

pressure

# JOFRA<sup>®</sup> calibration

## » Wide pressure range

IPI100A	7 bar absolute / 100 psi
IPI030C	2 bar / 30 psi
IPI100C	7 bar / 100 psi
IPI300C	21 bar / 300 psi
IPI500C	35 bar / 500 psi
IPI015G	1 bar / 15 psi
IPI01KG	70 bar / 1,000 psi
IPI02KG	140 bar / 2,000 psi
IPI03KG	200 bar / 3,000 psi
IPI05KG	350 bar / 5,000 psi
IPI10KG	700 bar / 10,000 psi

## » High accuracy

±0.05% of F.S. for positive pressure  
Vacuum ranges to 500 psi (35 bar)

## » High flexibility

Easily disassemble the test system and use the indicator for other tasks

## » True field indicator

Lightweight and portable with full temperature-compensation, long battery life and large display for easy visibility

## » Record min and max readings

Capture the min and max pressure readings for safety valve applications

## » Complete marine programme

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

## » ATEX and CSA certification

The IPI Indicator is ATEX and CSA certified and designed for use in potentially explosive environments



ISO 9001 Manufacturer

Specification Sheet  
SS-IPI

## Industrial Pressure Calibrator IPI Indicators

Intrinsically  
safe



JOFRA IPI indicators bring together the ease of an analog gauge with the accuracy and easy-to-read display of a digital calibrator.

Use the JOFRA IPI in applications from safety valve checks to system pressure verification.

Furthermore the IPI indicator is ATEX and CSA certified for use in potentially explosive environments such as oil refineries, chemical plants and offshore platform, where there is a risk of inflammable gases.

This series is designed to meet your pressure measurement applications and make the tasks easier. The IPI offers 18 different pressure units, long battery life, high accuracy, and even serial communications. The accuracy of the IPI rivals that of a pressure calibrator and is temperature compensated for shop or in process applications. This versatile unit is available as a stand alone indicator or in a complete test system.

You can perform a calibration locally without returning the IPI 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.

The JOFRA IPI is available as an indicator or in one of 6 test ready systems that are complete and equipped to meet your pressure measuring or testing needs.

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

The JOFRA IPI digital pressure indicator takes the concept of an analog test gauge, and brings it to a new level. The IPI combines the accuracy of digital technology with the simplicity of an analog gauge, and achieves performance, ease-of-use, and a feature set unmatched in the pressure measurement world. Setup of the IPI is fast and straightforward, through a menu-driven display, with minimal text, and intuitive functions, that is simple enough to allow the indicator to be used anywhere in the world, without the need for multilingual displays.

### ON / OFF

The IPI is delivered with the auto-shutoff active and set to 30 minutes: like many of our other instruments. This feature can be reduced from 30 minutes down to 1 minute in 1 minute increments. In cases where a constant reading is necessary, this can also be turned completely off to allow for continuous operation.

### ZERO

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

### MAX / MIN

A MIN/MAX function reads the maximum and minimum pressure that have been automatically stored. Monitor a safety valve or look for pressure spikes in the process. The IPI also have the ability to check the minimum and maximum readings during the ransient.

### Pressure connections

1/4" NPT male lower connection is standard. A 1/4" BSP male adapter is included. The IPI may be ordered with a back mounting configuration. This design has the 1/4 in. NPT male connection on the back of the case vice the lower manifold connection. This allows for use in panel mounted applications or in applications where flat mounting is necessary such as in an overhead. This configuration is not delivered with a protective boot.

### External power

Sometimes it is more convenient to take advantage of an existing power source rather than using batteries. The IPI may be ordered with a 24 VDC power supply option. The unit has terminals to accept the positive and negative leads to allow for easy connection to the power supply. These units will not be supplied with batteries and batteries should not be installed when the unit is connected to 24 VDC power.

### Protective boot

Standard configuration IPI units and those supplied with systems are delivered with a protective boot. Units with back mounting and the 24 VDC power supply are not delivered with the protective boot due to design limitations.

### Clear dual line display

The IPI display does more than just show a pressure reading. The user can check temperature and exact battery voltage through the use of the keypad. The large, 5 1/2 digit, 0.65 in (1.65 cm) character display is large and easy-to-read; even from a distance. Icons are also included to indicate battery life, engineering units, and there is a bar graph that shows the percentage of scale reading. All of this information can be read in low light with the use of the backlight.

### ENTER

Save selections and turn the backlight on and off.

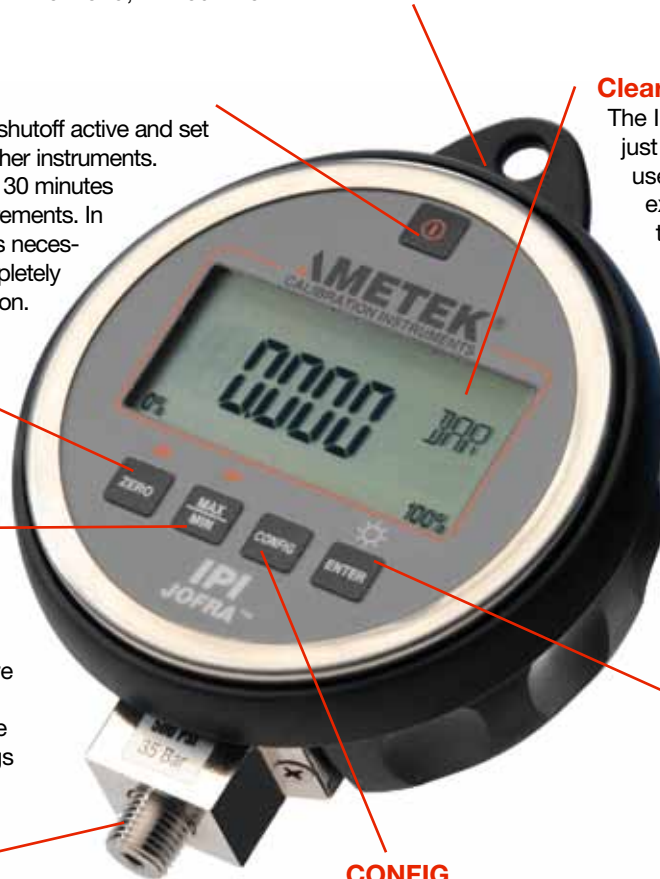
### CONFIG

This is the key to access all user-settable functions. The CONFIG key is used in conjunction with the ▼ and ▲ functions on the ZERO and MAX/MIN keys to select and change different functions.

You can set one of 20 engineering units, change the auto-shutoff function setting, display the actual battery voltage, display the actual temperature (in °C or °F), turn the dampening on or off, change the sample rate, and set the Tare value. In addition to the 20 available engineering units on the IPI, you can create your own unit to meet your measurement need. For example, if you need to take a level measurement, simply determine the pressure that equates to one unit of that measurement and set that as your engineering unit. The application may require gallons, feet, inches, meters, liters, or similar; with the IPI you can take the measurement.

### Serial communications

The IPI has a serial port that is accessible though the back of the case. This feature uses standard ASCII commands to allow for extraction of data from the IPI while taking readings. This requires the optional serial cable.



### Hazard location information / approvals

An explosive atmosphere is defined as a "mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture".



The standard in the European Union has been set with the 9/94/EC Directive, commonly called ATEX ("Atmosphères Explosibles," French for explosive atmospheres).

The JOFRA IPI Industrial Pressure Indicator is ATEX approved by KEMA as complying with the Essential Health and Safety Requirements related to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II in the directive, and with the following rating: II 3 G EEx nA IIB T6 (Ta=-10°C... +55°C).



The JOFRA IPI Industrial Pressure Indicator is also certified by CSA as conforming to relevant Canadian and USA standards with the following rating: Class 1, Div. 2, Groups A-D.

See the definitions regarding hazardous locations in NFPA 70, Article 500 or CSA C22.1 Section 18. NFPA 70, Article 500 and CSA C22.1 Section 18.

### Field recalibration

The IPI does not need to be returned to the factory for calibration. If you have a reliable and accurate pressure reference or a local laboratory, you may re-calibrate the IPI locally. This feature is password protected.

### Sampling rate

The IPI sampling rate is user selectable. If you want to capture fast system transients, the IPI can take a reading 10 times per second. Conversely, you may want to conserve battery life and only need periodic samples. Then, you can select 1 sample per every 2 seconds. This works well for in process and panel mounted applications. You can also choose the accepted instrument sampling rate of 3 samples per second for normal use or to allow for filtering, you can select 1 sample per second.

### Damping adjustment

The damping function can be turned on or off on the IPI. This allows for readings to be integrated, which accounts for momentary changes such as those from pulsing sources.

### Tare

Beyond zeroing the IPI, you may have to account for residual pressure. The Tare feature allows you to take care of that error and prevent the manual calculation of the difference. This can be used in combination with the custom engineering units to make the level measurements easier.

### Temperature display and compensation

Because the IPI is designed for in-process tasks, temperature compensation is included to make the job easier. This allows the IPI to maintain accuracy over the measurement range. The measured temperature may be checked from the keypad.

## 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, and IPI pressure calibrators, all JOFRA temperature calibrators, as well as JOFRA 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.

## 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 (32 bit versions only)
- System fonts: MS Sans Serif and Arial



## FUNCTIONAL SPECIFICATIONS

### Pressure; compound ranges

bar ..... -0.82 to 2, 7, 21 or 35  
psi ..... -12 to 30, 100, 300 or 500

### Pressure; gauge ranges

bar ..... 0 to 1, 70, 140, 200, 350 or 700  
psi ..... 0 to 12, 1,000, 2,000, 5,000 or 10,000

### Pressure; absolute ranges

bara ..... 0.07 to 7  
psia ..... 1 to 100

### Engineering units

User defined ..... One user-definable unit  
User selectable ..... 20 units

(PSI, Bar, kg/cm<sup>2</sup>, inH<sub>2</sub>O (4 °C, 20 °C or 60 °F), ftH<sub>2</sub>O (4 °C, 20 °C or 60 °F), mmH<sub>2</sub>O (4 °C and 20 °C), cmH<sub>2</sub>O (4 °C and 20 °C), mH<sub>2</sub>O (4 °C and 20 °C), KPa, mBAR, inHg, mmHg, Torr)

Not all units are available in all ranges.

### Pressure accuracy

Pressure ..... ±0.05% F.S.  
Full temperature compensation ..... 0 to 50°C / 32 to 122°F  
Vacuum (100, 300, 500 psi indicator/  
7, 21, 35 bar indicator) ..... ±0.25% F.S.  
Vacuum (30 psi indicator/2 bar indicator) ..... ±0.1% F.S.

F.S. (full scale) is the numerical value of the positive pressure range. Accuracy includes hysteresis, nonlinearity, repeatability and reference standard uncertainty, 1 year typical long-term stability, operated inside the rated temperature span and pressure range.

Requiring frequently zeroing (Gauge/diff.) or entering of reference pressure (Absolute).

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

### Serial communication interface

Connector ..... Stereo jack  
Serial ..... 0-3 VDC, 9600 baud, 8 data, no parity, 1 stop  
Protocol ..... ASCII command language

### Media compatibility

Liquids and gasses compatible with 316 stainless steel.

### Environmental

Storage temperature ..... -20 to 70°C / -4 to 158°F  
Operating temperature ..... -10 to 55°C / -14 to 131°F

### Pressure connection

All ranges ..... 1/4" NPT male

Adapters to 1/4" BSP male are included as standard

### Pressure overload

1 to 35 bar / 15 to 500 psi ..... 3X range  
70 to 350 bar / 1,000 to 5,000 psi ..... 2X range  
700 bar / 10,000 psi ..... 1.5X range  
Overload alarm ..... OL on display  
Overload alarm range ..... 1.2X range

### Display

Display ..... Backlight, blue  
Display resolution ..... 5 digit floating decimal  
Bar graph ..... 20 segment, 0 to 100%  
Display indicators ..... Engineering units icon  
..... Low battery indication icon  
..... Battery life indication utilizing bar graph  
..... Measured temperature display  
Display update ..... twice per second

### Power supply

Battery ..... (3) AA Alkaline  
Battery life ..... 1500 operational hours without backlight  
Battery life ..... 2000 operational hours without backlight  
..... at low sampling rate  
Battery life ..... 150 operational hours with backlight  
Low battery indicator ..... at 3 VDC  
Optional input port ..... 24 VDC connection 1) 2) 3)

1) Units delivered with 24 VDC power supply connection are not supplied with batteries

2) Batteries should not be installed when using 24 VDC power supply as damage to the IPI may occur

3) Units with 24 VDC power supply connection cannot be ordered with the protective boot option

### Instrument dimensions

Indicator LxWxH ..... 125 x 111 x 38 mm / 4.9 x 4.4 x 1.5 in  
Indicator weight (including battery) ..... 1.6 lb / 0.7 kg  
Input port ..... 1/4" NPT Male lower connection  
Optional input port ..... 1/4" NPT Male back connection 1)

3) Units with back connection cannot be ordered with the protective boot option

### Shipping dimensions

Indicator LxWxH ..... 250 x 160 x 100 mm / 9.8 x 6.3 x 3.9 in  
Indicator weight ..... 1.8 lb / 0.8 kg

### Instrument case

Rating ..... NEMA 4/IP65 1)

1) Does not apply if the serial connection is in use or if the external 24 VDC power option is used.

### Approvals - IPI system

CE Conformity ..... EN61326: 1998, EN60079-0: 2006,  
..... EN60079-15:2005

The JOFRA IPI systems are type approved by Det Norske Veritas. Find the certificate at [www.jofra.com](http://www.jofra.com)

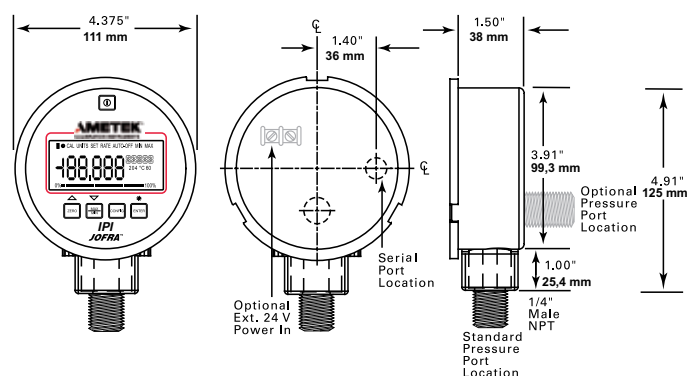
Approval, Certificate no. .... A-10549

### Ex approvals - IPI indicator only



CSA ..... Class 1, Div. 2, Groups A-D 1)  
ATEX ..... II 3 G EEx nA IIB T6 (Ta=-10°C... +55°C) 1)

1) The 24 volt version is not CSA or ATEX approved





## JOFRA IPI PRESSURE RANGES

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

Resolution obtained by the IPI indicator	IPI30C Vacuum to 30 psi Vacuum to 2 bar		IPI100A / IPI100C Vacuum to 100 psi Vacuum to 7 bar		IPI300C Vacuum to 300 psi Vacuum to 21 bar		IPI500C Vacuum to 500 psi Vacuum to 35 bar	
<b>Imperial ranges</b>								
psi	-12.000	30.000	-12.000	100.00	-12.000	300.00	-12.00	500.00
inH2O@4°C	-332.17	830.42	-332.2	2768.1	-332.2	8304.2	-332	13840
inH2O@20°C	-332.76	831.89	-332.7	2773.0	-332.7	8318.9	-333	13865
inH2O@60°F	-332.50	831.24	-332.5	2770.8	-332.5	8312.4	-332	13854
ftH2O@4°C	-27.681	69.202	-27.68	230.67	-27.68	692.02	-27.7	1153.4
ftH2O@20°C	-27.730	69.324	-27.73	231.08	-27.73	693.24	-27.7	1155.4
ftH2O@60°C	-27.708	69.270	-27.71	230.90	-27.71	692.70	-27.7	1154.5
inHg@0°C	-24.432	61.081	-24.43	203.60	-24.43	610.81	-24.4	1018.0
Torr	-620.6	1551.5	-620.6	5171.5	-620	15514	-621	25858
<b>Metric ranges</b>								
bar	-0.8300	2.0000	-0.8300	7.0000	-0.8300	21.000	-0.8300	35.000
mbar	-830.0	2000.0	-830.0	7000.0	-830.00	21000	-830	35000
kPa	-83.00	200.00	-83.00	700.00	-83.0	2100.0	-83.0	3500.0
kg/cm2	-0.8464	2.0394	-0.8464	7.1380	-0.846	21.414	-0.846	35.690
cmH2O@4°C	-846.4	2039.5	-846.4	7138.2	-846	21415	-846	35691
cmH2O@20°C	-847.9	2043.1	-847.9	7150.8	-847	21452	-848	35754
mH2O@4°C	-8.464	20.395	-8.464	71.382	-8.46	214.15	-8.46	356.91
mH2O@20°C	-8.479	20.431	-8.479	71.508	-8.48	214.52	-8.48	357.54
mmHg@0°C	-622.6	1500.1	-622.6	5250.4	-622	15751	-623	26252

Resolution obtained by the IPI indicator	IPI015G 0 to 15 psi 0 to 1 bar	IPI01KG 0 to 1,000 psi 0 to 70 bar	IPI02KG 0 to 2,000 psi 0 to 140 bar	IPI03KG 0 to 3,000 psi 0 to 200 bar	IPI05KG 0 to 5,000 psi 0 to 350 bar	IPI10KG 0 to 10,000 psi 0 to 700 bar
<b>Imperial ranges</b>						
psi	15.000	1000.0	2000.0	3000.0	5000.0	10000
inH2O@4°C	415.21	27681	55361	83042	N/A	N/A
inH2O@20°C	415.95	27730	55459	83189	N/A	N/A
inH2O@60°F	415.62	27708	55416	83124	N/A	N/A
ftH2O@4°C	34.601	2306.7	4613.5	6920.2	11534	23067
ftH2O@20°C	34.662	2310.8	4621.6	6932.4	11554	23108
ftH2O@60°C	34.635	2309.0	4618.0	6927.0	11545	23090
inHg@0°C	30.540	2036.0	4072.1	6108.1	10180	20360
Torr	775.73	51715	N/A	N/A	N/A	N/A
<b>Metric ranges</b>						
bar	1.0000	70.000	140.00	200.00	350.00	700.00
mbar	1000.0	70000	N/A	N/A	N/A	N/A
kPa	100.00	7000.0	14000	20000	35000	70000
kg/cm2	1.0197	71.380	142.76	203.94	356.90	713.80
cmH2O@4°C	1019.7	71382	N/A	N/A	N/A	N/A
cmH2O@20°C	1021.5	71508	N/A	N/A	N/A	N/A
mH2O@4°C	10.197	713.82	1427.6	2039.5	3569.1	7138.2
mH2O@20°C	10.215	715.08	1430.2	2043.1	3575.4	7150.8
mmHg@0°C	750.06	52504	N/A	N/A	N/A	N/A

**JOFRA IPI System A**

- 0 to 1 bar (15 psi)
- Vacuum to 2 bar (30 psi )
- Vacuum to 7 bar (100 psi)
- Vacuum to 21 bar (300 psi)



This system includes the JOFRA IPI calibrator together with one of the following pneumatic hand pumps: T-960 and T-970, depending on 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 IPI delivery always includes a protective boot for the indicator. All IPI indicators used in System A are delivered calibrated in both pressure and vacuum.

Only the IPI indicator is approved for use in potentially explosive atmospheres.

**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
- 1 roll of Teflon tape
- Protective carrying case
- Quick Connector between pump and calibrator

**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
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for rechargeable batteries - 115/230 VAC
SPK-HPC-005	Quick connector set for IPI system A / B

**Shipping Information**

Size.....570 x 180 x 350 mm / 22 x 7,1 x 13,8 inch  
 Weight .....5,5 kg / 12.13 lb

**Ordering information System A**

Order no.	Description
IPI	Industrial Pressure Indicator
	<b>Indicator pressure range</b>
015G	0 to 1 bar (15 psi)
100A	0 to 7 bar absolut (100 psi)
030C	Vacuum to 2 bar (30 psi)
100C	Vacuum to 7 bar (100 psi)
300C	Vacuum to 21 bar (300 psi)
500C	Vacuum to 35 bar (500 psi)
NONE	Pump system only (no calibrator)
	<b>Boot</b>
B	With boot (standard for indicator with battery power and lower mounting – and on all system kits)
	<b>Power supply</b>
X	Batteries (standard)
	<b>Mounting</b>
X	Lower mount (standard)
	<b>Base model number</b>
AXX	IPI System A (AXX pump T-960)
AHX	IPI System A (AHX pump T-970)
	<b>Certification</b>
G	NIST traceable certificate (standard)
H	Accredited certificate (optional quotation basis)

**IPI030CBXXAXXG Sample order number**

JOFRA IPI 2 bar (30 psi) indicator with boot and in pressure System AXX with pneumatic pressure handpump and NIST traceable calibration certificate.

**JOFRA IPI System B**

- Vacuum to 2 bar (30 psi)
- Vacuum to 40 bar (580 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 hand-pump.



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.

Only the IPI indicator is approved for use in potentially explosive atmospheres.

**T-965 and T-975 hand pumps for system B**

Model T-965 and T-975 pneumatic pressure pumps features both vacuum and pressure generation. Quick switch (valve) makes it easy to switch from vacuum to pressure measurements. A 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, T-965..... vacuum to 2 bar (30 psi)  
 Pressure range, T-975..... vacuum to 20 bar (300 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-965 Pump: -0.91 to 2 bar / -27 inHg to 30 psi  
 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-965 or T-975 with a 0.6 m / 24 in hose with 1/4" BSP and NPT female terminations
- 3/8" BSP female adapter with 1/4" BSP and NPT female terminations
- 1 roll of Teflon tape
- Protective carrying case
- Quick Connector between pump and calibrator

**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
- 124716 4x 1,5 Volt rechargeable batteries
- 124718 Charger for rechargeable batteries - 115/230 VAC
- SPK-HPC-005 Quick connector set for IPI system A / B

**Shipping Information**

Size.....570 x 180 x 350 mm / 22 x 7,1 x 13,8 inch  
 Weight .....5,5 kg / 12.13 lb

**Ordering information System B**

Order No.	Description
IPI	<b>Pressure indicator</b> Industrial Pressure Indicator
	<b>Indicator pressure range</b>
100A	0 to 7 bar absolute (100 psi)
030C	Vacuum to 2 bar (30 psi)
100C	Vacuum to 7 bar (100 psi)
300C	Vacuum to 21 bar (300 psi)
500C	Vacuum to 35 bar (500 psi)
NONE	Pump system only (no calibrator)
	<b>Boot</b>
B	With boot (standard for indicator with battery power and lower mounting – and on all system kits)
	<b>Power supply</b>
X	Batteries (standard)
	<b>Mounting</b>
X	Lower mount (standard)
	<b>Base model number</b>
BXX	IPI System B (BXX pump T-965)
BHX	IPI System B (BHX pump T-975)
	<b>Certificate</b>
G	NIST traceable certificate (standard)
H	Accredited certificate (optional quotation basis)

**IPI300CBXXBXXG Sample order number**

JOFRA IPI 21 bar (300 psi) indication with boot and in pressure System BXX kit with pneumatic combination handpump and NIST traceable calibration certificate.

**JOFRA IPI System C**

- 0 to 35 bar (500 psi)
- 0 to 70 bar (1,000 psi)
- 0 to 140 bar (2,000 psi)
- 0 to 200 bar (3,000 psi)
- 0 to 350 bar (5,000 psi)



This system consists of an IPI indicator 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 test 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 a protective carrying case with cutouts for fittings, hose, and the complete assembled test unit - no time adder to assemble the unit every time. Easy and fast connection between pump and indicator makes it easy to use the pressure indicator separately for other pressure test tasks.

Only the IPI indicator is approved for use in potentially explosive atmospheres.

**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 IPI indicator.

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 capacity..... 200 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
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for rechargeable 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

**Shipping Information**

Size.....560 x 188 x 350 mm / 22 x 7,4 x 13,8 inch  
 Weight .....5,5 kg / 12.13 lb

**Ordering information IPI System C**

Order No.	Description
IPI	Industrial Pressure Indicator
	<b>Indicator pressure range</b>
500C	Vacuum to 35 bar (500 psi)
01KG	0 to 70 bar (1,000 psi)
02KG	0 to 140 bar (2,000 psi)
03KG	0 to 200 bar 3,000 psi)
05KG	0 to 350 bar 5,000 psi)
NONE	Pump system only (no calibrator)
	<b>Boot</b>
B	With boot (standard for indicator with battery power and lower mounting – and on all system kits)
	<b>Power supply</b>
X	Batteries (standard)
	<b>Mounting</b>
X	Lower mount (standard)
	<b>Base model number</b>
CXX	IPI System C (CXX pump T-620)
CHX	IPI System C (CHX pump T-620H)
	<b>Certificate</b>
G	NIST traceable certificate (standard)
H	Accredited certificate (optional quotation basis)

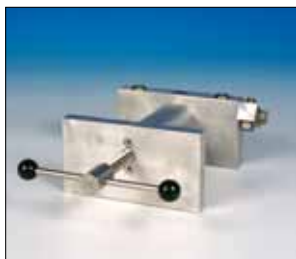
**IPI01KGBXXCXXG Sample order number**

JOFRA IPI 70 bar (1,000 psi) indicator with boot and in pressure System CXX with hydraulic pressure handpump and NIST traceable calibration certificate.



## JOFRA IPI System D

- 0 to 35 bar (500 psi)
- 0 to 70 bar (1,000 psi)
- 0 to 140 bar (2,000 psi)
- 0 to 200 bar (3,000 psi)
- 0 to 350 bar (5,000 psi)



This system consists of an IPI indicator together with a rugged, hydraulic, high pressure screw pump. System D is an easy-to-use test 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 a protective carrying case with cutouts for fittings and the complete assembled test unit - no time adder to assemble the unit every time. Easy and fast connection between pump and indicator makes it easy to use the pressure calibrator separately for other pressure test tasks.

Only the IPI indicator is approved for use in potentially explosive atmospheres.

### AMETEK screw pump

The 65-P016 and 65-P017 screw pumps 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 screw pump 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
- 1 roll of Teflon tape
- 10 bonded seals
- 6 mm Allen key
- Protective carrying case
- Banjo Connector Set

### 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)  
 \* 1/4" BSP female to 1/4" BSP male  
 65P180 2 m. Pressure hose, (Max. 350 bar / 5,000 psi)  
 \* 1/4" BSP female to 1/4" BSP male  
 60I156 1.5 m. 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  
 123958 RS232 cable with stereo Jack connector, 2m/6ft  
 124716 4x 1,5 Volt rechargeable batteries  
 124718 Charger for rechargeable batteries - 115/230 VAC  
 50-REP 615 Quick connector set, female 1/4" BSP  
 to 1/4" BSP  
 SPK-HPC-004 Banjo Connector Set for pump

### Shipping Information

Size..... 730 x 220 x 430 mm / 28,7 x 8,7 x 17 inch  
 Weight ..... 12 kg / 26.5 lb

### Ordering information IPI System D

Order No.	Description
IPI	Industrial Pressure Indicator
<b>Indicator pressure range</b>	
500C	Vacuum to 35 bar (500 psi)
01KG	0 to 70 bar (1,000 psi)
02KG	0 to 140 bar (2,000 psi)
03KG	0 to 200 bar (3,000 psi)
05KG	0 to 350 bar (5,000 psi)
NONE	Pump system only (no calibrator)
<b>Boot</b>	
B	With boot (standard for indicator with battery power and lower mounting – and on all system kits)
<b>Power supply</b>	
X	Batteries (standard)
<b>Mounting</b>	
X	Lower mount (standard)
<b>Base model number</b>	
DOX	IPI System D (DOX pump 65-P016)
DWX	IPI System D (DWX pump 65-P017)
<b>Certificate</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate (optional quotation basis)

### IPI01KGBXXDOXG Sample order number

JOFRA IPI 70 bar (1,000 psi) indicator with boot and in pressure System DOX with hydraulic oil screw pump and NIST traceable calibration certificate.

**JOFRA IPI System E**

- 0 to 70 bar (1,000 psi)
- 0 to 140 bar (2,000 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 IPI indicator together with a rugged, hydraulic, high pressure pump.

System E is an easy-to-use test 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 a protective carrying case with cutouts for fittings and the complete assembled test unit - no time adder to assemble the unit every time. Easy and fast connection between pump and indicator makes it easy to use the pressure calibrator separately for other pressure test tasks.

Only the IPI indicator is approved for use in potentially explosive atmospheres.

**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 65-P014 for hydraulic oil
- Vernier valve
- 1 roll of Teflon tape
- 10 bonded seals
- 6 mm Allen key
- 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)  
\* 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
- 123958 RS232 cable with stereo Jack connector, 2m/6ft
- 124716 4x 1,5 Volt rechargeable batteries
- 124718 Charger for rechargeable batteries - 115/230 VAC
- 50-REP 615 Quick connector set, female 1/4" BSP to 1/4" BSP

**Shipping Information**

Size.....730 x 220 x 430 mm / 28,7 x 8,7 x 17 inch  
 Weight ..... 13,5 kg / 30 lb

**Ordering information IPI System E**

Order No.	Description
IPI	Industrial Pressure Indicator
	<b>Indicator pressure range</b>
01KG	0 to 70 bar (1,000 psi)
02KG	0 to 140 bar (2,000 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)
	<b>Boot</b>
B	With boot (standard for indicator with battery power and lower mounting – and on all system kits)
	<b>Power supply</b>
X	Batteries (standard)
	<b>Mounting</b>
X	Lower mount (standard)
	<b>Base model number</b>
EXX	IPI System E (EXX pump 65-P014)
	<b>Certificate</b>
G	NIST traceable certificate (standard)
H	Accredited certificate (optional quotation basis)

**IPI01KGBXXEXXG Sample order number**

JOFRA IPI 70 bar (1,000 psi) indicator with boot an in pressure system System EXX with high pressure pump for hydraulic oil and NIST traceable calibration certificate.

**JOFRA IPI System F**

- 0 to 35 bar (500 psi)
- 0 to 70 bar (1,000 psi)
- 0 to 140 bar (2,000 psi)
- 0 to 200 bar (3,000 psi)
- 0 to 350 bar (5,000 psi)
- 0 to 700 bar (10,000 psi)



The System F hydraulic pump makes it very easy to prime the system. It 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.

Only the IPI indicator is approved for use in potentially explosive atmospheres.

**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. <sup>1)</sup> The 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 in<sup>3</sup>  
 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 <sup>2)</sup>
T-1/VITON	0 to 1,000 bar (15,000 psi) water	- Viton <sup>3)</sup>
T-1/EPT	0 to 1,000 bar (15,000 psi) water	- EPT <sup>4)</sup>
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)
- Type T Hydraulic pump
- 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-250	Service kit for T pump with VITON N O-rings
T-250	Service kit for T pump with EPT N O-rings
60I156	1.5 m. 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
123958	RS232 cable with stereo Jack connector, 2m/6ft
124716	4x 1,5 Volt rechargeable batteries
124718	Charger for rechargeable 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

**Shipping Information**

Size.....730 x 220 x 430 mm / 28,7 x 8,7 x 17 inch  
 Weight ..... 18 kg / 40 lb

**Ordering information IPI System F**

Order No.	Description
IPI	<b>Pressure indicator</b> Industrial Pressure Indicator
	<b>Indicator pressure range</b>
500C	Vacuum to 35 bar (500 psi)
01KG	0 to 70 bar (1,000 psi)
02KG	0 to 140 bar (2,000 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)
	<b>Boot</b>
B	With boot (standard for indicator with battery power and lower mounting – and on all system kits)
	<b>Power supply</b>
X	Batteries (standard)
	<b>Mounting</b>
X	Lower mount (standard)
	<b>Base model number</b>
FWB	IPI System F (pump T-1)
FWV	IPI System F (pump T-1/VITON)
FWE	IPI System F (pump T-1/EPT)
FOB	IPI System F (pump T-1/OIL)
FOV	IPI System F (pump T-1/OIL/VITON)
FOE	IPI System F (pump T-1/OIL/EPT)
	<b>Certificate</b>
G	NIST traceable certificate (standard)
H	Accredited certificate (optional quotation basis)

**IPI10KGBXXFOEG Sample order number**

JOFRA IPI 700 bar (10,000 psi) indicator with boot and in pressure System F with Type T pump for oil, EPT seals and NIST traceable calibration certificate.

## ORDERING INFORMATION - JOFRA IPI INDICATOR

Order No.	Description
IPI	Pressure indicator Industrial Pressure Indicator
<b>Indicator pressure range</b>	
100A	0 to 7 bar absolute (100 psi)
030C	Vacuum to 2 bar (30 psi)
100C	Vacuum to 7 bar (100 psi)
300C	Vacuum to 21 bar (300 psi)
500C	Vacuum to 35 bar (500 psi)
015G	0 to 1 bar (15 psi)
01KG	0 to 70 bar (1,000 psi)
02KG	0 to 140 bar (2,000 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>Boot</b>	
B	With boot (standard for indicator with battery power and lower mounting - and on all system kits)
X	No boot (standard for indicators with back mounting and/or 24 VDC powers supply connection)
<b>Power supply</b>	
X	Batteries (standard)
E	Connection for external 24 VDC power supply <sup>1)</sup>
<b>Mounting</b>	
X	Lower mount (standard)
B	Back mount
<b>Base model number</b>	
IND	IPI indicator with standard accessories for configuration
<b>Certification</b>	
G	NIST traceable certificate (standard)
H	Accredited certificate (optional – on quotation basis)

### IPI030CBXXINDG Sample order number

JOFRA IPI 2 bar (30 psi) indicator with boot, standard accessories, and NIST traceable calibration certificate.

<sup>1)</sup> The 24 volt version is not CSA or ATEX approved

## STANDARD DELIVERY

- IPI indicator
- Calibration certification performance traceable to NIST
- (3) AA batteries
- Adapter to 1/4" BSP male
- User manual
- Protective boot

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

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### 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: 5 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 -25 mbar to 1000 bar (0.4 to 15,000 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

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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*

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