

JOFRA™ AMC900

Advanced Multi-purpose Calibrator

The AMC900 bench calibrator is your solution for high precision signal, temperature, and pressure calibrations. This multi-purpose unit offers laboratory grade accuracy at an industrial calibrator price. The standard is delivered pre-loaded with 13 thermocouple curves and 14 RTD curves. You can also program curves to suit your individual needs. With the optional external pressure modules, you can tailor the system to address your calibration needs.

Laboratory standard

for electrical signals, handheld calibrators, and bench testing of instrumentation.

Output:

DC current 0-100 mA
DC voltage 0 to 100 V
DC mV 0 to 100 mV
TC simulation -10 to 75 mV
Resistance 5 to 4000 ohm
(RTD simulation)

Input:

DC mV -10 to 75 mV
(TC temperature conversion)
Resistance 0 to 4000 ohm
(RTD temperature conversion)
Pressure modules.

Fully remote controllable

with a parallel instrument bus IEEE-488 and RS232 serial interface.

Pressure reference capability

increases the flexibility of the instrument with the addition of external pressure modules. Accuracies up to 0.01%.

Temperature reference

13 different Thermocouple types,
14 different RTD types
Accuracies of up to 0.025°C.

Fast RTD simulation

works with all pulsed transmitters.



PRODUCT DESCRIPTION

The JOFRA AMC900 not only offers temperature and pressure calibration features, it includes sourcing of current and voltage and measurement of milli-volts, and resistance. This flexibility means that you need only one unit for calibration or verification. This standard gives you the confidence you need for your test instruments as well as in your field calibrations. Upgrade your laboratory or workshop to a higher level of accuracy and flexibility with the AMC900.

The JOFRA AMC900 has the ability to store up to 9 setpoints for each output range. The setpoints can be selected manually or automatically stepped at timed intervals. The AMC900 also features an easy-to-operate front panel user interface and computer control through an RS232 or IEEE-488 interface for automated production testing. The unit sources DC voltage and current for multifunction workload coverage, enabling calibration of data loggers, strip chart recorders, multi-meters, handheld calibrators, and other industrial instruments. This is the cost-effective solution for your multiple calibration needs.

JOFRA AMC900 APPLICATIONS

New calibration lab with one unit

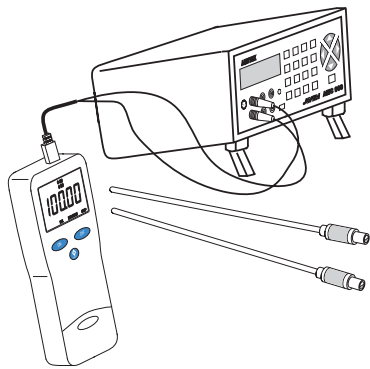
The AMC900 is the single unit that can make the greatest change to your instrument shop or calibration lab. This calibrator offers the ability to perform calibrations and verifications of signal, temperature, and pressure instrumentation with one device. You can source current and source/read voltage and resistance. Simulate virtually any temperature sensor made today.

Combined with a good digital multimeter and you have a complete electrical process calibration lab.

Saving you time

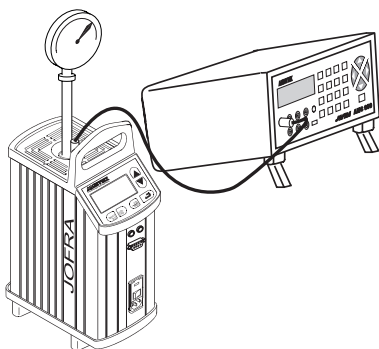
The AMC900 is flexible. If you need to store test points for particular calibrations, you can save up to 9 setpoints along with dedicated dwell times to allow for easy repeat calibrations. AMC900 has also installed many of the curves for today's wide range of temperature sensors so that you can spend time calibrating instruments and not programming the calibrator or referencing look up tables. Your pressure calibration needs are met with a vast array of modules that communicate directly with the AMC900. Additionally, you have the option of using an RS232 or IEEE-488 interface to easily automate your calibrations. Just use HyperTerminal, Visual Basic, or any other software using an ASCII interface.

AMC900 as your temperature reference



Use the AMC900 to maintain a high level of confidence in all your handheld temperature indicators. Check the electrical side against the AMC900 and the probes in a JOFRA dry-block calibrator - using the AMC900 as the external temperature reference. The AMC900 is a versatile performer. In addition to the 14 RTD curves and 13 T/C curves

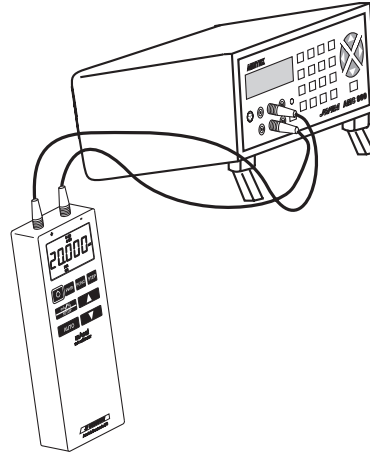
factory-installed on the unit, you may have an occasional need to add a custom curve for a specific sensor. The user interface allows you to add the constants to calibrate these sensors.



Save money by maintaining all your temperature calibration equipment yourself. The AMC900 can be a standard for your dry-block calibrators. The unit is configured to accept reference probe inputs for temperature verification. (Compatible with all JOFRA STS100 sensors). You can calibrate any of our dry-

block calibrators using a reference probe and the AMC900. As a temperature reference you can also verify temperature generation devices such as circulating baths, other dry-block calibrators, and ovens.

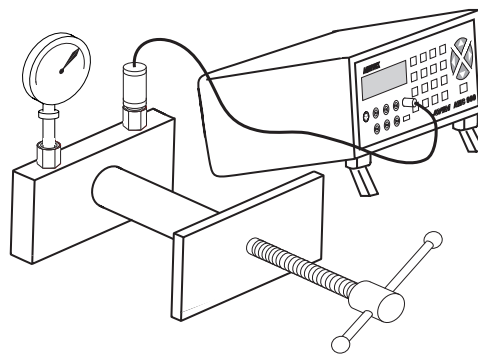
In the lab or in the shop



The AMC900 is designed to meet calibration needs in a laboratory environment or as a reference standard for instrument shops. The adaptability of this calibrator allows it to be utilized in a lab to be the standard for signal, temperature, and pressure calibrations. Where you are responsible for the operation of a wide range of equipment, such as in an instrument shop, you can bench-test instruments before

installation and you can save money by maintaining the traceability and performance of all your test instruments in operating order with this efficient calibrator.

AMC900 as pressure reference



Use your current pressure source, add a JOFRA APM pressure module to the JOFRA AMC900 calibrator and start your pressure calibration.

Each module communicates directly

with the calibrator to ensure proper information transfer and accurate calibrations. The AMC900 operates as a pressure standard with a wide range of pressure modules covering pressure ranges from 0 to 10 inH₂O up to 10,000 psi / 700 bar. Modules are available in gauge, differential, absolute, and vacuum ranges. Pressure can be displayed in a wide range of engineering units with up to 0.01% full scale accuracy. The modules are designed so that they plug into the front panel and communicate directly with the AMC900 and the handheld multifunction calibrator JOFRA ASC300.

Resistance			INPUT Accuracy		OUTPUT Accuracy	
	Resolution	Allowable current ¹	90 days	12 months	90 days	12 months
5 to 400 ohm	0.01 ohm	1 to 10 mA			±0.025 ohm	±0.03 ohm
5 to 4000 ohm	0.1 ohm	250 µA to 1 mA			±0.25 ohm	±0.3 ohm
0 to 400 ohm	0.001 ohm	1 mA	±35 ppm + 0.003 ohm	±40 ppm + 0.003 ohm		
401 to 4001 ohm	0.01 ohm	0.1 mA	±35 ppm + 0.03 ohm	±40 ppm + 0.03 ohm		

Absolute uncertainty, tcal ±5°C / 9°F

1. Continuously variable from 0 to 4 Kohm (Output). Current is fixed to 1 and 0.1 mA in input

RTD and thermistor		TEMPERATURE		INPUT accuracy ±		OUTPUT ¹ accuracy ±	
		range		90 days	12 months	90 days	12 months
		from °C / °F	to °C / °F	°C / °F	°C / °F	°C / °F	°C / °F
Pt100 alpha 3916	°C	-200°C	-190°C	0.006°C	0.006°C	0.06°C	0.07°C
		-190°C	-80°C	0.011°C	0.012°C	0.06°C	0.08°C
		-80°C	0°C	0.014°C	0.015°C	0.06°C	0.08°C
		0°C	100°C	0.018°C	0.019°C	0.06°C	0.08°C
		100°C	260°C	0.025°C	0.028°C	0.07°C	0.08°C
		260°C	300°C	0.026°C	0.029°C	0.07°C	0.08°C
		300°C	400°C	0.031°C	0.034°C	0.07°C	0.09°C
	°F	400°C	600°C	0.040°C	0.045°C	0.08°C	0.09°C
		600°C	630°C	0.042°C	0.047°C	0.08°C	0.09°C
		-328°F	-310°F	0.011°F	0.011°F	0.11°F	0.13°F
		-310°F	-112°F	0.020°F	0.022°F	0.11°F	0.14°F
		-112°F	32°F	0.025°F	0.027°F	0.11°F	0.14°F
		32°F	212°F	0.032°F	0.034°F	0.11°F	0.14°F
		212°F	500°F	0.045°F	0.050°F	0.13°F	0.14°F
Cu100 Russian Gost	°C	500°F	572°F	0.047°F	0.052°F	0.13°F	0.14°F
		572°F	752°F	0.056°F	0.061°F	0.13°F	0.16°F
	°F	752°F	1112°F	0.072°F	0.081°F	0.14°F	0.16°F
		1112°F	1166°F	0.076°F	0.085°F	0.14°F	0.16°F
		-180°C	-50°C	0.18°C	0.19°C	0.23°C	0.24°C
Pt200 alpha 385	°C	-50°C	200°C	0.14°C	0.15°C	0.18°C	0.20°C
		-292°F	-58°F	0.32°F	0.34°F	0.41°F	0.43°F
	°F	-58°F	392°F	0.25°F	0.27°F	0.32°F	0.36°F
		-200°C	-80°C	0.031°C	0.032°C	0.31°C	0.38°C
		-80°C	-0°C	0.035°C	0.036°C	0.32°C	0.38°C
		0°C	100°C	0.039°C	0.041°C	0.33°C	0.39°C
		100°C	260°C	0.042°C	0.045°C	0.33°C	0.39°C
		260°C	300°C	0.050°C	0.053°C	0.36°C	0.43°C
		300°C	400°C	0.053°C	0.057°C	0.36°C	0.43°C
		400°C	600°C	0.070°C	0.075°C	0.42°C	0.50°C
600°C	630°C	0.071°C	0.076°C	0.42°C	0.50°C		
°F	-328°F	-112°F	0.056°F	0.058°F	0.56°F	0.68°F	
	-112°F	32°F	0.063°F	0.065°F	0.58°F	0.68°F	
	32°F	212°F	0.070°F	0.074°F	0.59°F	0.70°F	
	212°F	500°F	0.076°F	0.081°F	0.59°F	0.70°F	
	500°F	572°F	0.090°F	0.095°F	0.65°F	0.77°F	
	572°F	752°F	0.095°F	0.103°F	0.65°F	0.77°F	
	752°F	1112°F	0.126°F	0.135°F	0.76°F	0.90°F	
	1112°F	1166°F	0.128°F	0.137°F	0.76°F	0.90°F	

Absolute uncertainty, tcal ±5°C / 9°F 1. 2-wire output 2. Based on MINCO application aid no. 18.

RTD and Thermistor		TEMPERATURE range		INPUT accuracy ±		OUTPUT ¹ accuracy ±	
		from	to	90 days	12 months	90 days	12 months
Pt500 alpha 385	°C	-200°C	-80°C	0.016°C	0.017°C	0.13°C	0.15°C
		-80°C	0°C	0.019°C	0.020°C	0.13°C	0.15°C
		0°C	100°C	0.023°C	0.025°C	0.13°C	0.16°C
		100°C	260°C	0.030°C	0.033°C	0.14°C	0.17°C
		260°C	300°C	0.032°C	0.035°C	0.14°C	0.17°C
		300°C	400°C	0.037°C	0.041°C	0.15°C	0.18°C
	°F	400°C	600°C	0.047°C	0.052°C	0.16°C	0.19°C
		600°C	630°C	0.048°C	0.076°C	0.16°C	0.19°C
		-328°F	-112°F	0.029°F	0.031°F	0.23°F	0.27°F
		-112°F	32°F	0.034°F	0.036°F	0.23°F	0.27°F
		32°F	212°F	0.041°F	0.045°F	0.23°F	0.29°F
		212°F	500°F	0.054°F	0.059°F	0.25°F	0.31°F
		500°F	572°F	0.058°F	0.063°F	0.25°F	0.31°F
		572°F	752°F	0.067°F	0.074°F	0.27°F	0.32°F
752°F	1112°F	0.085°F	0.094°F	0.29°F	0.34°F		
1112°F	1166°F	0.086°F	0.137°F	0.29°F	0.34°F		
Pt10 alpha 385	°C	-200°C	0°C	0.11°C	0.11°C	0.75°C	0.90°C
		0°C	400°C	0.17°C	0.18°C	0.75°C	0.90°C
		400°C	800°C	0.17°C	0.18°C	0.85°C	1.00°C
	°F	-328°F	32°F	0.20°F	0.20°F	1.35°F	1.62°F
		32°F	752°F	0.31°F	0.32°F	1.35°F	1.62°F
		752°F	1472°F	0.31°F	0.32°F	1.53°F	1.80°F
Pt50 alpha 385	°C	-200°C	400°C	0.045°C	0.047°C	0.15°C	0.18°C
		400°C	800°C	0.065°C	0.071°C	0.17°C	0.20°C
	°F	-328°F	752°F	0.08°F	0.08°F	0.27°F	0.32°F
752°F		1472°F	0.12°F	0.13°F	0.31°F	0.36°F	
Cu50 Russian Gost	°C	-180°C	-50°C	0.19°C	0.20°C	0.3°C	0.31°C
		-50°C	200°C	0.15°C	0.16°C	0.25°C	0.26°C
	°F	-292°F	-58°F	0.34°F	0.36°F	0.54°F	0.56°F
-58°F		392°F	0.27°F	0.29°F	0.45°F	0.47°F	
Pt100 alpha 385	°C	-200°C	-80°C	0.011°C	0.012°C	0.06°C	0.07°C
		-80°C	0°C	0.018°C	0.020°C	0.08°C	0.10°C
		0°C	100°C	0.018°C	0.020°C	0.08°C	0.10°C
		100°C	300°C	0.027°C	0.030°C	0.07°C	0.09°C
		300°C	400°C	0.031°C	0.035°C	0.07°C	0.09°C
		400°C	630°C	0.042°C	0.047°C	0.08°C	0.09°C
	°F	630°C	800°C	0.050°C	0.057°C	0.08°C	0.10°C
		-328°F	-112°F	0.023°F	0.022°F	0.11°F	0.13°F
		-112°F	32°F	0.032°F	0.036°F	0.14°F	0.18°F
		32°F	212°F	0.032°F	0.036°F	0.14°F	0.18°F
		212°F	572°F	0.049°F	0.054°F	0.13°F	0.16°F
		572°F	752°F	0.056°F	0.063°F	0.13°F	0.16°F
		752°F	1166°F	0.076°F	0.085°F	0.14°F	0.16°F
		1166°F	1472°F	0.090°F	0.103°F	0.14°F	0.18°F
Pt100 alpha 3926	°C	-200°C	-80°C	0.011°C	0.011°C	0.06°C	0.07°C
		-80°C	0°C	0.014°C	0.015°C	0.06°C	0.07°C
		0°C	100°C	0.018°C	0.019°C	0.06°C	0.08°C
		100°C	300°C	0.026°C	0.029°C	0.07°C	0.08°C
		300°C	400°C	0.031°C	0.034°C	0.07°C	0.09°C
	°F	400°C	630°C	0.041°C	0.046°C	0.08°C	0.09°C
		-328°F	-112°F	0.020°F	0.020°F	0.11°F	0.13°F
		-112°F	32°F	0.025°F	0.027°F	0.11°F	0.13°F
		32°F	212°F	0.032°F	0.034°F	0.11°F	0.14°F
		212°F	572°F	0.047°F	0.052°F	0.13°F	0.14°F
572°F	752°F	0.056°F	0.061°F	0.13°F	0.16°F		
752°F	1166°F	0.074°F	0.083°F	0.14°F	0.16°F		

Absolute uncertainty, tcal ±5°C / 9°F 1. 2-wire output 2. Based on MINCO application aid no. 18.

RTD and Thermistor		TEMPERATURE range		INPUT accuracy ±		OUTPUT ¹ accuracy ±	
		from	to	90 days	12 months	90 days	12 months
Pt1000 alpha 385	°C	-200°C	-80°C	0.011°C	0.012°C	0.06°C	0.07°C
		-80°C	-0°C	0.014°C	0.015°C	0.06°C	0.08°C
		0°C	100°C	0.019°C	0.020°C	0.07°C	0.08°C
		100°C	260°C	0.025°C	0.028°C	0.07°C	0.08°C
		260°C	300°C	0.027°C	0.030°C	0.07°C	0.09°C
		300°C	400°C	0.030°C	0.034°C	0.07°C	0.09°C
		400°C	600°C	0.041°C	0.045°C	0.08°C	0.09°C
	°F	600°C	630°C	0.042°C	0.047°C	0.08°C	0.09°C
		-328°F	-112°F	0.020°F	0.022°F	0.11°F	0.13°F
		-112°F	32°F	0.025°F	0.027°F	0.11°F	0.14°F
		32°F	212°F	0.034°F	0.036°F	0.13°F	0.14°F
		212°F	500°F	0.045°F	0.050°F	0.13°F	0.14°F
		500°F	572°F	0.049°F	0.054°F	0.13°F	0.16°F
		572°F	752°F	0.054°F	0.061°F	0.13°F	0.16°F
Ni 120 alpha 385	°C	-80°C	0°C	0.009°C	0.010°C	0.04°C	0.05°C
		0°C	100°C	0.010°C	0.011°C	0.04°C	0.04°C
		100°C	260°C	0.011°C	0.012°C	0.03°C	0.03°C
	°F	-112°F	32°F	0.016°F	0.018°F	0.07°F	0.09°F
		32°F	212°F	0.018°F	0.020°F	0.07°F	0.07°F
		212°F	500°F	0.020°F	0.022°F	0.05°F	0.05°F
Cu10 alpha 427 ²	°C	-100°C	260°C	0.067°C	0.069°C	0.63°C	0.75°C
	°F	-148°F	500°F	0.121°F	0.124°F	1.13°F	1.35°F
YSI 400	°C	15°C	50°C	0.005°C	0.007°C	0.005°C	0.007°C
	°F	59°F	122°F	0.009°F	0.013°F	0.009°F	0.013°F
Pt25 SPRT	°C	-200°C	660°C	0.05°C	0.06°C	-	-
	°F	-328°F	1220°F	0.09°F	0.11°F	-	-

Absolute uncertainty, tcal ±5°C / 9°F 1. 2-wire Output 2. Based on MINCO application aid no. 18.

DC Voltage	Resolution	Maximum burden ²	Stability 24 hours ±1°C / 1.8°F	OUTPUT ¹ Accuracy	
				90 days	12 months
0 to 100 mV	1 µV	10 mA	±5 ppm + 2 µV	±25 ppm + 3 µV	±30 ppm + 3 µV
0 to 1 V	10 µV	10 mA	±4 ppm + 20 µV	±25 ppm + 30 µV	±30 ppm + 20 µV
0 to 10 V	100 µV	10 mA	±4 ppm + 200 µV	±25 ppm + 200 µV	±30 ppm + 200 µV
0 to 100 V	1 mV	1 mA	±5 ppm + 1 mV	±25 ppm + 2 mV	±30 ppm + 2 mV
Thermocouple output					
-10 to 75 mV	1 µV	10 mV	±5 ppm + 2 µV	±25 ppm + 3 µV	±30 ppm + 3 µV

Absolute Uncertainty, tcal ±5°C / 9°F 1. All outputs are positive only 2. Remote sensing is not provided. Output resistance is < 1 ohm
 Noise: 0 to 100 mV: 1 µV p-p from 0.1 to 10 Hz, 6 µV rms from 10 Hz to 10 KHz
 Noise: 0 to 1 V: 10 µV p-p from 0.1 to 10 Hz, 60 µV rms from 10 Hz to 10 KHz
 Noise: 0 to 10 V: 100 µV p-p from 0.1 to 10 Hz, 600 µV rms from 10 Hz to 10 KHz
 Noise: 0 to 100 V: 10 ppm + 1 mV p-p from 0.1 to 10 Hz, 20 mV rms from 10 Hz to 10 KHz

Thermocouple	TEMPERATURE range		INPUT and OUTPUT accuracy \pm ¹		
	from	to	90 days	12 months	
B	°C	600°C	800°C	0.32°C	0.36°C
		800°C	1000°C	0.29°C	0.29°C
		1000°C	1550°C	0.30°C	0.30°C
	°F	1550°C	1820°C	0.34°C	0.35°C
		1112°F	1472°F	0.58°F	0.65°F
		1472°F	1832°F	0.52°F	0.52°F
C	°C	1832°F	2822°F	0.54°F	0.54°F
		2822°F	3308°F	0.61°F	0.63°F
		0°C	150°C	0.15°C	0.20°C
	°F	150°C	650°C	0.11°C	0.16°C
		650°C	1000°C	0.13°C	0.21°C
		1000°C	1800°C	0.28°C	0.40°C
1800°C		2316°C	0.53°C	0.74°C	
32°F		302°F	0.27°F	0.36°F	
302°F		1202°F	0.20°F	0.29°F	
E	°C	1202°F	1832°F	0.23°F	0.38°F
		1832°F	3272°F	0.50°F	0.72°F
		3272°F	4200°F	0.95°F	1.33°F
	°F	-250°C	-100°C	0.28°C	0.40°C
		-100°C	-25°C	0.06°C	0.08°C
		-25°C	350°C	0.04°C	0.05°C
350°C		650°C	0.04°C	0.06°C	
650°C		1000°C	0.06°C	0.11°C	
-418°F		-148°F	0.50°F	0.72°F	
J	°C	-148°F	-13°F	0.11°F	0.14°F
		-13°F	662°F	0.07°F	0.09°F
		662°F	1202°F	0.07°F	0.11°F
	°F	1202°F	1832°F	0.11°F	0.20°F
		-210°C	-100°C	0.10°C	0.17°C
		-100°C	-30°C	0.08°C	0.10°C
K	°C	-30°C	150°C	0.04°C	0.06°C
		150°C	760°C	0.04°C	0.07°C
		760°C	1200°C	0.08°C	0.13°C
	°F	-346°F	-148°F	0.18°F	0.28°F
		-148°F	-22°F	0.14°F	0.18°F
		-22°F	302°F	0.07°F	0.11°F
L	°C	302°F	1400°F	0.07°F	0.13°F
		1400°F	2192°F	0.14°F	0.23°F
		-200°C	-100°C	0.15°C	0.23°C
	°F	-100°C	-25°C	0.09°C	0.22°C
		-25°C	120°C	0.04°C	0.06°C
		120°C	1000°C	0.09°C	0.16°C
1000°C		1372°C	0.20°C	0.30°C	
-328°F		-148°F	0.27°F	0.41°F	
-148°F		-13°F	0.16°F	0.40°F	
L	°C	-13°F	248°F	0.07°F	0.11°F
		248°F	1832°F	0.16°F	0.29°F
		1832°F	2501°F	0.36°F	0.54°F
	°F	200°C	-100°C	0.27°C	0.27°C
		-100°C	-800°C	0.16°C	0.16°C
		800°C	900°C	0.07°C	0.07°C
°F	392°F	-148°F	0.49°F	0.49°F	
	-148°F	1472°F	0.29°F	0.29°F	
	1472°F	1652°F	0.13°F	0.13°F	

Absolute uncertainty, tcal \pm 5°C / 9°F 1. Does not include thermocouple wire error and Cold Junction compensation.

Thermocouple	TEMPERATURE range		INPUT and OUTPUT accuracy \pm ¹		
	from	to	90 days	12 months	
N	°C	-200°C	-100°C	0.23°C	0.30°C
		-100°C	-25°C	0.10°C	0.14°C
		-25°C	120°C	0.06°C	0.09°C
		120°C	410°C	0.04°C	0.08°C
	°F	410°C	1300°C	0.11°C	0.17°C
		-328°F	-148°F	0.41°F	0.54°F
		-148°F	-13°F	0.18°F	0.25°F
		-13°F	248°F	0.11°F	0.16°F
R	°C	248°F	770°F	0.07°F	0.14°F
		770°F	2372°F	0.20°F	0.31°F
		0°C	250°C	0.48°C	0.48°C
		250°C	400°C	0.24°C	0.25°C
	°F	400°C	1000°C	0.21°C	0.23°C
		1000°C	1750°C	0.20°C	0.30°C
		32°F	482°F	0.86°F	0.86°F
		482°F	752°F	0.43°F	0.45°F
S	°C	752°F	1832°F	0.38°F	0.41°F
		1832°F	3182°F	0.36°F	0.54°F
		0°C	250°C	0.46°C	0.46°C
		250°C	1000°C	0.26°C	0.26°C
	°F	1000°C	1400°C	0.20°C	0.27°C
		1400°C	1750°C	0.25°C	0.36°C
		32°F	482°F	0.83°F	0.83°F
		482°F	1832°F	0.47°F	0.47°F
T	°C	1832°F	2552°F	0.36°F	0.49°F
		2552°F	3182°F	0.45°F	0.65°F
		-250°C	-150°C	0.41°C	0.53°C
		-150°C	0°C	0.08°C	0.14°C
	°F	0°C	120°C	0.03°C	0.06°C
		120°C	400°C	0.02°C	0.04°C
		-418°F	-238°F	0.74°F	0.95°F
		-238°F	32°F	0.14°F	0.25°F
U	°C	32°F	248°F	0.05°F	0.11°F
		248°F	752°F	0.04°F	0.07°F
	°F	-200°C	0°C	0.46°C	0.46°C
		0°C	600°C	0.17°C	0.17°C
BP Russian Gost	°C	-328°F	32°F	0.83°F	0.83°F
		32°F	1112°F	0.31°F	0.31°F
		0°C	200°C	0.32°C	0.32°C
		200°C	600°C	0.22°C	0.22°C
		600°C	800°C	0.29°C	0.06°C
		800°C	1600°C	0.35°C	0.16°C
	°F	1600°C	2000°C	0.47°C	0.30°C
		2000°C	2500°C	0.57°C	0.70°C
		32°F	392°F	0.58°F	0.58°F
		392°F	1112°F	0.40°F	0.40°F
		1112°F	1472°F	0.52°F	0.54°F
		1472°F	2912°F	0.63°F	0.65°F
XK Russian Gost	°C	2912°F	3632°F	0.85°F	0.86°F
		3632°F	4532°F	1.03°F	1.26°F
		-200°C	-100°C	0.12°C	0.12°C
	°F	-100°C	300°C	0.02°C	0.03°C
		300°C	800°C	0.09°C	0.10°C
XK Russian Gost	°C	328°F	-148°F	0.22°F	0.22°F
		-148°F	572°F	0.04°F	0.05°F
	°F	572°F	1472°F	0.16°F	0.18°F

Absolute uncertainty, tcal \pm 5°C / 9°F 1. Does not include thermocouple wire error and Cold Junction compensation.

DC current	Resolution	Maximum compliance voltage	Maximum inductive load	OUTPUT ¹ Accuracy	
				90 days	12 months
0 to 100 mA	1 mA	10V	100 mH	±85 ppm + 2 µA	±100 ppm + 2 µA

Absolute uncertainty, tcal ±5°C / 9°F
 1. All outputs are positive only.
 Noise: 2 µA p-p from 0.1 to 10 Hz, 20 µA from 10 Hz to 10 KHz

Thermocouple Cold junction	Temperature range		Accuracy ± 12 months
	min	max	
CJC compensation	18°C / 64°F	28°C / 83°F	0.1°C / 0.18°F
CJC outside above			0.05°C/°C / 0.05°F/°F

Mains specifications

Selectable 115 V(90-132), 230 V(197-264)
 Frequency 47 - 63 Hz
 Power consumption (max.) 15 VA

Warm up and settling time

Warm up - maximum 30 minutes
 Settling time Less than 5 sec.

Ambient temperature

Operating 0 to 50°C / 32 to 122°F
 Calibration (tcal) 18 to 28°C / 64 to 82°F
 Storage -20 to 70°C / -4 to 158°F
 Temperature coefficient (outside tcal ±5°C / ±9°F):
 Celsius 10% of specification per °C
 Fahrenheit 5.5% of specification per °F

Relative humidity

Operating < 80% to 30°C / 86°F
 < 70% to 40°C / 104°F
 < 40% to 50°C / 122°F
 Storage <95% non-condensing

Altitude

Operating < 3,050 m / 10,000 ft
 Non-operating < 12,200 m / 40,000 ft

Standard interface

Serial RS 232
 Parallel IEEE-488 (GPIB)

CE-conformity

EN61326: 1997/A1:1998

Safety

EN 61010 Second, ANSI/ISA-S82.01-1994
 CAN/CSA-C22.2 No. 1010.1-92, NRTL

Isolation

Analog low isolation20 V

Instrument dimensions

AMC900 WxHxD: 300x120x220 mm / 11.5x4.7x8.9 in.

Instrument weight

AMC900 2.3 kg / 5 lb

Pressure specifications

The JOFRA AMC900 can display pressure from the modules in any of the below mentioned engineering units.

Range: Determined by module
 Accuracy: Determined by module
 Resolution: 5 digits

psi pound per square inch
 inH2O4°C inches of water at 4°C
 inH2O20°C inches of water at 20°C
 cmH2O4°C centimeters of water at 4°C
 cmH2O20°C centimeters of water at 20°C
 BAR bars
 mBAR millibars
 KPAL kilopascals
 inHG 0°C inches of mercury at 0°C
 mmHG 0°C millimeter of mercury at 0°C
 Kg/cm2 kilograms per square centimeter

TEMPERATURE REFERENCE PROBES

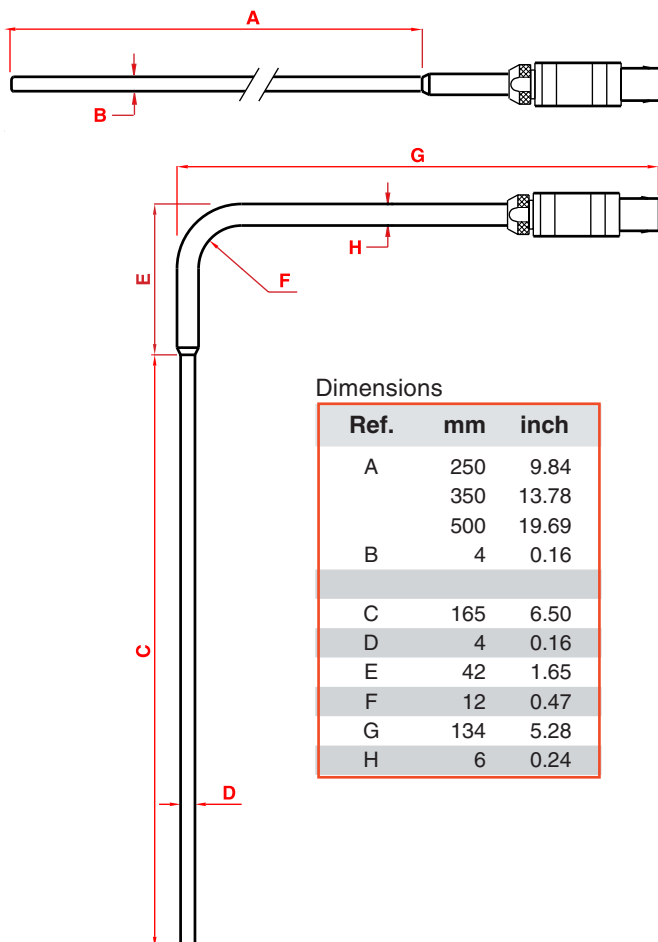
JOFRA STS series
Secondary Temperature Standard

JOFRA industrial temperature reference probes are based on more than 50 years of industrial temperature sensor manufacturing experience. The main requirement of a reference probe is stability: The less the probe drifts, the lower the measurement uncertainty.

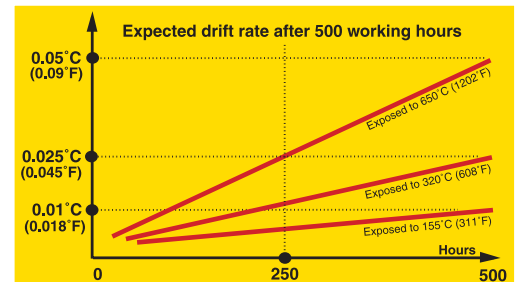
The JOFRA STS100A industrial temperature reference probes are built to last. All JOFRA Secondary Temperature Standard probes are economical and offer fast response times, low immersion depths, compact physical sizes, and specified low drift rates: even at high temperatures. These are all important considerations when selecting a reference probe.

In addition to straight probes, AMETEK offers a 90° angled version specifically developed for use with dry-block temperature calibrators. This probe allows the user to have both the sensor-under-test and the reference probe in the thermowell at the same time: even if the sensors have a connection or a transmitter head.

For more details about the JOFRA STS100 series please see specification sheet: SS-CP-2179



All probes are subjected to a long approval process. This includes mechanical stress reduction of the entire assembly as well as aging the sensor element itself. The purpose of aging the sensor is to remove the initial drift. The procedure involves cycling the sensor to 650°C / 1202°F a number of times and monitoring the drift. Finally all sensors are exposed to maximum temperature for 16 hours and again monitored for drift. To be accepted for final calibration and certification, the probe must meet our minimum tolerance.



Sensing elementPt100
 Temperature range..... -150 to 650°C / -238 to 1202°F
 Hysteresis, stability, repeatability.....0.002°C / 0.0036°F
 Long term stability..... See graph
 Optimum immersion depth.....>= 70 mm / 2.8 in.
 Response time (50%) 8 seconds
 Electrical connection..... LEMO goldplated Cable 4-wire + shield
 Media compatibility Inconel 600
 Protection class (connectors) DIN 40050 IP-50

JOFRA STS100 series		
Sensor	Length	Part number
Pt100	250 mm / 9.8 in.	STS100A250CH
Pt100	350 mm / 13.8 in.	STS100A350CH
Pt100	500 mm / 19.7 in.	STS100A500CH
Pt100	207 mm / 8.1 in.	STS100A901BH

Note: These part numbers include cable with LEMO connection and accredited certificate.

PRESSURE MODULES



**JOFRA APM
Advanced
Pressure
Module**

The APM series of pressure modules offer the flexibility to perform pressure calibrations with the ASC300. The pressure modules are compatible with the JOFRA AMC900 bench top

calibration system and the JOFRA ASC300 handheld multi-function calibrator. Independent of the engineering unit of the module you can change units on the ASC300 (11 different engineering units) at any time.

These rugged modules are engineered for both field and laboratory use. They are ready to use with the JOFRA calibrators and the protocol allows for immediate recognition and use of the module once it is plugged into the calibrator. All calibration data are stored in the modules. You only need to maintain the traceability of the modules - not the indicator, and, you can always add more as your needs change. For use out-of-the-box any where in the world all units are supplied with a 1/4 in. NPT and a BSP female adapter.



APM S series

The JOFRA APM S series are industrial pressure modules with good accuracies. The modules are designed so that the cable is integrated into the module housing, and an overall profile for easy storage of multiple modules.

Resolution: 5 digits (20 to 100 ppm depending on range)
 Dimensions: 60 x 45 x 75 mm / 2.4 x 1.8 x 3 in.
 Weight: 350 g / 0.77 lb.



APM H Series

The JOFRA APM H series are high accuracy laboratory units: 0.01% of F.S. The outstanding performance makes these modules perfect for use as an electronic pressure reference at the top of your calibration hierarchy. These modules are easy to work with and easy to transport.

Resolution: 6 digits (2 to 10 ppm depending on range)
 Dimensions: 99 x 55 x 55 mm / 3.9 x 2.18 x 2.18 in.
 Weight: 450 g / 1 lb.

For more details about the JOFRA APM series see specification sheet: SS-CP-2190

PRESSURE SOURCES

The flexible pressure solution: A JOFRA ASC300 a JOFRA APM pressure module and one of the AMETEK pressure pumps below and you have a complete pressure test and calibration system. If future tasks require other pressure ranges, just complement your system with an extra module and pressure source.



The T-810 / 811 series of small "bicycle" pumps is designed for very economical pressure test solutions. Vacuum to -0.8 bar / -23 inHg or pressure to 15 bar / 200 psi.



The T-730 / 40 / 50 series of rugged pneumatic hand pumps for pressure up to 15 bar / 200 psi or down to -0.8 bar / -23 inHg.



The T-910 pump is an easy-to-use, single-hand operation pneumatic pump featuring both vacuum and pressure generation up to 40 bar / 580 psi.



The T-720 is a small, lightweight, and convenient portable hydraulic pump. Medium is oil. Pressure generation up to 350 bar / 5,000 psi.



The screw pump is designed for very easy tabletop operation and offers exceptional pressure control. Generates up to 350 bar / 5,000 psi. Medium is water or oil.



This hydraulic pump is designed for high pressure oil applications. The small size and weight make it a good rugged portable solution. Pressure up to 700 bar / 10,000 psi.



The type T pump is designed for high pressure applications up to 1000 bar / 15,000 psi with either water, hydraulic oil, or Skydrol as pressure medium. All wetted parts are stainless steel.

JOFRA APM-S pressure modules

Range	Type	psi	bar	Pressure port*2	Reference port*2	Reference accuracy*3	12 month accuracy*4	Part number
10 inH ₂ O*1	Gauge	0.3612	0.0249	DRY	DRY	0.20%	0.30%	APM010WGSG
1 psi*1	Gauge	1.0000	0.0689	DRY	DRY	0.15%	0.30%	APM001PNSG
5 psi*1	Gauge	5.0000	0.3447	DRY	DRY	0.05%	0.10%	APM005PNSG
15 psi*1	Gauge	15.0000	1.0342	DRY	N/A	0.025%	0.05%	APM015PNSG
1 psi	Gauge	1.0000	0.0689	316L SS	DRY	0.075%	0.15%	APM001PGSG
5 psi	Gauge	5.0000	0.3449	316L SS	DRY	0.025%	0.05%	APM005PGSG
15 psi	Gauge	15.0000	1.0342	316L SS	N/A	0.025%	0.05%	APM015PGSG
30 psi	Gauge	30.0000	2.0684	316L SS	N/A	0.025%	0.05%	APM030PGSG
100 psi	Gauge	100.00	6.8948	316L SS	N/A	0.025%	0.05%	APM100PGSG
200 psi	Gauge	200.00	13.790	316L SS	N/A	0.025%	0.05%	APM200PGSG
300 psi	Gauge	300.00	20.684	316L SS	N/A	0.025%	0.05%	APM300PGSG
500 psi	Gauge	500.00	34.486	316L SS	N/A	0.025%	0.05%	APM500PGSG
1000 psi	Gauge	1000.0	68.948	316L SS	N/A	0.025%	0.05%	APM01KPGSG
2000 psi	Gauge	2000.0	137.90	316L SS	N/A	0.025%	0.05%	APM02KPGSG
3000 psi	Gauge	3000.0	206.84	316L SS	N/A	0.025%	0.05%	APM03KPGSG
5000 psi	Gauge	5000.0	344.76	316L SS	N/A	0.025%	0.05%	APM05KPGSG
10000 psi	Gauge	10000	689.48	316L SS	N/A	0.025%	0.05%	APM10KPGSG
7 kPa	Gauge	1.0152	0.0700	316L SS	DRY	0.10%	0.20%	APM007KGSG
35 kPa	Gauge	5.0761	0.3500	316L SS	DRY	0.035%	0.07%	APM035KGSG
70 kPa	Gauge	10.152	0.7000	316L SS	N/A	0.035%	0.07%	APM070KGSG
200 kPa	Gauge	29.006	2.0000	316L SS	N/A	0.025%	0.05%	APM200KGSG
350 kPa	Gauge	50.761	3.5000	316L SS	N/A	0.025%	0.05%	APM350KGSG
10 bar	Gauge	145.03	10.000	316L SS	N/A	0.025%	0.05%	APM010BGSG
21 bar	Gauge	304.56	21.000	316L SS	N/A	0.025%	0.05%	APM021BGSG
60 bar	Gauge	870.18	60.000	316L SS	N/A	0.025%	0.05%	APM060BGSG
160 bar	Gauge	2320.5	160.00	316L SS	N/A	0.025%	0.05%	APM160BGSG
200 bar	Gauge	2900.6	200.00	316L SS	N/A	0.025%	0.05%	APM200BGSG
400 bar	Gauge	5801.2	400.00	316L SS	N/A	0.025%	0.05%	APM400BGSG
700 bar	Gauge	10152	700.00	316L SS	N/A	0.025%	0.05%	APM700BGSG
5 psi	Differential	5.0000	0.3449	316L SS	DRY	0.035%	0.07%	APM005PDSG
100 psi	Differential	100.00	6.8948	316L SS	DRY	0.025%	0.05%	APM100PDSG
5 psi	Absolute	5.0000	0.3448	316L SS	N/A	0.035%	0.07%	APM005PASG
15 psi	Absolute	15.0000	1.0342	316L SS	N/A	0.025%	0.05%	APM015PASG
30 psi	Absolute	30.0000	2.0684	316L SS	N/A	0.025%	0.05%	APM030PASG
7 bar	Absolute	101.52	7.0000	316L SS	N/A	0.025%	0.05%	APM007BASG
±15 psi	Combination	±15.000	±1.0342	316L SS	N/A	0.035%	0.07%	APM015PCSG
-15/200 psi	Combination	-015.00 +200.00	-1.0342 +13.790	316L SS	N/A	0.025%	0.05%	APM200PCSG
-29 inHg	Vacuum	-14.243	-1.0342	316L SS	DRY	0.035%	0.07%	APM029HVSG

Note *1 Non isolated transducer - dry air or non-corrosive gas compatible media only

Note *2 Media compatibility on pressure or reference port side of the module - DRY indicates dry air or non-corrosive gas as compatible media. 316L SS indicates media compatible with type 316 stainless steel

Note *3 Reference uncertainty is expressed as % F.S. and includes only linearity, hysteresis, and repeatability at laboratory conditions.

Note *4 12 month accuracy - expressed as % F.S. Includes linearity, repeatability, hysteresis, and temperature compensation 0 to 50°C / 32 to 122°F.

JOFRA APM-H pressure modules

Range	Type	psi*6	bar*6	Pressure port*2	Reference port*2	6 month Accuracy*5	Part number
15 psi	Gauge	15.0000	1.03427	DRY	DRY	0.010%	APM015PGHG
50 psi	Gauge	50.0000	3.44756	DRY	DRY	0.010%	APM050PGHG
100 psi	Gauge	100.0000	6.89512	DRY	DRY	0.010%	APM100PGHG
500 psi	Gauge	500.0000	34.4756	DRY	DRY	0.010%	APM500PGHG
1000 psi	Gauge	1000.00	68.9513	DRY	DRY	0.010%	APM01KPGHG
15 psi	Absolute	15.0000	1.03427	DRY	N/A	0.010%	APM015PAHG
50 psi	Absolute	50.0000	3.44756	DRY	N/A	0.010%	APM050PAHG
100 psi	Absolute	100.0000	6.89512	DRY	N/A	0.010%	APM100PAHG
500 psi	Absolute	500.0000	34.4756	DRY	N/A	0.010%	APM500PAHG
1000 psi	Absolute	1000.00	68.9513	DRY	N/A	0.010%	APM01KPAHG
3000 psi	Absolute	3000.00	206.854	DRY	N/A	0.010%	APM03KPAHG

Note *5 6 month accuracy - expressed as % F.S. Includes linearity, repeatability, hysteresis, and temperature compensation 15 to 45°C / 59 to 113°F.

Note *6 The resolution is 6 digits from the H module. The ASC300 and the AMC900 read and display the first 5 digits

JOFRA AMC900 ORDERING INFORMATION

Order No.	Description
AMC900	Base model number (1st thru 6th characters) JOFRA AMC900 Benchtop calibrator
	Power supply - (7th thru 9th characters)
115	115 VAC, 50/60 Hz
220	230 VAC, 50/60 Hz
	Mains power cable type (10th character)
A	EUROPEAN, 230 V
B	USA/CANADA, 115 V
C	UK, 240 V
D	SOUTH AFRICA, 220 V
E	ITALY, 220
F	AUSTRALIA, 240 V
G	DENMARK, 230 V
H	SWITZERLAND, 220 V
I	ISRAEL, 230 V
	Certificate (11th character)
G	NIST traceable certificate (standard)
H	Accredited certificate
AMC900115BG	Sample order number JOFRA AMC900 for 115 VAC, NIST traceable certificate.

ACCESSORIES	
Part No.	Description
SPK-AMC-001	LEMO to banana bushings with 1m / 3 ft. cable
SPK-AMC-002	Rack/panel mount kit
SPK-AMC-003	LEMO connector (kit)
SPK-AMC-004	Manual for JOFRA AMC900
121985	Extension cable for Pt100 sensor 5 m
121983	Extension cable for type K 5 m
122523	Extension cable for type N 5 m
124012	Alu-carrying case
120519	Thermocouple male plug - type Cu-Cu (White)
120518	Thermocouple male plug - type R-S (Green)
120517	Thermocouple male plug - type K (Yellow)
120516	Thermocouple male plug - type J (Black)
120515	Thermocouple male plug - type T (Blue)
120514	Thermocouple male plug - type N (Orange)
2206011	Wire adapter - type K
2206012	Wire adapter - type T
104203	Test lead set
105366	RS-232 cable for the AMC900 unit



AMETEK Calibration Instruments offers a complete range of calibration equipment for pressure, temperature, and signal - including software.

Temperature standards
Portable precision thermometer. Dry-block calibrators: 4 series, more than 20 models - featuring speed, portability, accuracy, and advanced documenting functions.

Primary pressure standards
Pneumatic floating-ball or hydraulic piston deadweight testers - easy-to-use with accuracies up to 0.015% of reading.

Electronic pressure standards
Convenient electronic systems ranging from -1 to 700 bar (25 inHg to 10,000 psi) - multiple choices of pressure ranges, pumps, and accuracies, fully temperature-compensated for problem-free and accurate field use.

Signal calibration
Process signal measurement and simulation for easy control loop calibration and measurement tasks - from the small mA loop calibrator to the complete, software supported, modular-based "calibration shop".

...because calibration is a matter of confidence

AMETEK[®]
CALIBRATION INSTRUMENTS
www.ametekcalibration.com
www.jofra.com

AMETEK is a leading global manufacturer of electrical and electromechanical products for niche markets. Listed on the NYSE (AME) since 1930, AMETEK's annual sales exceed \$1 billion. Operations are in North America, Europe and Asia, with about one third of sales to markets outside the United States.

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