Product Data

Thermal Comfort Data Logger - INNOVA 1221

USES:

° For measuring all physical parameters necessary to evaluate heat stress and thermal comfort

° For evaluating heating and ventilation system performance

° For calculating comfort indices PMV, PPD and DR

° For calculating heat stress indices WBGT and required sweat rate

° For calculating ET*

° For displaying measurement data and calculated indices as graphs in exportable formats

° For long-duration monitoring (weeks) of the time history of thermal parameters and indices

° For logging data from third party transducers with analogue outputs

° For evaluation of the thermal environment in vehicles

FEATURES:

° Complies with: ISO 7730/CEN 27730; ISO 7726; ISO 7243/CEN 27243; ASHRAE 55; SAE J2234

° Modular system incorporating four slots for simultaneous connection of up to 12 transducers

° Four modules available: Comfort Module UA 1276, Heat-Stress Module UA 1277, Dry Heat Loss Module UA 1278 and Analogue Interface Module UA 1346

° Operates as both a stand-alone and an on-line instrument

° Data can be read and displayed on-line from a memory dump after off-line measurement, or from a disk file

° Data is stored in spreadsheet format and can be re-used to calculate other indices

° The application software runs under Windows™ and supports Clipboard function for graphs

° Input for up to six analogue signals (V or mA)

System Introduction

The Thermal Comfort Data Logger - INNOVA 1221 enables the evaluation of thermal comfort or local thermal discomfort as well as workplace-related heat stress.

The INNOVA 1221 is a black box built up modularly with up to four input modules. The data logger is supplied with a battery pack for use in the field. A mains transformer is also available.

The INNOVA 1221 is set up via the Thermal Comfort Manager Software - INNOVA 7701 and can be used in the field to collect data without any additional software or hardware, or it can be used in connection with a PC and to view data on-line.

The INNOVA 7701 software retrieves data from the data logger via the RS-232 or USB interface on the host computer. All Data is stored in the SQL Server 2005 database.

Hardware Introduction

The INNOVA 1221 enables the measuring of all the physical parameters necessary to evaluate thermal comfort according to ISO 7730 and ISO 7726, as well as to evaluate heat stress according to ISO 7243 and ISO 7933.

The data logger is built up modularly, allowing installation of up to four input modules. The types of transducers that can be connected depend on the input module; these are described later on in this Product Data.

The INNOVA 1221 can operate as a stand-alone data logger or on-line together with a PC, where data can be displayed and processed. The data logger also supplies the necessary power to the transducers connected to the modules and it controls the measurement.

Power Supply
The INNOVA 1221 can use two separate power supplies; a battery pack or a mains power supply.

Depending on the configuration of the INNOVA 1221 and the transducers used, the battery pack enables up to 18 hours of measurements to be made. A mains power supply fits neatly into the same slot as the battery box, enabling mains power to be used.

Setup the INNOVA 1221
The following parameters are set up on the INNOVA 1221 via the RS-232 interface:

Transducers
You define which transducers are connected to the sockets. You also decide what measurement data is stored to, or retrieved from, the INNOVA 1221. Five types of data are measured: Instantaneous values (i), Mean values (m), Max. values (h), Min. values (l), and the Standard deviation (s).

Measurement Interval
While the transducers for the INNOVA 1221 have a fixed sampling rate, depending on the transducers chosen, a measurement interval of as little as one tenth of a second can be specified in the INNOVA 7701 application software.
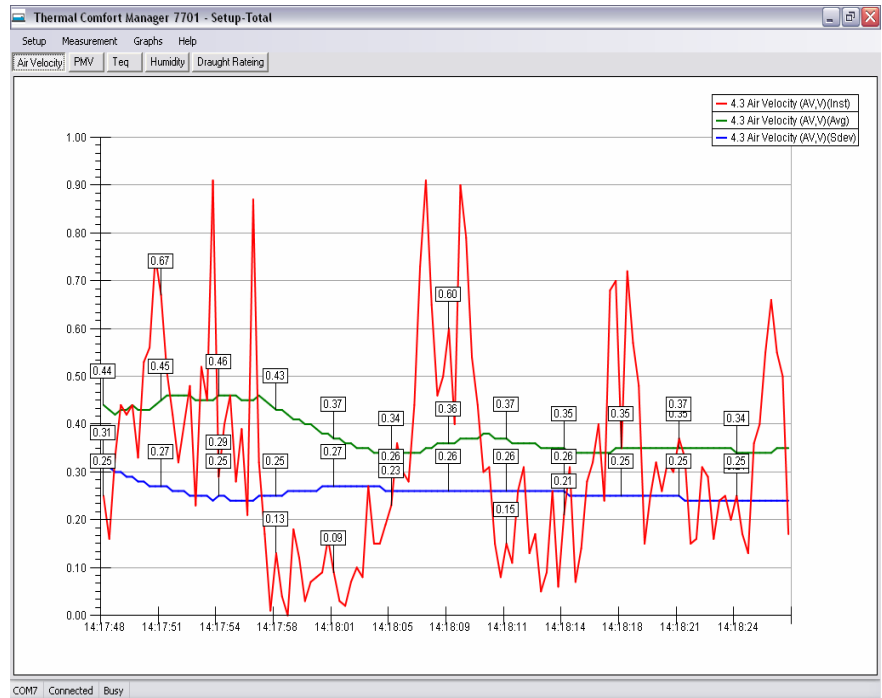

Fig.1 Thermal Comfort Manager Software-INNOVA 7701 running on a PC. It provides the interface for the Thermal Comfort Data Logger-INNOVA 1221.

Averaging Time
This option allows you to specify over how long a period the maximum, minimum, mean values and standard deviation are to be calculated.

Automatic Measurements
The start and stop times for the measurement are entered, enabling the data logger to operate as a self-contained, stand-alone instrument.

Both before and after measurement the INNOVA 1221 is in a passive state. This ensures that there is power available from the battery pack when required.

Data Format
All selected measurement and index data are stored in the SQL Server 2005 database where they can be accessed e.g. from Excel. An application is included in the software package to enable this.

Interface
The data logger comes complete with an RS-232 serial interface socket.

The interface is used to setup and transfer measurement data from the data logger to the PC. Using the INNOVA JV0901 USB to RS-232 converter the PC USB port can also be used as well.

Two Modes of Operation
The INNOVA 1221 has two modes of operations:

Stand-alone
Once the measurement setup has been defined for the INNOVA 1221 and the transducers, the PC can be disconnected, allowing the data logger to operate as a stand-alone unit. All the measurement data from the transducers is transferred to the data logger and stored in the internal memory, which can, for example, store up to one week's worth of measurement data if a 10 minute measurement interval is selected.

On-line
If real-time measurement data is desired, simply retain the PC/1221 connection. The RC-232 interface enables real-time measurement data to be transferred to the PC and displayed on screen as graphs.

The measured data is stored in the SQL2005 Server database and can be imported into Excel using the provided Excel software provided.

Comfort Module UA1276	Heat Stress Module UA1277	Dry Heat Loss Module UA1278	Analogue Interface Module UA1346
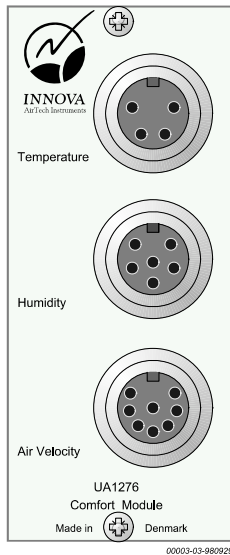
This module enables transducers to be connected that will provide measurement data for the majority of the physical parameters required to evaluate thermal comfort.

The module has three sockets, enabling a Temperature Transducer, a Humidity Transducer and an Air Velocity Transducer to be connected.
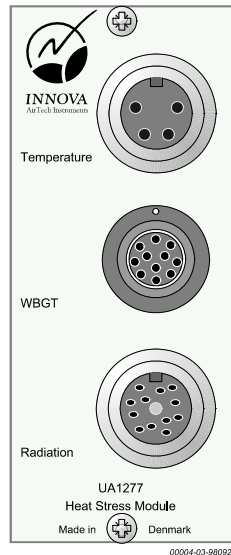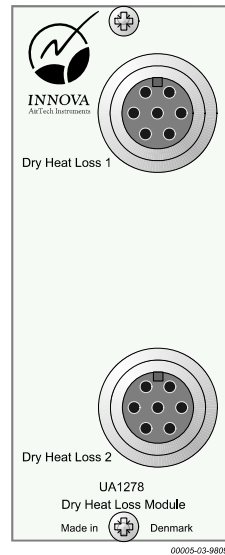
This module is able to connect the transducers that will provide measurement data to evaluate heat stress.

The module has three sockets, enabling a Temperature Transducer (with a wider measurement range than UA 1276), a WBGT Transducer and a Radiant Asymmetry Temperature Transducer to be connected.

This module enables two Dry Heat Loss Transducers MM0057 to be connected.

The transducer can be operated in the normally heated mode where it measures dry heat loss and equivalent temperature or in an unheated mode where it measures operative temperature.

Due to the power consumption, it is recommended that the number of UA1278 modules fitted to the 1221 is limited to three.
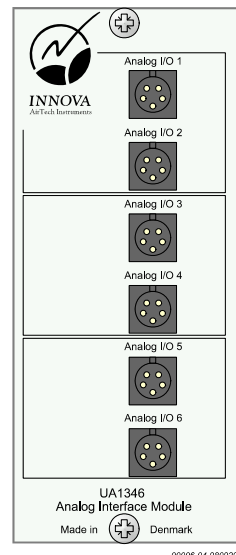
This module enables six analogue signals to be sampled from six non-specific measuring instruments. The data is sampled, stored and displayed just like data from the other measurement modules.

Ordering Information

| Thermal Comfort Data Logger-INNOVA 1221	Cables: From computer to 1221 (alternatives):	CONFIGURED SYSTEM
Includes the following accessories:		**INNOVA 3710**
7701 Application Software	WL0945 RS-232 cable 25/9pin	Basic Thermal Comfort System comprises:
ZG0146 Battery Box	WL0946 RS-232 cable 25/25 pin	1221 + 7701 + UA1276 + MM0034 + MM0037
Instruction Manual	JV0901 RS-232 to USB converter	+ MM0038 + MM0060 + WL0945 + KE0357 +
		UA0803 + UA1348 + DH0492 + 4*UA0588
BASIC SYSTEM REQUIREMENTS	**OPTIONAL ACCESSORIES**	
Requires on or more of these modules:	ZG0342 Mains Power Supply	
UA1276 Comfort Module	AQ0157 Charging Adaptor	
UA1277 Heat Stress Module	UA0803 Tripod incl. one rod	
UA1278 Dry Heat Loss Module	UA1348 Tripod extension rods, 3 pcs.	
UA1346 Analogue Interface Module	UA0588 Transducer Mounting Adaptor	
	DH0492 Tripod Mounting adaptor, 3 arms	
Requires one or more of these transducers	(excl. 3*UA0588)	
MM0030 WBGT Transducer	UA1347 Tripod Mounting Adaptor, 4 arms	
MM0034 Air Temperature Transducer	(excl. 4*UA0588)	
MM0035 Surface Temperature Transducer	KE0357 Transducer Carrying Case	
MM0036 Radiant Temperature Asymmetry	KE0401 WBGT Transducer Carrying Case	
Transducer	AO1429 Adaptor Cable for MM0023 to	
MM0037 Humidity Transducer	UA1278	
MM0038 Air Velocity Transducer	JP0500 Analogue Connector to UA1346	
MM0057 Dry Heat Loss Transducer		
MM0060 Operative Temperature Transducer		

Specifications INNOVA 1221, UA1276, UA1277, UA1278 and UA1346

DIMENSIONS:
Height: 138 mm (5.4")
Width: 285 mm (11.2")
Depth: 300 mm (11.8")
Weight: 4.0 kg (8.8 lb.) excl. power supply

MEASUREMENT RANGE:
For Dry Heat Loss Module—UA1278 when mains power supply ZG0342 is connected**
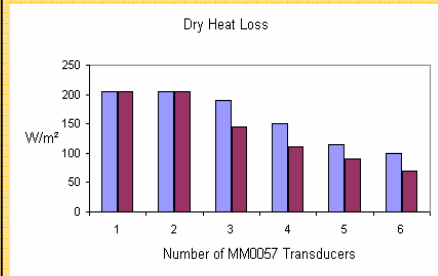
Blue shading: $t_{amb} \geq 45°C$
Purple shading: $t_{amb} < 45°C$

POWER SUPPLY:
Internal Power Supply: plug-in battery pack (ZG0146) containing 6 IEC R20 alkaline batteries or 6 NiCd rechargeable cells

External Power Supply (optional): plug-in power supply ZG0342. This is powered from 90 to 264 V AC mains supply at 47 to 65 Hz or 360 to 444 Hz

Power Consumption: INNOVA 1221 alone 1.8W. UA1276 alone (without transducers) 0.4W, UA1277 alone (without transducers) 0.2W, UA1278 alone (without transducers) 0.4W

Battery Lifetime (typical): 18 hours with alkaline batteries, 9 hours with rechargeable NiCd batteries installed (with one UA1276 and one 1277 installed)

10 hours with alkaline batteries, 5 hours with rechargeable NiCd batteries installed (with one UA1276 and one 1278 installed)

Data Transfer:
Built-in RS-232 interface using following communication parameters:
  Baud Rate: 9600
  Data Bits: 8
  Stop Bits. 1
  Parity: none
  Handshake: hardwire/switched line

DATA STORAGE:
INNOVA 1221 can store at least 10240 measured values. These values can be instantaneous, minimum, maximum, mean and standard deviation.

** If an extended operating range is necessary contact LumaSense Technologies A/S

COMPLIANCE WITH STANDARDS:

CE	CE-mark indicates compliance with EMC Directive and Low Voltage Directive.
Safety	EN 61010-1 (1993) & IEC 1010-1 (1990): Safety requirements for electrical equipment for measurement, control and laboratory use.
EMC Emission	EN 5008 1 - 1 (1992) : Generic emission standard. Part 1: Residential, commercial and light industry. FCC Class B limits.
EMC Immunity	EN 50082-2 (1995): Generic immunity standard. Part 2: Industrial environment. **Note:** The above is guaranteed using accessories listed in this Product Data sheet only.
Temperature	IEC 68-2- 1 & IEC 68-2-2: Environmental Testing. Cold and Dry Heat. Operating Temperature: +5°C to +50°C (41°F to 122°F) ** Storage Temperature: -25°C to +70°C (-13°F to +158°F)
Humidity	IEC 68-2-3: Operating 90% RH (non-condensing at 30°C) IEC 68-2-3: Storage 90% RH (non-condensing at 40°C)
Enclosure	IEC529: IP20
Mechanical	IEC 68-2-6: Vibration: 0.3 mm, 20m/s², 10-500 Hz EC 68-2-27: Shock: 750 m/s² IEC68-2-29: Bump: 2 x 1000 bumps at 400m/s²

MODULES

Comfort Module—UA1276

Socket	Transducers	Measurement *** Range (UA1276)	Resolution
Temperature	MM0034, MM0035, MM0060	-20° to 100° C	0.1° C
Humidity	MM0037	-20° to 100° C	0.1° C
Air Velocity	MM0038	See transducer Product Data Sheet	

Heat Stress Module—UA1277

Socket	Transducers	Measurement *** Range (UA1277)	Resolution
Temperature	MM0034, MM0035, MM0060	-40° to 150° C	0.1° C
WBGT	MM0030	-40° to 150° C	0.1° C
Radiation	MM0036	See transducer Product Data Sheet	

Dry Heat Loss Module—UA1278

Sockets (2)	Transducers	Measurement *** Range (UA1278)	Resolution
Dry Heat Loss	MM0057 Dry Heat Loss	0 to 205 W/M² *	0.1 W/M²
	MM0057 Operative	-20° to 50° C	0.1° C

Analogue Input Module—UA1346

Sockets (6)	Measurement Range (UA1346)	Resolution
Analogue Input	Voltage: 0—10V (Current: 0—20 mA)	0 to 4 V: 1 mV 4 to 10V: 2.5 mV

* At 0.5 CLO. Only one UA1278 installed
*** Indicates the measurement range on the module and not the range for the individual transducers
For additional specifications, see the individual Product Data Sheets for the transducers

LumaSense Technologies A/S reserves the right to change specifications and accessories without notice