

TruTrack Data Logger

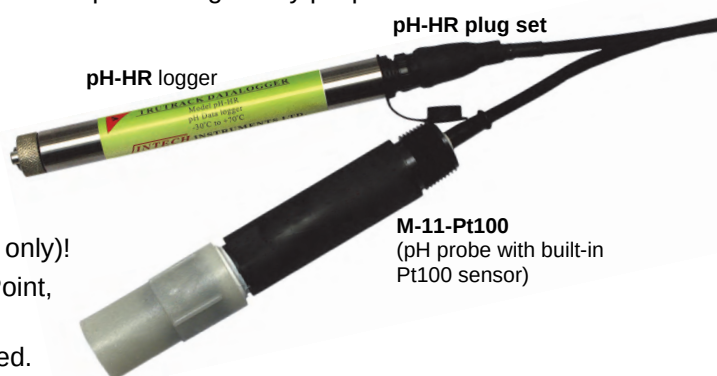
pH / Temperature Logger Model pH-HR mark 4

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 Pt100 temperature probe to allow temperature compensation of the pH reading. Many pH probes have a built in 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/OmniLog software, to give daily, weekly and monthly accumulated Grow Degree Day reports for a wide range of horticultural crops.

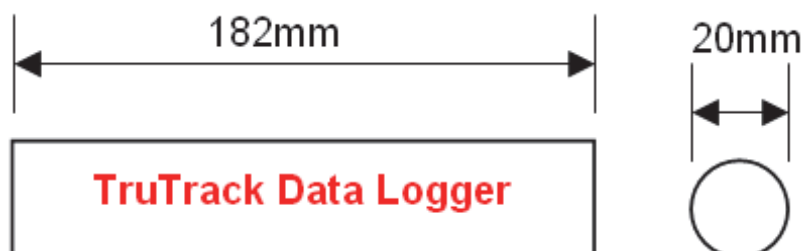
Ordering Information:

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

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 Pt100 temperature sensor for the best possible accuracy with the pH-HR.

pH-HR (mark 4) Dimensions:

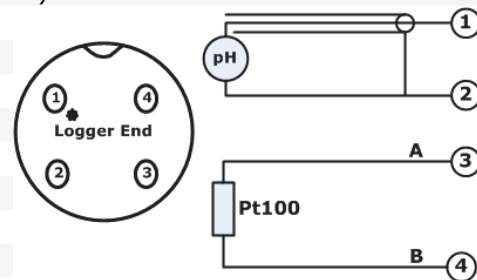


Putting into service (Using Omni7 - the original OmniLog differs slightly):

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 or serial port on your PC (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 Pt-100 A
		4 Pt-100 B
	pH range	0 to 14 pH
	Accuracy	±0.1pH
	Resolution	±0.1pH
Pt-100 Input:	External Sensor Connector	Same 4 pin Switchcraft Plug as pH input
	Pinout	See pH
	Accuracy	±1°C
	Resolution	±0.5°C



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

Logger:	Working Temperature	-30°C to +70°C
	Storage Temperature	-30°C to +70°C
	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/OmniLog 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/OmniLog 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 25°C with a traceable calibrated voltage source. Temperature compensation is then checked at 0°C, 50°C and 100°C.

A DLC3USB [USB] or DLC3 [RS232] download cable 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/OmniLog help file under 'Calibration Procedures > pH Calibration', or online:

<http://www.trutrack.com/intech/omnilog/usermanual/289.htm>

pH Calibration - instructions taken from the OmniLog 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 stabilize 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 stabilize 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:

The screenshot shows the 'Logger Control' software window with the 'Channel and Probe Setup' tab selected. The interface includes a top menu bar with 'Logger Status', 'Start Logger', 'Download', 'Channel and Probe Setup', 'Alarm Conditions', and 'Pager'. Below this is a channel selection bar with options: '(pH (Ch1)', '(Probe Temp (Ch2)', '(IntTemperature (Ch3)', '(Not Available (Ch4', and '(Batt Voltage (Ch5'. The main area is divided into several sections: 'Logger Channel Number 1 Name' with 'Long Name' and 'Short Name' fields both set to 'pH', and 'Clear'/'Reset' buttons; 'Probe' section with 'Select the required Probe Type' dropdown set to 'pH Digital' and a 'Reset' button; 'Units and Scaling' section with 'Offset' (0.00000000), 'Gain' (1.00000000), 'Units' (pH), and 'Decimal Places' (1), along with 'Select', 'Clear', 'Default', and 'Calculate' buttons; 'Calibration' section with 'First Point' and 'Second Point' rows, each having an 'Actual Value' field (both set to 0.00), a unit dropdown (both set to pH), and 'First Point'/'Second Point' buttons; 'Reading' section with 'Offset' (-34.87912021) and 'Gain' (-0.00084951) fields, and 'Read', 'Clear', and 'Reset' buttons; and a 'Remote Address' field. A large 'Write Unit, Scaling and Calibration values to the Logger' button is at the bottom right.

- * 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 stabilize to 4pH.
- * Enter 4 into the First Point Actual Value box.
- * Click on the First Point button.

This screenshot shows the same 'Logger Control' software window, but now the 'First Point' 'Actual Value' field in the 'Calibration' section is set to '4.00' pH. A red rectangle highlights this field and the 'First Point' button next to it. All other settings, including the 'pH Digital' probe type and the 'Units and Scaling' values, remain the same as in the previous screenshot. The 'Write Unit, Scaling and Calibration values to the Logger' button is still visible at the bottom right.

- * Place the pH Probe in a standard 9.22pH 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 stabilize to 9.22pH.
- * Enter 9.22 into the Second Point Actual Value box.
- * Click on the Second Point button.

The screenshot shows the 'Logger Control' software window with the 'Channel and Probe Setup' tab selected. The interface includes several sections:

- Channel Selection:** (pH (Ch1), (Probe Temp (Ch2), (IntTemperature (Ch3), (Not Available (Ch4), (Batt Voltage (Ch5).
- Logger Channel Number 1 Name:** Long Name: pH, Short Name: pH. Buttons: Clear, Reset.
- Probe:** Select the required Probe Type: pH Digital. Button: Reset.
- Units and Scaling:** Offset: 0.00000000, Gain: 1.00000000, Units: pH, Decimal Places: 1. Buttons: Select, Clear, Default, Calculate.
- Calibration:** Actual Value section with First Point (4.00 pH) and Second Point (9.22 pH). Buttons: First Point, Second Point. A red box highlights the Second Point input field and button.
- Reading:** Reading, Offset: -34.87912021, Gain: -0.00084951. Buttons: Read, Clear, Reset.
- Remote Address:** A text input field.
- Write Unit, Scaling and Calibration values to the Logger:** A large button at the bottom right.

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

This screenshot is identical to the previous one, but with a red box highlighting the 'Write Unit, Scaling and Calibration values to the Logger' button at the bottom right of the interface.

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

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

If the pH Probe does not have a Pt100 temperature sensor fitted, the loggers Pt100 channel will default to 25°C and all pH readings will be taken as if the pH probe was returning a temperature of 25°C. The 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 for the Pt100 channel.

Follow these steps:

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

The screenshot shows the 'Logger Control' software interface. The 'Channel and Probe Setup' tab is active. The 'Probe' dropdown menu is highlighted with a red circle, showing 'User Set Temperature' selected. The 'Units and Scaling' section shows 'Offset' as 0.00000000, 'Gain' as 1.00000000, and 'Units' as °C. The 'Calibration' section shows 'Reading' as 25.00000000, 'Offset' as 25.00000000, and 'Gain' as 0.00000000. The 'Remote Address' field is empty.

See the next page for additional steps >>

Please Note: Intech Instruments Ltd recommends the use of a pH probe that has a built in Pt-100 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;
 and then click the "Write Unit, Scaling and Calibration values to the Logger" button.

Logger Control

Logger Status | Start Logger | Download | Channel and Probe Setup | Alarm Conditions | Pager

(pH (Ch1) | (Probe Temp (Ch2) | (IntTemperature (Ch3) | (Not Available (Ch4) | (Batt Voltage (Ch5)

Logger Channel Number 2 Name
 Long Name: User Set Temp
 Short Name: STemp
 Clear Reset

Probe
 Select the required Probe Type
 User Set Temperature
 Reset

Units and Scaling
 Offset: 0.00000000 Select
 Gain: 1.00000000 Clear
 Units: °C Default
 Decimal Places: 1 Calculate

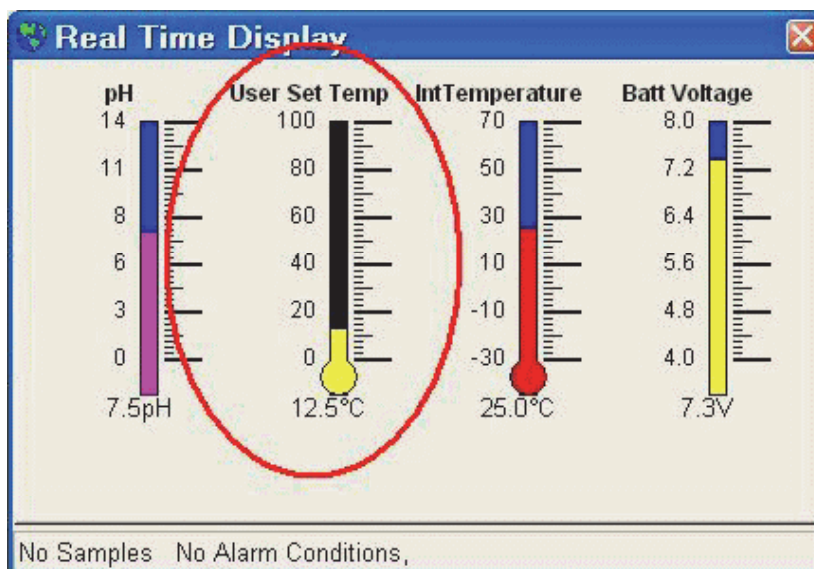
Compensation: Calibration:
 Reading: Read
 Offset: 12.50000000 Clear
 Gain: 0.00000000 Reset

Calibration Notes

Remote Address

Write Unit, Scaling and Calibration values to the Logger

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 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 Pt-100 temperature sensor for the best possible accuracy with the pH-HR.

