

pressure

JOFRA™

Specification Sheet
SS-CP-2181-US

NEW SYSTEM A + B PUMPS

Model APC Advanced Pressure Calibrator

Pressure range

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

High accuracy

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

True field calibrator

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

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.

Documentation made easy

RS232 communication and JOFRACAL calibration software are included in the standard delivery

Complete marine program

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

ISO 9001 Manufacturer

PRODUCT DESCRIPTION

This remarkable calibrator features deadweight tester accuracy in a modern digital package. The APC is available as an calibrator or in one of 6 test-ready systems that are complete and equipped to meet your pressure calibration needs.

The APC may be used in applications from safety valve verification to pressure transmitter.



Features

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 calibrator; and at a lower cost than purchasing another APC. The APM modules are also compatible with several other JOFRA calibrators.

Calibration of the instrument may be performed locally without returning the APC unit to the manufacturer. Everything needed is an accurate pressure reference. If a factory calibration is required, the pump and calibrator are independent and only the calibrator needs to be returned.

AMETEK®
CALIBRATION INSTRUMENTS

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

Electrical connections

The APC calibrator 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.



JOFRA APM pressure module

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

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

Please find more information about the APM series in specification sheet SS-CP-2190 at www.jofra.com

JOFRACAL CALIBRATION SOFTWARE

JOFRACAL calibration software ensures easy calibration of RTD's, thermocouples, transmitters, thermoswitches, pressure gauges and pressure switches. JOFRACAL can be used with JOFRA DPC-500, APC, CPC 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 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.

Please find more information about JOFRACAL calibration software in specification sheet SS-CP-2510, which may be found at www.jofra.com

REQUIREMENTS JOFRACAL

Minimum hardware requirements:

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

Minimum software requirements:

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

FUNCTIONAL SPECIFICATIONS

Pressure range

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

Engineering units (built-in)

User selectable 17 units
(psi, inH₂O@4°C, inH₂O@20°C, inH₂O@60°F, inHg@0°C, ftH₂O@4°C,
ftH₂O@20°C, ftH₂O@60°F, bar, mbar, kPa, kg/cm², cmH₂O@4°C,
cmH₂O@20°C, mH₂O@4°C, mH₂O@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 calibrator) ±0.1% F.S.
Vacuum (30, 200 psi / 2, 15 bar calibrator) ±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.

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

ACCESSORIES

Complete aluminum carrying case

The APC is available as an calibrator 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.



Useful soft case

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



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.

Environmental

Operating temperature -10°C to 50°C / 14°F to 122°F
(Temp. comp. 0 to 50°C)
Storage temperature -20°C to 60°C / -4°F to 140°F

Pressure connection

Calibrators 200 psi / 15 bar and below 1/8" NPT female
Calibrators 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 calibrator at 7 VDC

Instrument dimensions (L x W x H)

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

Miscellaneous

CE Conformity EN61326: 1998
The JOFRA APC is type approved by Det Norske Veritas.
Find the certificate at our web-page www.jofra.com
Approval, Certificate no. A-10549



JOFRA APC PRESSURE RANGES

This table shows the resolutions that can be obtained by the APC calibrators 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 | |
|-----------------|--|---------|---|--------|--|---------|--|---------|
| Imperial ranges | | | | | | | | |
| 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 |
| Metric ranges | | | | | | | | |
| 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 |
|-------------------------|--|---|---|--|
| Imperial ranges | | | | |
| psi | 1000.00 | 3000.0 | 5000.0 | 10000.0 |
| inH ₂ O@4°C | 27681 | 83042 | 138404 | 276807 |
| inH ₂ O@20°C | 27730 | 83189 | 138649 | 277297 |
| inH ₂ O@60°F | 27708 | 83124 | 138540 | 277080 |
| ftH ₂ O@4°C | 2306.7 | 6920.2 | 11533,6 | 23067 |
| ftH ₂ O@20°C | 2310.8 | 6932.4 | 11554,0 | 23108 |
| ftH ₂ O@60°C | 2309.0 | 6927.0 | 11545,0 | 23090 |
| inHg@0°C | 2036.0 | 6108.1 | 10180,1 | 20360 |
| Metric ranges | | | | |
| bar | 70.000 | 200.00 | 350.00 | 700.00 |
| mbar | 70000 | 200000 | 350000 | 700000 |
| kPa | 7000.0 | 20000 | 35000 | 70000 |
| kg/cm ² | 71.380 | 203.94 | 356.90 | 713.80 |
| cmH ₂ O@4°C | 71382 | 203949 | 356910 | 713821 |
| cmH ₂ O@20°C | 71508 | 204309 | 357541 | 715081 |
| mH ₂ O@4°C | 713.82 | 2039.5 | 3569.1 | 7138.2 |
| mH ₂ O@20°C | 715.08 | 2043.1 | 3575.4 | 7150.8 |
| mmHg@0°C | 52504 | 150013 | 262522 | 525045 |

JOFRA APC System A

- 0 to 2 bar (0 to 30 psi)
- 0 to 21 bar (0 to 300 psi)
- Vacuum to 0 bar (0 psi)

This system includes the JOFRA APC calibrator together with one of the following pneumatic hand pumps: T-960 and T-970, 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 aluminium 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 can at any time be used separately for other pressure test tasks.

A special quick connector between the pump and the calibrator makes it possible to separate the system in seconds and to swivel the calibrator for easy viewing.

The JOFRA APC calibrators used in System A are delivered calibrated in both pressure and vacuum.



T-960 and T-970 pumps for system A

Model T-960 pneumatic pressure pump features an extended range vernier adjustment for precisely controlling pump pressure and comfortable pistol grip handle.

Model T-970 pneumatic pressure pump is similar to the T-960, but generate pressure up to 40 bar (580 psi).

Pressure range, T-960 0 to 2 bar / 0 to 30 psi
 Pressure range, T-970..... 0 to 40 bar / 0 to 580 psi
 Type..... Pneumatic
 Test medium..... Air
 Operation Scissor
 "O"-rings Buna-N
 Wetted parts..... Aluminium, brass, stainless, steel, nylon, Nylatron GS
 Connection to test object Hose 0.6 m / 24 in with 1/4" BSP and NPT female terminations
 Size..... 21.6 x 12.1 x 6.2 cm / 8.5 x 4.8 x 2.4 in
 Weight 1.4 kg / 3.0 lb

Ordering

| Part No. | Description |
|----------|-----------------------------|
| T-960 | Pump: 0 to 2 bar (30 psi) |
| T-970 | Pump: 0 to 40 bar (580 psi) |

Included with System A delivery

- Standard delivery (see page 12)
- Hand pump T-960 or T-970
- 3/8" BSP female adapter with 1/4" BSP and NPT female terminations
- 0.6 m / 24 in hose with 1/4" BSP and NPT female terminations
- Quick connector between pump and calibrator
- 1 roll of Teflon tape
- Protective carrying case

Accessories

| Part No. | Description |
|-------------|---|
| 75P014 | Service kit for T-960 pump |
| 75P016 | Service kit for T-970 pump |
| T-733-2 | Pressure hose for T-960/970, 0.6 meter std. |
| T-733-3 | Pressure hose for T-960/970, 0.5 meter |
| T-733-4 | Pressure hose for T-960/970, 1.0 meter |
| T-733-5 | Pressure hose for T-960/970, 2.0 meter |
| T-733-6 | Pressure hose for T-960/970, 5.0 meter |
| 65R191 | Set of BSP female fittings, teflon tape, packings * Fitting size : 1x1/8", 1x3/8", 1x1/2" |
| 65R192 | Set of NPT female fittings, teflon tape, packings * Fitting size : 1x1/8", 1x1/4", 1x3/8" 1x1/2" |
| 60R191 | 1 set of packing and seals for 65R191 and 65R192 |
| 123958 | RS232 cable with stereo Jack connector, 2m/6ft |
| 124717 | 1x 9 Volt rechargeable battery |
| 124718 | Charger for rechargeable batteries - 115/230 VAC |
| SPK-HPC-001 | Quick connector set for APC system A / B (0.7-2 bar / 10-30 psi) |
| SPK-HPC-003 | Quick connector set for APC system A / B (15 bar / 200 psi) |

Connections for APM H/S pressure modules

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

Ordering information System A

| Order No. | Description |
|----------------------------------|---------------------------------------|
| APC | APC pressure calibrator |
| Calibrator pressure range | |
| 010C | Vacuum to 0.7 bar (10 psi) |
| 030C | Vacuum to 2 bar (30 psi) |
| 200C | Vacuum to 15 bar (200 psi) |
| NONE | Pump system only (no calibrator) |
| Base model number | |
| AXX | APC System A (pump T-960) |
| AHX | APC System A (pump T-970) |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate |

APC030CAXXG Sample order number

JOFRA APC 2 bar (30 psi) calibrator in pressure System A with pneumatic pressure handpump and NIST traceable calibration certificate.

JOFRA APC System B

- Vacuum to 0.7 bar (10 psi)
- Vacuum to 2 bar (30 psi)
- Vacuum to 15 bar (200 psi)
- Vacuum to 35 bar (500 psi)



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-975 handpump.

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

The calibrator 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 calibrator twisted to any angle.

T-975 hand pump for system B

Model T-975 pneumatic pressure pump features both vacuum and pressure generation. A 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. The unit offers both metric and imperial threads on the reference connection and the hose.

Pressure range..... -0.91 to 40 bar / -27 inHg to 580 psi
Type..... Pneumatic
Test medium..... Air
Operation Scissor
"O"-rings Buna-N
Wetted parts..... Anodized aluminium, nickel-plated brass,
..... stainless steel, Nylon
Connection to test object Hose 0.6 m / 24 in
..... with 1/4" BSP and NPT female terminations
Size..... 21.6 x 12.1 x 6.2 cm / 8.5 x 4.8 x 2.4 in
Weight 1.4 kg / 3.0 lb

Ordering

| Part No. | Description |
|----------|---|
| T-975 | Pump: -0.91 to 40 bar (-27 inHg to 580 psi) |

Included with System B delivery

- Standard delivery (see page 12)
- Hand pump T-975 for all ranges
- 3/8" BSP female adapter with 1/4" BSP and NPT female terminations
- 0.6 m / 24 in hose with 1/4" BSP and NPT female terminations
- Quick connector between pump and calibrator
- 1 roll of Teflon tape
- Protective carrying case

Accessories

| Part No. | Description |
|-------------|---|
| 75P017 | Service kit for T-975 pump |
| T-733-2 | Pressure hose for T-975, 0.6 meter std. |
| T-733-3 | Pressure hose for T-975, 0.5 meter |
| T-733-4 | Pressure hose for T-975, 1.0 meter |
| T-733-5 | Pressure hose for T-975, 2.0 meter |
| T-733-6 | Pressure hose for T-975, 5.0 meter |
| 65R191 | Set of BSP female fittings, teflon tape, packings * Fitting size : 1x1/8", 1x3/8", 1x1/2" |
| 65R192 | Set of NPT female fittings, teflon tape, packings * Fitting size : 1x1/8", 1x1/4", 1x3/8" 1x1/2" |
| 60R191 | 1 set of packing and seals for 65R191 and 65R192 |
| 123958 | RS232 cable with stereo Jack connector, 2m/6ft |
| 124717 | 1x 9 Volt rechargeable battery |
| 124718 | Charger for rechargeable batteries - 115/230 VAC |
| SPK-HPC-001 | Quick connector set for APC system A / B |
| SPK-HPC-003 | Quick connector set for APC system B (35 bar / 500 psi) |

Connections for APM H/S pressure modules

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

Ordering information APC System B

| Order No. | Description |
|----------------------------------|--|
| APC | Pressure calibrator APC pressure calibrator |
| Calibrator pressure range | |
| 010C | Vacuum to 0.7 bar (10 psi) |
| 030C | Vacuum to 2 bar (30 psi) |
| 200C | Vacuum to 5 bar (200 psi) |
| 500C | Vacuum to 35 bar (500 psi) |
| NONE | Pump system only (no calibrator) |
| System | |
| BXX | APC System B (pump T-975) |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate |

APC200CBXXG Sample order number

JOFRA APC 15 bar (200 psi) pressure System B with pneumatic combination handpump and NIST traceable calibration certificate.

JOFRA APC System C

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



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 aluminium 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 calibrator separately for other pressure test tasks.

AMETEK hydraulic handpump

This easy-to-use hand pump is specially designed for high pressure applications. The pump has a built-in 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.

Pressure range, T-620 0 to 200 bar / 3,000 psi
Pressure range, T-620H..... 0 to 350 bar / 5,000 psi
Type..... Hydraulic
Test medium..... Oil
Reservoir capacity200 cl / 0.5 pint
Operation Pistol-grip
"O"-rings Buna-N
Wetted parts..... Aluminum, brass, stainless steel, Lexan
Connection to test object Hose 0.6 m / 24 in
..... with 1/4" BSP and NPT female terminations
Size.....21.6 x 12.1 x 6.2 cm / 8.5 x 4.8 x 2.4 in
Weight 1.4 kg / 3.0 lb

Ordering

Part No. Description

T-620 Pump: 0 to 200 bar (3,000 psi)
T-620H Pump: 0 to 350 bar (5,000 psi)

Included with System C delivery

- Standard delivery (see page 12)
- Hand pump T-620 or T-620H
- 0.6 m (24 in) hose with 1/4" NPT female and 1/4" BSP terminations
- 1 roll of Teflon tape
- Protective carrying case

Accessories

Part No. Description

T-656 Service kit for T-620 and T-620H pumps
T-649 Pressure hose for T-620/T-620H pumps
65P175 1 m hose with 1/4" BSP female termination
Max. pressure 350 bar (5,000 psi)
65P180 2 m hose with 1/4" BSP female termination
Max. pressure 350 bar (5,000 psi)
123958 RS232 cable with stereo Jack connector, 2m/6ft
124717 1x 9 Volt rechargeable battery
124718 Charger for rechargeable batteries - 115/230 VAC
MGAAA/QT Oil for T-620 & T-1 pump AAA OIL in
1-QUART CAN
MGAAA/GL Oil for T-620 & T-1 pump AAA OIL in
1-GALLON CAN

Connections for APM H/S pressure modules

11-90067 Fitting 1/8" NPT male to 1/4" NPT male
for APM-H pressure module with system C
12-90135 Fitting 1/8" NPT male to 1/8" NPT male
for APM-H pressure module with system C
11-90067 Fitting 1/8" NPT male to 1/4" NPT male
for APM-H pressure module
11-90057 fitting 1/4" NPT male to 1/4" NPT male
for APM-S pressure module

Ordering information System C

| Order No. | Description |
|----------------------------------|--|
| APC | Pressure calibrator APC pressure calibrator |
| Calibrator pressure range | |
| 500C | Vacuum to 35 bar (500 psi) |
| 01KG | 0 to 70 bar (1,000 psi) |
| 03KG | 0 to 200 bar (3,000 psi) |
| 05KG | 0 to 350 bar (5,000 psi) |
| NONE | Pump system only (no calibrator) |
| Base model number | |
| CXX | APC System C (pump T-620 / T-620 H) |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate |

APC03KGCXXG Sample order number

JOFRA APC 200 bar (3,000 psi) calibrator in pressure
System C with hydraulic pressure handpump and NIST
traceable calibration certificate.

JOFRA APC System D

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



This system consists of an APC calibrator with a 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. The calibrator may be adjusted to give 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 aluminium 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 screwpump

The 65-P016 and 65-P017 screwpumps are designed for very easy generation of high pressure. The screw-pumps has a 4 connection manifold. Fine adjustment, vernier valve, liquid reservoir, and fittings are optional. The AMETEK screwpump may be delivered for 2 different test media: hydraulic oil or water.

Pressure range..... 350 bar / 0 to 5,000 psi
Type..... Hydraulic
Test media..... Hydraulic oil, water
Operation Screw pump
"O"-rings Buna-N
Wetted parts..... Aluminum, brass, stainless steel
Connections to test objects..... 4 x 1/4" BSP female
Size..... 36.6 x 19.5 x 10.5 cm / 14.4 x 7.7 x 4.1 in
Weight 3.7 kg / 8.2 lb

Ordering

Part No. Description

- 65-P016 Screw pump oil: 0 to 350 bar (5000 psi) ¹⁾
65-P017 Screw pump water: 0 to 350 bar (5000 psi) ¹⁾

¹⁾ 25 ml (0.85 oz) reservoir

Included with System D delivery

- Standard delivery (see page 12)
- Screw pump 65-P016 for hydraulic oil or 65-P017 for water
- 10 x 1/4" bonded seals
- Allen key 6 mm
- 2 x 1/4" NPT female adapters
- 1 roll of Teflon tape
- Protective carrying case

Accessories

Part No. Description

- 60P013 Vernier valve fine adjustment for 65-P016/017
60P016 Packing set for screw pump oil part no. 65-P016
60P017 Packing set for screw pump water part no. 65-P017
65-R975 Reservoir set with seals, valve and bonded seal
60R135 Valve for oil reservoir
65P175 1 m. Pressure hose, (Max. 350 bar / 5,000 psi) *
65P180 2 m. Pressure hose, (Max. 350 bar / 5,000 psi) *
60I156 1.5 m. Pressure hose, (Max. 700 bar/10,000 psi)*
60I157 5 m., Pressure hose, (Max. 700 bar / 10,000 psi) *
65N000 Extension tube, 120 mm (Max. 350 bar / 5,000 psi) *
* 1/4" BSP female to 1/4" BSP male
123958 RS232 cable with stereo Jack connector, 2m/6ft
124717 1x 9 Volt rechargeable battery
124718 Charger for rechargeable batteries - 115/230 VAC
50-REP 615 Quick connector set, female 1/4"BSP to 1/4" BSP

Connections for APM H/S pressure modules

- 60R115 Fitting 1/4" BSP male x 1/4" BSP male for APM-S pressure module with system D
11-90109 Fitting 1/4" BSP male to 1/4" NPT female for APM-H pressure module with system D ¹⁾
11-90067 Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module with system D ¹⁾
T-786 Fitting 1/4" NPT male to 1/4" BSP female for APM-S pressure module with screw pump alone
T-870 Fitting 1/8" NPT male to 1/4" BSP female for APM-H pressure module with screw pump alone

¹⁾ Please note that both 11-90109 and 11-90067 are needed to work with APM-H pressure module

Ordering information System D

| Order No. | Description |
|----------------------------------|---------------------------------------|
| APC | APC pressure calibrator |
| Calibrator pressure range | |
| 500C | Vacuum to 35 bar (500 psi) |
| 01KG | 0 to 70 bar (1,000 psi) |
| 03KG | 0 to 200 bar (3,000 psi) |
| 05KG | 0 to 350 bar (5,000 psi) |
| NONE | Pump system only (no calibrator) |
| Base model number | |
| DOX | APC System D (pump 65-P016) |
| DWX | APC System D (pump 65-P017) |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate |

APC03KGDOXG Sample order number

JOFRA APC 200 bar (3,000 psi) calibrator in pressure System D with hydraulic oil screw pump and NIST traceable calibration certificate.

JOFRA APC System E

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



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 calibrator 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 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 high pressure hydraulic oil pump

The 65-P014 hydraulic pump is designed for high pressure applications. The pump has a 4 connection output manifold. Fine adjustment vernier valve and fittings are optional.

Pressure range..... 0 to 700 bar / 10,000 psi
Type..... Hydraulic
Test media..... Oil
Operation Jack pump
"O"-rings Buna-N
Wetted parts..... Aluminum, brass, stainless steel
Connections to test objects..... 4 x 1/4" BSP female
Size..... 36.5 x 20.0 x 14.2 cm / 14.4 x 7.9 x 5.6 in
Weight 5.3 kg / 11.6 lbs

Ordering

Part No. Description

65-P014 Hydraulic pump for oil: 0 to 700 bar (10,000 psi) ¹⁾

¹⁾ 450 ml (15.22 oz) reservoir

Included with System E delivery

- Standard delivery (see page 12)
- Hydraulic pump
- 10 x 1/4" bonded seals
- Allen key 6 mm
- 2 x 1/4" NPT female adapters
- 1 roll of Teflon tape
- Vernier valve for fine adjustment
- Protective carrying case

Accessories

Part No. Description

60P013 Vernier valve for fine adjustment
60P014 Packing set for Jack pump part no. 65-P014
60I156 1.5 m. Pressure hose, (Max. 700 bar/10,000 psi)*
60I157 5 m., Pressure hose, (Max. 700 bar / 10,000 psi) *
* 1/4" BSP female to 1/4" BSP male
123958 RS232 cable with stereo Jack connector, 2m/6ft
124717 1x 9 Volt rechargeable battery
124718 Charger for rechargeable batteries - 115/230 VAC
50-REP 615 Quick connector set, female 1/4"BSP
to 1/4" BSP

Connections for APM H/S pressure modules

60R115 Fitting 1/4" BSP male x 1/4" BSP male for APM-S pressure module with system E
11-90109 Fitting 1/4" BSP male to 1/4" NPT female for APM-H pressure module with system E ¹⁾
11-90067 Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module with system E ¹⁾
T-786 Fitting 1/4" NPT male to 1/4" BSP female for APM-S pressure module with Jackpump 65-P014 alone
T-870 Fitting 1/8" NPT male to 1/4" BSP female for APM-H pressure module with Jackpump 65-P014 alone

¹⁾ Please note that both 11-90109 and 11-90067 are needed to work with APM-H pressure module

Ordering information System E

| Order No . | Description |
|----------------------------------|--|
| APC | Pressure calibrator APC pressure calibrator |
| Calibrator pressure range | |
| 01KG | 0 to 70 bar (1,000 psi) |
| 03KG | 0 to 200 bar (3,000 psi) |
| 05KG | 0 to 350 bar (5,000 psi) |
| 10KG | 0 to 700 bar (10,000 psi) |
| NONE | Pump system only (no calibrator) |
| Base model number | |
| EXX | APC System E (pump 65-P014) |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate |

APC03KGEXXG Sample order number

JOFRA APC 200 bar (3,000 psi) calibrator in pressure System E with high pressure pump for hydraulic oil and NIST traceable calibration certificate.

JOFRA APC System F

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



System F is an easy-to-use calibration system. The hydraulic pump makes it very easy to prime the system. The pump contains 75 in³ / 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 Type T hydraulic oil or water pump

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. ¹⁾

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.

Pressure range..... 0 to 1,000 bar / 15,000 psi
Type..... Hydraulic
Test media..... Hydraulic oil, water
Reservoir capacity 1.23 l / 75 in³
Operation Jack pump
"O"-rings Buna-N (standard) or EPT / Viton (optional)
Wetted part..... Stainless steel, Monel
Connections to test objects..... 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

Ordering

| Part No. | Description | Seals |
|---------------|--|-------|
| T-1 | 0 to 1,000 bar (15,000 psi) water - Buna N ²⁾ | |
| T-1/VITON | 0 to 1,000 bar (15,000 psi) water - Viton ³⁾ | |
| T-1/EPT | 0 to 1,000 bar (15,000 psi) water - EPT ⁴⁾ | |
| T-1/OIL | 0 to 1,000 bar (15,000 psi) oil - Buna N ²⁾ | |
| T-1/OIL/VITON | 0 to 1,000 bar (15,000 psi) oil - Viton ³⁾ | |
| T-1/OIL/EPT | 0 to 1,000 bar (15,000 psi) oil - EPT ⁴⁾ | |

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

²⁾ Buna N are the standard "O" ring material for the hydraulic testers. They are used with water/alcohol or non corrosive oils.

³⁾ Viton "O" ring material is used for all corrosive oils other than Skydrol.

⁴⁾ EPT "O" ring material is specifically for Skydrol Oil used for hydraulic systems in airplanes, it is very corrosive.

Included with System F delivery

- Standard delivery (see page 12)
- Hydraulic pump
- 2 x 1/4" bonded seals
- Allen key 6 mm
- 1 roll of Teflon tape
- Protective carrying case

Accessories

| Part No. | Description |
|----------|--|
| T-250 | Service kit for T pump with Buna N O-rings |
| T-559 | Service kit for T pump with VITON N O-rings |
| T-326 | Service kit for T pump with EPT N O-rings |
| 60l156 | 1.5 m. Pressure hose, (Max. 700 bar/10,000 psi)* |
| 60l157 | 5 m., Pressure hose, (Max. 700 bar / 10,000 psi) * * 1/4" BSP female to 1/4" BSP male |
| 123958 | RS232 cable with stereo Jack connector, 2m/6ft |
| 124717 | 1x 9 Volt rechargeable battery |
| 124718 | Charger for 124716 batteries - 115/230 VAC |
| MGAAA/GL | Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN |
| MGAAA/QT | Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN |

Connections for APM H/S pressure modules

| | |
|----------|---|
| T-134 | Union Body-1/4" NPT Female for manifold pump T |
| 11-90067 | Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module ¹⁾ |
| 11-90057 | Fitting 1/4" NPT male to 1/4" NPT male for APM-S pressure module ¹⁾ |

¹⁾ Please note that both AM-T-134 and AM-11-90067 are needed to work with APM-H and both AM-T-134 and AM-11-90057 are needed to work with APM-S

Ordering information System F

| Order No. | Description |
|----------------------------------|---------------------------------------|
| APC | APC pressure calibrator |
| Calibrator pressure range | |
| 500C | Vacuum to 35 bar (500 psi) |
| 01KG | 0 to 70 bar (1,000 psi) |
| 03KG | 0 to 200 bar (3,000 psi) |
| 05KG | 0 to 350 bar (5,000 psi) |
| 10KG | 0 to 700 bar (10,000 psi) |
| NONE | Pump system only (no calibrator) |
| Base model number | |
| FWB | APC System F (pump T-1) |
| FWV | APC System F (pump T-1/VITON) |
| FWE | APC System F (pump T-1/EPT) |
| FOB | APC System F (pump T-1/OIL) |
| FOV | APC System F (pump T-1/OIL/VITON) |
| FOE | APC System F (pump T-1/OIL/EPT) |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate |

APC10KGFOEG Sample order number
JOFRA APC 700 bar (10,000 psi) calibrator in pressure
System F with Type T pump for oil and NIST traceable calibration certificate.

ORDERING INFORMATION - APC CALIBRATOR

| Order No. | Description |
|----------------------------------|---|
| APC | Pressure calibrator APC Pressure Calibrator |
| Calibrator pressure range | |
| 010C | Vacuum to 0.7 bar (10 psi) |
| 030C | Vacuum to 2 bar (30 psi) |
| 200C | Vacuum to 15 bar (200 psi) |
| 500C | Vacuum to 35 bar (500 psi) |
| 01KG | 0 to 70 bar (1,000 psi) |
| 03KG | 0 to 200 bar (3,000 psi) |
| 05KG | 0 to 350 bar (5,000 psi) |
| 10KG | 0 to 700 bar (10,000 psi) |
| Base model number | |
| IND | APC calibrator only with standard accessories for configuration |
| Certificate | |
| G | NIST traceable certificate (standard) |
| H | Accredited certificate (optional – on quotation basis) |
| APC030CINDG | Sample order number JOFRA APC 2 bar (30 psi) calibrator with standard accessories and NIST traceable calibration certificate. |

STANDARD DELIVERY

- APC calibrator
- 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
- Connection cable for RS232
- JOFRACAL calibration software
- Soft case and shoulder strap
- User manual



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

JOFRA Temperature Instruments
Portable precision thermometers. Dry-block and liquid bath calibrators: 4 series, with more than 25 models and temperature ranges from -90° to 1205°C / -130° to 2200°F. All featuring speed, portability, accuracy and advanced documenting functions with JOFRACAL calibration software.

JOFRA Pressure Instruments
Convenient electronic systems ranging from -1 to 1000 bar (25 inHg to 14,500 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

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

JOFRA / JF Marine Instruments
A complete range of calibration equipment for temperature, pressure and signal, approved for marine use.

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

M&G Pressure Testers
Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

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

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

AMETEK®
CALIBRATION INSTRUMENTS