

CLEAR VISION

SOUND STRATEGIES

SOLID PERFORMANCE



JOFRA ASC-400

Advanced Signal Calibrator

February 2015, by Poul Madsen

Agenda

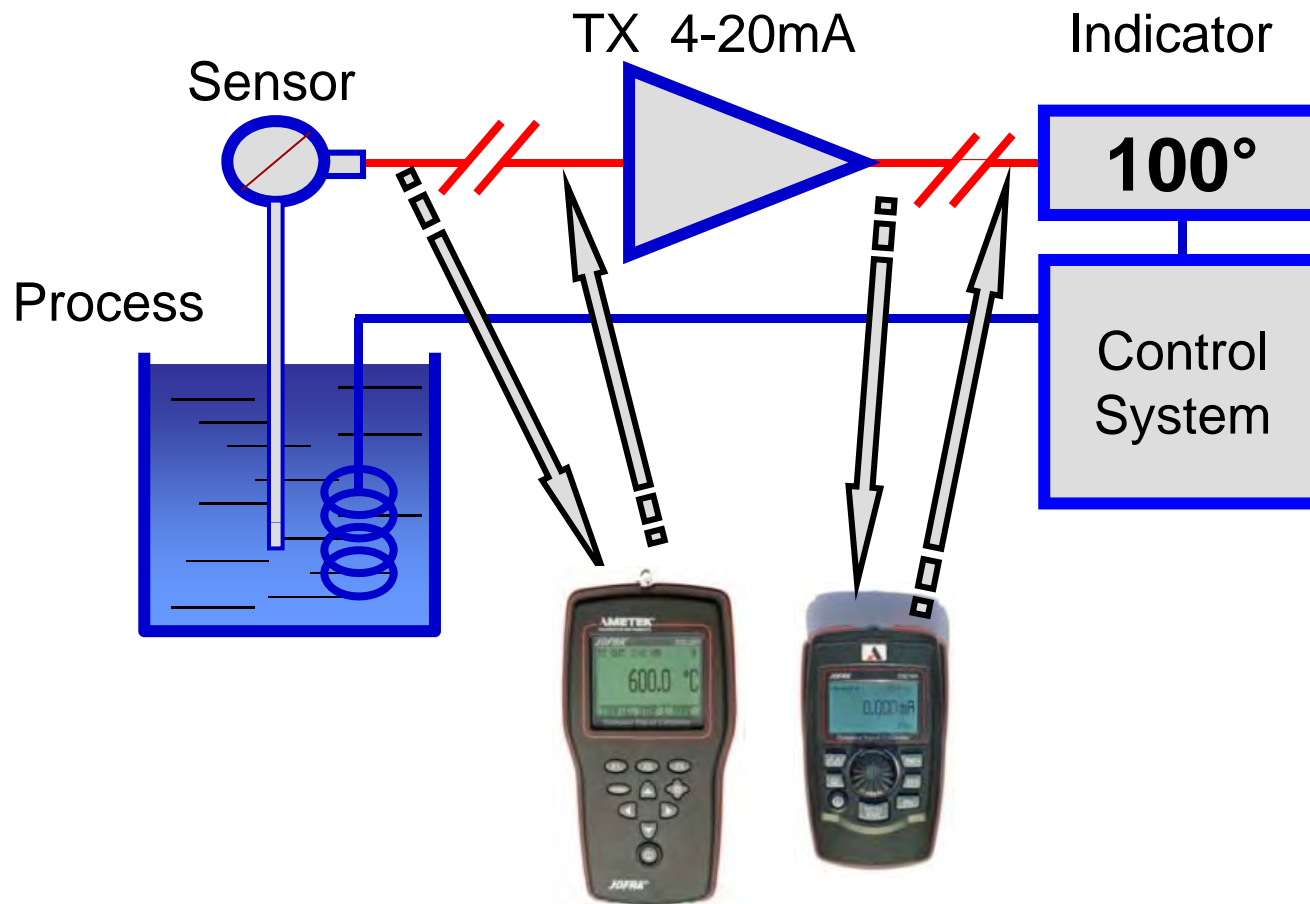
- JOFRA signal calibrators
- Single Vs. multifunction calibrator
- JOFRA ASC-400 calibrator
- Applications
- The competition
- Questions

JOFRA Signal Calibrators



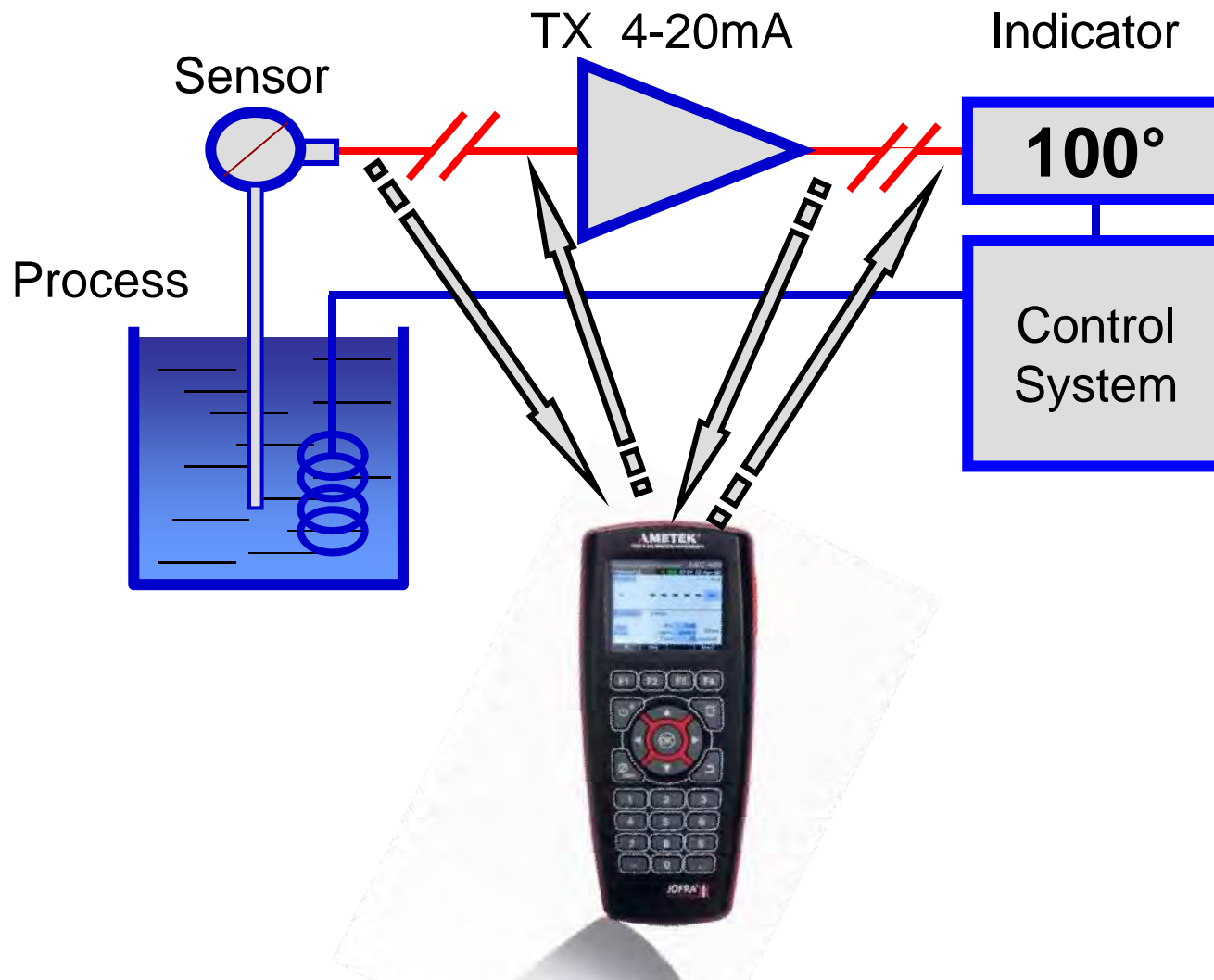
Signal calibration

(single function calibrators)



Signal calibration

(Multi function calibrator)



Multifunction...



What's in ASC-400...



mA Loop Calibrator



Pressure Indicator -w/APM



Barometer (option)



Voltage Calibrator



TC / mV Calibrator



Calculator



Frequency Calibrator



RTD / Ω Calibrator



Switch Tester



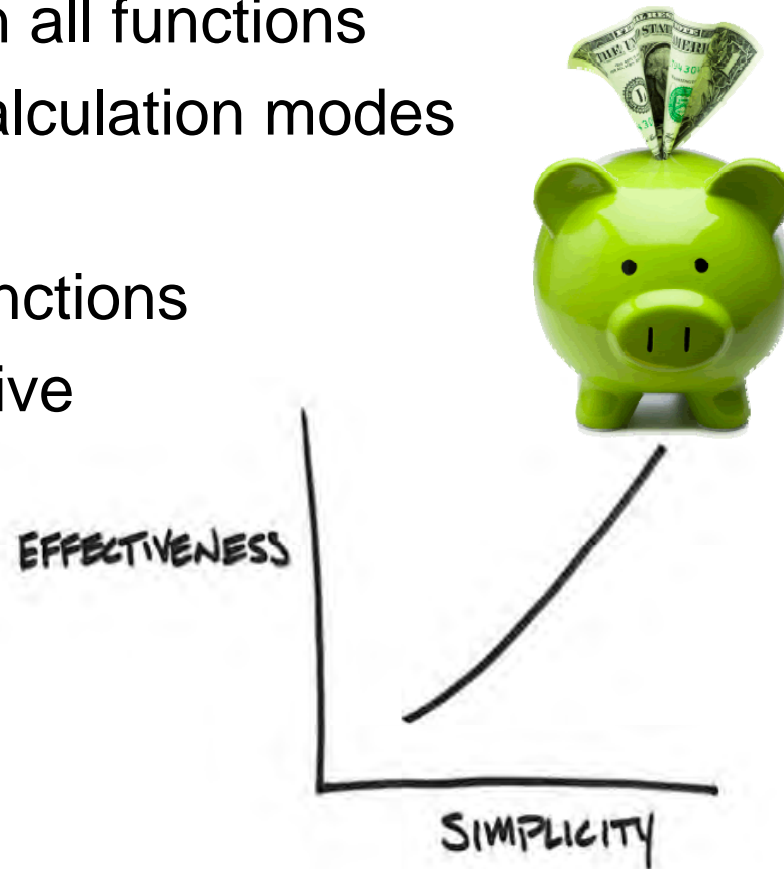
Pulse Generator



Loop Supply

Why Multifunction?

- Ease of use...
 - only one user interface to become familiar with
- Consistent high accuracy, on all functions
- Faster set-up, time saving calculation modes
- No “forgotten” calibrators...
- Error reducing calculation functions
- Investment, more cost effective
- Calibration costs
- Size & weight



Target groups

**Calibration
laboratories**

Maintain calibration instruments and very critical sensors within the company

**Critical
process
control**

Process control is essential to manufacturing and quality systems related to the the product

**Service
&
Test
applications**

All equipment needs to be checked but not necessarily calibrated and documented

Applications

The points below would include a combination of calibration and repair/fault location – **do not forget the “tools” potential.**

- Process controllers, Temperature / Pressure controllers
- Recorders, data loggers, data acquisition systems
- Sensor installation / debugging
- Engine control and regulation systems
- Safety systems, boilers etc.
- Signal converters and transmission systems



Customers?

- Chemical industry
- Utilities, Gas, Water
- Plastic & Rubber
- Pulp & Paper
- Power plants
- On-site calibration
- Wind turbine service
- Sensor manufactures
- Hydraulics service
- Controller manufactures
- Panel builders
- Pharmaceuticals
- Food industry
- Service suppliers
- Control system builders
- Educational institutions
- Gauge manufactures
- Engine manufactures
- Valve manufactures
- Marine installation/service

JOFRA ASC-400 layout



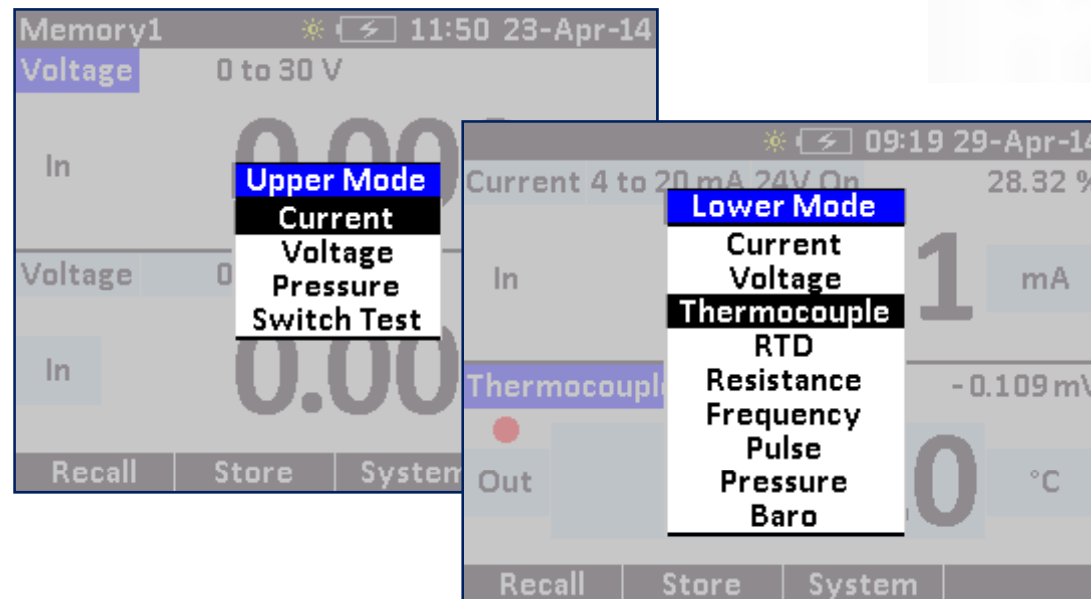
A better view...

- Crisp full **color** display.
- Setting new standards for ease of use!



Advanced Simplicity...

- Completely unique user interface.
- Single layer “menu free” user interface.
- Unmatched simplicity!
- Unique “pick and choose” interface



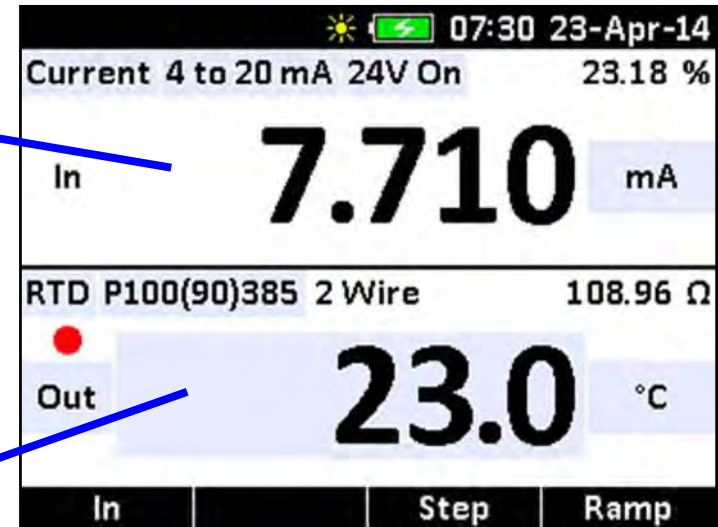
ASC-400 - two separate channels

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

Isolated read back
channel

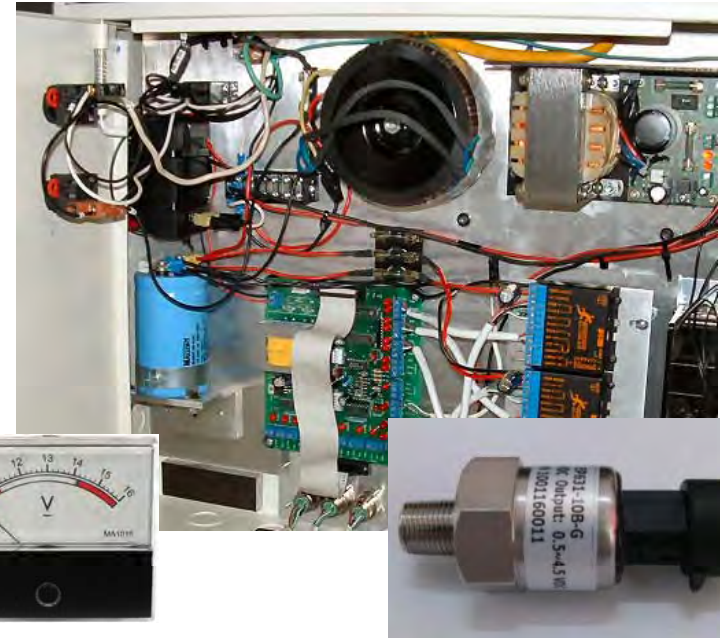
mA IN
mA OUT
mA simulation / sink
VOLTS IN
VOLTS OUT
TC IN CJC ON/OFF
TC OUT CJC ON/OFF
RTD IN 2, 3, 4 wire
RTD OUT
FREQ IN
FREQ OUT
PULSE OUT
PRESSURE / BAROMETER

Primary
Channel

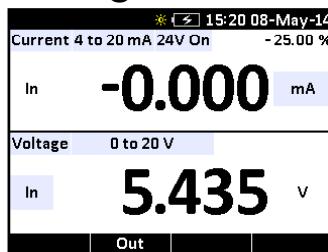


ASC-400 voltage capabilities

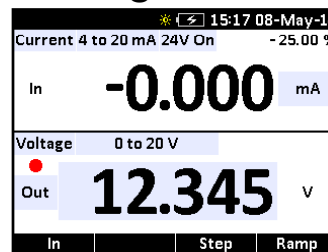
- Upper channel, measure isolated
- Lower channel, measure & source
- ✓ General VDC measurement and source
- ✓ Measure loop- and supply voltages
- ✓ Measure, calibrate, & simulate sensors with voltage out/input



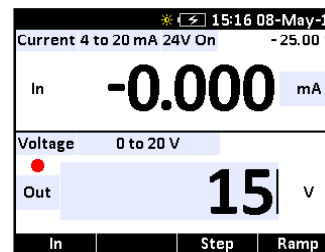
Voltage in



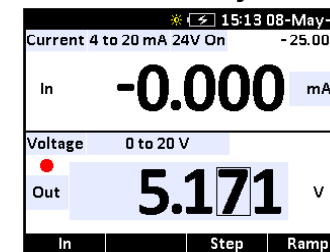
Voltage out



Direct key



Cursor adj.



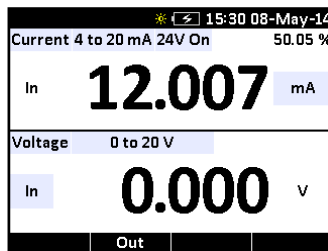
ASC-400 current capabilities

- Upper channel, measure isolated, switchable 24 V supply
- Lower channel, measure & source, simulate/sink (int. or ext. supply)
- % scale (0 to 20 or 4 to 20 mA) display

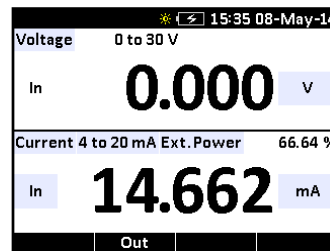


- ✓ General mA measurement and source
- ✓ Measure or source mA loop systems, insulation amplifiers...
- ✓ Simulate mA transmitters, debug or calibration

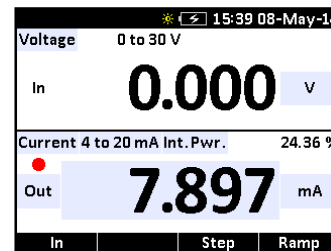
mA in



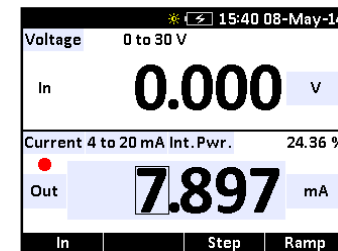
mA in



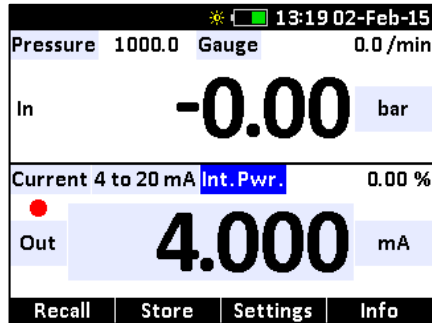
Direct key



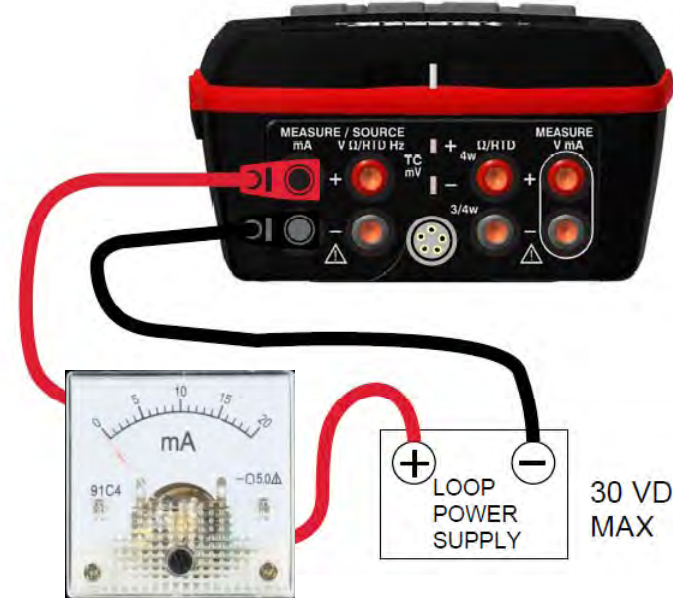
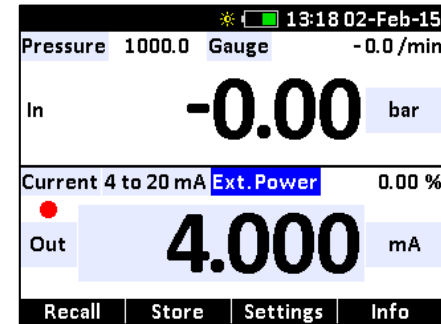
Cursor adj.



mA source & sink...



mA source
Internal supply



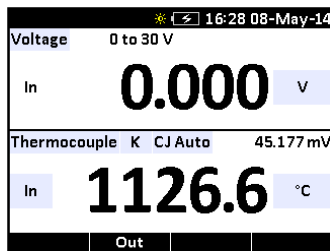
mA sink
External supply

ASC-400 mV & Thermocouple capabilities

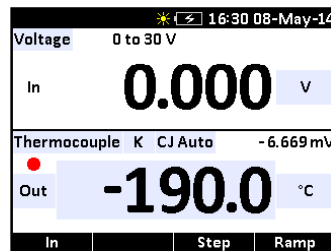
- Lower channel, measure & source
- 13 different TC types, Automatic or manual cold junction
- Very accurate Cold junction compensation
- ✓ General debug / calibration of mV, sensors, weight cells or..
- ✓ Simulation and measurement on thermocouples



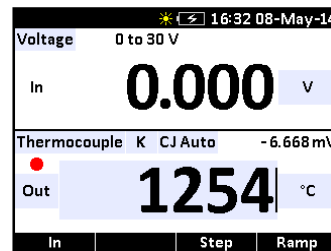
TC in



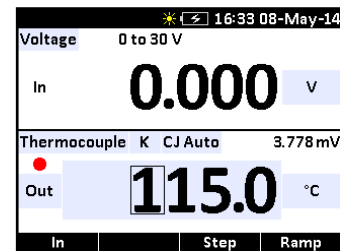
TC out



Direct key



Cursor adj.



Working with thermocouples

- Pay attention to connectors and cables, use the correct types to minimize errors!

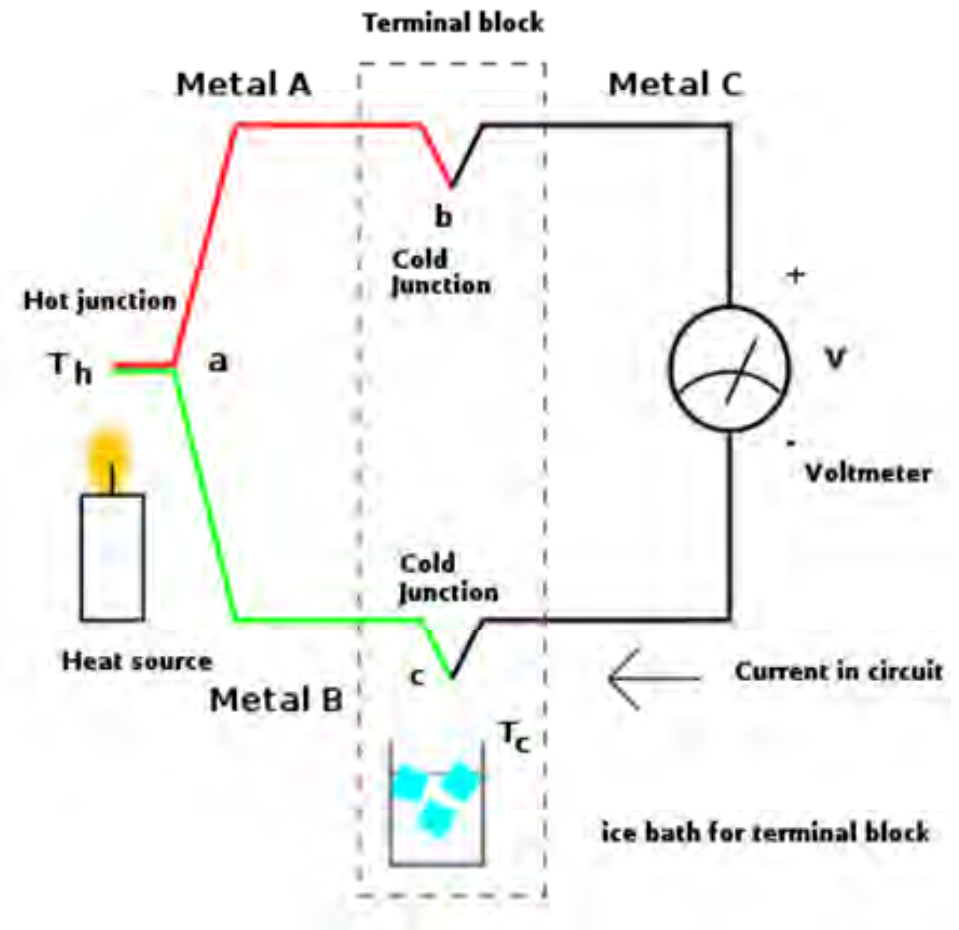


Use the correct connectors !



and be happy...

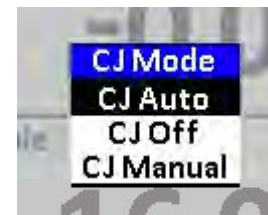
A thermocouple measuring circuit



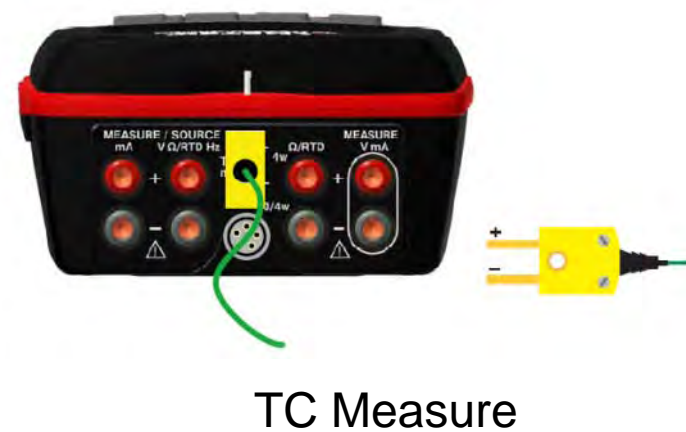
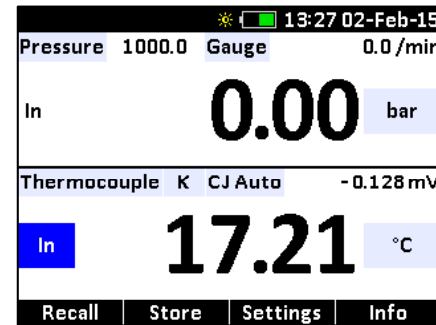
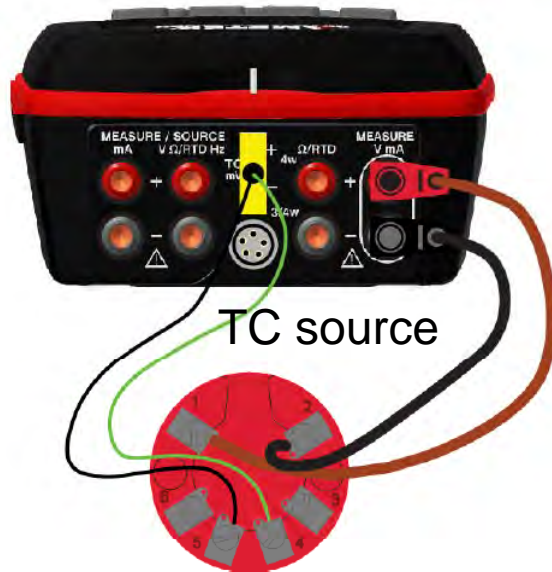
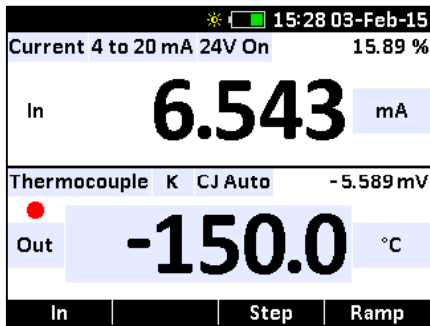
ASC-400 mV & Thermocouple capabilities

ASC-400 has 3 cold junction Modes to choose from:

- **CJ Auto** - Automatic CJ compensation, CJ temperature inside the connector is measured by a high accuracy RTD.
 - **CJ Off** - With CJ in OFF Mode, the calibrator will measure the difference between the thermocouple at the junction and at its TC input terminal (equivalent to 0°C CJ).
 - **CJ Manual** - With CJ in Manual Mode it is possible to set the CJ temperature to be used for temperature calculation.
- ✓ ASC-400 has an excellent TC accuracy and a superior cold junction system, copied from our High-End JOFRA RTC temperature calibrators!



ASC-400 Thermo couples



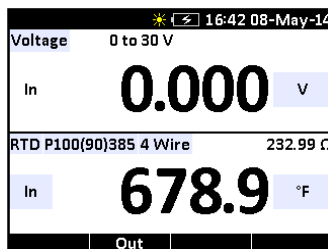
ASC-400 ohms & RTD capabilities

- Lower channel, measure & source
- **“True ohm”** eliminates thermo voltages in the measure circuit
- 16 different RTD types, 2, 3 or 4 wire measurement
- Custom definable RTD, reference thermometer function

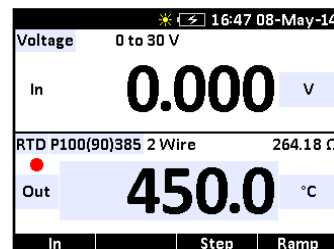
- ✓ Calibration and debug on RTD systems
- ✓ General debug or calibration of resistive sensors, level indicators, sliders, linear potentiometers...



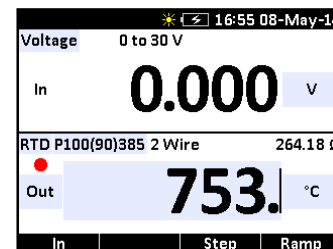
RTD in



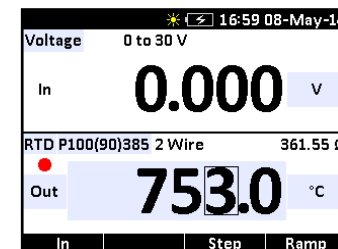
RTD out



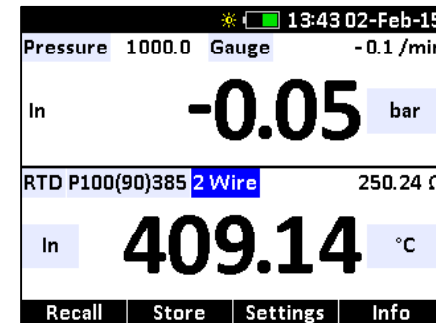
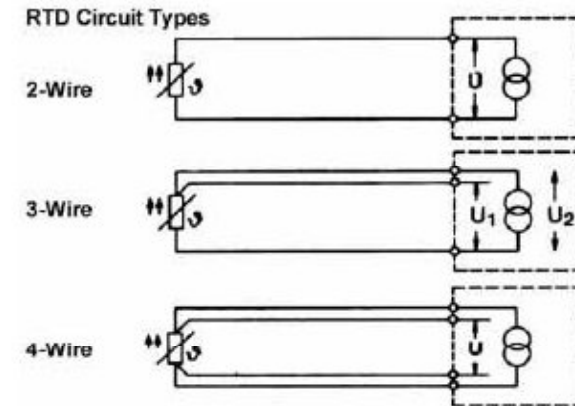
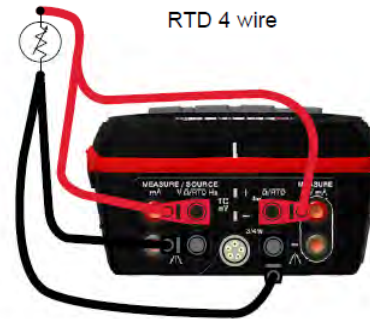
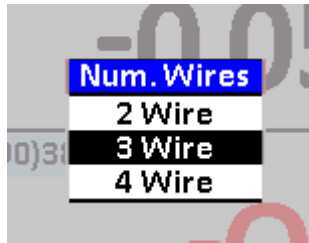
Direct key



Cursor adj.



RTD cabling

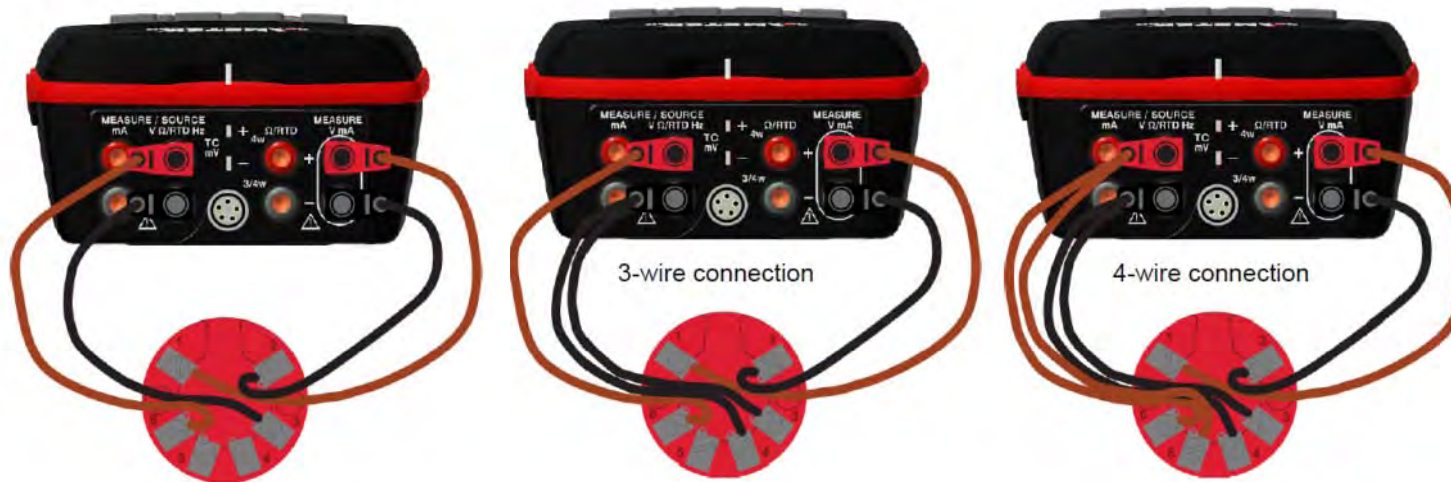


✓ Notice!

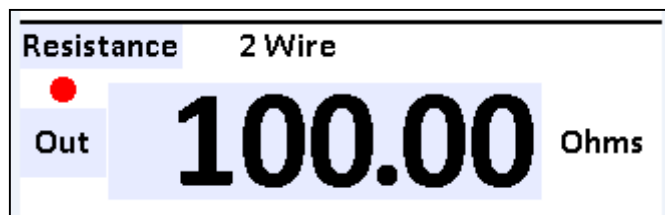
In a 2 wire system, a small resistance as low as 0.5 Ω, in cables and connectors, will apply apx. additional measurement error as below...

RTD Type	Pt 100	Pt 500	Pt 1000
Error @ 0.5 Ω	1.3 °C	0.7 °C	0.13 °C

ASC-400 RTD / ohms source

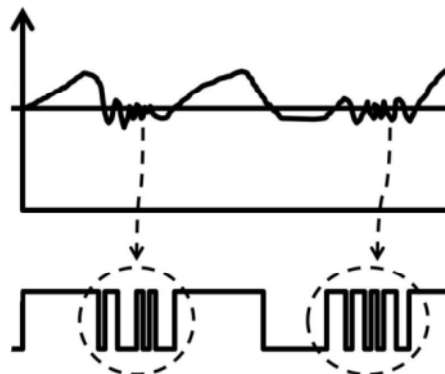


2, 3 or 4 measurement wires is related to the test device. ASC-400 always source / simulate RTD/ohms in 2 wires, like a real resistor...

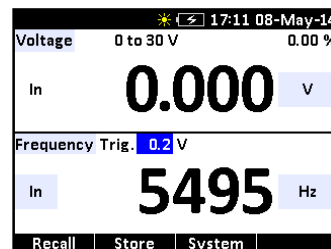


ASC-400 Frequency capabilities

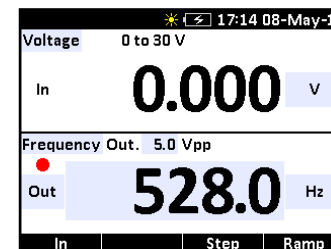
- Lower channel, measure & source
- Direct numerical input, CPM, Hz, kHz
- Adjustable output level, 1 to 20 Vpp
- Adjustable trigger level, 0.1 to 10.0 Volt
- ✓ Frequency transmission systems, calibration and debug
mA or V to freq, and reverse... (I/F-F/I converters)
- ✓ RPM measurement and meter / switch verification
- ✓ Use adjustable trigger level to “filter out” noise and hum



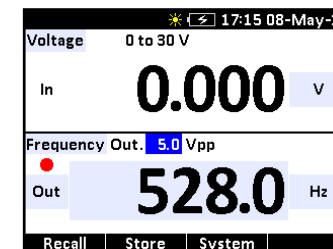
Trigger level



Frequency out



Output level

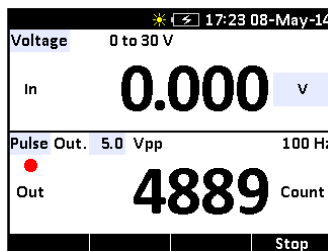


ASC-400 Pulse capabilities

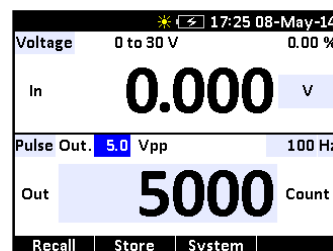
- Lower channel, source only
- Direct numerical input, 1 to 10000 pulses
- Adjustable output level, 1 to 20 Vpp
- ✓ Totalizer calibration and debug
- ✓ Counters, meter inputs...



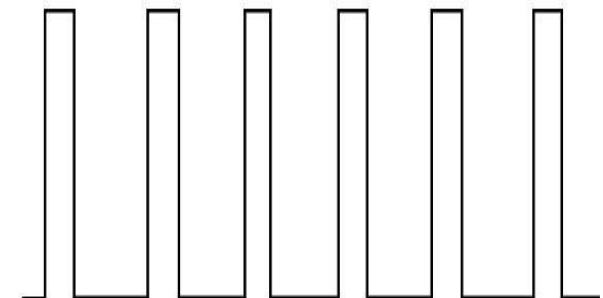
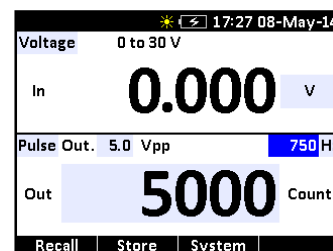
Pulse out



Output level



Output frq.



ASC-400 pressure capabilities

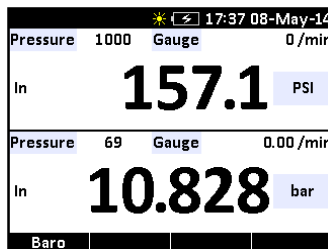
- Upper & lower channel measure, even at the same time
- On-line leak rate indicator, leak displayed in units/minute
- Pressure switch test, with open/close and dead band
- Built in barometer (option), makes absolute measurements with any gauge APM, a better way to do absolute...

0.02 /min

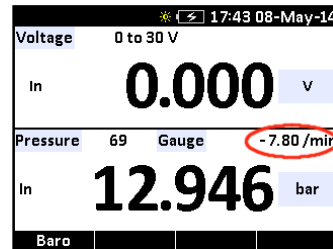
bar



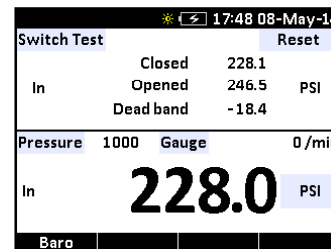
Pressure in



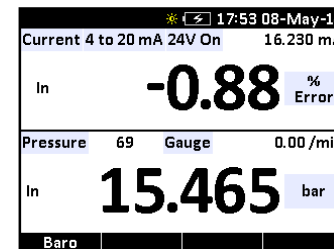
Leak rate



Switch test



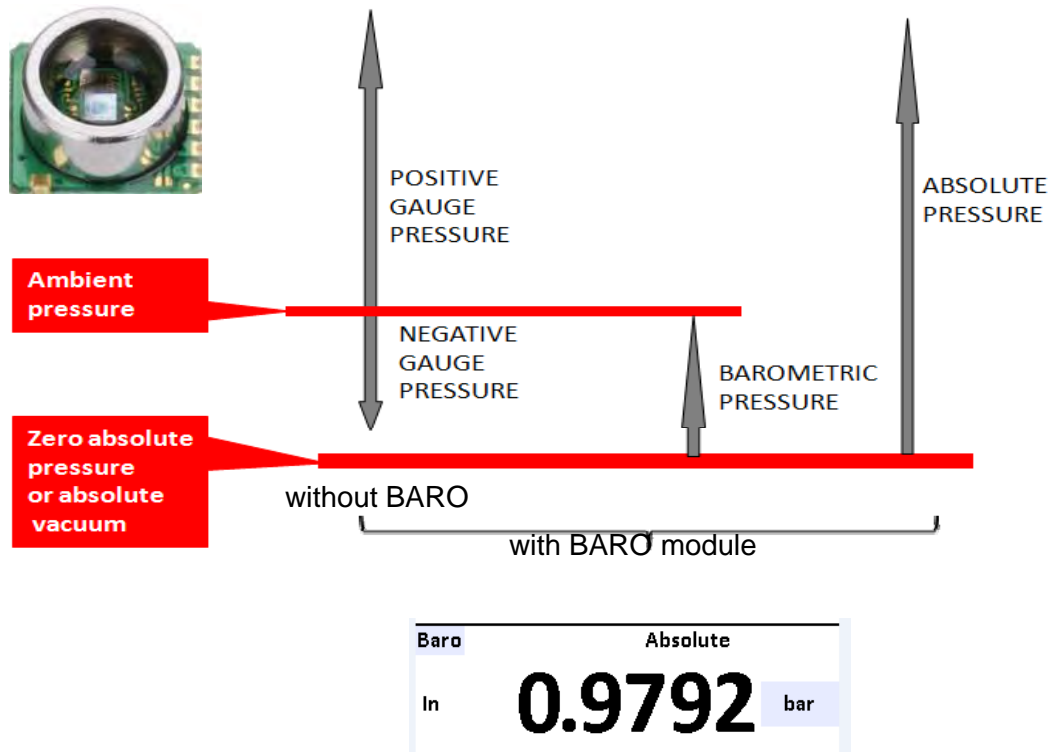
%error



BARO Option - built in high precision barometer

- The factory installed BARO option enables barometric and absolute measurements.
- Switch your pressure units input from gauge to absolute indication

**REDUCED
price 2015!!**



Accuracy:

$\pm 0.5 \text{ mbarA} / 0.00725 \text{ psiA}$

Pressure range:

700 to 1100 mbarA / 10.153 to 15.954 psiA

Accuracy includes all effects of linearity, hysteresis, temperature and stability for one year. (-20 to 50°C / -4 to 122°F)

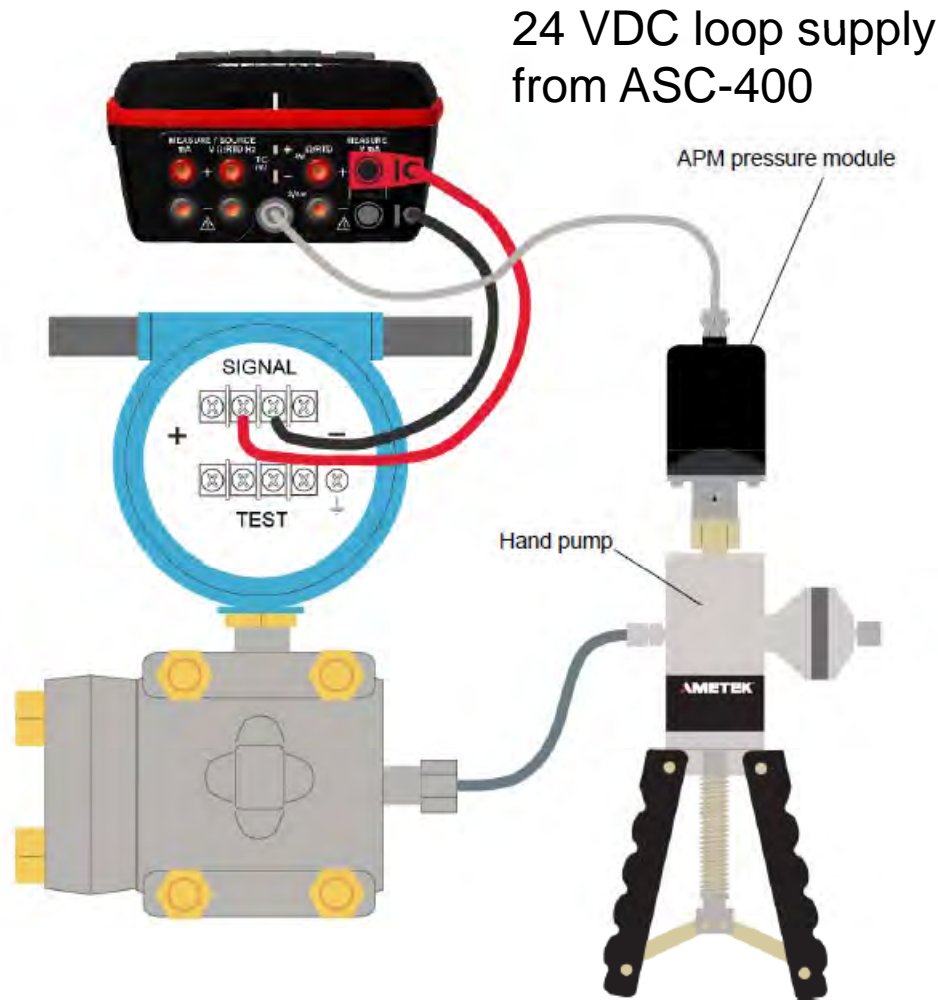
Accredited Calibration certificate
ISO/IEC 17025 compliant / A2LA certified

ASC-400 & APM

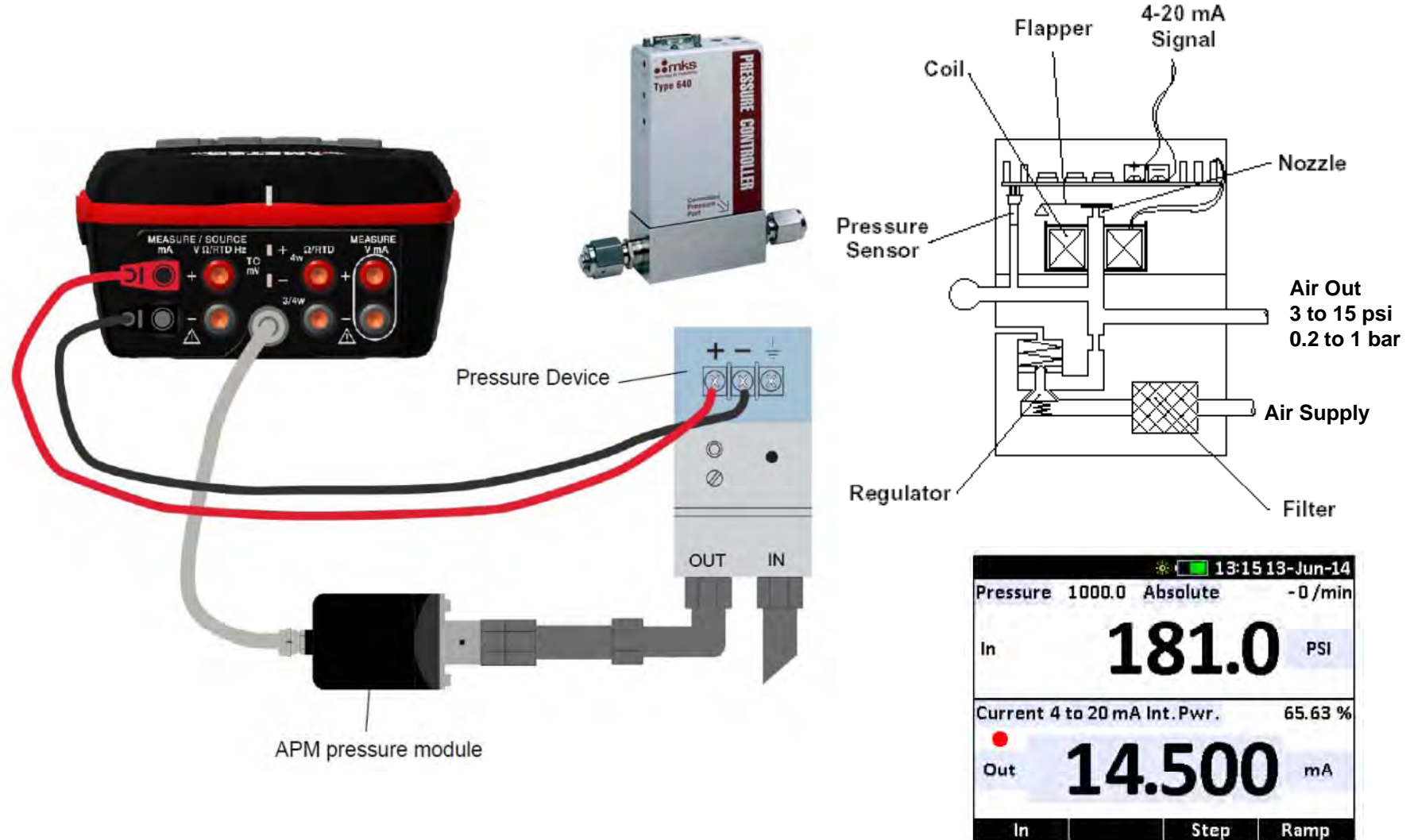
- ASC-400 is compatible with all JOFRA APM's
 - JOFRA APM-S
 - JOFRA APM-H
 - JOFRA APM Mk.II
 - Crystal APM CPF
- Temperature & linearization data are stored inside APM. Pressure calibration follows the APM!
- If BARO is mounted in ASC-400, ALL gauge APMs from the past, will be “upgraded” to do absolute pressure measurement.
- We do not want to leave costumers behind, just to improve...



ASC-400 PTX calibration



Calibrating a current to pressure converter



ASC-400 % Error Capabilities

- Upper channel, mA & voltage measure isolated
- Real-time FS % error calculation, Direct numerical input for 0 & 100 % span values

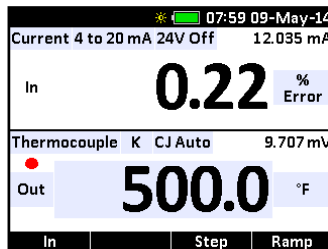


$$\text{Percent error} = \frac{(\text{observed value (temperature)} - \text{true value (mA)})}{\text{full scale true value}} \times 100$$

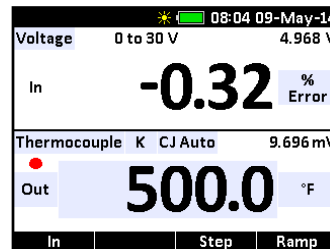
- ✓ Take the “guesswork” away from on-line calibration & adjustment



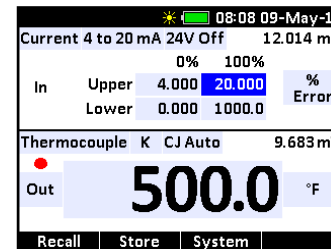
%Error / mA



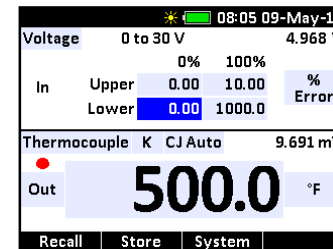
%Error / Volt



Set % values

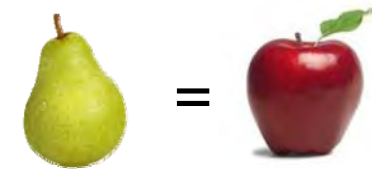


Set % values



ASC-400 Scaling Capabilities

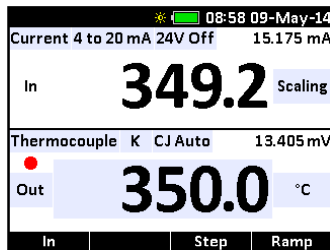
- Upper channel, mA or voltage measure isolated
- Real-time scaling, mA / voltage value displayed together with scaled value
- Compare or measure values scaled into the “right” format, avoid calculation errors.



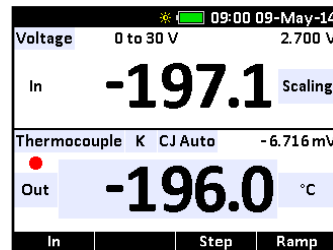
or scaled...



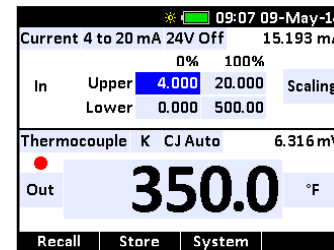
Scaling / mA



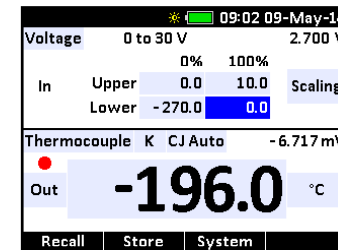
Scaling / Volt



mA scaling



Volt scaling



ASC-400 switch test capabilities

- ASC-400 will perform switch test on any output or measurement parameter, except pulse train.
- ✓ The following types of switches can be tested:
 - Pressure switches
 - Temperature switches
 - RTD (resistive) input temperature switches
 - TC (mV) input switches
 - Voltage switches
 - mA switches
 - Frequency / CPM switches



RTD switch

Switch Test				Reset
	Closed	156.2		
In	Opened	121.0	°F	
	Dead band	35.2		
RTD P10(90)385 2 Wire				9.30 Ω
Out		0.0	°F	
In	Step	Ramp		

Temp. switch

Switch Test				Reset
	Closed	90.6		
In	Opened	91.8	°C	
	Dead band	-1.1		
Thermocouple K CJ Auto				2.808 mV
In		90.6	°C	
Out				

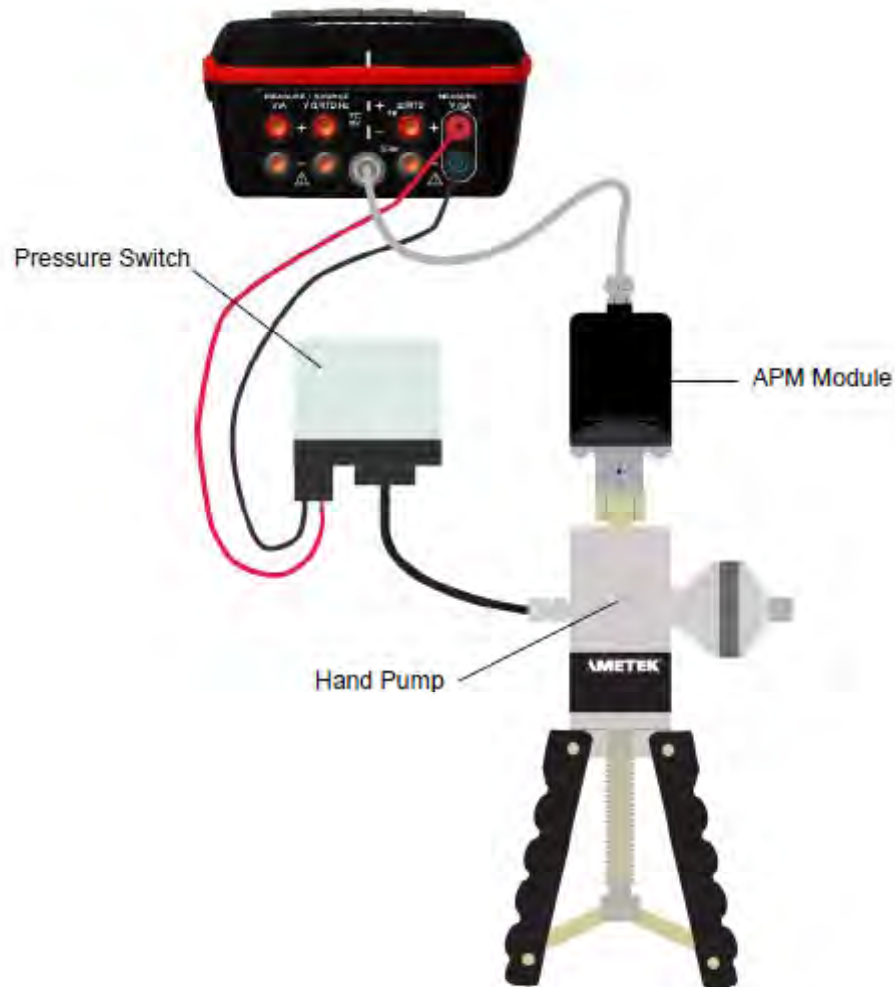
Pressure switch

Switch Test				Reset
	Closed	228.1		
In	Opened	246.5	PSI	
	Dead band	-18.4		
Pressure 1000 Gauge				0 /min
In		228.0	PSI	
Baro				

CPM switch

Switch Test				Reset
	Closed	448.0		
In	Opened	452.0	CPM	
	Dead band	-4.0		
Frequency Trig. 1.0 V				
In		444.0	CPM	
Out				

ASC-400 Switch test, pressure switch...



13:01 13-Jun-14			
Switch Test		Reset	
	Closed	4.051	
In	Opened	4.624	bar
	Dead band	-0.574	
Pressure	68.95	Gauge	0.00 /min
In	-0.001		bar
Baro			

ASC-400 Switch test, more than pressure...

RTD Probe

Temperature Switch

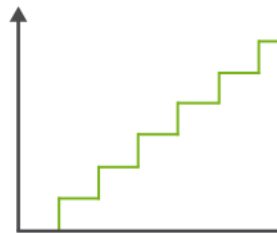
Switch Test		Reset
In	Closed	96.13
	Opened	97.53 °C
	Dead band	-1.41

RTD P100(90)385 4 Wire		137.04 Ω
In	96.13	°C
Out		

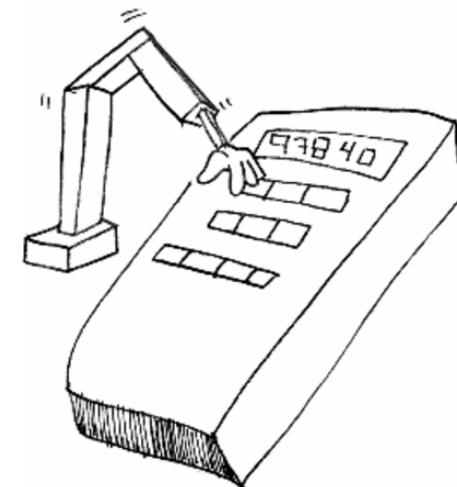
Auto Test Mode's

- All* output modes do manual step + auto-step & -ramp
- Step time between 2 and 999 seconds, 5 to 11 steps
- Ramp time between 5 and 999 seconds

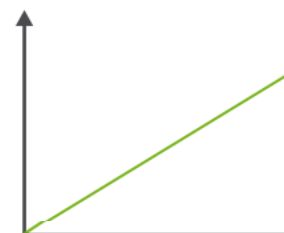
Test Mode
In
Out
Out Step
Out Ramp



Voltage		0 to 20 V	
Out	Size	25%	0% 0.000 V
Step			100% 20.000
	Time	30 seconds	
In	Out	Step	Auto



- Easy selection and setup
 - All in one window
 - Time saving function keys



Voltage		0 to 20 V	
Out		0% 0.000 V	
Ramp		100% 20.000	
	Time	30 seconds	
In	Out		Start

*Except pulse out

Power Options

- Standard
 - ASC-400 is as standard supplied with 6 x AA size alkaline batteries
- Option A, power supply type 124720
 - (also used for DTI 1000, DTI050 & ASC3X1) multi voltage, frequency & multiple plugs
- Option B, As option A + set of 6 x AA size
 - Ni-MH rechargeable batteries
 - Use the: Charge / no charge switch



JOFRA ASC-400 support...

- ASC-400 firmware can be updated via the USB port.
- Field update via small windows tool from the WEB.
- ***Did you remember to update your demo / stock items?!***
(Version 2.06 available on jofra.com ASC-400 page)
- ✓ Remote manual, available as pdf
- ✓ Adjustment Manual, available as pdf, ask service dept.



ASC / APM and the Competition

ASC-400

- Superior user interface, with easy navigation- set-up and operation, including bright color display and full numeric keypad
- Very competitively priced against main competitors
- Packed with, easy to use, useful features
- Fast delivery
- Optional built in barometer, to do absolute measurements with gauge Crystal APM CPF Series and older gauge JOFRA APM's

APM CPF

- % RDG accuracy, down to 0.025%
- Fully temperature compensated from -20 to 50 °C
- Fair price!
- You – and your ability to get the ASC-400 and APM in the hands of your potential costumers - the unit begs to be demonstrated..!

JOFRA ASC-400 and...



Delivery Time

- Under normal conditions, ordinary quantities...
 - From stock in Allerød DK!



0:00

How to sell ASC-400...

- Tell the story! – We got something special to offer...
- Show ASC-400 to every one!
- Get ASC-400 into the hands of the customers!
- Always show ASC-400 even if the meeting not is booked for ASC-400 presentation!
- Set up a sale or return system?
- Make mailings, including links to the intro movie.
- Make adverts/links on your WEB.
- Add a flyer in your boxes for all process equipment.
- If YOU don't do the foot work -

