MINI FIXED-POINT MAINTENANCE APPARATUS

Mini Fixed-Point Maintenance Apparatus **Model 9210, 9230, and 9260**

- Preprogrammed controller makes realizing fixed points easy
- Half the cost (or less) of traditional fixed-point systems
- Training takes a few hours—not a few years

If the reason you don't use fixed-point cells is because they're too expensive or too difficult to use, you haven't heard of Hart's mini fixed-point apparatus.

9210

The triple point of water (0.01°C) is one of the most important temperatures on the ITS-90. Unfortunately, realizing and maintaining triple point of water cells hasn't always been convenient or cost-effective.

Because ITS-90 calibrations require frequent measurements at the triple point of water, and because the triple point of water is often used as a statistical check against the drift of a temperature standard, it is important to be able to realize and maintain well-constructed triple point of water cells easily.

Hart's 9210 TPW Maintenance Apparatus provides built-in programming for the simple supercool-and-shake realization and maintenance of our Model 5901B Mini TPW Cell. Simply insert the cell, enter the "freeze" mode through the front-panel buttons, have your morning cup of coffee, and when the 9210 audibly alerts you, remove the Mini TPW Cell and give it a shake to initiate freezing a portion of the water. Re-insert the cell, change the program mode to "maintain," and you've got 0.01°C for the rest of the day with uncertainty of only ±0.0005°C.

Precision-machined thermal blocks can also be used to take advantage of the excellent stability and uniformity of the 9210 for performing comparison calibrations. Multi-hole and custom blocks are available with 7-inch depths.

9230

The gallium melting point (29.7646°C) is a critical temperature. Thermometers used in life science, environmental monitoring, and many other applications depend on it for accurate calibrations. Lab standards rely on it as an ITS-90 check standard and as a means of measuring drift between calibrations. Hart Scientific now makes it easy to use.

The new Model 9230 Gallium Maintenance System works with Hart's Model 5943 Stainless Steel Gallium Cell to provide melting plateaus that last a week. Not a day. Not a day-and-a-half. One week.

The Model 5943 Stainless Steel Gallium Cell holds a gallium sample that is 99.99999+% pure. The gallium is sealed in a Teflon envelope in a high purity argon atmosphere, which is itself sealed inside a stainless steel housing. This double-sealing method reduces leaching into the gallium sample and ensures a life of ten years or longer for the cell.

9260

Hart's 9260 Mini Fixed-Point Cell Furnace provides a fixed-point system that cuts in half the financial investment required to do fixed-point calibrations and virtually all the time and training required by traditional systems.

This furnace costs less than half of a large furnace and works with indium, tin, zinc, and aluminum cells to cover all ITS-90 fixed points from 156.5985°C to 660.323°C. The cells themselves, using a smaller volume of 99.9999% pure metal, also cost much less. But cost is only a part of the issue.

The 9260 makes using fixed points easy. Simply insert the cell at the end of the day and let it sit overnight. The next morning, initialize the built-in software routine for your specific cell. Come back in an hour, verify the stability of the cell, and you can take measurements for the rest of the day from a near-perfect temperature source!

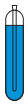
The built-in software lets you choose between using melting-point curves or freezing-point curves for each metal. The ITS-90 calls for freezing points, but melting points are easier to realize, and the difference in uncertainty (less than 2 mK for most applications) is generally insignificant. In fact, the difference between using traditional cells at their freezing points and Hart's mini cells at their melting points is not significant for most labs in most applications.

Comparison blocks are also available for the 9260 for high-precision comparison calibrations at high temperatures. Two blocks are available with a variety of pre-drilled wells in addition to blank or custom blocks. Well depth is 9 inches (229 mm).

Specifications	9210	9230	9260
Temperature Range	–10°C to 125°C	15°C to 35°C	50°C to 680°C
Ambient Operating Range	5°C to 45°C	18°C to 28°C	5°C to 45°C
Stability	±0.02°C	±0.02°C	±0.03°C to 300°C ±0.05°C above 300°C
Vertical Gradient	±0.05°C over 100 mm at 0°C	< 0.03°C over six inches during cell maintenance	Top and bottom zones adjustable by offset
Melting/Freezing-Point Duration	6–10 hours, typical	Five days, typical	6–10 hours typical
Resolution	0.01° (0.001° in program mode)	0.01° (0.001° in program mode)	0.01°
Display Scale	°C or °F, switchable		
Immersion Depth	6.75" (171 mm) in optional comparison block	6" (152 mm) in gallium cell	9" (229 mm)
Stabilization Time	15 minutes nominal	Preprogrammed	15 minutes nominal
Preheat Wells	3 wells (for 3.18, 6.35, or 7.01 mm probes)	2	2
Fault Protection	Adjustable software cutout using control probe, separate circuit thermocouple cutout for maximum instrument temperature	Heating/cooling rate cutout	Sensor burnout and short protection, over-temperature thermal cutout
Display Accuracy	±0.25°C	±0.05°C at 29.76°C	±0.2°C to 300°C ±0.3°C to 450°C ±0.5°C to 680°C
Comparison Block	Three multi-hole blocks, blanks, and custom blocks available	Contact Hart	Two multi-hole blocks, blanks, and custom blocks available
Well-to-Well Gradient (in comparison block)	±0.02°C	n/a	±0.02°C
Heating Time	Ambient to 100°C: 45 min.	Preprogrammed	1.25 hrs. from 25°C to 680°C
Cooling Time	Ambient to –5°C: 25 min.	Preprogrammed	10.5 hrs. from 680°C to 100°C
Communications	RS-232 included		
Power Requirements	115 VAC (±10%), 60 Hz, 1.5 A, or 230 VAC (±10%), 50 Hz, 0.75 A, 170 W	115 VAC (±10%), 60 Hz, 1.5 A, or 230 VAC (±10%), 50 Hz, 0.75 A, 175 W	115 VAC (±10%), 60 Hz, 11 A, or 230 VAC (±10%), 50 Hz, 6 A, specify, 1200 W
Exterior Dimensions	8.75" W x 10.25" D x 19.25" H (222 x 260 x 489 mm)		
Weight	15.5 lb. (7 kg) with block	18 lb. (8.2 kg) without cell	45 lb. (20.5 kg) with block

Ordering Information

9210	Mini TPW Maintenance Apparatus
5901B	Mini Quartz Glass TPW Cell
5931	X Cell, Triple Point of Water
1904-Tpw	Accredited Cell Intercomparison
3110-1	Comparison Insert, Blank
3110-2	Comparison Insert A, holes at 1/16", 1/8", 3/16", 1/4", 3/8", and 1/2"
3110-3	Comparison Insert B, 2 holes at 3/16", 2 at 1/4", and 2 at 3/8"
3110-4	Comparison Insert C, 6 holes at 6 1/4"
3110-6	X Cell Adapter Sleeve, 9210
	Call for other comparison insert options.
9230	Gallium Cell Maintenance System
5943	Stainless Steel Gallium Cell
1904-Ga	Accredited Cell Intercomparison
9260	Mini Fixed-Point Furnace
5914A	Mini Quartz Indium Cell
5915A	Mini Quartz Tin Cell
5916A	Mini Quartz Zinc Cell
5917A	Mini Quartz Aluminum Cell
5944	Metal Cased Mini Indium Cell
5945	Metal Cased Mini Tin Cell
5946	Metal Cased Mini Zinc Cell
1904-X	Accredited Cell Intercomparison
3160-1	Comparison Insert, Blank
3160-2	Comparison Insert, 7 holes at 1/4"
3160-3	Comparison Insert, 2 holes at 1/8", 2 at 3/16", 2 at 1/4", 2 at 9/32" (9 mm), and 2 at 3/8"
	Call for other comparison insert options.



See page 18 for triple point of water cells.

Read about our accredited calibration services on page 156.