HANDHELD STANDARDS THERMOMETERS

Features Summary

- Reads PRTs/RTDs to ±0.025°C and thermistors to ±0.005°C

- Model 1522 logs up to 10,000 readings on-board in multiple data sets

- INFO-CON connector allows interchangeable use of calibrated probes

- INFO-CON eliminates errors from programming probe data

With the Super-Thermometer, *Black Stack,* and Tweener thermometers, Hart established itself as the clear product leader for thermometer readouts. Our program of offering more power and more versatility for less money is indisputable. Now we underline that fact by introducing the two most powerful handheld thermometers in the world.

The Models 1521 and 1522 are the first standards thermometers to fit into a battery-powered handheld package. They're accurate to ±0.005°C! You'll only find that level of accuracy in large benchtop units that cost three times more. That's why we call the 1521 the Little Lord Kelvin.

Fitting easily into your hand and weighing only one pound (0.4 kg), these thermometers can go anywhere. And when they get there, you can have total confidence in the accuracy of your measurements. The 1522 is a full data logger, with memory to hold 10,000 readings.

Probes

The 1521 and 1522 read both Pt-25 and Pt-100 RTDs as well as thermistors.

PRTs, with their wide temperature ranges and stabilities, have long been favored as temperature standards. From –200°C to 100°C, the 1521 reads PRTs accurately to ±0.025°C. Even at 800°C, these high-precision readouts are accurate to ±0.1°C.

Precision thermistors offer excellent stability and even greater accuracies over a more narrow range—typically from about –10°C to 110°C. At temperatures below 50°C, these handheld thermometers read thermistors to ±0.005°C. Accuracy at 100°C is ±0.02°C.

While a small number of handheld thermometers on the market offer 0.01° resolution, they fail to provide the accuracy necessary for the last digit to be meaningful. Hart's Handheld Thermometers let you select resolution from 0.1° to 0.001° and offer the accuracy to have confidence in the last digit.

Of course, the 1521 and 1522 let you match the exact resistance-versus-temperature characteristics of an individually calibrated probe. This is true standards thermometry. Hart's Handheld Thermometers read ITS-90, Callendar-Van Dusen, or Steinhart-Hart coefficients for maximum system accuracy. These are real algorithms, not approximating conversion methods or electronic look-up tables. If you want to use common industrial curves, RTDs can be read using the common DIN 43760 (IEC 751) curve, and thermistors can be read using the YSI 400 curve.

INFO-CON Connectors

Probes attach to the 1521 and 1522 using Hart's new "INFO-CON" connector, partially based on U.S. Patent 5,857,777. The INFO-CON allows you to change the probes you use without reprograming your readout. A memory chip in the INFO-CON stores all the critical information about your probe, including its serial number, recall date, and calibration constants.

When you connect your probe, the 1521 and 1522 automatically recognize whether you're using an RTD or thermistor and download the calibration constants and type of conversion specific to your probe. They also check the recall date to verify it has not expired. To dedicate a single probe to your readout, disable the password-protected interchangeability function and your thermometer will read only the probe you specify.

Forget entering calibration constants yourself, and don't worry about the mistakes that can so easily occur during that process. You don't even need to select the sensor type. It's all stored in the INFO-CON. Simply plug in your probe

and you're ready to take readings. It doesn't get any easier.

Information is loaded into the memory of the INFO-CON by Hart when you purchase a probe or have a probe recalibrated by Hart. Alternatively, you may load your own information into an INFO-CON through a Handheld Thermometer or from the serial port of your PC with the optional download adapter.

If you'd like to use a Hart Handheld Thermometer with probes you already own, no problem! Spare connectors are available. They connect easily, and you can program them yourself.

Model 1521 LLK

The 1521 uses a menu system for convenient access to all functions. Calibration and sensor programming functions are password protected to help prevent unauthorized access.

"Min" and "Max" functions store the lowest and highest readings since the last reset. The "Hold" function freezes and stores the current reading (up to six may be stored) for later recall. And the "Delta" function computes the difference between the current reading and a reference value, which may be recorded at any time.

Stores (in a memory chip) the characterization constants for your RTD or thermistor so there's no need to enter them manually or download them from a PC.

Tells your 1521/1522 the serial number and recall date of the attached probe so you never have to worry about using a probe that is overdue for recertification.

Tells your 1521/1522 whether it's connected to an RTD or thermistor. No need to tell your readout what to do.

Allows you to change probes easily. Simply plug in the new probe and the 1521 is "married" to it with all the relevant data.
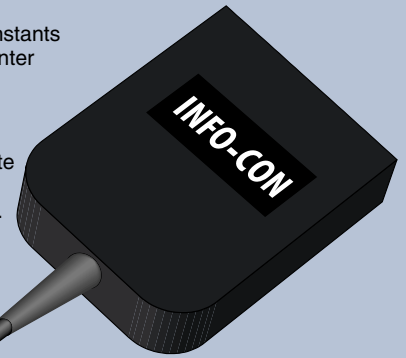
Each thermometer comes complete with rechargeable nickel-metal-hydride batteries, an AC adapter/charger, an RS-232 cable, and a spare INFO-CON connector. Every unit also includes a NIST-traceable certificate giving actual resistance measurements for your individual meter at ten points—four representing typical RTD values and six representing typical thermistor values.

A wide variety of standards-quality probes are available from Hart in many different shapes, sizes, and price ranges, including PRTs as accurate as ±0.015°C and thermistors as accurate as ±0.02°C. The uncertainty of your probe should be added to the uncertainty of the meter to compute total system uncertainty.

Model 1522 LLL

The Model 1522 is the Little Lord Logger. It has all the power and great features of the 1521 plus the ability to log data. Two data acquisition modes are on-board.

In "Auto Logging" mode, the 1522 records up to 10,000 measurements, including the value, unit of measure, date, and time of each measurement. Measurements are recorded at any of 12 selectable intervals ranging from every second to every hour.

Multiple log sessions may be appended to memory and stored with identifying data set labels. As many data sets can be stored as will fit in the 1522'\'s 10,000-reading data bank. Up to 25 user-definable labels are available for identifying data sets. Simply select the appropriate label when initializing your log session and all the readings are stored together.

With the 1522, you can calibrate all your jobs in a single trip. There's nothing

Handheld Thermometers Make Reference Thermometry Portable

Portable temperature calibrators (such as dry-wells or micro-baths) achieve better results when used with an external reference thermometer such as a 1521 or 1522 handheld thermometer. Why? Because even if the display of

your heat source has been calibrated, the accuracy of the display is never as good as the accuracy of an external reference.

A Hart 9102 Dry-Well, for example, has an accuracy specification of ±0.5°C at 100°C. Yet a 1522 thermometer with a Model 5612 PRT can read the 9102's thermal block to within 0.1°C at 100°C. By using an external reference you can dramatically improve results from your heat sources, as this example shows.

Hart's new handheld thermometers make the perfect companion for field calibrations using dry-wells or micro-baths. They're small and light, yet they deliver all the accuracy you need. If field calibrations are part of your work, make a Hart thermometer one of your tools.

HART SCIENTIFIC

to write down, and there's no need to clear memory after each job. Load all the data on-site and download the labeled data sets at your desk for analysis.

In "Demand Logging" mode, up to 100 individual measurements can be recorded, each one tagged with one of the 25 data labels. Whether you need many measurements from one source or single measurements from many sources, the 1522 is a powerful data recording tool.

With Hart's 9934 Log*Ware* software, data management is easy. Download to your PC using the built-in IR port or through the serial port. Data sets are downloaded into a single file or separated by labels. View the data, graph it, or apply alarms. With Log*Ware* you can record data in real time either from a Model 1522 or 1521 Thermometer.

One company consistently delivers powerful metrology products that make your life easier. Ask other companies about their handheld thermometers. Ask them about their thermometers that are accurate to within a few millikelvin and that record data at the touch of a button. Then ask them to give it all to you in one package. Hart Scientific from Fluke Corporation does—at a price you'll love. Call us today and get the most powerful handheld thermometer in the world.

Why an INFO-CON?

Achieving maximum accuracy in temperature measurement requires individually characterizing the thermometer being used and applying that characterization to the readout device, which reads the thermometer's output and converts it to a temperature. This is generally done by programming the thermometer's coefficients into the readout device—a time-consuming process subject to data-entry errors.

In contrast, industrial probes—100-ohm RTD's, for example—are usually manufactured to meet a standard performance curve. They are not individually calibrated, don't have characterization coefficients, and are considered interchangeable.

With INFO-CON connectors, using calibrated thermometers is as easy as using industrial probes. The time and errors of data entry and programming are completely eliminated, the highest possible accuracies are achieved, and both calibrated and uncalibrated probes become interchangeable.

Specifications

Sensor Type	Pt 25 to Pt 100	Thermistor
Temperature Range	–200 to 962°C	See "Resistance Range"
Resistance Range	0 to 400 ohms	0 to 500K ohms
Characterizations	ITS-90, IEC-751 (DIN '385'), Callendar-Van Dusen	Steinhart-Hart thermistor polynomial, YSI 400 (2252 ohms)
Temperature Accuracy (meter only)	–200°C to 100°C: ±0.025°C 100°C to 400°C: ±0.05°C 400°C to 800°C: ±0.1°C 800°C to 962°C: ±0.15°C	0°C to 50°C: ±0.005°C 50°C to 75°C: ±0.01°C 75°C to 100°C: ±0.02°C
Excitation Current	0.5 mA	5 µA
Operating Range	0°C to 40°C	
Temperature Resolution	0.001°	
Measurement Period	1 second	
Digital Filter	1- to 60-second exponential filter	
Probe Connection	INFO-CON connector	
Communications	RS-232 (Model 1522 also includes infrared interface)	
Memory	Model 1521 stores 6 readings in "Hold" mode; Model 1522 logs 10,000 readings in "Auto Log" mode and 100 readings in "Demand Log" mode (memory also holds up to 25 data labels)	
Log Intervals	1 sec, 5 sec, 10 sec, 15 sec, 30 sec, 60 sec, 2 min, 5 min, 10 min, 15 min, 30 min, 60 min	
Display	6-digit, 7-segment LCD with 16 x 1 alphanumeric	
Power	Rechargeable NiMH batteries (AC adapter included)	
Size	7.75" H x 4.2" W x 1.5" D (20 x 11 x 4 cm)	
Weight	1 lb. (0.4 kg)	
Probes	Contact Hart for a variety of precision PRTs and thermistors	
Calibration	10-point, NIST-traceable resistance certificate with data	

Ordering Information

HT1521-UV Thermometer, Handheld, 1 Channel

HT1522-UV Thermometer, Handheld, 1 Channel Data Logger

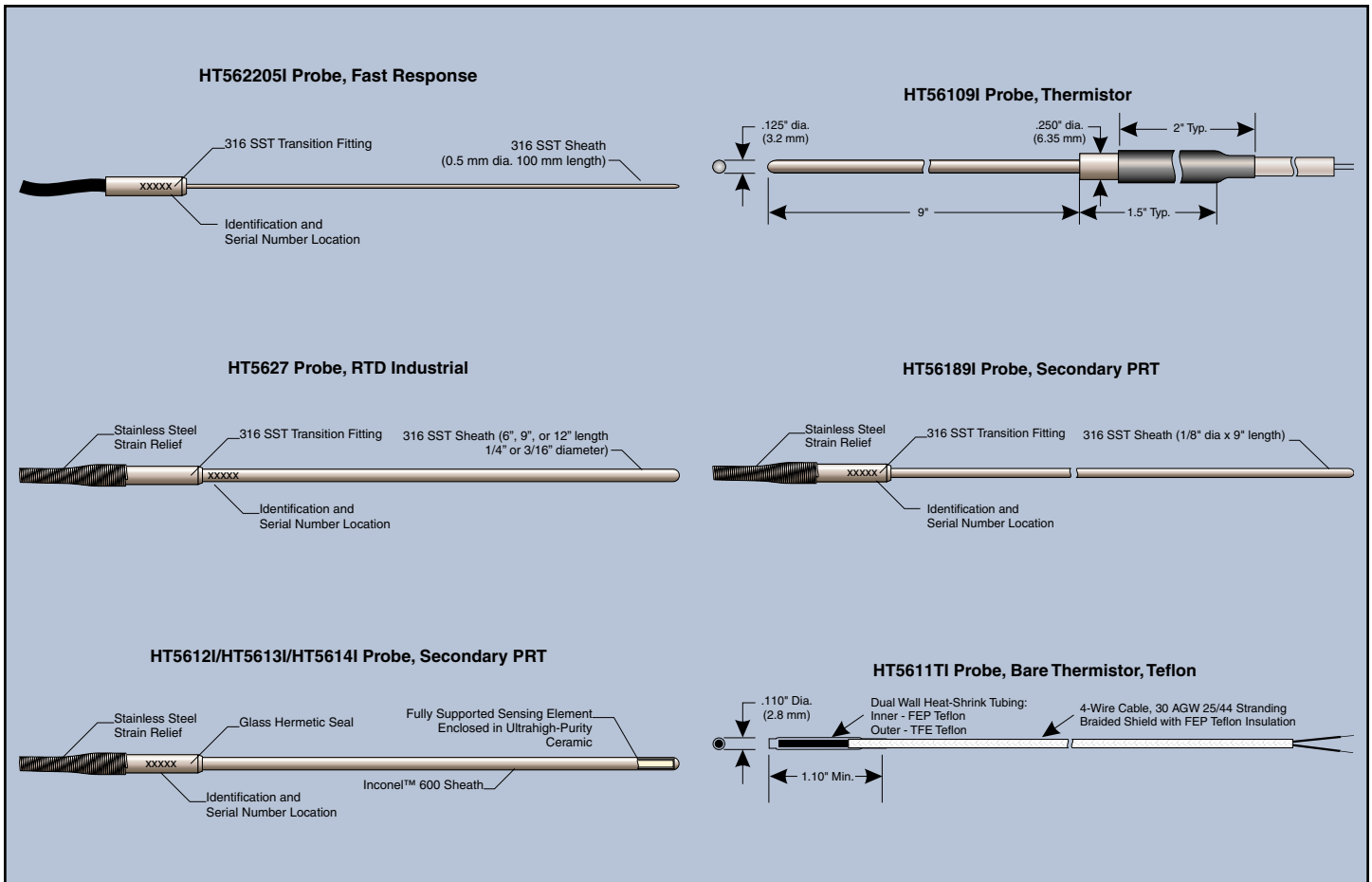**HT9934-M** Software, Log*Ware* 1-chan, Multi User

HT9934-S Software, Log*Ware* 1-chan, Single User

HT2372 Adapter, INFO-CON Download

HT2374 Dongle, Infrared Communications.

HT9318 Case, 1521/1522 & Probe Carrying

HART SCIENTIFIC

PROBE OPTIONS

HT562205I Probe, Fast Response

316 SST Transition Fitting

316 SST Sheath
(0.5 mm dia. 100 mm length)

Identification and
Serial Number Location

HT56109I Probe, Thermistor

.125" dia.
(3.2 mm)

.250" dia.
(6.35 mm)

2" Typ.

9"

1.5" Typ.

HT5627 Probe, RTD Industrial

Stainless Steel
Strain Relief

316 SST Transition Fitting

316 SST Sheath (6", 9", or 12" length
1/4" or 3/16" diameter)

Identification and
Serial Number Location

HT56189I Probe, Secondary PRT

Stainless Steel
Strain Relief

316 SST Transition Fitting

316 SST Sheath (1/8" dia x 9" length)

Identification and
Serial Number Location

HT5612I/HT5613I/HT5614I Probe, Secondary PRT

Stainless Steel
Strain Relief

Glass Hermetic Seal

Fully Supported Sensing Element
Enclosed in Ultrahigh-Purity
Ceramic

Identification and
Serial Number Location

Inconel™ 600 Sheath

HT5611TI Probe, Bare Thermistor, Teflon

.110" Dia.
(2.8 mm)

Dual Wall Heat-Shrink Tubing:
Inner - FEP Teflon
Outer - TFE Teflon

4-Wire Cable, 30 AGW 25/44 Stranding
Braided Shield with FEP Teflon Insulation

1.10" Min.

Ordering Information

| Model	Type	Range	Size	Cal Uncertainty and Short-Term Stability	Typical Drift (1 year)
HT561412I	Probe, Secondary PRT, 100 ohm	−200°C to 420°C	1/4" x 12" (6.35 x 305 mm)	±0.018°C at 0°C	±0.01°C
HT56136I	Probe, Secondary PRT, 100 ohm	−200°C to 300°C	3/16" x 6" (4.76 x 152 mm)	±0.018°C at 0°C	±0.01°C
HT56129I	Probe, Secondary PRT, 100 ohm	−200°C to 420°C	3/16" x 9" (4.76 x 229 mm)	±0.018°C at 0°C	±0.01°C
HT56276I	Probe, RTD Industrial	−200°C to 300°C	3/16" x 6" (4.76 x 152 mm)	±0.05°C at 0°C	±0.13°C
HT56279I	Probe, RTD Industrial	−200°C to 420°C	3/16" x 9" (4.76 x 229 mm)	±0.05°C at 0°C	±0.13°C
HT562712I	Probe, RTD Industrial	−200°C to 420°C	1/4" x 12" (6.35 x 305 mm)	±0.05°C at 0°C	±0.13°C
HT56109I	Probe, Thermistor, Stainless	0°C to 110°C	1/8" x 9" (3.2 x 229 mm)	±0.02°C	±0.01°C
HT5611TI	Probe, Bare Thermistor, Teflon	0°C to 110°C	0.11" x 1.1" (2.8 x 28 mm)	±0.02°C	±0.01°C
HT56189I	Probe, Secondary PRT	−200°C to 500°C	1/8" x 9" (3.2 x 229 mm)	±0.015°C at 0°C	±0.01°C
HT562205I	Probe, Fast Response	−200°C to 350°C	0.5 x 100 mm	±0.015°C at 0°C	±0.15°C

HART SCIENTIFIC

Turn any Hart Handleld or Tweener Thermometer into a real-time datalogger with Hart's new Log*Ware* software package for Windows®. It's the easiest data acquisition program you'll ever use.

Log*Ware* lets you acquire data on your PC graphically and store it to a text file. It also performs statistical functions automatically on each data set. The setup is so easy you won't need to read the manual to use it.

Log*Ware* was designed specifically for temperature data acquisition. Set high and low alarm conditions, program a delayed start time, store a data log for a fixed number of readings or length of time, program the acquisition interval from one second to 24 hours, and then let the software take readings from the thermometer while you get the rest of your work done.

During a log session you can view the data in a time/temperature trend graph while the data points are stored to a file on your PC. Output the graph to your printer, view the test points from a spreadsheet, or review the pertinent statistics once your log is completed.

If you have a Hart Scientific 1522 LLL Thermometer, there's even more you can do. The 1522 stores up to 10,000 data points in multiple log sessions. Once you're back to your PC, you can use Log*Ware* to download the data into individual log sessions and view each one separately.
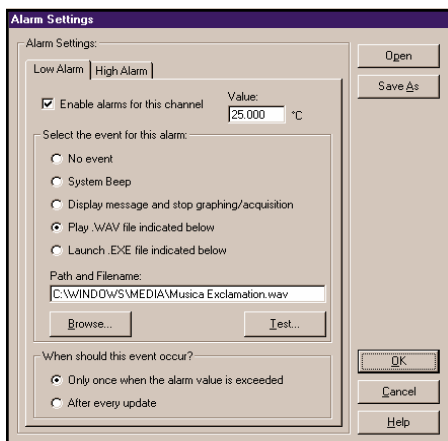
Log*Ware's* alarm options include playing sounds, displaying pop-up messages, and launching other applications.
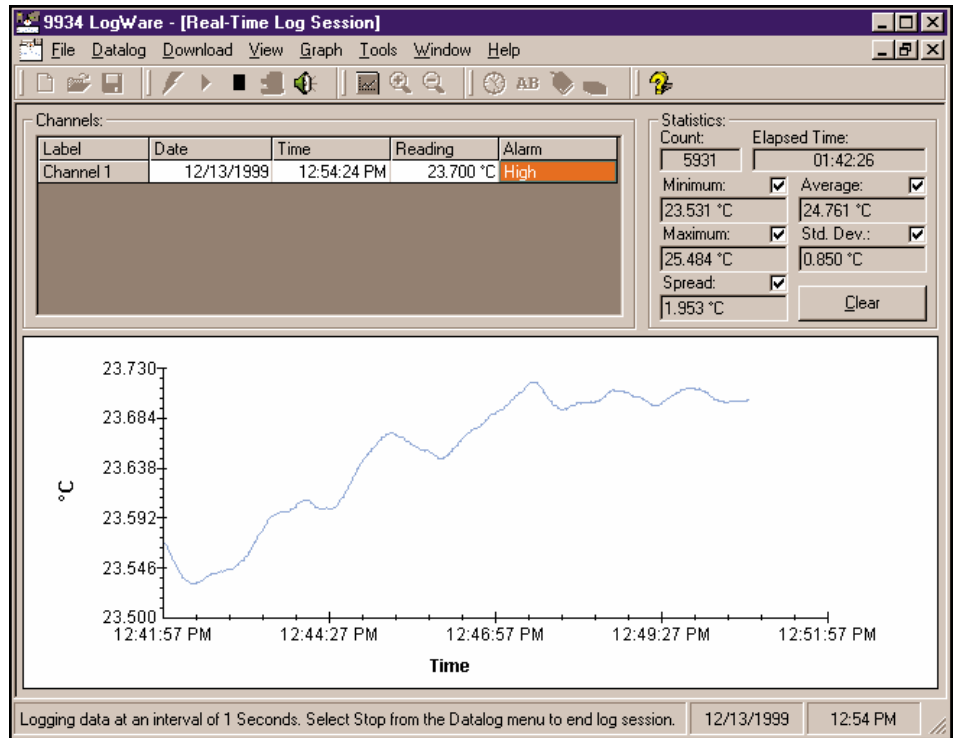
Take the 1522 out in the field, store readings from your freezers, ovens, chambers, and anywhere else you need to record temperature, bring it back to your PC, and Log*Ware* will separate each log session into individual data sets. You don't have to load the text file into your spreadsheet and try to figure out which data points went with each log session. Log*Ware* does all that for you.

For faster downloading from the 1522, we've provided an IR link in addition to a standard serial interface. Beam your data at high speeds, or use the standard RS-232 link.

Log*Ware* also gives you the ability to make configuration changes to your thermometer. Program your probe coefficients, write calibration data to your meter, set password parameters, and access other tools all from your PC in user-friendly Windows screens.

Get the most out of your thermometer with Log*Ware*. If you don't agree this is the best temperature acquisition system for your application, send it back and we'll refund your money. Buy it today and try it out at no risk.

Key Features

- Collects real-time data using Hart Handheld and Tweener Thermometers

- Calculates statistics and displays customizable graphs

- Allows user-selected start times, stop times, and sample intervals

- Provides user-defined alarms that trip customizable alarm events

- Downloads data from Model 1522 Thermometer using serial or IR ports

- Includes tools to read/write probe coefficients and other thermometer settings

Ordering Information

HT9934-M Software, Log*Ware* 1-chan, Multi User

HT9934-S Software, Log*Ware* 1-chan, Single User

Specifications subject to change.