signal

JOFRA® calibration

Advanced Signal Calibrator

ASC301

» Multi-function signal calibrator
Robust custom housing, Ideal for both field and work-shop use. The process engineers best tool

» High accuracy
ASC301 accuracy is designed to meet high demands from modern sensors and transmitters

» 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 out-put, 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 pulsed transmitters and PLC´s

» Calibrate pressure
Full featured pressure calibrator, just apply a JOFRA APM, and benefit from, semi automatic leak-test, pressure-switch calibration and more…

» Calibrate temperature
Use the ASC301 together with JOFRA temperature calibrators, add measurement channels for sensors or temperature switches

» Measure temperature
ASC301 can be used as high accuracy thermometer, ASC301 works with RTD´s and CvD equations, to obtain true temperature

» Optimal read out visability
Large ClearBrite™ display

JOFRA ASC301 a portable process signal calibrator that provides the functionality and accuracy you expect from a laboratory calibration system, but compact enough to fit into the tool box and be operated with one hand for easy field calibration.

The ASC301 is more than a signal calibrator. Combined with JOFRA's APM external pressure modules or a JOFRA dry-block calibrator, it will calibrate pressure and temperature, and used together with JOFRACAL even document it as well. For Workshop use a DC power supply is available.

The full numerical keypad with a series of function keys and the cursor keys, provide a simple and quick user interface. The new ClearBrite™ graphical display offer the best visibility.

The high accuracy of ASC301 has not been achieved on account of fragile measurements or source circuitries, the ASC301 has fuse less protection all the way up to 250 VAC – might save you a calibrator, lowers cost of ownership.

ISO 9001 Manufacturer

Specification Sheet
SS-ASC301

AMETEK®
TEST & 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 funtionality and an excellent overview of the test in progress.

Menu keys

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

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.

We call it the wire-less keybord…

Cursor keys

Incremet / decremet outputs, Set step & ramp range.

Numeric keyboard

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

Simultaneous input and output

The ASC301 offers simutaneous input and output. This means that you can calibrate and adjust a temperature transmitter on the table with no other necessary instruments.

Source the sensor signal loop and input the mA from the transmitter. If you select mA Loop the ASC301 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 10% or 25% steps or go direct to zero or full span values. The ASC301 has dedicated keys for this operation so adjustment on the transmitter is made easier.

Temperature reading at reference level

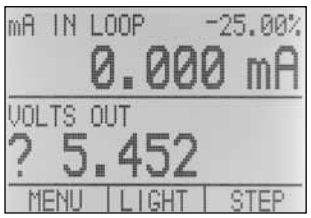
The ASC301 offers the possibility to charaterize an RTD sensor. Use this feature to add a missing special curve or to characterize a reference RTD.

If you choose a reference RTD from the accurate and stable STS100 temperature sensors, they will be delivered with a traceable calibration certificate including the neccessary Van Dusen coefficients. Enter the figures into the ASC301 and you have a temperature reference. Complement this with a JOFRA dry-block temperature calibrator and your ASC301 becomes the heart of your portable calibration lab.

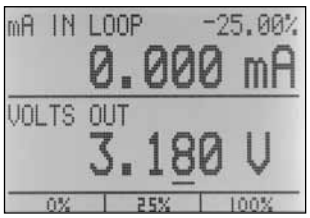
Fuseless protection

If you by mistake connect the ASC301 to the mains supply, the instrument is protected with a fuseless protection feature. This feature protects the instrument on up to 250 VAC on any combination of connections made on the test lead connectors and prevents expensive repairs and recalibration of the instrument.

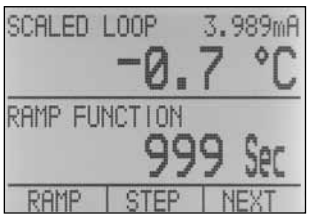
To avoid injury never connect the instrument to the mains supply!



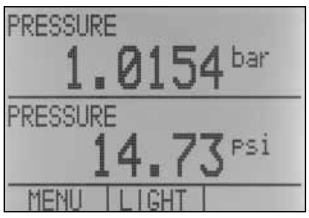
Direct input, full numeric keypad. Easy output entry of specific values



Easy single digit adjustment, by cursor keys. Ideal for gauges and tweaking tasks



User adjustable ramp and step time. Very wide range, from 5 to 999 seconds



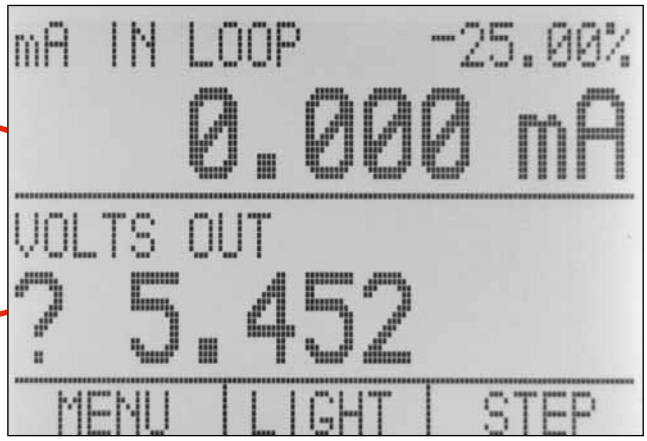
Dual pressure display measurements, enable eay pressure conversion

mA IN
mA LOOP
VOLTS IN
PRESSURE
SCALING
% ERROR
SWITCH TEST

Isolated read back channel

mA IN
mA OUT
mA simulation / sink
VOLTS IN
VOLTS OUT
TC IN CJC ON/OFF
TC OUT CJC ON/OFF
RTD IN 2, 3, 4 wire
RTD OUT
FREQ IN
FREQ OUT
POULSE OUT
PRESSURE

Primary channel

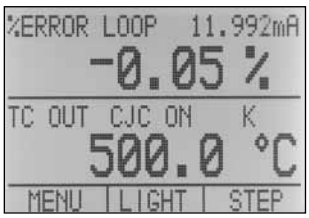


Useful soft case (optional)

ASC301 can be delivered with a padded soft case as an option. The spacey soft case is designed for protection during transport. The soft case has separate compartments for ASC301 (w/Velcro strap), test leads, test hoses, temperature probe, and JOFRA APM pressure module. A shoulder strap ensures convenient transportation when climbing ladders, etc. The manual and calibration documents fit into a pocket on the front of the soft case.

Charger for rechargeable batteries (optional)

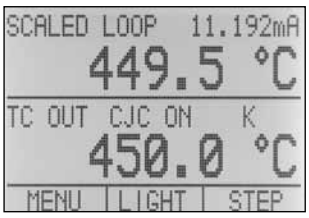
The ASC301 indicator use 4 batteries. To save energy and always have loaded battteries, it is possible to buy a batteri charger.



Online % error calculation, fast and responsive reading, for calibration and adjustment tasks

Automatic leak test, adjustable timer and automatic calculation to leak rate / minute

Quasi automatic pressure switch test, records automatically, open, close and deadband values



Online scaling, get the difference in the actual unit, saves calculation time and potential errors in the field

JOFRACAL CALIBRATION SOFTWARE

JOFRACAL calibration software ensures easy calibration of RTD´s, thermocouples, transmitters, thermoswithes, pressure gauges and pressure switches. JOFRACAL can be used with all JOFRA calibration instruments. 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.

OPTION T - Temperature Sensor

- Option T, temperature sensor, -40 to 155°C (-40 to 311°F)
- Delivered with international traceable calibration certificate and CvD coefficients, ready to enter into any JOFRA ASC
- Sensor dimensions ø 4 x 200 mm + handle
- Calibration points, -40/-20/0/50/100/155°C (-40/-4/32/122/212/311°F)
- Calibration accuracy ± 0.030°C (0.054°F)

STANDARD DELIVERY

- JOFRA ASC301 instrument
- Battery set (4 x AA)
- Manual
- Set of test leads
- Handy soft case, with pocket for the test leads and an opening in the top to provide easy access to the test terminals
- NIST traceable certificate

JOFRA APM PRESSURE MODULES

When used with pressure modules the ASC301 becomes a true pressure calibrator with features such as; leak test, switch test, scaling and online % error calculations.

The APM series of pressure modules by JOFRA are compatible with the AMC900, AMC910, ASC300, ASC301 or HPC500, HPC502 or HPC600 calibrators. The APM external pressure modules includes more than 24 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 immediate recognition and use of the module once plugged into the calibrator.

17 built-in engineering 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)

SPECIFICATIONS

Ambient temperature specifications

Operating temperature ..... -10 to 50°C / 14 to 122°F
Storage temperature ..... -20 to 60°C / -4 to 140°F
All specifications specified
at ambient temperature: ..... 23°C ±5°C / 73°F ±9°F
Outside ambient 23°C ±5°C ..... ±0.003% rdg/°C
Outside ambient 73°F ±9°F ..... ±0.0017% rdg/°F

Power specifications

Batteries ..... 4 x AA batteries
Mains adapter ..... 9VDC/200mA - 230VAC/115VAC
Low battery warning ..... Yes

RS232 communication interface

Connector: ..... 3.5 mm jack
Communication rate ..... 9600 baud, ASCII

Physical specifications (LxHxW)

Instrument ..... 235x53x95 mm / 9.3x2.1x3.7 in
Weight inclusive batteries ..... 590 g / 21 oz
Instr. in soft case ..... 250x95x110 mm / 9.8x3.7x4.3 in
Weight incl. test leads & shoulder strap .... 1030 g / 360 oz
Shipping cargo box size ..... 285x110x160 mm
..... 11.2x4.3x6.3 in
Shipping weight ..... 1380 g / 38 oz

Miscellaneous

CE - EMC .. EN50082-1: 1992 and EN55022: 1994 Class B
Safety: ..... CSA C22.2 No. 1010.1: 1992

SPECIFICATIONS

Thermocouple mV	Range min	Range max	Accuracy ± 12 months
TC mV read	-10.000 mV	75.000 mV	0.015% rdg +10µV
TC mV source	-10.000 mV	75.000 mV	0.015% rdg +10µV

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

Thermocouple Cold junction	Range min	Range max	Accuracy ± 12 months
CJC compensation	18°C 64°F	28°C 83°F	0.2°C 0.36°F
CJC outside above			0.05°C/°C 0.03°F/°F

Volt V	Range min	Range max	Accuracy ± 12 months
Read (Isolated)	0.000 V	30.000 V	0.01% rdg +2mV
Read (non-isolated)	0.000 V	20.000 V	0.01% rdg +2mV
Source	0.000 V	20.000 V	0.01% rdg +2mV

Maximum current output in voltage ranges is 3 mA with an output impedance of <= 1 ohm

Frequency Pulse	Range min	Range max	Accuracy ± 12 months
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% rdg
Hz source	1.0	1000.0	0.05% rdg
KHz source	1.0	10.0	0.125% rdg
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 min	Range max	Accuracy ± 12 months
Ohm read (low)	0.00	400.00	0.015% rdg +0.03 ohm
Ohm read (high)	401.0	4000.0	0.015% rdg +0.3 ohm
Ohm source (low)			
@ 0.1 to 0.5 mA	5.0	400.0	0.015% rdg +0.1 ohm
@ 0.5 to 3 mA	5.0	400.0	0.015% rdg +0.03 ohm
Ohm source (high)			
@ 0.05 to 0.8 mA	400	1500	0.015% rdg +0.3 ohm
@ 0.05 to 0.4 mA	1500	4000	0.015% rdg +0.3 ohm

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

Thermocouple - TC

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

TC Type	Temperature range °C From	°C To	°F From	°F To	12 month accuracy °C	°F
J	-210	-150	-346	-238	0.4	0.8
	-150	1200	238	2192	0.2	0.4
K	-200	-100	-328	-148	0.5	0.9
	-100	600	-148	1112	0.2	0.4
	600	1000	1112	1832	0.3	0.6
	1000	1372	1832	2501	0.4	0.8
T	-250	-200	-418	-328	1.5	1.7
	-200	0	-328	32	0.5	0.9
	0	400	32	752	0.2	0.4
E	-250	-200	-418	-328	1.0	1.8
	-200	-100	-328	-148	0.3	0.6
	-100	1000	-148	1832	0.2	0.4
R	0	200	32	392	1.7	3.1
	200	1767	392	3212	1.0	1.8
S	0	200	32	392	1.7	3.1
	200	1767	392	3212	1.1	2.0
B	600	800	1112	1472	1.5	2.7
	800	1000	1472	1832	1.2	2.2
	1000	1820	1832	3308	1.0	1.8
C	0	1000	32	1832	0.5	0.9
	1000	2316	1832	4200	1.5	2.7
XK	-200	800	-328	1472	0.2	0.4
BP	0	800	32	1472	1.9	3.5
	800	2500	1472	4532	0.6	1.1
L	-200	900	-328	1652	0.2	0.4
U	-200	0	-328	32	0.4	0.8
	0	600	32	1112	0.2	0.4
N	-200	-100	-328	-148	0.8	1.5
	-100	1300	-148	2372	0.3	0.6

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		
P10(90)385	-200	100	-328	212	0.85	1.53
	100	400	328	752	1.00	1.80
	400	800	752	1472	1.20	2.16
P50(90)385	-200	100	-328	212	0.20	0.32
	100	400	212	752	0.30	0.54
	400	800	752	1472	0.40	0.72
P100(90)385	-200	100	-328	212	0.15	0.27
	100	400	212	752	0.20	0.36
	400	800	752	1472	0.30	0.54
P200(90)385	-200	100	-328	212	0.40	0.72
	100	630	212	1166	0.50	0.90
P400(90)385	-200	100	-328	212	0.20	0.36
	100	630	212	1166	0.25	0.45
P500(90)385	-200	100	-328	212	0.20	0.36
	100	630	212	1166	0.30	0.54
P1K(90)385	-200	100	-328	212	0.15	0.27
	100	630	212	1166	0.20	0.36
P50(90)391	-200	100	-328	212	0.20	0.36
	100	400	212	752	0.30	0.54
	400	800	752	1472	0.40	0.72
P100(90)391	-200	100	-328	212	0.15	0.27
	100	400	212	752	0.20	0.36
	400	800	752	1472	0.30	0.54
P100(90)392	-200	100	-328	212	0.10	0.18
	100	630	212	1166	0.20	0.36
M10(90)427	-100	260	-148	500	0.75	1.35
M50(90)428	-180	200	-292	392	0.15	0.27
M100(90)428	-180	200	-292	392	0.10	0.18
H120(90)672	-80	260	-112	500	0.10	0.18
P100(90)JIS	-200	100	-328	212	0.10	0.18
	100	630	212	1166	0.20	0.36
YSI(90)400	15	50	59	122	0.10	0.18

Read accuracy is based on 4 wire input.
Source accuracy in terminals 2 wire source.

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 ±
	min	max	12 months
Read (Isolated)	0.000 mA	24.000 mA	0.010% rdg +2µA
Read (non-isolated)	0.000 mA	24.000 mA	0.010% rdg +2µA
Source	0.000 mA	24.000 mA	0.010% rdg +2µA

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

APM Mk.II Type	Pressure range				12 month accuracy	
	Bar		PSI		%rdg	%FS
	From	To	From	To		
Differential						
025MD	-0.025	0.025	-0.4	0.4	-	0.100%
075MD	-0.070	0.07	-1	1	-	0.050%
350MD	-0.350	0.35	-5	5	-	0.050%
Compound						
001C	-0.960	1	-14	15	0.025%	0.010%
002C	-0.960	2	-14	30	0.025%	0.010%
007C*	-0.820	7	-12	100	0.025%	0.010%
020C*	-0.820	20	-12	300	0.025%	0.010%
035C*	-0.820	35	-12	500	0.025%	0.010%
Gauge						
001G*	0	1	0	15	0.025%	0.010%
002G*	0	2	0	30	0.025%	0.010%
007G*	0	7	0	100	0.025%	0.010%
020G*	0	20	0	300	0.025%	0.010%
035G*	0	35	0	500	0.025%	0.010%
070G*	0	70	0	1000	0.025%	0.010%
100G*	0	100	0	1500	0.025%	0.010%
200G*	0	200	0	3000	0.025%	0.010%
350G*	0	350	0	5000	0.025%	0.010%
400G*	0	400	0	6000	0.025%	0.010%
700G*	0	700	0	10000	0.025%	0.015%
Absolute						
001A*	0.020	1.1	0.4	16	0.025%	0.010%
003A*	0.020	3.5	0.4	50	0.025%	0.010%
007A*	0.020	7	0.4	100	0.025%	0.010%
020A*	0.020	20	0.4	300	0.025%	0.010%

* Stainless steel isolated pressure sensor

Specified temperature range 23°C ± 5°C / 73°F ± 9°F

F.S. (full scale) is the numerical value of the positive pressure range.
Accuracy includes hysteresis, nonlinearity, repeatability and reference standard uncertainty, 1 Year typical long-term stability, operated inside the rated temperature span and pressure range.
Requiring frequently zeroing (Gauge/diff.) or entering of reference pressure (Absolute).

ORDERING INFORMATION - ASC301

Order No.			Description
			Base model number
ASC301			Multi-function Signal Calibrator
			Certificate
	G		NIST traceable certificate (standard)
	H		Accredited certificate (optional)
			Accessories (Optional)
		A	External Power Supply
		B	Rechargeable Battery Pack
		C	Softcase with shoulder strap
		T	Temperature Sensor Pt100 incl. traceable certificate
			Sample order number
ASC301	G	C	JOFRA ASC301 with NIST traceable certificate and softcase

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
124720 Mains adapter 9VDC/200mA - 230VAC/115VAC
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

AMETEK Test & Calibration Instruments
A business unit of AMETEK Measurement & Calibration Technologies Division offering the following industry leading brands for test and calibration instrumentation.

JOFRA Calibration Instruments
Temperature Calibrators
Portable dry-block calibrators, precision thermometers and liquid baths. Temperature ranges from -90°C(-130°F) to 1205°C(2200°F). Temperature sensors for industrial and marine use.
Pressure Calibrators
Convenient electronic systems ranging from -25 mbar to 1000 bar - fully temperature-compensated for problem-free and accurate field use.
Signal Instruments
Process signal measurement and simulation for easy control loop calibration and measurement tasks.

M&G Pressure Testers & Pumps
Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading. Pressure generators delivering up to 1,000 bar.

Lloyd Instruments
Materials testing machines and software from Lloyd Instruments guarantees expert materials testing solutions. The comprehensive program also covers Texture Analysers to perform rapid, general food testing and detailed texture analysis on a diverse range of foods and cosmetics.

Davenport Polymer Test Equipment
Allows measurement and characterization of moisture-sensitive PET polymers and polymer density.

Chatillon Force Measurement
The hand held force gauges and motorized testers have earned their reputation for quality, reliability and accuracy and they represent the de facto standard for force measurement.

Newage Testing Instruments
Hardness testers, durometers, optical systems and software for data acquisition and analysis.

AMETEK®
TEST & CALIBRATION INSTRUMENTS

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