Product User Guide

HiTemp140X2 Series

HiTemp140X2 Series
High Temperature Dual Probe Data Logger Series

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Product Overview

The HiTemp140X2 series of dual probe high temperature data loggers are comprised of a stainless steel data logger body and feature either two remote temperature probes one ambient and one remote temperature probe combination. This data logger series offers extreme flexibility for high temperature monitoring applications.

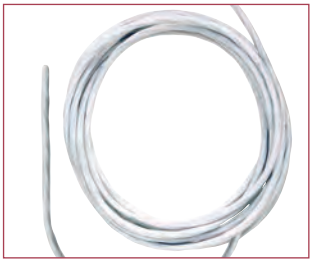
The dual probes of the HiTemp140X2 series allow for simultaneous temperature monitoring and are ideal for applications such as oven mapping, surface temperature monitoring, autoclave validation, food processing, sterilization processes and much more.

The HiTemp140X2-TD data logger models feature a 2 inch rigid, fast response, transitional diameter probe to measure ambient temperature, combined with a second stainless steel bendable or flexible RTD probe option.

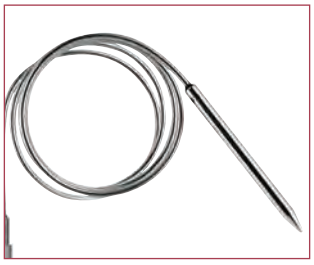
The HiTemp140X2-FP data logger models feature a 6 inch, 12 inch, 36 inch or 72 inch, lightweight flexible RTD probe, combined with a second stainless steel bendable probe or a second flexible RTD probe.

The HiTemp140X2 data logger series is compatible with the latest version of the MadgeTech Software. This allows for simple starting, stopping and downloading of collected data. Once the readings have been downloaded to the software, it can be viewed in graphic, tabular, and summary form for easy analysis, as well as the potential to be exported into Excel for further calculations.

Rigid Transitional Diameter Probe (TD)



Flexible RTD Probe (FP)



Stainless Steel Bendable RTD Probe (PT)

Additional Features

Submergibility

The HiTemp140X2 series is rated IP68 and is fully submersible. They can be placed in environments up to 230 ft (70 m) of water.

Bend Radius

- The bendable probe can be bent to a 1/4 inch bend radius. The probe should not be bent within 1 inch of either weld joint.
- The flexible probe should not be bent within 1 inch where the probe meets the logger or less than 1 inch from the probe tip.

O-Rings

O-ring maintenance is a key factor when properly caring for the HiTemp140X2 data loggers. The O-rings ensure a tight seal and prevent liquid from entering the inside of the device. Please refer to the application note "O-Rings 101: Protecting Your Data", found on the MadgeTech website, for information on how to prevent O-ring failure.

Trigger Settings

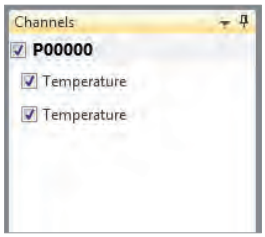
The device can be programmed to only record based off user configured trigger settings.

1. In the **Connected devices** panel, select the intended device to change the settings.
2. On the **Device** tab, in the **Information** group, click **Properties**. Users can also right-click on the device and select **Properties** in the context menu.
3. Click **Trigger** and configure the **Trigger** settings. Trigger formats are available in Window and Two Point (bi-level) mode. Window mode allows for one range of temperature monitoring and two point mode allows for two ranges.

Note: This product is rated for use up to 140 °C. Please heed the battery warning. The product will explode if exposed to temperatures above 140 °C.

Temperature Channels

All HiTemp140X2 data loggers feature 2 temperature channels. The channel number for each probe is identified on the top of the logger as shown below. The MadgeTech Software will list the temperature channels in sequence, listing channel 1 first and channel 2 second, under the data logger device ID as shown to the right.



Installation Guide

Installing the Interface cable

- IFC400 or IFC406
  Refer to the "Quick Start Guide" included in the package.

Installing the software

The Software can be downloaded from the MadgeTech website. Follow the instructions provided in the Installation Wizard to install the MadgeTech Software.

Device Operation

Connecting and Starting the data logger

- Once the software is installed and running, plug the interface cable into the docking station.
- Connect the USB end of the interface cable into an open USB port on the computer.
- Place the data logger into the docking station.
- The data logger will automatically appear under **Connected Devices** within the software.
- For most applications, select **Custom Start** from the menu bar and choose the desired start method, reading rate and other parameters appropriate for the data logging application and click **Start**. (***Quick Start*** *applies the most recent custom start options,* ***Batch Start*** *is used for managing multiple loggers at once,* ***Real Time Start*** *stores the dataset as it records while connected to the logger.*)
- The status of the device will change to **Running**, **Waiting to Start** or **Waiting to Manual Start**, depending upon your start method.
- Disconnect the data logger from the docking station and place it in the environment to measure.

Note: The device will stop recording data when the end of memory is reached or the device is stopped, unless user selectable memory wrap is enabled. At this point the device cannot be restarted until it has been re-armed by the computer.

Downloading data from a data logger

- Place the logger into the docking station.
- Highlight the data logger in the **Connected Devices** list. Click **Stop** on the menu bar.
- Once the data logger is stopped, with the logger highlighted, click **Download**. You will be prompted to name your report.
- Downloading will offload and save all the recorded data to the PC.

Device Maintenance

Battery Replacement

When replacing the battery, it is important to insert the battery with positive polarity pointing upward. Failure to do so could result in product inoperability or potential explosion if exposed to high temperatures.

Recalibration

The HiTemp140X2 standard calibration points are 30 °C and 140 °C.

Call for custom calibration options to accommodate specific application needs. Prices and specifications subject to change. See MadgeTech's terms and conditions. To send devices to MadgeTech for calibration, service or repair, please use the MadgeTech RMA Process (next section).

Notice: Steam Sterilization Applications

The pervasive nature of pressurized steam creates a very difficult environment for electronics. Please refer to the following preventative maintenance procedure when using this device in steam sterilization applications.
Additionally, this device is not ideal for steam sterilization applications above 121 °C/1.1 bar.

Preventive Maintenance
After every 3 hours of steam exposure:

1. Remove the endcap and battery from the device (ref. battery change procedure on Product User Guide)
2. Place open logger (minus battery) in an oven at 120°C (250°F) for a minimum of 30 minutes
3. Remove logger from oven and allow to cool to room temp
4. Re-assemble the logger with the battery (note polarity) and endcap

RMA Instructions

To send a device back in to MadgeTech, follow the instructions below to create an RMA (Return Merchandise Authorization) on the MadgeTech website:

1. Visit the **Services** tab select **RMA Process**.
2. When the web page opens, please sign in. If this is the first time, select **Click here to register an account** and create one. Once signed in, click on the **Make New RMA** button and fill in all the blank fields.
3. Complete the applicable fields on the form including customer Billing and Shipping information, even if they are the same. Please see the field explanation below for a more detailed description about questions asked in the Device Information section.
4. When all of the fields are complete, click **Generate RMA**.
5. Print out the confirmation page that follows containing the RMA number and MadgeTech's address for shipping. **A Return Merchandise Authorization must be accompanied by a copy of the RMA paperwork and shipping is prepaid by the customer**. The RMA number should be clearly marked on the outside of the package.
6. Please ship the package via UPS, FedEx, TNT, or DHL to the address listed on the confirmation page. USPS will not ship MadgeTech data loggers.
7. A notification email will be automatically sent when MadgeTech has received the RMA.

HiTemp140X2 Series General Specifications

Reading Rate	1 reading every second up to 1 reading every 24 hours
Memory	32,767 readings
Memory Wrap Around	Yes
Start Modes	• Software programmable immediate start • Delay start up to 18 months in advance
Stop Modes	Manual or Timed (Specific data and time)
Real Time Recording	May be used with PC to monitor and record data in real time
Password Protection	An optional password may be programmed into the device to restrict access to configuration options. Data may be read out without the password.
Readings in Trigger Settings Mode	16,383 readings
Trigger Settings	High and Low limits may be set. Once data meets or exceed sets limits, the device will record to memory. Bi-level start and stop triggers can also be programmed. Users can specify the number of readings to take after the device triggers. *(Triggering on channel #1 only)*
Battery Type	3.6V high-temperature lithium battery included user replaceable
Battery Life	1 year typical (1 minute reading rate at 25 °C/77 °F)
Calibration	Digital calibration through software
Calibration Date	Automatically recorded within device
Data Format	Date and time stamped °C, °F, °R, K,
Time Accuracy	• 1 minute/month at 25 °C (77 °F) • Extended Operation: ±20 minutes/month at 140 °C (±450 ppm)
Computer Interface	IFC400 or IFC406 USB docking station required; 125,000 baud
Operating System Compatibility	XP SP3/Vista/Windows 7/Windows 8
MadgeTech Software Compatibility	• MadgeTech Standard Software version 4.2.1.0 or later • MadgeTech Secure Software version 4.2.0.0 or later
Operating Environment	-40 °C to +140 °C (-40 °F to +284 °F) 0 %RH to 100 %RH, 0.002 PSIA to 100 PSIA *Note: any X2 logger with an FP probe is only rated to 60 PSIA.*
IP Rating	IP68
Dimensions (body)	1.89 in x 0.97 in x 0.97 in (48 mm x 24.6 mm x 24.6 mm)
Enclosure Material	316 Stainless Steel
Approvals	CE

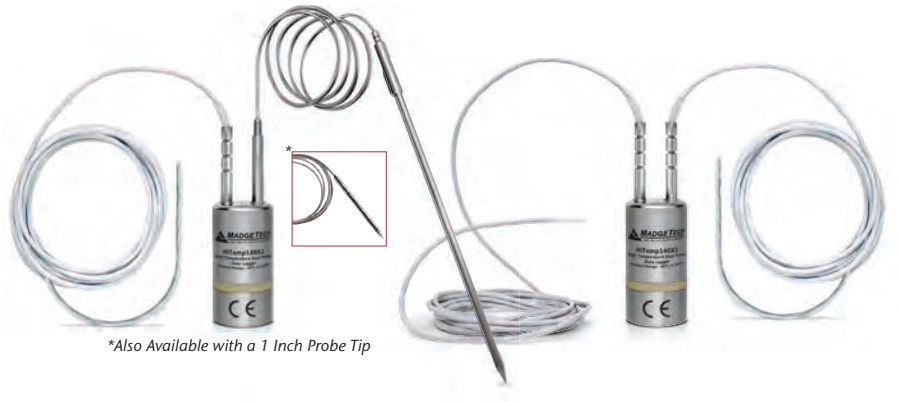
Battery Warning

WARNING: FIRE, EXPLOSION, AND SEVERE BURN HAZARD. DO NOT SHORT CIRCUIT, CHARGE, FORCE OVER DISCHARGE, CRUSH, PENETRATE, OR INCINERATE. BATTERY MAY LEAK OR EXPLODE IF HEATED ABOVE 150 °C (302 °F).

Specifications subject to change.
See MadgeTech's terms and conditions

HiTemp140X2-FP

High Temperature Dual Probe Data Loggers with two Remote Temperature Probes



*Also Available with a 1 Inch Probe Tip

The HiTemp140X2-FP series of dual probe high temperature data loggers are comprised of a stainless steel data logger body and feature 6 inch, 12 inch, 36 inch or 72 inch flexible FP probes or are available with one flexible probe and a stainless steel bendable PT probe combination.

The dual probes of this HiTemp140X2 series allow for simultaneous temperature monitoring and provide flexibility in applications such as oven mapping, surface temperature monitoring, autoclave validation and sterilization processes.

The HiTemp140X2-FP model offers lightweight, flexible RTD probes coated with PFA insulation. The FP probe design allows the probe to be easily maneuvered and is ideal for temperature monitoring inside test tubes, small vials, and other delicate applications. The narrow thermistor probe tip is compatible for use with the MicroDisc probe attachment allowing for precise surface temperature monitoring of shelving and more.

The HiTemp140X2-FP-PT-1 and HiTemp140X2-FP-PT-5 models feature a 6 inch, 12 inch, 36 inch, or 72 inch stainless steel bendable probe with the option of either a 1 inch or 5 inch probe tip (sheath). The stainless steel probe can be bent, angled, and coiled in any direction and formed into position as needed. The sharp probe tip allows for easy insertion and has an extended measurement range of -200 °C to +350 °C.

HiTemp140X2-FP Specifications

Temperature Sensor	• **HiTemp140X2-FP:** Flexible RTD Probe • **HiTemp140X2-FP-PT:** Flexible RTD Probe & Bendable RTD Probe
Probe Measurement Range	• **Flexible Probe:** -60 °C to +260 °C (-76 °F to +500 °F) • **Bendable Probe:** -200 °C to +350 °C (-328 °F to +662 °F)
Temperature Resolution	0.01 °C (0.02 °F)
Calibrated Accuracy	±0.1 °C (±0.18 °F)
Dimensions *(probe)*	• **HiTemp140X2-FP** Flexible Probe: 6 in x 0.10 in (152 mm x 2.5 mm) Flexible Probe: 12 in x 0.10 in (305 mm x 2.5 mm) Flexible Probe: 36 in x 0.10 in (914 mm x 2.5 mm) Flexible Probe: 72in x 0.10 in (1829 mm x 2.5 mm) • **HiTemp140X2-FP-PT 1 Inch Bendable Probe:** **Probe tip:** 1.7 in x 0.125 in dia. (42 mm x 3.2 mm dia.) **Bendable portion:** 22 in x 0.062 in dia. (559 mm x 1.6 mm dia. • **HiTemp140X2-FP-PT 5 Inch Bendable Probe:** **Probe tip:** 4.8 in x 0.125 in dia. with 1 in x 0.188 in dia. handle (121 mm x 3.2 mm dia. with 25 mm x 4.8 mm dia. handle) **Bendable portion:** 22 in x 0.062 in dia. (559 mm x 1.6 mm dia.
Materials	• **Bendable Probe:** 316 Stainless Steel • **Flexible Probe:** PFA Insulated Cable
Weight	• **HiTemp140X2-FP:** 4.1 oz (115 g) • **HiTemp140X2-FP-PT:** 3.9 oz (110 g)
Operating Enviornment	-40 °C to +140 °C (-40 °F to +284 °F) 0 %RH to 100 %RH, 0.002 PSIA to 60 PSIA

Questions?

For troubleshooting tips and information, refer to the built in help section of the MadgeTech 4 software, visit our Knowledge Base online.

HiTemp140X2-TD

High Temperature Dual Probe Data Loggers with Ambient & Remote Temperature Probes

The HiTemp140X2-TD data logger models feature a 2 inch rigid transitional diameter probe to measure ambient temperature, combined with a second bendable or flexible probe option. The rigid 2 inch TD probe is made of stainless steel, offers an ultra-fast response time and is suitable for measuring ambient temperatures in the harshest environments.

The HiTemp140X2-TD-PT-1 and the HiTemp140X2-TD-PT-5 models include a 24 inch bendable probe made of stainless steel with either a 1 inch or 5 inch probe sheath at the tip. The stainless steel PT probe options provide the ability to retain shape when bent into position and the sharp probe tip allows for easy insertion. The stainless steel PT probes also offer an extended measurement range to accommodate extremely high temperatures.

The HiTemp140X2-TD-FP combines the 2 inch rigid probe with the 6 inch 12 inch, 36 inch, or 72 inch RTD lightweight flexible RTD probe. The flexible FP probe option is a light-weight, pliable probe coated with PFA insulation making it ideal for use inside small vials and test tubes. This probe style has a narrow diameter, high accuracy and is ideal for steam sterilization and lyophilization. The FP probe is also compatible with the MicroDisc probe attachment, used for the surface temperature monitoring of shelving and more.

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HiTemp140X2-TD Specifications

Temperature Sensor	• **HiTemp140X2-TD-PT:** Rigid RTD Probe with a Bendable RTD Probe • **HiTemp140X2-TD-FP:** Rigid RTD Probe with a Flexible RTD Probe
Probe Measurement Range	• **Rigid Probe:** -200 °C to +260 °C (-328 °F to +500 °F) • **Bendable Probe:** -200 °C to +350 °C (-328 °F to +662 °F) • **Flexible Probe:** -60 °C to +260 °C (-76 °F to +500 °F)
Temperature Resolution	0.01 °C (0.02 °F)
Calibrated Accuracy	±0.1 °C (±0.18 °F)
Dimensions *(probe)*	• **HiTemp140X2-TD-PT Rigid Probe:** 2.0 in x 0.125 in dia. (0.188 in transitional dia.) 51 mm x 3.2 mm dia. (4.8 mm transitional dia.) • **HiTemp140X2-TD-PT 1 Inch Bendable Probe:** **Probe tip:** 1.7 in x 0.125 in dia. (42 mm x 3.2 mm dia.) **Bendable portion:** 22 in x 0.062 in dia. (559 mm x 1.6 mm dia.) • **HiTemp140X2-TD-PT 5 Inch Bendable Probe:** **Probe tip:** 4.8 in x 0.125 in dia. with 1 in x 0.188 in dia. handle (121 mm x 3.2 mm dia. with 25 mm x 4.8 mm dia. handle) **Bendable portion:** 22 in x 0.062 in dia. (559 mm x 1.6 mm dia.) • **HiTemp140X2-TD-FP- Flexible Probe:** 6 in x 0.10 in (152 mm x 2.5 mm) 12 in x 0.10 in (305 mm x 2.5 mm) 36 in x 0.10 in (914.4 mm x 2.5 mm) 72 in x 0.10 in (1829 mm x 2.5 mm)
Materials	• **Rigid/Bendable Probe:** 316 Stainless Steel • **Flexible Probe:** PFA Insulated Cable
Weight	• **HiTemp140X2-TD-PT:** 3.0 oz (85 g) • **HiTemp140X2-TD-FP:** 3.5 oz (100 g)
Operating Enviornment	-40 °C to +140 °C (-40 °F to +284 °F) 0 %RH to 100 %RH, 0.002 PSIA to 100 PSIA *Note: any X2 logger with an FP probe is only rated to 60 PSIA.*

Troubleshooting Tips

Why is the data logger not appearing in the software?

If a HiTemp140X2 data logger doesn't appear in the Connected Devices panel, or an error message is received while using any of the HiTemp140X2 loggers, try the following:

- Check that the IFC400 or IFC406 is properly connected. For more information, see Troubleshooting Interface Cable problems (below).
- Ensure that the battery is not discharged. For best voltage accuracy, use a voltage meter connected to the battery of the device. If possible, try switching the battery with a new 3.6V lithium battery.
- Ensure that no other MadgeTech software (such as **MadgeTech 2,** or **MadgeNET**) is running in the background.
- Ensure that **MadgeTech 4** is being used. **MadgeTech 2** and **MadgeNET** are not the correct software for connecting a HiTemp140X2.
- Ensure that the **Connected Devices** panel is large enough to display devices. This can be verified by positioning the cursor on the edge of the Connected Devices panel until the resize cursor appears, then dragging the edge of the panel to resize it. The screen layout may also be reset in the options menu by selecting **File**, **Options**, and scrolling to the bottom.

Troubleshooting Interface Cable problems

Check that the software properly recognizes the connected IFC400 or IFC406.

If the data logger is not appearing in the **Connected Devices** list, it may be that the IFC400 or IFC406 is not properly connected.

1. In the software, click the **File** button, then click **Options**.
2. In the **Options** window, click **Communications**.
3. The **Detected Interfaces** box will list all of the available communication interfaces. If the IFC400 or IFC406 is listed here, then the software has correctly recognized and is ready to use it.

Check that Windows recognizes the connected IFC400 or IFC406.

If the software does not recognize the IFC400 or IFC406, there may be a problem with Windows or the USB drivers.

1. In Windows, click **Start**, right-click **Computer** and choose **Properties** or press **Windows+Break** as a keyboard shortcut.
2. Click **Device Manager** in the left hand column.
3. Double click **Universal Serial Bus Controllers**.
4. Look for an entry for **Data logger Interface**.
5. If the entry is present, and there are no warning messages or icons, then windows has correctly recognized the connected IFC400 or IFC406.
6. If the entry is not present, or has an exclamation point icon next to it, the USB drivers may need to be installed. These are available on the software flash drive included with the IFC400 or IFC406, and on the MadgeTech website.

Ensure that the USB end of the IFC400 or IFC406 is securely connected to the computer.

1. Locate the USB-A plug of the IFC400 or IFC406.
2. If the interface cable is connected to the PC, unplug it. Wait ten seconds.
3. Reconnect the cable to the PC.
4. Check to make sure that the blue LED is lit on the IFC400 or the green LED is lit on the IFC406, indicating a successful connection.

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