

## High-Accuracy Dual-Well Calibrator



- Combined ranges for calibrating from  $-30\text{ }^{\circ}\text{C}$  to  $670\text{ }^{\circ}\text{C}$ ; one unit—two blocks
- Two independent temperature controllers (hot and cold side)
- Stability to  $\pm 0.02\text{ }^{\circ}\text{C}$
- Multi-hole wells calibrate up to eight probes simultaneously

To give you the widest temperature range available in a dry-well calibrator, we've combined two of our most popular units. The 9011 allows temperature probes to be calibrated from  $-30\text{ }^{\circ}\text{C}$  to  $670\text{ }^{\circ}\text{C}$  in a single unit.

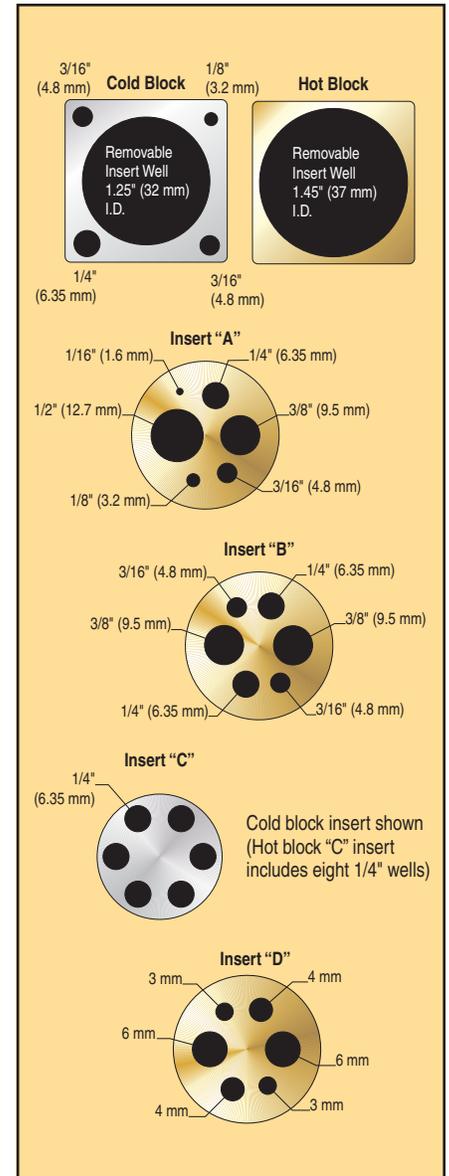
The 9011 features two independently controlled temperature wells, which makes calibrating RTDs and thermocouples faster than ever. While readings are being taken at one temperature, the other well can be ramping up or down to the next point. Checking the zero and span points of temperature transmitters is a breeze. The cold block can even be used as a zero-point reference for a thermocouple making measurements in the hot block.

The 9011 is a high-accuracy unit that is capable of laboratory as well as field calibrations. Stabilities to  $\pm 0.02\text{ }^{\circ}\text{C}$  are possible, and display accuracy is better than  $\pm 0.25\text{ }^{\circ}\text{C}$ . Using multi-hole interchangeable inserts, you can calibrate more probes at the same time. With a single RS-232 port for both wells, you can automate your calibration work and be even more efficient. Add on Hart's

9938 MET/TEMP II software and totally automate your calibrations of RTDs, thermocouples, and thermistors.

Every dry-well we ship from the factory includes a full NIST-traceable calibration report with test data for each well at each point. There's no extra charge for the report or the test readings from your unit. We also include your choice of multi-hole inserts. If you don't find one that suits your applications, we'll provide a blank sleeve or have a custom one made.

At Hart, we continually develop new industrial calibration tools that make your work easier and better. We gave you the first handheld dry-well, the first Micro-Bath, and now we're giving you the widest ranging dry-well available. Whatever your temperature application, Hart has a solution.



# High-Accuracy Dual-Well Calibrator

Specifications	Hot Block	Cold Block
Range	50 °C to 670 °C (122 °F to 1238 °F)	-30 °C to 140 °C (-22 °F to 284 °F)
Accuracy	±0.2 °C at 50 °C ±0.4 °C at 400 °C ±0.65 °C at 600 °C	±0.25 °C (insert wells) ±0.65 °C (fixed wells)
Stability	±0.02 °C at 100 °C ±0.06 °C at 600 °C	±0.02 °C at -30 °C ±0.04 °C at 140 °C
Uniformity	±0.2 °C (±0.05 °C typical)	±0.05 °C (insert wells) ±0.25 °C (fixed wells)
Well Depth	152 mm (6 in)	124 mm (4.875 in)
Heating Time to Max.	30 minutes	15 minutes
Cooling Times	120 minutes from 660 °C to 100 °C	30 minutes from 140 °C to -30 °C
Well Inserts	1 interchangeable well accommodates multi-hole insert	1 interchangeable well accommodates multi-hole insert, plus four outer wells, 1/4", 3/16", 3/16", and 1/8"
Computer Interface	RS-232 interface included with Model 9930 Interface-it control software	
Power	115 VAC (±10 %), 10 A or 230 VAC (±10 %), 5 A, switchable, 50/60 Hz, 1150 W	
Size (HxWxD)	292 x 394 x 267 mm (11.5 x 15.5 x 10.5 in)	
Weight	16.4 kg (36 lb.)	
NIST-Traceable Certificate (8 points)	Data at 50 °C, 100 °C, 200 °C, 300 °C, 400 °C, 500 °C, 600 °C, and 660 °C	Data at -30 °C, 0 °C, 25 °C, 50 °C, 75 °C, 100 °C, 125 °C, and 140 °C

## Ordering Information

- 9011-X** High-Accuracy Dual-Well Calibrator (specify X, X = A, B, C, or D included insert)
- 3109-0** Insert, Blank (Hot Side)
- 3109-1** Insert A, Miscellaneous (Hot Side)
- 3109-2** Insert B, Comparison (Hot Side)
- 3109-3** Insert C, Eight 1/4 in Wells (Hot Side)
- 3109-4** Insert D, Comparison - Metric (Hot Side)
- 3103-1** Insert, Blank (Cold Side)
- 3103-2** Insert A, Miscellaneous (Cold Side)
- 3103-3** Insert B, Comparison (Cold Side)
- 3103-4** Insert C, Six 1/4 in Wells (Cold Side)
- 3103-6** Insert D, Comparison - Metric (Cold Side)
- 2125-C** IEEE-488 Interface (RS-232 to IEEE-488 converter box)
- 9319** Large Instrument Case

## The sometimes subtle art of specsmanship

"Specsmanship" is the careful wording of performance specifications to provide the expectation of better performance than practically achievable. We see this often as we work with customers who are comparing our products against others. Hart's philosophy is to provide meaningful, clearly written specifications that provide verifiable and guaranteed performance. Unfortunately, all manufacturers don't seem to share our approach, particularly when it comes to heat sources such as baths and dry-wells. Here are some terms to watch out for:

**"Typical" or "best"** - While "typical" or "best" specifications may provide useful information, they offer no guarantee that the unit you buy is "typical" or capable of providing the "best" performance as listed. For calibration applications, worst-case or guaranteed performance specifications are required that include all natural variations in the product. "Typical" or "best" specifications are fine if accompanied by a guaranteed specification. If they're not, be sure you ask!

**"Relative" accuracy** - "Relative" accuracy specs attempt to remove errors associated with the test standards or reference thermometers used in a heat source. This assumes that references contribute no measurement errors—an impossibility! Some may argue that "relative" specs allow the customer to add the error of their reference to obtain a complete specification

unique to their situation. And we would agree, but the fact that the specification excludes these errors is too often relegated to the fine print and is simply misleading to less-informed readers. One thing's for sure. You can't directly compare "relative" specs to "absolute" specs, since the components of "relative" specs comprise a subset of the components of "absolute" specs.

**"Comprehensive evaluation reports"** - Evaluation reports are a very important method of determining the performance of a unit or sample of units. Evaluation reports can be misleading, however, if they are used to infer the performance of an entire population of instruments, or more importantly, the unit you are purchasing. Evaluation reports only provide information regarding the units that were evaluated and the conditions present during the evaluation. It takes extensive engineering analysis to use this information to produce a specification of performance that applies to all units being produced. Be sure whatever specs you rely on are the ones the manufacturer guarantees and will stand behind.

If you ever have a question about Hart's specifications, please talk to us and we'll gladly help you understand the performance you can expect from our products.