

# Tc-LCD Data Logger

## Thermocouple Temperature Logger & Display

Two Channel High Resolution (16 bit) Temperature Data Logger with LCD Display.

The **Tc-LCD** is a high resolution (16 bit), handheld temperature data logger with a liquid crystal display. The logger connects to a single external thermocouple probe and also has an internal temperature sensor for convenient logging of ambient temperature if desired. The logger accepts Type J, K, N, R and T thermocouple probes (factory set to type K). The display shows ambient temperature, thermocouple temperature, battery voltage, logger and alarm status.

This logger is designed for indoor use (IP 40) but can be supplied with a TruTrack Seahorse Logger Enclosure for outdoor use. The logger uses the standard NIST (National Institute of Standards and Technology) equations to calculate, display and log temperatures from the various thermocouple probe types.



### Features.

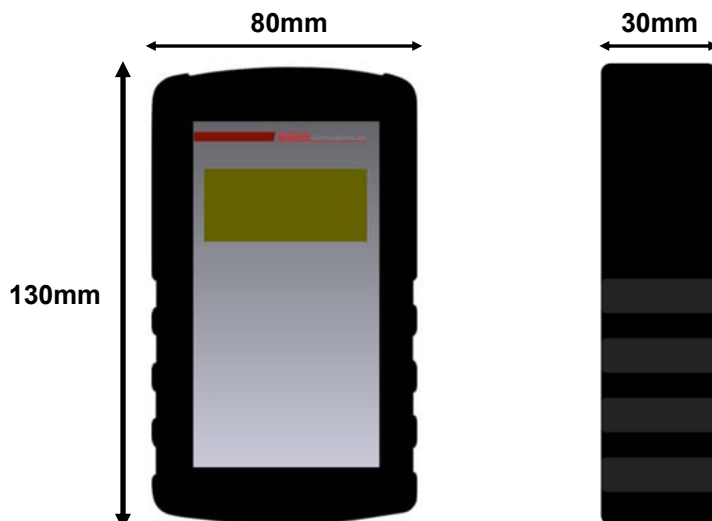
- Universal miniature thermocouple connector socket can be used to connect type J, K, N, R and T thermocouples (factory set to type K).
- Storage capacity of over 500,000 samples.
- Easy to use LCD menu options.
- LCD display shows logger status and alarm status continuously.
- LCD display can be set to show; thermocouple temperature, internal temperature, battery voltage, number of logged samples and alarm status.
- 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", at a given time in the future, on a condition (e.g. temperature >20°C) or on Trigger (push button on logger).

### Ordering Information.

**Tc-LCD** LCD Thermocouple temperature data logger.

**DLC8USB** [USB] or **DLC8** [RS232] download cable (2m) to connect Tc-LCD with computer.  
*Please Note: The Tc-LCD data logger is not supplied with a Thermocouple probe. These can be ordered separately from Intech Instruments Ltd if required. See page 4.*

### Tc-LCD Dimensions.



## Specifications.

Thermocouple Input:	Thermocouple Sensor Connector	Universal Miniature Thermocouple Connector Socket
Accuracy	$\pm 0.5^{\circ}\text{C}$ (Display Only)	
	Thermocouple accuracy depends on the type used	
Temperature Coefficient	$\pm 0.1\%$ per $^{\circ}\text{C}$ of logger temperature	
Temperature Range	Type	Min Temp
	J	$-200^{\circ}\text{C}$
	K	$-250^{\circ}\text{C}$
	N	$-250^{\circ}\text{C}$
	R	$-50^{\circ}\text{C}$
	T	$-250^{\circ}\text{C}$
		Max Temp
		$900^{\circ}\text{C}$
		$1300^{\circ}\text{C}$
		$1300^{\circ}\text{C}$
		$1760^{\circ}\text{C}$
		$400^{\circ}\text{C}$
Resolution	$0.1^{\circ}\text{C}$	



Internal Temperature:	Sensor Type	Thermistor
	Linear accuracy over range	$\pm 0.3^{\circ}\text{C}$ ( $0^{\circ}\text{C}$ to $70^{\circ}\text{C}$ )
	Repeatability	$\pm 0.1^{\circ}\text{C}$
	Long term stability	$\pm 0.1^{\circ}\text{C}$

Logger:	Working Temperature	$-20^{\circ}\text{C}$ to $+70^{\circ}\text{C}$
	Storage Temperature	$-30^{\circ}\text{C}$ to $+70^{\circ}\text{C}$
	Sampling Rate	1 second minimum, 10 hours maximum; in 1 second intervals
	Storage capacity	522,240 samples logging Thermocouple only
		362 days with 1 min logging interval
		4.9 years with 5 min logging interval

Alarms	Two independent Alarms
	Triggered on any combination of six user configurable Alarm Conditions
	Both alarms can be configured to send SMS messages if connected to a cell modem
	Two Open Collector Alarm Outputs
	Alarms can be visually checked on the LCD Display or by using the Omni7 software

Start modes	Start immediately; Start on date/time; Start on Condition (e.g. temperature $>20^{\circ}\text{C}$ ); Start on trigger (push button on logger)
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Stop modes	Stop when memory is full / Stop on date/time / Loop around (continues logging)
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Logging modes	Each channel can be set to log any combination of:
	- Point readings
	- Average reading
	- Maximum 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 years life depending on usage as above
	Using the logger in temperatures below $-5^{\circ}\text{C}$ ( $23^{\circ}\text{F}$ ) will reduce battery life
	User Replaceable; Two 3.6 volts Lithium AA cells
	The data is retained in the case of battery failure
	Battery Status Monitor on LCD display and in Omni7 software

Download time	9 minutes, 30 seconds for Full Logger
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Case material	ABS Plastic
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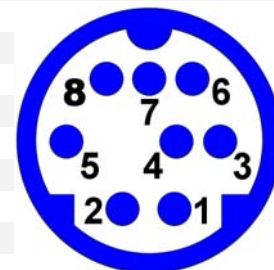
IP Rating	40
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Weight	185g
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Size	130mm x 80mm x 30mm
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Communication Connector	The Tc-LCD has a 8 pin Mini-DIN female socket
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Pinout	Pin 1 Common
	Pin 2 RS232 RX (out of logger)
	Pin 3 RS232 TX (into logger)
	Pin 4 RS232 CTS (out of logger)
	Pin 5 RS232 RTS (into logger)
	Pin 6 Alarm 1 Open Collector Output
	Pin 7 Alarm 2 Open Collector Output
	Pin 8 Power 9 to 16V dc



A **DLC8USB [USB]** or **DLC8 [RS232]** download cable (2m) is required to connect the Tc-LCD 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.**

## 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.



## Liquid Crystal Display Operation.

The Tc-LCD displays logger status and alarm status continuously and can be set to show the internal temperature (cold junction compensation temperature), the thermocouple sensor temperature, the battery voltage and the number of logged samples.

Logger status is shown as:

- **Running**
- **Stopped**
- **Waiting** (Waiting for “Start on Condition”)
- **Waiting Trigger** (Waiting for “Start on Trigger”)

If the logger is waiting for “Start on Trigger” it can be started in the field from the Menu provided on the display.

If an Alarm has been triggered the display will show

- **Alarm 1**
- **Alarm 2**

If both Alarms are triggered “**Alarm**” will be displayed continuously and “**1**” and “**2**” will flash consecutively.

**Low Batt** will be displayed if the internal batteries require replacement.

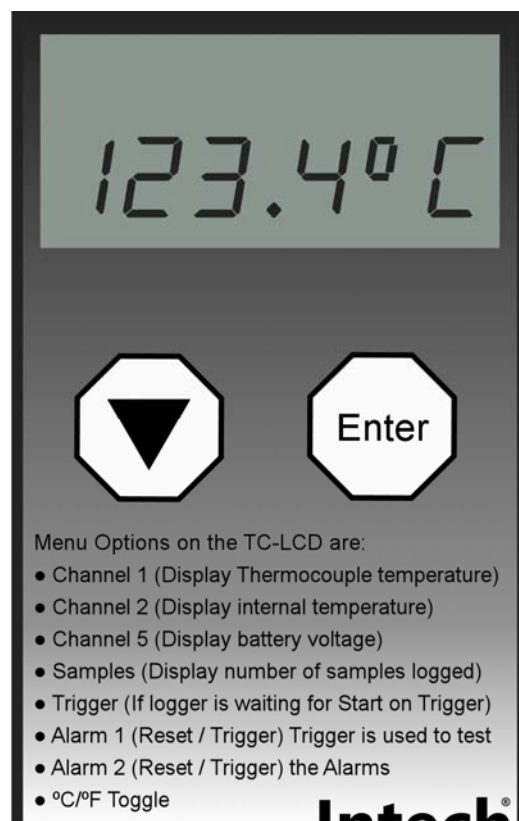
## Tc-LCD Menu Options.

Pressing the **Enter** button on the front panel of the Tc-LCD activates the Menu Display. The **Down Arrow** can then be used to scroll down through the various Menu Options. When the required menu option is displayed, press **Enter** to select this option.

Menu Options on the Tc-LCD are:

- Channel 1 (Display Thermocouple temperature)
- Channel 2 (Display internal temperature)
- Channel 5 (Display battery voltage)
- Samples (Display number of samples logged)
- Trigger (If logger is waiting for Start on Trigger)
- Alarm 1 (Reset / Trigger) Trigger is used to test
- Alarm 2 (Reset / Trigger) the Alarms
- °C/°F Toggle

The display will update at 1 second intervals for 1 minute after any button is pushed. It will then slow down to 10 second display updates (this is a power saving feature).



Menu Options on the TC-LCD are:

- Channel 1 (Display Thermocouple temperature)
- Channel 2 (Display internal temperature)
- Channel 5 (Display battery voltage)
- Samples (Display number of samples logged)
- Trigger (If logger is waiting for Start on Trigger)
- Alarm 1 (Reset / Trigger) Trigger is used to test
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## Thermocouple Probe Setup.

The Tc-LCD is factory set for use with type K thermocouple probes.

For other thermocouple probe types the Tc-LCD needs to be setup for the correct thermocouple probe type using a computer and the Omni7 software. There is no need to alter these settings if you are using a type K thermocouple probe!

### To set the Thermocouple probe type of the Tc-LCD:

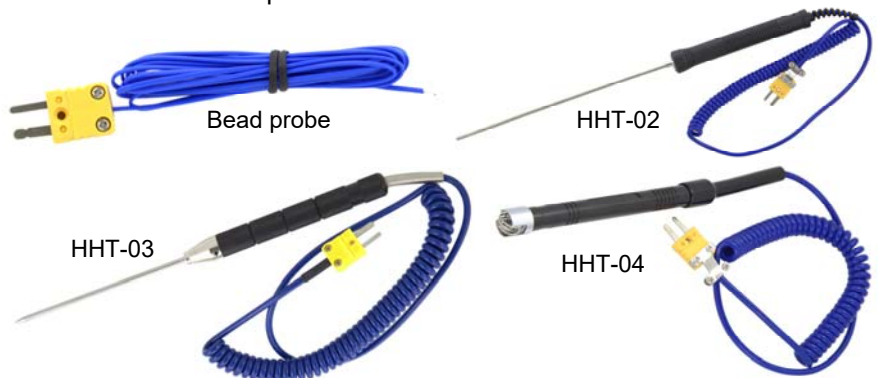
- Run the Omni7 software.
- Connect to the logger using a **DLC8USB [USB]** or **DLC8 [RS232]** download cable (2m).
- Select the Logger Control window.
- Select the 'Channel and Probe Setup' tab.
- Select the 'Ext Temperature (Ch1)' tab.
- In the Probe box, select the required Thermocouple Probe Type.
- Click on the "Write Unit Scaling and Calibration Values to the Logger" button.

**Note:** For complete calibration instructions for each Thermocouple probe type, please refer to the Omni7 Help. For  $\pm 50\text{mV}$  DC input, follow the procedure above and select  $\pm 50\text{mV}$  Digital as the Probe Type.

## Thermocouple Probes.

CODE	DESCRIPTION
<b>Bead probe</b>	<b>Miniature plug and cable. Type K.</b> Probe: Bead tip. Cable: 2m Teflon. Temp: min/max of probe: 0/100°C.
<b>HHT-01</b>	<b>Industrial food probe. Type K.</b> Probe: 4.7 x 100mm Spear tip. 316 Stainless steel. Cable: 900mm PVC. Curly cord. Temp: min/max of probe: -30/400°C.
<b>HHT-02</b>	<b>Insertion probe. Type K.</b> Probe: 3.2 x 200mm. Stainless steel. Cable: 900mm PVC. Temp: min/max of probe: -30/600°C.
<b>HHT-03</b>	<b>Mini spear probe. Type K.</b> Probe: 3.2 x 100mm. Stainless steel. Cable: 900mm PVC. Temp: min/max of probe: -30/300°C.
<b>HHT-04</b>	<b>Surface probe. Type K.</b> Probe: Foil sensor. Fast response. Cable: 900mm PVC. Temp: min/max of probe: 0/400°C

The Tc-LCD data logger is not supplied with a thermocouple probe. These can be ordered separately from Intech Instruments Ltd if required. Handheld Thermocouple Probes available from Intech include:



Note: The above covers the more common Hand-Held Thermocouple probes. We can supply thermocouple probes to your particular specification.

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