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CRYSTAL
engineering corporation

Handpumps and Accessories

PrecisionPressure measurement

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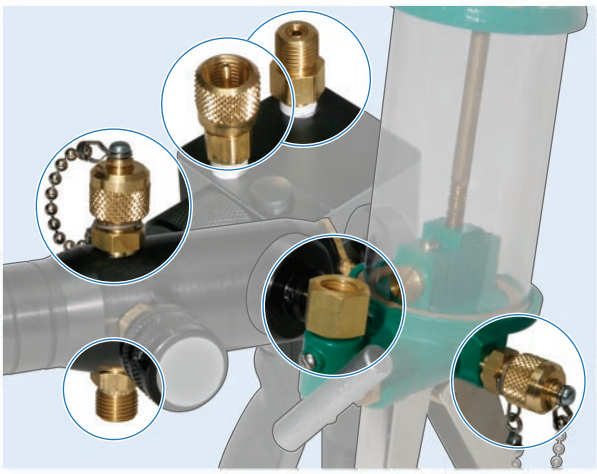
CRYSTAL
engineering corporation

CRYSTAL Engineering offers a range of accessories for test and calibration of pressure instruments in the field. Included in this brochure are portable pressure sources (handpumps); leak-free fittings and hoses that easily connect to pumps, gauges, and other devices ***without the need for tools***; waterproof carrying cases; and complete carry-case kits that include all of the accessories you need for specific Crystal gauges and calibrators.

All of our handpumps have been designed for field use and incorporate these common features:

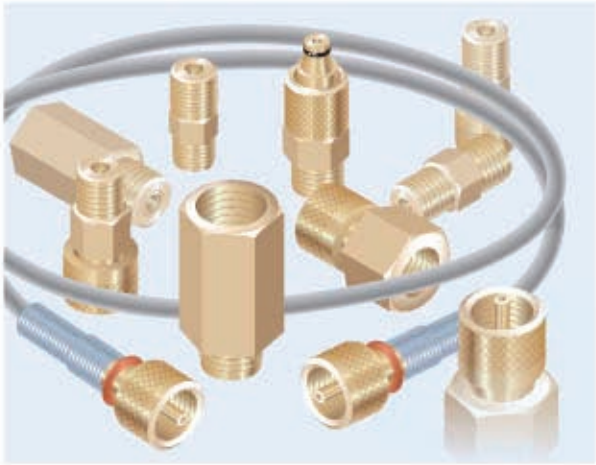


Two pressure ports—one for the gauge or calibrator, the other for the device being tested—eliminate the need for additional fittings.

Simple construction allows for easy replacement of parts, and for complete rebuilds. Rebuild kits are available for every pump in this brochure.

Lightweight but rugged construction assures that your pump will perform even in the harshest field conditions.

Each Crystal handpump is fitted with two pressure ports.



Our Quick-Connect hoses and fittings employ an innovative internal o-ring system designed to insure leak-free connections without the use of tools. While all hoses and fittings may be ordered separately, we also offer them in complete Fitting Kits, designed for use with specific handpumps and test devices. Refer to pages 10 & 11 for complete technical descriptions of all Crystal hoses and fittings.

Waterproof carrying cases have die cut ***rigid*** foam inserts, and have been designed to efficiently fit accessories appropriate to the specific gauge or calibrator, while still being the most compact and lightweight cases available. Our rugged, orange carrying case (shown here and on the following page) is included with every Calibration Kit, or may be ordered separately. We also offer a rolling waterproof case for our popular GaugeCalXP Pressure Comparator, and a low cost non-waterproof case for gauges or calibrators, with room for additional fittings, test leads, or other miscellaneous items.

Lightweight Case
P/N **3009**

Waterproof Case
P/N **2888**

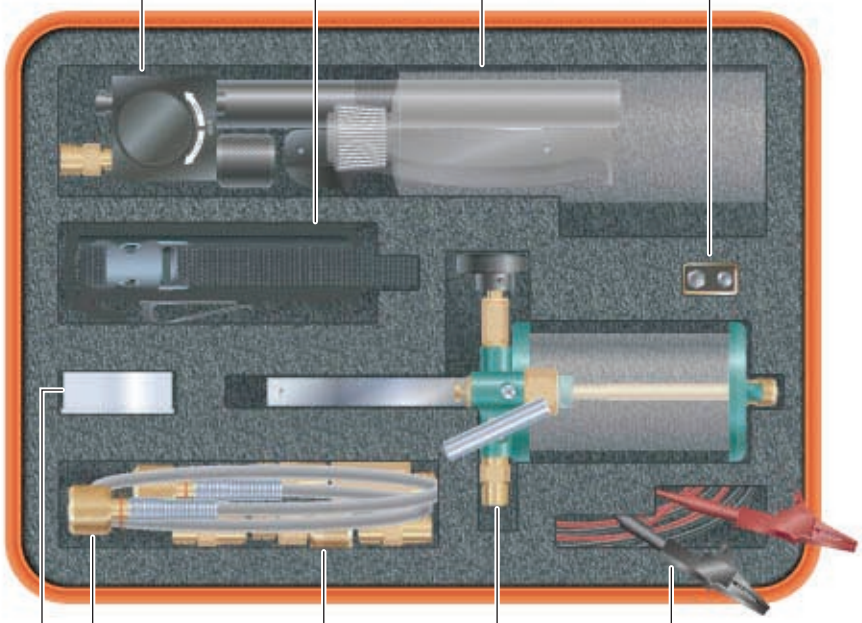
GaugeCalXP Case
P/N **3395**

▸ Calibration Kits

Calibration kits offer the most convenient and compact solutions available for carrying everything you need for field pressure calibration work.

All calibration kits start with an extremely rugged carry case, manufactured from high grade ABS plastic, and designed to withstand a drop of up to 2 meters (6 feet). The case is fully sealed and water tight, with a pressure equalization valve to allow easy opening after changes in altitude or temperature. A rigid, die-cut foam insert is custom designed to fit everything you need into the most compact space possible. Your calibrator, pump, fittings, hoses, leads, pipe thread tape, battery, and bottle of hydraulic fluid (if required) fit snugly into precut locations.

Universal Calibration Kit
*(does not include 30 Series Calibrator)



CylinderPump Calibration Kits (to 80 PSI/5.5bar)

- **for 30 Series Calibrator** . . . . . P/N: **2858**
- **for XP2i Pressure Gauge** . . . . . P/N: **2937**

ComboPump Calibration Kits (to 500 PSI/35bar)

- **for 30 Series Calibrator** . . . . . P/N: **2910**
- **for XP2i Pressure Gauge** . . . . . P/N: **2938**

HydraulicPump Calibration Kits (to 5000 PSI/350bar)

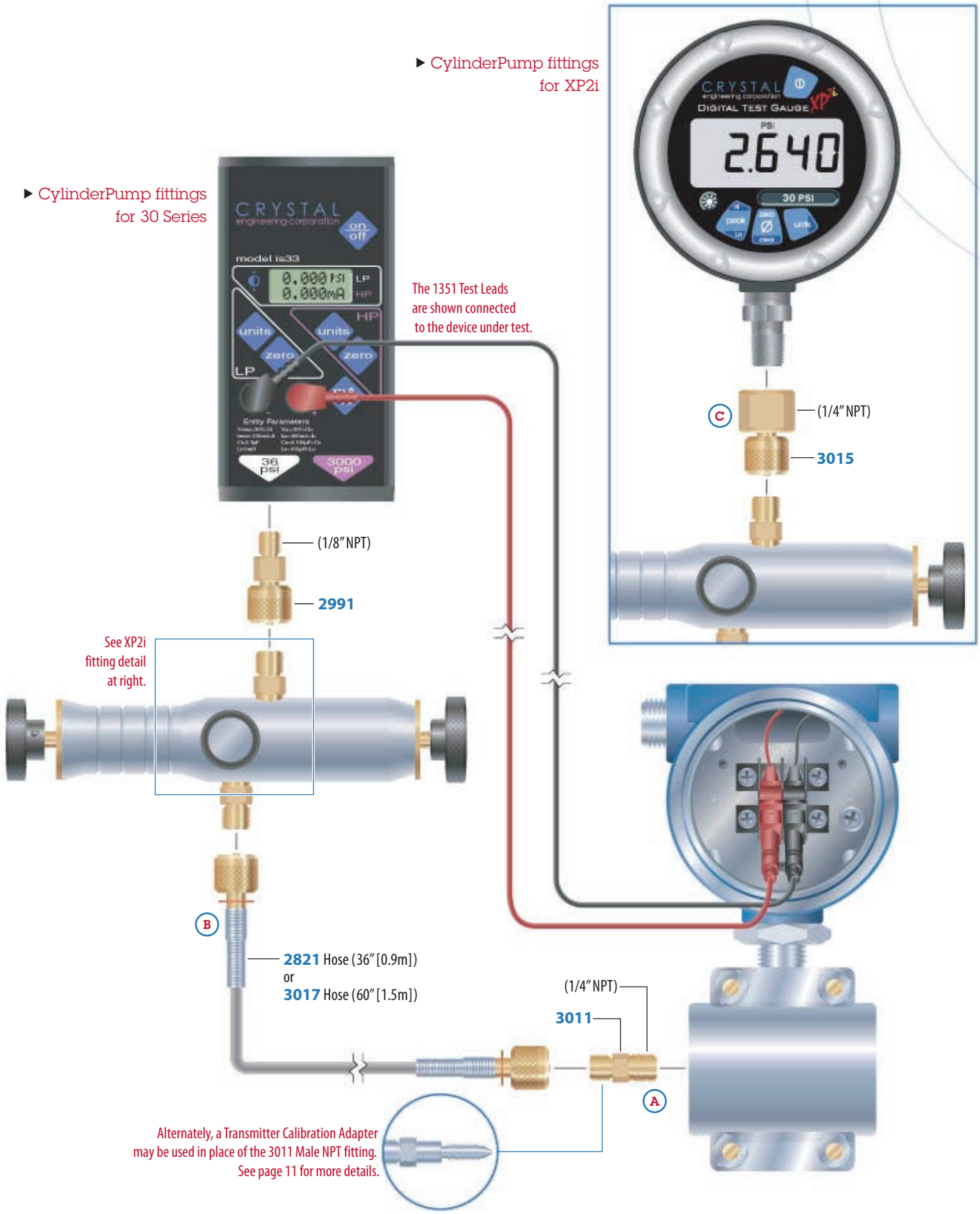
- **for 30 Series Calibrator** . . . . . P/N: **2911**
- **for XP2i Pressure Gauge** . . . . . P/N: **2939**

Universal Calibration Kit (to 5000 PSI/350bar)

- **for 30 Series Calibrator and XP2i Pressure Gauge** . . . . . P/N: **2834**

Every Calibration Kit includes a waterproof hardshell case, complete with a handpump—the Universal Kit includes both a 2980 ComboPump *and* a 2820 HydraulicPump—hose, thread tape, and all fittings required to use the gauge or calibrator with the included pump(s). Refer to pages 4-9 for details of required fittings.

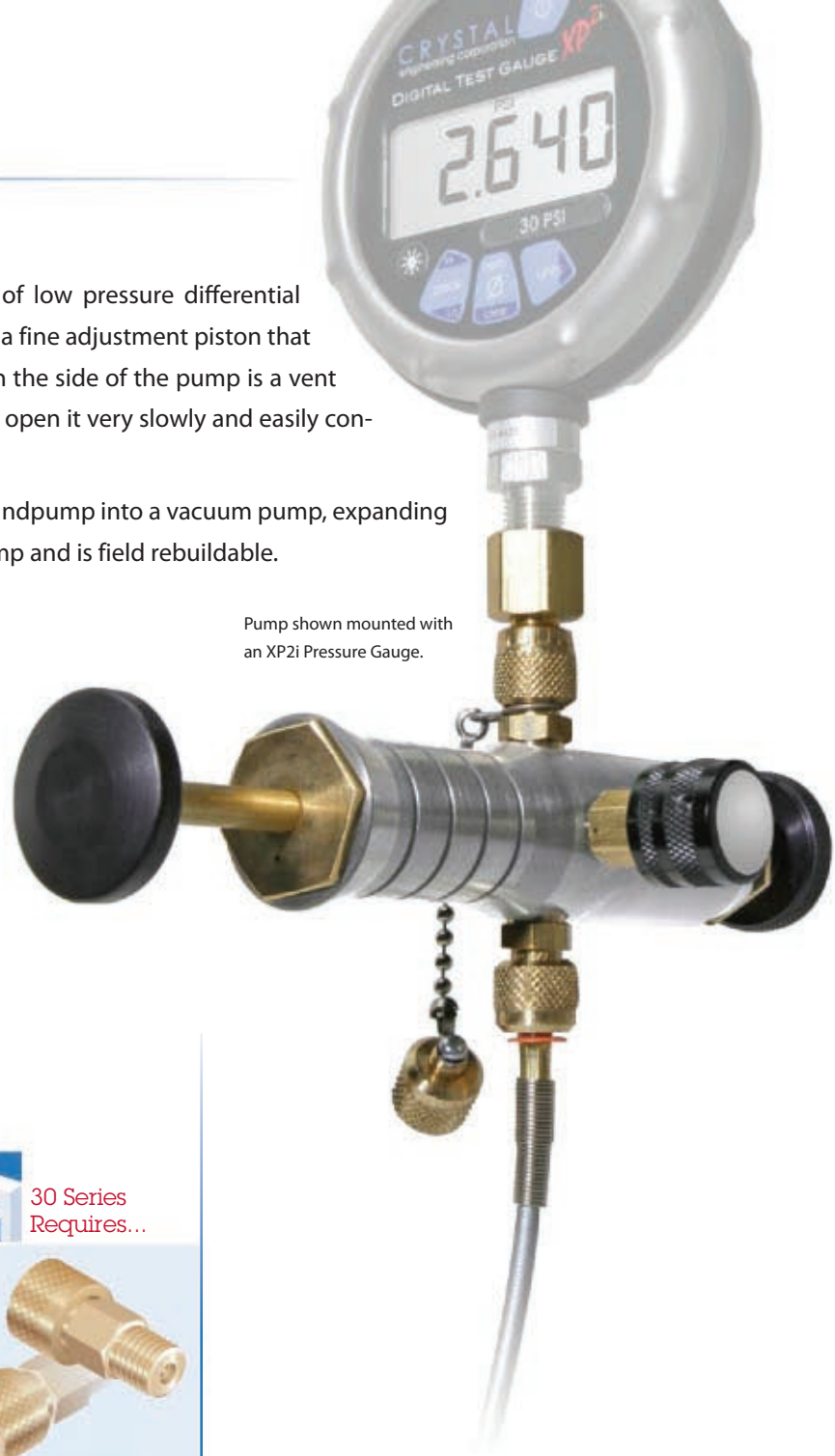
Universal and 30 Series kits also include test leads and a spare 9V battery.


CylinderPump fittings for XP2i
CylinderPump fittings for 30 Series
CRYSTAL engineering corporation
DIGITAL TEST GAUGE XP2i
PSI
2.640
30 PSI
peak
zero
units
CRYSTAL engineering corporation
on off
model is33
0.000 PSI LP
0.000mA HP
units
zero
LP
HP
Entry Parameters
36 psi
3000 psi
The 1351 Test Leads are shown connected to the device under test.
C
(1/4" NPT)
3015
(1/8" NPT)
2991
See XP2i fitting detail at right.
B
2821 Hose (36" [0.9m])
or
3017 Hose (60" [1.5m])
(1/4" NPT)
3011
A
Alternately, a Transmitter Calibration Adapter may be used in place of the 3011 Male NPT fitting.
See page 11 for more details.

▸ CylinderPump

This is the ideal pressure source for calibration of low pressure differential transmitters. It works like a bicycle pump, but with a fine adjustment piston that makes it easy to set the pressure very precisely. On the side of the pump is a vent valve, also designed for precise control, so you can open it very slowly and easily control the rate of change of pressure.

Another valve (not shown) changes the cylinder handpump into a vacuum pump, expanding the usefulness of the pump. This is an all metal pump and is field rebuildable.



Pump shown mounted with an XP2i Pressure Gauge.

Pump Includes...

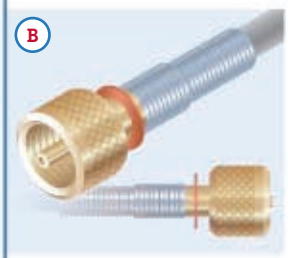
3011 Male NPT (1/4")
QTY **1**

XP2i Requires...

3015 Female NPT (1/4")
QTY **1**

30 Series Requires...

2991 Male NPT (1/8")
QTY **1**



2821 Hose (36" [0.9m])
QTY **1**

CylinderPump ..... P/N: **2936**
- Rated pressure: 80 PSI/ 5.5 bar/ 550 kPa
  Easily produces: 30 PSI/ 2 bar/ 200 kPa
  Vacuum: -25"Hg/-12 PSI/-0.85 bar/-85 kPa

Rebuild Kit ..... P/N: **2941**
- for CylinderPump

CylinderPump Calibration Kit ..... P/N: **2858**
- for 30 Series Calibrator
  Includes waterproof case, CylinderPump, fittings, test leads, etc. SEE PAGE 3 FOR DETAILS.

CylinderPump Calibration Kit ..... P/N: **2937**
- for XP2i Pressure Gauge
  Includes waterproof case, CylinderPump, hose, fittings, etc. SEE PAGE 3 FOR DETAILS.

▶ ComboPump fittings for XP2i

See pages 10 and 11 for NPT, swage, and transmitter fittings to make fast, leak- free test connections ***without*** thread tape or tools.

(1/4" NPT)

3015 C

3012 B

See 30 Series fitting detail at right.

(1/8" NPT)

D

2821 Hose (36" [0.9m])
or
3017 Hose (60" [1.5m])

▶ ComboPump fittings for 30 Series

D

(1/8" NPT)

2991 E

B

3012

(1/8" NPT)

B

To device under test.

(1/4" NPT)

3011

A

From pump to device under test.
(Sample 30 Series configuration)

▶ ComboPump

The ComboPump is our best selling pump because it's so versatile. You can use it for low differential pressure transmitters but it can generate up to 500 PSI/ 35 bar/ 3.5 MPa, and it's a vacuum pump, too! The unique pressure balanced variable volume lets you set pressure precisely and easily, even at maximum pressure.

Mount a gauge or a calibrator on one of the two pressure ports and use the second port for the device being tested. The result is a complete field pressure calibration system that can be operated with one hand.

Pump shown mounted with 30 Series Calibrator.

Pumps Include…

No fittings

All fittings on this page may be ordered separately, or as complete fitting kits.

XP2i Fitting Kit
P/N: **2797**
Includes the hose and all fittings shown in the second column at right.

30 Series Fitting Kit
P/N: **2786**
Includes the hose and all fittings shown in the third column at right.

XP2i Requires…

A

3011 Male NPT (1/4")
QTY **1** (NOT SHOWN IN SCHEMATIC)

B

3012 Male NPT (1/8")
QTY **2**

C

3015 Female NPT (1/4")
QTY **1**

D

2821 Hose (36" [0.9m])
QTY **1**

30 Series Requires…

E

2991 Male NPT (1/8")
QTY **1**

B

3012 Male NPT (1/8")
QTY **2**

D

2821 Hose (36" [0.9m])
QTY **1**

ComboPump . . . . . P/N: **2907**
▶ Rated pressure: 300 PSI/ 20 bar/ 2 MPa
Easily produces: 200 PSI/ 14 bar/ 1.4 MPa
Vacuum: -25"Hg/-12 PSI/-0.85 bar/-85 kPa

ComboPump . . . . . P/N: **2908**
▶ Rated pressure: 500 PSI/ 35 bar/ 3.5 MPa
Easily produces: 300 PSI/ 20 bar/ 2 MPa
Vacuum: -25"Hg/-12 PSI/-0.85 bar/-85 kPa

Rebuild Kit . . . . . P/N: **2802**
▶ for all ComboPumps

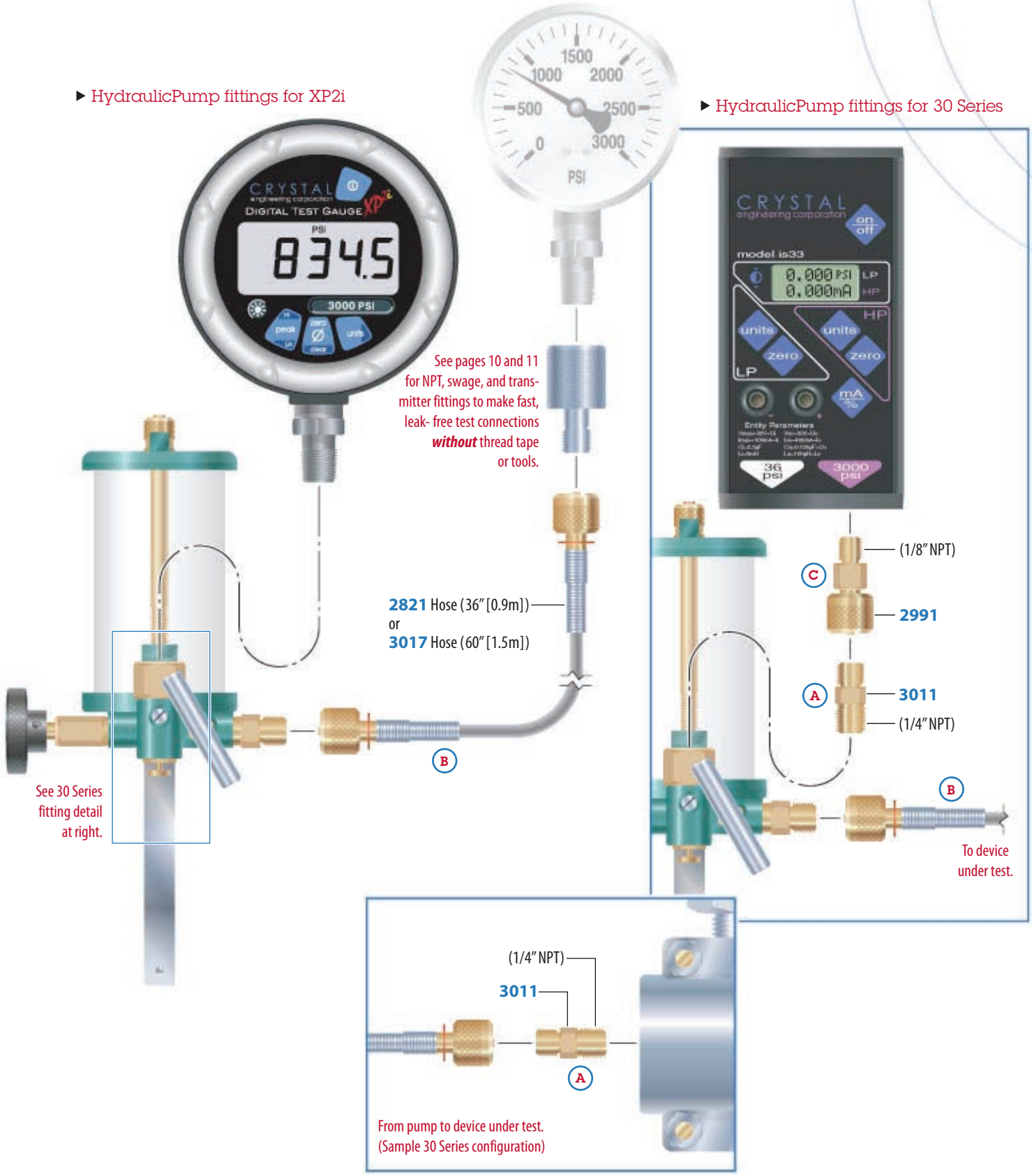
ComboPump Calibration Kit . . . . . P/N: **2910**
▶ for 30 Series Calibrator
Includes waterproof case, ComboPump, hose, fittings, etc. SEE PAGE 3 FOR DETAILS.

ComboPump Calibration Kit . . . . . P/N: **2938**
▶ for XP2i Pressure Gauge
Includes waterproof case, ComboPump, hose, fittings, etc. SEE PAGE 3 FOR DETAILS.

Universal Calibration Kit . . . . . P/N: **2834**
▶ for 30 Series Calibrator and XP2i Pressure Gauge
Includes waterproof case, ComboPump and HydraulicPump, hoses, fittings, etc.
SEE PAGE 3 FOR DETAILS.

Fitting Kit . . . . . P/N: **2786**
▶ for 30 Series Calibrator

Fitting Kit . . . . . P/N: **2797**
▶ for XP2i Pressure Gauge


HydraulicPump fittings for XP2i
HydraulicPump fittings for 30 Series
CRYSTAL engineering corporation
DIGITAL TEST GAUGE XP2i
PSI
834.5
3000 PSI
peak
zero
units
1500
1000
2000
500
2500
0
3000
PSI
See pages 10 and 11 for NPT, swage, and transmitter fittings to make fast, leak- free test connections ***without*** thread tape or tools.
2821 Hose (36" [0.9m])
or
3017 Hose (60" [1.5m])
B
See 30 Series fitting detail at right.
CRYSTAL engineering corporation
on off
model is33
0.000 PSI
0.000mA
LP
HP
units
zero
mA %
Entry Parameters
36 psi
3000 psi
(1/8" NPT)
C
2991
A
3011
(1/4" NPT)
B
To device under test.
(1/4" NPT)
3011
A
From pump to device under test.
(Sample 30 Series configuration)

▶ HydraulicPump

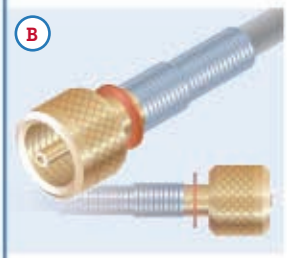
The HydraulicPump is a lightweight, high pressure source that can use oil or water as the test fluid, and produces up to 5000 PSI/ 350 bar/ 35 MPa.

There are two pressure ports on the pump: Mount a gauge or calibrator directly to the front of the pump, connect the spare port directly to the device being tested, and you have a complete field pressure calibration system. A hose, and fittings are included (see below) along with a convenient plastic bottle to hold your hydraulic test fluid. The built-in variable volume provides a way to set the pressure precisely, and the pump is rebuildable. Two versions of the pump are available with maximum pressure ratings of 3000 PSI/ 200 bar/ 20 MPa or 5000 PSI/ 350 bar/ 35 MPa.

Pump shown mounted with XP2i Pressure Gauge.

Pumps Include…

3011 Male NPT (1/4")
QTY **1**



2821 Hose (36" [0.9m])
QTY **1**

XP2i Requires…

No additional fittings

30 Series Requires…

2991 Male NPT (1/8")
QTY **1**

3011 Male NPT (1/4")
QTY **1**

HydraulicPump 3000 PSI.....P/N: **2819**
- Rated pressure: 3000 PSI/ 200 bar/ 20 MPa
  Easily produces: 3000 PSI/ 200 bar/ 20 MPa

HydraulicPump 5000 PSI.....P/N: **2820**
- Rated pressure: 5000 PSI/ 350 bar/ 35 MPa
  Easily produces: 5000 PSI/ 350 bar/ 35 MPa

Rebuild Kit.....P/N: **2940**
- for all HydraulicPumps

Hydraulic Calibration Kit.....P/N: **2911**
- for 30 Series Calibrator
  Includes HydraulicPump, hose, fitting, and reservoir, etc. SEE PAGE 3 FOR DETAILS.

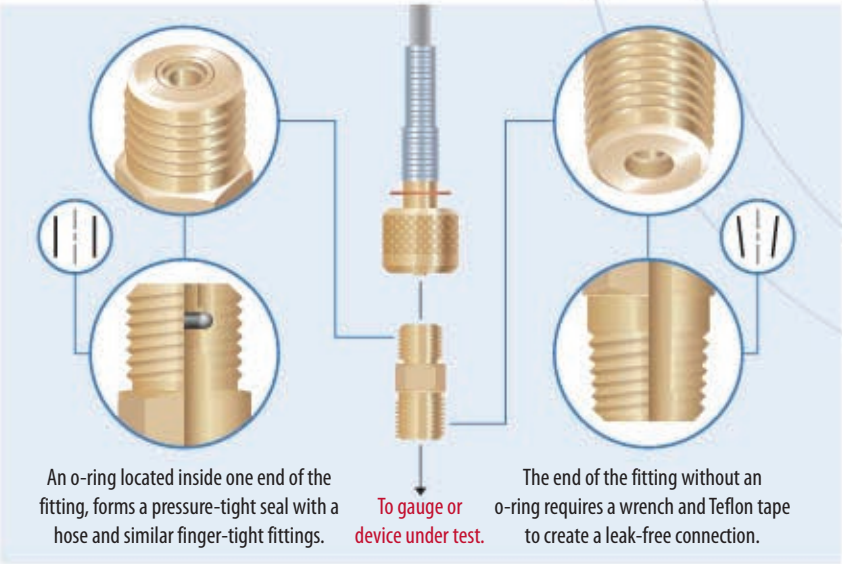
Hydraulic Calibration Kit.....P/N: **2939**
- for XP2i Pressure Gauge
  Includes HydraulicPump, hose, fitting, and reservoir.

Universal Calibration Kit.....P/N: **2834**
- for 30 Series Calibrator and XP2i Pressure Gauge
  Includes waterproof case, HydraulicPump and ComboPump, hoses, fittings, etc.
  SEE PAGE 3 FOR DETAILS.

Crystal Quick-Connect Fittings save time and eliminate leaks!

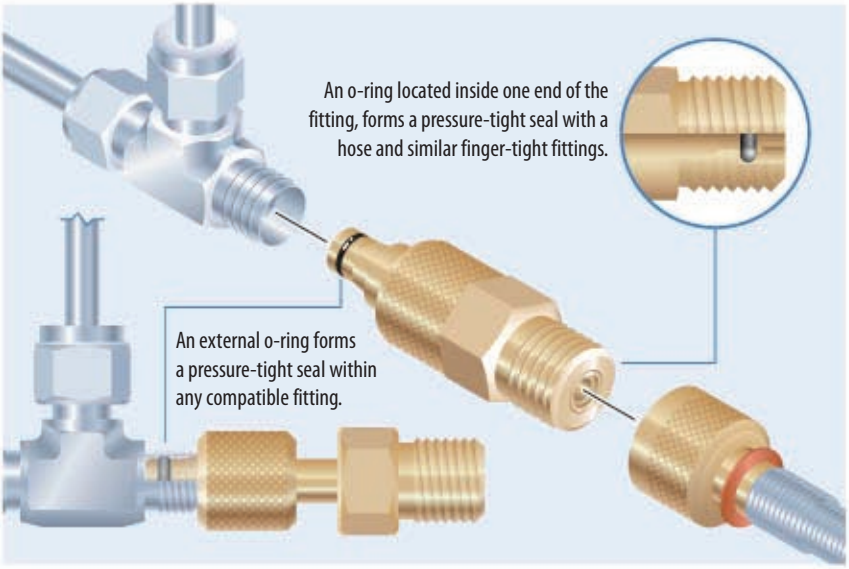
The secret to making leak-tight connections is the o-ring hidden inside each fitting. The o-ring forms a high pressure seal on the external surface of the small tube that protrudes from the (male) mating fitting.

Note: The side of the fitting with the built-in o-ring has parallel threads that are similar in size to 1/4" NPT. **Do not connect this side to any NPT fitting!** It will leak, and you could damage one or both fittings.



The threads on the ***non-NPT*** end of the fitting ***are parallel***.

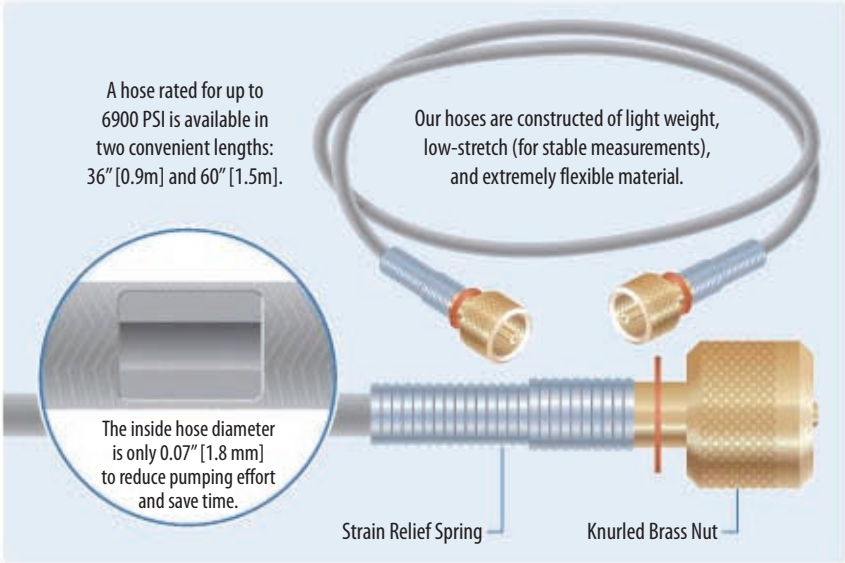
The threads on the ***NPT*** end of the fitting ***are tapered***.



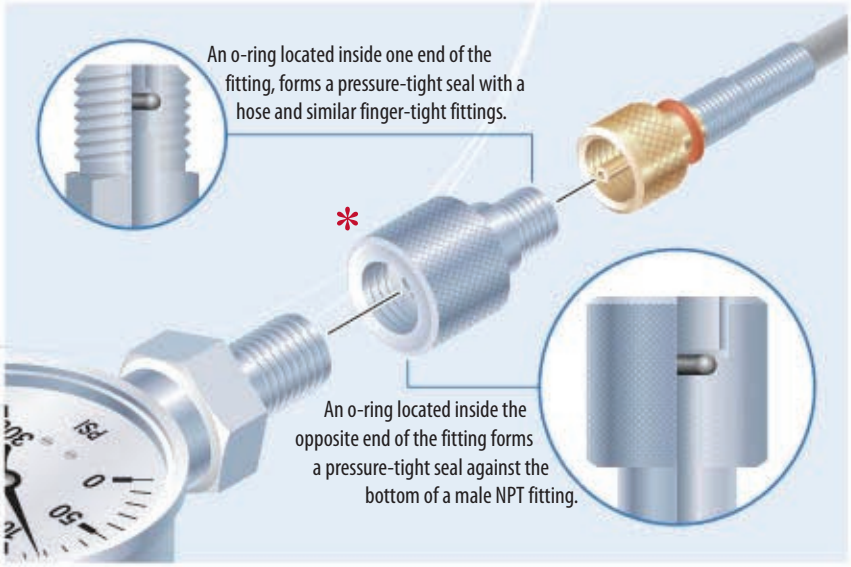
Another time saving fitting lets you connect to any swage style fitting ***without the need for any tools***. An o-ring inside the connection seals to the swage fitting and converts the swage fitting to the Crystal Quick-Connection system.

Additional adapters are available that mate with the proprietary connections found on various brands of pressure transmitters.

Crystal Quick-Test Hose assemblies have a strain relief spring and knurled brass nut. The brass nut features the same innovative hidden o-ring design used in our Quick-Connect fittings. The small diameter hose is both strong *and* flexible, and is rated for up to 6900 PSI (475 bar).

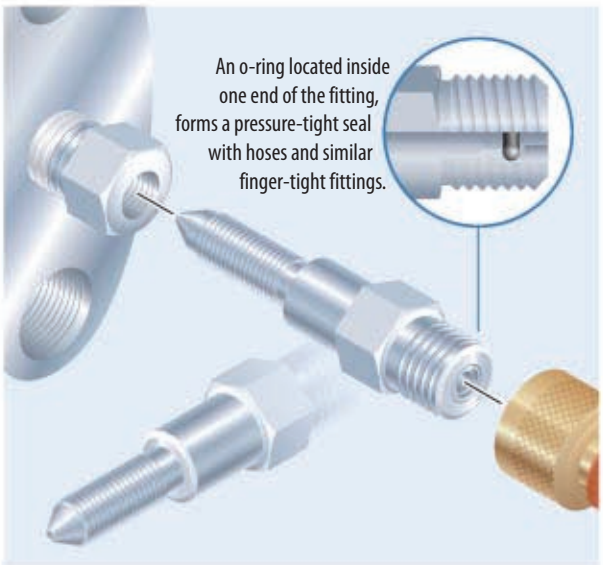


▸ Making NPT connections without the need for thread tape!



*P/Ns 3125, 3126, and 3127 for 1/8", 1/4", and 1/2" respectively.

Crystal offers Quick-Connect adapters designed specifically for fast and easy gauge and calibrator changes, eliminating the need for tools or thread tape. Simply finger tighten to ensure a leak free connection up to 5000 PSI (350 bar). These fittings are available for both NPT and BSPP and may be ordered separately or as complete Quick-Connect kits.



Transmitter calibration adapters are specially designed to mount in the bleed ports of a number of popular models of pressure transmitters. The adapters are installed without the need for thread tape or other sealants, and once installed will accept our Quick-Connect fittings and hoses.

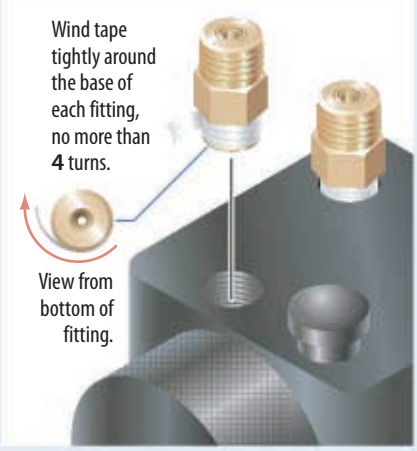
Adapters are available in two configurations: P/N 3400 (5/16"-24 UNF) for Foxboro®, Rosemount®, and Yokogawa transmitters; and P/N 3401 (1/4"-28 UNF) for Honeywell® transmitters.

The secret to making leak-tight connections is the o-ring hidden inside each fitting.

PTFE Thread Tape

Any NPT (or non-parallel thread) pressure connection ***not using a Crystal Quick-Connect adapter*** (as described above) requires the use of PTFE (Teflon®) thread sealing tape. PTFE thread tape not only reduces friction on non-parallel (tapered) threads, it also forms a reliable air- and liquid-tight seal to eliminate leaks.

Apply 3 or 4 turns of thread seal tape in a clockwise direction (as shown below). Take special care to align one edge of the tape on the first (lead-in) thread to avoid having excess tape block the flow of gas or fluid through the connection.



Ordering Information

Handpumps and Rebuild Kits

CylinderPump
P/N: **2936**

Rebuild Kit for CylinderPump
P/N: **2941**

ComboPump 300 PSI/20 bar/2MPa
P/N: **2907**

ComboPump 500 PSI/35 bar/3.5MPa
P/N: **2908**

Rebuild Kit for all ComboPumps
P/N: **2802**

HydraulicPump 3000 PSI/200 bar/20Mpa
P/N: **2819**

HydraulicPump 5000 PSI/350 bar/35Mpa
P/N: **2820**

Rebuild Kit for all HydraulicPumps
P/N: **2940**

Calibration Kits

CylinderPump Calibration Kit
for 30 Series Calibrator
P/N: **2858**

CylinderPump Calibration Kit
for XP2i Pressure Gauge
P/N: **2937**

HydraulicPump Calibration Kit
for 30 Series Calibrator
P/N: **2911**

HydraulicPump Calibration Kit
for XP2i Pressure Gauge
P/N: **2939**

ComboPump Calibration Kit
for 30 Series Calibrator
P/N: **2910**

ComboPump Calibration Kit
for XP2i Pressure Gauge
P/N: **2938**

Universal Calibration Kit
for 30 Series Calibrator & XP2i Pressure Gauge
P/N: **2834**

Other Accessories

Hose 6900 PSI (36" [0.9m])
P/N: **2821**

Hose 6900 PSI (60" [1.5m])
P/N: **3017**

Red & Black Test Leads
P/N: **1351**

RS232 Cable for 30 Series (6' [2m])
P/N: **1928**

RS232 Cable for XP2i (6' [2m])
P/N: **2400**

USB to RS232 Adapter
P/N: **3313**

Hardshell Carrying Case
For Calibration Kits (orange)
P/N: **2888**

Hardshell Carrying Case
For Individual Calibrators (black)
P/N: **3009**

Hardshell Rolling Case
For GaugeCalXP (black)
P/N: **3395**

Soft Case with Cover for 30 Series
P/N: **2490**

Protective Boot for XP2i
P/N: **3193**

White PTFE Thread Tape
(1/4" [6mm])
P/N: **1810**

Yellow Gas Line PTFE Thread Tape
(1/2" [12mm])
P/N: **3386**

CRYSTAL
engineering corporation

▶ 30 Series Pressure Calibrator Fitting Kit **2786**

2821
Hose
(36″[0.9m])
QTY **1**

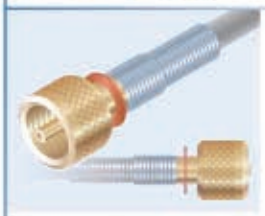
plus...

2991 Male NPT (1/8″)
QTY **2**

3011 Male NPT (1/4″)
QTY **1**

3012 Male NPT (1/8″)
QTY **2**

▶ XP2i Test Gauge Fitting Kit **2797**



2821
Hose
(36″[0.9m])
QTY **1**

plus...

3011 Male NPT (1/4″)
QTY **1**

3012 Male NPT (1/8″)
QTY **2**

3015 Female NPT (1/4″)
QTY **1**

▶ Fitting Kits

All fittings are rated to 5000 PSI (350 bar), and once installed require no tools to connect or disconnect. Internal o-ring seals insure finger-tight, leak-free connections. Hoses are both strong and flexible, and feature nylon linings covered with Kevlar® braiding. Though our fittings and hoses may be ordered individually, to ensure you have everything you might need, consider these convenient, device-specific fitting kits.

▶ Universal Fitting Kit **2832**

2991
Male NPT (1/8″)
QTY **1**

2992
Male NPT (1/4″)
QTY **1**

3011
Male NPT (1/4″)
QTY **3**

3012
Male NPT (1/8″)
QTY **4**

3013
Female NPT (1/4″)
QTY **2**

3014
Female NPT (1/8″)
QTY **1**

3015
Female NPT (1/4″)
QTY **1**

3016
Male Swage
Fitting (1/4″)
QTY **1**

▶ Additional Fittings

* **3400**
5/16″-24 UNF
for:
Foxboro®
Rosemount® &
Yokogawa
transmitters

* **3401**
1/4″-28 UNF
for:
Honeywell®
transmitters

3254
Male NPT (1/4″)

* **3125**
Female NPT (1/8″)
3126
Female NPT (1/4″)
3127
Female NPT (1/2″)

3184
BSPP (1/8″)
3185
BSPP (1/4″)
3186
BSPP (3/8″)
3187
BSPP (1/2″)

* Refer to page 11 for detailed descriptions of these fittings.

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