

1221 Thermal Comfort Data Logger

From Serial number: 1 823 408

7301 Application Software

Version 3.2

December 2001

Safety Considerations

This apparatus has been designed and tested in accordance with IEC IEC 1010-1 *Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use* (see specifications), and has been supplied in safe condition. This User Manual contains information and warnings which must be followed to ensure safe operation and to retain the apparatus in safe condition. Special note should be made of the following:

Powering the Apparatus

Verify that the correct fuse is inserted.

Safety Symbols



The apparatus will be marked with this symbol when it is important to refer to the associated warning statements given in this User Manual.

Warnings

- Switch off all power to equipment and remove power cable before connecting or disconnecting their digital interface. Failure to do so could damage the equipment.
- Whenever it is likely that the correct function or operating safety of the apparatus has been impaired, it must be made inoperative and be secured against unintended operation.
- Any adjustment maintenance and repair of the open apparatus under voltage must be avoided as far as possible and, if unavoidable, must be made only by trained service personnel.
- Contains a lithium battery which may only be changed by trained service personnel
- INNOVA cables WL0945 or WL0946 *must* be used. Other cables may not have the proper current/ground configuration, and might cause system damage (1221 or PC).

Trademarks

MS Windows is a trademark of Microsoft Corp.

Intel is a registered trademark of Intel Corp.

All other product names and trademarks are the property of their respective manufacturers.

Copyright © 2001, Innova AirTech Instruments A/S

All rights reserved. No part of this publication may be reproduced or distributed in any form, or by any means, without prior consent in writing from Innova AirTech Instruments A/S, Ballerup, Denmark.

1.1 1221 Thermal Comfort Data Logger

The Thermal Comfort Data Logger enables you to evaluate the thermal comfort of indoor climates and heat stress at the workplace.

The data logger is a black box thermal platform built up modularly with up to four input modules with a number of transducer sockets in each.

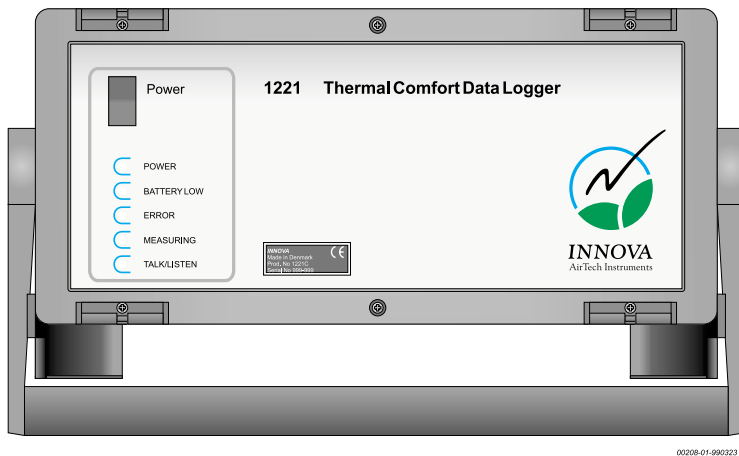
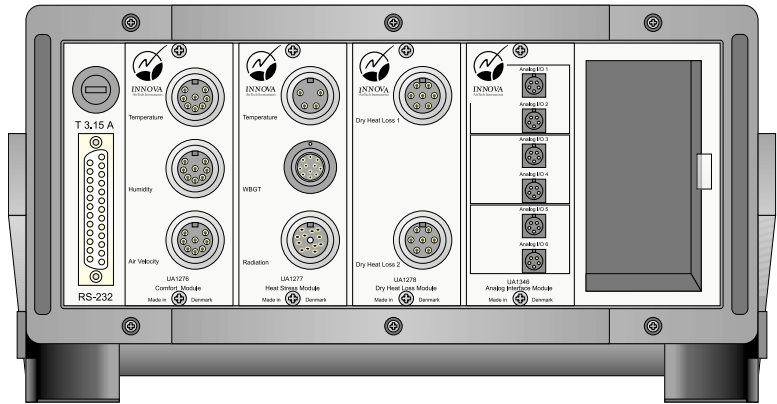


Fig. 1.1 Front – 1221 Thermal Comfort Data Logger

The 1221 can be used in the field to collect data as a stand-alone apparatus, or it can be used via its serial interface connection with a PC and 7301 software to view data on-line.

The 1221 is supplied with a battery pack for use in the field. A mains powered DC supply ZG 0342 is available.



00209-01-990324

Fig. 1.2 Back – 1221 Thermal Comfort Data Logger

1.2 7301 Application Software

7301 Application Software is a software package for use exclusively with 1221 Thermal Comfort Data Logger. 7301 software runs on a PC under MS Windows 98 or later.

The software retrieves data from the 1221 via the RS–232 interface on the host computer. The measured data can be shown on the computer screen along with calculations of a number of indices. The 1221 is set up via the 7301 software.

Measured data and results can be stored to disk in spreadsheet readable format.

1.3 About this Manual

General information regarding how to set-up and configure a system using the 1221 and its associated Application Software is provided in Chapter 2.

Chapter 3 provides information specific to the 1221 Thermal Comfort Data Logger and its installation, start-up and power requirements.

Chapters 4 introduces 7301 Application Software. The software is discussed in depth in Chapters 5, 6 and 7, which cover each of the main software menus.

Chapter 8 provides information regarding the basis for index calculations.

2.1 Power Requirements

The 1221 Thermal Comfort Data Logger comes with Battery Box ZG 0146 for which either NiCd or alkaline batteries must be purchased. Typically, the 1221 can run for about 9 hours before battery re-charging (NiCd) or about 18 hours before replacement (alkaline) is required. For more information about the battery box see section 3.2.

Power Supply ZG 0342 can be ordered for the 1221. This cassette is slipped into the back of the 1221 instead of the battery box. The 1221 can then be connected to any wall socket from 100 to 240 V (see section 3.2).

2.2 PC Requirements

To run the 1221 and 7301 as a single system, a host computer is required with at least the following:

- Processor: Pentium, at least 160 MHz
- RAM At least 16 Mbyte
- Hard disk: At least 100 Mbyte available
- Screen: Colour, SVGA 800x600
- Mouse
- Serial interface: At least one RS-232 interface connection (not including that used for the mouse)
- Disk drive 3¹/₂", 1.44 Mbyte

The following are recommended:

- Processor: Pentium III, 450 MHz
- RAM: 32 Mbyte
- Hard disk: 5 Gbyte
- Screen: Colour, SVGA 1024x768

2.3 Software Requirements

To run 7301 software you *must* have the following:

- Operating System: Windows 98, Windows 2000, Windows NT 4.0 with SP 6A
- User Interface: MS Windows™ version 3.1 or later.
(MS Windows 95/98 is recommended)

Optional

- Spreadsheet: Supports Excel 97, which has the same format as that used by the 1221 (comma-separated values)

Note: These requirements indicate which supporting software 1221/7301 has been tested with. The system may (or may not) work with other versions of the specified supporting software, but no tests have been made and no guarantees can be given.

2.4 Serial Interface

Serial communication between PC and 1221 is carried out at 9600 baud, 8 data bits, 1 stop bit, Parity = None, Handshake = Hardwired, switched line.

It is not possible to change these parameters.

The cable length (see section 3.3) between PC and 1221 must not be longer than 17 metres.



INNOVA cables WL0945 or WL0946 *must* be used. Other cables may not have the proper ground configuration, and might cause system damage to the 1221 or PC.

2.5 Selecting Modules

2.5.1 Introduction

Modules for the 1221 are installed before delivery, based on your measurement requirements. The modules are installed in the back of the 1221 as shown in Fig.3.1.

Note: The module configurations described in this chapter are standard configurations for 1221 modules. The 1221 modules are fully flexible and can be configured to measure parameters other than those described in this chapter. They can also be configured to measure parameters ascribed in this chapter to another module (for example, Comfort Module UA 1276 can be configured to measure heat stress, if required).

2.5.2 Comfort Module UA 1276

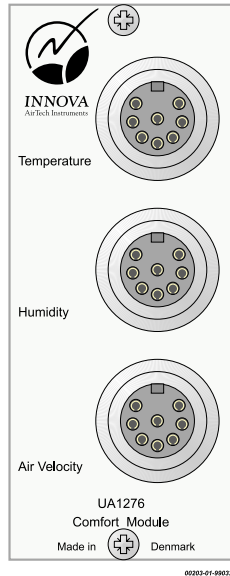


Fig 2.1 Comfort Module UA 1276

This module enables the connected transducers to provide measurement data for the majority of the physical parameters used in evaluating thermal comfort such as (in accordance with ISO 7730) PMV, PPD and DR.

The module has three sockets for the following transducer types:

- Temperature (MM 0034, MM 0035, MM 0060)
- Humidity (MM 0037)
- Air Velocity (MM 0038)

The input sockets for temperature and humidity transducers have a measurement range from -20 to 100°C , with a resolution of 0.1°C .

For further specifications see the Product Data Sheet for the relevant transducer(s).

2.5.3 Heat Stress Module UA 1277

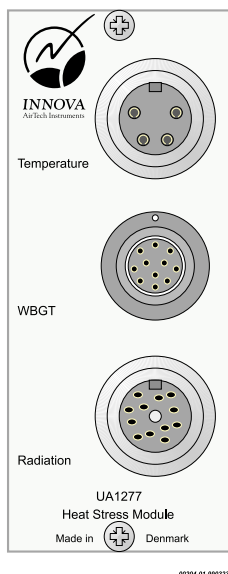


Fig.2.2 Heat Stress Module UA 1277

This module enables connected transducers to provide data for evaluating heat stress such as WBGT (in accordance with ISO 7243) and Radiant Temperature Asymmetry (in accordance with ISO 7730).

The module has three sockets for connecting the following transducer types:

- Temperature (MM 0034, MM 0035, MM 0060)
- WBGT (MM 0030)
- Radiation (MM 0036)

The input sockets for Temperature and WBGT transducers have a measurement range from -40 to 150°C with a resolution of 0.1°C .

For further specifications see the Product Data Sheet for the relevant transducer(s).

2.5.4 Dry Heat Loss Module UA 1278

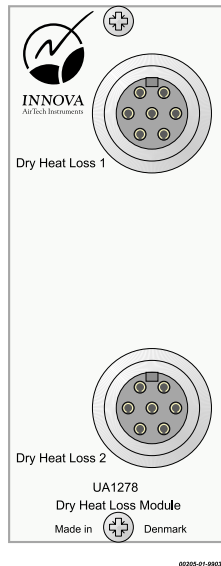


Fig. 2.3 Dry Heat Loss Module UA 1278

This module enables the connected transducers to provide Dry Heat Loss data for PMV, PPD, etc. (in accordance with ISO 7730).

The module has two sockets for the transducer type:

- Dry Heat Loss (MM0057)

The sockets have a measurement range from -20 to 50°C , with a resolution of 0.1°C , and a Dry Heat Loss range from 0 to 205W/m^2 *, with a resolution of 0.1W/m^2 .

For further specifications see the Product Data Sheet for the MM0057.

Note: Installing more than three modules is not recommended because of the power requirements for the UA 1278. See section 3.7.

2.5.5 Analog Interface Module UA 1346

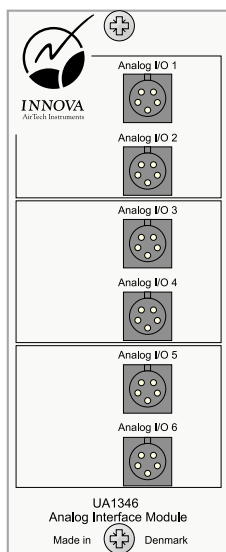


Fig.2.4 Analog Interface Module UA 1346

This module enables up to 6 analog signals to be sampled from six non-specific measuring instruments. The data is sampled,

* At 0.5CLO. Only one UA 1278 installed

stored and displayed just like the data from the other measurement modules.

The module has six sockets, each of which has an analog input and an analog output. The principle behind the calculated values is described in Fig.2.5.

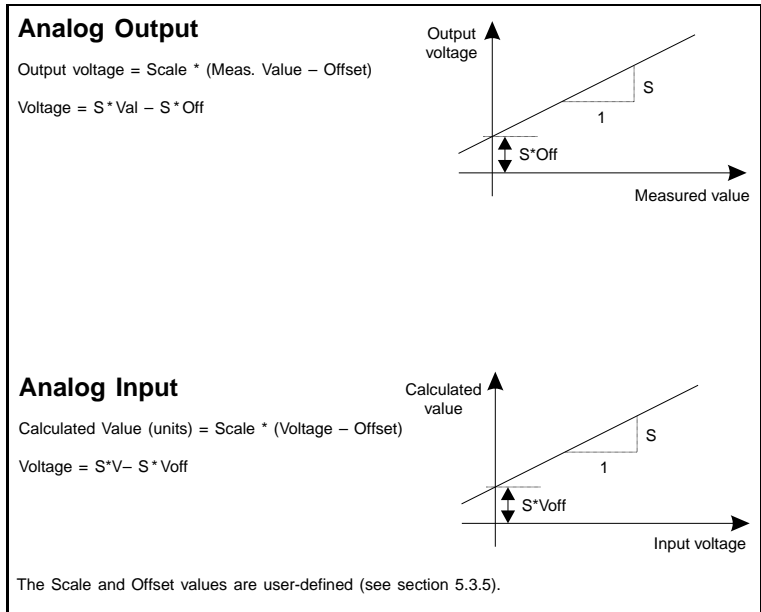
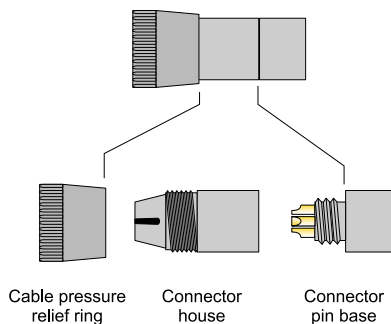


Fig.2.5 Offset for analog Inputs and Outputs

The output values are linked to the measured parameters through a user-defined setup, see Chapter 5. This allows every measured value to be output as a voltage value.

To connect equipment to the Analog Interface Module UA 1346 a 5-pole connector (part no. JP0500) is used. The connector consists of three parts. These are shown in Fig.2.6.

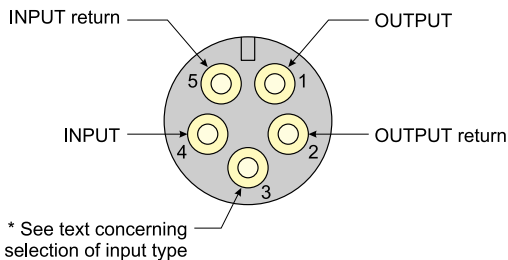
The configuration of the pins in the JP 0500 connector are shown in Fig.2.7.



00223-01-886324

Fig.2.6 Component parts of the JP0500 connector

JP0500 shown from solder side



00224-01-990322

Fig.2.7 Pin configuration in a JP0500 connector

Before soldering the cables to the pins in the JP 0500 connector, you must consider the type of input required:

- Voltage input: do not connect to pin 3.
- 0–20mA input: connect pin 3 to pin 4.

2.6 Selecting Transducers

As described in section 5.3.4, the module you select partially determines the transducers you can use.

Sampling times are determined by the input to which the transducer is attached, as shown in Table 2.1.

	Input Name	Transducer	Sampling Time (minimum)
Comfort Module UA 1276	Temperature (Input 1)	MM 0034 MM 0035 MM 0060	1 s
	Humidity (Input 2)	MM 0037	Humidity: 3 min. Dry Temp.: 3 min. Mirror Temp: 1 s
	Air Velocity (Input 3)	MM 0038	0.05 s
Heat Stress Module UA 1277	Temperature (Input 1)	MM 0034 MM 0035 MM 0060	1 s
	WGBT (Input 2)	MM 0030	1 s
	Radiation (Input 3)	MM 0036	1 s
Dry Heat Loss Module UA 1278	Dry Heat Loss (Input 1)	MM 0057 C MM 0057 O	1 s
	Dry Heat Loss (Input 2)	MM 0057 C MM 0057 O	1 s

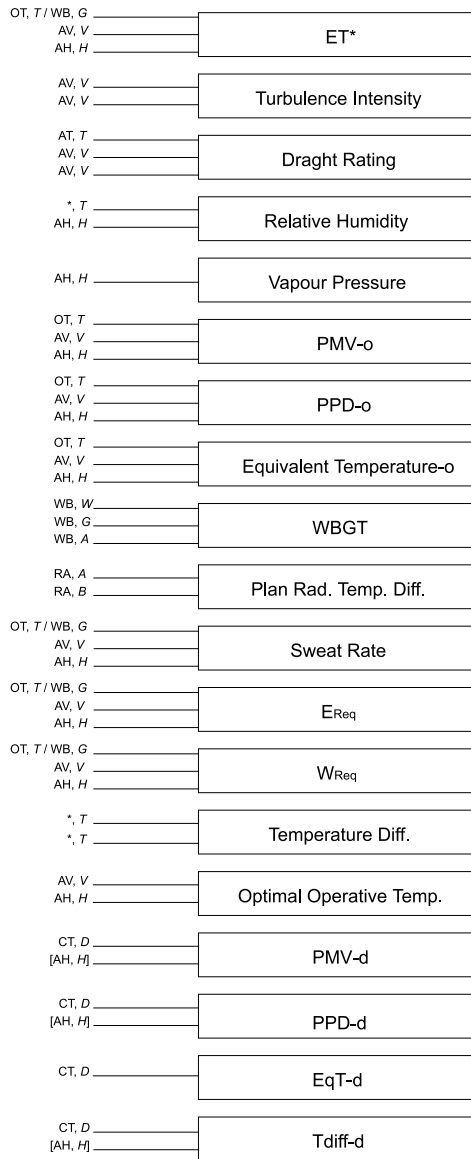
Table 2.1 Transducer sampling times

	Measurement Range	Resolution
Analog Interface Module UA 1346	Analog In Voltage: 0 to 10V (Current: 0 to 20mA)	0 to 4V: 1mV 4 to 10V: 2.5mV*
	Analog Out Voltage: 0 to 10V	2.5mV (12 bits)

* There are two resolution values because the gain changes when the input value is greater than 4V.

Table 2.1 (Cont.) Transducer sampling times

The modules and transducers you select depend on your application. A summary of the relationships between module, transducer and thermal parameters are shown in Fig.2.8.

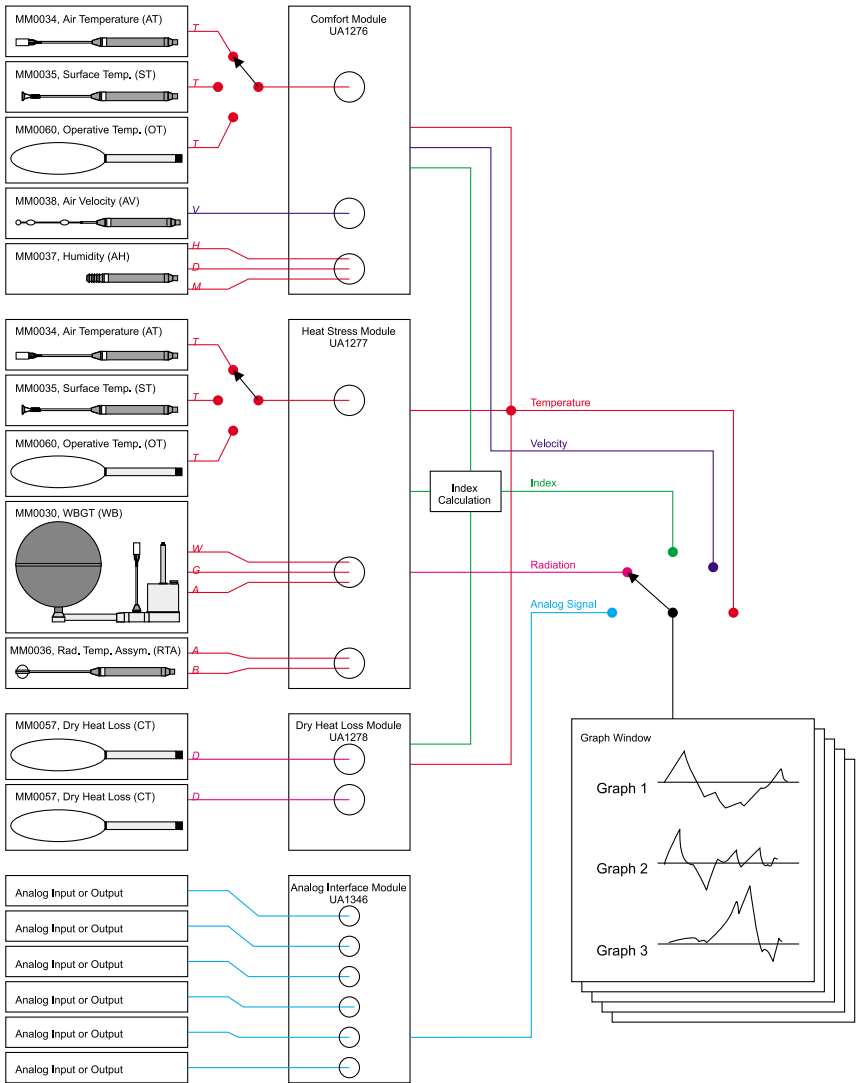


00207-01-000224

Fig. 2.8 *Relationship between thermal transducer, module and measurement type*

Chapter 2 — System Configuration

Selecting Transducers



00202-01-0001

Fig.2.9 Overview of transducer types used with each 1221 module

4.1 Introduction

7301 Application Software is delivered on a CD-ROM containing:

- Installation program
- 7301 Software
- Adobe Acrobat Reader
- Service Pack 6A for Windows NT
- Autorun program

4.2 Installing and Starting the Software

Close all application programs before installing the software. If the Autorun doesn't start the installation program, use Run under the Start menu and follow the instructions on screen.

4.3 Getting to Know the Software

4.3.1 Introduction

7301 Application Software is designed for use with 1221 Thermal Comfort Data Logger. This software is the only user interface for 1221. All set-ups specified in the 7301 software must be downloaded to the 1221 before any measurement, either on-line or off-line, can take place.

The software can display data in three kinds of graphs: temperature measurement data, measured wind velocity data and calculated indices. Each type of graph is displayed in a separate window. You can have as many windows (graphs) open as you want, each showing something different, if necessary.

4.3.2 Starting the Software

Use the normal Windows procedure to start the software. After the initial splash-screen, the following screen appears, see Fig. 4.1.




Fig. 4.1 Start-up menu bar for 7301 software

This has a basic menu bar common to many Windows programs. To come further into the program, a new measurement task must be created or an existing measurement task opened. The measurement task files have the suffix .SET. These files are described in more detail in section 4.5.

To create a new measurement task file:

1. Select **File>New**. A new window displaying two axes opens.
2. Select **File>SaveAs**. In the Save As dialogue, type in a unique name for the file and its destination.
3. The name in the Application Software's Title Bar and the window open in the program will contain the newly assigned name.

To open an existing measurement task file:

1. Select **File>Open**, or click on .
2. In the Open dialogue, go to the file destination and highlight the desired file.

3. Click OK.

All the windows that were open when you closed the file will now open on screen.

After you have created a new measurement or opened an existing one, you should notice that the number of menu options in the menu bar increases. The options available under this menu bar are described in the following sections.

4.4 Menu Bar Overview

With a measurement open, the menu bar at the top of the screen is used to enter one of the main 7301 application areas:

- File
- Set-up
- Presentation
- Measurement
- View
- Window
- Help



Fig 4.2 Menu bar when a measurement is open

Many of the most common commands are readily available as a single mouse-click through the Tool Bar icons. These are described in section 4.4.8.

4.4.1 File Menu

The File menu in this program is similar to many other Windows programs. In general, the File menu allows you to select one of the following:

- **New**
This enables you to create a new measurement task file from within the program, see section 4.3.2.
- **Open**
This lets you open an existing measurement task file, see section 4.3.2.
- **Close**
Closes the measurement task currently open.
- **Save**
This saves the setup for the individual windows displayed on screen in the <name>.SET file currently open.
- **Save As**
If you have an original display setup, but want to make some changes to it, this function allows you to save the changes under a new name, preventing the original display (*.SET file) from being lost.
- **Save As Metafile**
This enables you to save the application software windows active on screen as a Metafile. This can be used in other software programs, for example, if a report is required, the metafiles can be used for illustrations. For more details see section 4.6.
- **Print Graph**
This prints the graph(s) in the active window.
- **Printer Setup**
For setting up printer parameters.
- **1....(History)**
Provides a list of, and a short-cut to, the last 4 measurement tasks that have been open.
- **Exit**
Stops any active on-line measurements and quits the program.

4.4.2 Set-up Menu

The Set-up menu, described in detail in Chapter 5, has the following main functions:

- **Communication**

For specifying the communications (Com) port on the PC to be used for connecting the RS-232 from the 1221 (section 5.2).

- **Set-up**

This menu has many functions. These include:

- Specifying where the data is to be taken from (a file, on-line data, or a 1221 dump) (section 5.3).
- Quick Index: an initial selection of the calculated indices required.
- Connections: specify which transducers are connected to the individual modules installed in the 1221.

Note that if you have selected the indices in the Quick Index dialogue, then the software auto-suggests the necessary transducers and their connections to the modules currently installed in the 1221.

- Setting the duration of a measurement and the format of the stored data
- Store Data: selecting which data is to be stored (measurement data and/or index data) and its destination.

Information about transducers, measurement intervals, start and stop times are downloaded to the 1221.

4.4.3 Presentation Menu

The Presentation menu is described in detail in Chapter 6 and has the following main functions:

- **New Graph**

Allows you to create a new graph and define it's appearance.

- **Clear All**
This clears the curves for all the graphs in the windows currently open.
- **Show Connections**
This shows all the connections between the modules installed in the 1221 and the transducers attached.
- **Calculator**
This enables you to convert units and solve arithmetic problems quickly and easily.
- **Info**
This function displays flags created by the transducers connected to the modules and provides information about the flags. It also presents Warning and Error information from the 1221, the software and provides information about the communication link between the 1221 and the software.
- **Edit time axis**
This function enables you to change the appearance of the time axis.

4.4.4 Measurement Menu

The Measurement menu is described in detail in Chapter 7 and allows you to “tell” the 1221 to start/stop off-line or on-line (as specified in the Set-up menu).

4.4.5 View Menu

This menu has two items: Toolbar and Status Bar. These have toggle functions. By selecting or de-selecting them, you can display the Toolbar and Status Bar or hide them from view, respectively.

4.4.6 Window Menu

This allows you to rearrange the windows and icons (minimized windows) in the 7301 software. You can also use the “open window” list to identify the different windows and select a different active window.

4.4.7 Help Menu

This menu provides you with an on-screen user manual through an Adobe® Acrobat® Reader and information about the 7301 Application Software.

4.4.8 Tool Bar

The Tool Bar contains several icons, which represent the most commonly used functions. A single click on an icon starts its associated function. The icons and their associated functions are listed below:



Open an existing file.



Save the setup for the windows displayed on screen in a *.SET file.



Print the graph in the active window.



Start a measurement



Stop the current measurement



Select online or offline



Create new graph



Clear all graphs.



Open Information window



Start Calculator



Help



About 7301



Tool Bar Tips: these inform you about the Tool Bar icon's function. The tip is displayed for 2 seconds or until the icon is selected.

4.5 File-name Conventions

Normally you will access any files you require directly from the 7301 software. There are standard procedures for creating and accessing data and set-up files. These are described in detail in Chapter 5. However, if you need to manually manipulate any of the system-associated files, a summary is provided here of file-name conventions:

- **Set-up or Measurement Task Files**

These files always have the suffix “**.SET**”. They include the setup parameters for the 1221 (for example, measurement start/stop times and transducer connections). They also include information for the software, such as, which windows were open last time the file was used, information about how the information was presented and the indices calculated. These files contain so much fundamental information that they can be stored using unique names and reused in different measurement situations.

- **Data Files**

Data files are generated by the 7301 software from the Data Destination dialog box (section 5.3). The normal extension is “**.CSV**”. CSV stands for “Comma Separated Values”, and is the recommended extension because it can be recognized by spreadsheet programs and thus is easily imported.

- **Index Files**

It is recommended that index file names be preceded by “**i**”, and have extension “**.CSV**”. Thus an index file would appear as follows: **i<name>.CSV**. Again, the CSV suffix is recommended because it is easily accessible by spreadsheet programs, however other extensions can be used. If you do not specify the “**i**” prefix for index files, you should separate them by placing them in different directories. Index file-names are specified in the Store Data dialogue, see section 5.3.11.

Note: index files cannot be read using the 7301 software.

4.6 Use Graphs in Other Software

If you need to publish or present your measurement data, it is often useful to be able to incorporate graphs into your reports. This is possible by saving the graph data in the active window as a Windows Metafile (*.WMF). These files can be imported into a variety of DTP (DeskTop Publishing) programs.

To save graph data as a Metafile

1. Select File>Save as Metafile.
2. In the Save as Metafile dialogue, define the name and destination of the graph data.
3. Press OK.

6.1 Introduction

The **Presentation** portion of the 7301 includes six options, shown in Fig. 6.1. These enable you to create new or edit existing graphs, display the transducer connections and see what indices are being calculated and which ones are also being stored, display a conversion calculator, view any error or warning flags that may be raised by the transducers, 1221, interface or software, and change the time axis in the graph.

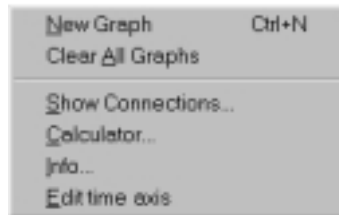


Fig. 6.1 The Presentation menu


Each of these options is described in detail in this chapter.

6.2 New Graph

This option displays a new window with a new set of axes, see Fig. 6.2.

Each graph displays up to 3 curves for a particular type of data, for example, indices or temperature. A new graph has no title and no data displayed - these need to be set.

To set up a new graph

1. Select **Presentation>New Graph** or use . A new window with an undefined graph is displayed.
2. Click on the **Graph Data** softkey. The **Graph Settings** dialogue is displayed.

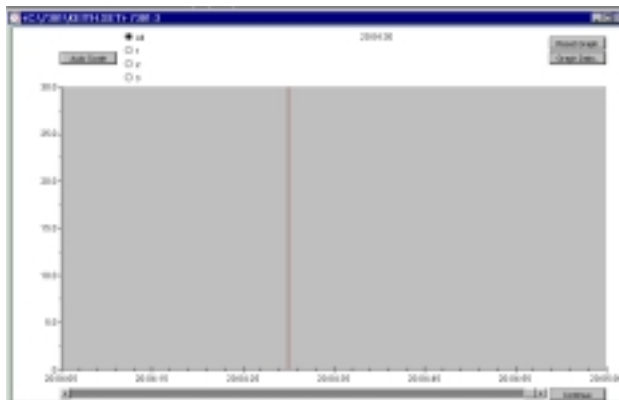


Fig.6.2 A new graph window

3. In the Graph Type field, pull down the menu and select one of the graph types. There are 5 to choose from: Index, Temperature, Air Velocity, Radiation, and Analogue Input.

If Index is selected, go to Index definition dialogue, page 6–5.

4. Now click on one of the **Define** softkeys. The Select Value dialogue is displayed. A list of all the available selections is displayed.

Note: if an air velocity graph is selected, all the measured air velocities are possible selections here.

5. Select one of the options in the list, see Fig.6.3. If you need more information about what is being measured and what is stored, click on the **Show Connections** softkey. Using this is described in section 6.4.
6. Now select one of the parameter check boxes and click on **OK**. Note that only the ones selected when you setup the measurement are available.
7. Repeat steps 4. to 6. if you want more than a single curve on the graph.

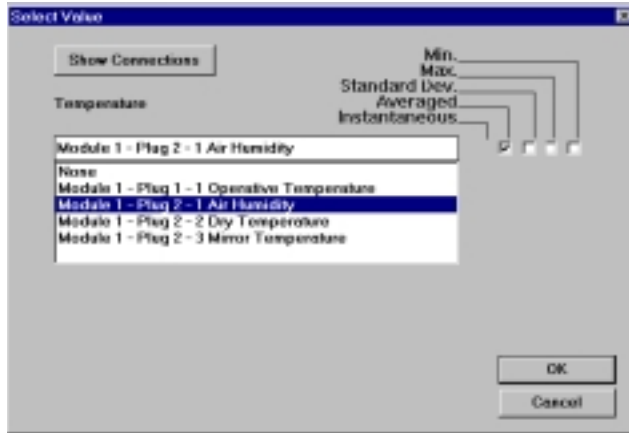


Fig.6.3 The Select Value dialogue for a temperature graph

8. Click on **OK** when you are satisfied with your selections.

Index definition dialogue

When Index is selected in the Graph Settings dialogue, use this procedure:

1. Click on one of the Define softkeys and the Index Definition dialogue is displayed.
2. Pull down the Index Type menu. A list of all the indices is displayed, see Fig.6.4.
3. Select the desired index. The dialogue now displays the measurement parameters necessary to calculate the index. If the necessary transducer is not available, then this index can not be calculated or displayed on a graph.
4. Select the desired transducers and one of the parameters check boxes. Note that only the ones selected when you setup the measurement are available. Click on **OK**.
5. Repeat these steps if you want up to 3 curves on the graph.



Fig 6.4 A list of indices in the Index Definition dialogue

6. Click on OK when you are satisfied with your selections.

6.2.1 Auto Scale

This ensures that all the values are displayed within the range of the Y-axis. Simply by clicking on this softkey invokes this function.

6.2.2 Radio Buttons: All, 1, 2, 3

These define which data-set the auto-scale function works on. For example, when 1 is selected, the auto-scale ensures that all the data from curve 1 is within the range. The same applies to curves 2 and 3 when their respective number is selected. When All is selected, this ensures that all the data from each data-set is within the range.

Note that the Auto-scale function works on all data, not just the displayed data, but also the data that has scrolled out of the window.

6.2.3 Reset Graph

This is for online users. When the data from the transducer is unsettled, the graph can be cleared and reset to start accepting data from the “reset time”.

6.2.4 Moving the Cursor

The cursor on the graph can be moved by positioning the mouse cursor and right-clicking. The values for the curve(s) where the cursor cuts it is shown opposite the curve description in the field at the top of the graph.

6.3 Clear All Graphs

Warning! This function does not contain an Undo feature. All graphs will be lost.

To clear all the graphs

Select `Presentation>Clear All Graphs` or  to clear all the curves on all the open windows, leaving blank graphs.

6.4 Show Transducer Connections

This option displays all the connections between the modules installed in the Data Logger and the transducers attached. Transducer connections cannot be changed in this option, they can only be made in the Setup option see section 5.3.4. This option provides information and can remain open while measuring. This option can also show which measurement parameters are measured and which of them are stored during the measurement

To show the connections

1. Select Presentation>Show Connections. The Transducer Connections dialogue is displayed.
2. Click on the plug of the particular transducer and the values being measured are displayed. Those shown in light blue are stored to disk, see Fig.6.5.

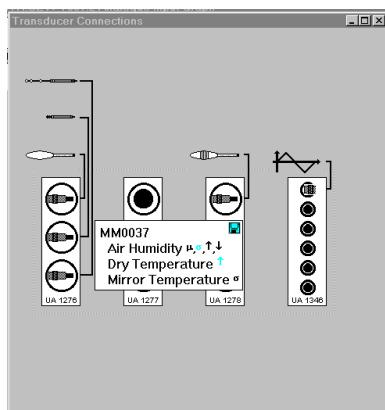


Fig.6.5 The Transducer Connections dialogue showing which parameters are being measured and those also being stored.

The information field tells you the type of transducer, the parameters being measured, the indices being calculated and what data is being stored.

The example illustrated in Fig.6.5, shows the following information:

Transducer: MM0037		
Meas. Parameters		Stored Parameters (light blue colour)
Air Humidity:	μ , σ , \uparrow , \downarrow	σ
Dry Temperature:	\uparrow	\uparrow
Mirror Temperature:	σ	
Key to symbols:	i = Instantaneous μ = Averaged σ = Standard Deviation \uparrow = Maximum \downarrow = Minimum	

Table 6.1 Overview of symbols for transducer parameters

6.5 Altering the Appearance of the Graphs

6.5.1 Change the Colour of the Curves

In the Graph Settings dialogue, see section 6.2, the colour of the individual curves can be changed.

Click on the softkey next to the coloured line. A Windows style colour palette is displayed. Use normal Windows procedures to redefine the colour.

6.5.2 Change the Appearance of the Graph Text

The text on the graphs, including the text on the axes can be edited.

Double click on the text you want to edit. A new dialogue is displayed, which enables you to change position of the labels and the font styles.

6.5.3 Change the Appearance of the Axes

Select **Presentation>Edit time axis**. A new dialogue is displayed, see Fig.6.6.

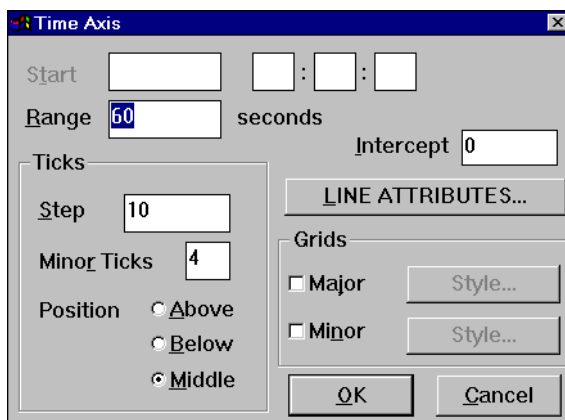


Fig 6.6 The Time Axis dialogue.

Double click on the vertical axis and a new dialogue is displayed, see Fig.6.7:

Double click on the axis label you want to edit. A new dialogue is displayed: for the X-axis see Fig.6.8; for the Y-axis see Fig.6.9.

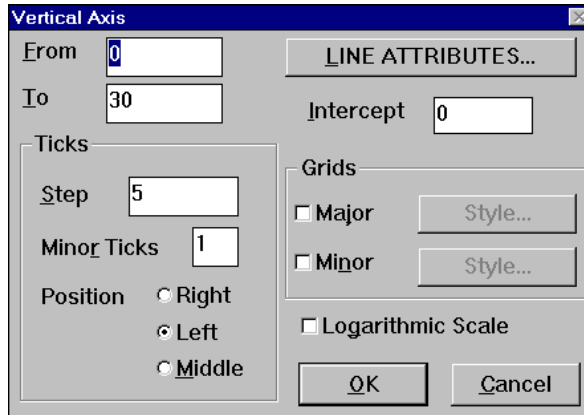


Fig. 6.7 The Vertical Axis dialogue.

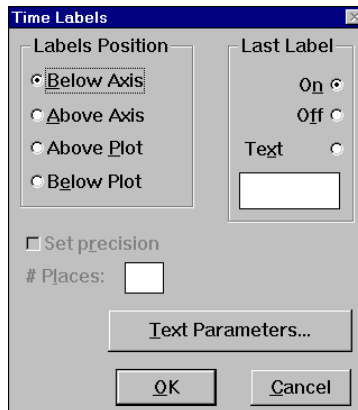


Fig. 6.8 The time axis label dialogue.

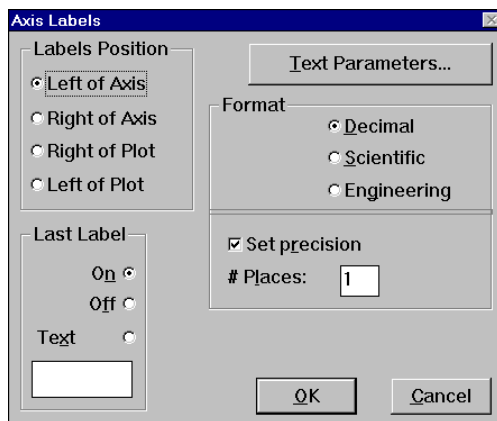


Fig 6.9 The vertical axis label dialogue.

6.6 Information (Info)

This facility displays any flags created by the transducers connected to the modules and any Error or Warning flags raised for the 7301 Application Software, the 1221 or the connection between the software and the Data Logger.

To view flags raised

Select Presentation>Info, see Fig.6.10.



Fig.6.10 The Info dialogue.

The transducer flags are shown in a number of “fields”. These correspond to the number of sockets on the module installed in the labelled location.

For example, in Fig.6.10 the module in location Mod 1 has 6 sockets, a UA1346 Analog Module, 3 sockets on Mod 2, 2 sockets on Mod 3 and 3 sockets on Mod 4.

The Flags S (incomplete statistics) and U (unstable transducer) are raised on Mod 4. The Warnings and Errors for the 7301 software, communication and the 1221 are listed in individual fields at the bottom of the window.

A complete list of Error, Warning and Module flags are provided in sections 6.6.1, 6.6.2, 6.6.3 and 6.6.4.

The flags can be cleared by clicking on the `Clear` softkey.

6.6.1 System Error Messages and Warnings

Message	Problem	Solution
7301 booted during measurement	Power On/Off	Use Uninterruptable Power Supply (UPS)
Cannot open destination file	Wrong directory specification. The specified file exists but is read only	Change directory or delete file and change attribute
Cannot open file		Correct the specification
Cannot open index file		Correct directory or delete the file or change the attribute
Cannot open selected source		Correct directory
Cannot read Set-up from 1221. Cannot communicate with 1221	Wrong Com-port or cabling. Is 1221 powered up? Fatal system error.	Check cabling. Check the selected COM port. Check 1221
Cannot write Set-up to 1221. Cannot communicate with 1221	Corrupted data communication of 7301/1221 synchronization.	
Checksum error in file	CRC error detected while reading file	Do not use this file
CRC error detected in reading source. Source not read	CRC error detected while reading file, 1221 dump or on-line 1221 data	When 1221 dump or on-line data, then check cabling and environment. Retry

Table 6.2 System errors and warnings

Message	Problem	Solution
Destination file selected already exists. OK will overwrite - all data will be lost	Destination file already exists	Choose new file or overwrite
Error detected in reading source header	File destroyed or wrong type. Fatal error	Do not use this file
Error in file header		
Illegal Value Type	The value type is not the required type for defining the parameters of the index	Make sure the selected parameter is of the type specified in the list of available parameters for the selected index
Not enough windows timers available for 7301. Try stopping other windows applications and restart 7301	Timers in Windows are not available. Fatal system error	Stop Windows. Re-start Windows and do not start the applications occupying the timers. Re-start 7301
Numeric value expected	A character has been entered instead of a numeric value for a numeric constant	Check the constants required for you index calculation(s). Change to a numeric.
Parameter definition not complete	Not all the parameters required for the selected index calculations have been specified	Check your indices and add the parameter(s) required for the calculation
Specification is complete	You are trying to select more parameters for an index which is already fully defined	Observe the number of parameters required for the selected index and specify only these
Start time must be before stop time	The specified start/stop times are wrong	Correct the parameters

Table 6.2 (Cont.) System errors and warnings

Message	Problem	Solution
The index file selected already exists. OK will overwrite - all previous data will be lost	Index file(s) already exists	Choose new file or overwrite
The instrument is not a 1221. Set-up not read	Wrong equipment, corrupted data communication or communication against each other. Fatal system error	Try again
The instrument is not a 1221. Set-up not written		Check cabling, 1221 and try again
The specified destination and index files are the same. Measurement is not possible	The destination and index files must be different files	Choose different files
Value out of range	The value entered for a numeric index constant exceeds the recommended range for the constant	Make sure the value is correctly specified. If possible, change to a value that lies within the recommended range ¹
Value out of range. Set to limit	The value entered for a numeric index constant exceeds the allowable range for the constant	Change the value for the constant so that it lies within the allowable range ²
Yes/No expected	“Yes” or “No” required for index constant	Change the index constant to “Yes” or “No”

1. Recommended ranges for constants: $0 \leq \text{CLO} \leq 2$, $0.8 \leq \text{MET} \leq 3.0$, $0.0 \leq i_{\text{ce}} \leq 1.0$

2. Allowable ranges for constants: $-5 \leq \text{CLO} \leq 10$, $0.8 \leq \text{MET} \leq 5.0$, $0.0 \leq i_{\text{ce}} \leq 5.0$

Table 6.2 (Cont.) System errors and warnings

6.6.2 Communication Errors

Message	Problem	Solution
Com. 1221: Communication	Time-out, over-run, parity or frame error. Communication noise, or HW error	Check cabling, environment and PC configuration. Try stopping other applications or drivers
Com. 1221: Parameter mismatch	Communication noise, PC configuration, HW or SW error	
Com. 1221: Unknown header		
Com. 1221: Value out of range (units not recognized)		Check parameter range for 1221 set-up. Check cabling, environment and PC configuration. Try stopping other applications or drivers
Com 1221: Wrong command	Communication noise or wrong moment for command	Check cabling and environment. Retry. Check cabling, environment and PC configuration. Try stopping other applications or drivers
Communication: CRC	Temporary CRC error	Check cabling and environment. Check cabling, environment and PC configuration. Try stopping other applications or drivers
Communication: Timeout	Fatal error in 1221 or 1221 is busy (on-line or down-loading measurement). Is the 1221 connected and powered up?	Check cabling, environment and PC configuration. Try stopping other applications or drivers

Table 6.3 Communication errors

Message	Problem	Solution
RS-232: Over-run	Communication problems	Check cabling, connections and PC configuration
RS-232: Parity		
RS-232: Framing		
RS-232: Break		

Table 6.3 (Cont.) Communication errors

6.6.3 1221 Errors (Apparatus)

Message	Problem	Solution
1221 Error	Fatal error. Hardware error in 1221	Repair
Basis: Power failure	Power Off/On	Check power or battery
Basis: Sample over-run	The calculation or data management capacity in the 1221 is too small for the statistical values (i, m, s, h, l) or modules specified	Remove transducers, turn down the save interval or reduce the number of the chosen statistical values (i, m, s, h, l)
Basis: Data over-run	No more memory for accumulated data	Stop time-consuming PC activities
Basis: Battery low	battery low	Replace battery or connect power to 1221
Basis: Error	Hardware error in 1221	Repair
Module N: Error	HW error	Repair. Report to INNOVA
Module N is missing	Missing module or HW error	Do not address an empty slot. Insert the selected module
Not a 1221	Wrong ID from instrument	Check instrument

Table 6.4 Type 1221 errors

6.6.4 1221 Errors (Module)

Message	Problem	Solution
E (Code for: Error transducer X module N)	HW error	Repair. Report to INNOVA
S (Code for: Incomplete statistics for transducer X, module N)	Insufficient data for calculating statistics	In start phase this is o.k. After start phase, reduce the measurement interval
C (Code for: No transducer connected for transducer X, module N)	Disconnected transducer or maybe defective transducer	Do not choose this transducer, or connect it. If a defective transducer, repair
U (Code for unstable value in module N)	Only in use for humidity transducer. Either unstable dew point or defective transducer	Look at mirror temp. to determine if the transducer is functioning properly. If it is not, clean it (see transducer manual). If necessary, repair
O (Code for: Overload transducer X in module N. Do not take the measurement results seriously)	Use of the transducer does not match the specification	Do not use the transducers beyond their specifications
P (Code for: Not enough power to feed transducer)	The environmental/measurement conditions require more power than the 1221 can deliver	Remove transducers or external power supply

Table 6.5 Type 1221 module errors

6.7 Calculator

This enables you to convert units and find simple arithmetic solutions quickly and easily. The calculator can be left open while viewing the measurement or index data.

To access the calculator

Select Presentation>Calculator, see Fig.6.11;

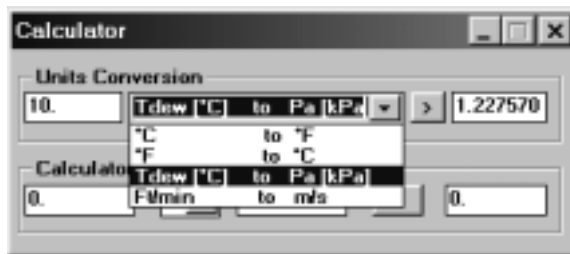


Fig.6.11 The Calculator dialogue.

