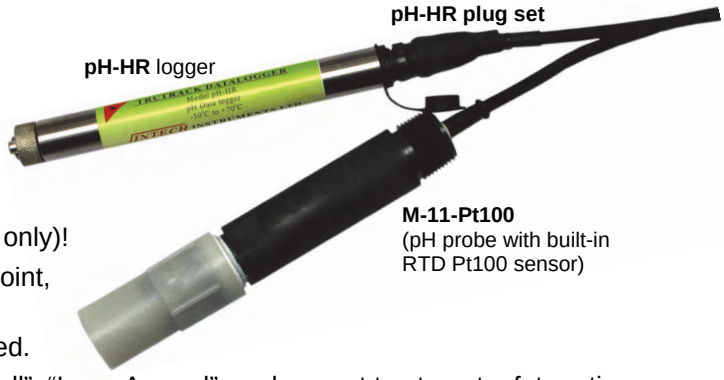
TruTrack Data Logger

pH / Temperature Logger
Model pH-HR mark 4

Three Channel High Resolution (12 bit) pH and Temperature Data Logger.

The pH-HR is a small three channel high resolution (12 bit) pH and Temperature data logger housed in a rugged 304 stainless steel case. The logger connects to an external pH probe and also has the option of connecting to an external RTD Pt100 temperature probe to allow temperature compensation of the pH reading. Many pH probes have a built in RTD Pt100 temperature sensor for convenient connection.
The pH-HR logger also has an internal temperature sensor for convenient logging of ambient temperature if desired.
Logging can be configured to: start on time, immediate start, stop when full, loop around (overwrite oldest data).



Features.

- Over 500,000 samples can be logged (when logging pH only)!
- pH and Temperature can be set to any combination of Point, Average, Maximum & Minimum readings.
- The battery voltage of the logger can be logged if required.
- The logger can be run in either “Stop when memory is Full”, “Loop Around” mode or set to stop at a future time.
- The logger can be started “Now”, started at a given time in the future or on a condition (e.g. pH > 6.2pH).
- The data from any logger that records Temperature can now be processed, by the Omni7 software, to give daily, weekly and monthly accumulated Grow Degree Day reports for a wide range of horticultural crops.

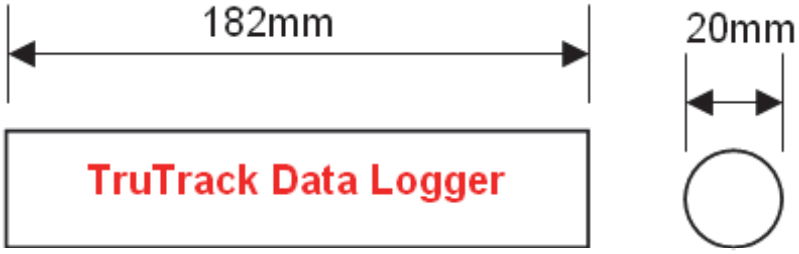
Ordering Information.

pH-HR	pH / Temperature data logger.
pH-HR plug set	For connecting Intech supplied pH probe.

DLC3USB [USB] *or* **DLC3** [RS232] download cable (2m) to connect pH-HR with computer.

Please Note: The pH-HR data logger is not supplied with a pH probe. These can be ordered separately from Intech Instruments Ltd if required.
We recommend using a pH probe that has a built in RTD Pt100 temperature sensor for the best possible accuracy with the pH-HR.

pH-HR mark 4 Dimensions.



Putting into service with Omni7 Data Management software.

1. From the SWDL-DLC Omni7 software and Download cable kit, **first install the Omni7 software**, then plug the Download cable into a spare USB [standard size] or RS232 serial port on your computer (depending on which type you have). The Omni7 has an excellent “Help”. This will need to be read to enable successful operation of the Omni7 Data Management Program and gain familiarisation of the many advanced features available.

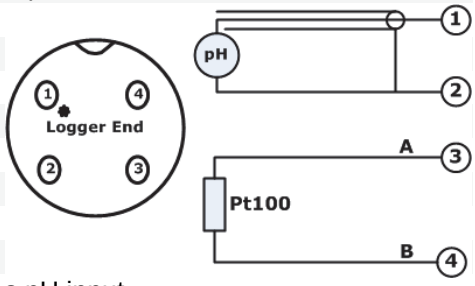
2. Connect the data logger to the download cable. Select the correct connection type on the Omni7 screen. Omni7 requires manual connection and disconnection to the data logger using the Green 'Connect' and Red 'Disconnect' buttons. It will not connect to a data logger automatically. (Refer to “Help” for further assistance.)

3. On the “Logger Control” screen, click on “Channel and Probe Setup” button, and check the Battery Condition, plus other configurations.

4. Now click on the “Start Logger” tab for the final configurations, before putting the logger into service.

Specifications.

pH Input:	External Sensor Connector	4 pin Switchcraft Plug (EN3C4M)
		Weatherproof; IP66
		1 pH Probe Positive
		2 pH Probe Negative
		3 Pt100 A
		4 Pt100 B
	pH range	0 to 14 pH
	Accuracy	±0.1pH
	Resolution	±0.1pH
RTD Pt100 Input:	External Sensor Connector	Same 4 pin Switchcraft Plug as pH input
	Pinout	See pH
	Accuracy	±1ºC
	Resolution	±0.5ºC



Internal Temperature:	Sensor Type	Thermister
	Linear accuracy over range	±0.3ºC (0ºC to 70ºC)
	Repeatability	±0.1ºC
	Long term stability	±0.1ºC

Logger:	Working Temperature	-30ºC to +70ºC
	Storage Temperature	-30ºC to +70ºC
	Sampling Rate	1 second minimum, 10 hours maximum; in 1 second intervals
	Storage capacity	522,240 samples logging pH only
		261,120 samples logging pH and Temperature
		362 days with 1 min logging interval, pH only
		4.9 years with 5 min logging interval, pH only
	Alarms	Two independent Alarms
		Triggered on any combination of six user configurable Alarm Conditions
		Both alarm can be configured to send SMS messages
		Conditions can be setup to reset alarms
		Alarms can be visually checked using the Omni7 software
	Start modes	Start immediately / Start on date/time / Start on condition (e.g. pH > 6.2pH)
	Stop modes	Stop when memory is full / Stop on date/time /
		Loop around (continues logging)
	Logging modes	Each channel can be set to log any combination of:
		- Point readings - Maximum reading
		- Average reading - Minimum reading
	Warning: When using the Average, Maximum or Minimum reading(s), the logger reads the attached sensor(s) every second. **This will reduce battery life.**	
	Battery	One to Five year life depending on usage as above
		Using the logger in temperatures below -5°C (23°F) will reduce battery life
		One 7.2V lithium battery; User Replaceable
		The data is retained in the case of battery failure
		Battery Status Monitor in Omni7 software
	Download time	9min 30sec for Full Logger
	Case material	304 Stainless tube
	Screw on end cap	Plated brass
	Weight	148g
	Size	20mm diameter X 182 mm long
	Temperature Compensation	Temperature compensation is performed within the logger so temperature data does not have to be logged if it is not required
	Calibration	The pH input is calibrated in the factory at 25ºC with a traceable calibrated voltage source. Temperature compensation is then checked at 0ºC, 50ºC and 100ºC.

*A **DLC3USB** [USB] or **DLC3** [RS232] **download cable** (2m) is required to connect the pH-HR to a computer.*

Product Liability. This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.
Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independent fail-safe back-up system must always be implemented.

Taking good care of your pH probes.

1. The pH probes (if supplied by Intech Instruments Ltd) are supplied with protection caps which are also designed to keep the glass electrodes wet. Do not dispose of these caps as they will be required, when transporting the pH probe.
2. The glass electrodes on the pH probes must always be kept wet.
3. Short term storage of pH probes in pH7 solution is OK, but pH4 solution is preferred.
4. Long term storage of pH probes in pH4 solution.
5. Always buffer the pH probe and logger before use. Setup and buffer probe and logger using fresh buffer solutions. Use a suitably qualified technician. Allow plenty of time for the logger to settle in each buffer. The easiest way is to set the logger going and look at the graph to see if the logger has settled.
6. If the pH probes cannot be buffered satisfactory, replace with new pH probes.
7. The buffer solutions used should cover the pH range to be measured.
8. Where the pH probes in use are not fitted with a temperature compensation probe, the buffer solution should be at the same temperature as the liquid being measured.
9. When deploying in the field, leave the logger attached to the pH probe after buffering has been carried out. Buffering should be carried out as close to when deploying in the field as possible. The initial samples taken may need to be excluded from the data, as while the logger settles, these may read differently.
10. Take measures to protect the pH probe cable if there is any possibility of damage occurring.
11. Check for water in the pH probe cable plugs (if fitted). If present, clean and dry.
12. To maintain the pH probes correctly, carefully follow the instructions from the manual included with the pH probes.

IMPORTANT: You will need to buffer (calibrate) the pH sensors with your pH-HR loggers **before each use**. pH calibration instructions can be found below:
The instructions can also be found in the Omni7 help file under ‘Calibration Procedures > pH Calibration’, or online:
http://www.trutrack.com/intech/omnilog/usermanual/289.htm

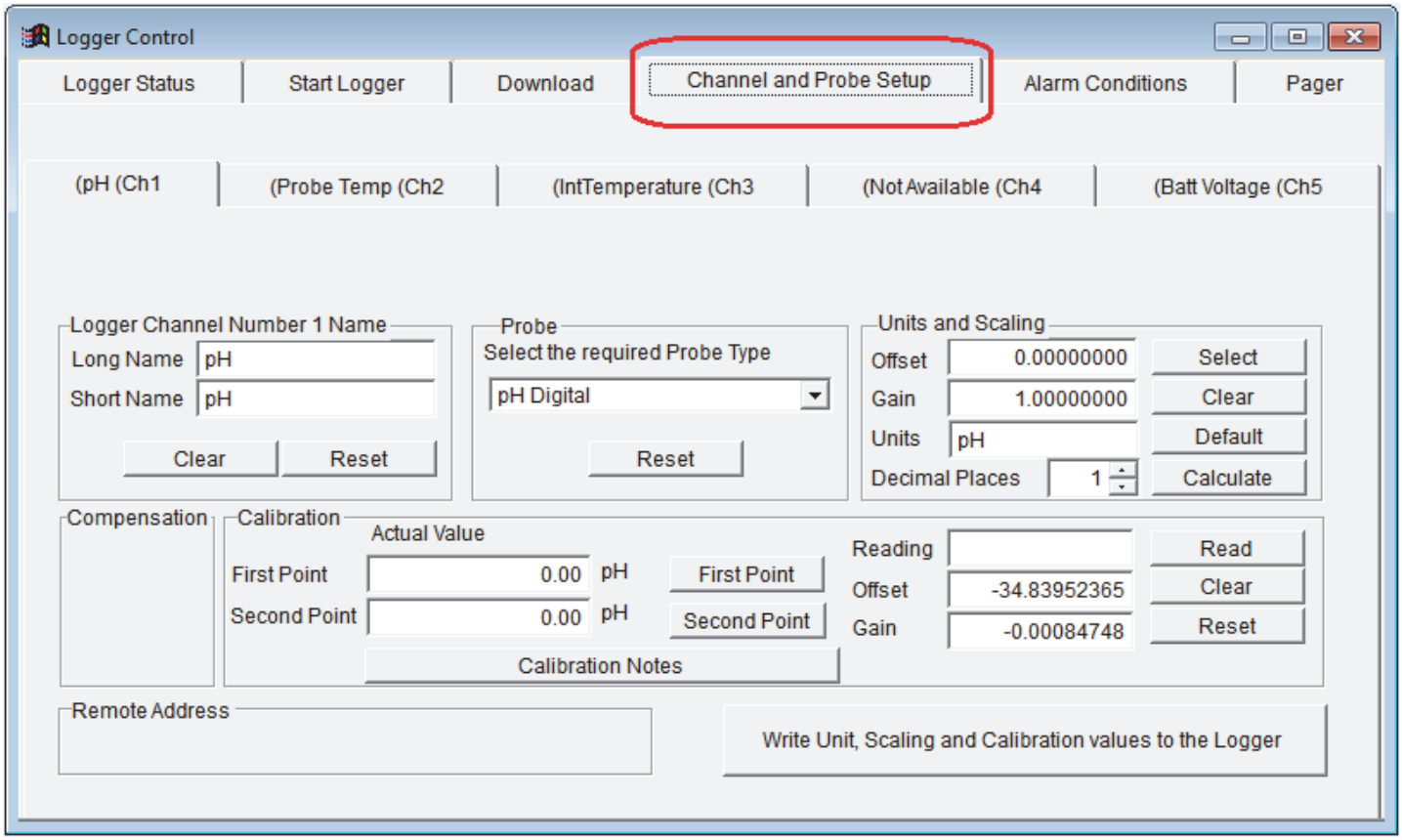
pH Calibration - instructions taken from the Omni7 help file.

- Where the pH probes in use are not fitted with a temperature compensation probe, the buffer solution should be at the same temperature as the liquid being measured.
- Place the pH Probe in a known standard pH solution.
- Wait for the pH probe to stabilise to the known pH.
- Enter the known pH value into the First Point Actual Value box.
- Click on the First Point button.
- Place the pH Probe in a second known standard pH solution.
- Wait for the pH probe to stabilise to the known pH.
- Enter the second known pH value into the Second Point Actual Value box.
- Click on the Second Point button.
- Click on the Write Unit, Scaling and Calibration values to the Logger button.

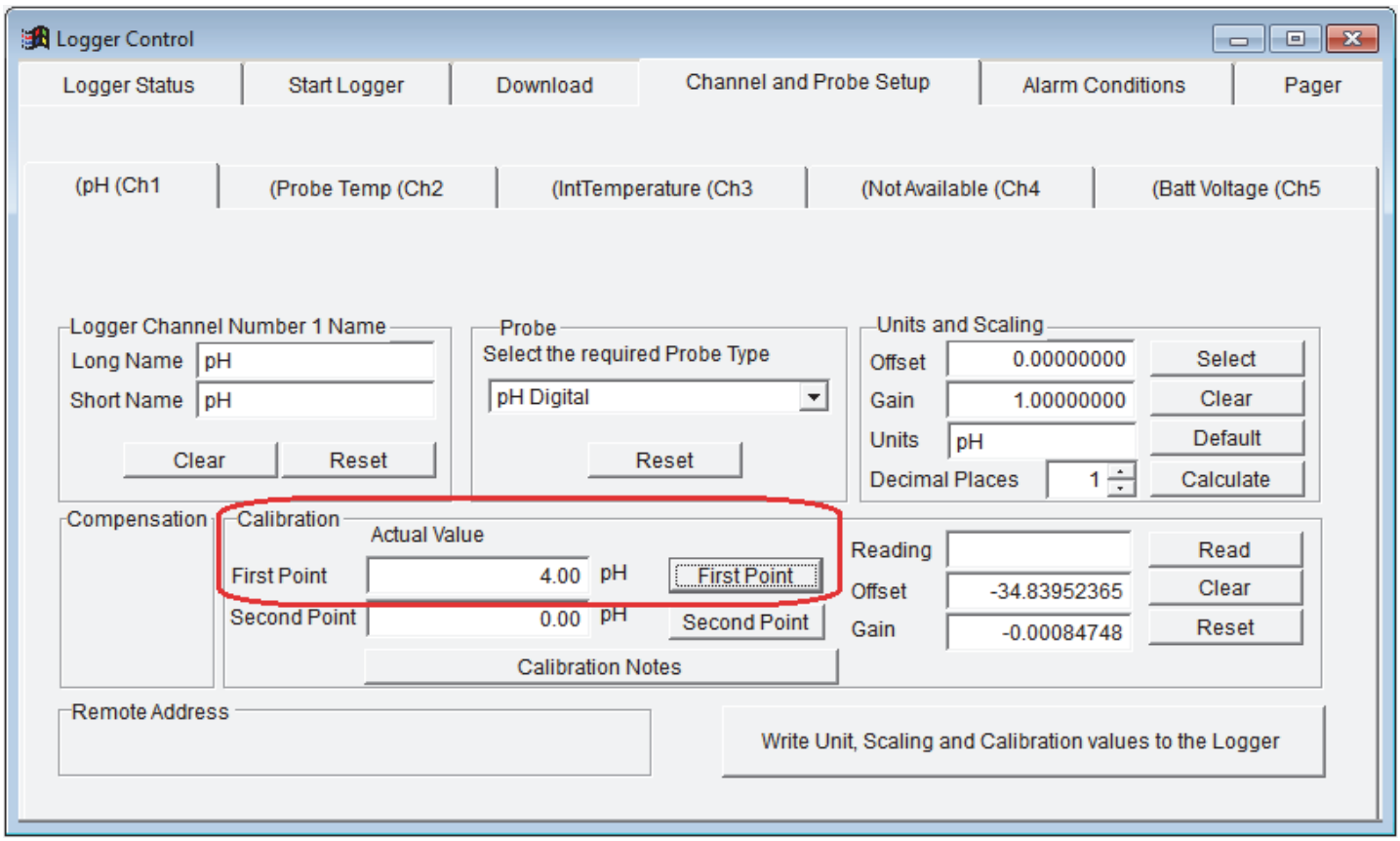
IMPORTANT: It is recommended that the two standard pH solutions for calibration be at least 5pH units apart. Probes calibrated in the factory are calibrated at 4pH and 9.22pH.

Please see the pages following for an example of the calibration (buffering) procedure >>

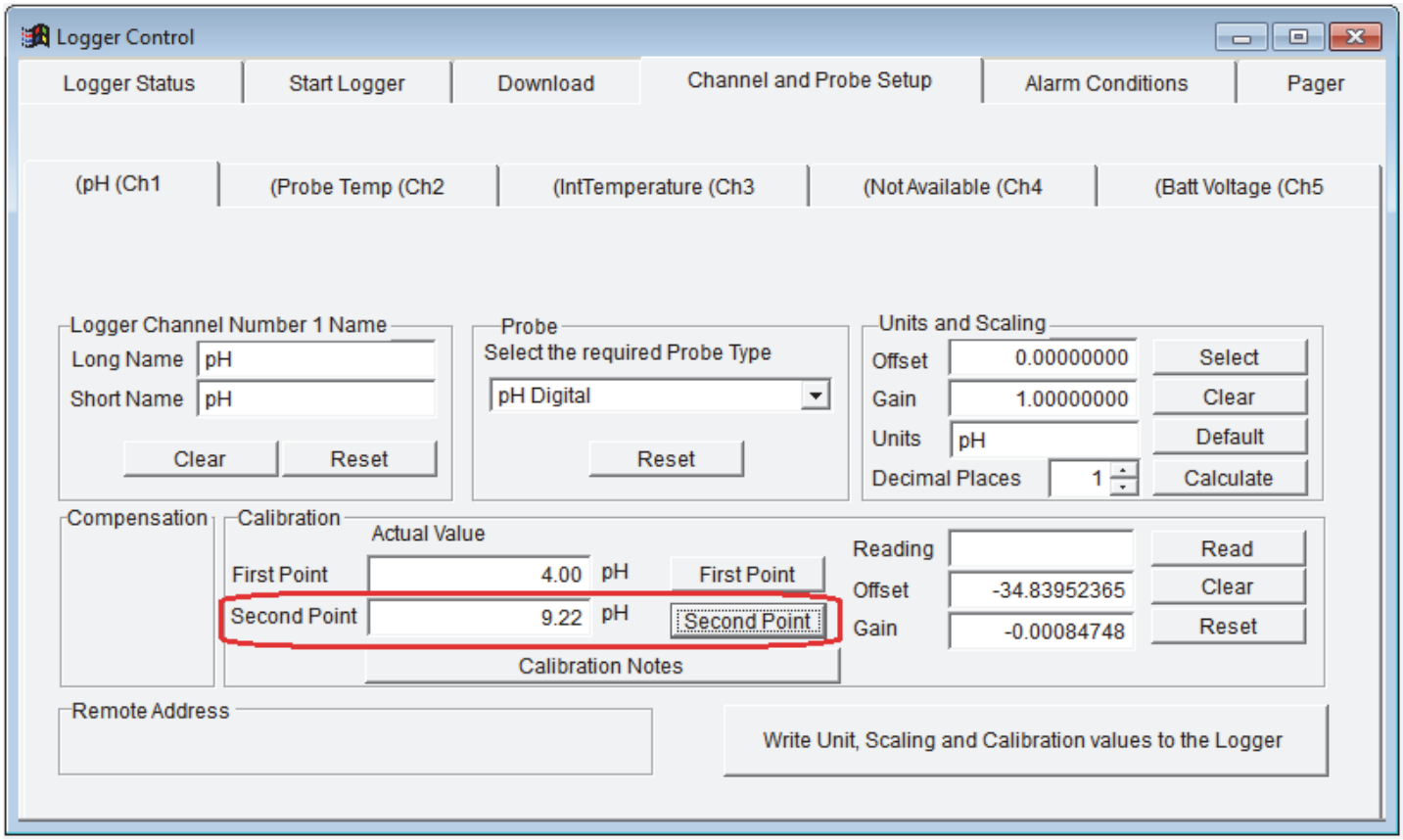
Example Calibration Steps.



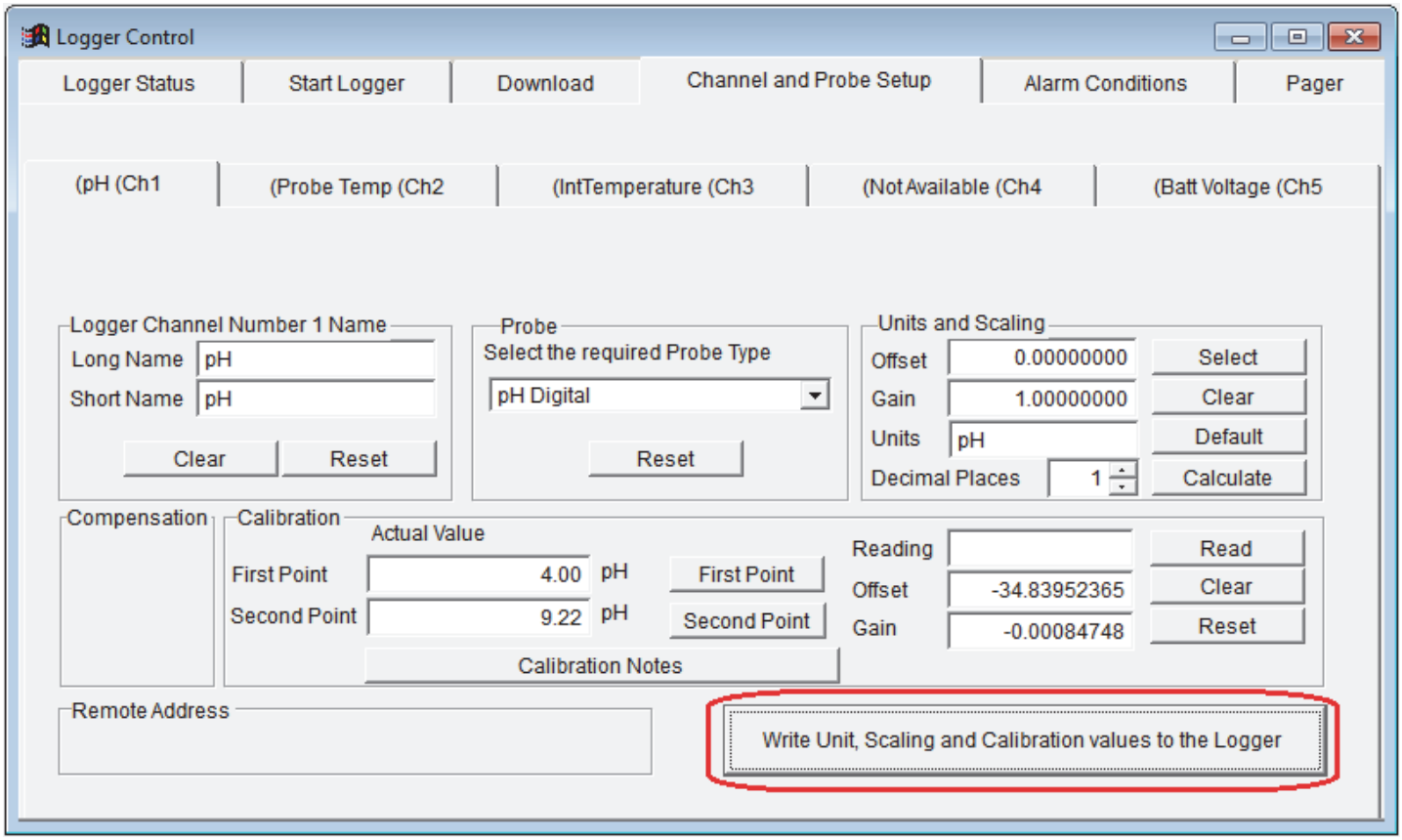
- Place the pH Probe in a standard 4pH solution. **Note:** Where the pH probes in use are not fitted with a temperature compensation probe, the buffer solution should be at the same temperature as the liquid being measured.
- Wait for the pH probe to stabilise to 4pH.
- Enter 4 into the First Point Actual Value box.
- Click on the First Point button.



* Place the pH Probe in a standard 9.22pH solution. **Note:** Where the pH probes in use are not fitted with a RTD Pt100 temperature compensation probe, the buffer solution should be at the same temperature as the liquid being measured.
* Wait for the pH probe to stabilise to 9.22pH.
* Enter 9.22 into the Second Point Actual Value box.
* Click on the Second Point button.



* Click on the 'Write Unit, Scaling and Calibration values to the Logger' button.



* The pH-HR logger is now buffered and ready for use!

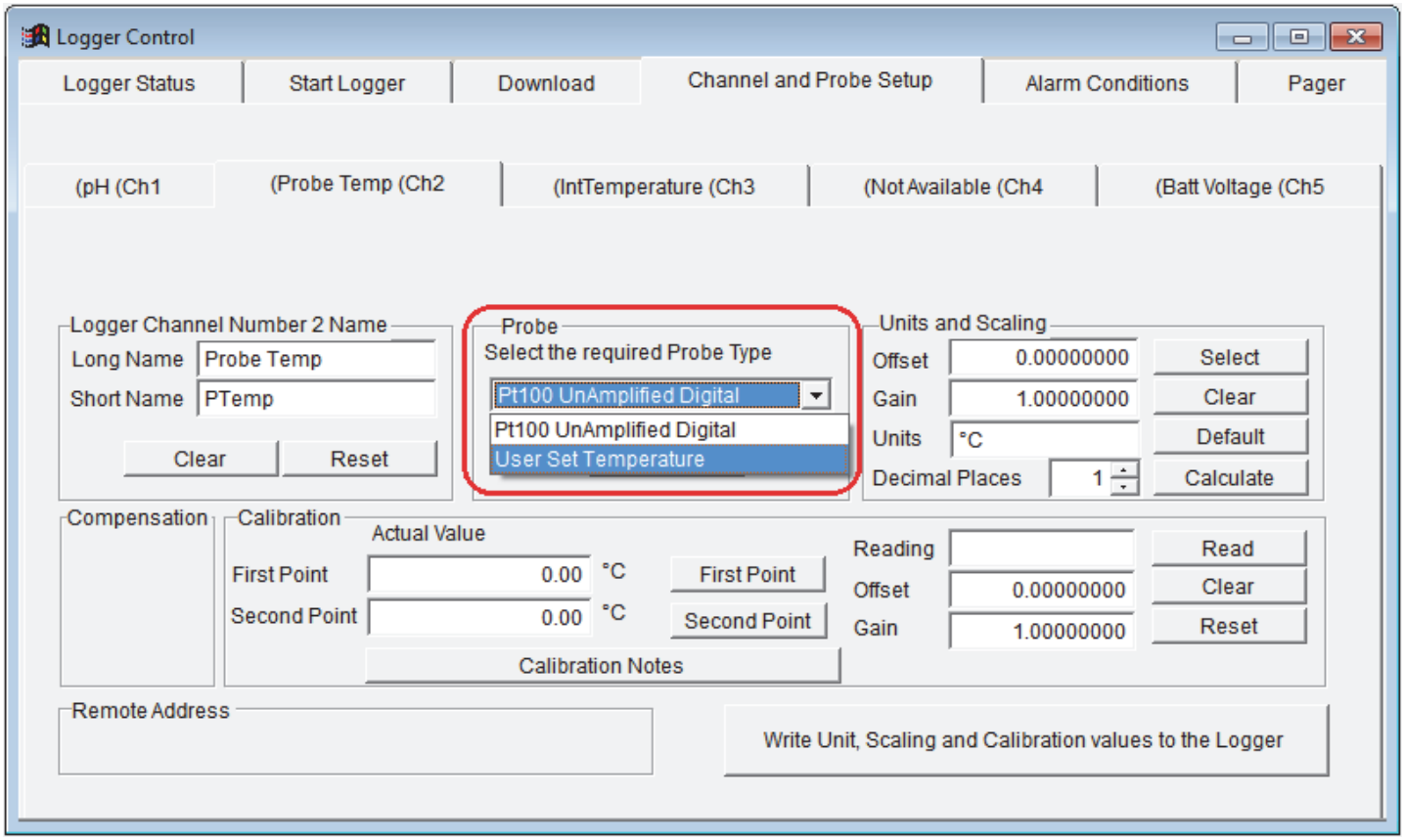
Notes on Temperature Compensation if the pH probe has no RTD Pt100 sensor.

If the pH Probe does not have a RTD Pt100 temperature sensor fitted, the loggers RTD Pt100 channel will default to 25ºC and all pH readings will be taken as if the pH probe was returning a temperature of 25ºC. The RTD Pt100 channel realtime read and logged values will display "No Data".

If the temperature of the sample solution being logged is known, the logger can be setup to temperature compensate at this known temperature. This is done by selecting a new probe type in the Probe Temp channel using Omni7 software.

Follow these steps:

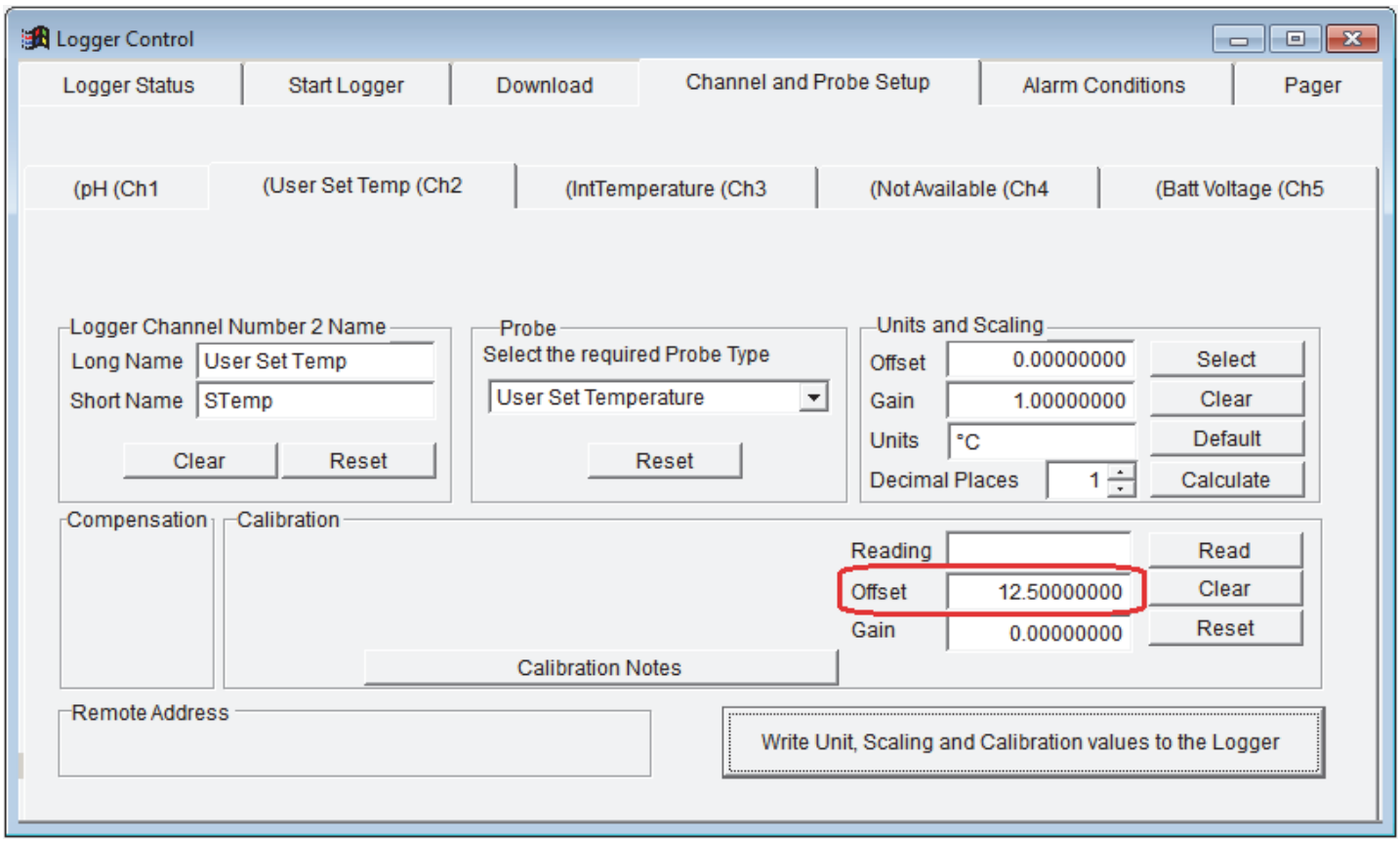
* Connect to the pH-HR logger
* Select the Logger Control Screen
* Select the Channel and Probe Setup tab
* Select the '**Probe Temp Ch 2**' tab
* Change the probe type to **User Set Temperature** as shown below:



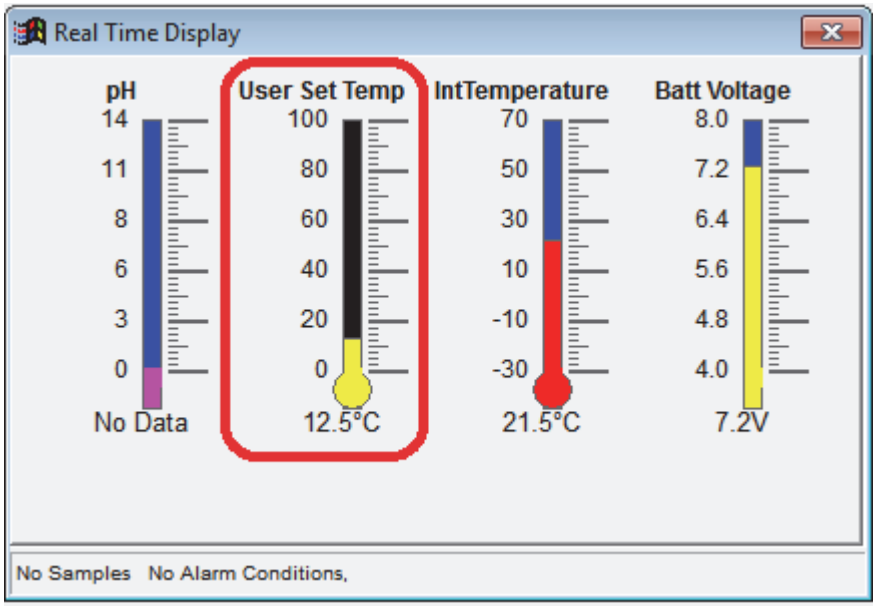
See the next page for additional steps >>

Please Note: *Intech Instruments Ltd recommends the use of a pH probe that has a built in RTD Pt100 temperature sensor for the best possible accuracy with the pH-HR.*

The Calibration Gain will automatically be changed to 0 when you select "User Set Temperature"
Enter the required temperature into the Calibration Offset box as shown below (example shows 12.5°C input); and then click the "Write Unit, Scaling and Calibration values to the Logger" button.



The logger will now operate with the temperature set to the value entered in the Calibration Offset box and temperature compensation will be applied at this set temperature. Realtime read and Logged data will show the set temperature as shown below:



The User Set Temperature can then be changed at any time by entering the new value in the Calibration Offset box and then click the "Write Unit, Scaling and Calibration values to the Logger" button.
Note: When buffering the pH probe, the procedure above must be followed (when using a pH probe that does not have a RTD Pt100 temperature sensor). I.e. Enter the temperature of the buffer solution.

Please Note: *Intech Instruments Ltd recommends the use of a pH probe that has a built in RTD Pt100 temperature sensor for the best possible accuracy with the pH-HR.*

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pH-HR 150818