

Sales Guide

9190A Ultra-Cool Field Metrology Well

(v. 1.0)



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1. Objective

Get a quick introduction to the key product features, learn about the target industries and customers, see how the 9190A compares with the competition, and learn where to find available marketing materials.

2. Introduction

The Fluke Calibration 9190A, Ultra-Cool Field Metrology Well is the most stable and accurate ultra-cold drywell calibrator on the market today. It ranges from -95°C to 140°C and is used for comparison calibration of temperature sensors used primarily by process industries such as pharmaceuticals, biomedical, chemicals, and food. The wide temperature range allows calibration of control sensors used in equipment such as freezers, freeze dryers (lyophilizers), autoclaves and Steam-in-Place (SIP) systems.

Its digital controller is based on the 914X series Field Metrology Wells and includes the familiar “process electronics” option. A new feature included with the process electronics option allows the drywell to pass temperature control from the block’s internal control sensor to an external reference thermometer. Similar to the 914X series, all connections and user controls are accessible from the front panel.

The 9190A uses a Stirling cooler to achieve ultra-cold temperatures. Compared to a refrigerated bath or Peltier controlled drywells, it is very quiet and efficient. Built-in handles in the front and back make two-handed carry easy.

2.1.Key Features at-a-glance

- Range: -95°C to 140°C (no heat transfer fluids required!)
- Stability: $\pm 0.015^{\circ}\text{C}$ (full range)
- Accuracy: $\pm 0.05^{\circ}\text{C}$ (with external reference thermometer)
- Display accuracy: $\pm 0.2^{\circ}\text{C}$ (full range)
- Fast cooling time: 23°C to -95°C : 90 min
- Optional process electronics include:
 - Built-in reference thermometer readout
 - Reference thermometer control function
 - UUT readout for thermocouple and 4-wire RTD
 - 4-20 mA measurement
 - 24 Vdc loop power supply
- Remote interface: USB and RS-232
- Programmable “Ramp-and-Soak” feature with data logging
- Portable: 16 kg (35 lbs.) with built-in carrying handles for two-handed carry

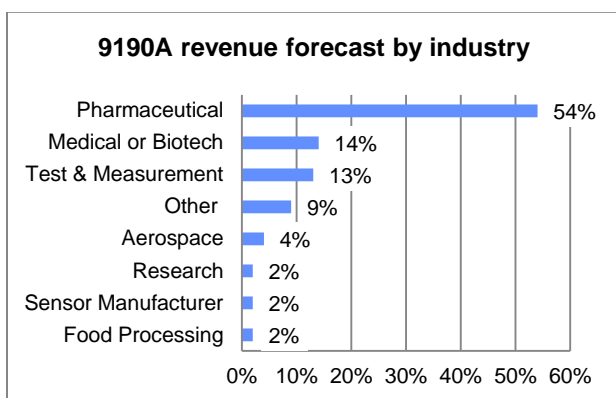


2.2. Product Positioning

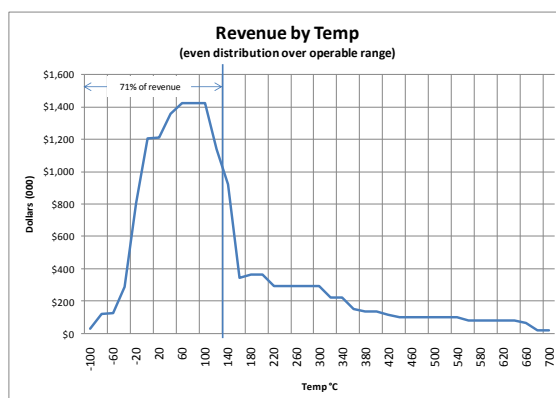
The 9190A is positioned as an alternative to fluid baths for in-situ calibration of process control sensors. Eliminating messy and sometimes dangerous or toxic bath fluids is important to customers—especially those who perform calibrations in manufacturing or cleanroom environments.

Dual-stage refrigerated baths such as the 7380 are commonly used to achieve extremely cold temperatures, but they are slower to reach temperature than a drywell, less portable and the user has to deal with the bath fluids. Although a compact bath will still have its place when lower calibration uncertainties are required, Fluke Calibration customers now have a faster, more portable, and adequately stable alternative to consider.

The charts below illustrate the expected 9190A revenue distribution by industry and the percentage of TCAL revenue by temperature range.



Approximately 70% of TCAL temperature source revenue falls within the temperature range of the 9190A.



2.3. Summary of Value Proposition

- The 9190A is ideal for in-situ calibration of RTDs and TCs used in process control instrumentation—especially in Pharma/Biotech:
 - Freezers that store biological samples
 - Lyophilizers (freeze dryers)
 - Environmental chambers
 - Steam-in-place (SIP)
- Elimination of bath fluids keeps “cleanrooms” clean, easier to transport, faster heat/cool rates.
- Best-in-class temperature stability (2X better than competition) minimizes calibration uncertainty.
- Wide temperature range brackets the coldest and higher temperatures required for thermal validation studies and sensor calibration.

3. Target Customers and Applications

The 9190A targets process manufacturers whose functions include: maintaining product quality, reducing waste, improving efficiency and conforming to regulatory standards. To accomplish these goals, process control sensors must be maintained and calibrated regularly. Most process control sensors such as temperature transmitters, RTDs & thermocouples can be calibrated by the 9190A.

The table below summarizes target industries and applications.

Industry	Application
Pharmaceutical	Laboratory refrigerators, Freezers, Cleanrooms, Steam-in-place (SIP), Freeze-drying
Biomedical	Medical freezers, Sample and culture storage, Blood banks, Sterilizers (autoclaves), Quality monitoring
Food Processing	Process control sensors, Transmitters, Freeze-drying
Test & Measurement	3rd party labs (on-site calibration)
Energy	Process control sensors



3.1. Common Job Titles

- **Process manufacturers:** Quality Assurance Manager, Quality Control Inspector, Process Engineer, Validation Engineer, Compliance Manager
- **3rd party cal labs:** Metrologist, Lab Manager, Calibration Technician
- **Research & Development:** Design Engineer, Engineering Technician, Project Manager
- **Manufacturing:** Manufacturing Engineer, Asset Manager, Test Engineer, Production Manager

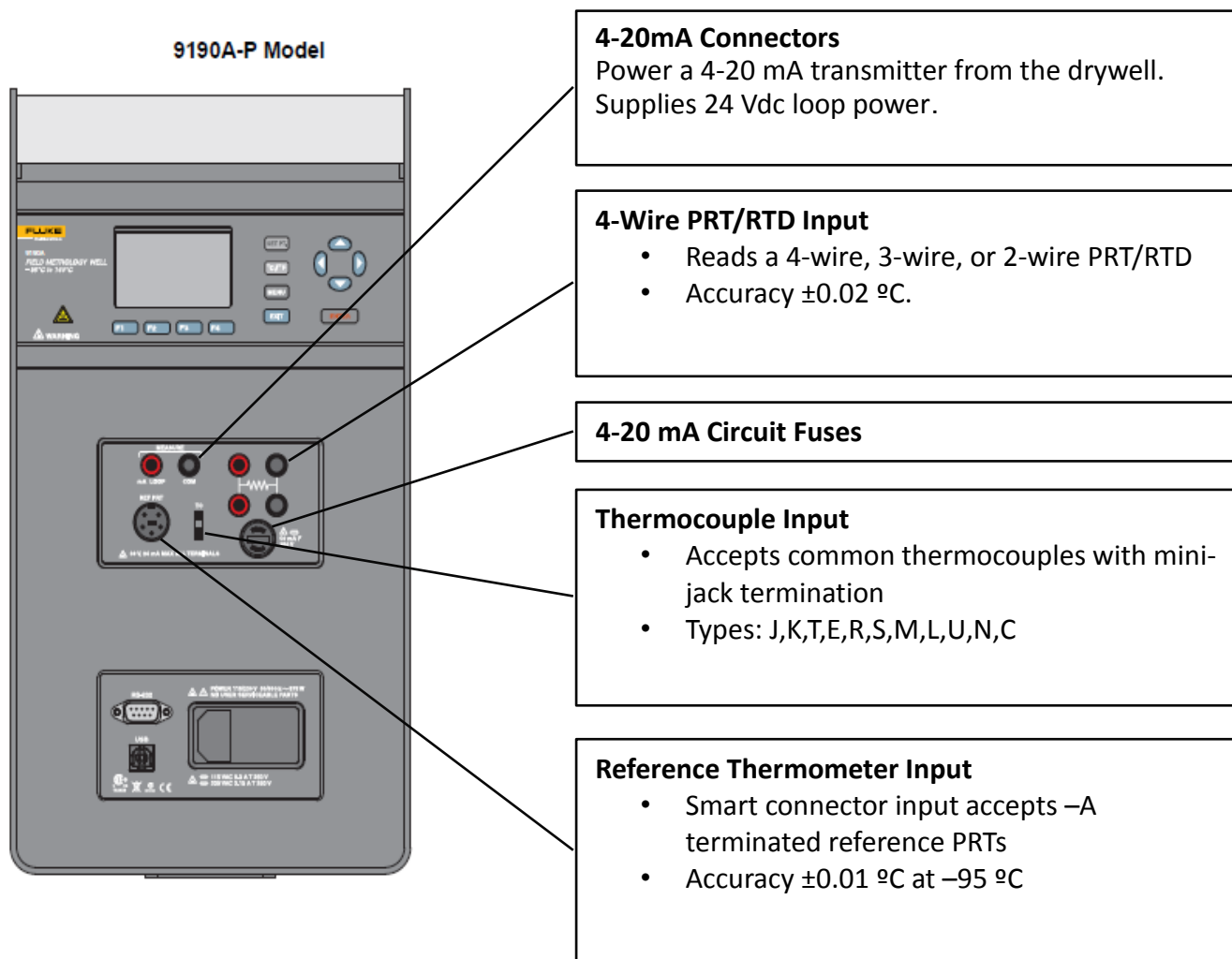
3.2. Workload

- Industrial RTDs/PRTs
- Freezer probes
- Thermocouples (common types: T, N, E & J)
- Temperature transmitters
- Digital thermometers
- Dial thermometers
- Food thermometers
- Sanitary sensors
- Mercury thermometers (less common)



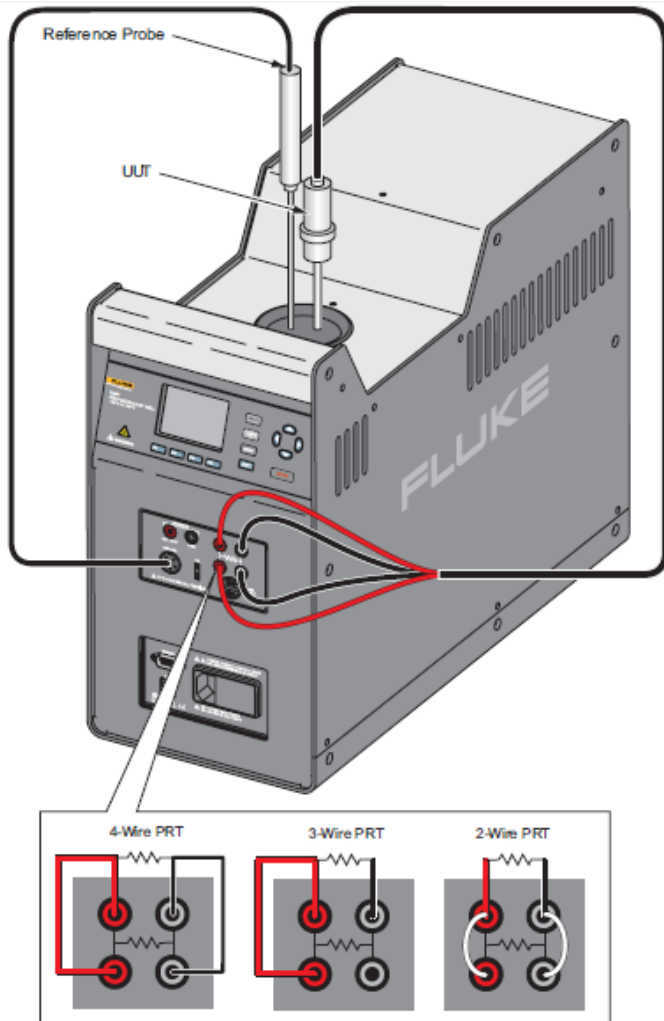
4. Key features

4.1. Optional Process Electronics (-P option)



NOTE: The 9190A-P does not include the switch test feature which is included in the 914X Field Metrology Wells.

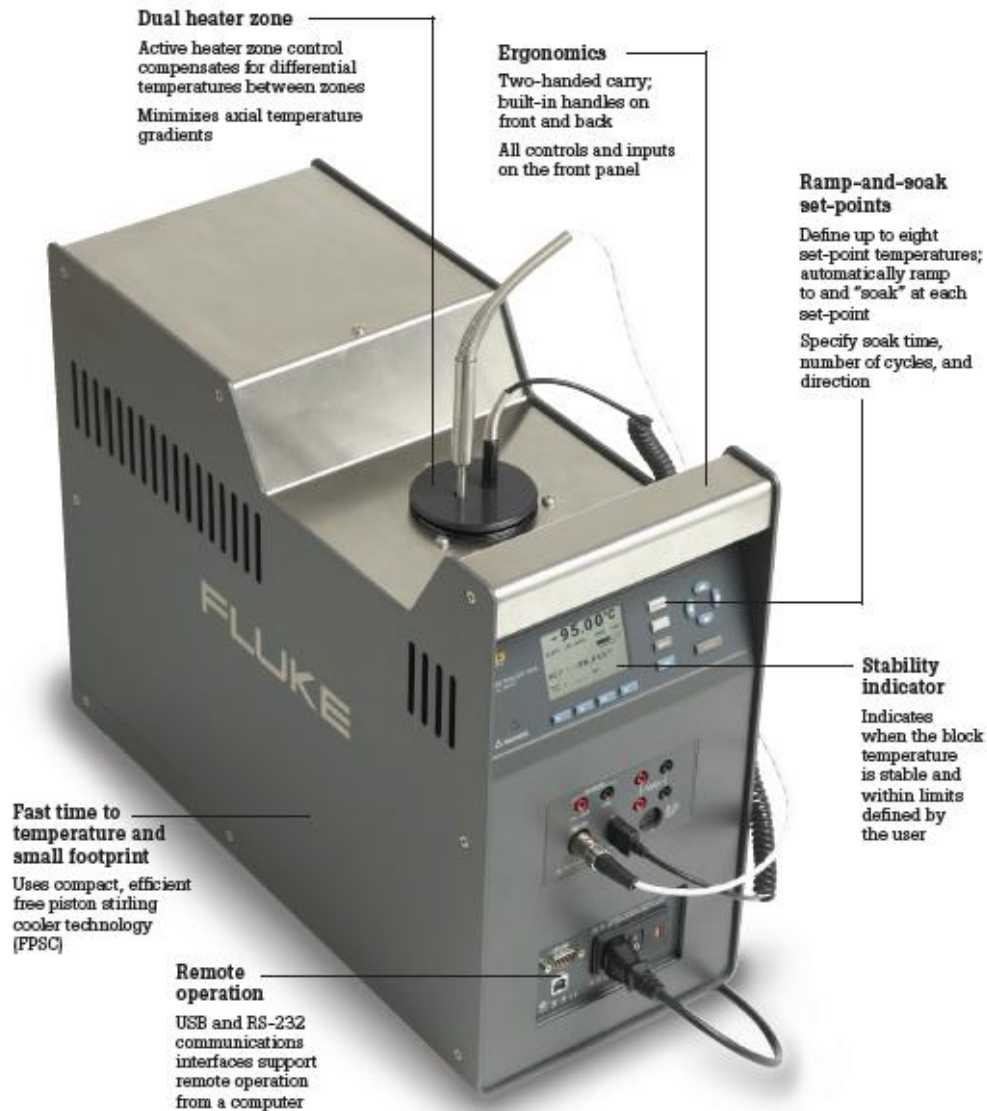
4.2. Process Electronics Application



Example:

- Reference thermometer and UUT (4-wire RTD) connection
- Reads reference thermometer and one UUT simultaneously (RTD or TC)
- Accommodates 2-, 3- and 4-wire connection
- Displays both reference thermometer temperature and UUT simultaneously

4.3. Other “cool” stuff



4.4. More “cool” stuff

Reference sensor control

Set-point temperature control gets passed from the internal sensor to external reference PRT

9190A controls the well temperature based on its measurement and position inside the well

Helps minimize the effects of the axial gradient when reference PRT is aligned with short sensors

4-20 mA connectors

Power a 4-20 mA transmitter from the drywell

Supplies 24 V dc loop power

Reference thermometer input

Reference thermometer input automatically reads Fluke Calibration PRTs terminated with a “smart” connector

Accuracy ± 0.01 °C at -95 °C (readout accuracy only)



4-wire PRT/RTD input

Reads a 4-wire, 3-wire, or 2-wire PRT/RTD

Accuracy ± 0.02 °C

4-20 mA circuit fuses

Thermocouple input

Accepts common thermocouples with mini-jack termination




Types: J, K, T, E, R, S, M, L, U, N, C

4.5. Summary of features and benefits

Key Features	Benefits
Wide temperature range: –95 °C to 140 °C	Brackets the coldest and highest temperatures required for most pharmaceutical, biomedical and food processing applications
Best-in-class stability: ± 0.015 °C full range	Ideal for applications that demand strict quality control and regulatory process compliance
No bath fluids	Keep “cleanrooms” clean. Easier to transport. Faster heating and cooling times.
Fast cooling time	Reaches target temperature quickly; –90 °C in 80 min; –95 °C in 90 minutes
Small footprint and portability	Dimensions: 480 mm H x 205 mm W x 380 mm D (18.8 in x 8.0 in x 14.9 in). Weight: 16 kg (35 pounds). Built-in front and back handles for easy two-handed carry. Portable enough to take to the field. More portable than a calibration bath.
9190A-P “process” option	Everything you need to test RTDs and thermocouples in a process environment – in the lab or in the field. Includes reference thermometer input, RTD input, TC input, 4-20 mA measure, 24 V dc loop power supply.
Best measurement practices	Conforms to EURAMET cg-13 guidance on measurement practices for temperature block calibrators. The 9190A specifications are outstanding for accuracy, stability, axial (vertical) uniformity, radial (well-to-well) uniformity, loading, and hysteresis.

5. Competitive comparison

5.1. Key specs/feature comparison

Competitive Comparison												
		Temperature Range (°C)	Display Accuracy	Accuracy w/Ext. Reference ^[1]	Stability at Min Temp	Cool Time, Ambient to Min (minutes)	Axial Uniformity	Total Immersion Depth (mm)	Process Electronics Option	Reference Sensor Control ^[3]	Dynamic Load Compensation ^[4]	Data Logging Option
Fluke 9190A-P		-95 to 140	± 0.15 °C	± 0.05 °C	0.015	90 (1.3 °C/min)	± 0.05 °C	160	Yes	Yes	No	Yes
Fluke 9190A		-95 to 140	± 0.15 °C	n/a	0.015	90 (1.3 °C/min)	± 0.05 °C	160	No	No	No	Yes
Jofra RTC-159		-100 to 155	± 0.3 °C	± 0.06 °C	0.03	135 (1 °C/min)	± 0.01 °C ^[2]	190	Yes	Yes	Yes	Yes
Jofra PTC-125		-90 to 125	± 0.3 °C	± 0.07 °C	0.03	115 (1 °C/min)	± 0.05 °C	190	Yes	Yes	No	Yes
Isotech Isis		-100 to 40	± 0.3 °C	n/a	0.02	90 (1.4 °C/min)	± 0.2 °C	160	-	No	No	No
Chino KT-H503		-100 to 50	-	n/a	0.03	37 (3.4 °C/min)	± 0.05 °C	205	No	No	No	No

[1] External reference thermometer is a priced option

[2] No specification. Based on graphic in datasheet. Assumes Dynamic Load Compensation (a priced option) is enabled.

[3] The "Reference Sensor Control" feature allows the block temperature control to be passed from the block sensor to the reference thermometer.

[4] The Dynamic Load Compensation feature is a priced option that improves vertical gradients when the drywell is loaded with multiple UUTs.

5.2 How the 9190A wins

5.2.1. Best stability and uniformity

The 9190A stability is two times better than Ametek Jofra cold-temperature drywells. When using an external reference thermometer, stability and uniformity are the largest contributors to overall measurement uncertainty. A more stable temperature source means a more accurate calibration, which can equate to major savings (or cost depending on the situation).

5.2.2. Speed to temperature

Speed to temperature: The 9190A provides the fastest speed to temperature. While competitors use the same free piston Stirling cooler (FPSC), the 9190A requires less time to reach temperature and stabilize. This is due to Fluke Calibration refrigeration expertise and proprietary controller technology.

5.2.3. Reference sensor control

Setpoint temperature control can be passed from the internal sensor to an external reference PRT connected to the Reference Probe input. The 9190A controls the well temperature based on its measurement and position inside the well. This feature can minimize the effects of the axial gradient when the reference/control PRT is aligned with sensors that don't reach the bottom of the well.

5.2.4. Process inputs

The 9190A provides a complete calibration with a single tool. There's no need to carry extra gear when performing on-site calibrations.

Ergonomics and industrial design: Built-in handles make the 9190A easier and safer to carry than a bail-style handle.

7. Specifications

9190A Specifications	
Temperature Range at 23 °C	–95 °C to 140 °C (–139 °F to 284 °F)
Display Accuracy	± 0.2 °C Full Range
Accuracy with External Reference	± 0.05 °C Full Range
Stability	± 0.015 °C Full Range
Axial Uniformity at 40 mm (1.6 in)	± 0.05 °C Full Range
Radial Gradient	± 0.01 °C Full Range
Loading Effect (with a 6.35 mm reference probe and three 6.35 mm probes)	± 0.006 °C Full Range
Loading Effect (versus display with 6.35 mm probes)	± 0.25 °C at –95 °C ± 0.10 °C at 140 °C
Operating Conditions	0 °C to 35 °C 0 % to 90 % RH (non-condensing)
Environmental conditions for all specifications except temperature range	13 °C to 33 °C
Immersion (Well) Depth	160 mm (6.3 in)
Insert OD	30 mm (1.18 in)
Heating Time	–95 °C to 140 °C: 40 min
Cooling Time	23 °C to –90 °C: 80 min 23 °C to –95 °C: 90 min 140 °C to 23 °C: 60 min
Stabilization Time	15 min
Resolution	0.01
Display	LCD, °C or °F user-selectable
Size (H x W x D)	480 mm x 205 mm x 380 mm (18.8 x 8.0 x 14.9 in)
Weight	16 kg (35 lbs)
Power Requirements	100 V to 115 V (± 10 %) 50/60 Hz, 575 W
	200 V to 230 V (± 10 %) 50/60 Hz, 575 W
System Fuse Ratings	115 V: 6.3 A T 250 V
	230 V: 3.15 A T 250 V
4–20 mA Fuse (–P model only)	50 mA F 250V

Specifications (cont.)

Computer Interface	RS-232, USB Serial, and 9930 Interface-it control software included
Safety	EN 61010-1:2010, CAN/CSA C22.2 No. 61010.1-04
Refrigerants	R32 (Difluoromethane) < 20 g ASHRAE Safety Group A2L
	R704 (Helium) < 20 g ASHRAE Safety Group A1
1. For ambient temperature of 23 °C	
2. Time from stability alarm to when the unit is with in Stability specification	
Optional Process Electronics Specifications	
Built-in Reference Thermometer Readout	± 0.010 °C at –95 °C
Accuracy	± 0.013 °C at –25 °C
(4-Wire Reference Probe)†	± 0.015 °C at 0 °C
	± 0.020 °C at 50 °C
	± 0.025 °C at 140 °C
Reference Resistance Range	0 ohms to 400 ohms
Reference Resistance Accuracy‡	0 ohms to 42 ohms: ±0.0025 ohms
	42 ohms to 400 ohms: ±60 ppm of reading
Reference Characterizations	ITS-90, CVD, IEC-751, Resistance
Reference Measurement Capability	4-wire
Reference Probe Connection	6 Pin Din with INFO-CON Technology
Built-in RTD Thermometer Readout Accuracy	NI-120: ± 0.015 °C at 0 °C
	PT-100 (385): ± 0.02 °C at 0 °C
	PT-100 (3926): ± 0.02 °C at 0 °C
	PT-100 (JIS): ± 0.02 °C at 0 °C
RTD Resistance Range	0 ohms to 400 ohms
Resistance Accuracy‡	0 ohms to 25 ohms: ±0.002 ohms
	25 ohms to 400 ohms: ±80 ppm of reading
RTD Characterizations	PT-100 (385),(JIS),(3926), NI-120, Resistance
RTD Measurement Capability	2-, 3-, 4-wire RTD with Jumpers only
RTD Connection	4 terminal input

Specifications (cont.)

Built-in TC Thermometer Readout Accuracy³	Type J: $\pm 0.70\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type K: $\pm 0.75\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type T: $\pm 0.60\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type E: $\pm 0.60\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type R: $\pm 1.60\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type S: $\pm 1.60\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type M: $\pm 0.65\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type L: $\pm 0.65\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type U: $\pm 0.70\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type N: $\pm 0.75\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
	Type C: $\pm 1.00\text{ }^{\circ}\text{C}$ at $140\text{ }^{\circ}\text{C}$
TC Millivolt Range	-10 mV to 75 mV
Voltage Accuracy	0.025 % of reading +0.01mV
Internal Cold Junction Compensation Accuracy	$\pm 0.35\text{ }^{\circ}\text{C}$ (ambient of $13\text{ }^{\circ}\text{C}$ to $33\text{ }^{\circ}\text{C}$)
TC Connection	Miniature Connectors
Built-in mA Readout Accuracy	0.02% of reading + 0.002 mA
mA Range	Cal 4-22 mA, Spec 4-24 mA
mA Connection	2 terminal input
Loop Power Function	24 VDC loop power
Built-in Electronics Temperature Coefficient (0 °C to 13 °C, 33 °C to 50 °C)	$\pm 0.005\text{ \% of range per }^{\circ}\text{C}$
†The temperature range may be limited by the reference probe connected to the readout. The Built- In Reference Accuracy does not include the sensor probe accuracy. It does not include the probe uncertainty or probe characterization errors.	
‡Measurement accuracy specifications apply within the operating range and assume 4-wires for PRTs. With 3-wire RTDs add 0.05 ohms to the measurement accuracy plus the maximum possible difference between the resistances of the lead wires.	
3 The thermocouple input readout is sensitive to EM fields in the frequency range of 500-700MHz.	

8. Ordering information

Item Number	Item Model	Description	Gross Weight (kg)	Box Dimensions (LxWxH cm)	Country of Origin	UPC Code	ECCN	HTS
Mainframe								
4178780	9190A-A-156	9190A with Insert A, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63548 6	3A992	9032.89.6085
4178798	9190A-A-256	9190A with Insert A, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63549 3	3A992	9032.89.6085
4178800	9190A-A-P-156	9190A with Insert A and Process Electronics, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63550 9	3A992	9032.89.6085
4178817	9190A-A-P-256	9190A with Insert A and Process Electronics, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63550 9	3A992	9032.89.6085
4178821	9190A-B-156	9190A with Insert B, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63552 3	3A992	9032.89.6085
4178839	9190A-B-256	9190A with Insert B, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63553 0	3A992	9032.89.6085
4178842	9190A-B-P-156	9190A with Insert B and Process Electronics, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63554 7	3A992	9032.89.6085
4178856	9190A-B-P-256	9190A with Insert B and Process Electronics, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63555 4	3A992	9032.89.6085
4178863	9190A-C-156	9190A with Insert C, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63556 1	3A992	9032.89.6085
4178874	9190A-C-256	9190A with Insert C, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63557 8	3A992	9032.89.6085
4178888	9190A-C-P-156	9190A with Insert C and Process Electronics, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63558 5	3A992	9032.89.6085
4178895	9190A-C-P-256	9190A with Insert C and Process Electronics, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63559 2	3A992	9032.89.6085
4178901	9190A-D-156	9190A with Insert D, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63560 8	3A992	9032.89.6085
4178912	9190A-D-256	9190A with Insert D, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63561 5	3A992	9032.89.6085
4178920	9190A-D-P-156	9190A with Insert D and Process Electronics, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63562 2	3A992	9032.89.6085
4178935	9190A-D-P-256	9190A with Insert D and Process Electronics, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63563 9	3A992	9032.89.6085
4178947	9190A-DW-156	9190A with no insert, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63564 6	3A992	9032.89.6085
4178958	9190A-DW-256	9190A with no insert, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63565 3	3A992	9032.89.6085
4178964	9190A-DW-P-156	9190A with Process Electronics but no insert, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63566 0	3A992	9032.89.6085
4178973	9190A-DW-P-256	9190A with Process Electronics but no insert, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63567 7	3A992	9032.89.6085
4178986	9190A-E-156	9190A with Insert E, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63568 4	3A992	9032.89.6085
4178999	9190A-E-256	9190A with Insert E, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63569 1	3A992	9032.89.6085
4179006	9190A-E-P-156	9190A with Insert E and Process Electronics, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63570 7	3A992	9032.89.6085
4179014	9190A-E-P-256	9190A with Insert E and Process Electronics, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63571 4	3A992	9032.89.6085
4179023	9190A-F-156	9190A with Insert F, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63572 1	3A992	9032.89.6085
4179038	9190A-F-256	9190A with Insert F, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63573 8	3A992	9032.89.6085
4179045	9190A-F-P-156	9190A with Insert F and Process Electronics, 115V	18	59.7 x 33.0 x 56.8	US	0 95969 63574 5	3A992	9032.89.6085
4179050	9190A-F-P-256	9190A with Insert F and Process Electronics, 230V	18	59.7 x 33.0 x 56.8	US	0 95969 63575 2	3A992	9032.89.6085

Ordering information (cont.)

Item Number	Item Model	Description	Gross Weight (kg)	Box Dimensions (LxWxH cm)	Country of Origin	UPC Code	ECCN	HTS
Accessories								
4231689	9190A-CASE	9190A Carrying Case	4.5	63.2 x 33.3 x 60.2	US	0 95969 64343 6	EAR99	4202.12.2020
4231692	9190-INS A	9190A Insert A, imperial miscellaneous holes	0.9	30.5 x 22.9 x 12.7	US	0 95969 64344 3	EAR99	9032.90.0000
4231704	9190-INS B	9190A Insert B, imperial comparison holes	0.9	30.5 x 22.9 x 12.7	US	0 95969 64345 0	EAR99	9032.90.0000
4231719	9190-INS C	9190A Insert C, 0.25 inch holes	0.9	30.5 x 22.9 x 12.7	US	0 95969 64346 7	EAR99	9032.90.0000
4231728	9190-INS D	9190A Insert D, metric comparison holes	0.9	30.5 x 22.9 x 12.7	US	0 95969 64347 4	EAR99	9032.90.0000
4231737	9190-INS E	9190A Insert E, metric miscellaneous holes with 0.25 inch hole	0.9	30.5 x 22.9 x 12.7	US	0 95969 64348 1	EAR99	9032.90.0000
4231743	9190-INS F	9190A Insert F, metric comparison miscellaneous holes with 0.25 inch hole	0.9	30.5 x 22.9 x 12.7	US	0 95969 64349 8	EAR99	9032.90.0000
4231770	9190-INS Y1	9190A Insert Y, custom insert with blank insulator	0.9	30.5 x 22.9 x 12.7	US	0 95969 64352 8	EAR99	9032.90.0000
4319562	9190-INS Y2	9190A Insert Y, custom insert with custom insulator	0.9	30.5 x 22.9 x 12.7	US	0 95969 66582 7	EAR99	9032.90.0000
4231781	9190-INS Z	9190A Insert Z, blank insert	0.9	30.5 x 22.9 x 12.7	US	0 95969 64353 5	EAR99	9032.90.0000

9. Standard equipment included with each 9190A

Name	Quantity
9190-INSX Insert (X=A, B, C, D, E, or F)	1
6-foot Mains Power Cord	1
USB Cable	1
Getting Started Manual	1
Product CD that contains manuals and remote interface driver files	1
9930 Interface-it Calibration Software and Users Guide	1
Report of Calibration and Calibration Label	1
Well Insulator Cap	1
Insert Removal Tool	1
Clamp-on Ferrites (-P model only)	4
6-pin DIN Connector (-P model only)	1
Test Lead Kit (-P model only)	1

10. Sales and Marketing Materials

The following sales and marketing materials are available at: <http://us.flukecal.com/9190A-Launch>.

Item	Literature number
Collateral	
Press release	9040292
Brochure	4264843A
Datasheet	4264972A
Product video	http://us.flukecal.com/videos
E-advertising	
Sales channel HTM email	9040291
Product web page	http://us.flukecal.com/products/temperature-calibration/industrial-calibrators/field-metrology-wells/9190a-ultra-cool-field
Web banners	4265057
Print advertising	
Full page ad	4264896A
Half page ad	4264908A
Quarter page ad	4264913A
Trade show graphics	
Quick screen	4226323
Sales tools	
Sales guide	9040301A
Product announcement	9040296
Sales training power point	9040295
Customer power point	9040293
Distributor tools	
Distributor HTML email	9032423
Distributor brochure	4265159
Distributor power point	9032411
Catalog copy - full page	9030587
Catalog copy - half page	9030591
Catalog copy - quarter page	9032407
Product photos	
9190a front view	9032427
9190A 3/4 view	9032428
9190A App 01	9032424
9190A App 02	9032425
9190A App 03	9032426

11. FAQ

Ref#	Question	Answer
1	Does the 9190A-P (process input option) include the switch test function?	No. The 9190A-P controller was based on the 418X controller which does not include the switch test feature.
2	Can the 9190A achieve –100 °C?	Yes. The standard firmware allows the user to set the minimum temperature to –100 °C but the drywell is only specified to –95 °C.
3	Do the hole diameters of the insulator match the hole diameters of the insert?	Yes.
4	Can customers order custom inserts?	Yes. Two custom insert options are offered. The 9190-INSY1 is a blank insulator allowing the customer to drill their own holes in the insulator. The 9190-INSY2 is a custom made insulator whose hole diameters match the custom sized holes requested by the customer.
5	What is the purpose of the well insulator?	The well insulator prevents moisture from condensing and freezing on the well.
6	Is an insulator included with each insert ordered?	Yes. Today there is not an option to order an insert without an insulator.
7	Is the connector for the external reference thermometer programmable?	Yes. It is a –A termination similar to the 914X and considered a “smart” connector or INFO-CON.
8	Is the Reference Sensor Control function included as standard with the –P option?	Yes. The Reference Sensor Control function is included when the customer purchases the –P option.
9	Can a customer upgrade from a non-P option to a –P option?	No. Traceability of the original configuration to the original serial number limits the option to upgrade. To date, a work-around has not been developed.
10	Why must the 9190A remain horizontal during operation?	Since refrigerant flow in the liquid phase from the condenser to the evaporator (well) is gravity-dependent, the product must remain relatively horizontal during operation.
11	Is it necessary to ship the 9190A upright?	No. It does not matter if the 9190A ships on its side or upright (best not however to ship upside-down).
12	Is USB control a standard interface?	Yes. USB control is included as standard on both the –P and non-P configurations.
14	Will more questions be added to this section over time?	Yes. As you encounter new questions, please pass to the TCAL BU. These questions will be added to the sales guide and the sales guide will be revised and re-released.