FLUKE ®

Hart Scientific ®

Industrial Calibration Selection Guide

Look inside for:

Field Metrology Wells

Infrared Calibrators

Handheld and Field Dry-Wells
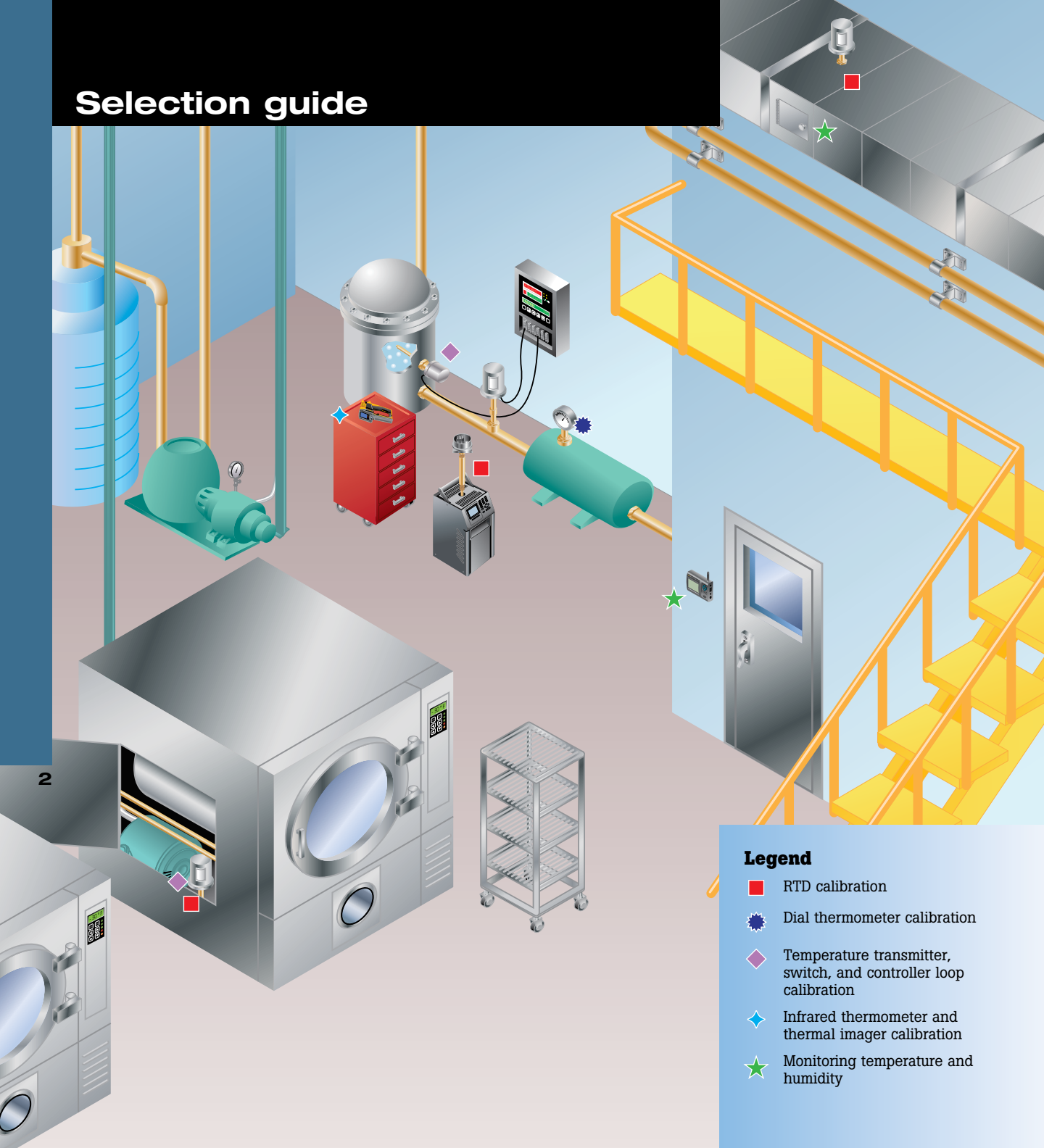
Micro-Baths

Environmental Monitoring

Thermometer Readouts

Reference Sensors

Temperature Measurement and Calibration

Tools for industrial instrumentation and calibration technicians

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Legend

🟥 RTD calibration

✴️ Dial thermometer calibration

🔶 Temperature transmitter, switch, and controller loop calibration

🔷 Infrared thermometer and thermal imager calibration

⭐ Monitoring temperature and humidity

	NEW! Field Metrology Wells			NEW! Precision Infrared Calibrators		Handheld dry-wells	
Model	9142/9142P page 4	9143/9143P page 4	9144/9144P page 4	4180 page 6	4181 page 6	9100S page 8	9102S page 8
Range	−25 °C to 150 °C 4–20 mA	33 °C to 350 °C 4–20 mA	50 °C to 660 °C 4–20 mA	−15 °C to 120 °C	35 °C to 500 °C	35 °C to 375 °C	−10 °C to 122 °C
Best Accuracy	± 0.2 °C	± 0.2 °C	± 0.35 °C	± 0.35 °C	± 0.35 °C	± 0.25 °C	± 0.25 °C
Applications	◆	◆	◆	✦	✦	■	■

	Field dry-wells					Sensors	
Model	9009 page 9	9103 page 10	9140 page 10	9141 page 10	9150 page 10	PRT page 15	Thermistor page 15
Range(s)	−15 °C to 350 °C	−25 °C to 140 °C	35 °C to 350 °C	50 °C to 650 °C	150 °C to 1200 °C	−200 °C to 670 °C	0 °C to 100 °C
Best Accuracy	± 0.2 °C	± 0.25 °C	± 0.5 °C	± 0.5 °C	± 5 °C	See pages 14–15	See pages 14–15
Applications	■ ✹	■ ✹	■ ✹	■ ✹	thermocouples	◆ ■ ✹	◆ ■ ✹

	Micro Baths			Thermometer readouts and environmental monitoring		
Model	6102 page 11	7102 page 11	7103 page 11	1521/1522 page 14	1502A page 13	1529 page 13
Range	35 °C to 200 °C	−5 °C to 125 °C	−30 °C to 125 °C	−200 °C to 962 °C	−200 °C to 962 °C	−200 °C to 962 °C
Best Accuracy	± 0.25 °C	± 0.25 °C	± 0.25 °C	± 0.008°C	± 0.006 °C	± 0.006 °C
Channels	n/a	n/a	n/a	1	1	4
Applications	✹	✹	✹	■ ✹	◆ ✹	◆ ✹

Fluke is pleased to offer a selection of Hart Scientific dry-wells and reference thermometers made specifically for industrial applications.

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Field Metrology Wells

Hart Scientific 9142, 9143, 9144 Field Metrology Wells

- Lightweight, portable, and fast
- Cool to −25 °C in 15 minutes and heat to 660 °C in 15 minutes
- Built-in two-channel readout for PRT, RTD, thermocouple, 4–20 mA current
- True reference thermometry with accuracy to ± 0.01 °C
- Specifications guaranteed in an ambient range of 13 °C to 33 °C
- On-board automation and documentation
- Metrology performance in accuracy, stability, uniformity, and loading

Field Metrology Wells offer accuracy, portability, and speed for nearly all field calibration applications. These units are packed with functionality and are remarkably easy to use. Field Metrology Wells are light weight, small, and quick to reach temperature set points, yet also stable, uniform, and precise. This industrial product line is perfect for transmitter loop, comparison calibration, or a simple check of a thermocouple sensor. There is no need to have to carry additional tools into the field as the "process" option offers a built-in readout for resistance, voltage, and mA measurement, 24V loop power, and on-board documentation.

Typical applications:

- Loop calibration of temperature transmitters
- Thermocouple calibration or verification
- Calibrations of RTDs or PRTs
- Testing of thermostatic switches
- Verification of industrial thermometers

Each unit includes: Accredited report of calibration, insert, insert removal tool, power cord, user manual, 9930 Interface-*it* software, serial cable, test leads (process versions only), spare PRT connector (process version only)

Recommended accessories: carrying case, MET/TEMP II automated calibration software, reference temperature sensor

Ordering Information

9142-X Field Metrology Well, −25 °C to 150 °C

9142-X-P Field Metrology Well, Process Version, −25 °C to 150 °C

9143-X Field Metrology Well, 33 °C to 350 °C

9143-X-P Field Metrology Well, Process Version, 33 °C to 350 °C

9144-X Field Metrology Well, 50 °C to 660 °C

9144-X-P Field Metrology Well, Process Version, 50 °C to 660 °C

9142-CASE Case, Carrying, Field Metrology Wells

5616-12-A PRT 305 mm x 6.35 mm (11.75 in x 1/4 in) w/ NIST traceable calibration, −200 °C to 420 °C

5609-12-A PRT 305 mm x 6.35 mm (11.75 in x 1/4 in) uncalibrated, −200 °C to 660 °C

1923-4-7 Calibration, PRT −200 °C to 660 °C

X = insert (interchangeable). Specify "A", "B", "C", "D", "E", or "F"

Field Metrology Wells

Summary specifications for 9142, 9143, and 9144

	9142/9142-P	9143/9143-P	9144/9144-P
Range	−25 °C to 150 °C	33 °C to 350 °C	50 °C to 660 °C
Display Accuracy	± 0.2 °C	± 0.2 °C	± 0.35 °C (420 °C) ± 0.5 °C (660 °C)
Stability	± 0.01 °C	± 0.02 °C (33 °C) ± 0.03 °C (350 °C)	± 0.03 °C (50 °C) ± 0.05 °C (660 °C)
Heating Time (max)	23 min	5 min	15 min
Cooling Time	15 min to −25 °C	14 min to 100 °C	25 min to 100 °C
Weight	8.2 kg (18 lbs)	7.3 kg (16 lbs)	7.7 kg (17 lbs)
Process Version Accuracy	± 0.01 °C at −25 °C ± 0.02 °C at 155 °C	± 0.02 °C at 50 °C ± 0.04 °C at 350 °C	± 0.02 °C at 50 °C ± 0.07 °C at 660 °C
RTD inputs (process version)	2-, 3-, 4-wire RTD. Resistance range of 0 to 400 Ω. Ni-120, PT-100 (385), PT-100 (3926), PT-100 (JIS), or Ω		
TC inputs (process version)	Type J, K, T, E, R, S, B, L, U, N, C, and mV		
mA Specs (process version)	Range: 0–24 mA with 24–28 V dc loop power mA Accuracy: 0.02% of rdg + 0.002 mA		

9142 Insert Options
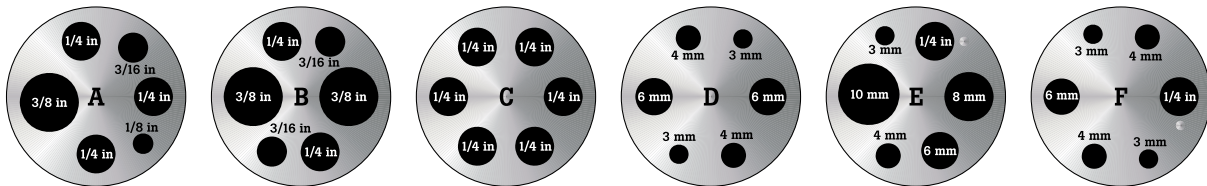
9143/9144 Insert Options
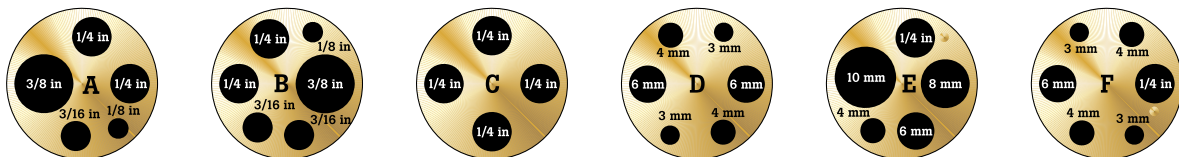
Precision infrared calibrators

Hart Scientific 4180 and 4181 Precision Infrared Calibrators

Accurate yet portable
- Combined temperature range of −15 °C to 500 °C
- Infrared display accuracy as good as ± 0.35 °C on both units
- Convenient handle and weight of 9.5 kg (21 lbs) or less for portability

Easy to get dependable results
- Each unit is given an accredited radiometric calibration for consistent, reliable, and traceable results
- Corrections for emissivity are performed automatically with no manual calculations
- Audio/visual stability indication provided for ease of use
- Stores thermometer calibration routines including temperature set-points, calibration distance, emissivity setting, and use of external aperture

A superior target
- 152 mm (6 in) diameter target addresses critical size-of-source effect issues for infrared thermometers and thermal imager calibration requirements
- Stability as good as ± 0.05 °C over 30 minutes for both models
- Uniformity as good as ± 0.1 °C over the inner 127 mm (5 in) diameter

Each unit includes: Accredited radiometric report of calibration, protective target cover, manual, 9930 Interface-*It* software

Recommended accessories: Protective carrying case

Do you calibrate your infrared thermometers and thermal imagers? Even those infrared thermometers that cannot be adjusted can benefit from a calibration that demonstrates the consistency and validity of your results. A trusted calibration means less worry, fewer questions and more time being productive. The 4180 Series of Precision Infrared Calibrators for infrared thermometers and thermal imagers is fast, accurate, and easy to use. It comes with an accredited calibration from one of the world's most trusted temperature calibration laboratories, sample calibration procedures for Fluke thermometers built right in, and everything you need to get started making high-quality infrared thermometer calibrations. This is the perfect solution for any infrared thermometer or thermal imager within its temperature range.

Ordering information

4180 Precision Infrared Calibrator, −15 °C to 120 °C

4181 Precision Infrared Calibrator, 35 °C to 500 °C

4180-CASE Protective carrying case

4180-DCAS Protective carrying case with wheels

Precision infrared calibrators

Excellent performance

The 4180 reaches temperatures from −15 °C to 120 °C and the 4181 has a temperature range from 35 °C to 500 °C. Check out the uniformity of the large six-inch targets shown in the thermal imager photo. The uniformity and stability are so good that variations can't be detected with a thermal imager. Uniformity is important in infrared temperature calibration work because an infrared thermometer will "see" as much as the entire target when placed at the appropriate calibration distance and each pixel of a thermal imager registers a temperature that needs to be both accurate and consistent across the imager.

Why calibrate?

Business decisions costing thousands of dollars are based on the results of your measurements, so they had better be right! It can be very expensive to shut down a line for repairs and maintenance but it might be catastrophic if the shut down is unplanned. To stand by your recommendations with confidence, you should definitely have your thermometers calibrated.

Application notes

For information on emissivity, size of source effect and radiometric calibration see the Hart Scientific application note "Infrared Temperature Calibration 101" and have a look at our Guide to Infrared Thermometer Calibration to get started quickly with your new calibrator. You can download both documents from our web site.

Summary Specifications for 4180 and 4181

	4180	4181
Temperature Range (@ 23 °C ambient and 0.95 emissivity)	−15 °C to 120 °C	35 °C to 500 °C
Infrared Display Accuracy	± 0.40 °C at −15 °C ± 0.35 °C at 0 °C ± 0.45 °C at 120 °C	± 0.35 °C at 35 °C ± 0.55 °C at 200 °C ± 1.6 °C at 500 °C
Display Resolution	0.01 °	
Target Size	152 mm (6 in) dia.	
Stability	± 0.1 °C at −15 °C ± 0.05 °C at 0 °C ± 0.1 °C at 120 °C	± 0.05 °C at 35 °C ± 0.2 °C at 250 °C ± 0.4 °C at 500 °C
Uniformity (5.0-inch diameter zone at the center of the target)	± 0.15 °C at −15 °C ± 0.1 °C at 0 °C ± 0.25 °C at 120 °C	± 0.1 °C at 35 °C ± 0.5 °C at 250 °C ± 1.0 °C at 500 °C
Heating Time	15 min: −15 °C to 120 °C 14 min: 23 °C to 120 °C	20 min: 35 °C to 500 °C
Cooling Time	15 min: 120 °C to 23 °C 20 min: 23 °C to −15 °C	100 min: 500 °C to 35 °C 40 min: 500 °C to 100 °C
Stabilization Time	10 minutes	10 minutes

Handheld dry-wells

Temperature sensor calibration is easy with a handheld dry-well.

Hart Scientific 9100S and 9102S Handheld Dry-Well Temperature Calibrators

- A temperature source that you can take anywhere
- Fast and easy calibrations of temperature sensors
- 9100 model weighs only 2 lbs, 3 oz (1 kilogram)
- Temperature ranges from −10 °C to 375 °C
- Stability during calibrations to ± 0.05 °C
- Direct interface to the Fluke 744 Documenting Process Calibrator

Each unit includes RS–232 interface, instrument control software and a NIST–traceable calibration.

Recommended accessories: carrying case, additional inserts, reference temperature sensor and indicator, battery pack
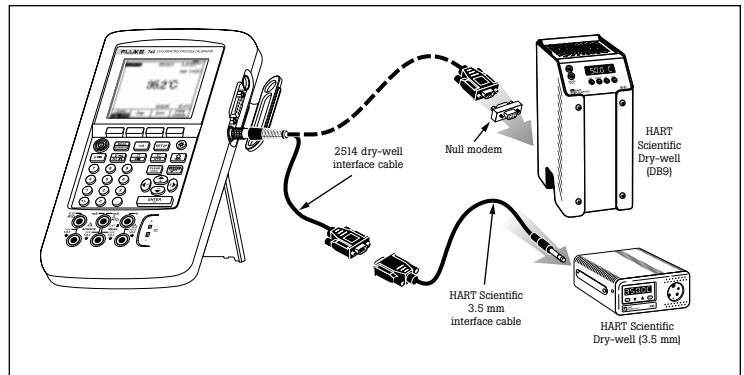
Easily connect a Fluke 744 to a dry-well for a fully automated temperature calibration that includes the temperature transmitter and temperature sensor.

Ordering information

9100S Handheld Dry–Well

9300 Rugged Carrying Case, 9100

9102S Handheld Dry–Well, comes with your choice of two 3102 inserts

9308 Hard Carrying Case, 9102/9132

9320A Battery Pack, 115V (9102S run time: 4 hrs)

3102-1 Insert, AL 1/16 in (1.6 mm)
3102-2 Insert, AL 1/8 in (3.2 mm)
3102-3 Insert, AL 3/16 in (4.8 mm)
3102-4 Insert, AL 1/4 in (6.4 mm) (Standard)
3102-6 Insert, AL 3/8 in (9.5 mm) (Standard)
3102-7 Insert, AL 7/16 in (11.1 mm) (Standard)
3102-8 Insert, AL 5/32 in (4 mm) (Standard)
2514 Dry-well interface cable to Fluke 744

Insert. Specify "A", "B", "D"

9100 fixed–block options
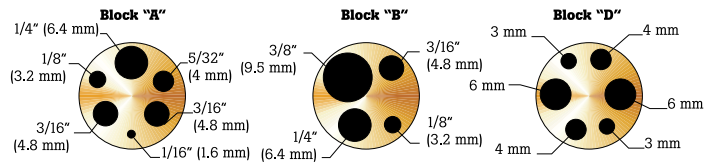
Hart Scientific 9009 Industrial Dual–Block Calibrator

Cut your calibration time in half

- Calibrate temperature sensors fast
- Independently controlled cold and hot blocks
- –15 °C to 110 °C (cold block), 50 °C to 350 °C (hot block)
- Self-contained in a rugged watertight case
- Four removable inserts,
- Direct interface to Fluke 744

Each unit includes four removable inserts, including two with holes that are 6.4 mm (1/4 in) and two with holes that are 4.8 mm (3/16 in) in diameter. Each unit also includes a power cord, insert removal tool, RS-232 interface, instrument control software and a NIST-traceable calibration

Recommended accessories: additional inserts, reference temperature sensor and indicator

Now it's easy to work twice as fast.

Why calibrate thermometers? Because your performance will go up and your costs will come down. As suggested in the example in Table 1, the cost of inaccurate measurements can be quite high.

Tip: While you're checking your transmitter sensor at one temperature, the other well can be heating or cooling to your next set-point.

High Cost of Not Calibrating a Sensor	
Process fluid	Water
Flow rate	100 gallons per minute
Control temp	38 °F
Energy cost	*Rate* per kW–Hr
Energy cost	70,812 (*Rate*) per year

Table 1. Annual cost of energy due to a 1 °C temperature error
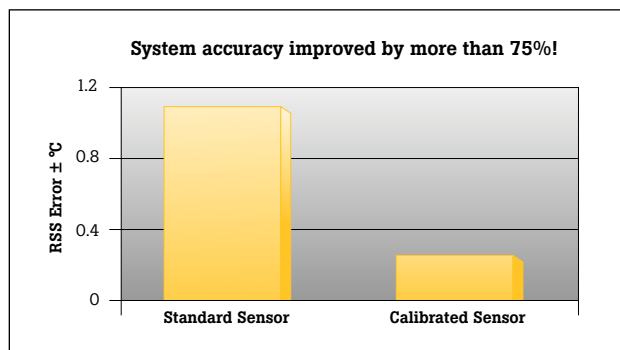
System accuracy improvement achieved with a calibrated Pt100 sensor.

Field dry-wells and furnaces

Hart Scientific dry-wells interface directly to the Fluke 744 for fully automated calibration.

Hart Scientific 9103, 9140 and 9141 Field Dry-Wells and 9150 Thermocouple Furnace

Temperature sensor test and calibration
- Lightweight and very portable
- Accuracy to ± 0.25 °C
- RS-232 and Interface-*it* software included
- Interchangeable inserts
- 9103 goes as low as –25 °C.
- 9140 is 6 pounds (2.7 kg) and 9141 is 3.6 kg (8 pounds)
- 9140 and 9141 reach max temp in 12 minutes
- 9150 extends up to 1200 °C covering a wide range of T/C types.
- Direct interface to Fluke 744

Recommended accessories: carrying case, additional inserts, reference temperature sensor and indicator

Each dry-well includes one of four available well inserts, an optional carrying case, RS–232 interface, instrument control software and a NIST–traceable calibration.

9103, 9140, 9141 and 9150 Insert Options

Insert "A"
1/16 in (1.6 mm)
1/4 in (6.35 mm)
1/2 in (12.7 mm)
3/8 in (9.5 mm)
1/8 in (3.2 mm)
3/16 in (4.8 mm)

Insert "B"
3/16 in (4.8 mm)
1/4 in (6.35 mm)
3/8 in (9.5 mm)
3/8 in (9.5 mm)
1/4 in (6.35 mm)
3/16 in (4.8 mm)

Insert "C"
1/4 in (6.35 mm)

Insert "D"
3 mm
4 mm
6 mm
6 mm
4 mm
3 mm

Hart Scientific 6102, 7102 and 7103 Micro-Baths

Portability and extreme stability

- Temperature sensor calibration
- Stability to ± 0.015 °C
- Ranges from −30 °C to 200 °C
- Accepts oddly shaped sensors
- Exceptional bath portability
- Direct interface to Fluke 744

Each unit includes a stir bar, power cord, RS-232 interface, instrument control software and a NIST–traceable calibration.

Recommended accessories: Fluid, case, reference probe and meter, extra stir bar, tank extension for LIG, MET/TEMP II

Hart Scientific MET/TEMP II Software

Easy-to-use temperature calibration automation software

- Fully automated calibration of RTDs, thermocouples, thermistors and many heat sources
- Calibrates up to 100 sensors at up to 40 points
- Performs coefficient calculations and generates tables and reports
- Reports conform to ANSI and NCSL standards

Each unit includes: CD, RS-232 multiplexer box, adapter, and PC cable

Hart Scientific Log*Ware* and Log*Ware* II Data Logging and Analysis Software

Turns any Hart Scientific thermometer readout into a real-time data logger

- Calculates statistics and displays customized graphs
- User-selectable alarms, delayed start times, and sample intervals
- Logging intervals from 1 second to 24 hours
- User-settable alarm functions
- Choose Log*Ware* II for readouts with more than one channel

See data logged in real-time.

Tip: For improved accuracy, use an external reference temperature indicator and sensor such as a 1521 and 5615–12–I combination.

Ordering information

7103 Micro-Bath, −30 °C to 125 °C
(includes a transport seal lid and a 2085 test lid)

7102 Micro-Bath, −5 °C to 125 °C
(includes a transport seal lid and a 2082–P test lid)

6102 Micro-Bath, 35 °C to 200 °C
(includes a transport seal lid and a 2082–M test lid)

5010-L Silicone Oil, type 200.05, 1 liter
(usable range: −40 °C to 130 °C)

5013-L Silicone Oil, type 200.20, 1 liter
(usable range: 10 °C to 230 °C)

9317 Carrying Case for 7103

9310 Carrying Case for 6102

9311 Carrying Case for 7102

9934–M Software, Log*Ware,* 1-channel, multi user

9934–S Software, Log*Ware*, 1-channel, single user

9935 Log*Ware* II, multiple channel logging software

9938 Software, MET/TEMP II

2514 Dry-Well Interface Cable to Fluke 744

* Software requires Windows® 98 or higher

Hart Scientific 1529 Chub-E4 Thermometer

Lab-quality accuracy on four channels

- Four channels for PRTs, thermistors and thermocouples
- Simultaneous measurement on four channels
- Displays eight user-selected data fields
- Logs up to 8,000 readings
- Battery provides eight hours of continuous operation
- Compatible with Log*Ware* and MET/TEMP II software

Recommended accessories: PRT (5626-12-L, 5615-12-L, or 5627A-12-L), thermistor (5611T-L or 5610-L), rugged carrying case (holds 1529 and four probes), Log*Ware* II multi channel logging software (see page 11)

Hart Scientific 1502A "Tweener" Thermometer

Great price and performance in one package

- PRT readout with accuracy to ± 0.006 °C
- Reads both 100 Ω and 25 Ω probes
- 0.0001° resolution
- Optional battery pack available
- Compatible with Log*Ware* and MET/TEMP II software

Recommended accessories: PRT (5626-12-D, 5615-12-D, or 5627A-12-D), 9301 carrying case fits Tweener and 12 in probe, Log*Ware* II single channel logging software

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Summary specifications for 1502A and 1529

	1529 PRT / RTD	1529 Thermistor	1529 Thermocouple	Tweener
Inputs	2 channels PRT/thermistor and 2 channels TC, or 4 channels PRT/thermistor, or 4 channels TC, specify when ordering; PRT/thermistor channels accept 2, 3, or 4 wires; TC inputs accept B, E, J, K, N, R, S, T, and Au-Pt TC types			1-channel 4-wire PRT
Temperature range	−189 °C to 960 °C (−308 °F to 1760 °F)	−50 °C to 150 °C (−58 °F to 302 °F)	−270 °C to 1800 °C (−454 °F to 3272 °F)	−200 °C to 962 °C (−328 °F to 1764 °F)
Measurement range	0 to 400 Ω	0 to 500 KΩ	−10 to 100 mV	0 to 400 Ω
Characterizations	ITS-90, IEC-751(DIN "385"), Callendar-Van Dusen	Steinhart-Hart, YSI-400	NIST Monograph 175, 3-point deviation function applied to NIST 175, 6th-order polynomial	ITS-90 subranges 4, 6 thru 11, IPTS-68 Callendar-Van Dusen
Temperature accuracy, typical (meter only)	± 0.006 °C at 0 °C ± 0.009 °C at 100 °C	± 0.0025 °C at 0 °C ± 0.025 °C at 100 °C	Ext. RJC: Int. RJC K at 600 °C ± 0.15 °C: ± 0.4 °C T at 200 °C ± 0.1 °C: ± 0.3 °C	± 0.006 °C at 0 °C ± 0.009 °C at 100 °C
Temperature resolution	0.001°	0.0001°	0.01 to 0.001°	0.001 °
Operating range	16 °C to 30 °C			
Logging intervals	0.1, 0.2, 0.5, 1, 2, 5, 10, 30, or 60 seconds; 2, 5, 10, 30, or 60 minutes			
Communications	RS-232 (tweener) and IR ports included, IEEE-488 (GPIB) optional			
Size (HxWxD)	102 x 191 x 208 mm (4.0 x 7.5 x 8.2 in)			61 x 143 x 181 mm (2.4 x 5.6 x 7.1 in)
Weight	2 kg (4.5 lb)			1.0 kg (2.2 lb)
Calibration	Accredited NIST-traceable resistance calibration and NIST-traceable voltage calibration provided			

Hart Scientific 1521 and 1522 Handheld Thermometers

Built to last and built to perform
- PRT readout accuracy to ± 0.025 °C
- 0.001° resolution
- Reads RTDs and thermistors
- Hart's INFO-CON connector manages probe coefficients
- 1522 log up to 10,000 readings
- Compatible with Log*Ware* and MET/TEMP II software

Recommended accessories: PRT (5626–12–I, 5615–12–I, or 5627A–12–I), thermistor (5611T–I or 5610–I), 9318 carrying case fits 1521/1522 and 12 in probe, Log*Ware* II single channel logging software (see page 11)

Summary specifications for 1521 and 1522

Temperature Accuracy (± °C) (includes sensor drift and calibration)					
Temperature sensor	**5626**	**5616**	**5615**	**5627A**	**5610/ 5611T**
−200 °C	0.008	0.013	0.025	0.027	N/A
0 °C	0.024	0.026	0.026	0.052	0.01
100 °C	0.034	0.036	0.037	0.069	0.019
420 °C	0.069	0.074	0.076	0.141	N/A
660 °C	0.1	N/A	N/A	N/A	N/A
Operating range 0 °C to 40 °C					
Memory 1521 – Stores 6 readings in "Hold" mode 1522 – Logs 10,000 readings in "Auto Logging" mode, 100 readings in "Demand Logging" mode					
Power Rechargeable nickel-metal-hydride batteries (ac adapter included)					
Size (HxWxD) 197 x 107 x 38 mm D (7.75 x 4.2 x 1.5 in)					
Weight 0.4 kg (1 lb)					
NIST-tracebale calibration included					

Ordering Information

1521 Thermometer, handheld, 1 channel

1522 Thermometer, handheld, 1 channel data logger, 110 V

5626-12-I Secondary PRT (12 in x 1/4 in),–200 °C to 660 °C

5616-12-I Secondary PRT (12 in x 1/4 in),–200 °C to 420 °C

5627A-12-I Precision Industrial PRT (12 in x 1/4 in),–200 °C to 420 °C

5611T-I Flexible Teflon coated precision thermistor, 0 °C to 100 °C

5610-9-I Precision thermistor, 0 °C to 100 °C

9934-S Software, Log*Ware* 1-channel, single user

9934-M Software, Log*Ware* 1-channel, multi user

9318 Case, 1521/1522, probe carrying

Included: Adapter/charger

Use the 1521 for accurate test, measurement, and calibration.

Temperature sensors

Each probe includes:

- Individual report of calibration
- Probe linearization coefficients
- Resistance vs. temperature table
- Termination to match your thermometer readout (see spec chart)

Tip: Improve the accuracy of your calibration by using an external reference thermometer. Calibrated temperature sensors and indicators can improve your results by a factor of 2 or more.

Recommended accessories: 2601 probe carrying case (for probes up to 12 in long), 2609 probe carrying case with handle (for probes up to 20 in long)

Summary specifications

PRT							
			Accuracy w/ Chub-E4 or Tweener (includes drift)				
Model	Range	Type of Cal	−200 °C	0 °C	Max °C	Dimensions	Unique Selling Point
5626-12-X	−200 °C to 661 °C	Accredited	± 0.006	± 0.009	± 0.037	6.35 x 305 mm	Best reference
5609-12-X	−200 °C to 670 °C	Order 1930-4-7†	± 0.010	± 0.011	± 0.054	6.35 x 305 mm	Highest temperature
5608-12-X	−200 °C to 500 °C	Order 1930-4-R†	± 0.010	± 0.011	± 0.031	3.2 x 305 mm	Excellent immersion
5616-12-X	−200 °C to 420 °C	Traceable	± 0.012	± 0.013	± 0.035	6.35 x 298 mm	Best value
5615-12-X	−200 °C to 420 °C	Accredited	± 0.024	± 0.014	± 0.041	6.35 x 305 mm	Accredited calibration
5615-9-X	−200 °C to 420 °C	Accredited	± 0.024	± 0.014	± 0.041	4.76 x 229 mm	Accredited calibration
5615-6-X	−200 °C to 300 °C	Accredited	± 0.024	± 0.014	± 0.041	4.76 x 152 mm	Smallest
5626-12-X	−200 °C to 661 °C	Accredited	± 0.006	± 0.009	± 0.037	6.35 x 305 mm	Best reference
5609-12-X	−200 °C to 670 °C	Order 1930-4-7†	± 0.010	± 0.011	± 0.054	6.35 x 305 mm	Highest temperature
5608-12-X	−200 °C to 500 °C	Order 1930-4-R†	± 0.010	± 0.011	± 0.031	3.2 x 305 mm	Excellent immersion
5616-12-X	−200 °C to 420 °C	Traceable	± 0.012	± 0.013	± 0.035	6.35 x 298 mm	Best value
5615-12-X	−200 °C to 420 °C	Accredited	± 0.024	± 0.014	± 0.041	6.35 x 305 mm	Accredited calibration
5615-9-X	−200 °C to 420 °C	Accredited	± 0.024	± 0.014	± 0.041	4.76 x 229 mm	Accredited calibration
5615-6-X	−200 °C to 300 °C	Accredited	± 0.024	± 0.014	± 0.041	4.76 x 152 mm	Smallest
5627A-12	−200 °C to 420 °C	Accredited	± 0.030	± 0.050	± 0.125	4.76 x 305 mm	Most rugged
5627A-9	−200 °C to 300 °C	Accredited	± 0.030	± 0.050	± 0.100	4.76 x 229 mm	Most rugged
5627A-6	−200 °C to 300 °C	Accredited	± 0.030	± 0.050	± 0.100	4.76 x 152 mm	Most rugged
Thermistor							
5610-9-X	0 °C to 100 °C	Traceable	N/A	± 0.009	± 0.023	3.2 x 229 mm	High accuracy
5611T-X	0 °C to 100 °C	Traceable	N/A	± 0.009	± 0.023	3 x 6100 mm	Teflon, flexible
X= Lead termination. Specify "A" for 9142/9143/9144, "D" for Tweener, "L" for Chub-E4, and "I" for 1521/1522. Accuracy calculated at k=2 95% confidence interval							
†Calibration ordered separately. For individual probe calibration order the 1923-4-7 or 1923-4-R calibration.							

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