

pressure

**JOFRA™**

Specification Sheet  
SS-CP-2181-US

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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 indicator 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 indicator; 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 indicator are independent and only the indicator 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 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.



### JOFRA APM 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](http://www.jofra.com)

## JOFRACAL CALIBRATION SOFTWARE

JOFRACAL calibration software ensures easy calibration of RTD's, thermocouples, transmitters, thermoswithes, pressure gauges and pressure switches. JOFRACAL can be used with JOFRA DPC-500, APC, CPC and IPI pressure calibrators, all JOFRA temperature calibrators, as well as JOFRA AMC900, 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](http://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



## APC INDICATOR 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, 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.

### 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

### 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

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 (L x W x H)

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

### Miscellaneous

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

## ACCESSORIES

### 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.



### Useful soft case

The APC indicator 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.



### 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-730, T-740 or T-750, 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 (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 softcase 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 for 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.

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

#### Part No. Description

- T-730 Pump: 0 to 2 bar (0 to 30 psi)  
 T-740 Pump: 0 to 21 bar (0 to 300 psi)  
 T-750 Pump: -0.850 to 0 bar (-25 to 0 inHg) <sup>1)</sup>

<sup>1)</sup> Pump T-750 is not part of the system and has to be bought separately. If used in an existing system remember to buy an extra replacement swivel fitting for pump (T-873)

### Included with System A delivery

- Standard delivery (see page 12)
- Base model AXX: Pump T-730 for APC010
- Base model AXX: Pump T-730 for APC030
- Base model AXX: Pump T-740 for APC200
- Base model AVX: Pump T-750 for APC010
- Base model AVX: Pump T-750 for APC200
- 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 ..... 5.5 kg / 12.13 lb  
 Size.....188 x 350 x 560 mm / 7.4 x 13.8 x 22 in

### Accessories

#### Part No. Description

- 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  
 AM-T-746 Service kit for T-730 and T-740 pumps  
 AM-T-747 Service kit for T-750 pump  
 AM-11-90067 Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module  
 AM-12-90136 Fitting 1/4" NPT male to 1/4" NPT male for APM-S pressure module  
 124716 4x 1,5 Volt rechargeable batteries  
 124718 Charger for 124716 batteries - 115/230 VAC

### Ordering information System A

Order No.	Description
APC	APC pressure calibrator
<b>Indicator pressure range</b>	
NONE	Pump system with std. acc. (no indicator)
010C	Vacuum to 0.7 bar (10 psi)
030C	Vacuum to 2 bar (30 psi)
200C	Vacuum to 15 bar (200 psi)
<b>Base model number</b>	
AXX	APC System A (pump T-730 or T-740)
AVX	APC System A (pump T-750)
<b>Certificate</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

### APC030CAXXG Sample order number

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

### APC System B

- 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-930 handpump.

The System B comes in an aluminium 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-930 hand pump for system B

The T-930 pump is an easy-to-use single hand-operated pneumatic pump. The T-930 pump features both vacuum and pressure generation up to 35 bar (500 psi).

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..... -0.95 to 35 bar / -14 psi to 500 psi  
 Test medium..... Air  
 Wetted parts..... Anodized aluminium, nickel-plated brass,  
 ..... stainless steel, Nylon  
 Connections to test object: Hose 1 m / 40 in with 1/4" BSP  
 ..... and NPT female terminations

Part No.	Description
T-930	Pump: -0.95 to 35 bar / -28 inHg to 500 psi



### Included with System B delivery

- Standard delivery (see page 12)
- Hand pump T-930 for all ranges
- 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 ..... 15.5 kg / 2.13 lb  
 Size.....7.4 x 13.8 x 22 in / 188 x 350 x 560 mm

### Accessories

Part No.	Description
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
75P013	Service kit for T-930 pump
50-REP 700	Set of 5 pcs of O-rings for quick connector
AM-12-90136	Fitting 1/4" NPT male to 1/4" NPT male for APM-H pressure module
AM-11-90067	Fitting 1/8" NPT male to 1/4" NPT male for APM-S pressure module
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for 124716 batteries - 115/230 VAC

### Ordering information APC System B

Order No.	Description
APC	APC pressure calibrator
<b>Indicator pressure range</b>	
NONE	Pump system with std. acc. (no indicator)
200C	Vacuum to 5 bar (200 psi)
500C	Vacuum to 35 bar (500 psi)
<b>System</b>	
BXX	APC calibration System B
<b>Certificate</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

**APC200CBXXG** Sample order number  
 JOFRA APC 15 bar (200 psi) pressure calibration System B and NIST traceable calibration certificate.

### 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 added 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 for system C

This easy-to-use hand pump is specially designed for high pressure applications. 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.

Pressure range, T-620 ..... 0 to 200 bar / 3,000 psi  
 Pressure range, T-620H..... 0 to 350 bar / 5,000 psi  
 Test medium..... Hydraulic oil  
 Wetted parts..... Aluminium, 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 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
- Hose 0.5 m with 1/4" BSP and NPT female connector
- 1 roll of teflon tape
- Aluminum carrying case

### Shipping information

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

### Accessories

Part No.	Description
65P175	1 meter, Pressure hose, (Max. 350 bar / 5,000 psi) * 1/4" BSP female to 1/4" BSP male
65P180	2 meter, Pressure hose, (Max. 350 bar / 5,000 psi) * 1/4" BSP female to 1/4" BSP male
60I104	Roll of Teflon tape
AM-T-656	Service kit for T-620 and T-620H pumps
AM-MGAAA/GL	Oil for T-620 pump AAA Oil in 1-gallon can
AM-MGAAA/QT	Oil for T-620 pump AAA Oil in 1-quart can
AM-11-90067	Fitting 1/8" NPT male to 1/4" NPT male for APM-S pressure module with system C
AM-12-90135	Fitting 1/8" NPT male to 1/8" NPT male for APM-H pressure module with system C
AM-11-90067	Fitting 1/8" NPT male to 1/4" NPT male for APM-S pressure module with T-620 pump alone
AM-12-90136	Fitting 1/4" NPT male to 1/4" NPT male for APM-H pressure module with T-620 pump alone
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for 124716 batteries - 115/230 VAC

### Ordering information System C

Order No.	Description
APC	APC pressure calibrator
	<b>Indicator pressure range</b>
NONE	Pump system with std. acc. (no indicator)
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</b>
CXX	APC calibration System C
	<b>Certificate</b>
G	NIST traceable certificate (standard)
H	Accredited certificate

### APC03KGCXXG Sample order number

JOFRA APC 200 bar (3,000 psi) pressure calibration System C hand pump for oil and NIST traceable calibration certificate.

### 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 indicator 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 screw pump for system D

The screw pump is designed for very easy generation of high pressure. 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 350 bar / 5,000 psi  
 Test media.....Hydraulic oil, water  
 Wetted parts..... Aluminium, brass, stainless steel  
 Connections to test objects:..... 4 x 1/4" BSP female

#### Part No. Description

- 65-P016 Screw pump oil: 0 to 350 bar (5,000 psi) <sup>1)</sup>  
 65-P017 Screw pump water: 0 to 350 bar (5,000 psi) <sup>1)</sup>  
<sup>1) 25 ml (0.85 oz) reservoir</sup>

### Ordering information System D

Order No.	Description
APC	APC pressure calibrator
<b>Indicator pressure range</b>	
NONE	Pump system with std. acc. (no indicator)
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)
<b>Base model number</b>	
DOX	APC calibration System D - oil
DWX	APC calibration System D - water
<b>Certificate</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

#### APC03KGDOXG Sample order number

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

### Included with System D delivery

- Standard delivery (see page 12)
- 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 ..... 12 kg / 26.5 lb  
 Size..... 230 x 440 x 750 mm / 9.1 x 17.3 x 29.5 in

### Accessories

#### Part No. Description

- 65P175 1 meter, Pressure hose, (Max. 350 bar / 5,000 psi)  
 \* 1/4" BSP female to 1/4" BSP male
- 65P180 2 meter, Pressure hose, (Max. 350 bar / 5,000 psi)  
 \* 1/4" BSP female to 1/4" BSP male
- 60I156 1.5 meter, Pressure hose, (Max. 700 bar / 10,000 psi)  
 \* 1/4" BSP female to 1/4" BSP male
- 60I157 5 meter, Pressure hose, (Max. 700 bar / 10,000 psi)  
 \* 1/4" BSP female to 1/4" BSP male
- 65N000 Extension tube, 120 mm (Max. 350 bar / 5,000 psi)  
 \* 1/4" BSP female to 1/4" BSP male
- 65-R975 Reservoir set with seals, valve and bonded seal
- 60R135 Valve for oil reservoir
- 60P013 Vernier valve for fine adjustment
- 50-REP 615 Quick connector set, female 1/4" BSP to 1/4" BSP
- 60I104 Role of Teflon tape
- 60P016 Packing set for screw pump oil
- 60P017 Packing set for screw pump water
- 60R115 Fitting 1/4" BSP male x 1/4" BSP male for APM-S pressure module with system D
- AM-11-90109 Fitting 1/4" BSP male to 1/4" NPT female for APM-H pressure module with system D <sup>1)</sup>
- AM-11-90067 Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module with system D <sup>1)</sup>
- AM-T-786 Fitting 1/4" NPT male to 1/4" BSP female for APM-S pressure module with screw pump alone
- AM-T-870 Fitting 1/8" NPT male to 1/4" BSP female for APM-H pressure module with screw pump alone
- 124716 4x 1,5 Volt rechargeable batteries
- 124718 Charger for 124716 batteries - 115/230 VAC

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



**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 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 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 hydraulic pump for System E**

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

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

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

**Ordering information System E**

Order No .	Description
APC	APC pressure calibrator
<b>Indicator pressure range</b>	
NONE	Pump system with std. acc. (no indicator)
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)
<b>Base model number</b>	
EXX	PC calibration System E - oil
<b>Certificate</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

**APC03KGEXXG** Sample order number  
 JOFRA APC 200 bar (3,000 psi) pressure calibration System E hydraulic pump for oil and NIST traceable calibration certificate.

**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
- Aluminum carrying case
- Vernier valve for fine adjustment

**Shipping information**

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

**Accessories**

Part No.	Description
60I156	1.5 meter, Pressure hose, (Max. 700 bar / 10,000 psi) * 1/4" BSP female to 1/4" BSP male
60I157	5 meter, Pressure hose, (Max. 700 bar / 10,000 psi) * 1/4" BSP female to 1/4" BSP male
50-REP 615	Quick connector set, female 1/4" BSP to 1/4" BSP
60I104	Roll of Teflon tape
60P014	Packing set for Jack pump part no. 65-P014
60R115	Fitting 1/4" BSP male x 1/4" BSP male for APM-S pressure module with system E
AM-11-90109	Fitting 1/4" BSP male to 1/4" NPT female for APM-H pressure module with system E <sup>1)</sup>
AM-11-90067	Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module with system E <sup>1)</sup>
AM-T-786	Fitting 1/4" NPT male to 1/4" BSP female for APM-S pressure module with Jackpump 65-P014 alone
AM-T-870	Fitting 1/8" NPT male to 1/4" BSP female for APM-H pressure module with Jackpump 65-P014 alone
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for 124716 batteries - 115/230 VAC

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

**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 hydraulic pump for System F**

The type T pump is designed for high pressure applications. The pump 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. Three seal packages are available 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.

Pressure range..... 0 to 1000 bar / 15,000 psi  
 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	0 to 1,000 bar (15,000 psi) water	- Buna N <sup>2)</sup>
T-1/VITON	0 to 1,000 bar (15,000 psi) water	- Viton
T-1/EPT	0 to 1,000 bar (15,000 psi) water	- EPT
T-1/OIL	0 to 1,000 bar (15,000 psi) oil	- Buna N <sup>2)</sup>
T-1/OIL/VITON	0 to 1,000 bar (15,000 psi) oil	- Viton <sup>3)</sup>
T-1/OIL/EPT	0 to 1,000 bar (15,000 psi) oil	- EPT <sup>4)</sup>

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
- 2 x 1/4" NPT female adapters
- 1 roll of teflon tape
- Aluminum carrying case

**Shipping information**

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

**Accessories**

Part No.	Description
60I156	1.5 meter, Pressure hose, (Max. 0 bar / 10,000 psi) * 1/4" BSP female to 1/4" BSP male
60I157	5 meter, Pressure hose, (Max. 700 bar / 10,000 psi) * 1/4" BSP female to 1/4" BSP male
60I104	Role of Teflon tape
AM-T-250	Service kit for T pump with Buna N O-rings
AM-T-250	Service kit for T pump with VITON N O-rings
AM-T-250	Service kit for T pump with EPT N O-rings
AM-T-134	Union Body-1/4" NPT Female for manifold on T pump
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for 124716 batteries - 115/230 VAC
AM-12-90136	Fitting 1/4" NPT male to 1/4" NPT male for APM-S pressure module with system F <sup>1)</sup>
AM-11-90067	Fitting 1/8" NPT male to 1/4" NPT male for APM-H pressure module with system F <sup>1)</sup>
AM-MGAAA/GL	Oil for T-1 pump AAA Oil in 1-gallon can
AM-MGAAA/QT	Oil for T-1 pump AAA Oil in 1-quart can

<sup>1)</sup> Please note that both AM-T-134 and AM-11-90136 are needed to work with APM-H pressure module

**Ordering information System F**

Order No.	Description
APC	APC pressure calibrator
<b>Indicator pressure range</b>	
NONE	Pump system with std. acc. (no indicator)
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)
<b>Base model number</b>	
FWB	System F - water - seal - Buna N
FWV	System F - water - seal - Viton
FWE	System F - water - seal - EPT
FOB	System F - oil - seal - Buna N
FOV	System F - oil - seal - Viton
FOE	System F - oil - seal - EPT
<b>Certificate</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate

APC10KGFOEG Sample order number  
 JOFRA APC 700 bar (10,000 psi) 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
APC	Pressure calibrator APC Pressure Calibrator
<b>Indicator pressure range</b>	
NONE	Pump system with std. acc. (no indicator)
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 pi)
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)
<b>Base model number</b>	
IND	APC indicator only with standard accessories for configuration
<b>Certificate</b>	
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



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 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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 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).

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