

pressure

# JOFRA™

### Wide pressure range

16 pressure ranges, ranging from 25 mbar (0.35 psi) to 700 bar (10,000 psi) F.S. Absolute, differential and gauge sensors.

### High accuracy

±0.025% of reading +0.01% F.S.

### True field calibrator

Fully temperature compensated

### Single or dual sensor versions

Select HPC500 single or HPC502 dual range calibrators and eliminate the need for 2 separate calibrators.

### Full set of intelligent features

Wide selection of useful functions and features. Damping, leak test, % error calculation, min/max, switch test, etc.

### Thermometer

High accuracy thermometer, Pt100 sensor.

### External Pressure Modules

More than 60 different pressure modules, accuracy up to 0.01% F.S.

ISO 9001 Manufacturer

Specification Sheet  
SS-HPC500

## Handheld Pressure Calibrator Model HPC500 Family



JOFRA HPC500 calibrators feature deadweight tester accuracy in a modern digital package. The HPC is available as an independent calibrator or in one of 6 ready-for-test systems that are complete and equipped to meet any need for pressure calibration.

The HPC500 may be used in a very broad range of applications from simple tool type jobs to complex calibration jobs in custody transfer systems.

The JOFRA HPC500 calibrators introduce a new generation of AMETEK handheld pressure calibrators. This series has been designed to meet high accuracy pressure calibration applications and facilitate your tasks. The HPC offers features such as user configurable information display, 15 different pressure units, transmitter supply, mA input, % error calculation, voltage measurement, serial communication, and external pressure module capability. The accuracy of the HPC500 calibrators is specified in % of reading to ensure an even better accuracy and wider applicable pressure range. The HPC is temperature compensated from 0 to 50°C / 32 to 122°F for on-site operation. It is a truly superior pressure calibrator for laboratory and field use, bringing laboratory accuracy into the field.

The JOFRA APM series of pressure modules extends the application base of the HPC calibrators by allowing calibrations in additional ranges. The APM modules are compatible with several other JOFRA calibrators.

Calibration of the instrument may be performed locally without returning the HPC unit to the manufacturer. Adjustment software is part of the design - you just need an accurate pressure reference and a PC. If factory calibration is required, the pump and the calibrator are independent units and only the calibrator needs to be returned.

**AMETEK®**  
CALIBRATION INSTRUMENTS

## Clear graphical display

Large backlit graphical display shows current status and mode, 1, 2 or 3 measurement windows, to suit your applications and demands.

## Intuitive menu system

Combination of “soft keys” and cursor keypad ensures easy operation

## Electrical connections

HPC calibrators are well equipped and include inputs for mA, voltage, switches and temperature measurements, including 24 VDC supply for mA transmitters.

## Serial interface

Connection for JOFRA APM pressure module and computer.



## Zero

To keep high accuracy, a dedicated zero button is available to provide convenient zero before test.

## Temperature measurement

High accuracy temperature measurement port by use of the optional Pt100 sensor. A superb instrument for easy and convenient temperature measurement.

## Pressure connections

1/8" BSP female. 300 series stainless steel. 1/4" NPT male and 1/4" BSP female adapters are supplied as standard.

## Full set of features

Perform semi-automatic pressure switch tests, leak test, % error calculation, switch in HART resistor or other calibration tasks through the outstanding functions and features of the HPC500.

## ON / OFF

Auto shut-off to expand battery life time (user programmable).

## Units

15 different engineering units on pressure measurements.

## JOFRACAL CALIBRATION SOFTWARE

### Compatible with 2010 software release

JOFRACAL calibration software ensures easy calibration of RTD's, thermocouples, transmitters, thermowithes, pressure gauges and pressure switches. JOFRACAL can be used with JOFRA DPC-500, HPC500, HPC502 and IPI pressure calibrators, all JOFRA temperature calibrators, as well as JOFRA AMC910, ASC300 multi signal calibrator and ASM-800 signal multi scanner. When used with JOFRA ASM-800 signal multi scanner, JOFRACAL can perform a simultaneous semiautomatic calibration of 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 optimize recalibration intervals. A scheduler feature allows planning of future calibrations.

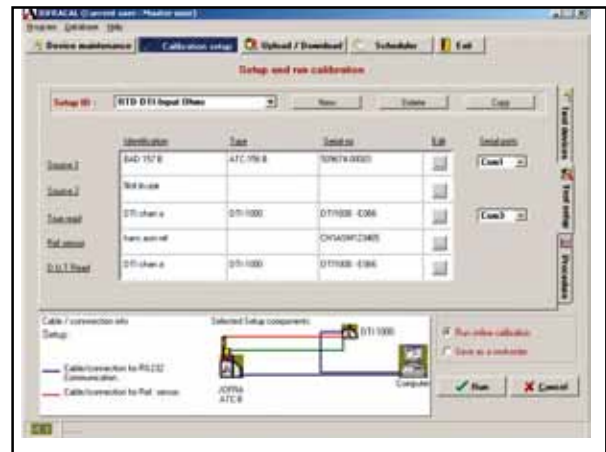
The JOFRACAL temperature calibration software may be downloaded free of charge from our website.



### JOFRA APM pressure module

The JOFRA APM external pressure modules extend the range of the JOFRA HPC. There are more than 60 models available with gauge, absolute, differential, and vacuum pressure references, in metric and imperial engineering units.

The modules are engineered for in-plant, field, or laboratory use. They are ready-to-use with the JOFRA HPC and the protocol allows for immediate recognition and use of the module once it is plugged into the calibrator.



## REQUIREMENTS JOFRACAL

### Minimum hardware requirements:

- Intel® Pentium® II 1.4 GHz processor
- 64MB RAM (1 28MB recommended)
- 400MB free disk space on hard disk (500MB recommended) prior to installation
- Standard VGA (800x600, 256 colours). 1024x768 recommended
- CD-ROM drive or USB port for installation of program
- 1 or 2 free RS-232 serial ports, depending on configuration

### Minimum software requirements:

- Microsoft Windows® XP, Vista.
- System fonts: MS Sans Serif and Arial

## FUNCTIONAL SPECIFICATIONS

### Pressure; gauge / compound ranges

bar	..... -0.96 to 1 & 2
psi	..... -14 to 15 & 30
bar	..... -0.82 to 7, 20 & 35
psi	..... -12 to 100, 300 & 500

### Pressure; gauge

bar	.....70, 200, 350 & 700
psi	.....1,000, 3,000, 5,000 & 10,000

### Pressure; absolute ranges

bar	..... 0.025 to 1.1 & 2
psi	..... 0.35 to 16 & 30
bar	..... 0.07 to 7 & 20
psi	..... 1 to 100 & 300

### Pressure; differential ranges (HPC500 only)

mbar	..... ±25, ±70 & ±350
psi	..... ±0.35, ±1 & ±5

### Engineering units (built-in)

User selectable..... 15 units  
 (bar, mbar, MPa, kPa, inHg@0°C, mmHg@0°C, kg/cm<sup>2</sup>, mmH<sub>2</sub>O@4°C, mmH<sub>2</sub>O@20°C, psi, inH<sub>2</sub>O@4°C, inH<sub>2</sub>O@20°C, inH<sub>2</sub>O@60°F, cmH<sub>2</sub>O@4°C, cmH<sub>2</sub>O@20°C)

### Pressure accuracy ambient temp. (18 to 28°C / 65 to 82°F)

±25 mbar / 0.35 psi	..... ±0.10% F.S.
±70, 350 mbar / 1, 5 psi	..... ±0.05% F.S.
All other pressure ranges	..... ±0.025% RDG + 0.01% F.S.
Vacuum	..... ±0.025% F.S.

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).

### Pressure accuracy ambient temp. (0 to 50°C / 32 to 122°F)

±25 mbar / 0.35 psi	..... ±0.15% F.S.
±70, 350 mbar / 1, 5 psi	..... ±0.10% F.S.
All other pressure ranges	..... ±0.04% RDG + 0.01% F.S.
Vacuum	..... ±0.05% F.S.

F.S. (full scale) is the numerical value of the positive pressure range.  
 Temperature effect -10 to 0°C / 14 to 32°F ±0.005% F.S./°C.

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).

### Display

LCD	..... Graphical (with light)
Display resolution	..... 5 digits
Display update	..... 3 times per second

### RS232 communication interface

Connector	..... LEMO
Serial	..... 0-5 VDC, 9600 baud, 8 data, no parity, 1 stop
Protocol	..... ASCII command language

### Input / output (18 to 28°C / 65 to 82°F)

mA range	..... 0 to 24 mA
mA accuracy	..... ±0.015% RDG + 2 µA
Transmitter supply	..... 24 VDC ±10%
Voltage measurement	..... 0 to 30 VDC
Voltage accuracy	..... ±0.015% RDG + 2mV
RTD range (ohms)	..... 84 to 140 Ω
RTD accuracy	..... ±0.015% RDG + 0.02 Ω
RTD range (temperature)	..... -40 to 105°C / -40 to 220°F
RTC accuracy @ 0°C/32°F (temperature)	..... ±0.10°C / 0.18°F
HART® resistor	..... 250 Ω
Peak hold capture	..... 50 milliseconds
Switch test input	..... 5V (<1mA)

Temperature effect outside 18 to 28°C / 65 to 82°F ±0.001% F.S./°C.

### Media compatibility

Nickel plated brass and 316 stainless steel

### Environmental

Operating temperature	..... -10 to 50°C / 14 to 122°F
Storage temperature	..... -20 to 60°C / -4 to 140°F
Ingress protection rating	..... IP54

### Pressure connection

All calibrators ..... 1/8" BSP female  
 Adapters to 1/4" NPT male and 1/4" BSP female are included as standard.

### Pressure overload

Overload alarm..... "OL" in display at approx. +20% F.S.

### Power supply

Battery	..... 4 x 1.5 VDC Alkaline
Battery type	..... AA, LR6, MN1500, AM3
Battery lifetime	..... Typically more than 35 hours
Low battery indicator	..... Yes

### Instrument dimensions (LxWxH)

Calibrator	..... 201x99x50 mm / 8.3x3.9x2.0 in
HPC500 weight (incl. battery)	..... 635 g / 22.4 oz
HPC502 weight (incl. battery)	..... 665 g / 23.5 oz
Calibrator, shipping	..... 243x180x80 mm / 9.6x7.1x3.1 in
Calibrator weight, shipping	..... 1.1 kg / 39.5 oz

### Miscellaneous

Compliance: EN 61326 : 2006 & CISPR 11, Edition 5.0 - 2009 Class "B"



Function / Feature	HPC500	HPC502
Single sensor high accuracy pressure calibrator	Yes	-
Dual sensor high accuracy pressure calibrator	-	Yes
mA measurement	Yes	Yes
Voltage measurement	Yes	Yes
24 VDC transmitter supply	Yes	Yes
High speed pressure switch test	Yes	Yes
Temperature measurement with external RTD sensor	Yes	Yes
JOFRA APM pressure module connection	Yes	Yes
RS232 communication	Yes	Yes
On-line calculation of sensor error %	Yes	Yes
Automatic leak test timer function	Yes	Yes
High speed min./max. hold	Yes	Yes
Delta / sum calculation on pressure measurements	Yes	Yes
Display contrast adjustment	Yes	Yes
Instrument setup lock	Yes	Yes
Storage of 5 setups	Yes	Yes
Setup of automatic off timer	Yes	Yes
Setup of number of display windows / measurement channels	Yes	Yes
Setup of temperature sensor RTD type	Yes	Yes
Select display high or low resolution	Yes	Yes
Setup of backlight timer	Yes	Yes
HART resistor on/off	Yes	Yes
Normal or dampened display update rate	Yes	Yes



## HPC500 PRESSURE RANGES

This table shows the resolutions that can be obtained by the HPC calibrators throughout all engineering units.

HPC500/HPC502 Ranges and Resolutions													
Range (bar)	25mbar	70mbar	350mbar	1	1.1	2	7	20	35	70	200	350	700
Burst pressure (bar)	1.4	1.4	7	20	20	20	70	133	133	677	677	677	1000
Proof pressure (bar)	70mbar	200mbar	1	2	2	4	14	40	67	200	400	677	1000
Static pressure (bar)	70mbar	7	7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Range (psi)	0.35	1	5	15	16	30	100	300	500	1000	3000	5000	10000
Burst pressure (psi)	10	10	100	300	300	300	1000	2000	2000	10000	10000	10000	15000
Proof pressure (psi)	1	3	15	30	30	60	200	600	1000	3000	6000	10000	15000
Static pressure (psi)	1	100	100	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
psi	0.4000	1.0000	5.0000	15.000	16.000	30.000	100.00	300.00	500.00	1000.00	3000.00	5000.00	10000.00
bar	0.0689	0.0689	0.3447	1.0342	1.1032	2.0684	6.8947	20.684	34.474	68.947	206.84	344.74	689.47
mbar	27.579	68.948	344.74	1034.2	1103.2	2068.4	6894.8	20684	344.74	689.48	n/a	n/a	n/a
kPa	2.7579	6.8948	34.474	103.42	110.32	206.84	689.48	2068.4	3447.4	6894.8	2068.4	3447.4	68948
MPa	0.0028	0.0068	0.0344	0.1034	0.1103	0.2068	0.6894	2.0684	3.447	6.8948	20.684	34.474	68.948
kg/cm <sup>2</sup>	0.0281	0.0703	0.3515	1.0546	1.1248	2.1092	7.0307	21.092	35.153	70.307	210.92	351.53	703.07
cmH <sub>2</sub> O@4°C	28.124	70.309	351.54	1054.6	1124.9	2109.3	7030.9	21093	35154	70309	n/a	n/a	n/a
cmH <sub>2</sub> O@20°C	28.173	70.434	352.17	1056.5	1126.9	2113.0	7043.4	21130	35217	70434	n/a	n/a	n/a
mmH <sub>2</sub> O@4°C	281.24	703.09	3515.4	10546	11249	21093	70309	n/a	n/a	n/a	n/a	n/a	n/a
mmH <sub>2</sub> O@20°C	281.73	704.34	3521.7	10565	11269	21130	70434	n/a	n/a	n/a	n/a	n/a	n/a
inH <sub>2</sub> O@4°C	11.072	27.681	138.40	415.21	442.89	830.42	2768.1	8304.2	13840	27681	83042	n/a	n/a
inH <sub>2</sub> O@20°C	11.092	27.730	138.65	415.95	443.68	831.89	2773.0	8318.9	13865	27730	83189	n/a	n/a
inH <sub>2</sub> O@60°F	11.083	27.708	138.54	415.61	443.32	831.23	2770.8	83123	13854	27708	83123	n/a	n/a
mmHg@0°C	20.686	51.715	258.58	775.73	827.44	1551.5	5171.5	15515	25858	51715	n/a	n/a	n/a
inHg@0°C	0.8144	2.0360	10.108	30.540	32.576	61.081	203.6	610.81	1018.0	2036.0	6108.1	10180	20360

Proof pressure - maximum allowable pressure without a shift in calibration.

Burst pressure - sensor damaged or destroyed, some risk of personal injury.

Static pressure - Differential units only. Maximum allowed common mode pressure between both points.

Compound ranges - the data for the 1 bar range also applies to the -1 to +1 bar compound range, the data for the 2 bar range also applies to the -1 to +2 bar compound range.

Absolute ranges - the data for the 1.1, 2, 7 and 20 bar ranges also applies to the absolute pressure versions of those ranges.

## STANDARD DELIVERY (HPC Calibrator)

- HPC500 or HPC502 calibrator
- Traceable calibration certificate (NIST) with pressure and vacuum performance
- 4 x 1.5 volt batteries
- Adapter to 1/4" NPT male from 1/8" BSP male\*
- Adapter to 1/4" BSP female from 1/8" BSP male\*
- 1/8" sealed gasket / washer type
- Test leads: red and black
- Hand strap with clip
- User manual

\* Set for each pressure port



**HPC500, System E**

- EXX/0 to 700 bar (10,000 psi)

This system consists of an HPC calibrator together with a rugged, hydraulic, high pressure pump.



System E is an easy-to-use calibration system. The hydraulic pump makes it very easy to prime the system. The calibrator can be adjusted to fit the best viewing angle. The system includes a manifold for connection of two test devices and the fine adjustment volume adjuster is standard.

The System E comes in a carrying case with cut-outs for fittings and the complete assembled calibration unit - no time adder to assemble the unit before use. Easy and fast connection between pump and calibrator makes it easy to use the pressure calibrator separately for other pressure test jobs.

**AMETEK high pressure hydraulic oil pump for system E**

The hydraulic pump is designed for high pressure applications. The pump has a 4-connection output manifold and a fine adjustment volume adjuster.

Pressure range .....	0 to 700 bar (10,000 psi)
Type.....	Hydraulic
Test medium.....	Oil
Operation.....	Jack pump
Reservoir capacity.....	500 cl / 1 pint
“O”-rings .....	Buna-N
Wetted parts.....	Aluminum, brass, stainless steel
Connection to test object.....	4 x 1/4” BSP female
Size.....	36.5x20.0x14.2 cm / 14.4x7.9x5.6 in
Weight .....	5.3 kg / 11.6 lb

**Included with System E delivery**

- HPC standard delivery (see page 6)
- Hydraulic pump
- 10 x 1/4” bonded seals
- Allen key 6 mm
- 2 x 1/4” NPT female adapters
- 1 roll of Teflon tape
- Volume adjuster for fine adjustment
- Protective carrying case

**Accessories**

- Volume adjuster for fine adjustment
- 1.5 m Pressure hose, (Max. 700 bar/10,000 psi)<sup>1</sup>
- 5 m Pressure hose, (Max. 700 bar/10,000 psi)<sup>1</sup>
- Quick connector set, female 1/4”BSP to 1/4” BSP
- Connections for APM H/S pressure modules
- Fitting 1/4” BSP male x 1/4” BSP male for APM-S pressure module with system E
- Fitting 1/4” BSP male to 1/4” NPT female for APM-H pressure module with system E
- Fitting 1/8” NPT male to 1/4” NPT male for APM-H pressure module with system E
- Fitting 1/4” NPT male to 1/4” BSP female for APM-S pressure module with system E
- Fitting 1/8” NPT male to 1/4” BSP female for APM-H pressure module with Jack-pump alone

<sup>1</sup> 1/4” BSP female to 1/4” BSP male

**HPC500, System F**

- FOx/0 to 700 bar (10,000 psi) oil
- FWx/0 to 700 bar (10,000 psi) water



System F is an easy-to-use calibration system. The hydraulic pump makes it very easy to prime the system. The pump contains 1.23 l of liquid.

The system includes a manifold for connection of two test devices and the volume adjuster for fine adjustment is standard. System F comes in a protective carrying case with cut-outs for fittings. Easy and fast connection between pump and calibrator makes it easy to use the pressure calibrator separately for other pressure test jobs.

The pump is designed for high pressure applications up to 15,000 psi (1,000 bar). The pump and system may be ordered with either oil or a water/alcohol mixture as pressure medium. The pump is constructed of 300 series stainless steel and Monel allowing for the use of other hydraulic media. There are three available seal packages for the system: Buna-N, Viton®, and EPT.

**Type T pump for system F**

The Type T pump features a dual pressure output manifold, volume adjuster (up to 200 bar / 2,900 psi), relief valve, and dual volume control for rapid pressure increase at lower pressures and easier pumping at higher pressures.

Pressure range .....	0 to 1,000 bar (15,000 psi)
Type.....	Hydraulic
Test medium.....	Hydraulic oil, water
Operation.....	Jack pump
Reservoir capacity.....	1.23 l / 2.6 pint
“O”-rings .....	Buna-N (standard) or EPT/Viton (Optional)
Wetted parts.....	Stainless steel, Monel
Connection to test object....	1/4” and 1/2” BSP terminations 1/4” and 1/2” PT female terminations
Size.....	79.4x22.9x50.8 cm / 31.3x9x20 in
Weight .....	9.1 kg / 20 lbs

**Included with System F delivery**

- HPC standard delivery (see page 6)
- Hydraulic pump
- 2 x 1/4” bonded seals
- Allen key 6 mm
- 1 roll of Teflon tape
- Protective carrying case

**Accessories**

- 1.5 m Pressure hose (Max. 700 bar/10,000 psi)<sup>1</sup>
- 5 m Pressure hose (Max. 700 bar/10,000 psi)<sup>1</sup>
- Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN
- Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN
- Connections for APM H/S pressure modules
- Union Body 1/4” NPT female for manifold pump T
- Fitting 1/8” NPT male to 1/4” NPT male for APM-H pressure module
- Fitting 1/4” NPT male to 1/4” NPT male for APM-S pressure module

<sup>1</sup> 1/4” BSP female to 1/4” BSP male