

Protege Temperature and Humidity Sensor Installation Manual

ICTProtege.[®]

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1 Welcome!

Thank you for purchasing the Protege Temperature and Humidity Sensor (PRT-ATH1/ACC-ATH1) by Integrated Control Technology Limited. The Protege System is an advanced technology security system specifically designed to enhance the functionality of condominium and apartment security with flexible local monitoring and offsite communication.

The PRT-ATH1 Protege Temperature and Humidity Sensor extends the Protege System by providing Temperature, Humidity and Dew Point readings that can be used for building automation and control or environmental alarms. The Protege Temperature and Humidity Sensor can monitor the environmental conditions of highly critical server rooms, this data can be used to control the air conditioning in the room to maintain regulated conditions. Protege can also use the data to trigger reportable alarms when normal operating conditions are exceeded to enable a prompt response to any problems.

The ACC-ATH1 Protege Temperature and Humidity Sensor is identical to the PRT-ATH1 with the exception that it includes two 0-10V or 4-20mA independently configurable analog outputs. In this manual the term Protege Temperature and Humidity Sensor will refer to both modules except where stated otherwise.

The current features of the Protege Temperature and Humidity Sensor include:

- Temperature Sensor -40°C to 60°C ($\pm 1^\circ\text{C}$) -40°F to 140.0°F ($\pm 2^\circ\text{F}$)
- Humidity Sensor 0% to 100% ($\pm 3\%$)

When receiving the Protege Temperature and Humidity Sensor you should find the kit contains the items listed below. The kit type is clearly labelled on the packaging and will tell you what your kit contains. Please note that if you do not have the correct contents contact your distributor immediately.

- Protege Temperature and Humidity Sensor Quick Start Guide
- Protege Temperature and Humidity Sensor
- 10 Way Wiring Loom

For more information on the Protege Temperature and Humidity Sensor and other Integrated Control Technology products please login to www.incontrol.co.nz.



Indicates a warning or advisory message relating to the section or location



Indicates a hint or suggestion that relates to the section or location

[TEXT]

Bold text enclosed in brackets is used to show a section number or address of a programmable option or information on programming shortcut sequences.

Italics

Italic text shows a reference to a section, page, manual or website

2 Protege System Products

2.1 Protege System Management Suite

The Protege System Management Suite application is a Windows®™ based Integrated Access Control and Alarm Management System designed for any configuration from single site, single Protege SE Integrated System Controller applications up to global multi-national corporations using multiple site, multiple Protege SE Integrated System Controller installations.

Product Code	Description
PRT-SMGT-ENT	Protege System Management Suite Enterprise Edition
PRT-SMGT-PRO	Protege System Management Suite Professional Edition
PRT-SMGT-STN	Protege System Management Suite Standard Edition
PRT-SMGT-1U	Protege System Management Suite Single Client License Edition

2.2 Protege Modules

The Protege System can be expanded to accommodate large numbers of modules using the encrypted RS-485 Network. Modules that are currently available are listed below. *Visit www.incontrol.co.nz for the latest Protege Module and product information.*

Product Code	Description
PRT-CTRL-SE	Protege SE Integrated System Controller
PRT-CTRL-LE	Protege LE Integrated System Controller
PRT-TLCD	Protege Touchscreen Keypad
PRT-ATH1	Protege Temperature and Humidity Sensor
PRT-KLCD	Protege Alphanumeric LCD Keypad
PRT-ZX16-PCB	Protege 16 Zone Input Expander
PRT-ZXS16-PCB	Protege Standard 16 Zone Input Expander
PRT-PX16-PCB	Protege 16 PGM Output Expander
PRT-PXS16-PCB	Protege Standard 16 PGM Output Expander
PRT-RDM2-PCB	Protege Mini 2 Reader Expander
PRT-RDS2-PCB	Protege Standard 2 Reader Expander
PRT-RDI2-PCB	Protege Intelligent 2 Reader Expander
PRT-RDE2-PCB	Protege Ethernet 2 Reader Expander
PRT-ADC4-PCB	Protege Analog Input Expander
PRT-DAC4-PCB	Protege Analog Output Expander
PRT-COMM	Protege RS-232 Serial Communication Interface
PRT-PX16-DRI	Protege 16 Input Destination Reporting Interface
PRT-MNR4-PCB	Protege 4 Way Module Network Repeater
PRT-PSU-5I	Protege Intelligent 5 Amp Power Supply
PRT-HIO	Protege Hi-O Network Door Control Module

3 Mounting

The Protege Temperature and Humidity Sensor is intended to measure the temperature and humidity of air in an enclosed space (a room). It is intended to be mounted on a wall with adequate air flow around and through it.

Step 1

Select where to mount the Protege Temperature and Humidity Sensor. Be sure to account for the temperature gradient within the room. Hot air rises so rooms are generally warmest toward the ceiling. In an office setting, when determining a comfortable temperature for seated and upright people, mount the Protege Temperature and Humidity Sensor 1.2m above the floor.

Step 2

In a factory or server room, where the ambient temperature around machinery is to be measured, mount the Protege Temperature and Humidity Sensor 1.7m above the floor. Mount the Sensor in a position where it is away from hot or cold spots within the room. E.g. windows, air conditioning vents, lighting etc. Air enters the Protege Temperature and Humidity Sensor through vents along the sides of the case. These should be unobstructed.

Step 3

Remove the rear half of the Protege Temperature and Humidity Sensor by depressing the retaining clip and rotating the case halves apart.

Step 4

Hold the rear case half against the wall and mark the mounting holes and cable entry area. The cable entry area should align with a hole cut through the plaster wall-board. Cables are intended to be run inside the wall. Use appropriate screws (not supplied) to affix the case to the wall.

Step 5

Run the wiring. Refer to later sections of this manual for the electrical connections. Leave about 20cm (8") of wire protruding through the center of the mounted half of the case.

Step 6

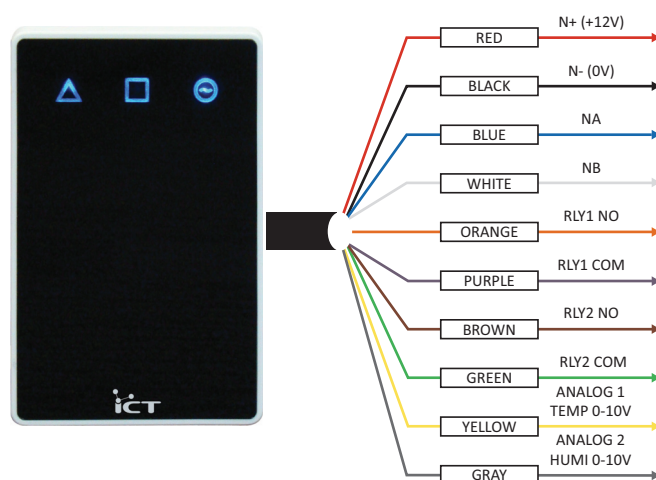
Connect the wiring to the Protege Temperature and Humidity Sensor electronics, then, to clip the case together, hook the top edges together then rotate and press the bottom in until you hear the clip snap into place.

4 Wiring and Configuration

To operate over the Encrypted Module Network and interface with the Protege Integrated System Controller, the Protege Temperature and Humidity Sensor needs to be correctly wired to the Protege RS-485 System Module Network and to any devices that it will control through Programmable Outputs (PGM's). It also needs to be set to operate in the correct Mode and to have a suitable Address. The following sections detail how this is achieved.

4.1 Loom

The Protege Temperature and Humidity Sensor is supplied with a wire loom attachment and is connected using a keyed 10 position snap lock connector. The 10 way wiring loom connection uses the following color coding.



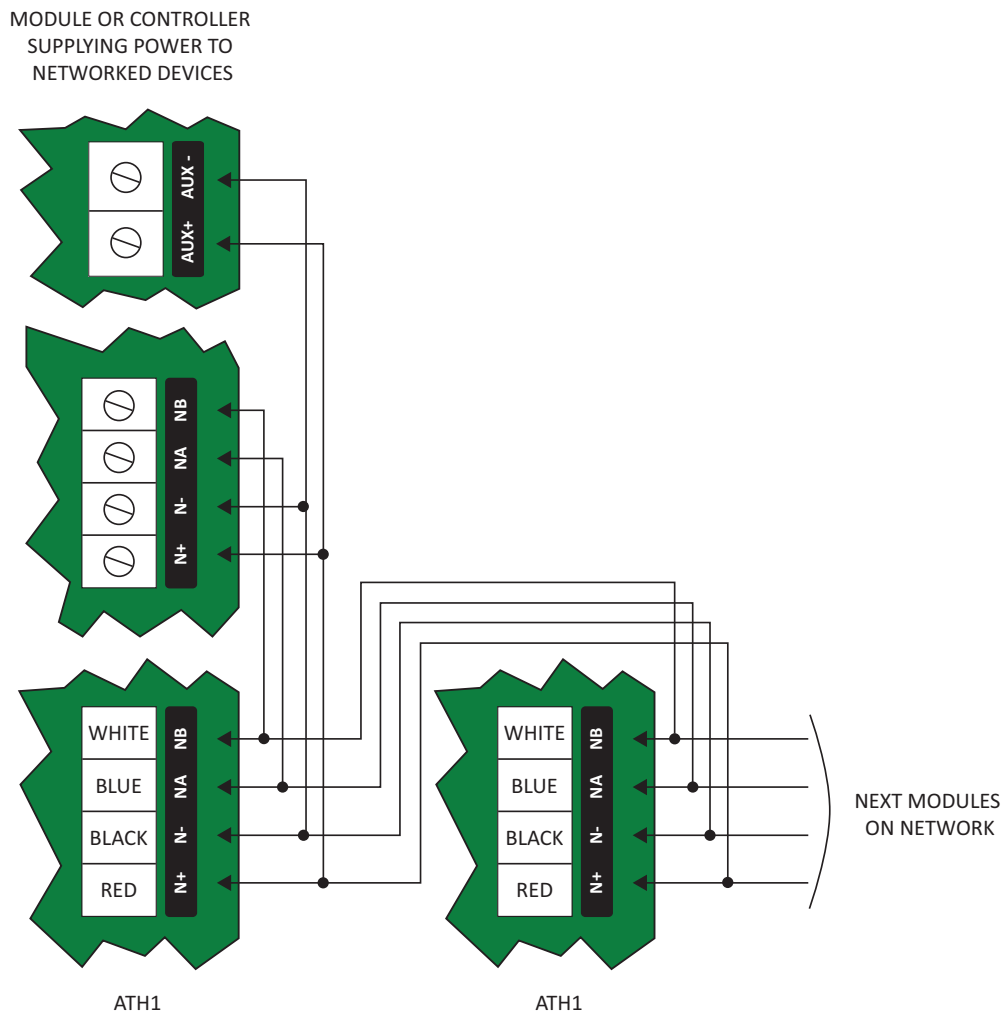
Wiring Loom Color Coding

4.2 Encrypted Module Network

The Protege Temperature and Humidity Sensor incorporates encrypted RS-485 Communications Technology. Connection of the communications should be performed according to the diagram shown below. It is important that the N+ Network Communications power be supplied from an independent battery backed power supply unit or a networked module capable of supplying the required voltage to all of the network powered devices on the RS-485 Network.



Always connect the Protege Temperature and Humidity Sensor NA and NB terminals to the NA and NB terminals of the communication network.



Network and Power Supply Connection



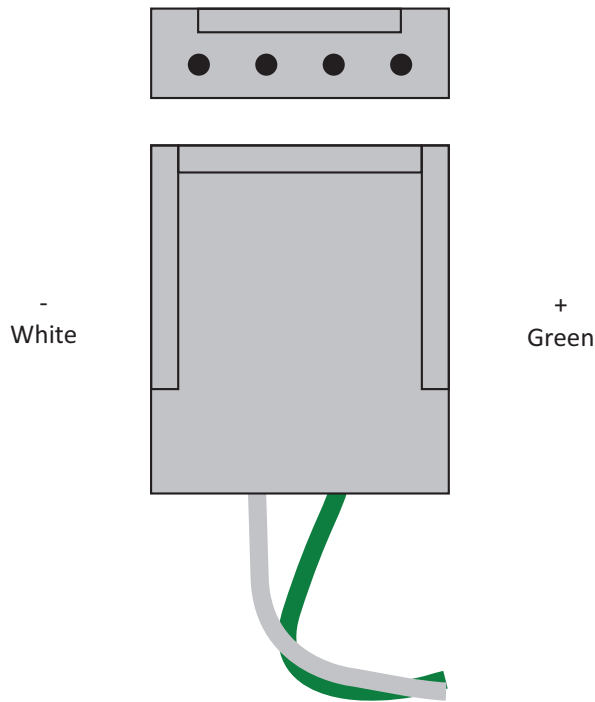
The 12V N+ and N- communication input must be supplied from only ONE point. Connections from more than one 12V supply may cause failure or damage to the Protege Temperature and Humidity Sensor or device supplying network power.



Under no circumstances should you power locking devices from the N+ and N- Network Communication power supply. A separate power supply MUST be used to power locking devices.

4.3 Thermocouple Wiring

While the internal temperature sensor may be suitable for most applications, the Protege Temperature and Humidity Sensor can also be used with an external thermocouple. *A K-Type thermocouple must be used and should be connected as shown in the diagram below.* Note that, of the four pins of the connector, the two left hand pins are internally connected together, and the two right hand pins are internally connected together.

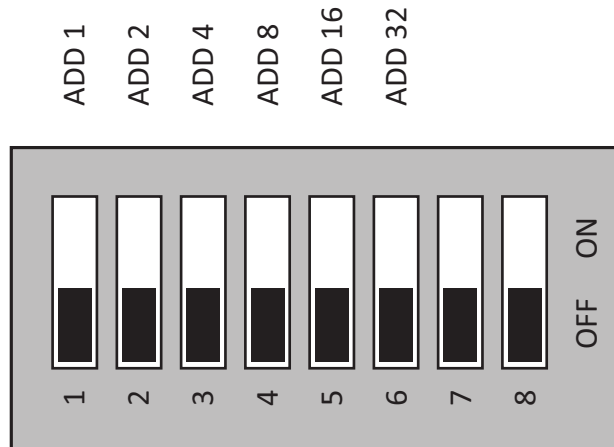


Connecting a K-Type Thermocouple

4.4 Address Configuration Switch

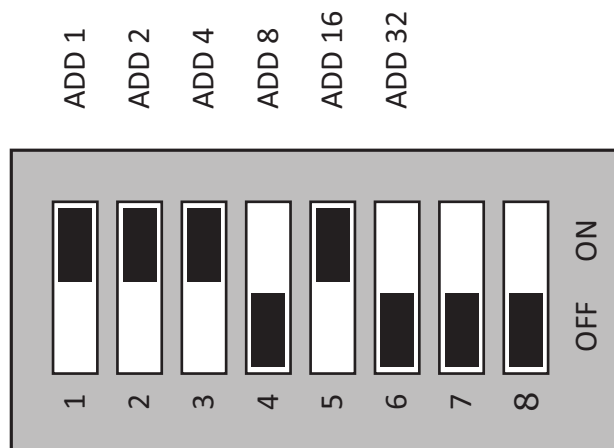
The addressing of the Protege Temperature and Humidity Sensor allows up to 64 devices to be connected to the Protege Integrated System Controller. The configuration DIP switch allows each Protege Temperature and Humidity Sensor to have a unique address.

The switch positions 1 to 6 select the device address from 1 to 64. When setting an address the Protege Temperature and Humidity Sensor **MUST** be powered down and restarted for the new address to take affect. When changing the address the Protege Temperature and Humidity Sensor will automatically default the internal configuration and require a network update. *See the Protege System reference manual for information on performing a module update.*



DIP Switch Configuration

The device address is determined by adding the value of each switch that is selected in the **ON** position and then adding 1 to this value. *In the example below the address 24 results in $(16+4+2+1) + 1 = 24$. Setting all address switches to OFF results in the default address of 001.*



Configuring Address 24

5 Programmable Outputs

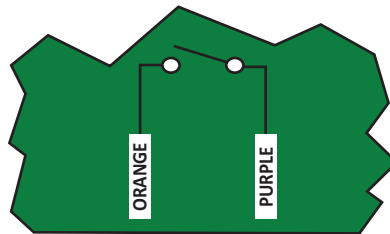
The Protege Temperature and Humidity Sensor has 4 Programmable Outputs (PGM's). The PGM's are used to activate a range of low current devices including relays.

5.1 Standard Relay Outputs

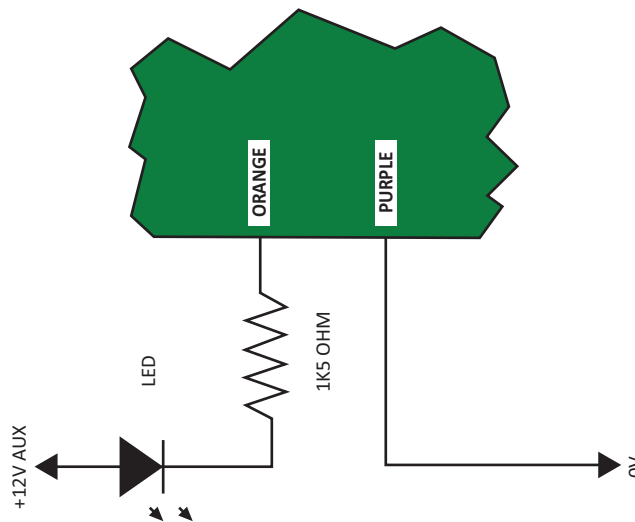
The PGM Outputs 1 and 2 on the Protege Temperature and Humidity Sensor are normally open low current relay outputs.

PGM Number	Description
AExxx:01	Programmable Output 1
AExxx:02	Programmable Output 2

Replace 'xxx' with the appropriate address of the Protege Temperature and Humidity Sensor that you are programming.



PGM 1 Connection



Example of LED Control



The PGM Outputs 1 and 2 can switch to a maximum capacity of 100mA each; exceeding this amount will damage the PGM Output.

5.2 Standard LED Outputs

The PGM Outputs 3 and 4 on the Protege Temperature and Humidity Sensor are internal LEDs that can be used for user display and warnings.

PGM Number	Description
AExxx:03	Square LED Output (Centre)
AExxx:04	Triangle LED Output (Left)

5.3 Analog Outputs (0-10V/4-20mA)

The Protege ACC-ATH1 Temperature and Humidity Sensor also has two 0-10V or 4-20mA analog outputs that follow the current values of the temperature and humidity inputs, allowing the sensor to interface to external control systems. These outputs will be updated even when operating with the Protege System. Each analog output can be independently configured for either 0-10V or 4-20mA output, but not both at the same time. The tables below detail what the voltages and currents represent.

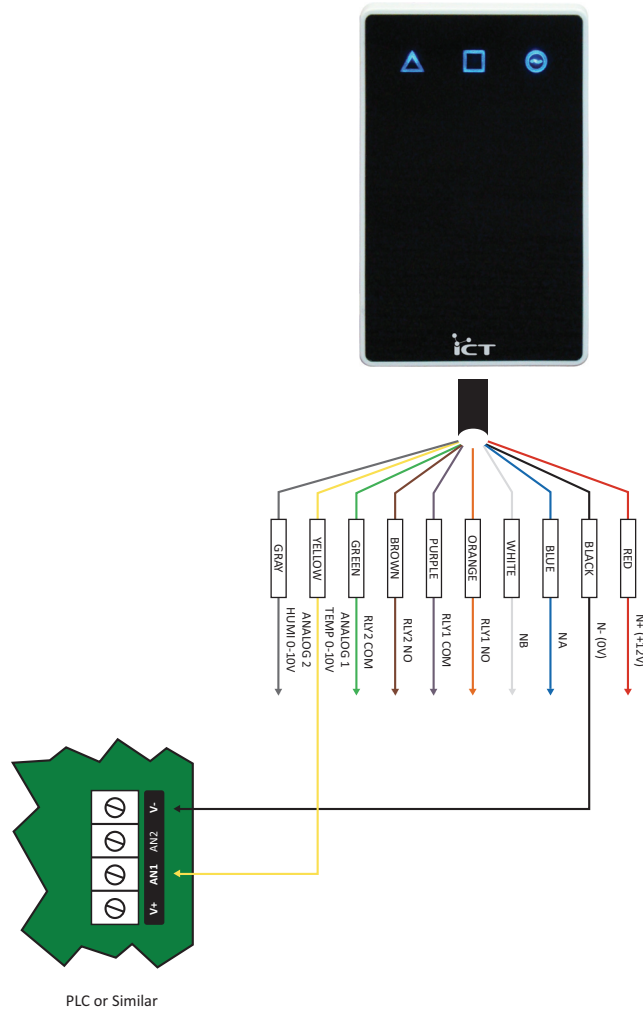
Sensor	Analog Value	
	0V	10V
Temperature (Yellow)	-40°C (-40°F)	60°C (140.0°F)
Humidity (Gray)	0%	100%

Sensor	Analog Value	
	4mA	20mA
Temperature (Yellow)	-40°C (-40°F)	60°C (140.0°F)
Humidity (Gray)	0%	100%

When operating with the Protege System, these outputs default to the voltage setting. When operating in Standalone Mode these outputs can be configured for either voltage or current output. These outputs, when enabled, are always present and are not affected by the alarm settings.

5.4 Analog Wiring

The analog outputs from the Protege ACC-ATH1 Temperature and Humidity Sensor can be directly wired into an analog input of a Programmable Logic Controller (PLC) or similar. The diagram below shows how to wire the 0-10V temperature output into a PLC.



0-10V Interface

6 Zone Inputs

6.1 Trouble Zone Inputs

Each Protege Temperature and Humidity Sensor can monitor up to 8 trouble zones. Trouble zones are used to monitor the status of the Protege Temperature and Humidity Sensor and in most cases are not physically connected to an external zone input. For example, trouble zone AE001:02 is used to monitor the power supply voltage and will generate an alarm if the voltage is low or fails.

The following table details the trouble zones that are configured in the system and the trouble type and group that they activate.

Zone Number	Description	Type	Group
AExxx:01	Reserved	None	None
AExxx:02	Power Supply Voltage Low	Power Fault	General
AExxx:03	Reserved	None	None
AExxx:04	Reserved	None	None
AExxx:05	Reserved	None	None
AExxx:06	Reserved	None	None
AExxx:07	Reserved	None	None
AExxx:08	Module Offline	Module Offline	System

Replace 'xxx' with the appropriate address of the Protege Temperature and Humidity Sensor that you are programming.



The Protege Temperature and Humidity Sensor emulates an Analog Expander Module on the Protege Module Network. This means that all programming, trouble zone input and PGM Output information is stored in and reported by the Analog Expander records when programming via the Protege Alphanumeric LCD Keypad or Protege System Management Suite.

7 Status Indication

The Protege Temperature and Humidity Sensor includes diagnostic indicators that can aid the installer in diagnosing faults and conditions. In some cases an indicator may have multiple meanings depending on the indicator display at the time.

7.1 Power Indicator

The Power Indicator is located at the top right and indicates the Status of the Protege Temperature and Humidity Sensor. If the Sensor is operating normally, the indicator will remain steadily illuminated. Flashing rapidly at 250ms intervals indicates that the Sensor is attempting to register with the Protege Integrated System Controller, or that communication has failed and it is retrying the request.



Power LED Location











If the Power Indicator LED is not steadily ON then there is a fault condition. Refer to Error Code Indication (see page 17) for further details.

8 Error Code Indication

When the Protege Temperature and Humidity Sensor attempts to register with the Protege Integrated System Controller a registration error can be generated if it was not successful.

8.1 Error Code Display

The following table is only valid if the 'POWER' indicator is **FLASHING** a series of pulses. The power indicator will flash with the error code number. The error code number is shown with a 250ms **ON** and **OFF** period (duty cycle) with a delay of 1.5 seconds between each display cycle.

LED Flash	Description
1 	Unknown Error Code The error code returned by the System Controller could not be understood by the Analog Expander. Contact Integrated Control Technology.
2 	Firmware Version The firmware version on the Temperature and Humidity Sensor is not compatible with the System Controller. To clear this error, update the module using the module update application.
3 	Address Too High The Temperature and Humidity Sensor address is above the maximum number of Analog Expanders available on the System Controller. To clear this error change the address to one within the range set on the System Controller, then restart the Temperature and Humidity Sensor by disconnecting and reconnecting the power.
4 	Address In Use The Address is already in use by another Analog Expander. To clear this error set the address to one that is currently not occupied by a Analog Expander. Use the 'View Network Status' command to list the attached devices, or the network update command to refresh the registered device list.
5 	Controller Secured Registration Not Allowed The System Controller is not accepting any module registrations. To allow module registrations use the network secure command to change the secure setting to not secured.
6 	Serial Number Fault The serial number in the device is not valid. Return the unit to the distributor for replacement.
7 	Locked Device The Temperature and Humidity Sensor or system controller is a locked device and can not communicate on the network. Return the unit to the distributor for replacement.
8 	Virtual Module This address has been reserved as a virtual module and therefore no module can register at this address. This protects programming of zones and PGM that are used internally by programmable functions.

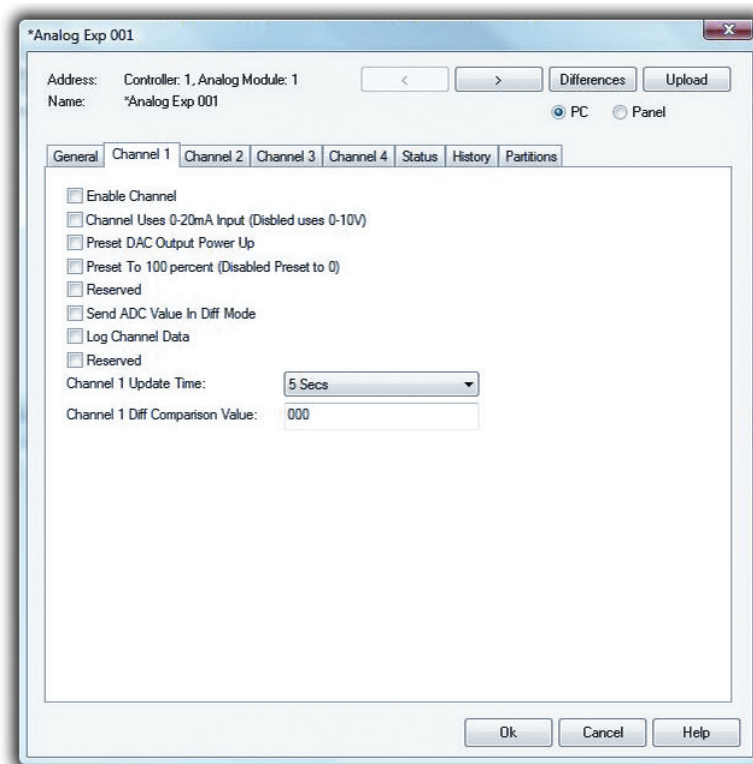
9 Intelligent Monitoring

The Protege Temperature and Humidity Sensor is designed to interface with the Protege Network. In order to achieve this several set-up steps must be carried out.

9.1 Monitoring Setup

The Protege Temperature and Humidity Sensor will register with the Protege Integrated System Controller as an Analog Expander Module, AExxx where the xxx is the address determined by the configuration switch settings.

Once the Protege Temperature and Humidity Sensor has registered at the selected Analog Expander address and is online, each channel must be enabled and given an update time period. This can be achieved by performing the following steps:



Analog Expander Properties Window

Step 1

Open the **'Properties'** dialog for the Analog Expander AExxx with the required address.

Step 2

Select to the appropriate **'Channel'** tab for the channel to be modified.

The channels that each Protege Temperature and Humidity Sensor will monitor are:

- **Channel 1:** Internal temperature
- **Channel 2:** Humidity
- **Channel 3:** Dew Point
- **Channel 4:** External Temperature (thermocouple)

Step 3

Tick the **'Enable Channel'** option.

Step 4

Select an **'Update Time'** from the drop down box. Five seconds is recommended for initial setup, once complete this should be set to a longer time period to minimize network traffic.

Step 5

Close the dialog then perform a Module Update by right clicking on the Module name and selecting **'Update This Module'** from the pop up menu.



The **'Log Channel Data'** option may also be selected to view the raw data as it is received in the event log, however this will create a large amount of events and should only be used for verifying the reception of data.

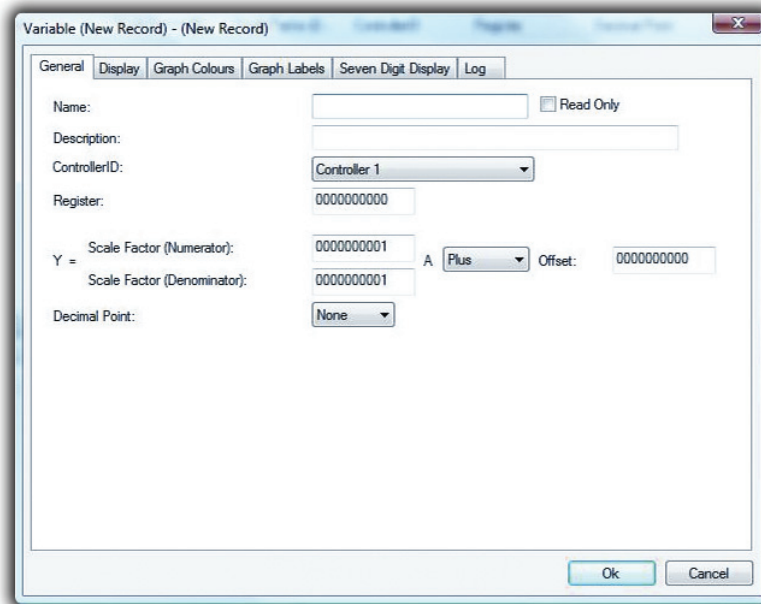
9.2 Register Locations

Each Enabled Analog Expander channel will store data in a Register held by the Protege Integrated System Controller. Each Register is assigned an address, and the register address range used by each Analog Expander channel depends on the AExxx address of the module. Each Analog Expander Module uses 4 Register Addresses, with Register addresses starting from 000. This means that Analog Expander Channels will link to registers as shown in the table below.

Analog Expander Address	Channel Number	Register Address
AE001	Channel 1	000
	Channel 2	001
	Channel 3	002
	Channel 4	003
AE002	Channel 1	004
	Channel 2	005
	Channel 3	006
	Channel 4	007
AE016	Channel 1	060
	Channel 2	061
	Channel 3	062
	Channel 4	063

9.3 Variable Setup

To view the temperature and humidity information in the Protege System Management Suite, the information stored in the registers must be linked to variables in the Protege System Management Suite. To set up a variable to correctly display and log the temperature or humidity information, perform the following steps:



Variable Properties Window – General Tab

Step 1

Open the new variable by selecting **Controller' -> Variables -> Add'**.

Step 2

Enter a name for the variable in the Name field.

Step 3

In the Register field, enter the required register number as explained in the Register Locations section (see page 20).

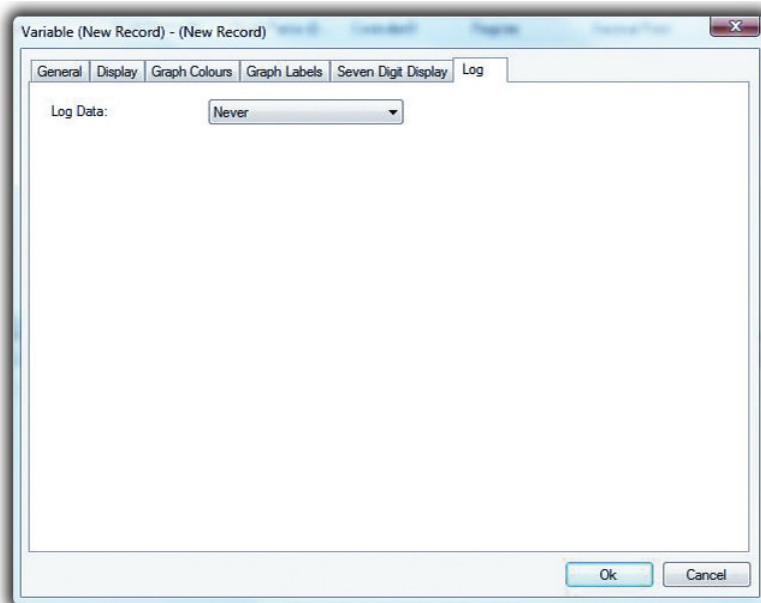
Step 4

Scale the values. The number which is sent from the module is (Celsius Temperature x 100) + 4000, or Relative Humidity x 100. This means that the number 0 corresponds to -40°C, 0 and the number 6500 corresponds to 25.0°C. This number must be scaled and offset to display temperature correctly. *Refer to the table below for the correct settings for the desired output.*

Output	Scale Factor (N)	Scale Factor (D)	Offset	Decimal Point
Temperature (Celsius)	1	1	Minus 4000	2
Temperature (Fahrenheit)	9	5	Minus 4000	2
Relative Humidity (Percent)	1	1	Plus 0	2

9.4 Logging Variables

Logging of the variable values for future review or exporting can also be enabled by performing the following steps:



Variable Properties Window – Log Tab

Step 1

Select the '**Log tab**' of the Variable Properties window (right click the variable and select '**Properties**' if not currently editing a new variable)

Step 2

In the Log Data field, select a time interval from the drop down box. The current variable value will be recorded with a time stamp once every selected time interval.

Once each required temperature or humidity value from the appropriate registers has been stored in a variable, the variables created can be used purely to log the data received. The logged values can be viewed in the Protege System Management Suite by right clicking the variable name and selecting '**Variable History**'. This will bring up the variable history which can be scrolled through, or exported to a CSV (Comma Separated Value) file by right clicking any log value and selecting '**Export**'. This file is suitable for importing into Microsoft® Office Excel or other processing software.

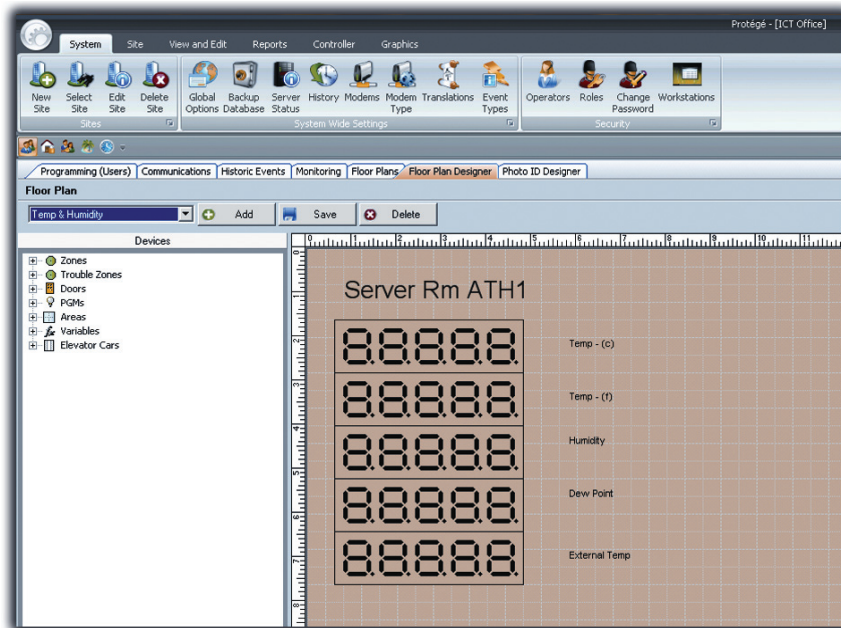
The variables can also be used to create graphical representations of the temperature and humidity levels for the Protege Temperature and Humidity Sensor on a floor plan page in the Protege System Management Suite. *An example of this is described in the following section.*

9.5 Floor Plan Display

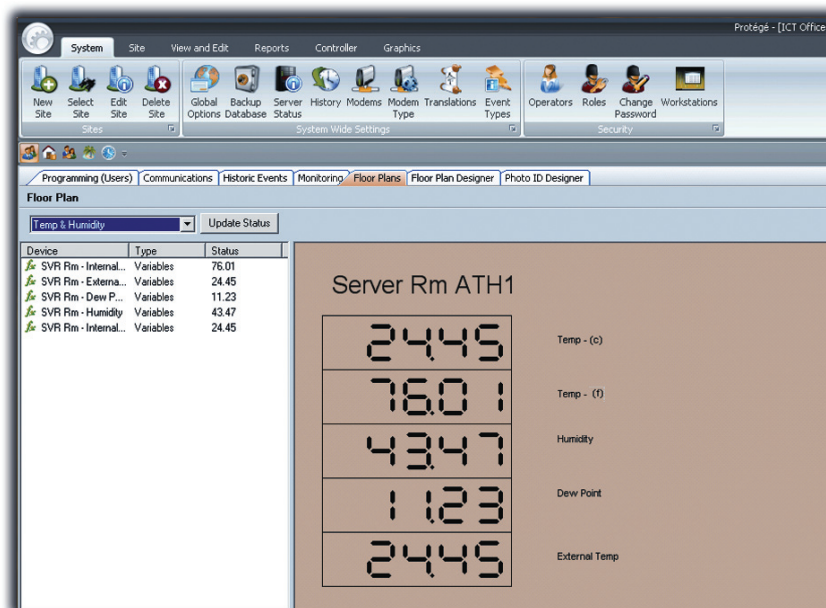
The live status of the temperature and humidity level information monitored by each Protege Temperature and Humidity Sensor can be easily viewed with the use of a floor plan page.

The information can be displayed in the form of '7segment' calculator number style displays, or colored bar graphs with level markers. This manual explains how to set up each of the values monitored by one Protege Temperature and Humidity Sensor as individual '7segment' displays.

Once variables for each monitored value have been created as per the Variable Setup section, the displays can be created in the 'Floor Plan Designer'. To add variables monitored by the Protege Temperature and Humidity Sensor perform the following steps:



Floor Plan Design



Floor Plan Display

Step 1

Select the '**Floor Plan Designer**' tab in the Protege System Management Suite.

Step 2

Select '**Variables**' from the display options list on the left hand side of the designer.

Step 3

Click and drag the '**4Segment**' item from the variable display items box on the left hand side to the current floor page in the centre of the floor plan designer.

Step 4

Double click the new '**4Segment**' item in the floor plan to open the component properties window.

Step 5

Select the '**Link**' tab and in the variable field select the variable containing the temperature or humidity value to be monitored.

Step 6

Click '**OK**' to confirm the changes.

Step 7

Add a text item next to the '**4Segment**' item by selecting '**Graphics -> Text**' and clicking next to the '**4Segment**' item to place the text item.

Step 8

Double click the new text item to open the '**Component -> New Text**' dialog.

Step 9

Select the '**Text**' tab.

Step 10

Change the '**Object Text**' field to contain a description of the variable being displayed, e.g. Internal temperature, Humidity etc.

Repeat these steps for each level to be monitored, remembering to label appropriately to aid the end user in understanding the given information. Once all required displays have been added and correctly configured, click the '**Save**' button to save the floor plan so that it can be viewed.

To view the live values, select the '**Floor Plans**' tab. *The values will be updated according to the update time selected in the Monitoring Setup (see page 18).*

10 Standalone Configuration

The Protege Temperature and Humidity Sensor can operate separate of the Protege System and can activate the 4 onboard outputs based on internal settings and output the current temperature and humidity as 0-10V or 4-20mA analog outputs.

10.1 Configuring Standalone Mode

By default the Protege Temperature and Humidity Sensor will not operate in **'Standalone Mode'**. *With the power off set DIP switch 8 on as shown in the diagram below.*



Configuring Standalone Mode

When the Protege Temperature and Humidity Sensor is next turned on it will operate in a **'Standalone Mode'**. In this mode the Status LED will not flash on start up, but all 3 LEDs will activate for 5 seconds to confirm it is operating in the **'Standalone Mode'**.
















10.2 DIP Switch Programming

The Protege Temperature and Humidity Sensor can be programmed from either a Terminal program via a Serial interface or, for simple applications, the programming of some settings can be achieved using the DIP switches alone. Using the DIP switches alone is referred to as **'DIP Switch Mode'**.

When in 'DIP Switch Mode' some settings cannot be programmed and default to the values shown in the table below.

Sensor	Outputs			Hysteresis
	Relay	LED	Analog	
Internal Temperature	1	■	1 (0-10V)	2°C (3.6°F)
External Temperature	2	▲	2 (0-10V)	5%

The settings which can be programmed via the DIP switches are shown in the following table.

Switch	Variable	Setting	Action
1-2	Temperature Set Point		22°C (71.6°F)
			4°C (39.2°F)
			10°C (50.0°F)
			26°C (78.8°F)
3-4	Humidity Set Point		60%
			40%
			50%
			70%
5	Alarm Mode		Alarm Above
			Alarm below
6	Invert Outputs		None
			Invert
7-8	Mode Setting		Protege Mode
			Standalone Mode using Serial Port Settings
			Standalone Mode using DIP Switch Settings

10.3 PC Connection - Standalone Mode

For complex systems where the required setup can not be achieved using the DIP switch programming show above, the Protege Temperature and Humidity Sensor can be programmed using a serial connection from a PC Computer. Both the Temperature and Humidity inputs have independently configurable set points that can activate the LED and Relay outputs when they are exceeded.

These are configured using a terminal emulator program (e.g. Hyper-Terminal) on a PC Computer.

Step 1

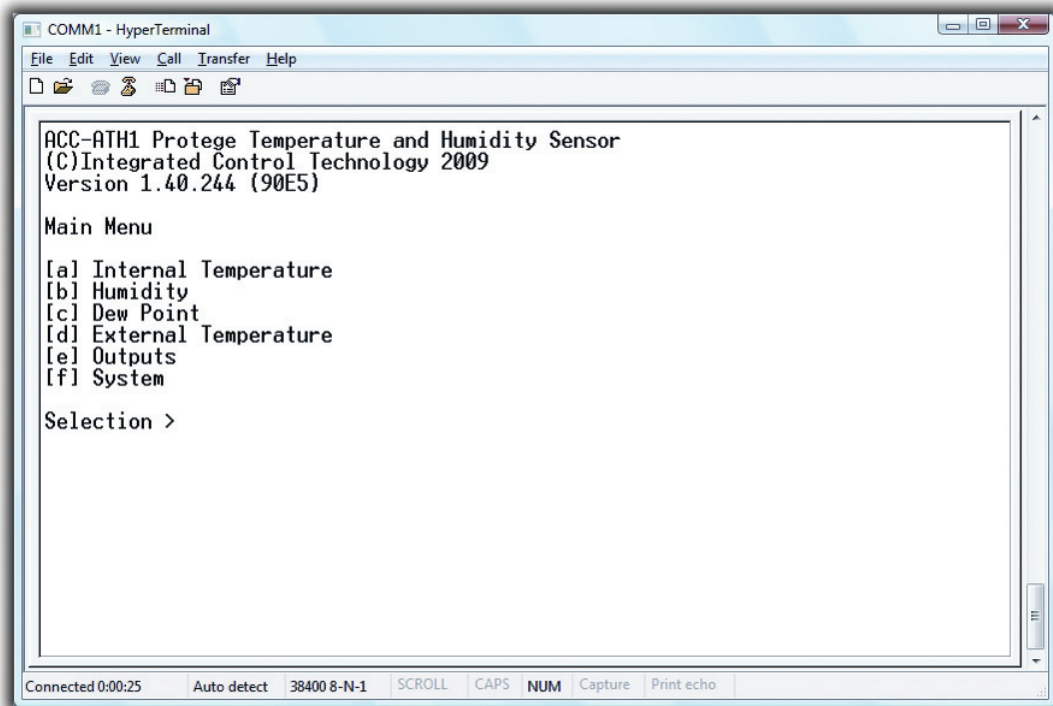
Using an RS-232 to RS-485 Converter (like the ACC-485 from Integrated Control Technology) or USB to RS-485 Converter (like the ACC-485-USB from Integrated Control Technology) connect the Protege Temperature and Humidity Sensor to a Serial Port.

Step 2

Open the terminal emulator program and make a connection using a baud rate of 38400, 8 data Bits, no parity Bit, 1 stop Bit and no flow control (38400,8,n,1).

Step 3

Press 'ESC' and the following screen will appear.

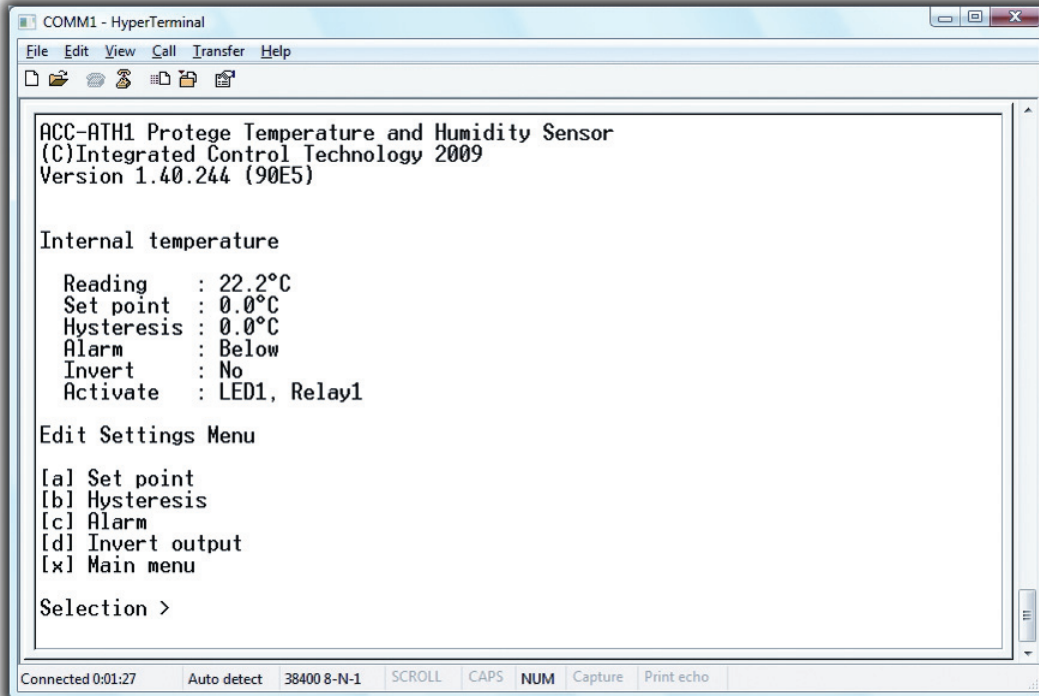


The Main Standalone Menu

Step 4

Select 'a' to modify the Internal Temperature alarm, 'b' to modify the Humidity alarm, 'c' to modify the Dew Point alarm, 'd' to modify the External Temperature alarm, 'e' to assign the Outputs or 'f' to modify System settings.

Each of the four sensor inputs are configured independently as shown below. The following table details each of the parameters that are programmed for each sensor.



```
COMM1 - HyperTerminal
File Edit View Call Transfer Help
ACC-ATH1 Protege Temperature and Humidity Sensor
(C)Integrated Control Technology 2009
Version 1.40.244 (90E5)

Internal temperature
  Reading   : 22.2°C
  Set point : 0.0°C
  Hysteresis : 0.0°C
  Alarm     : Below
  Invert    : No
  Activate  : LED1, Relay1

Edit Settings Menu
[a] Set point
[b] Hysteresis
[c] Alarm
[d] Invert output
[x] Main menu

Selection >

Connected 0:01:27  Auto detect  38400 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

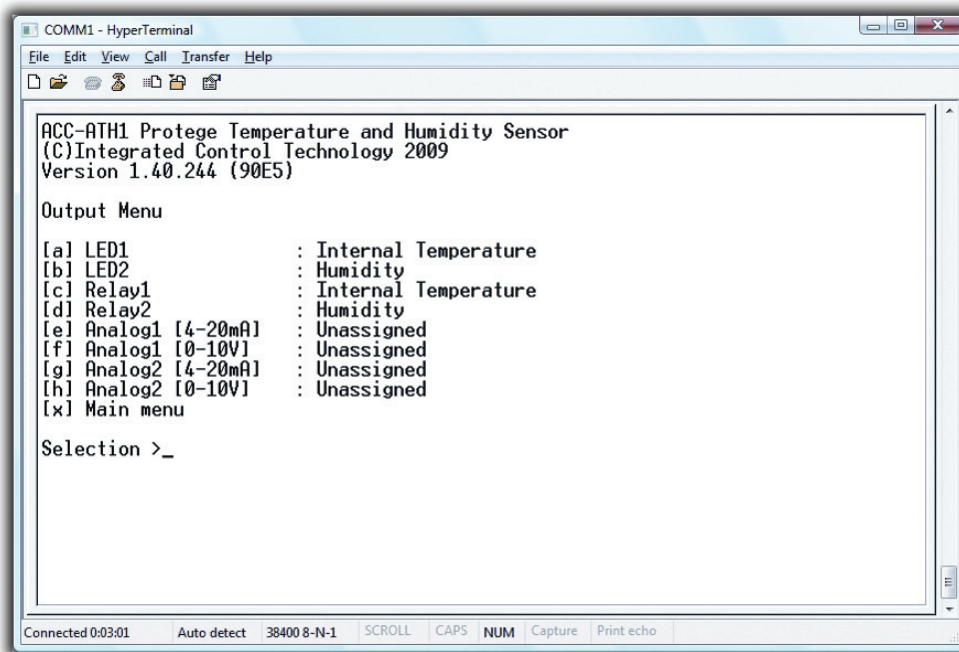
Editing the Sensor Options

Variable	Values	Definition
Set Point	IT: -40°C to 60°C (-40°F to 140.0°F) H: 0-100% DP: -40°C to 60°C (-40°F to 140.0°F) ET: -40°C to 60°C (-40°F to 140.0°F)	When operating in 'Alarm Above Mode', when the temperature or humidity exceeds this value the output(s) will be turned on. When operating in 'Alarm Below Mode', when the temperature or humidity drops below this value the output(s) will be turned on. This setting affects LED and Relay outputs. The Analog outputs are not affected by this setting.
Hysteresis	0-100	When operating in 'Alarm Above Mode', when the temperature drops below the Set point minus the Hysteresis the output(s) will be turned off. When operating in 'Alarm Below Mode', when the temperature or humidity exceeds the Set point plus the Hysteresis the output(s) will be turned off.
Alarm	Above	The mode determines when the output will be activated compared to the set point. In this mode the output(s) will be activated when the set point is exceeded. <div style="text-align: center;"> <p>ALARM ABOVE</p> </div>
	Below	In 'Alarm Below Mode' the output(s) are activated when the temperature or humidity is below the set point. <div style="text-align: center;"> <p>ALARM BELOW</p> </div>
Invert	No Yes	The state of the output(s) can be inverted when this option is set to 'Yes'. When the invert option is selected the output will be turned off when the sensor is in alarm.

Once the programming is complete, select 'x' or press 'ESC' to return to the main menu and program the other sensors or outputs.

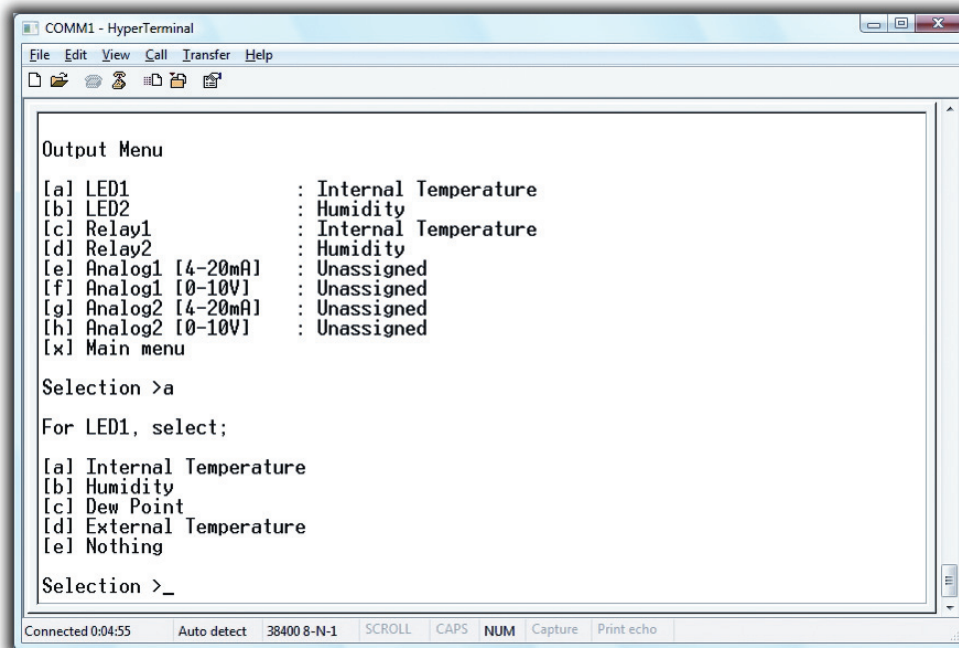
Step 5

The Outputs Menu is shown below. Use this menu to assign a sensor to an output. Each output is shown next to its currently assigned sensor (if any). *Select the desired output and assign a sensor to it, as shown below in figure 18 and 19.* Note that the Analog outputs can be either voltage or current but not both. E.g. attempting to set Analog1 (0-10V) to External Temperature will automatically result in Analog1 (4-20mA) switching to Unassigned.



```
COMM1 - HyperTerminal
File Edit View Call Transfer Help
Output Menu
[a] LED1           : Internal Temperature
[b] LED2           : Humidity
[c] Relay1        : Internal Temperature
[d] Relay2        : Humidity
[e] Analog1 [4-20mA] : Unassigned
[f] Analog1 [0-10V] : Unassigned
[g] Analog2 [4-20mA] : Unassigned
[h] Analog2 [0-10V] : Unassigned
[x] Main menu
Selection >_
Connected 0:03:01  Auto detect  38400 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Editing the Output Settings

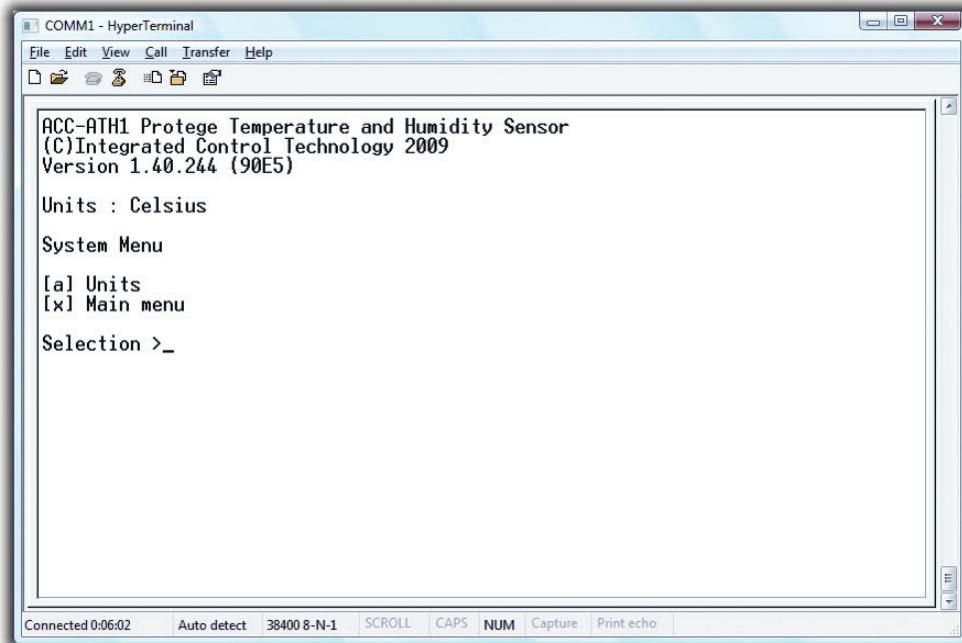


```
COMM1 - HyperTerminal
File Edit View Call Transfer Help
Output Menu
[a] LED1           : Internal Temperature
[b] LED2           : Humidity
[c] Relay1        : Internal Temperature
[d] Relay2        : Humidity
[e] Analog1 [4-20mA] : Unassigned
[f] Analog1 [0-10V] : Unassigned
[g] Analog2 [4-20mA] : Unassigned
[h] Analog2 [0-10V] : Unassigned
[x] Main menu
Selection >a
For LED1, select;
[a] Internal Temperature
[b] Humidity
[c] Dew Point
[d] External Temperature
[e] Nothing
Selection >_
Connected 0:04:55  Auto detect  38400 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Editing the Output Settings

Step 6

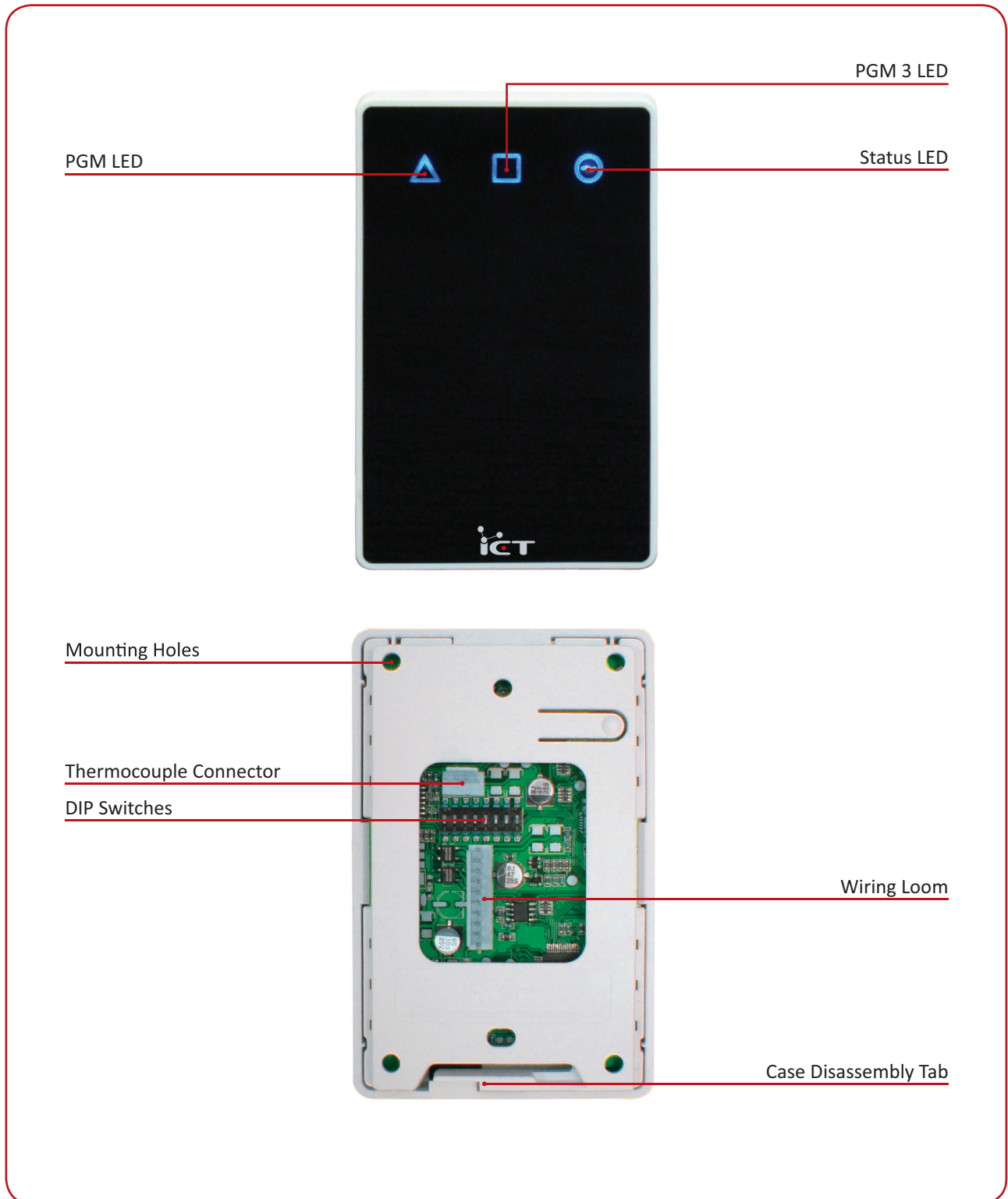
The System Menu is shown below. Use this menu to select the temperature display units, Celsius or Fahrenheit. Note that this setting is for Standalone mode only and will not affect Protege.



The System Menu

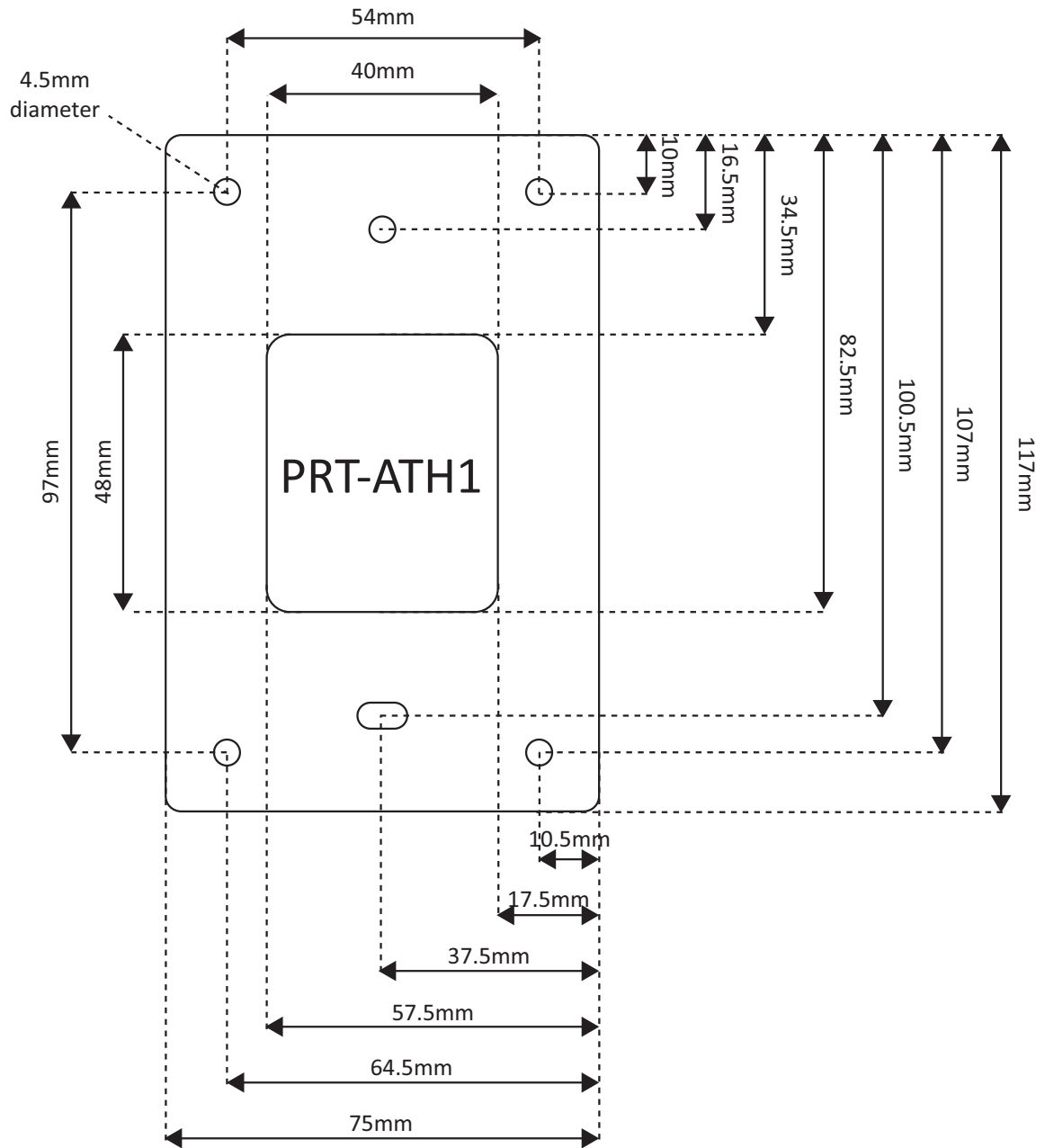
11 Mechanical Diagram

The mechanical diagram shown below outlines the essential details needed to help ensure the correct installation of the Protege Temperature and Humidity Sensor.



12 Technical Diagram

The technical diagram shown below outlines the essential details needed to help ensure the correct installation of the Protege Temperature and Humidity Sensor.



13 Technical Specifications

The following technical specifications are important and vital to the correct operation of the Protege Temperature and Humidity Sensor. Failure to adhere to the technical specifications will result in any warranty or guarantee that was provided becoming **NULL AND VOID**.

Integrated Control Technology continually strives to increase the performance of its products and as a result the specifications may change without notice. *It is recommended that you always consult www.incontrol.co.nz for the latest documentation and product information.*

Operating Voltage	12VDC (8 to 30VDC)
Operating Current	20mA (Typical)
Internal Temperature Range	-40°C to 60°C (±1°C) (-40°F to 140.0°F (±2°F))
External Temperature Range (Thermocouple)	-40°C to 60°C (±1°C) (-40°F to 140.0°F (±2°F))
Humidity Range	0% to 100% (±3%)
Communication	Non-isolated
Zone Inputs	8 Trouble Zones
PGM Outputs	2x Relay Outputs (100mA max) 2x Configurable LED Outputs
PGM Outputs (ACC-ATH1 only)	2x 4-20mA or 0-10V Analog Outputs
Operating Temperature	5° to 55°C (41° to 131°F)
Storage Temperature	-10° to 85°C (14° to 185°F)
Humidity	0% to 85% (non condensing)
Dimensions (H x W x D)	118 x 75 x 19mm (4.7 x 3 x 0.75")
Weight	118g (4.16oz)

The size of conductor used for the supply of power to the Protege Temperature and Humidity Sensor should be adequate in size to prevent voltage drop at the power terminals of no more than 5% of the rated supply voltage.

Specifications are subject to change without notice, please visit www.incontrol.co.nz for the latest information.

14 Ordering Information

Please use the following product codes when placing an order for the Protege Temperature and Humidity Sensor.

- PRT-ATH1 or ACC-ATH1

Manuals and literature are available at the Integrated Control Technology website in the documentation section.

15 Warranty

The Seller warrants its products to be free from defects in materials and workmanship under normal use for a period of one year. Except as specifically stated herein, all express or implied warranties whatsoever, statutory or otherwise, including without limitation, any implied warranty of merchantability and fitness for a particular purpose, are expressly excluded. The Seller does not install or connect the products and because the products may be used in conjunction with products not manufactured by the Seller, the Seller cannot guarantee the performance of the security system. Seller's obligation and liability under this warranty is expressly limited to repairing or replacing, at Seller's option, any product not meeting the specifications. In no event shall the Seller be liable to the buyer or any other person for any loss or damages whether direct or indirect or consequential or incidental, including without limitation, any damages for lost profits, stolen goods, or claims by any other party caused by defective goods or otherwise arising from the improper, incorrect or otherwise faulty installation or use of the merchandise sold.

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16 Contact

Integrated Control Technology welcomes all feedback.

Please visit our website (<http://www.incontrol.co.nz>) or use the contact information below.

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