

## HIGH-ACCURACY DRY-WELLS



### High-Accuracy Dry-Wells

### Models 9105, 9107, 9122A, and 9127

- World's best dry-wells — accurate to 0.1°C, stable to  $\pm 0.005^\circ\text{C}$
- Largest-capacity temperature wells
- Model 9107 reaches lowest temperatures:  $-45^\circ\text{C}$  in  $23^\circ\text{C}$  ambient
- Model 9122A provides temperatures to  $700^\circ\text{C}$

Hart's dry-wells are the best in this industry, not only because of their performance specs, but because they're the easiest to use and have a variety of software packages available to fully automate the calibration of sensors.

These units are specifically built for the demanding requirements of temperature work in calibration labs. Each instrument has excellent stability, uniformity, and accuracy and features Hart's own proprietary controller for precision work; you can set the temperature with 0.01°C resolution. Our new Model 9107 Ultracold Dry-Well even reaches  $-45^\circ\text{C}$  in normal room temperatures.

All four dry-wells come with an RS-232 port and have an optional IEEE interface

available. However, unlike the competition, Hart dry-wells include our 9930 Interface-*it* software for controlling the unit with your PC. And if you want more, buy our 9938 MET/TEMP II software, which totally automates the calibration process for RTDs, thermocouples, and thermistors.

No other company offers software packages as good as these two from Hart. Our MET/TEMP II software is not entry-level data acquisition stuff. It is a total automation solution for the calibration process. These packages do everything but take the probe out of your dry-well when the calibration process is done, and we're working on a program that will do that too! (See page 75.)

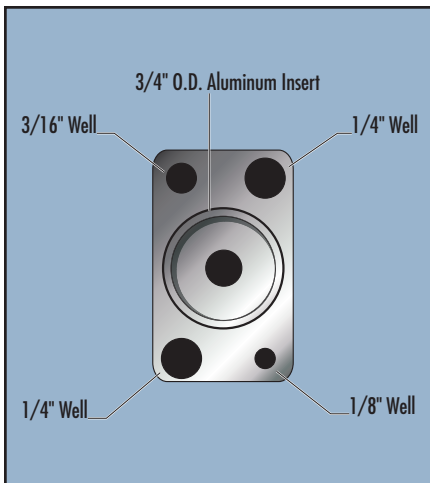
If you don't want to use a PC with these dry-wells, program them through the front panel to automatically set and hold up to eight temperatures in the sequence and duration of your choice. Each unit also has a "switch test" protocol that locks in the triggering temperature for thermal switches. The dry-well's ramp rate can be set to a speed of your choosing.

Each dry-well is completely tested and calibrated before shipment, and we don't charge extra for the traceability certificate. When accuracy and stability are important to your work, Hart is your best choice, especially when you compare prices.

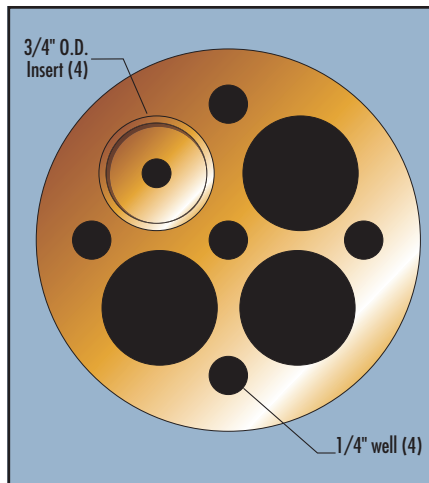
### 9105

The Model 9105 Dry-Well has a temperature range of  $-25^\circ\text{C}$  to  $140^\circ\text{C}$  with a stability of  $\pm 0.01^\circ\text{C}$ . It has four outside wells of various sizes and a removable center well as shown in the illustration. Well-to-well uniformity in the drilled wells is  $\pm 0.05^\circ\text{C}$ .

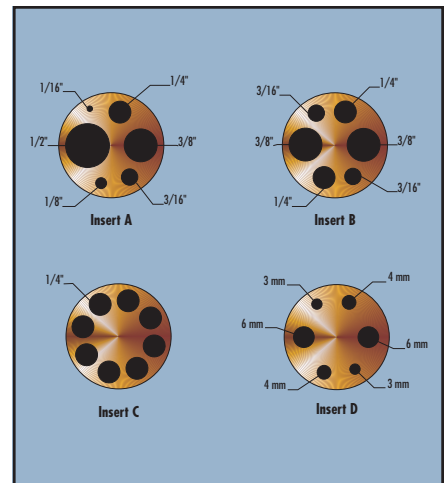
Used with a standards probe, the 9105 has the test well uniformity and the stability



The 9105 and 9107 blocks have five calibration wells, one of which accepts interchangeable inserts.



The 9122A has the most wells of any dry-well: 9 total with four that accept interchangeable inserts.



The 9127 block has one well that accepts interchangeable inserts.

to give you  $\pm 0.05^{\circ}\text{C}$  calibration accuracy. The high-precision, microprocessor-based controller has 0.01 degrees of resolution.

You recalibrate your 9105 through its front panel, which reduces the cost and problems of recertifying your instrument. It comes with a NIST-traceable calibration at no additional cost, making the 9105 dry-well an even better value.

## 9107

Need temperatures colder than  $-25^{\circ}\text{C}$ ? The 9107 Ultracold Dry-Well gets you to  $-45^{\circ}\text{C}$  in a  $23^{\circ}\text{C}$  ambient and still covers temperatures as high as  $140^{\circ}\text{C}$ . You won't find another dry-well anywhere that gets colder—or that is more stable.

The 9107 features five calibration wells, incredible accuracy, and stability better than  $\pm 0.005^{\circ}$  over most of its range. Like the 9105, this ultracold dry-well doesn't use a compressor and doesn't require external cooling. Peltier modules do all the work so you don't have to worry about external hookups or cold ambient temperatures. Hart's dry-wells are simply easier to use and outperform everything else out there.

## 9122A

Too many probes to calibrate and too little time? The 9122A High Capacity Dry-Well comes with nine test wells, a display calibrated to  $660^{\circ}\text{C}$ , and an upper temperature limit of  $700^{\circ}\text{C}$ .

Test nine probes simultaneously or eight probes against a reference thermometer. Four of the nine wells accept removable inserts; the other five are drilled for  $1/4"$  (6.35 mm) probes. The center well on the 9122A is accurate to  $\pm 0.3^{\circ}\text{C}$  and stable to  $\pm 0.05^{\circ}\text{C}$  at  $660^{\circ}\text{C}$ . No other unit on the market offers this combination of capacity, temperature range, and performance.

What's more, this unit makes a perfect annealing furnace. Reference PRTs (and thermocouples) generally benefit from periodic annealing at high temperatures to remove sensor strain and oxidation build-up. With capacity for nine probes and temperatures to  $700^{\circ}\text{C}$ , the 9122A offers a perfect solution.

## 9127

For work between  $50^{\circ}\text{C}$  and  $600^{\circ}\text{C}$ , the 9127 is one of our most popular instruments. It has a "smart" controller that automatically increases fan speed for cooling the block and then reduces the fan speed at a specific set-point temperature for maximum stability during calibrations.

It has an accuracy of  $\pm 0.15^{\circ}\text{C}$  up to  $300^{\circ}\text{C}$  and  $\pm 0.5^{\circ}\text{C}$  to  $600^{\circ}\text{C}$ . Resolution is  $0.01^{\circ}\text{C}$  and stability is  $\pm 0.02^{\circ}\text{C}$  at  $300^{\circ}\text{C}$ . Inserts are available with multiple sensor holes for doing comparison calibrations. Uniformity between holes is  $\pm 0.05^{\circ}\text{C}$ .

For fast cool-downs of a 9122A or 9127 dry-well, the optional 2032 Air Chiller connects directly to shop air to inject cool

air into the well and reduce cooling times by more than 50%.



Our 9304 carrying case fits the 9105, 9107, and 9127 Super Dry-Well models. (Use the 9324 to carry and protect a 9122A.)



Use MET/TEMP II software and a reference thermometer to recalibrate your own heat sources!



Call for custom inserts.



Have you considered a good reference thermometer? See page 36.

Specifications	9105	9107	9122A	9127
<b>Range</b>	$-25^{\circ}\text{C}$ to $140^{\circ}\text{C}$ ( $-13^{\circ}\text{F}$ to $284^{\circ}\text{F}$ ) at $23^{\circ}\text{C}$ ambient	$-45^{\circ}\text{C}$ to $140^{\circ}\text{C}$ ( $-49^{\circ}\text{F}$ to $284^{\circ}\text{F}$ ) at $23^{\circ}\text{C}$ ambient	$50^{\circ}\text{C}$ to $700^{\circ}\text{C}^{\dagger}$ ( $122^{\circ}\text{F}$ to $1292^{\circ}\text{F}$ )	$50^{\circ}\text{C}$ to $600^{\circ}\text{C}$ ( $122^{\circ}\text{F}$ to $1112^{\circ}\text{F}$ )
<b>Accuracy</b>	<b>Center well:</b> $\pm 0.1^{\circ}\text{C}$	<b>Center well:</b> $\pm 0.1^{\circ}\text{C}$	<b>Center well:</b> $\pm 0.1^{\circ}\text{C}$ at $100^{\circ}\text{C}$ $\pm 0.1^{\circ}\text{C}$ at $300^{\circ}\text{C}$ $\pm 0.3^{\circ}\text{C}$ at $660^{\circ}\text{C}$	$\pm 0.1^{\circ}\text{C}$ at $100^{\circ}\text{C}$ $\pm 0.15^{\circ}\text{C}$ at $300^{\circ}\text{C}$ $\pm 0.5^{\circ}\text{C}$ at $600^{\circ}\text{C}$
<b>Stability</b>	$\pm 0.01^{\circ}\text{C}$	$\pm 0.01^{\circ}\text{C}$ at $-40^{\circ}\text{C}$ $\pm 0.005^{\circ}\text{C}$ at $0^{\circ}\text{C}$ $\pm 0.005^{\circ}\text{C}$ at $100^{\circ}\text{C}$	$\pm 0.01^{\circ}\text{C}$ at $100^{\circ}\text{C}$ $\pm 0.02^{\circ}\text{C}$ at $300^{\circ}\text{C}$ $\pm 0.05^{\circ}\text{C}$ at $660^{\circ}\text{C}$	$\pm 0.01^{\circ}\text{C}$ to $100^{\circ}\text{C}$ $\pm 0.02^{\circ}\text{C}$ to $300^{\circ}\text{C}$ $\pm 0.05^{\circ}\text{C}$ to $600^{\circ}\text{C}$
<b>Well-to-Well Uniformity</b>	<b>Drilled wells:</b> $\pm 0.05^{\circ}\text{C}$	<b>Drilled wells:</b> $\pm 0.05^{\circ}\text{C}$	<b>Drilled wells:</b> $\pm 0.025^{\circ}\text{C}$ at $100^{\circ}\text{C}$ $\pm 0.1^{\circ}\text{C}$ at $300^{\circ}\text{C}$ $\pm 0.3^{\circ}\text{C}$ at $660^{\circ}\text{C}$	$\pm 0.05^{\circ}\text{C}$
<b>Well Depth</b>	6" (152 mm)			
<b>Computer Interface</b>	RS-232 Interface included with Model 9930 Interface- <i>it</i> control software, IEEE optional			
<b>Heating Time to Max.</b>	10 minutes	15 minutes	75 minutes	30 minutes
<b>Cooling Time</b>	$25^{\circ}\text{C}$ to $-25^{\circ}\text{C}$ : 15 minutes	$25^{\circ}\text{C}$ to $-45^{\circ}\text{C}$ : 35 minutes	$700^{\circ}\text{C}$ to $100^{\circ}\text{C}$ : 280 minutes	$600^{\circ}\text{C}$ to $100^{\circ}\text{C}$ : 125 minutes
<b>Test Wells</b>	5 wells: 2 at $1/4"$ (6.35 mm), 1 at $3/16"$ (4.8 mm), 1 at $1/8"$ (3.2 mm), and 1 interchangeable ( $3/4"/19.1$ mm O.D.)	5 wells: 2 at $1/4"$ (6.35 mm), 1 at $3/16"$ (4.8 mm), 1 at $1/8"$ (3.2 mm), and 1 interchangeable ( $3/4"/19.1$ mm O.D.)	9 wells: 4 interchangeable ( $3/4"/19.1$ mm O.D.) and 5 at $1/4"$ (6.35 mm)	1 interchangeable well accommodates multi-hole insert (1.5"/38.1 mm O.D.)
<b>Resolution</b>	0.01°C or °F			
<b>Display</b>	LED, °C or °F, user-selectable			
<b>Size</b>	13.5" H x 7.8" W x 11.9" D (343 x 198 x 302 mm)			
<b>Weight</b>	26 lb. (11.8 kg)	22 lb. (10 kg)	25 lb. (11.3 kg)	25 lb. (11.3 kg)
<b>Power</b>	115 VAC ( $\pm 10\%$ ), 3 A or 230 VAC ( $\pm 10\%$ ), 1.6 A, specify, 50/60 Hz, 350 W	115 VAC ( $\pm 10\%$ ), 4 A or 230 VAC ( $\pm 10\%$ ), 3.15 A, specify, 50/60 Hz, 350 W	115 VAC ( $\pm 10\%$ ), 8.8 A or 230 VAC ( $\pm 10\%$ ), 4.4 A, specify, 50/60 Hz, 1000 W	115 VAC ( $\pm 10\%$ ), 8.8 A or 230 VAC ( $\pm 10\%$ ), 4.4 A, switchable, 50/60 Hz, 1000 W
<b>NIST-Traceable Calibration</b>	Data at $-25^{\circ}\text{C}$ , $0^{\circ}\text{C}$ , $75^{\circ}\text{C}$ , and $140^{\circ}\text{C}$	Data at $-45^{\circ}\text{C}$ , $0^{\circ}\text{C}$ , $75^{\circ}\text{C}$ , and $140^{\circ}\text{C}$	Data at $100^{\circ}\text{C}$ , $200^{\circ}\text{C}$ , $300^{\circ}\text{C}$ , $400^{\circ}\text{C}$ , $500^{\circ}\text{C}$ , and $660^{\circ}\text{C}$	Data at $100^{\circ}\text{C}$ , $200^{\circ}\text{C}$ , $300^{\circ}\text{C}$ , $400^{\circ}\text{C}$ , $500^{\circ}\text{C}$ , and $600^{\circ}\text{C}$

<sup>†</sup>Calibrated to  $660^{\circ}\text{C}$ ; reference thermometer recommended at higher temperatures.

## Ordering Information 9105, 9107

9105	Low-Temp Dry-Well, includes $1/4"$ insert
9107	Ultra Low-Temp Dry-Well, includes $1/4"$ insert
2125	IEEE-488 Option
2168	Blank Insert
2169	$1/16"$ Insert (1.6 mm)
2170	$1/8"$ Insert (3.2 mm)
2171	$5/32"$ Insert (4 mm)
2172	$3/16"$ Insert (4.8 mm)
2173	$1/4"$ Insert (6.35 mm)
2174	$5/16"$ Insert (7.9 mm)
2175	$3/8"$ Insert (9.5 mm)
2176	$1/2"$ Insert (12.7 mm)
2177	$5/8"$ Insert (15.9 mm)
2181	1 User-Specified Hole
2182	2 User-Specified Holes
9304	Carrying Case

## Ordering Information 9122A

9122A	High-Capacity Dry-Well, includes $1/8"$ , $3/16"$ , $3/8"$ , and $1/4"$ inserts, and cleaning kit for wells and inserts
2125	IEEE-488 Option
2152	Blank Insert
2154	$1/8"$ Insert (3.2 mm)
2155	$5/32"$ Insert (4 mm)
2156	$3/16"$ Insert (4.8 mm)
2157	$1/4"$ Insert (6.35 mm)
2158	$5/16"$ Insert (7.9 mm)
2159	$3/8"$ Insert (9.5 mm)
2160	$1/2"$ Insert (12.7 mm)
2161	$5/8"$ Insert (15.9 mm)
2162	1 User-Specified Hole
2163	2 User-Specified Holes
9324	Carrying Case, 9122A
2032	Air Chiller, Dry-Well
2037	Well and Insert Cleaning Kit

## Ordering Information 9127

9127-X	High-Speed Dry-Well with removable multi-hole insert (specify X, X = A, B, C, or D included insert)
2125	IEEE-488 Option
3109-0	Insert, blank
3109-1	Insert A, holes at $1/16"$ , $1/8"$ , $3/16"$ , $1/4"$ , $3/8"$ , $1/2"$ (1.6, 3.2, 4.8, 6.35, 9.5, 12.7 mm)
3109-2	Insert B, two holes each at $3/16"$ , $1/4"$ , $3/8"$ (4.8, 6.35, 9.5 mm)
3109-3	Insert C, eight holes each at $1/4"$ (6.35 mm)
3109-4	Insert D, two holes each at 3 mm, 4 mm, and 6 mm
9304	Carrying Case
2032	Air Chiller, Dry-Well



Don't forget a protective case!



See our calibration and data acquisition software packages on page 74.