

signal

# JOFRA™

### Multi-function signal calibrator

With high accuracy. Ideal for both field and maintenance shop use

### Input and output

RTD: 14 different types, TC: 13 different types, Current 0-24 mA DC, Voltage 0-20 VDC, Frequency 0 to 10 KHz, Pulse train output, Resistance 5 to 4000 Ohm

### Simultaneous read-back

Including isolated read-back from device-under-test of mA, V, and pressure

### Fast RTD simulation

This feature is fast enough to work with all pulsed transmitters

### Calibrate pressure

At varying reference levels using external pressure modules with accuracies up to 0.01% F.S.

### Calibrate temperature

Using JOFRA dry-block calibrators with accuracies up to 0.04°C / 0.07°F

### Full remote control of all functions

With the help of simple ASCII commands

### Complete marine program

Part of a complete program of marine approved temperature, pressure and signal calibrators; including temperature sensors

ISO 9001 Manufacturer

Specification Sheet  
SS-ASC300

## Advanced Signal Calibrator ASC300



The ASC300 is substantial enough to cover all needs for a process signal calibrator with superior accuracy and compact enough to fit into the tool box and operate with one hand for easy field calibration.

The ASC300 can change the entire calibration regimen for signal, pressure, and temperature. It may be combined with the APM external pressure modules or a JOFRA dry-block calibrator to meet any calibration needs.

It combines a full numerical keypad with a series of function keys and a graphical user interface making it easy to perform various tasks in a short period of time. This advanced calibrator employs the latest technology in supporting your calibration needs.

The ASC300 measures and sources: TCs, RTDs, current, voltage, frequency, and pulse trains. This instrument is also designed to be compatible with the JOFRA APM pressure modules and thus offering true multi-function operability. There are two channels of operation providing the user with an isolated read-back circuit. The graphical display makes it easy to recognize the status of the instrument, take readings, and simulate different functions.

**AMETEK®**  
CALIBRATION INSTRUMENTS

## Read-back display

The upper half of the graphical display is dedicated to the read-back signal from the device-under-test. This input section is electrically isolated from the circuitry. You can also read pressure from the JOFRA APM pressure modules in this display section.

## Primary display

This part is used for all input or output combinations. The primary display plus the read-back display gives a full comprehensive and simultaneous input-output functionality and an excellent overview of the test in progress.

## Soft keys

Three navigation keys. Their function is clearly explained in the bottom of the display.

## Backlit display - ON/OFF

Turn the back light on in dark environments.

## Numeric keyboard

A full numeric keyboard gives you the absolute fastest way to reach your desired set values.

## Pressure modules

LEMO connector in the bottom of the instrument to provide easy connection for the entire range of JOFRA APM pressure modules.

## Terminal block

All input and output connectors are placed away from the display and keyboard to give you the maximum freedom to operate the unit.



## “Never get lost” - HOME key

This key sends you immediately back to the main operating display without making any changes to the setup.

## Communication connection

Small stereo jack connector for the serial communication interface.

## Fast stepping keys

Just one push of a button and you can output null (0%) or full span (100%) of your desired range. The 25% button cycles the output in 25% steps up or down each time you push it.



## Simultaneous input and output

The ASC300 offers simultaneous input and output. This means that you can calibrate and adjust a temperature transmitter on the table with no other necessary instruments.

Output the sensor signal and input the mA from the transmitter. If you select mA Loop the ASC300 will also supply the 24 VDC for the loop. In the display you will see both your output temperature and the return mA from the transmitter. Enter the zero and full scale values and you can make quick 25% steps or go direct to zero or full span values. The ASC300 has dedicated keys for this operation so adjustment on the transmitter is made easier.



## Temperature reading at reference level

The ASC300 offers the possibility to characterize an RTD sensor. Use this feature to add a missing special curve or to characterize a reference RTD.

If you choose a reference RTD from the STS100 series of high accurate and stable temperature sensors, they will be delivered with a traceable calibration certificate including the necessary Van Dusen coefficients. Enter the figures into the ASC300 and you have a temperature reference. Complement this with a JOFRA dry-block temperature calibrator and your ASC300 becomes the heart of your portable calibration lab.



## Fuseless protection

*You should avoid connecting the instrument to the mains supply as you may injure yourself!*

If you by mistake connect the ASC300 to the mains supply, the instrument is protected with a fuseless protection feature. This feature protects the instrument on up to 240 VAC on any combination of connections made on the test lead connectors and prevents expensive repairs and recalibration of the instrument.



## Useful soft case (standard)

The ASC300 indicator is supplied in a handy softcase designed for easy vertical operation during the calibration. The soft case have a pocket for the test leads and an opening in the top and bottom provide easy access to the termination block and the pressure module connector. A shoulder strap ensures convenient transportation when climbing ladders, etc. and the handy strap at the back makes it possible to hang the instrument on a pipe, ladder etc, while performing the calibration, test, or service task.

## JOFRACAL CALIBRATION SOFTWARE

JOFRACAL calibration software ensures easy calibration of RTD's, thermocouples, transmitters, thermoswitches, pressure gauges and pressure switches. JOFRACAL can be used with JOFRA DPC-500, HPC, and IPI pressure calibrators, all JOFRA temperature calibrators, as well as AMC900, ASC300 multi signal calibrator and ASM-800 signal multi scanner. When used with ASM-800 signal multi scanner, JOFRACAL can perform a simultaneous semi automatic calibration on up to 24 pressure and/or temperature devices under test in any combination.

JOFRACAL software controls the complete calibration procedure, stores the results and provides a calibration audit trail through hard-copy certificates. All calibration data are stored for each sensor to monitor drift and optimise recalibration intervals. A scheduler feature allows planning of future calibrations.

## REQUIREMENTS JOFRACAL

### Minimum hardware requirements:

- Intel® Pentium® II 1.4 GHz processor.
- 64MB RAM (128MB recommended)
- 80MB free disk space on hard disk (120MB recommended) prior to installation
- Standard VGA (800x600, 256 colours). 1024x768 recommended.
- CD-ROM drive for installation of program
- 1 or 2 free RS-232 serial ports, depending on configuration

### Minimum software requirements:

- Microsoft Windows® 98, Microsoft Windows® NT 4.0, Microsoft Windows® 2000, Microsoft Windows® ME, Microsoft Windows® XP, Vista.
- System fonts: MS Sans Serif and Arial



Set-up with JOFRA ASC300, ITC temperature calibrator and DTI-1000 reference thermometer connected to a PC with JOFRACAL

## JOFRA APM PRESSURE MODULES

The APM series of pressure modules by JOFRA are compatible with the AMC910, ASC300 or HPC calibrators. The APM external pressure modules includes more than 60 models available with gauge, absolute, differential, and vacuum pressure references and in metric and imperial engineering units. The modules are engineered for in-plant, field, or laboratory use. They are ready-to-use with the AMC910 and the protocol allows for immediate recognition and use of the module once plugged into the calibrator.

The ASC300 can read out pressure from the APM series of modules in any of the below mentioned engineering units.



### Engineering units (built-in)

User selectable..... 17 units

(psi, inH2O@4°C, inH2 O@20°C, inH2 O@60°F, inHg@0°C, ftH2 O@4°C, ftH2O@20°C, ftH2O@60°F, bar, mbar, kPa, kg/cm 2, cmH 2O@4°C, cmH2O@20°C, mH2O@4°C, mH2 O@20°C, mmHg@0°C)

## STANDARD DELIVERY

- JOFRA ASC300 instrument
- Battery set (4 x AA)
- Manual
- Set of test leads
- Soft carrying case and shoulder strap
- NIST traceable certificate

## ACCESSORIES

121983	Extension Cable for Type K - 5 m
122523	Extension Cable for Type N - 5 m
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	Thermocouple plug + K wire + alligator
2206012	Thermocouple plug + T wire + alligator
123958	RS232 cable with stereo Jack connector, 2m / 6ft
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for rechargeable batteries - 115/230 VAC
125002	Edgeport Converter with 4 pcs of RS232 ports
65-PT100-LB-CABLE	Cable 2 m (6.6 ft.) with LEMO/ Banana connectors

## Charger for rechargeable batteries (optional) - 124718

The ASC300 indicator use 4 batteries. To save energy and always have loaded batteries, it is possible to buy a battery charger.



## SPECIFICATIONS

### Temperature stability - unless other specified

Operating temperature..... -10 to 50°C / 14 to 122°F  
 Storage temperature.....-20 to 70°C / -4 to 158°F  
 All specifications specified  
 at ambient temperature:..... 23°C ±5°C / 73°F ±9°F  
 Outside ambient 23°C ±5°C .....±0.005% rdg/°C  
 Outside ambient 73°F ±9°F..... ±0.0028% rdg/°F

### Power specifications

Batteries ..... 4 x AA batteries  
 ..... Re-chargeable battery pack optional  
 Low battery warning..... Yes

### RS232 communication interface

Connector: ..... Stereo jack  
 Communication rate.....9600 baud, ASCII  
 Electrical interface ..... ±5 V non isolated

### Physical specifications

Instrument LxHxW..... 235x53x95 mm / 9.3x2.1x3.7 in  
 Weight inclusive batteries .....510 g / 1.1 lb  
 Instr. in soft case LxHxW 250x95x110 mm / 9.8x3.7x4.3 in  
 Weight incl. test leads and shoulder strap ....950 g / 2.1 lb  
 Shipping cargo box size LxHxW..... 285x110x160 mm  
 ..... 11.2x4.3x6.3 in  
 Shipping weight .....1300 g / 2.9 lb

### Miscellaneous

CE - EMC .. EN50082-1: 1992 and EN55022: 1994 Class B  
 Safety: ..... CSA C22.2 No. 1010.1: 1992  
 The ASC-300 is type approved by Det Norske Veritas.  
 Find the certificate at [www.jofra.com](http://www.jofra.com)  
 Approval, Certificate no. ....A-10549



## SPECIFICATIONS

Thermocouple	Range		Accuracy ±
	min	max	12 months
mV			
TC mV read	-10.000 mV	75.000 mV	0.02% rdg +10µV
TC mV source	-10.000 mV	75.000 mV	0.02% rdg +10µV

Maximum current output is 1 mA with an output impedans of <= 1 ohm.

Thermocouple	Range		Accuracy ±
	min	max	12 months
Cold junction			
CJC compensation	18°C 64°F	28°C 83°F	0.2°C 0.36°F
CJC outside above			0.05°C/°C 0.05°F/°F

Volt V	Range		Accuracy ±
	min	max	12 months
Read (Isolated)	0.000 V	30.000 V	0.015% rdg +2mV
Read (non-isolated)	0.000 V	20.000 V	0.015% rdg +2mV
Source	0.000 V	20.000 V	0.015% rdg +2mV

Maximum current output in voltage ranges is 1 mA with an output imped-  
ance of <= 1 ohm

Frequency	Range		Accuracy ±
	min	max	12 months
Pulse			
CPM read	2.0	600.0	0.05% rdg +0.1CPM
Hz read	1.0	1000.0	0.05% rdg +0.1Hz
KHz read	1.00	10.00	0.05% rdg +0.01KHz
CPM source	2.0	600.0	0.05%
Hz source	1.0	1000.0	0.05%
KHz source	1.0	10.0	0.125%
Pulse (source only) Rate: 2CPM to 10KHz	1	30000	

Input voltage amplitude range on frequency is 1 to 20 V zero based square  
wave only.

Output amplitude is adjustable from 1 to 20 V and is a square wave with a  
50% duty cycle.

For output frequency, a slight negative offset of approximately -0.1 V is  
present to assure zero crossing.

Ohm	Range		Accuracy ±
	min	max	12 months
Ohm read (low)	0.00	400.00	0.025% rdg +0.05 ohm
Ohm read (high)	0.00	4000.0	0.025% rdg +0.5 ohm
Ohm source (low) @ 0.1 to 0.5 mA	5.0	400.0	0.025% rdg +0.1 ohm
@ 0.5 to 3 mA	5.0	400.0	0.025% rdg +0.05 ohm
Ohm source (high) @ 0.05 to 0.8 mA	400	1500	0.025% rdg +0.5 ohm
@ 0.05 to 0.4 mA	1500	4000	0.025% rdg +0.5 ohm

Unit is compatible with pulsing transmitters.  
Pulse response is <= 5 mSec.

## Thermocouple - TC

TC types ..... B C E J K L N R S T U BP XK  
Cold junction compensation ON/OFF control ..... Yes

TC Type	Temperature range				12 month accuracy	
	°C		°F		°C	°F
	From	To	From	To		
B	600	800	1112	1472	1.4	2.52
	800	1000	1472	1832	1.5	2.7
	1000	1820	1832	3308	1.7	3.06
C	0	1000	32	1832	0.8	1.44
	1000	2316	1832	4200	2.5	4.5
E	-250	-100	-482	-148	0.8	1.44
	-100	1000	-148	1832	0.4	0.72
J	-210	0	-346	-32	0.6	1.08
	0	800	32	1472	0.4	0.72
	800	1200	1472	2192	0.5	0.9
K	-200	0	-328	32	0.8	1.44
	0	1000	32	1832	0.5	0.9
	1000	1372	1832	2502	0.7	1.26
L	-200	0	-328	32	0.45	0.81
	0	900	32	1652	0.4	0.72
R	0	1767	32	3213	1.4	2.52
S	0	1767	32	3213	1.4	2.52
T	-250	0	-328	32	0.8	1.44
	0	400	32	752	0.4	0.72
U	-200	0	-328	32	0.7	1.26
	0	600	32	752	0.45	0.81
XK	-200	800	-328	1472	0.4	0.72
BP	0	800	32	1472	1.1	1.98
	800	2500	1472	4532	2.5	4.5

Does not include thermocouple wire error and CJC.



## Resistance - RTD

RTD types..... Pt10 Pt25 Pt50 Pt100 Pt200 Pt500 Pt1000  
 ..... Cu10 Cu50 Cu100 Ni120 YSI400  
 Response time ..... Less than 5 mSec.  
 Connection ..... 2, 3 and 4-wire

4-wire RTD Type	Temperature range				12 months accuracy	
	°C		°F		°C	°F
	From	To	From	To		
<b>Pt10</b>	-200	100	-328	212	1.4	2.5
alpha 385	100	300	212	572	1.6	2.9
	300	600	572	600	1.8	3.2
	600	800	1112	800	2.0	3.6
<b>Pt50</b>	-200	100	-328	212	0.4	0.72
alpha 385	100	300	212	572	0.5	0.90
	300	600	572	1112	0.6	1.08
	600	800	1112	1472	0.7	1.26
<b>Pt100</b>	-200	-80	-328	212	0.2	0.36
alpha 385	100	155	212	572	0.3	0.54
	300	600	572	1112	0.4	0.72
	600	800	1112	1472	0.5	0.90
<b>Pt200</b>	-200	100	-328	212	0.2	0.36
alpha 3926	100	300	212	572	0.3	0.54
	300	630	572	1166	0.4	0.72
<b>Pt100</b>	-200	100	-328	212	0.2	0.36
alpha 3916	100	300	212	572	0.3	0.54
	300	630	572	1166	0.4	0.72
<b>Pt200</b>	-200	100	-328	212	0.8	1.44
alpha 385	100	300	212	572	0.9	1.62
	300	630	572	1166	1.0	1.80
<b>Pt500</b>	-200	100	-328	212	0.4	0.72
alpha 385	100	300	212	572	0.5	0.90
	300	630	572	1166	0.6	1.08
<b>Pt1000</b>	-200	100	-328	212	0.2	0.36
alpha 385	100	300	212	572	0.3	0.54
	300	630	572	1166	0.4	0.72
<b>Cu10</b>	-80	260	-112	500	1.4	2.52
<b>Cu50</b>	-180	200	-292	392	0.4	0.72
<b>Cu100</b>	-100	200	-148	392	0.3	0.54
<b>Ni120</b>	-80	260	-112	500	0.2	0.36
<b>YSI400</b>	15	50	59	122	0.1	0.18

Read accuracy is based on 4 wire input.

For 3-wire input add  $\pm 0.005$  ohm assuming all three RTD leads are matched.

## Current - mA and loop

Range mA..... 0 to 24 (-25% to 125%)  
 Loop power for transmitters ..... Yes, 24 VDC  
 Isolated input..... Yes

Current mA	Range		Accuracy $\pm$
	min	max	12 months
Read (Isolated)	0.000 mA	30.000 mA	0.015% rdg +2 $\mu$ V
Read (non-isolated)	0.000 mA	20.000 mA	0.015% rdg +2 $\mu$ V
Source	0.000 mA	20.000 mA	0.015% rdg +2 $\mu$ V

Max. load on mA source is 1000 ohms  
 Voltage input range on simulation mode is 5 to 30 V



## ORDERING INFORMATION - ASC300

Order No.	Description
	<b>Base model number</b>
ASC300	Handheld calibrator
	<b>Certificate</b>
G	NIST traceable certificate (standard)
H	Accredited certificate (optional)
	<b>Sample order number</b>
ASC300G	JOFRA ASC300 with standard NIST traceable certificate.



### AMETEK Calibration Instruments

is one of the world's leading manufacturers and developers of calibration instruments for temperature, pressure and process signals as well as for temperature sensors both from a commercial and a technological point of view.

### JOFRA Temperature Instruments

Portable precision thermometers. Dry-block and liquid bath calibrators: 5 series, with more than 25 models and temperature ranges from -90° to 1205°C / -130° to 2200°F. All featuring speed, portability, accuracy and advanced documenting functions with JOFRACAL calibration software.

### JOFRA Pressure Instruments

Convenient electronic systems ranging from -25 mbar to 1000 bar (0.4 to 15,000 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

### JOFRA Signal Instruments

Process signal measurement and simulation for easy control loop calibration and measurement tasks - from handheld field instruments to laboratory reference level bench top instruments.

### JOFRA / JF Marine Instruments

A complete range of calibration equipment for temperature, pressure and signal, approved for marine use.

### FP Temperature Sensors

A complete range of temperature sensors for industrial and marine use.

### M&G Pressure Testers

Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

### M&G Pumps

Pressure generators from small pneumatic "bicycle" style pumps to hydraulic pumps generating up to 1,000 bar (15,000 psi).

*...because calibration is  
a matter of confidence*

**AMETEK®**  
CALIBRATION INSTRUMENTS

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