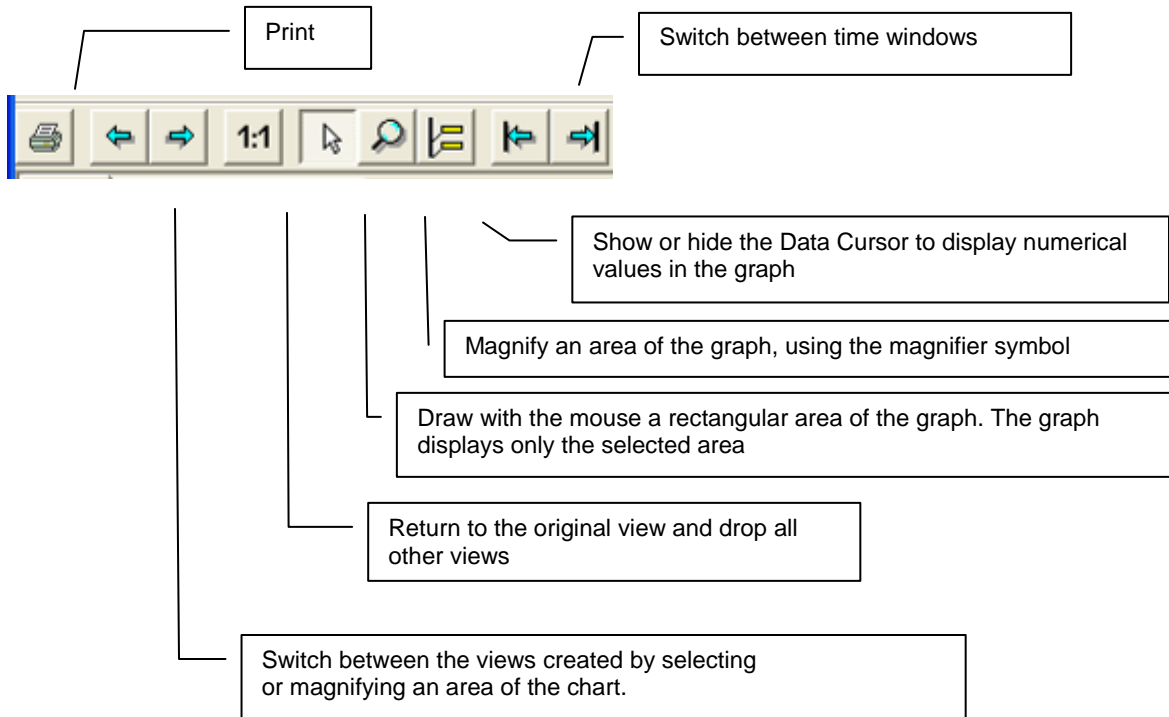
Note: any change made here to the graph settings will affect all graphs, including the on-line graph

#### 22.2.4 Help

- **HW4 Help:** opens HW4 Help.
- **About HW4:** displays the version number and ID number of HW4.

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### 22.3 View Data Toolbar

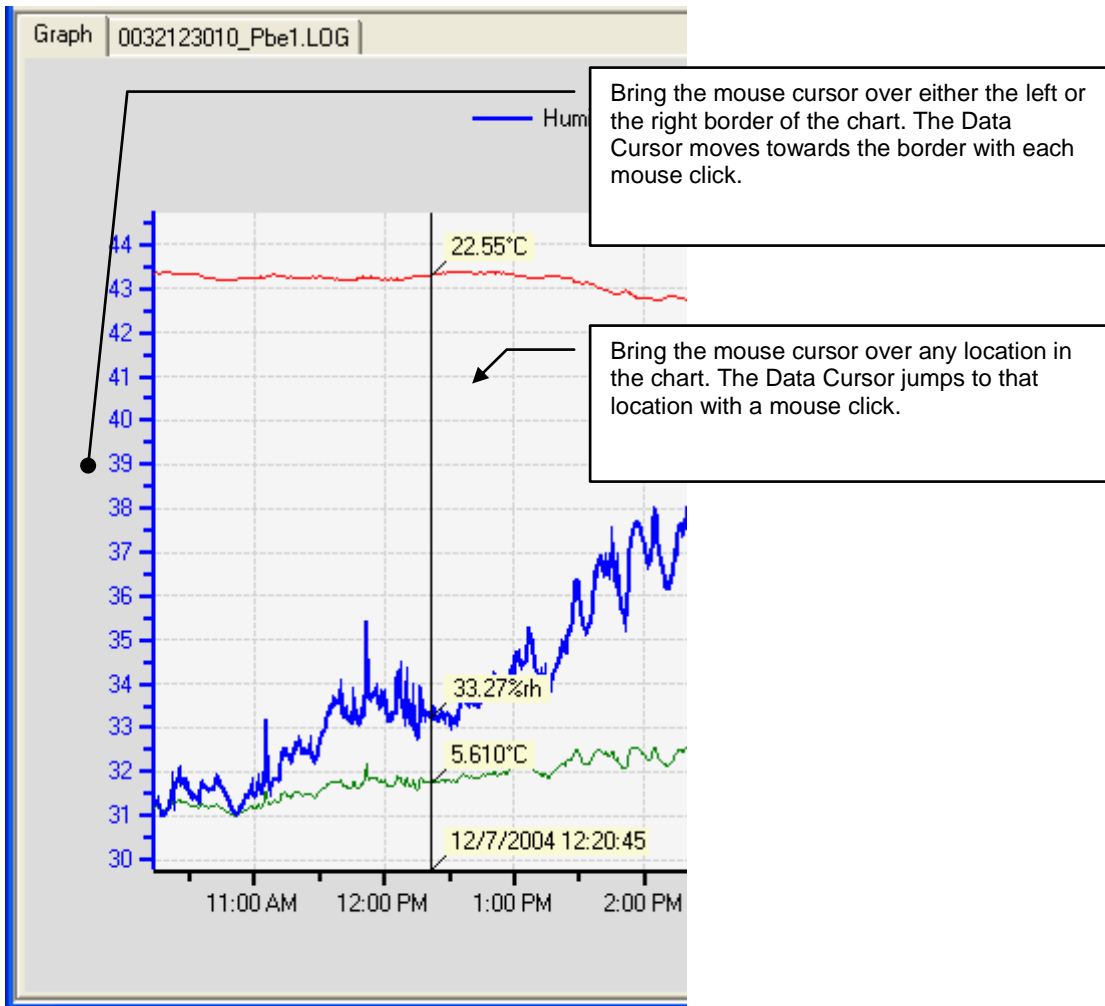


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## 22.4 Graph Tab

### 22.4.1 Using the Data Cursor

In the toolbar, left click on the Data Cursor button. The Data Cursor appears as a vertical bar on the graph. Labels appear next to the data cursor to display numerical values.

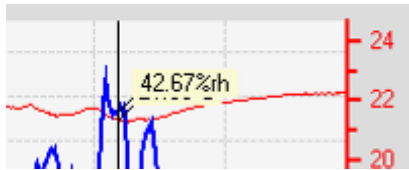


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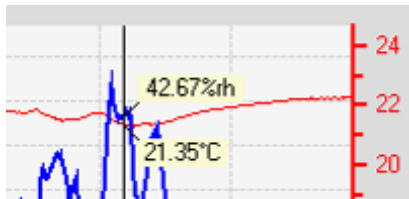
### 22.4.2 Displaying hidden data labels

When two traces on the chart are close one to the other, it may happen that the data labels attached to the Data Cursor are on top one of the other. Left clicking with the mouse on any visible label makes the label move 90° clockwise and can be used to uncover a hidden label.

a) The temperature data label is hidden behind the humidity data label



b) Left click with the mouse on the humidity data label. The temperature data label becomes visible.



### 22.4.3 Selecting which traces are displayed by the graph

Right clicking with the mouse over any area of the graph opens the following menu:

- Insert text box (see Adding text notes directly in the graph, further down)
- Show all traces: displays all available traces on the graph

To select a trace, bring the mouse cursor over one of the chart traces. The cursor changes to a hand. Right click with the mouse to select the trace. The color of the trace changes and the following menu opens:

- Hide this trace
- Show this trace only
- Show alarm band: shows on the graph the alarm settings (if any) for the selected trace. The alarm band can be displayed only for one trace at a time. The alarm band appears as two shaded areas of the same color as the trace. To hide, deselect the menu item.
- Attach text/data box (see further down)
- Show all traces

Note: showing the alarm band for one of the traces usually results in a different scale.

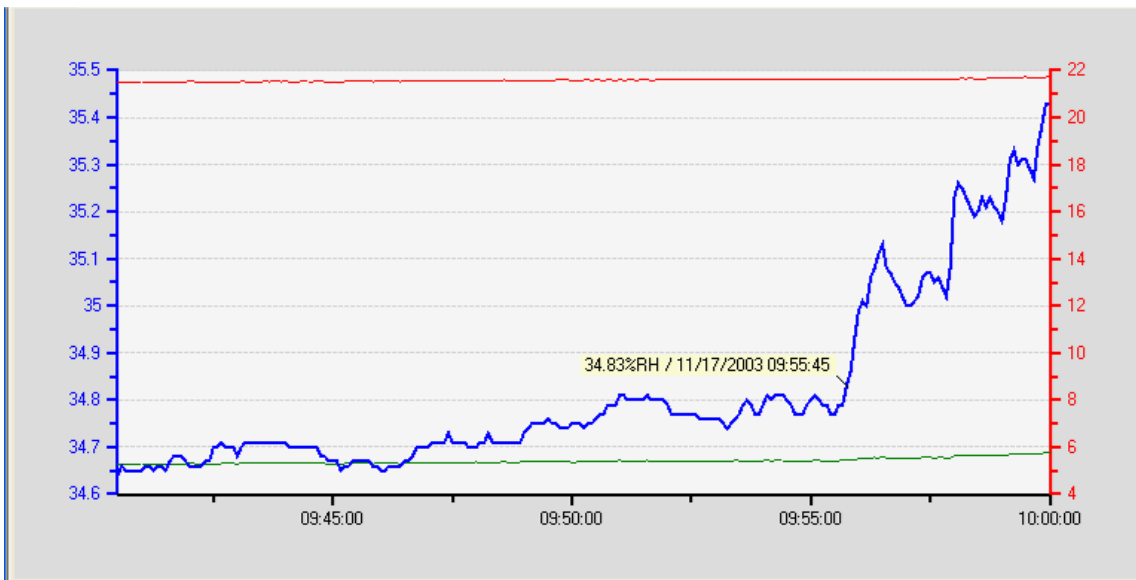
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#### 22.4.4 Attaching a text / data box to a trace

Bring the mouse cursor close to a trace. Right click with the mouse when the cursor changes to a hand. Doing this selects the trace and also opens a small menu box.

The menu item Attach Text/Data Box creates a text / data box that is attached to a specific location of the selected trace. Upon selecting this menu item, the mouse cursor changes to a cross. By default, HW4 fills the text box with data corresponding to the location of the mouse cursor. Move the mouse cursor (cross) to any location on the trace. The data in the box changes as the box moves along the trace.

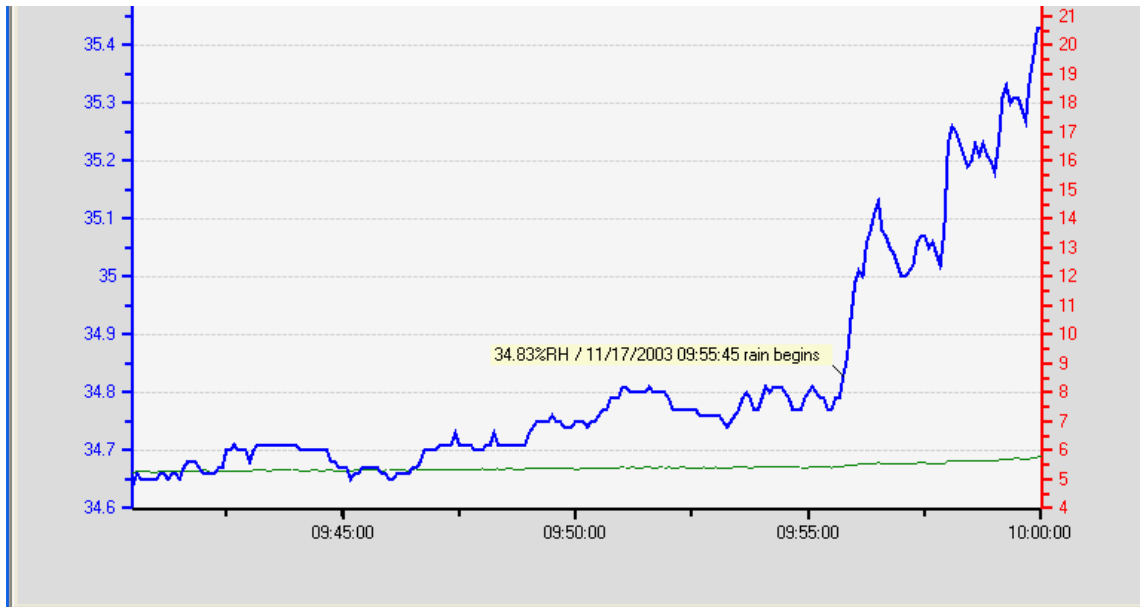
To attach the text box, left click with the mouse when the cursor is at the desired location. The mouse cursor jumps inside the text box and the text inside the box is highlighted (edit mode). Left click with the mouse to edit the contents of the box. Use the keyboard arrow keys to move the cursor to a location where text is to be inserted or added. When done, left click with the mouse anywhere in the graph.



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Bringing the mouse cursor over the text box makes the cursor change into a hand. At that time, right clicking with the mouse opens another menu:

- Edit text box: use to add text after the numerical data or to replace the numerical data with text
- Delete text box
- Orientation: use one of the available options to place the text box at a convenient location



#### 22.4.5 Adding a text note directly in the graph

To create a text note that is not attached to a specific trace, use the following two steps:

a) Create and position the text box: bring the mouse cursor to the location of the graph where you want to add a text note. Right click with the mouse. This opens a small menu. In this menu, select Insert Text Box. The mouse cursor changes to a cross and a textbox is created with the text: "Enter text here". Move the cross to the desired location of the text box and left click with the mouse.

b) Enter the text: right click with the mouse on the text box. This opens a small menu. Select Edit Text Box and type the text in the blue area. When done, left click with the mouse

#### 22.4.6 Deleting a text note or text/data box

Make sure that the Data Cursor is not visible. Bring the mouse cursor over the text/data box. The cursor changes to a hand (the hand appears only when the data cursor is not visible). Right click with the mouse. This opens a small menu. Select Delete Text Box and left click with the mouse



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## 22.5 Data Table / File Name Tab

Clicking on the file name tab, displays both the contents of the file header (top of the form) and the data in the form of a table (bottom of the form). Values that correspond to an alarm condition (if any was specified for the probe in Device Manager) are shown over a red background.

Graph: 0032123010\_Pbe2.LOG

[#U]User  
RIC  
A. Smith  
160 E. Main Street  
11743  
Huntington  
(631) 427-3898  
USA

[#I]Device name  
RIC Demo2

[#P]Process type

Number	Date	Time	Humidity	Temperature	Frost point
1322	12/7/2004	15:45:45	39.44	20.11	5.90
1323	12/7/2004	15:46:00	39.54	20.07	5.90
1324	12/7/2004	15:46:15	39.67	20.07	5.95
1325	12/7/2004	15:46:30	39.64	20.04	5.91
1326	12/7/2004	15:46:45	39.71	20.01	5.91
1327	12/7/2004	15:47:00	39.78	20.00	5.93
1328	12/7/2004	15:47:15	39.84	19.97	5.92
1329	12/7/2004	15:47:30	39.86	19.97	5.93
1330	12/7/2004	15:47:45	39.85	19.97	5.92
1331	12/7/2004	15:48:00	39.92	19.97	5.95
1332	12/7/2004	15:48:15	39.97	19.91	5.92
1333	12/7/2004	15:48:30	40.04	19.90	5.93
1334	12/7/2004	15:48:45	40.07	19.90	5.94
1335	12/7/2004	15:49:00	40.13	19.91	5.97
1336	12/7/2004	15:49:15	40.07	19.89	5.93
1337	12/7/2004	15:49:30	40.07	19.89	5.93
1338	12/7/2004	15:49:45	40.10	19.89	5.94

## 22.6 Working with log files and graphs (How To)

- [Superimpose several log files within a single graph](#)
- [Merge several log files into a single file](#)
- [Use a common time origin when displaying log files within a single graph](#)
- [Display statistical data](#)
- [View numerical data directly within a graph \(Data Cursor and Data Labels\)](#)
- [Display a data label that is hidden behind another label](#)
- [Attach a text or data box to a trace within a graph](#)
- [Add a text note to a graph](#)
- [Delete a text note or a text/data box](#)
- [Select which trace to display in a graph](#)
- [Display in a graph the alarm band corresponding to a trace](#)
- [Make a copy of a file in LOG format, converted to the text format \(XLS\)](#)
- [Sign a log file](#)

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## 23 ALARM INDICATION & REPORTING - Overview

### 23.1 Standard alarm notification (all HW4 versions)

When a device detects an alarm condition, all versions of HW4 give a visual notification on the PC monitor. Device alarm conditions are defined when configuring the device with Device Manager.

#### 23.1.1 Device tree

Any individual device reporting an alarm condition appears in red in the device tree. Device groups also appear in red when a member of the group reports an alarm condition.



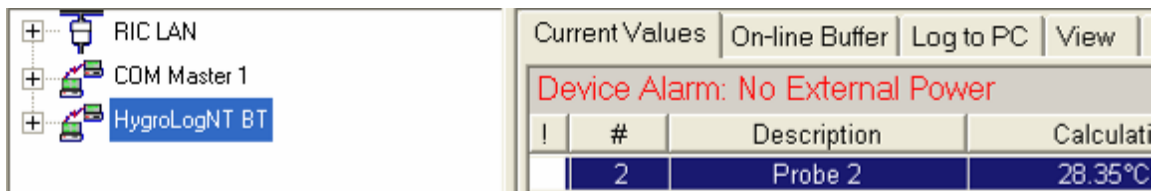
#### 23.1.2 Right Pane - Current Values Tab

Both in Device View and in Group View, values that are out of limits appear in red.

Current Values   On-line Buffer   Log to PC   View   OPC Tags						
!	#	Source	Description	Humidity	Temperature	Calculation
	2	HygroClip Pbe	External 2	69.05%RH +	23.95°C =	17.93°C +
		Logical Input	Contacts 1/2			
		Relay Status	Relay Status			

Note: limit values for each individual device and input are defined in Device Manager

Other types of alarms are also shown in red on the screen as illustrated below:



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## 23.2 Optional alarm notification (HW4 Professional)

In addition to visualizing alarm conditions directly on the PC monitor, HW4 Global Settings can be configured so that the PC will take any combination of the following actions whenever an alarm condition occurs:

### a) Give an acoustic alarm (a single beep)

**HW4 Global Settings Form**

View | General | Language/Unit System | File Locations | Graph Settings | **Alarm Settings** | Events

Trigger an alarm for the following:

<input checked="" type="checkbox"/> No communication with device	Priority	Low	Time delay [hh:mm:ss]	00:00:30
<input checked="" type="checkbox"/> Measured values out of limits or N/A	Priority	High	Time delay [hh:mm:ss]	00:00:00
<input type="checkbox"/> HygroLog NT errors	Priority	High	Time delay [hh:mm:ss]	00:00:00
<input type="checkbox"/> Unavailable log-to-PC or HW4 path	Priority	High		
<input type="checkbox"/> HW4 software errors	Priority	High		
<input type="checkbox"/> Alarm Test	Priority	Low	Interval	Daily

[Run an alarm test now](#)

Time limits for the alarm function

Enable workdays only [Mo-Fr]

Enable during limited hours    Enable time [HH:mm]    00:00    Disable time [HH:mm]    00:00

When an alarm is triggered:

<input type="checkbox"/> Send e-mail	For priority	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
<input type="checkbox"/> Print report	For priority	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
<input checked="" type="checkbox"/> Give acoustic signal on PC (once)	For priority	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
<input type="checkbox"/> Display the alarm table				

E-mail settings

Recipient: plafarie@optonline.net

MAPI

SMTP: mail.optonline.net

OK    Cancel    Help

### b) Automatically display the Alarm Table

**Alarm Table**

File View Options

	Start Time	End Time	Device	Device name	Input name	Alarm Description
!	11/24/2006 8:38 PM		HygroLab 2	HyGen Lab 2	HG Ctrl	No communication with probe

The red exclamation mark denotes an alarm condition that is still ongoing.

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**c) Print a report and/or send an e-mail.**

When an alarm is triggered, it is either printed and / or an email is sent. The printout or e-mail reproduces the information provided in the alarm table for this particular alarm.

### **23.3 Alarm Reporting (HW4 Professional)**

HW4 offers several ways of globally reviewing current and past alarms

#### **23.3.1 Viewing the Alarm Table**

The alarm table can be viewed at any time by clicking on Settings and Tools in the HW4 main menu bar and selecting View Alarm Table.

Note: alarm conditions that occur simultaneously are reported as separate lines in the alarm table. For example, when both the value of temperature and the value of humidity measured by the same probe correspond to an alarm condition, the alarm table displays two separate lines, one for temperature and the other for humidity.

By default, the alarm table contains only alarms that occurred during the current HW4 session. The alarm table offers the choice of viewing past events and of filtering the alarm events in several ways.

See also [Alarm table](#).

#### **23.3.2 Alarm summary report**

An alarm summary report can be printed by selecting File and Print Summary Report from the Alarm Table menu bar. This report reproduces the current contents of the alarm table. Consequently, the contents of the report depend on the selections made as to which information (columns), priority level and dates to display in the Alarm Table.

### **23.4 Additional alarm data**

#### **23.4.1 Log files**

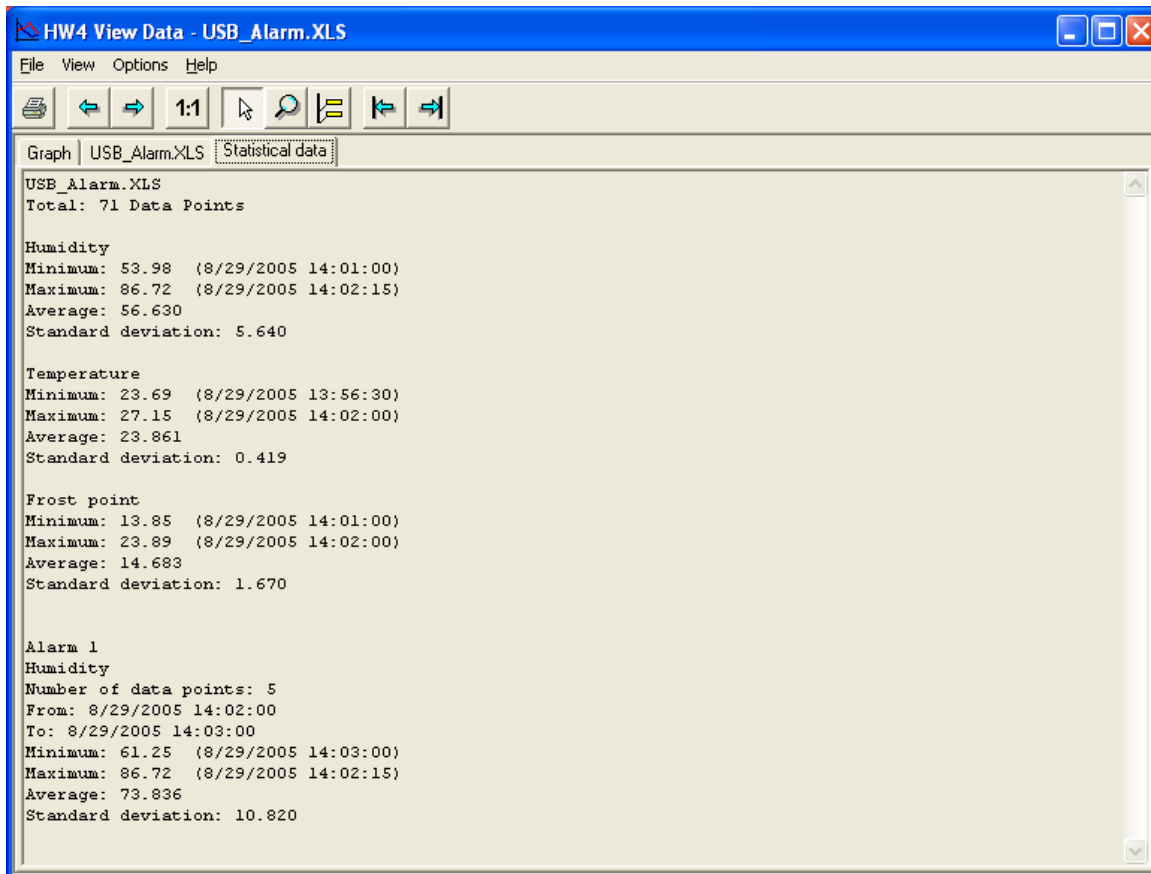
Measurement data, and other information such as the status of logical inputs, can be recorded on the PC and / or locally on a data logger. HW4 offers the possibility of automatically starting a new log file every hour, every day, etc. Within Device Manager, alarm conditions can be defined for any measured or calculated parameter or logical input.

A log file (PC or data logger) can be displayed by HW4 in the form of either a chart or a table. In both cases, values that correspond to an alarm condition can be made clearly visible on the PC screen:

- When data is viewed as a graph, any alarm band that may be associated with an individual parameter can be displayed directly on the graph (limited to one parameter at a time).
- When data is viewed as table, values that are out of limits appear over a red background (however, the red background cannot be printed).

Summarized (statistical) data can also be displayed on the PC screen and printed. As illustrated below, each individual occurrence of an alarm condition is clearly reported in the statistical data as separate block (one parameter and one occurrence per block).

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HW4 offers the possibility of printing log file data either as a graph or as a table. Statistical data can be printed separately.

#### 23.4.2 HygroLog NT Logger event file

The HygroLog NT maintains a file that records the date, time and description of all logger events, including any alarm condition that may have been defined when configuring the logger with Device Manager. This file is split between the internal memory of the logger (up to 170 events) and the flash memory card (unlimited number of events). All past logger events are available to HW4 as long as the flash memory card is not removed from the logger.

HW4 offers the possibility of displaying and printing this file.

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### 23.4.3 HygroClip Alarm event memory and event viewer

The HygroClip Alarm (HCA) features an internal memory that can retain up to 680 events. When the memory is full, the oldest event is erased whenever a new event is recorded. The following events are automatically recorded by the HCA:

- Logical input alarm
- End of logical input alarm
- Relay output alarm
- End of relay output alarm
- Device power up
- Watchdog overflow
- Configuration written to device
- Date/Time prior to being changed
- Date/Time after being changed
- RS-485 address changed
- Event memory erased

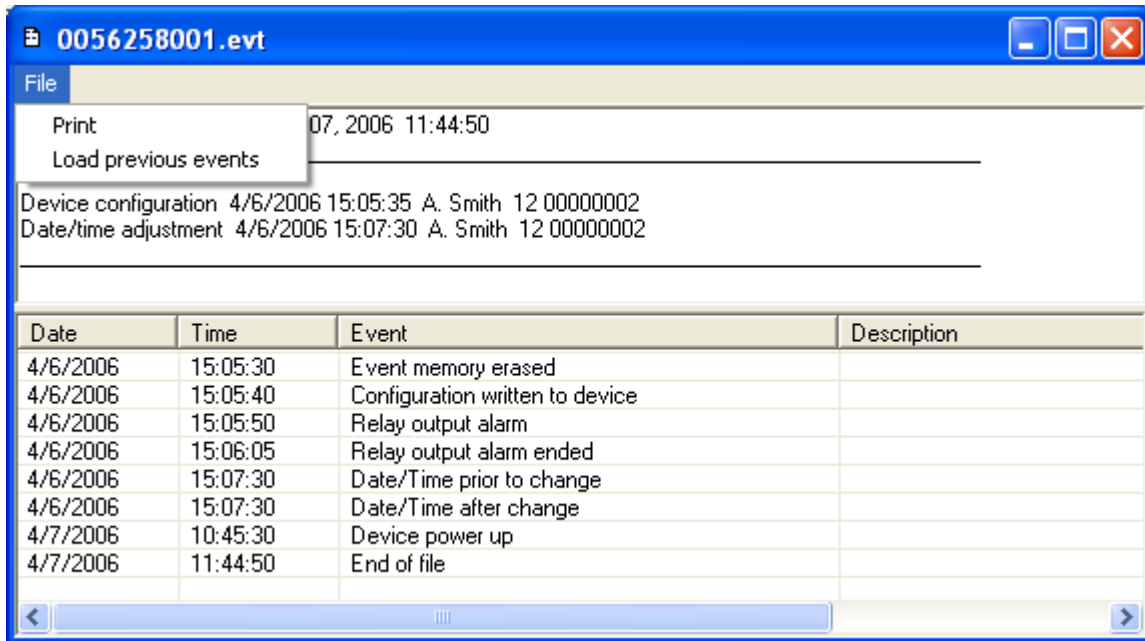
Accessing the events memory requires the HCA to be connected via RS-485 and a master device to a PC with the HW4 software. Using HW4, the Event Viewer is accessed or the event memory is cleared from the HCA device manager.

**Event Viewer:** the Event Viewer displays the most current events.

Date	Time	Event	Description
4/6/2006	15:05:30	Event memory erased	
4/6/2006	15:05:40	Configuration written to device	
4/6/2006	15:05:50	Relay output alarm	
4/6/2006	15:06:05	Relay output alarm ended	
4/6/2006	15:07:30	Date/Time prior to change	
4/6/2006	15:07:30	Date/Time after change	
4/7/2006	10:45:30	Device power up	
4/7/2006	11:44:50	End of file	

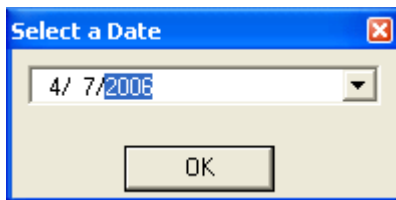
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**File:** the file item is located on the Event Viewer menu bar:



**Print:** prints the current contents of the event viewer to a printer or to a file.

**Load previous events:** opens a date selection box and allows loading in the viewer events from a previous day (this operation can be repeated several times).



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## 24 ERES REGULATORY COMPLIANCE (HW4 Professional)

### 24.1 Required settings and selections

The following settings and selections are required in order to comply with FDA / GAMP regulatory requirements regarding electronic records, electronic signatures (ERES) and the tracking of software problems.

- **Main Screen Menu Bar – Users and Passwords:** create at least one user with administrative rights.
- **HW4 Global Settings – General Tab:** Enable system monitoring (tracking of software problems)
- **HW4 Global Settings – Events Tab:** Enable authentication stamps and enable the monitoring of user events.
- **HW4 Global Settings – Events Tab:** enable protocols (see Record keeping by HW4)
- **Device Manager – User Information Form:** put a check mark in the box labeled “include in log file”
- **Device Manager – Keypad Form:** disable the MENU key of the HygroLog NT to prevent unauthorized or undocumented operations.
- **Log file type:** select the file extension LOG for the log files (measurement data) recorded either with HW4 on the PC or with the HygroLog NT. For the HygroLog NT, the file type is selected from Device Manager – Memory Card. For the files recorded by HW4 to the PC, the selection is done in the Log to PC tab on the Main Screen at the time the file name is entered.

### 24.2 Electronic records

In compliance with regulatory requirements regarding electronic records, electronic signatures (ERES) and the tracking of software problems, HW4 maintains a number of event files and protocols. To effectively comply with ERES regulatory requirements, both types of record must be enabled in **HW4 Global Settings**. Details on the event files and protocols are provided in the “**Record keeping**” section of this manual.

### 24.3 Log File Format

Both HW4 (direct data logging to the PC) and the HygroLog NT offer the choice of two different types of file format to record the measured data. Both file types have two main sections: the file header and the measurement data.

- **Binary Files (LOG):** the header section of this type of file can be read with a regular text editor. As opposed to this, the data section is in binary format and cannot be read with a text editor or imported into a program such as Microsoft Excel. Both the header and data sections are protected against alterations. If the file contents are somehow modified, HW4 will display an error message when trying to open the file.

**For maximum protection of the recorded data and to comply with ERES regulatory requirements, use the LOG file type.**

- **Text Files (XLS):** these files are entirely in text format and can be read with a regular text editor. This type of file is easily imported into Microsoft Excel. Like all the other files created by HW4, files with the XLS extension are saved with the “Read Only” attribute. This attribute provides a protection against inadvertent file operations such as file delete, file move and saving the file under the same name and location (eventually after altering the file contents). Since it is possible to remove the “Read Only”



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attribute, this attribute does not provide protection against intentional alterations. **HW4 does not detect alterations to a file with the XLS extension.**

As an additional protection, HW4 keeps track of the date and time when a log file is created or copied to the PC. This information is kept in the protected user event file and can be compared with the file creation / file modification date and time recorded by Windows.

Note: the HygroLog NT automatically gives each log file a name comprised of the last 4 digits of the logger serial number, followed by the input number and a sequential run number.

## 25 RECORD KEEPING - Overview (HW4 Professional)

In compliance with FDA / GAMP regulatory requirements regarding electronic records, electronic signatures (ERES) and the tracking of software problems, HW4 maintains the following records when enabled to do so in HW4 Global Settings:

### 25.1 Event Files

Both HW4 and the HygroLog NT maintain a number of files to keep track of major events. With the exception of the HW4 event file (extension ERR), these files are protected. Altering the contents of these files will cause any line that has been modified to appear on a red background when the file is opened with HW4. By default event files are located in the directory **C:\Documents and Settings\your Windows login name\Application Data\ROTRONIC\_HW4EVENT**.

#### 25.1.1 HW4 events

A text file with the extension ERR is generated whenever HW4 encounters a software execution problem. The HW4 Event files are not directly useful to the HW4 user. These files are meant to be sent to the manufacturer and hold information useful to ROTRONIC for troubleshooting software problems. The file name consists of the text ErrorHW4Event followed by the date and time.

Example: ErrorHW4Event2005\_9\_18\_11\_58\_31.ERR

To enable HW4 to keep track of software problems, place a check mark in the box labeled **Enable System Monitoring**, located in **HW4 Global Settings – General tab**.

#### 25.1.2 User events

A user event file with the extension EVT is created by HW4 as soon as the very first session begins.

The file name consists of the text HW4USER followed by the year.

Example: HW4USER\_2005.EVT

To the purpose of limiting the size of individual files, HW4 starts a new user event file at the beginning of each calendar year. Data from several years can still be reviewed on the screen and printed using the user events form.

To enable HW4 to keep track of user events, place a check mark in the box labeled **Enable Monitoring of User Events** located in **HW4 Global Settings – Events tab**.

A separate record with date and time is entered in the user event file for each event listed in the table below:

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Event File Text	Event
Start HW4 ID#	HW4 ID # started
User logon	A legitimate user has logged on correctly
Log function programmed	The log function of input # has been programmed
Protocol generated	Protocol # has been generated
Authentication stamp	Checksum of protocol #
Configuration written to device	New or existing configuration written to device #
Error during probe adjustment	The probe connected to input # could not be adjusted due to an error
Probe adjusted	The probe connected to input # was adjusted
Device adjusted to PC date and time	The date and time of device # was adjusted to the PC date and time
New user created	A new user was created
Old RS address	RS-485 address of device # prior to change
New RS address	RS-485 address of device # after the change
Language file uploaded to device	A new or existing internal language file was uploaded to device #
File deleted from PC	File # was deleted from the PC
File deleted from logger	File # was deleted from the logger memory card
User data / rights changed	User data or rights changed
Exit HW4	Exit HW4
Device deleted	Device # was deleted from the device tree
User deleted	User # was deleted
Log-to-PC started	Data recording to the PC started for input #
Log-to-PC stopped	Data recording to the PC stopped for input #
Log file path and name	Log file path and name
HW4 Global Settings saved	The HW4 Global Settings were either changed or written over

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Event File Text	Event
Logger data file saved to PC	Logger data file # was saved on the PC
Logger data file downloaded	Data file # was read from the logger
Logger configuration saved to PC	The logger configuration file # was saved to the PC
Logger configuration downloaded	The configuration of logger # has been read
Logger event file saved to PC	Logger event file # has been saved on the PC
Logger event file downloaded	The event file of logger # has been read
Authentication stamp of language file not valid	The HW4 language file is not a factory original
Unauthorized user tried to log on	An unauthorized used tried to log on
User could not log on (password error)	An invalid password was entered
User log off	The current user logged off

### 25.1.3 Logger events

The HygroLog NT maintains an internal event file with the extension EVT. No particular configuration is required to enable this feature.

Part of the procedure to ensure conformity to ERES regulatory requirements is to disable the MENU key on the HygroLog NT keypad. The MENU key is the only one that can be used to make changes to the logger. Therefore, the events recorded by the HygroLog NT are normally the result of an interaction with the HW4 software. When the MENU key is not disabled, a limited number of events are recorded in the logger event file and no entries are made in the logger event file header. The two tables below provide a list of the events tracked by the HygroLog NT.

The logger event file is split between the internal memory of the logger (up to 170 events) and the flash memory card (practically unlimited number of events). HW4 offers the possibility of downloading, opening and printing the entire file contents. All past logger events are available to HW4 as long as the flash memory card is not removed from the logger. The serial number of the logger is used as the file name.

Example: 1111111111.EVT

The logger event file consists of a file header and a file body. The file header provides the following information:

- Most recent programming of the log function: programming date and time, user and HW4 product ID
- Most recent device configuration: date and time, user and HW4 product ID
- Most recent adjustment to the PC date and time: date and time, user and HW4 product ID

An individual record with date and time is entered in the event file body for each event listed in the table below:

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Event File Text	Event (interaction with HW4)
Power up	The battery was inserted or the instrument powered down and up after an internal problem
Watchdog overflow	Internal instrument error (normally should not occur)
Writing device configuration	New or existing configuration written to logger
Memory card removed	While recording data, the logger could not find the memory card. The data was written to the EEPROM and are not yet lost
Memory card full	No free memory space on the memory card
New memory card inserted	The memory card was replaced while data was being logged. The data will be split between two different memory cards. Possibly, some data has been lost.
Humidity adjusted	Humidity adjustment of the probe connected to input #
Temperature adjusted	Temperature adjustment of the probe connected to input #
Logging started	Start recording data from input #
Logging stopped manually	Data recording of input # ended before the programmed stop time
Logging ended automatically	Data recording of input # ended at the programmed stop time
Out-of-limits value detected	An out-of-limits value was newly detected on input #
Battery almost empty	Battery voltage dropped below 6.5V
Battery empty	The battery is empty and the logger has powered itself off (keeping power up could result in erroneous data or loss of data)
Beginning accumulator charge	Starting to charge the rechargeable battery
Accumulator charge ended	Rechargeable battery full
MFG command	<i>Reserved for the factory</i>
Lost data, memory card not ready	While recording data, the logger could not find the memory card. The data could not be written to the EEPROM, and was lost
HygroClip probe connected <sup>1</sup>	A HygroClip probe was connected to input #
HygroClip probe disconnected <sup>1</sup>	A HygroClip probe was removed from input # or the input can no longer communicate with the probe
External power connected	The A/C adapter was connected and is being powered
External power removed or faulty	The A/C adapter was disconnected, or failed, or is not being powered
Device time changed / adjusted	Device date and time prior and after adjustment (up to firmware v1.1d only)
Prior device time	Device date and time prior to change (firmware v1.2a and up)

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Event File Text	Event (interaction with HW4)
New device time	Device date and time after change (firmware v1.2a and up)
RS-485 address changed	The RS-485 address was changed
EEPROM erased	<i>Reserved for the factory</i>
Docking station disconnected <sup>2</sup>	The docking station was disconnected or there is no longer any communication with it
Docking station connected <sup>2</sup>	A docking station was connected and communication was established
Logger language file downloaded	A different internal language file was loaded or the same file was loaded again
Log function programmed	The log function has been programmed for input #
Event file deleted	<i>Reserved for the factory</i>

<sup>1</sup> connection / removal of analog probes is not recorded

<sup>2</sup> only when the docking station has internal electronics

Event File Text	Event (triggered from the Keypad)
Humidity adjusted	Humidity adjustment of the probe connected to input #
Temperature adjusted	Temperature adjustment of the probe connected to input #
Logging started	Start recording data from input #
Logging stopped manually	Data recording of input # ended before the programmed stop time
Prior device time	Device date and time prior to change (firmware v1.2a and up)
New device time	Device date and time after change (firmware v1.2a and up)
Log function programmed	The log function has been programmed for input #

## 25.2 Protocols

Protocols are text files (extension .txt or .doc) that can be generated, opened and printed from within HW4. By default, protocols are located in the directory **C:\Documents and Settings\your Windows login name\Application Data\ROTRONIC\_HW4\DOC**

Protocols are enabled by placing a check mark either in the box labeled “**Enable Protocols**” or in the box “**Display Protocols**” both located in **HW4 Global Settings – Events tab**. When protocols are enabled, HW4 automatically creates the following types of file:

- **HW4 configuration protocol:** a file is created whenever the HW4 Global Settings are changed.

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- **Instrument configuration protocol:** a file is created whenever the Device Manager function of HW4 is used to configure a device / instrument
- **Log function programming protocol:** a file is created whenever the Data Logging function of HW4 is used to program a data logger

Note: HW4 does not create a protocol when data is being logged directly to the PC. However, a record is entered in the user event file whenever log-to-PC is started or stopped. This record includes the date, time, location and name of the log file.

- **Probe adjustment protocol:** a file is created whenever the Probe Adjustment function of HW4 is used to adjust a probe connected to an instrument

In addition to a detailed description of each event, protocol files include the following information:

- Date and time
- HW4 current user
- HW4 version and ID number (product key)

To prevent tampering, HW4 Professional adds an authentication stamp at the end of each protocol. To have HW4 automatically validate the authentication stamp whenever a protocol file is opened from within HW4, place a check mark in the box labeled “**Authentication stamp**” box located in **HW4 Global Settings – Events tab**. When the tracking of user events is enabled:

- Whether protocols are enabled or not, HW4 enters a record of the event in the user event file.
- When protocols are enabled, HW4 enters an additional record in the user event file for cross-reference purposes. This record includes the location and name of the corresponding protocol file. Similarly, the protocol text file includes a reference to the user event file (location and file name).

### 25.2.1 Protocol file names

- **HW4 configuration protocols**

The file name for this type of protocol consists of the text HW4\_Extras, followed by a sequential number generated by HW4. Example of an HW4 configuration protocol file name: HW4\_Extras\_1.txt

- **Instrument configuration protocols**

The file name for this type of protocol consists of the serial number of the instrument followed by the letters CNF and a sequential number generated by HW4. Example of a configuration protocol file name: 1111111111\_CNF\_3.txt

- **Log function programming protocols**

The file name for this type of protocol consists of the serial number of the instrument followed by the letters PROG and a sequential number generated by HW4. Example of a log function programming protocol file name: 1111111111\_PROG\_0.txt

- **Probe adjustment protocols**

The file name for this type of protocol consists of the serial number of the instrument followed by the letters ADJ and a sequential number generated by HW4. Example of a probe adjustment protocol file name: 1111111111\_ADJ\_2.txt

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### 25.3 Cross referencing protocols and event files

By cross referencing the date and time of log files - or the date, time and authentication stamp of the event files and protocols, it is possible to keep track of events and to identify which user was logged in HW4 at the time of the event. Example: cross referencing a probe adjustment protocol with the user event file

a) Open the probe adjustment protocol:

```

PROBE ADJUSTMENT PROTOCOL
-----
Adjustment Date and Time
Date: Friday, November 24, 2006
Time: 20:39:58
-----
Device Information
Device type: HygroClip DI
Device name: DI-4 VAL
Serial number: 0019236002
Firmware: V1.0a
-----
Input 1
LabRoom / 32337246
Parameter to be adjusted: Temperature
Reference value: 20.77°C
1-point adjustment (global offset)

Readings prior to adjustment
Temperature: 20.75°C =
Humidity: 33.64%RH =

Readings after adjustment
Temperature: 20.77°C
Humidity: : 33.64%RH =

Probe adjustment completed
-----
Adjusted by
HW4 User name: A. Smith
User description: Administrator
User ID: 27378
-----
HW4 Information
Version: 2.0.0.31736
HW4 ID: 12 00000002
-----
User event file
C:\ROTRONIC_HW4\EVENT\HW4USER_2006.evt
-----
Authentication Stamp
763BA3AF

```

The following information is located at the end of the probe adjustment protocol:

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- User information
- HW4 information
- User event file: path and name
- Authentication stamp

b) Open the user event file referenced in the probe adjustment protocol:

Date	Time	Event	Description
11/24/2006	20:37:55	Start HW4 ID#	12 00000002 V2.0.0.31736
11/24/2006	20:38:00	User Log on	A. Smith
11/24/2006	20:38:00	Authentication Stamp of language file not valid	C:\Program Files\HW4\Language\English.txt
11/24/2006	20:38:50	Error during probe adjustment	HygroLogNT 0033414009
11/24/2006	20:38:50	Protocol generated	C:\ROTRONIC_HW4\DOC\0033414009_ADJ_0.txt
11/24/2006	20:38:50	Authentication Stamp of protocol	528EB2D1
11/24/2006	20:39:15	Error during probe adjustment	HygroLogNT 0033414009
11/24/2006	20:39:15	Protocol generated	C:\ROTRONIC_HW4\DOC\0033414009_ADJ_1.txt
11/24/2006	20:39:15	Authentication Stamp of protocol	C1B80E27
11/24/2006	20:39:55	Probe adjusted	HygroClip DI 0019236002
11/24/2006	20:39:55	Protocol generated	C:\ROTRONIC_HW4\DOC\0019236002_ADJ_0.txt
11/24/2006	20:39:55	Authentication Stamp of protocol	763BA3AF

Look for the event “Probe adjusted” (in this example, line 10 of the user event file). Since there could be several such events, make use of the date and time of the probe adjustment protocol to find the correct event. Compare the following information with the information located at the end of the probe adjustment protocol: user name, description and group

Lines 10 and 11 of the user event file report that a probe connected to the HygroClip DI S/N 0019236002 was adjusted and that a protocol was generated. The date and time should match the date and time of the probe adjustment protocol. The authentication stamp on line 12 of the user event file should match the authentication stamp of the probe adjustment protocol.

## 26 FILE PROTECTION

The data and record keeping files generated by HW4 are of two types: binary files and text files. Binary files use the file extension LOG while text files use a variety of file extensions: TXT, XLS, EVT, ALR and ERR.

All data and record keeping files created by HW4 are saved with the “Read Only” attribute. This provides a protection against inadvertent file operations such as file delete, file move and saving the file under the same name and location (eventually after altering the file contents). Since it is possible to remove the “Read Only” attribute, this attribute does not by itself provide protection against intentional alterations.

### 26.1 Authentication stamp

HW4 makes use of one or more authentication stamps to verify that a file has not been altered. With the exception of files with the XLS and ERR file extensions all data and record keeping files generated by HW4 are stamped. HW4 will display an error message when opening a stamped file that has been altered.

- o **Binary Files (LOG):** Both the header and data sections are protected by an authentication stamp against alterations.
- o **Text Files (TXT):** The file extension TXT is used for all protocols generated by HW4. These files are protected by a single authentication stamp.
- o **Text Files (EVT):** The file extension EVT is used for all event files (user and device events). Each individual file entry is protected by an authentication stamp.
- o **Text Files (ALR):** The file extension EVT is used for the file holding the HW4 alarm records captured by HW4. Each individual file entry is protected by an authentication stamp.



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## 26.2 Overview

File extension	Usage	Protected
LOG	Log files (recommended format)	YES
XLS	Log files (alternate format)	NO
ERR	Service files used for trouble shooting	NO
TXT	Protocols	YES
EVT	User and device events	YES
ALR	Alarm records	YES

## 27 RELOCATING THE HW4 USER FOLDER

### WARNING:

Relocating the HW4 User Folder may require re-entering your HW4 ID Number, all HW4 users, the HW4 Global Settings and may also require a new search for the devices connected to the PC.

Prior to relocating the HW4 User Folder, be sure to have a record of your HW4 ID Number. When HW4 is running, this information can be found by clicking on Help – About ROTRONIC HW4 in the HW4 main menu bar.

During the initial startup, HW4 automatically creates a user folder named **ROTRONIC\_HW4** folder and several subfolders.

The ROTRONIC\_HW4 folder holds the HW4 configuration data. The subfolders DATA, DATA\_ONLINE, SYS, DOC and EVENT hold the log files (measurement data), protocols, event files and alarm records.

By default HW4 creates the User Folder on drive C of the PC starting HW4 for the first time and uses the following path:

**C:\Documents and Settings\Windows User\Application Data**

*Windows User* is the Windows user account that was logged in at the time HW4 was installed.

Windows automatically gives *Windows User* **exclusive access** to the directory C:\Documents and Settings\Windows User and subfolders.

If for any reason the default path for the HW4 user folder is not either not convenient or suitable, HW4 can be configured to use a different path (see example below).

Example: in order to share the contents of the **ROTRONIC\_HW4** folder between several workstations, the folder can be located on a Windows 2003 server. The server drive where ROTRONIC\_HW4 is located should be mapped to all workstations that will use HW4 and sufficient permissions to the ROTRONIC\_HW4 folder and subfolders must be given by the server administrator to the different workstation users.

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**IMPORTANT:**

- Do not change the name of the HW4 user folder. This name must always be ROTRONIC\_HW4.
- You can change freely the name of any of the ROTRONIC\_HW4 subfolders

Two different methods are available to change the path of the HW4 user folder:

### 27.1 Method 1 (using Windows Explorer)

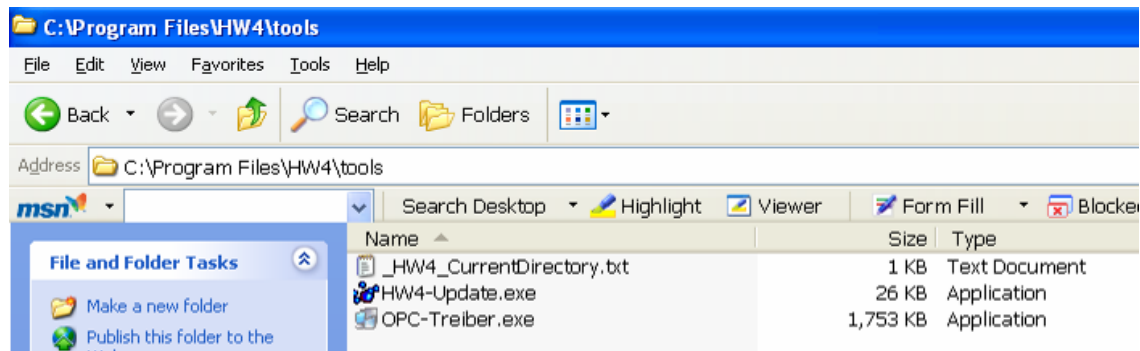
**Note:** Method 1 can be used just after installing HW4 and prior to starting HW4 for the first time or at any time thereafter when HW4 is not running.

**Basic assumptions:**

- HW4 is already installed on the PC or workstation, in the folder C:\Program Files\HW4

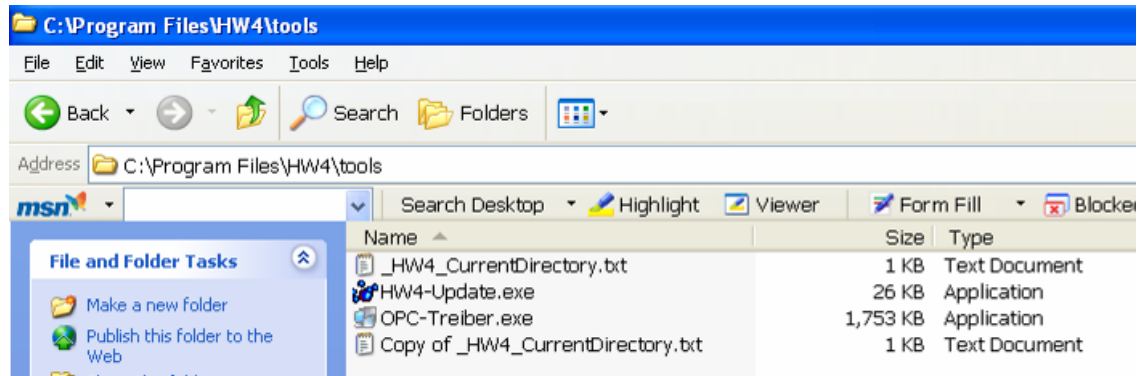
• **Step 1:**

Open the directory C:\Program Files\HW4\tools (created during the installation of HW4).



• **Step 2:**

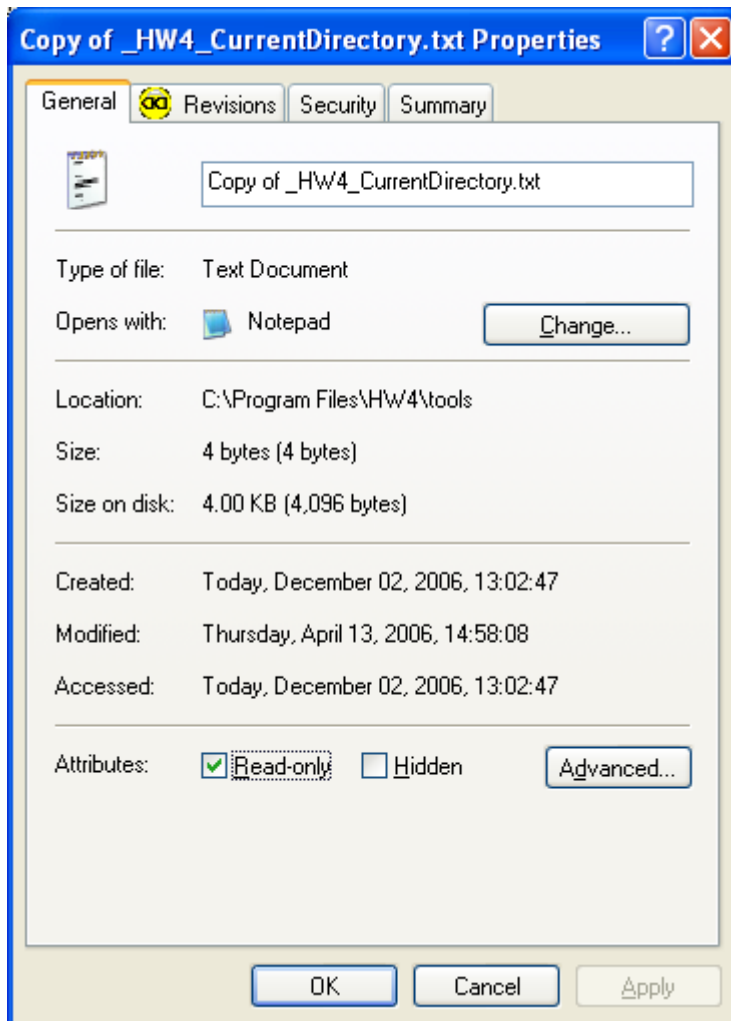
Select the text file **\_HW4\_CurrentDirectory.txt** and copy it in the same directory.



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• **Step 3:**

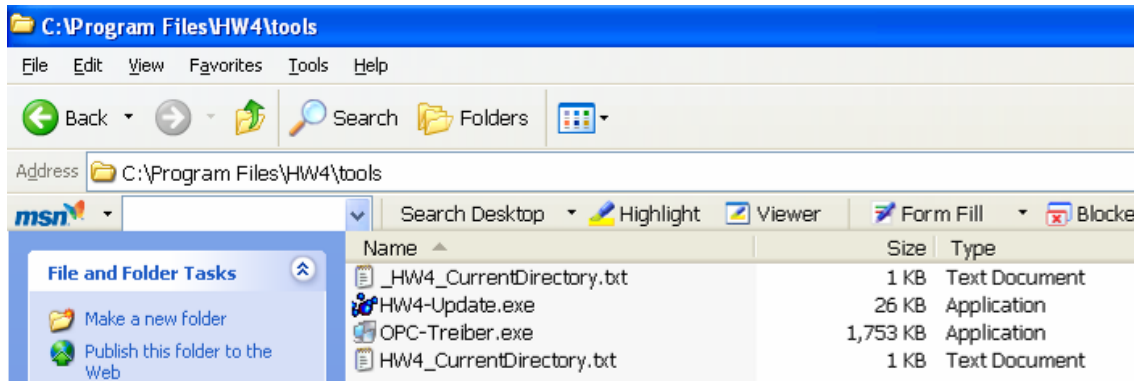
Right click on **Copy of \_HW4\_CurrentDirectory.txt** and select **Properties**. Remove any Read-only attribute that may be present.



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- **Step 4:**

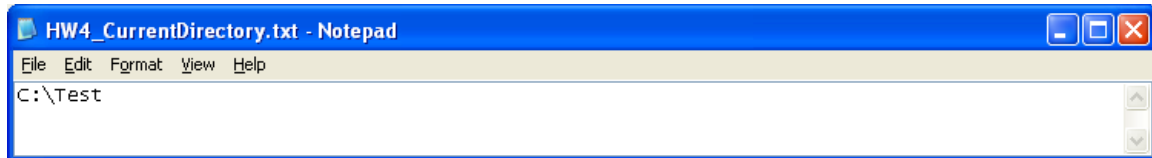
Rename the file copy to **HW4\_CurrentDirectory.txt** (no leading underline).



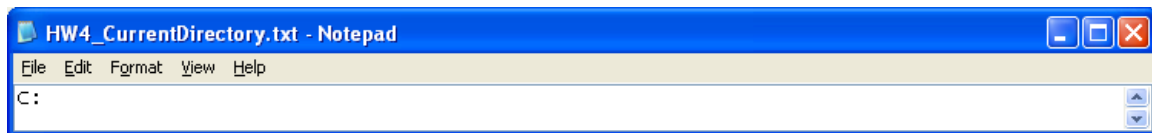
- **Step 5:**

Open **HW4\_CurrentDirectory.txt** with Notepad. Delete the existing text line and replace it with the new path for the HW4 User Folder (**do not put a backslash at the end of the line**).

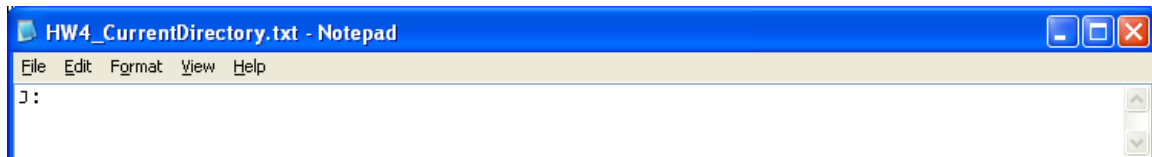
Examples:



End result: C:\Test\ROTRONIC\_HW4



End result: C:\ROTRONIC\_HW4



End result: J:\ROTRONIC\_HW4 (J: is a mapped server drive)

Save and close the file.

- **Step 6:**

HW4 will automatically create a new ROTRONIC\_HW4 and subfolders at the desired location.

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**IMPORTANT:**

- To avoid the inconvenience of a new initial start-up proceed as explained in [Retrieving your previous settings and other data](#).
- If you do not want to retrieve your settings and data, start HW4 and proceed as described in [Initial Start-up](#).
- To make HW4 use again the default location of the ROTRONIC\_HW4 folder (C:\Documents and Settings\Windows User\Application Data), delete the file **HW4\_CurrentDirectory.txt**.

## 27.2 Method 2 (after the initial HW4 start-up)

• **Basic assumptions:**

- HW4 is already installed on the PC and has been started at least one time

• **Step 1:**

In the HW4 main menu bar select Settings and Tools > HW4 Global Settings > File locations.

Note: after the initial start-up, the default location of the HW4 user folder and subfolders is as follows:

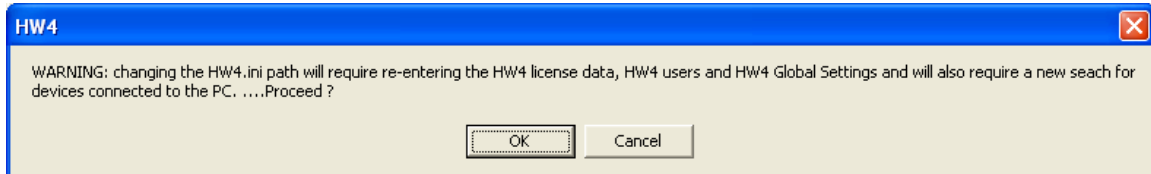
The screenshot shows the 'HW4 Global Settings Form' with the 'File Locations' tab selected. The form is organized into three sections: Measurement Data, Configuration Data, and Protocols and Events. Each section contains several rows of settings, each with a text field containing a file path.

Section	Setting Name	File Path
Measurement Data	Logger Data Files	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\DATA
	Log to PC Files	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\DATA_ONLINE
Configuration Data	User Folder Path	C:\Documents and Settings\admin.ROTRONIC\Application Data
	Device Configuration Files	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\SYS
Protocols and Events	Protocols	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\DOC
	Device Event Files	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\EVENT
	Alarm Records	C:\Program Files\HW4\EVENT
	HW4 Event Files	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\EVENT
	User Event Files	C:\Documents and Settings\admin.ROTRONIC\Application Data\ROTRONIC_HW4\EVENT

At the bottom of the form, there are three buttons: OK, Cancel, and Help.

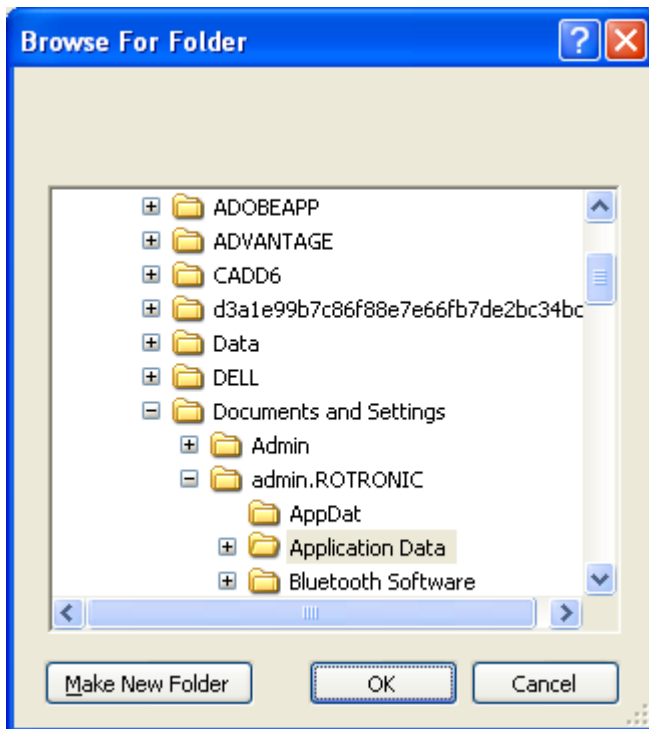
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- **Step 2:** Click on the blue link next to User Folder Path. HW4 issues the following warning:



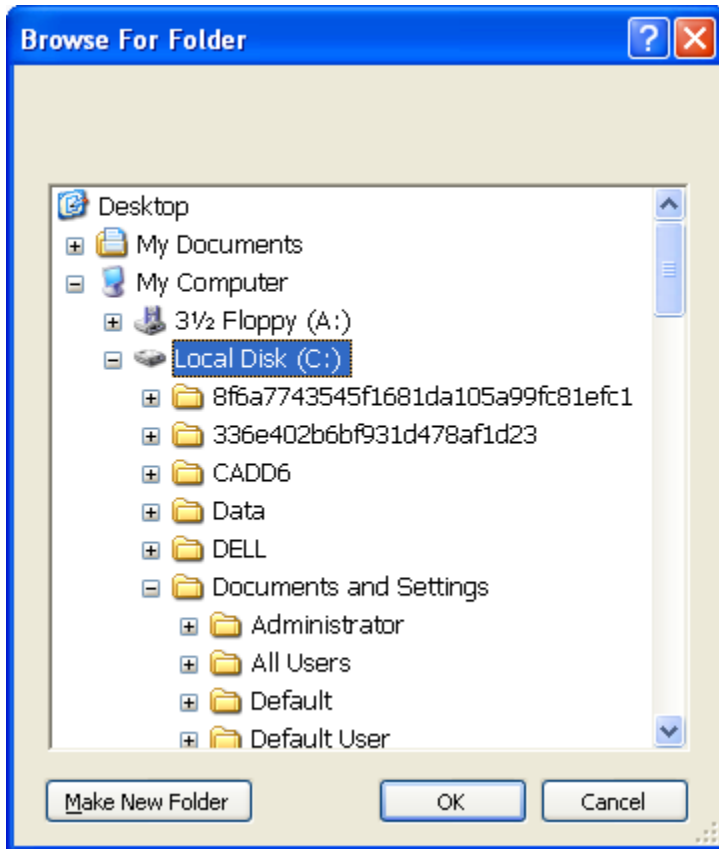
Click on the OK button.

HW4 opens the following box:



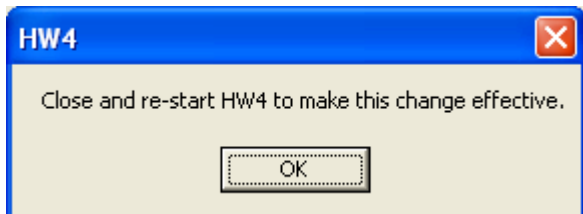
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- **Step 3:** Make the selection pointing HW4 to the desired location of the HW4 User Folder (in this example the root directory of drive C)



Click on the OK button.

The following message box appears. Click on the OK button:



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The HW4 Global settings form changes as follows:

**HW4 Global Settings Form**

View | General | Language/Unit System | **File Locations** | Graph Settings | Alarm Settings | Events

**Measurement Data**

Logger Data Files: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\DATA](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\DATA)

Log to PC Files: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\DATA\\_ONLINE](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\DATA_ONLINE)

**Configuration Data**

User Folder Path: <C:>

Device Configuration Files: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\SYS](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\SYS)

**Protocols and Events**

Protocols: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\DOC](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\DOC)

Device Event Files: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\EVENT](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\EVENT)

Alarm Records: <C:\Program Files\HW4\EVENT>

HW4 Event Files: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\EVENT](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\EVENT)

User Event Files: [C:\Documents and Settings\JPL\Application Data\ROTRONIC\\_HW4\EVENT](C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\EVENT)

OK Cancel Help

Click on the OK button at the bottom of the HW4 Global settings form

• **Step 4:**

**IMPORTANT:** to avoid the inconvenience of a new initial start-up proceed as explained in [Retrieving your previous settings and other data](#).

If you do not want to retrieve your settings and data , start HW4 and proceed as described in [Initial Start-up](#).

HW4 will automatically create a new ROTRONIC\_HW4 and subfolders at the desired location.



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### 27.3 Retrieving your previous settings and other data

After relocating the HW4 User Folder, close but do not restart HW4.

- After closing HW4, open My Computer. Select C: > Documents and Settings > *Windows User* > Application Data. Open the Application Data folder.

*Windows User* is the Windows user account that was logged in at the time HW4 was installed.

Select the folder named ROTRONIC\_HW4. Assuming that the new location of the HW4 User Folder is the root directory of drive C, either copy or move ROTRONIC\_HW4 to C:\ - **do not rename the folder**.

Note: you may have to change the Windows permissions to the folder and subfolder (Security Tab in folder properties).

- Start HW4 again.

In the HW4 main menu bar select Settings and Tools > HW4 Global Settings > File locations:

The screenshot shows the 'HW4 Global Settings Form' with the 'File Locations' tab selected. The form is organized into three main sections: Measurement Data, Configuration Data, and Protocols and Events. Each section contains several rows with labels and corresponding file paths.

Section	Label	File Path
Measurement Data	Logger Data Files	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\DATA
	Log to PC Files	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\DATA_ONLINE
Configuration Data	User Folder Path	C:
	Device Configuration Files	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\SYS
Protocols and Events	Protocols	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\DOC
	Device Event Files	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\EVENT
	Alarm Records	C:\Program Files\HW4\EVENT
	HW4 Event Files	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\EVENT
	User Event Files	C:\Documents and Settings\JPL\Application Data\ROTRONIC_HW4\EVENT

At the bottom of the form are three buttons: OK, Cancel, and Help.

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- Change the path of the different subfolders used to hold data, configuration, protocol and event files. To change a path, click on the corresponding blue link.

**HW4 Global Settings Form**

View | General | Language/Unit System | **File Locations** | Graph Settings | Alarm Settings | Events

**Measurement Data**

Logger Data Files: [C:\ROTRONIC\\_HW4\DATA](#)

Log to PC Files: [C:\ROTRONIC\\_HW4\DATA\\_ONLINE](#)

**Configuration Data**

User Folder Path: [C:](#)

Device Configuration Files: [C:\ROTRONIC\\_HW4\SYS](#)

**Protocols and Events**

Protocols: [C:\ROTRONIC\\_HW4\DOC](#)

Device Event Files: [C:\ROTRONIC\\_HW4\EVENT](#)

Alarm Records: [C:\ROTRONIC\\_HW4\VALARM](#)

HW4 Event Files: [C:\ROTRONIC\\_HW4\EVENT](#)

User Event Files: [C:\ROTRONIC\\_HW4\EVENT](#)

OK | Cancel | Help

- Click on the OK button at the bottom of the form.
- Close and restart HW4

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## 28 CHANGING THE BAUD RATE OF AN ETHERNET DEVICE

The Baud rate of the internal module of a ROTRONIC device with Ethernet (TCP/IP) interface may have to be changed prior to using the device as the master in a RS-485 multi-drop network.

**Changing the baud rate of an Ethernet device is a two step process:**

- (1) Change the baud rate in HW4 > Device Manager > Interface**
- (2) Change the baud rate using the Web Interface of the internal Digi International module: Configuration > Serial Port > Basic Serial Settings**

The Web Server of the Digi International module can be accessed either directly from Internet Explorer (type in the IP address of the module and click on Go) or from the HW4 main menu bar > Settings and Tools > Ethernet Configuration Tool (Digi Device Discovery). When Digi Device Discovery is open, right click on the device with the mouse and select "**Open web interface**".

In the case of a device with a wired connection, no user name or password are required to open the web server. By contrast, a device with a wireless connection (WI-ME) requires a user name and password. The ROTRONIC factory defaults are as follows:

- User name : **rotronic**
- Password : **wlan**

Note: if for any reason, you had to reset the WI-ME module to the original Digi International manufacturer defaults, the user name reverts to **root** and the password **dbps**.

The home page of the Digi module web server is as follows:

The screenshot shows the home page of the Digi module web server. On the left is a sidebar with a dark blue background and white text, containing a 'Home' link and several menu categories: Configuration (Network, Serial Port, GPIO, Alarms, Security, System), Management (Serial Ports, Connections), Administration (File Management, Backup/Restore, Update Firmware, Factory Default Settings, System Information, Reboot), and Logout. The main content area has a dark blue header with 'Home' and a light blue background. It contains several sections: 'Getting Started', 'Tutorial' (with a link and text 'Not sure what to do next? This Tutorial can help.'), 'System Summary' (with fields for Model: Digi Connect ME, IP Address: 192.168.57.152, MAC Address: 00:40:9D:24:60:3D, Description: JPL Test1, Contact: JPL Test 1, Location: JPL Test 1), and 'User Interfaces' (with 'Web Interface (Default)' and 'Custom Interface:' options, each with a 'Launch' button and a 'Set as Default' button).

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The left hand side of the web server home page displays a menu. Left click with the mouse on Serial Port to gain access to the Serial Port Configuration page:

**Serial Port Configuration - HygroLog NT**

**▼ Port Profile Settings**

Current Port Profile: **TCP Sockets** [Change Profile...](#)  
The TCP Sockets Profile allows a serial device to communicate over a TCP r

**TCP Server Settings**

Connect directly to the serial device using the following TCP ports on the n

Enable Telnet access using TCP Port:

Enable Raw TCP access using TCP Port:

Enable Secure Socket access using TCP Port:

**TCP Client Settings**

Automatically establish bi-directional TCP connections between the serial d

Automatically establish TCP connections  
Establish connection under one of the following conditions:

- Always connect and maintain connection
- Connect when data is present on the serial line  
Match string:
- Strip string before sending
- Connect when DCD (Data Carrier Detect) line goes high
- Connect when DSR (Data Set Ready) line goes high

Establish connection to the following network service:

IP Address:

Service:  ▼

TCP Port:

---

**▶ Basic Serial Settings**

**▶ Advanced Serial Settings**

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Click with the mouse on Basic Serial Settings.



## Digi Connect ME Configuration and Management

- Home
- Configuration**
  - Network
  - Serial Port**
  - GPIO
  - Alarms
  - Security
  - System
- Management**
  - Serial Ports
  - Connections
- Administration**
  - File Management
  - Backup/Restore
  - Update Firmware
  - Factory Default Settings
  - System Information
  - Reboot

### Serial Port Configuration - HygroLog NT

- ▶ Port Profile Settings
- ▼ Basic Serial Settings

Description:

Baud Rate:  ▼

Data Bits:  ▼

Parity:  ▼

Stop Bits:  ▼

Flow Control:  ▼

---

- ▶ Advanced Serial Settings

Set the baud rate to match the value entered in Device Manager > Interface.

**Warning:** exercise caution when using the device web server:

- Be sure to use settings that are compatible with your LAN.
- The menu item "Serial Port" on the home page allows the configuration of the TCP ports used by the device. No configuration should be required. Whatever you do, "Enable raw TCP access using TCP port" should always be checked and the port number should always be 2101.

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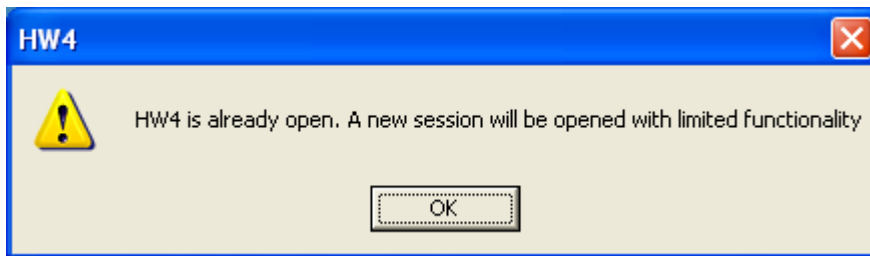
## 29 CONCURRENT HW4 SESSIONS ON DIFFERENT WORKSTATIONS

HW4 can be installed on a number of workstations connected to a file server and the HW4 User Folder (ROTRONIC\_HW4) can be relocated to a file server drive that is mapped to all workstations. The purpose of doing this is to be able to use the same data, protocols, events and alarms on all workstations.

**IMPORTANT:** Installing the HW4 software on the file server is not recommended and may not work.

**LIMITATIONS:** Running concurrent sessions of HW4, each on a different workstation is subject to the following limitations.

- The HW4 user who opens the first session (or Master session) can use HW4 with all the rights given to that user by the HW4 administrator.
- When an additional session starts on one of the other workstations, HW4 issues the following warning:



After clicking on the OK button, HW4 starts the new session. The user of this session has only minimum rights (essentially limited to viewing the measurement data), regardless of the rights given to this user by the HW4 administrator. This limitation remains in effect until the end of the session, even when the original Master session has been ended.

- The new session is not tracked by the HW4 user event file (user login, etc.).
- The Master session is the only one to write to the HW4.ini file (HW4 main screen configuration, etc.). In the main, this happens only at the time when this session is closed
- When running concurrent sessions of HW4, the live memory of each workstation holds the information that was in the HW4.ini file at the time the workstation opened the HW4 session. No complete update of this file takes place during a session. This means that workstations that are running the additional HW4 sessions are essentially limited to viewing measurement data and that they do not necessarily have current information regarding any of the changes made by the Master first session or any activity of that session.
- The HW4 edition is automatically the same as the edition used to open the Master session.
- Both the online buffer and online graph are local to each workstation and can be locally cleared without affecting the other workstations.
- The only devices that can be seen simultaneously by several workstations are devices connected either directly to the LAN (Ethernet) or indirectly connected to the LAN by means of a RS-485 multi-drop. Connections via Internet are similar to a LAN connection. To avoid conflicts when devices are being polled by several workstations follow the procedure described in this manual under **Polling Synchronization**

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- o Without polling synchronization, conflicts may result when the same device is simultaneously polled by several workstations. Using a longer polling interval may make such conflicts less frequent. When there is a conflict, a device icon may temporarily appear in the device tree with a red cross over it. This does not necessarily mean that communication with the device was lost and it may simply show that the device is busy. For example, a HygroLog NT that is in the process of uploading a log file to the server is likely to appear busy to a number of workstations. False alarms may be avoided by using an appropriate time delay for the alarm type “no communication with device”.

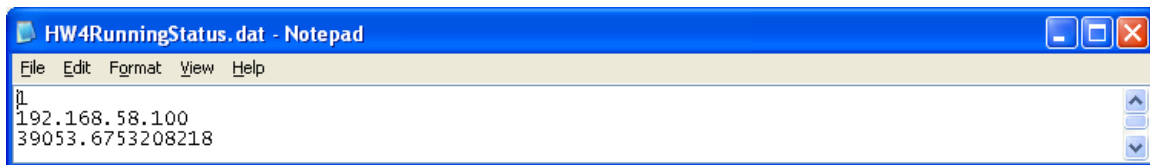
**CONFIGURATION:** After installing HW4 on the different workstations, each workstation can be configured to make HW4 use a common HW4 User Folder (ROTRONIC\_HW4) that is located on a drive of the file server that is mapped to all workstations.

See [Relocating the HW4 User Folder](#)

It is important to distinguish between a Windows user and a HW4 user. Do not confuse HW4 rights with the permissions to a Windows folder. The administrator of the Windows 2003 server should grant sufficient permissions to the HW4 user folder and subfolders (Folder Properties – Security tab) so that all workstations have access to the same files.

**NOTE:** The file HW4RunningStatus.dat is located in the HW4 User Folder (ROTRONIC\_HW4). This file holds the IP address of the workstation that is (or was) running the Master session. This information may be used to identify the location of this workstation.

HW4RunningStatus.dat can be opened with Notepad:

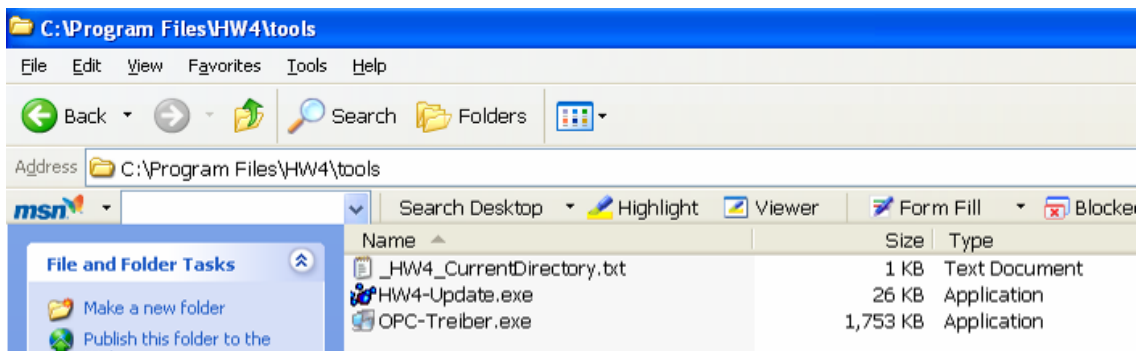


The first line is either a 1 or a 0 (1 means the Master session is still open / 0 means that a new Master session can be started).

## 29.1 Polling synchronization

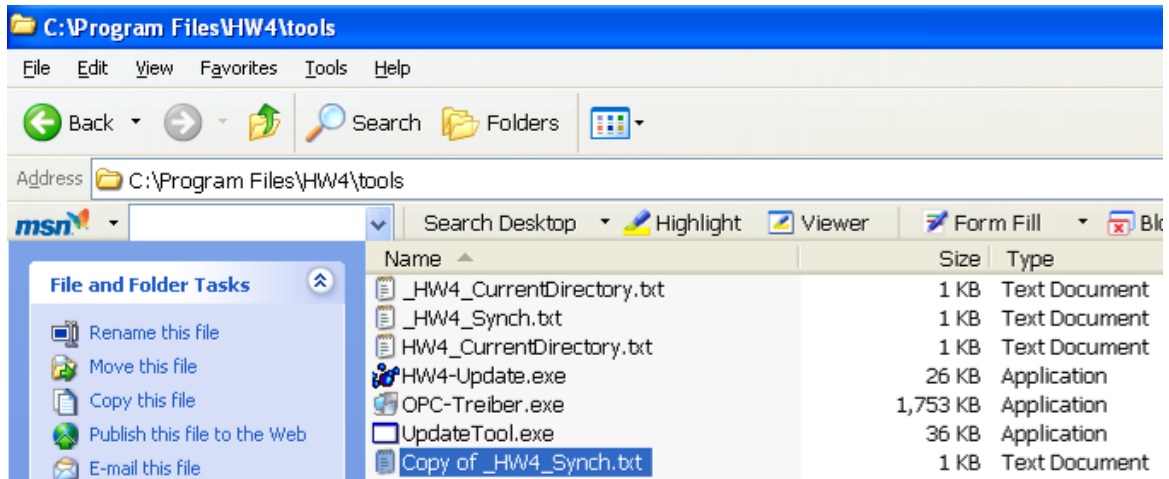
To avoid conflicts when the same device is simultaneously polled by several workstations, proceed as follows [for each HW4 workstation](#):

- **Step 1:** Open the directory C:\Program Files\HW4\tools (created during the installation of HW4).

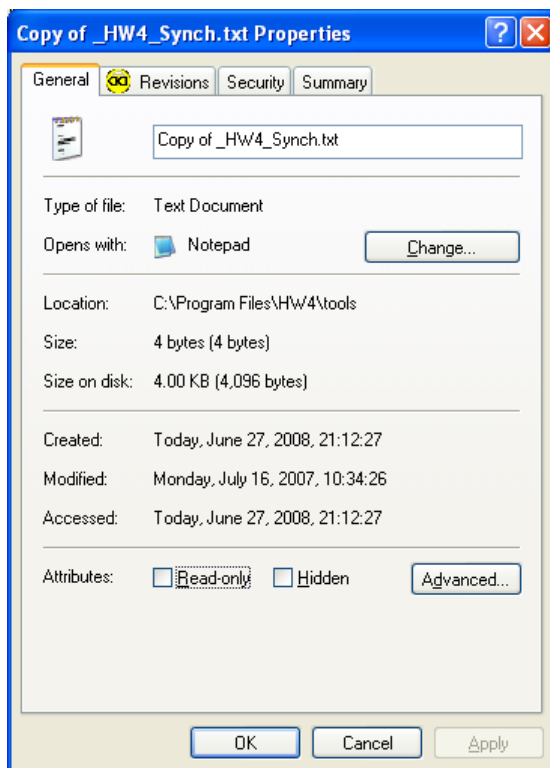


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- **Step 2:** Select the text file **\_HW4\_Synch.txt** and copy it in the same directory.



- **Step 3:** Right click on **Copy of \_HW4\_CurrentDirectory.txt** and select **Properties**. Remove any Read-only attribute that may be present.

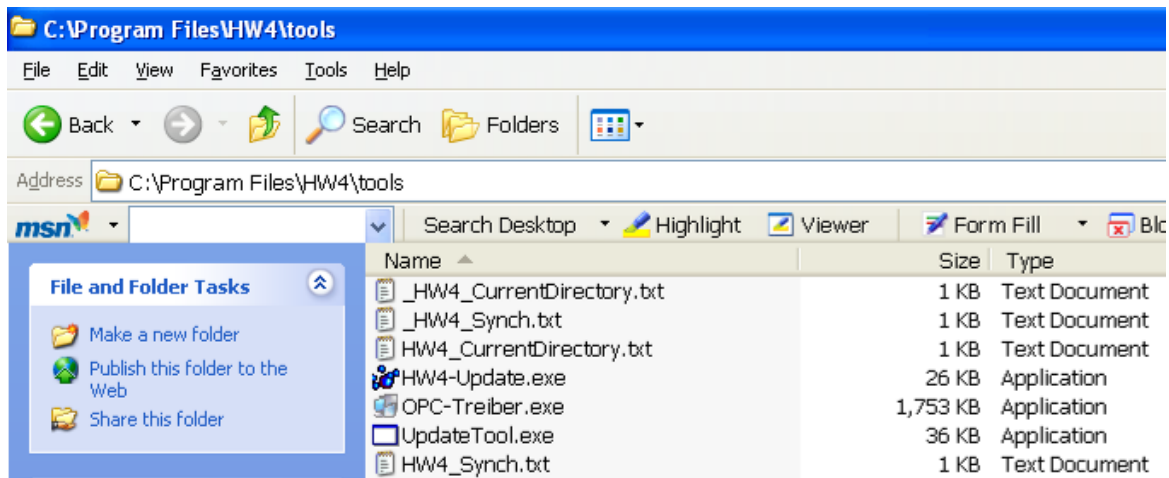




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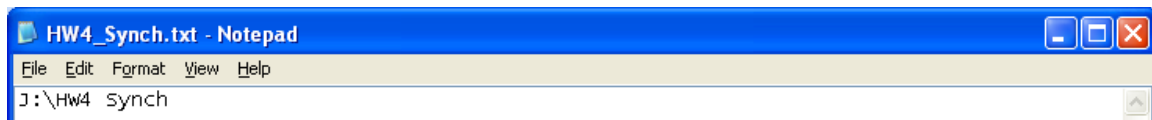
• **Step 4:**

Rename the file copy to **HW4\_Synch.txt** (no leading underline).



• **Step 5:**

Open **HW4\_Synch.txt** with Notepad. Create a text line similar to the one shown below:



**Comments:**

- J: must be a network drive mapped to each HW4 workstation (any mapped network drive may be used).
- HW4 Synch must be a folder accessible to all HW4 workstation users that log onto the file server domain (except for Full Control, give all Windows permissions to each domain user). Any name may be used for this folder.

Upon startup HW4 creates two files in the folder declared in **HW4\_Synch.txt**:

**HW4\_Synch\_Close.txt**

**HW4\_Synch\_Open.txt**

These files are used by HW4 to synchronize the polling of devices common to the different HW4 workstations so as to prevent conflicts resulting from the simultaneous polling of the same device by two or more workstations.

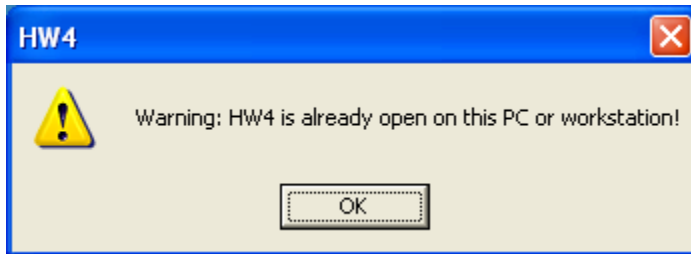
**IMPORTANT:** The polling interval (Main Menu Bar > Settings and Tools > HW4 Global Settings > General Tab) must be set to a value that allows the different workstations to poll all of the devices present in the device tree. For example, if each workstation requires about 6 seconds for polling the devices and there are 4 workstations, set the polling interval to at least 25 to 30 seconds.

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## 30 MULTIPLE HW4 SESSIONS ON THE SAME PC

We do not recommend running simultaneously multiple sessions of HW4 on the same PC or workstation. Doing so may give unpredictable results.

Nevertheless, if you so desire, HW4 will let you open more than one session on a PC or workstation and will issue the following warning:

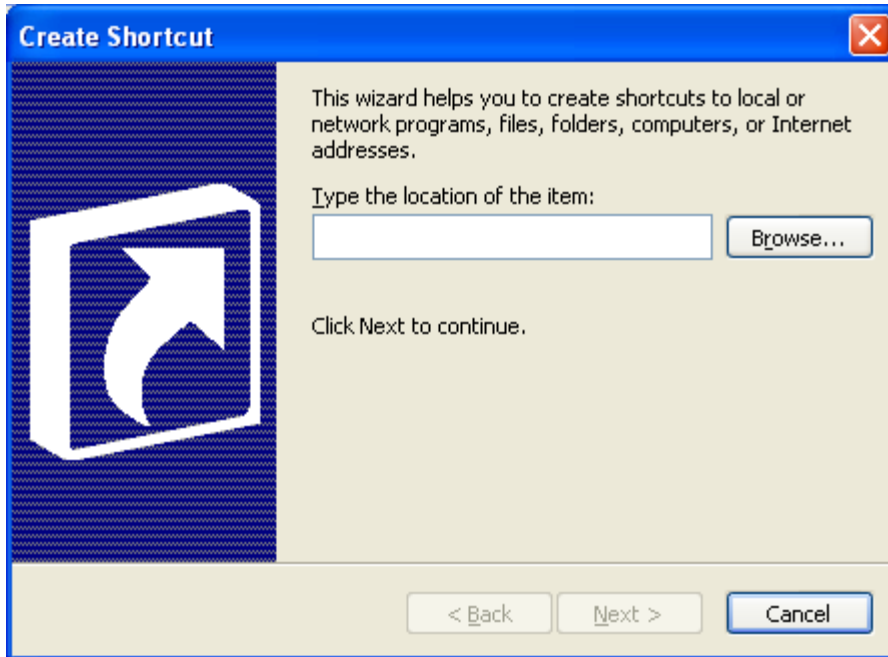


## 31 STARTING HW4 AUTOMATICALLY with Windows

HW4 can be started automatically by Windows, for example after re-starting the PC. To do this a few steps are required.

- Configure Windows so that it can be started without requiring any keystroke or mouse click.
- During the initial start-up HW4 creates the HW4 User Folder following folder in C:\Documents and Settings\Windows User\Application Data\ROTRONIC\_HW4. Relocate this folder so that it can be accessed by all Windows users .See: [Relocating the HW4 User Folder](#)
- In the HW4 main menu bar, select Settings and Tools > HW4 Global Settings > General. Use the mouse to place a check mark in the box labeled "Auto-Start Mode". See [General Tab](#)
- In Windows, right click on Start and select Explore all Users.
- Select Documents and Settings > All Users > Start Menu > Programs. In Programs, open the folder Startup. Right click with the mouse on a blank spot within the folder view and select New > Shortcut.
- This opens the create shortcut wizard:

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- Use the Browse button to locate HW4.exe in C:\Program Files\HW4.

Click on the OK button to save the changes. Because the shortcut is in the Startup folder in All Users, HW4 will start automatically each time that Windows starts up.

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## 32 BASIC ETHERNET CONCEPTS

### 32.1 *Compatibility requirements*

In order to use a device / docking station on an LAN, the device (also called a host) must to be configured so as to be compatible with the LAN.

- **IP address** (Network ID and Host ID)

An IP address consists of 4 numbers (1 to 3 digits each) separated with dots. On any network, each IP address should be unique.

IP addresses are classified as follows:

Class A: **1**.x.x.x to **127**.x.x.x  
Class B: **128.0**.x.x to **191.255**.x.x  
Class C: 192.0.0.x to 223.255.255.x

In the above, x is a number between 0 and 255.

Within an IP address, the network ID is defined depending on the class of the IP address and is indicated above in bold. The remainder of the address is the host ID.

Typically a local area network (LAN) uses class C IP addresses. In a class C address, the first 3 numbers define the network ID and therefore, the maximum number of devices on the network is limited to 254 (host IDs of all zeros or all ones are not allowed).

In order for two devices in a network to communicate together, their IP address must contain the same network ID.

- **Gateway Address**

The gateway address used by the host should be the LAN IP address of the router used to interface with other networks (e.g. Internet) or sub-networks. When there is no router, you may try any unused IP address on the network.

- **Subnet Mask**

The subnet mask is used to differentiate the network ID portion of an IP address from the host ID.

Class A: **255**.0.0.0  
Class B: **255.255**.0.0  
Class C: **255.255.255**.0

Note: if more network ID's are required, the last number of the subnet mask can be used but this reduces the maximum number of hosts available for each network ID.

In order for two devices in the same network to communicate together, their subnet mask must be the same.

- **TCP port**

TCP ports are used to specify how requests are sent to a device and how a device listens to requests. HW4 makes exclusive use of port 2101 to communicate with devices on the LAN. If using a ROTRONIC Ethernet docking station, this port number is already configured and should not be changed.

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## 32.2 DHCP

A TCP device / docking station may be configured to enable DHCP (Dynamic Host Configuration Protocol). This makes sense only if a DHCP server such as a router is present on the network.

With DHCP enabled, the DHCP server senses when a new device (or host) is connected to the network and automatically assigns / configures the device with the next available IP address. The device is also automatically configured with the network subnet mask and gateway address. Using DHCP is simple, guarantees compatibility with the network and eliminates the possibility of conflicting IP addresses.

An IP address assigned using DHCP is also known as a dynamic address. As long as DHCP remains enabled on the host, the host IP address is subject to change. This is not desirable when using HW4.

Once the dynamic address of the host is known, and communication with the host can be established, we recommend to change the host IP address to an unused network address and to disable DHCP on the host. In this manner, the new host IP address is a static address, not subject to change.

## 32.3 MAC Address

Each individual Ethernet device is given by its manufacturer a unique MAC address that cannot be changed by the user. In a way the MAC address is akin to a social security number.

# 33 WATER ACTIVITY MEASUREMENT WITH HW4

## 33.1 Water Activity: definition and applications

### 33.1.1 Definitions

The moisture content of a product can be defined as the percentage weight of water in relation to the dry weight of the product.

Products in which moisture can be present can be classified in two categories: hygroscopic and non hygroscopic. Examples of hygroscopic materials are salts, vegetal fibers, most metal oxides, many polymers, etc. Examples of non hygroscopic products are metal powders, glass granules, etc.

Regarding the moisture content of a product, we define static equilibrium as a set of conditions under which the product does not exchange any moisture with its environment. Under conditions of static equilibrium, the moisture content of a hygroscopic product depends on the nature of the product and also on the two following factors:

- (a) the partial pressure of water vapor in the immediate environment of the product
- (b) the temperature of the product

If the moisture content of a product is not dependent on both these factors, the product is not hygroscopic.

Hygroscopic products may absorb water in different ways: sorption with formation of a hydrate, binding by surface energy, diffusion of water molecules in the material structure, capillary condensation, formation of a solution, etc. Depending on the absorption process, water is bound to the product with more or less strength. Moisture content can include both an immobilized part (e.g. water of hydration) and an active part.

Water activity  $A_w$  (or equilibrium relative humidity %ERH) measures the vapor pressure generated by the moisture present in a hygroscopic product.

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$A_w = p / p_s$  and  $\%ERH = 100 \times A_w$ , where:

$p$  : partial pressure of water vapor at the surface of the product  
 $p_s$  : saturation pressure, or the partial pressure of water vapor above pure water at the product temperature

Water activity reflects the active part of moisture content or the part which, under normal circumstances, can be exchanged between the product and its environment.

Water activity is usually defined under static conditions of equilibrium. Under such conditions, the partial pressure of water vapor ( $p$ ) at the surface of the product is equal to the partial pressure of water vapor in the immediate environment of the product. Any exchange of moisture between the product and its environment is driven by a difference between these two partial pressures.

Finally, water vapor can also be present in a gas or gas mixture. The relative humidity of a gas is defined as  $\%RH = 100 \times p/p_s$ , where ( $p$ ) is the partial pressure of the water vapor present in the gas mixture and ( $p_s$ ) is the saturation pressure, or the partial pressure of water vapor above pure water at the temperature of the gas.

### 33.1.2 $A_w$ and Temperature

Both water activity (materials) and relative humidity (gases) are referred to the saturation pressure ( $p_s$ ) or partial pressure of water vapor above pure water:

$$A_w = p / p_s$$

$$\%RH = 100 \times p/p_s$$

The saturation pressure ( $p_s$ ) is strongly dependent on temperature. At normal room temperature, ( $p_s$ ) increases by about 6.2% for a 1°C increase in temperature. In an open environment that is not saturated with water vapor, the partial pressure of water vapor ( $p$ ) does not change with temperature. In a closed environment, ( $p$ ) changes proportionally to the °K temperature (°K temperature = °C temperature + 273.16). At normal room temperature, the change in ( $p$ ) caused by a small change in the °C temperature is practically negligible. Because ( $p$ ) does not change with temperature while ( $p_s$ ) does, the relative humidity of a gas ( $\%RH = 100 \times p/p_s$ ) is strongly temperature dependent. At 95 %RH and room temperature, an increase of 1°C results in a relative humidity decrease of about 6 %RH. At 50%RH, the same temperature increase causes relative humidity to decrease by about 3 %RH.

The water activity of most hygroscopic products is not as strongly dependent on temperature. At room conditions, research data typically shows that water activity varies only by roughly 0.0005 to 0.005  $A_w$  (0.05 to 0.5 %RH) when temperature changes by 1°C.

This is explained by the fact that the partial pressure ( $p$ ) at the surface of a hygroscopic product does vary with temperature. Above most hygroscopic products, the magnitude of the change in the partial pressure of water vapor ( $p$ ) with temperature is similar (but not exactly equal) to the magnitude of the change of the saturation pressure ( $p_s$ ) above pure water.

In summary, a change in temperature causes the partial pressure of water vapor above a hygroscopic product to change. At the same time, the partial pressure in the air above the product is practically unchanged. It follows that any change in the temperature of a hygroscopic product automatically causes the product to exchange moisture with the air (or gas) that surrounds it. Moisture is exchanged until the partial water vapor pressure at the surface of the product and in the air is equal. When measuring water activity, it is essential to keep temperature as constant as possible.

### 33.1.3 Applications

The active part of moisture content and, therefore, water activity, provide better information than the total moisture content regarding the micro-biological, chemical and enzymatic stability of perishable products such as foods and seeds. For similar reasons, water activity is equally relevant in the pharmaceutical

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industry where it provides useful information regarding the cohesion of tablets and pills, or the adherence of coatings. Water activity can be directly compared with the relative humidity of the ambient air to prevent dimensional changes in a product (paper, photographic film), to prevent hygroscopic powders (powdered sugar, salt) from caking or turning into a solid block, etc.

Water activity can be used with some products (mostly synthetic products) as a means of indirectly measuring the total moisture content. This requires developing sorption isotherms to this purpose. Sorption isotherms are graphs that provide the relationship between water activity and moisture content at constant temperature. For most natural products, repeatable sorption isotherms cannot be reliably developed and water activity should be regarded as separate from moisture content.

### **33.2 Instruments and probes for measuring water activity**

In theory, any ROTRONIC instrument and probe from can be used together with HW4 to measure water activity. Usually product samples are being measured, typically with a probe such as the ROTONIC model AW-DIO. This probe can be connected without adapter cable to the HygroPalm and HygroLab indicators, the HygroLog NT data logger and to the HygroClip DI Interface.

### **33.3 Water activity measurement modes in HW4**

The AwE / AwQuick tab is available only with HW4 Professional with AwQuick. HW4 features two modes for measuring water activity and the name of the tab depends on which mode has been selected.

- **AwE mode**

In this mode HW4 monitors the stability of both temperature and humidity. The measurement is automatically ended as soon as both humidity and temperature reach equilibrium. The natural (or static) equilibration of most products typically requires from 45 to 60 minutes and can take as long as a couple of hours.

- **AwQuick mode:**

In the AwQuick mode, HW4 uses an algorithm to project the full equilibrium value (water activity) of the measured product. The measurement is automatically ended and typically requires about 5 minutes.

HW4 performs the following tasks:

- 1) The value of the humidity signal is constantly monitored
- 2) The stability of the temperature signal is constantly monitored
- 3) After an initial period of time (dwell time), HW4 uses the humidity data to project the end value of the equilibration process (water activity). The measurement ends automatically as soon as the projected Aw value is stable.

With the dwell time set to 4 minutes, measurements typically require about 5 minutes. When temperature conditions are stable (both at the product and probe), the measurement obtained with the AwQuick mode is generally within  $\pm 0.005$  aw of the measurement that would be obtained by waiting for full equilibration (AwE mode).

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### 33.4 Mode selection and settings

To select the mode and to enter or modify the settings to be used in each mode, click on the Settings button located on the AwE / AwQuick tab.

The screenshot shows the 'HW4 Global Settings Form' with the 'AwQuick Mode' tab selected. The 'AwE Mode' radio button is selected. The settings for 'AwE Mode' are:

Mode	Parameter	Value
AwQuick Mode	Dwell Time [min]	4
	Temperature stability [°C/min]	0.01
AwE Mode	Humidity stability [Aw/min]	0.0001
	Temperature stability [°C/min]	0.01

Buttons at the bottom: OK, Cancel, Help.

Note: the values shown above are the most frequently used.

**IMPORTANT:** Both the selected mode and its settings apply globally to all instruments and probes.



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### 33.5 Using the AwE mode

- 1) Select the instrument to be used in the device tree (left pane of the HW4 main screen)
- 2) In the right pane of the HW4 main screen, select the AwE / AwQuick tab (the label of this tab changes depending on which mode is currently selected)
- 3) If necessary, click on the settings button and select the AwE mode in the form. Click on the form OK button and verify that the tab label reads AwE Mode
- 4) To start the measurement, click on the input corresponding to the desired probe. A check mark appears on the corresponding box and the Status column changes to "Running". If so desired, you can click on each of the inputs available with the instrument selected in the device tree.

**Note:** only those inputs that are selected in the View tab appear in the AwE / AwQuick tab.

Input	Input Name	Probe S/N	Humidity [Aw]	Temperature [°C]	Elapsed Time	Water Activity [Aw]	Status
<input checked="" type="checkbox"/>	Port 1	33220033	0.176 <=>	24.13 <=>	00:00:05		Running
<input type="checkbox"/>	Port 2	36067221	0.177	24.13			
<input type="checkbox"/>	Port 3	32221185	0.178	23.99			
<input type="checkbox"/>	Port 4	32337234	0.178	23.97			
<input type="checkbox"/>	Port 5	39678190	0.176	24.13			

When HW4 detects equilibrium condition, the measurement ends automatically and the background color of the line corresponding to the probe turns to green. The status column changes to "End Result".

Input	Input Name	Probe S/N	Humidity [Aw]	Temperature [°C]	Elapsed Time	Water Activity [Aw]	Status
<input checked="" type="checkbox"/>	Port 1	33220033	0.177 <=>	24.08 <=>	00:06:55	0.177	End Result
<input type="checkbox"/>	Port 2	36067221	0.177	24.06			
<input type="checkbox"/>	Port 3	32221185	0.178	23.95			
<input type="checkbox"/>	Port 4	32337234	0.178	23.96			
<input type="checkbox"/>	Port 5	39678190	0.176	24.05			

All data on the line with the green background remains frozen until the process is ended by clicking on the input box with the mouse to remove the check mark.

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### 33.6 Using the AwQuick mode

- 1) Select the instrument to be used in the device tree (left pane of the HW4 main screen)
- 2) In the right pane of the HW4 main screen, select the AwE / AwQuick tab (the label of this tab changes depending on which mode is currently selected)
- 3) If necessary, click on the settings button and select the AwE mode in the form. Click on the form OK button and verify that the tab label reads AwE Mode
- 4) To start the measurement, click on the input corresponding to the desired probe. A check mark appears on the corresponding box and the Status column changes to "Dwell Phase" and to "Running" at the end of the dwell time. If so desired, you can click on each of the inputs available with the instrument selected in the device tree.

**Note:** only those inputs that are selected in the View tab appear in the AwE / AwQuick tab.

Input	Input Name	Probe S/N	Humidity [Aw]	Temperature [°C]	Elapsed Time	Water Activity [Aw]	Status
<input checked="" type="checkbox"/>	Port 1	33220033	0.298	23.12	00:00:10		Dwell Phase
<input checked="" type="checkbox"/>	Port 2	36067221	0.299	23.08	00:00:10		Dwell Phase
<input type="checkbox"/>	Port 3	32221185	0.301	22.99			
<input type="checkbox"/>	Port 4	32337234	0.299	22.95			
<input type="checkbox"/>	Port 5	39678190	0.299	23.10			

When HW4 generates a stable projection, the measurement ends automatically and the background color of the line corresponding to the probe input turns to green. The status column changes to "End Result".

Input	Input Name	Probe S/N	Humidity [Aw]	Temperature [°C]	Elapsed Time	Water Activity [Aw]	Status
<input checked="" type="checkbox"/>	Port 1	33220033	0.298 <=>	23.09 <=>	00:05:10	0.297	End Result
<input checked="" type="checkbox"/>	Port 2	36067221	0.299 <=>	23.10 <=>	00:04:20	0.299	End Result
<input type="checkbox"/>	Port 3	32221185	0.301	22.98			
<input type="checkbox"/>	Port 4	32337234	0.299	22.92			
<input type="checkbox"/>	Port 5	39678190	0.299	23.10			

The data on the line with the green background remains frozen until the process is ended by clicking on the input box with the mouse to remove the check mark.

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### 33.7 Water activity measurement report

Click on the "Generate Report" button to generate a measurement report. HW4 automatically saves the report in the subfolder ROTRONIC\_HW4\DOC.as a text file with the name AW-Quick followed by an automatically generated number.

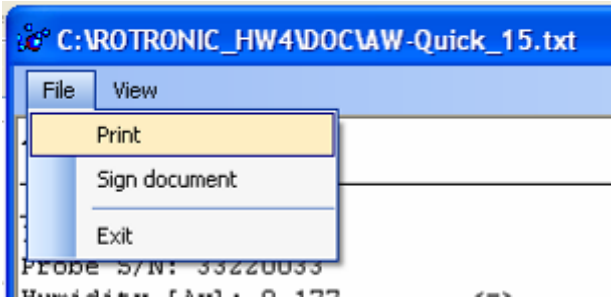
```

C:\ROTRONIC_HW4\DOC\AW-Quick_1.txt
File View
AwQuick Mode
-----
Date: Saturday, December 02, 2006
Time:16:58:42
-----
Device Name: HyGen NT3
Device Serial Number: 0034277001
-----
Input Name: Port 1
Probe S/N: 33220033
Humidity [Aw]: 0.298      <=>
Temperature [°C]: 23.09   <=>
Elapsed Time: 00:05:10
Water Activity [Aw]: 0.297
Status: End Result
-----
Input Name: Port 2
Probe S/N: 36067221
Humidity [Aw]: 0.299      <=>
Temperature [°C]: 23.10   <=>
Elapsed Time: 00:04:20
Water Activity [Aw]: 0.299
Status: End Result
-----
Configured by
HW4 User name: A. Smith
User description:Administrator
User ID number:27378
-----
HW4 Information
Version:2.0.0.28071
HW4 ID:86 00000002
-----
User Events File
C:\ROTRONIC_HW4\EVENT\HW4USER_2006.evt
-----
Authentication Stamp
3E6B355A

```

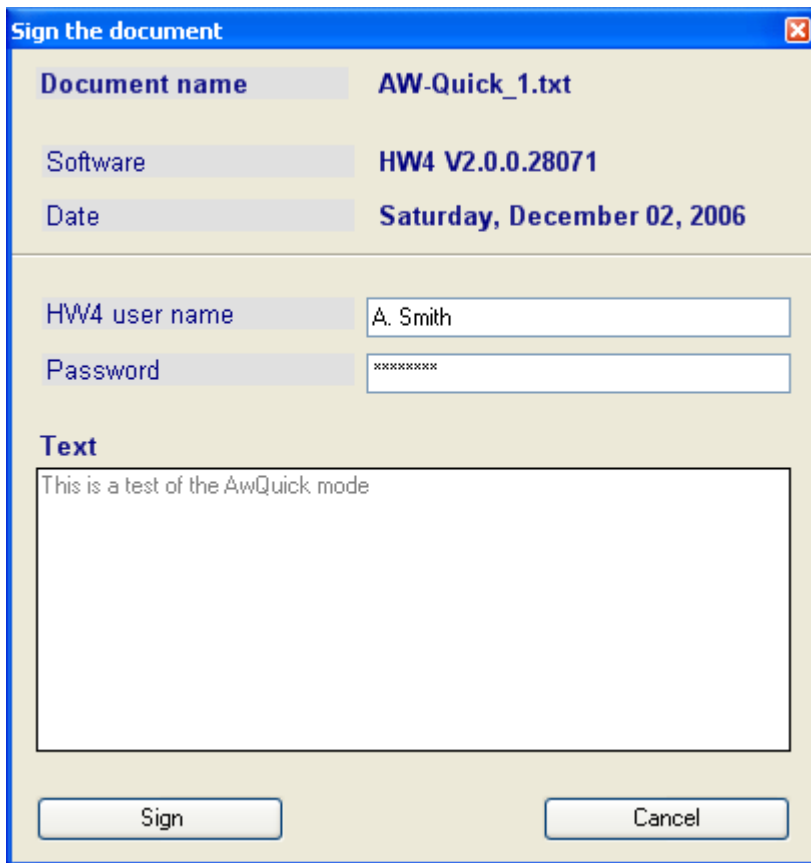
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Use the report menu bar to sign and / or print the report.



### 33.7.1 Signing the report

Select "Sign document" from the file menu to add your HW4 user name and a comment text to the report. For authentication purposes you will need to enter your password.



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A new section is inserted at the bottom of the report:

```

Authentication Stamp
3E6B355A

[#E][HW4 user signature]
Name: A. Smith
Description: Administrator
ID: 27378
Date: Saturday, December 02, 2006
Document: AW-Quick_1.txt
Software: HW4 V2.0.0.28071

Text:
This is a test of the AwQuick mode

[#e]Signature ID
F54986AD

AUTHENTICATION STAMP OK

```

## 34 DOCUMENT RELEASES

Release	Software Ver.	Date	Notes
_10	2.1.0	Jun. 27, 2008	Original release
_11	2.1.1	Oct. 24, 2008	HW4 2.1.1 – see Chapter 3
_12	2.2.0	Feb. 4, 2009	HW4 2.2.0 – see Chapter 3
_13	2.3.0	Jun.9, 2009	HW4 2.3.0 – see Chapter 3