

## pressure



### Pressure range

APC010C	Vacuum to 10 psi / 0.7 bar
APC030C	Vacuum to 30 psi / 2 bar
APC200C	Vacuum to 200 psi / 15 bar
APC500C	Vacuum to 500 psi / 35 bar
APC01KG	0 to 1,000 psi / 70 bar
APC03KG	0 to 3,000 psi / 200 bar
APC05KG	0 to 5,000 psi / 350 bar
APC10KG	0 to 10,000 psi / 700 bar

### High accuracy

±0.04% of reading ±0.01% F.S. with no low range degradation in accuracy

### Ideal for on-site use

Complete ready-to-use calibration systems in carrying case or as individual indicators

### True field calibrator

Fully temperature compensated - same high accuracy in the lab and in the field

### Save time - instant general view

Display both reference pressure and the device-under-test at the same time

### Transmitter scaling

Calculation of % error of the device-under-test with user-defined scaling

### Easy pressure switch test

Automatically records opening and closing point values on the display

### Record min and max readings

Capture the min and max pressure readings for safety valve applications

### External Pressure Modules

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

### Complete marine program

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

See more at [www.jofra.com](http://www.jofra.com)

ISO 9001 Manufacturer

# JOFRA™ APC Series

## Advanced Pressure Calibrator

Handheld pressure calibrator offering user-friendly features and superior performance

This remarkable calibrator features deadweight tester accuracy in a modern digital package. The APC is available as an indicator or in one of 6 test-ready systems that are complete and equipped to meet your pressure calibration needs. You can use the APC in applications from safety valve verification to pressure transmitter.



## PRODUCT DESCRIPTION

The JOFRA APC calibrators are the latest in the new generation of AMETEK handheld pressure calibrators. This series was designed to meet high accuracy pressure calibration applications and to make your tasks easier. The APC offers features such as dual information display, 17 different pressure units, transmitter supply, scalable mA input for % error calculation, serial communications, and external pressure module capability. The accuracy of the APC calibrators is deadweight caliber throughout the range and is temperature compensated for operation in controlled or in process applications. This is a truly superior pressure calibrator.

The JOFRA APM series of pressure modules extends the application base for the APC calibrators by allowing for calibrations in ranges other than those of the indicator; and at a lower cost than purchasing another APC. The APM modules are also compatible with several other JOFRA calibrators.

You can perform a calibration locally without returning the APC unit to the manufacturer. All you need is an accurate pressure reference. If you do require factory calibration, the pump and indicator are independent and only the indicator needs to be returned.

**AMETEK®**  
CALIBRATION INSTRUMENTS

**JOFRA APC INDICATOR**

**Clear dual line display**

Large digits display the pressure, icons show current status and mode, and the smaller digits show device-under-test conditions.

**ON / OFF**

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

**mA / %**

Save time and effort in calculating the error between the APC and the device-under-test by entering the pressure range corresponding to 4-20mA. This gives immediate read-out of the error in %. You can also read mA or % of 4-20mA in the display.

**SWITCH TEST**

Perform semi-automatic pressure switch tests. The APC records the "close" and "open" pressure values and calculates the hysteresis (deadband). You change the pressure and the APC does the rest.

**MAX / MIN**

Reads the highest and lowest pressure value since you last reset the APC. Monitor a safety valve or look for pressure spikes in the process.

**Pressure connections**

1/8 in NPT female 200 psi (15 bar) and below.  
1/8 in NPT male for 500 psi (35 bar) and above.

**Electrical connections**

The APC indicator have inputs for mA readings for pressure switches and transmitters, including 24 VDC supply, and for external JOFRA APM pressure modules.



**UNITS**

Easy access to 17 different pressure engineering units.

**Serial interface**

Serial interface to communicate with a PC (terminal). Also used if adjustment of the unit is necessary.

**ZERO**

Keep the high accuracy: ZERO the instrument before every test.

**APM PRESSURE MODULES**



The JOFRA APM series of pressure modules extends the application base for the APC calibrators by allowing for calibrations in ranges other than those of the indicator; and at a lower cost than purchasing another APC.



The APM series of pressure modules by JOFRA are compatible with your APC calibrators, ASC300 or AMC900. These units are available in a series of ranges, units, and pressure references. From vacuum to absolute pressure, AMETEK has your application covered with the pressure modules to meet your calibration needs. There are different accuracies, ranges, and references designed to offer you the exact specifications you need for your pressure calibrations.

These rugged modules are engineered for in-plant, field, or 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. If you have pressure instrumentation, these modules are for you. When combined with the JOFRA calibrators and pump systems these modules make for a powerful arsenal of calibration tools. 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.

Please see more about the APM series in specification sheet SS-CP-2190 at [www.jofra.com](http://www.jofra.com)

The JOFRA APM S series are industrial pressure modules with good accuracies up to  $\pm 0.05\%$  of F.S. The modules are designed so that the cable is integrated into the module housing, and the overall profile allows for easy storage of multiple modules.



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.



AMETEK offers the user several solutions for pressure generation. This line spans from a small pneumatic "bicycle" type pump to a hydraulic pump that generates up to 15,000 psi / 1,000 bar. These are durable pumps with features such as vernier valves, vent valves, manifold connections, swivel fittings, and optional O-ring materials and fittings making the pumps flexible to meet your calibration and testing applications.



Please see more at [www.jofra.com](http://www.jofra.com)

**JOFRA APM module**

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

## APC INDICATOR SPECIFICATIONS

### Pressure range

psi: ..... vacuum to 10, 30, 200  
 bar: ..... vacuum to 0.7, 2, 15  
 psi: ..... 0 to 500, 1,000, 3,000, 5,000, 10,000  
 bar: ..... 0 to 35, 70, 200, 350, 700

### Engineering units (built-in)

User selectable ..... 17 units  
 (psi, inH<sub>2</sub>O@4°C, inH<sub>2</sub>O@20°C, inH<sub>2</sub>O@60°F, inHg@0°C, ftH<sub>2</sub>O@4°C,  
 ftH<sub>2</sub>O@20°C, ftH<sub>2</sub>O@60°F, bar, mbar, kPa, kg/cm<sup>2</sup>, cmH<sub>2</sub>O@4°C,  
 cmH<sub>2</sub>O@20°C, mH<sub>2</sub>O@4°C, mH<sub>2</sub>O@20°C, mmHg@0°C)

### Pressure accuracy

Pressure APC030C to APC10KG: ... ±0.04% rdg + 0.01% F.S.  
 Pressure APC010C: ..... 0.05% F.S.  
 Full temperature compensation: ..... 0 to 50°C / 32 to 122°F  
 Vacuum (10 psi / 0.7 bar indicator) ..... ±0.1% F.S.  
 Vacuum (30, 200 psi / 2, 15 bar indicator) ..... ±0.05% F.S.  
 Full temperature compensation: ..... 10 to 45°C / 50 to 113°F

F.S. (full scale) is the numerical value of the positive pressure range. The accuracy includes non-linearity, hysteresis, repeatability and temperature effect 18 to 28°C / 64 to 82°F.

### Display

LCD: ..... Dual line plus icons  
 Display resolution: ..... 5 digits (see table on back page)  
 Display update: ..... twice per second

### Input / output

mA range: ..... 0 to 24 mA  
 mA accuracy: ..... ±0.015% rdg +2 µA  
 Transmitter supply: ..... 24 VDC  
 Peak hold capture: ..... 50 milliseconds  
 Switch test input: ..... supply max. 9 VDC

### Useful soft case

The indicator is available separately and all APC units are supplied in a handy softcase.

The soft case that protects the instrument is engineered so that it becomes a useful part of the instrument. The soft case is designed for easy vertical operation so that when you open the case you will have easy access to all your test leads in the pocket. A flap in the top and an opening in the bottom provide access to the termination block and the pressure module connector. The soft case includes a shoulder strap for convenient transportation of the instrument when climbing ladders, etc.

At the back of this case you will also find a handy strap that fits your hand or makes it possible to hang the instrument on a pipe, ladder or the like while performing the calibration, test, or service task.



### RS232 communication interface

Connector: ..... Stereo jack  
 Serial: ..... 0-5 VDC, 9600 baud, 8 data, no parity, 1 stop  
 Protocol: ..... ASCII command language  
 Media compatibility ..... Non corrosive gasses and liquids.

### Pressure connection

Indicators 200 psi / 15 bar and below: ..... 1/8" NPT female  
 Indicators 500 psi / 35 bar and above: ..... 1/8" NPT male  
 Adapters to 1/4" NPT and BSP female are included as standard

### Pressure overload

Overload: ..... +50% F.S.  
 Overload alarm: ..... "OL" in display at +20% F.S.

### Power supply

Battery ..... 1 x 9 VDC Alkaline  
 Battery life ..... Minimum 20 hours  
 Battery life with APM module connected... Minimum 10 hours  
 Low battery indicator ..... at 7 VDC

### Instrument dimensions

Indicator L x W x H: ..... 7.9 x 3.2 x 2.1 in / 200 x 82 x 54 mm  
 Indicator weight (including battery): ..... 470 g / 17 oz  
 Indicator L x W x H, shipping: ..... 45 x 567 x 45 in /  
 ..... 333 x 888 x 444 mm  
 Indicator weight, shipping: ..... 2.4 lb / 1.1 kg

### Miscellaneous

CE Conformity ..... EN61326: 1998  
 DNV Marine Approval, Certificate no.: ..... A-9557

### Complete aluminum carrying case

The APC is available as an indicator or in one of 6 test-ready systems that are complete and equipped to meet your pressure calibration needs.

The complete ready-to-use system is delivered in a practical aluminum carrying case.



# JOFRA™ APC Series

## Advanced Pressure Calibration System A

- 0 to 10 psi (0.7 bar)
- 0 to 30 psi (2 bar)
- 0 to 200 psi (15 bar)

This system includes the JOFRA APC calibrator together with one of the following pneumatic hand pumps: T-730 or T-740, depending on the chosen pressure range.

System A is an easy-to-use single hand operated calibration system. No need for a flat surface to operate the system - just hold it in your hand.

The System A comes in an aluminum carrying case with cutouts for fittings, hose, and the complete assembled calibration unit - no time is required to assemble the unit every time you need it. The calibrator (indicator) can at any time be used separately for other pressure test tasks. A special quick connector between the pump and the indicator makes it possible to separate the system in seconds and to swivel the indicator for easy viewing.

The JOFRA APC delivery always includes a protective soft-case for the indicator. All APC indicators used in System A are delivered calibrated in both pressure and vacuum. If a vacuum pump is required see below or APC System B.



### T-700 series hand pumps

This hand pump is used in the APC System A. Three pump models are available, each covering a specific pressure range.

The pump features a built-in vent valve, a vernier valve for fine adjustment, and dual pressure output. There is an easy connection between the pump and the calibrator.



Range, T-730: ..... 0 to 30 psi / 0 to 2 bar  
 Range, T-740: ..... 0 to 300 psi / 0 to 21 bar  
 Range, T-750: ..... 25 to 0 inHg / -0.850 to 0 bar  
 Test medium: ..... Air  
 Wetted parts: Aluminum, brass, stainless, ..steel, nylon, Nylatron GS  
 Connections to test object: ..... 24 in / 0.6 m hose with 1/4" BSP and NPT female terminations

Part No.	Description
T-730	Pump: 0 to 30 psi (0 to 2 bar)
T-740	Pump: 0 to 300 psi (0 to 21 bar)
T-750	Pump: -25 to 0 inHg (-0.850 to 0 bar)

#### For use with System A or standard pump connection:

11-90057	Fitting for APM-S pressure module 1) 1/4" NPT male to 1/4" NPT male
11-90067	Fitting for APM-H pressure module 1) 1/8" NPT male to 1/4" NPT male

Teflon tape is suggested with NPT fittings

1) Use standard 1/4" NPT female swivel fitting on pump

### Standard delivery:

#### APC calibrator (indicator):

- Traceable calibration certificate (NIST)
- With pressure and vacuum performance
- 9V battery
- Adapter to 1/4" NPT female from 1/8" NPT
- Adapter to 1/4" BSP female from 1/8" NPT
- Test leads: red and black
- Soft case and shoulder strap
- User manual

#### Also included with System A delivery:

- Hand pump T-730 for APC010C (10 psi / 0.7 bar)
- Hand pump T-730 for APC030C (30 psi / 2 bar)
- Hand pump T-740 for APC200C (200 psi / 15 bar)
- Hose 24 in / 0.6 m with 1/4" BSP and NPT female connector
- Quick connector between pump and indicator
- 1 roll of teflon tape
- Aluminum carrying case
- Fitting to go from the quick connector on the indicator to 1/4" BSP or NPT female (when using the indicator as a gauge in the process)

### Shipping information

Weight ..... 12.13 lb / 5.5 kg  
 Size ..... 7.4 x 13.8 x 22 in / 188 x 350 x 560 mm

### Accessories

Part No.	Description
Recommended fitting set for the system - to interface your device-under-test with the test hose:	
65R191	Fitting set BSP female: 1x1/8" 1x3/8" 1x1/2" teflon tape and packings (60R191)
65R192	Fitting set NPT female: 1x1/8" 1x1/4" 1x3/8" 1x1/2" teflon tape and packings (60R191)
60R191	Set of rubber packings for 65R191 and 65R192
60H104	Roll of teflon tape
60R178	Fitting: From the quick connector to 1/4" BSP fem.
60R166	Fitting: From the quick connector to 1/4" NPT fem.
SPK-HPC-002	System quick connector including T-873
T-873	Replacement swivel fitting for the pumps
124109	Aluminum carrying case for APC system A
123958	Serial communication cable for PC
T-746	Service kit for T-730 and T-740
T-747	Service kit for T-750 pump

### Ordering information System A

Order No.	Description
<b>Pressure calibrator - 1st through 3rd characters</b>	
APC	APC pressure calibrator
<b>Indicator pressure range - 4th through 7th characters</b>	
010C	Vacuum to 10 psi (0.7 bar)
030C	Vacuum to 30 psi (2 bar)
200C	Vacuum to 200 psi (15 bar)
<b>Base model number - 8th through 10th characters</b>	
AXX	APC calibration System A with automatic pneumatic pressure hand pump
<b>Certificate - 11th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

**APC030CAXXG** Sample order number  
 JOFRA APC 30 psi (2 bar) pressure calibration System A T-730 hand pump and NIST traceable calibration certificate.

# JOFRA™ APC Series

## Advanced Pressure Calibration System B

- Vacuum to 200 psi (15 bar)
- Vacuum to 500 psi (35 bar)

This system includes the dual function pneumatic hand pump. With this pump you can calibrate both vacuum and pressure applications.

It takes just a few seconds to switch between vacuum and pressure, just push one button (valve) on the T-910 handpump.

The System B comes in an aluminum carrying case with cutouts for fittings, hose and the complete assembled calibration unit - no time required to assemble the unit every time.

The indicator and the pump are fitted with a special quick connector that makes it possible to separate the system in seconds without any tool. This quick connector also makes it possible to use the assembled system with the indicator twisted to any angle.



### T-910 hand pump

The T-910 pump is an easy-to-use single hand-operated pneumatic pump. The T-910 pump features both vacuum and pressure generation up to 580 psi (40 bar).

One button (valve) makes it easy to switch from vacuum to pressure measurements. Built-in release valve, vernier valve for fine adjustment and dual pressure output enable safe and simple operation.



Pressure range..... -14 psi to 580 psi / -0.960 to 40 bar  
 Test medium..... Air  
 Wetted parts.....Anodized aluminum, nickel-plated brass,  
 ..... stainless steel, Nylon  
 Connections to test object: ..... Hose 40 in / 1 m with 1/4" BSP  
 ..... and NPT female terminations

Part No.	Description
T-910	Pump: -29 inHg to 580 psi (-0.960 to 40 bar)

#### For use with System B or standard pump connection:

11-90057	Fitting for APM-S pressure module <sup>1)</sup> 1/4" NPT male to 1/4" NPT male
11-90067	Fitting for APM-H pressure module <sup>1)</sup> 1/8" NPT male to 1/4" NPT male

Teflon tape is suggested with NPT fittings

<sup>1)</sup> Use 1/4" NPT female x 3/8" BSP male adapter supplied with pump

### Standard delivery:

#### APC calibrator (indicator):

- Traceable calibration certificate (NIST)
- With pressure and vacuum performance
- 9 V battery
- Adapter to 1/4" NPT female from 1/8" NPT
- Adapter to 1/4" BSP female from 1/8" NPT
- Test leads: red and black
- Soft carrying case
- User manual

#### Also included with System B delivery:

- Hand pump
- Hose 40 in / 1 m with 1/4" BSP and NPT female connector
- Quick connector between pump and indicator
- 1 roll of teflon tape
- Aluminum carrying case
- Fitting to go from the quick connector on the indicator to 1/4" BSP or NPT female (when using the indicator as a gauge in the process)

### Shipping information

Weight..... 12.13 lb / 5.5 kg  
 Size .....7.4 x 13.8 x 22 in / 188 x 350 x 560 mm

### Accessories

Part No.	Description
Recommended fitting set 65R191 or 65R192 for the system - to interface your device-under-test with the test hose:	
65R191	Fitting set BSP female: 1x1/8" 1x3/8" 1x1/2" teflon tape and packings (60R191)
65R192	Fitting set NPT female: 1x1/8" 1x1/4" 1x3/8" 1x1/2" teflon tape and packings (60R191)
60R191	Set of rubber packings for 65R191 and 65R192
60I104	Roll of teflon tape
60R178	Fitting: From the quick connector to 1/4" BSP fem.
60R166	Fitting: From the quick connector to 1/4" NPT fem.
SPK-HPC-001	System quick connector (System B 200 psi unit)
124110	Aluminum carrying case for APC system B
123958	Serial communication cable for PC
75P012	Service kit for T-910 pump
SPK-HPC-003	System quick connector (System B 500 psi unit)

### Ordering information APC System B

#### Order No. Description

<b>Pressure calibrator - 1st through 3rd characters</b>	
APC	APC pressure calibrator
<b>Indicator pressure range - 4th through 7th characters</b>	
200C	Vacuum to 200 psi (15 bar)
500C	Vacuum to 500 psi (35 bar)
<b>System - 8th through 10th characters</b>	
BXX	APC calibration System B
<b>Certificate - 11th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate
<b>APC200CBXXG</b>	<b>Sample order number</b> JOFRA APC 200 psi (15 bar) pressure calibration System B and NIST traceable calibration certificate.

# JOFRA™ APC Series

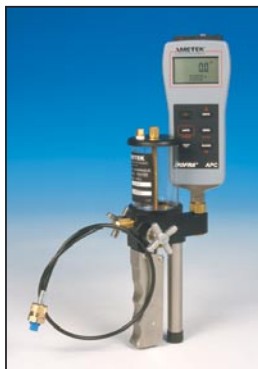
## Advanced Pressure Calibration System C

- 0 to 500 psi (35 bar)
- 0 to 1,000 psi (70 bar)
- 0 to 3,000 psi (200 bar)
- 0 to 5,000 psi (350 bar)

This system consists of an APC calibrator together with a hydraulic, high pressure hand pump T-620 or T-620H, which features an oil reservoir to prime the system.

System C is an easy-to-use single hand-operated calibration system. No need for a flat surface (table) to operate the system. The system includes release valve and vernier valve for fine adjustment to enable safe and simple operation of the pump.

The System C comes in an aluminum carrying case with cutouts for fittings, hose, and the complete assembled calibration unit - no time adder to assemble the unit every time. Easy and fast connection between pump and calibrator makes it easy to use the pressure indicator separately for other pressure test tasks.



### AMETEK hydraulic hand pump with oil reservoir

This easy-to-use hand pump is specially designed for high pressure applications. The pump is used in the APC system C.

The pump has a 0.5 pint / 200 cl built-in oil reservoir, vent valve, and vernier valve for fine adjustment. The pump has a dual pressure output - one for the test object and one for the APC calibrator.



Range, T-620 ..... 0 to 3,000 psi / 200 bar  
 Range, T-620H..... 0 to 5,000 psi / 350 bar  
 Test medium..... Hydraulic oil  
 Wetted parts..... Aluminum, brass, stainless steel, Lexan  
 Connection to test object:..... Hose 20 in / 0.5 m with 1/4" BSP and NPT female terminations

Part No.	Description
T-620	Pump: 0 to 3,000 psi (200 bar)
T-620H	Pump: 0 to 5,000 psi (350 bar)

#### For use with System C:

11-90067	Fitting for APM-S pressure module <sup>1)</sup> 1/8" NPT male to 1/4" NPT male
12-90135	Fitting for APM-H pressure module <sup>1)</sup> 1/8" NPT male to 1/8" NPT male
Teflon tape is suggested with NPT fittings	
<sup>1)</sup> 1/8" NPT female swivel fitting on pump	

#### For use with standard pump connections:

11-90057	Fitting for APM-S pressure module <sup>2)</sup> 1/4" NPT male to 1/4" NPT male
11-90067	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT male to 1/4" NPT male
Teflon tape is suggested with NPT fittings	
<sup>2)</sup> Use standard 1/4" NPT female swivel fitting on pump	

### Standard delivery:

#### APC calibrator (indicator):

- Traceable calibration certificate (NIST)
- 9 V battery
- Adapter to 1/4" NPT female from 1/8" NPT
- Adapter to 1/4" BSP female from 1/8" NPT
- Test leads; red and black
- Soft carrying case
- User manual

#### Also included with System C delivery:

- Hand pump T-620 or T-620H
- Hose 20 in / 0.5 m with 1/4" BSP and NPT female connector
- 1 roll of teflon tape
- Aluminum carrying case

### Shipping information

Weight ..... 12.13 lb / 5.5 kg  
 Size ..... 7.4 x 13.8 x 22 in / 188 x 350 x 560 mm

### Accessories

Part No.	Description
65P175	1 m hose with 1/4" BSP female termination Max. pressure 5,000 psi / 350 bar
65P180	2 m hose with 1/4" BSP female termination Max. pressure 5,000 psi / 350 bar
T-656	Service kit for pump
124299	Aluminum carrying case for System C
123958	Serial communication cable for PC
T-878	Replacement swivel fitting for pump to 1/8" NPT female for APC indicators
601104	Teflon tape

### Ordering information System C

#### Order No. Description

<b>Pressure calibrator - 1st thru 3rd characters</b>	
APC	APC pressure calibrator
<b>Indicator pressure range - 4th through 7th characters</b>	
500C	Vacuum to 500 psi (35 bar)
01KG	0 to 1,000 psi (70 bar)
03KG	0 to 3,000 psi (200 bar)
05KG	0 to 5,000 psi (350 bar)
<b>Base model number - 8th through 10th characters</b>	
CXX	APC calibration System C
<b>Certificate - 11th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate
<b>Sample order number</b>	
APC03KGCXXG	
JOFRA APC 3,000 psi (200 bar) pressure calibration System C hand pump for oil and NIST traceable calibration certificate.	

# JOFRA™ APC Series

## Advanced Pressure Calibration System D

- 0 to 500 psi (35 bar)
- 0 to 1,000 psi (70 bar)
- 0 to 3,000 psi (200 bar)
- 0 to 5,000 psi (350 bar)

This system consists of an APC calibrator with a rugged, hydraulic, high pressure screw pump.

System D is an easy-to-use calibration system. Place the pump on a flat surface and turn the handle to generate pressure. You can adjust the indicator to fit the best viewing angle. The system includes a manifold for connection of the test device, a fine adjustment vernier valve (optional), and a reservoir for extra oil or water (optional).

The System D comes in an aluminum carrying case with cutouts for fittings and the complete assembled calibration unit - no time adder to assemble the unit every time. Easy and fast connection between pump and calibrator makes it easy to use the pressure calibrator separately for other pressure test tasks.



### AMETEK screw pump

The AMETEK screw pump is designed for very easy generation of high pressure.

This pump is part of system D. The screw pump has a 4 output manifold. Fine adjustment, vernier valve, liquid reservoir, and fittings are optional. The AMETEK screw pump may be delivered for 2 different test media: hydraulic oil or water.



Pressure range..... 0 to 5,000 psi / 350 bar  
 Test media ..... Hydraulic oil, water  
 Wetted parts..... Aluminum, brass, stainless steel  
 Connections to test objects: ..... 4 x 1/4" BSP female

Part No.	Description
65-P016	Screw pump oil: 0 to 5,000 psi (350 bar) <sup>1)</sup>
65-P017	Screw pump water: 0 to 5,000 psi (350 bar) <sup>1)</sup>

<sup>1)</sup> 0.85 oz (25 ml) reservoir

#### For use with System D:

11-90110	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT female to 1/4" BSP female
12-90135	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT male to 1/8" NPT male
T-786	Fitting for APM-S pressure module 1/4" NPT male to 1/4" BSP male Teflon tape is suggested with NPT fittings Bonded seal is suggested with BSP fittings <sup>2)</sup> Both fittings are required for APM-H

#### For use with standard pump connections:

T-870	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT male to 1/4" BSP male
60R115	Fitting for APM-S pressure module <sup>2)</sup> <sup>3)</sup> 1/4" BSP male to 1/4" BSP male Teflon tape is suggested with NPT fittings Bonded seal is suggested with BSP fittings <sup>2)</sup> Use standard 1/4" BSP male connections on pump <sup>3)</sup> Use 1/4" BSP female adapter supplied with APM-S

### Standard delivery:

#### APC calibrator (indicator):

- Traceable calibration certificate (NIST)
- 9 V battery
- Adapter to 1/4" NPT female from 1/8" NPT
- Adapter to 1/4" BSP female from 1/8" NPT
- Test leads: red and black
- Soft carrying case
- User manual

#### Also included with System D delivery:

- Screw pump for oil or water
- 10 x 1/4" bonded seals, Allen key 6 mm
- 2 x 1/4" NPT female adapters
- 1 roll of teflon tape
- Aluminum carrying case

### Shipping information

Weight ..... 26.5 lb / 12 kg  
 Size ..... 9.1 x 17.3 x 29.5 in / 230 x 440 x 750 mm

### Accessories

Part No.	Description
65P175	1 m hose with 1/4" BSP female termination Max. pressure 5,000 psi /350 bar
65P180	2 m hose with 1/4" BSP female termination Max. pressure 5,000 psi / 350 bar
60I156	1.5 m hose with 1/4" BSP female termination Max. pressure 10,000 psi /700 bar
60I157	5 m hose with 1/4" BSP female termination Max. pressure 10,000 psi /700 bar
65N000	Extension tube, 120 mm
65-R975	10.14 oz (300 ml) reservoir set including valve and bonded seals
60R135	Valve for reservoir
60P013	Vernier valve for fine adjustment
124301	Aluminum carrying case for System D
123958	Serial communication cable for PC
50-REP-615	Quick connector set (male + female) (max. 10,000 psi / 700 bar)
SPK-HPC-004	Complete banjo/instrument connecting set
60I104	Teflon tape
60R120	1/4" bonded seal

### Ordering information System D

#### Order No. Description

<b>Pressure calibrator - 1st through 3rd characters</b>	
APC	APC pressure calibrator
<b>Indicator pressure range - 4th through 7th characters</b>	
500C	Vacuum to 500 psi (35 bar)
01KG	0 to 1,000 psi (70 bar)
03KG	0 to 3,000 psi (200 bar)
05KG	0 to 5,000 psi (350 bar)
<b>Base model number - 8th through 10th characters</b>	
DOX	APC calibration System D - oil
DWX	APC calibration System D - water
<b>Certificate - 11th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate
<b>Sample order number</b>	
APC03KGDOXG	JOFRA APC 3,000 psi (200 bar) pressure calibration System D screw pump for oil and NIST traceable calibration certificate.

# JOFRA™ APC Series

## Advanced Pressure Calibration System E

- 0 to 1,000 psi (70 bar)
- 0 to 3,000 psi (200 bar)
- 0 to 5,000 psi (350 bar)
- 0 to 10,000 psi (700 bar)

This system consists of an APC 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. You can adjust the indicator to fit the best viewing angle. The system includes a manifold for connection of two test devices and the fine adjustment vernier valve is standard.

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



### AMETEK hydraulic pump for System E

The AMETEK hydraulic pump is designed for high pressure applications. The pump is used in the APC System E.

The pump has a 4 pressure output manifold. Fine adjustment vernier valve and fittings are optional.



Pressure range..... 0 to 10,000 psi / 700 bar  
 Test media..... oil  
 Wetted parts..... Aluminum, brass, stainless steel  
 Connections to test objects: ..... 2 x 1/4" BSP female

Part No.	Description
65-P014	Hydraulic pump for oil: 0 to 10,000 psi (700 bar) <sup>1)</sup> 1) 15.22 oz (450 ml) reservoir

#### For use with System E:

11-90110	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT female to 1/4" BSP female
12-90135	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT male to 1/8" NPT male
T-786	Fitting for APM-S pressure module 1/4" NPT male to 1/4" BSP male Teflon tape is suggested with NPT fittings Bonded seal is suggested with BSP fittings 2) Both fittings are required for APM-H

#### For use with standard pump connections:

T-870	Fitting for APM-H pressure module <sup>2)</sup> 1/8" NPT male to 1/4" BSP male
60R115	Fitting for APM-S pressure module <sup>2) 3)</sup> 1/4" BSP male to 1/4" BSP male Teflon tape is suggested with NPT fittings Bonded seal is suggested with BSP fittings 2) Use standard 1/4" BSP male connections on pump 3) Use 1/4" BSP female adapter supplied with APM-S

### Standard delivery:

#### APC calibrator (indicator):

- Traceable calibration certificate (NIST)
- 9 V battery
- Adapter to 1/4" NPT female from 1/8" NPT
- Adapter to 1/4" BSP female from 1/8" NPT
- Test leads: red and black
- Soft carrying case
- User manual

#### Also included with system E delivery:

- Hydraulic pump
- 10 x 1/4" bonded seals, Allen key 6 mm
- 2 x 1/4" NPT female adapters
- 1 roll of teflon tape
- Aluminum carrying case

### Shipping information

Weight ..... 28.7 lb / 13 kg  
 Size ..... 9.1 x 17.3 x 29.5 in / 230 x 440 x 750 mm

### Accessories

Part No.	Description
60I156	1.5 m hose with 1/4" BSP female termination Max. pressure 10,000 psi / 700 bar
60I157	5 m hose with 1/4" BSP female termination Max. pressure 10,000 psi / 700 bar
124303	Aluminum carrying case for System E
123958	Serial communication cable for PC
50-REP-615	Quick connector set Max. pressure 10,000 psi (700 bar)
SPK-HPC-004	Complete banjo/instrument connecting set
60I104	Teflon tape
11-90109	1/4" BSP male to 1/4" NPT female
60P013	Vernier valve for fine adjustment
60R120	1/4" bonded seal

### Ordering information System E

#### Order No. Description

<b>Pressure calibrator - 1st through 3rd characters</b>	
APC	APC pressure calibrator
<b>Indicator pressure range - 4th through 7th characters</b>	
01KG	0 to 1,000 psi (70 bar)
03KG	0 to 3,000 psi (200 bar)
05KG	0 to 5,000 psi (350 bar)
10KG	0 to 10,000 psi (700 bar)
<b>Base model number - 8th through 10th characters</b>	
EXX	PC calibration System E - oil
<b>Certificate - 11th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate
<b>Sample order number</b>	
APC03KGEXXG   JOFRA APC 3,000 psi (200 bar) pressure calibration System E hydraulic pump for oil and NIST traceable calibration certificate.	

# JOFRA™ APC Series

## Advanced Pressure Calibration System F

- 0 to 500 psi (35 bar)
- 0 to 1,000 psi (70 bar)
- 0 to 3,000 psi (200 bar)
- 0 to 5,000 psi (350 bar)
- 0 to 10,000 psi (700 bar)

System F is an easy-to-use calibration system. The hydraulic pump makes it very easy to prime the system. The pump contains 75 in<sup>3</sup> / 1.23 l of liquid.



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

### AMETEK hydraulic pump for System F

The type T 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 the 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. <sup>1)</sup>

The Type T pump features a dual pressure output manifold, fine adjustment vernier valve, relief valve, and dual volume control for rapid pressure increase at lower pressures and easier pumping at higher pressures.

<sup>1)</sup> Customer must verify compatibility of seals and pump materials with pressure medium. Viton is a registered trademark.

Pressure range: ..... 0 to 15,000 psi / 1000 bar  
 Test media:.....Hydraulic oil, water, Skydrol  
 Wetted parts:.....Stainless steel, Monel  
 Connections to test objects: .....BSP fittings 1/4" and 1/2" female;  
 NPT fittings 1/4" and 1/2" female

Part No.	Description	Seals
T-1	Pump: 0 to 15,000 psi (1,000 bar) water	- Buna N <sup>2)</sup>
T-1/VITON	Pump: 0 to 15,000 psi (1,000 bar) water	- Viton
T-1/EPT	Pump: 0 to 15,000 psi (1,000 bar) water	- EPT
T-1/OIL	Pump: 0 to 15,000 psi (1,000 bar) oil	- Buna N <sup>2)</sup>
T-1/OIL/VITON	Pump: 0 to 15,000 psi (1,000 bar) oil	- Viton
T-1/OIL/EPT	Pump: 0 to 15,000 psi (1,000 bar) oil	- EPT

<sup>2)</sup> Standard

#### For use with System F:

11-90057	Fitting for APM-S pressure module <sup>3)</sup> 1/4" NPT male to 1/4" NPT male
11-90067	Fitting for APM-H pressure module <sup>3)</sup> 1/8" NPT male to 1/8" NPT male
T-134	Fitting for APM-S pressure module <sup>4)</sup> Union body to 1/4" NPT female

<sup>3)</sup> Uses the supplied 1/4" NPT female fitting (T-134)  
<sup>4)</sup> Only (1) supplied with pump

### Standard delivery:

#### APC calibrator (indicator):

- Traceable calibration certificate (NIST)
- 9 V battery
- Adapter to 1/4" NPT female from 1/8" NPT
- Adapter to 1/4" BSP female from 1/8" NPT
- Adapter 15/16-18 male to 1/8" NPT female
- Test leads: red and black
- Soft carrying case
- User manual

#### Also included with system F delivery:

- Hydraulic pump
- 2 x 1/4" bonded seals, Allen key 6 mm
- 2 x 1/4" NPT female adapters
- 1 roll of teflon tape
- Aluminum carrying case

### Shipping information

Weight .....39.7 lb / 18 kg  
 Size ..... 9.1 x 17.3 x 29.5 in / 230 x 440 x 750 mm

### Accessories

Part No.	Description
60I156	1.5 m hose with 1/4" BSP female termination Max. pressure 10,000 psi / 700 bar
60I157	5 m hose with 1/4" BSP female termination Max. pressure 10,000 psi / 700 bar
124304	Aluminum carrying case for system F
123958	Serial communication cable for PC
T-863	15/16-18 male to 1/8" NPT female
T-134	15/16-20 male to 1/4" NPT female
T-135	15/16-20 male to 1/2" NPT female
T-786	1/4" NPT male to 1/4" NPT female
T-787	1/2" NPT male to 1/4" NPT female

### Ordering information System F

#### Order No. Description

<b>Pressure calibrator - 1st through 3rd characters</b>	
APC	APC pressure calibrator
<b>Indicator pressure range - 4th through 7th characters</b>	
500C	Vacuum to 500 psi (35 bar)
01KG	0 to 1,000 psi (70 bar)
03KG	0 to 3,000 psi (200 bar)
05KG	0 to 5,000 psi (350 bar)
10KG	0 to 10,000 psi (700 bar)
<b>Base model number - 8th through 10th characters</b>	
FWB	APC cal. System F - water - seals: Buna N
FWV	APC cal. System F - water - seals: Viton
FWE	APC cal. System F - water - seals: EPT
FOB	APC cal. System F - oil - seals: Buna N
FOV	APC cal. System F - oil - seals: Viton
FOE	APC cal. System F - oil - seals: EPT
<b>Certificate - 11th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

#### APC10KGFOEG

#### Sample order number

JOFRA APC 10,000 psi (700 bar) pressure calibration System F. Hydraulic pump for oil and NIST traceable calibration certificate.

**APC INDICATOR PRESSURE RANGES**

This table shows the resolutions that can be obtained by the APC indicators throughout all engineering units.

Resolution	APC010C Vacuum to 10 psi Vacuum to 0.7 bar		APC30C Vacuum to 30 psi Vacuum to 2 bar		APC200C Vacuum to 200 psi Vacuum to 15 bar		APC500C Vacuum to 500 psi Vacuum to 35 bar	
	<b>Imperial ranges</b>							
psi	-10.0000	10.0000	-12.000	30.000	-12.00	200.00	-12.00	500.00
inH2O@4°C	-276.81	276.81	-332.17	830.42	-332.2	5536.1	-332,2	13840,4
inH2O@20°C	-277.30	277.30	-332.76	831.89	-332.8	5545.9	-332,8	13864,9
inH2O@60°F	-277.08	277.08	-332.50	831.24	-332.5	5541.6	-332,5	13854,0
ftH2O@4°C	-23.067	23.067	-27.681	69.202	-27.68	461.35	-27.68	1153.36
ftH2O@20°C	-23.108	23.108	-27.730	69.324	-27.73	462.16	-27.73	1155.40
ftH2O@60°C	-23.090	23.090	-27.708	69.270	-27.71	461.80	-27.71	1154.50
inHg@0°C	-20.360	20.360	-24.432	61.081	-24.43	407.21	-24.43	1018.01
<b>Metric ranges</b>								
bar	-0.7000	0.7000	-0.8300	2.0000	-0.8300	15.0000	-0.830	35.000
mbar	-700.00	700.00	-830.0	2000.0	-830,0	15000,0	-830	35000
kPa	-70.000	70.000	-83.00	200.00	-83.00	1500.00	-83.0	3500.0
kg/cm2	-0.7138	0.7138	-0.8464	2.0394	-0.8464	15.2957	-0.846	35.690
cmH2O@4°C	-713.82	713.82	-846.4	2039.5	-846,4	15296,2	-846	35691
cmH2O@20°C	-715.08	715.08	-847.9	2043.1	-847,9	15323,2	-848	35754
mH2O@4°C	-7.1382	7.1382	-8.464	20.395	-8.464	152.962	-8.46	356.91
mH2O@20°C	-7.1508	7.1508	-8.479	20.431	-8.479	153.232	-8.48	357.54
mmHg@0°C	-525.04	525.04	-622.6	1500.1	-622,6	11251,0	-623	26252

Resolution	APC01KG 0 to 1,000 psi 0 to 70 bar		APC03KG 0 to 3,000 psi 0 to 200 bar		APC05KG 0 to 5,000 psi 0 to 350 bar		APC10KG 0 to 10,000 psi 0 to 700 bar	
	<b>Imperial ranges</b>							
psi		1000.00		3000.0		5000.0		10000.0
inH2O@4°C		27681		83042		138404		276807
inH2O@20°C		27730		83189		138649		277297
inH2O@60°F		27708		83124		138540		277080
ftH2O@4°C		2306.7		6920.2		11533,6		23067
ftH2O@20°C		2310.8		6932.4		11554,0		23108
ftH2O@60°C		2309.0		6927.0		11545,0		23090
inHg@0°C		2036.0		6108.1		10180,1		20360
<b>Metric ranges</b>								
bar		70.000		200.00		350.00		700.00
mbar		70000		200000		350000		700000
kPa		7000.0		20000		35000		70000
kg/cm2		71.380		203.94		356.90		713.80
cmH2O@4°C		71382		203949		356910		713821
cmH2O@20°C		71508		204309		357541		715081
mH2O@4°C		713.82		2039.5		3569.1		7138.2
mH2O@20°C		715.08		2043.1		3575.4		7150.8
mmHg@0°C		52504		150013		262522		525045

## ORDERING INFORMATION - APC INDICATOR

### Order No. Description

<b>Pressure calibrator – 1st through 3rd characters</b>	
APC	APC Pressure Calibrator
<b>Indicator pressure range – 4th through 7th characters</b>	
010C	Vacuum to 10 psi (0.7 bar)
030C	Vacuum to 30 psi (2 bar)
200C	Vacuum to 200 psi (15 bar)
500C	Vacuum to 500 psi (35 bar)
01KG	0 to 1,000 psi (70 bar)
03KG	0 to 3,000 psi (200 bar)
05KG	0 to 5,000 psi (350 bar)
10KG	0 to 10,000 psi (700 bar)
<b>Base model number – 8th through 10th characters</b>	
IND	APC indicator only with standard accessories for configuration
<b>Certification – 1th character</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate (optional – on quotation basis)
<b>Sample order number</b>	
APC030CINDG	JOFRAC APC 30 psi (2 bar) calibrator with standard accessories and NIST traceable calibration certificate.



**AMETEK**

### Calibration Instruments

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

### JOFRA Temperature standards

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

### JOFRA 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.

### JOFRA Signal calibration

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

### M&G Primary pressure standards

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

### Frode Pedersen sensors

AMETEK Denmark A/S are producing and selling temperature sensors for industrial and marine use under the brand name Frode Pedersen.

### JOFRA & JF Marine Instruments

AMETEK offers a complete range of calibration equipment for temperature, pressure, and signal approved for marine use.

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

**AMETEK**<sup>®</sup>  
CALIBRATION INSTRUMENTS

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.

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