

# ProCon® — P14 Series with NEXUS® pH Sensor Transmitter Operating Manual



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Ultra-pure H2O



P14P

General



P14C

Complex



P14C

HF < 1000ppm



P14H

HF > 1000ppm



P14F

Seawater



P14S

Desulfurization



P14D



Industrial Analytical Equipment



## Preface

Please read this manual carefully before use.

Only properly skilled authorized personnel should carry out installation, setup and operation. Ensure that the power cable is physically separated from the power supply during the initial wiring connection or repair.

For example,

1. Apparent damage to the sensor
2. The sensor does not work properly or provides specified measurements
3. The sensor has been stored for a long time in an environment where the temperature exceeds 70°C

## Safety Information



- De-pressurize and vent system prior to installation or removal
- Confirm chemical compatibility before use
- **DO NOT** exceed maximum temperature or pressure specifications
- **DO NOT** alter product construction
- **ALWAYS** wear safety goggles or face-shield during installation and/or service

## Preparation before measurement



Important

**Be sure to calibrate your sensor prior to use.**

**Please refer to the operating instructions of your ProCon® Controller for calibration details.**

Connect the wires from the sensor to the appropriate ProCon® controller. All ProCon® pH sensors come with an internal PT1000 temperature electrode. Refer to sensor wiring diagram of controller.

Prepare electrode maintenance before measurement. When using the electrode, the protective bottle at the top shall be screwed off and placed at a place where it is not easy to touch. Then, the protective bottle cap shall be removed and the electrode bulb and liquid interface shall be immersed in the measured liquid.

## PH Sensor Calibration SimplCal®

1. Select two – three pH buffers, with values that are consistent with the pH value to be measured.  
USA (7.00, 4.01, 10.01) · NIST(6.86, 4.01, 9.18)
2. Unscrew the sensor protection cap and wash the sensing electrode with distilled water
3. Select the calibration mode in the controller (See manual for ProCon® SimplCal® for step by step simple instruction)
4. Insert the sensor into the first reference solution ensure the sensor tip is covered.
5. Stir
6. Wait for the reading to stabilize (60 seconds)
7. Press the Enter button on the ProCon® Controller
8. Wait until the DONE is display on screen
9. Insert sensor into 2nd, 3rd reference solutions and follow the above procedure
10. Once the sensor has been calibrated rinse with distilled water.

In order to ensure a fast response time, the electrode glass should always be kept wet. After the calibration is completed and the electrode is properly cleaned, store the sensor in a 3mol KCl Potassium Chloride solution.

**NOTE:** After use it is important to inspect the sensor glass membrane to ensure there are no deposits and the glass is transparent and not translucent. If deposits or the glass is hazy the sensor can be washed with a dilute HCL acid wash.

It is not recommended to store the sensor in distilled, or deionized water.



### Warning | Caution | Danger

Indicates a potential hazard. Failure to follow all warnings may lead to equipment damage, injury, or death.



### Note | Technical Notes

Highlights additional information or detailed procedure.



### Hand Tighten Only

Over tightening may permanently damage product threads and lead to failure of the retaining nut.



### Do Not Use Tools

Use of tool(s) may damage product beyond repair and potentially void product warranty.



### Personal Protective Equipment (PPE)

Always utilize the most appropriate PPE during installation and service of Truflo products.



## High performance industrial pH sensor for harsh applications

The ProCon® P14 series offers the ultimate combination of durability, functionality and long-term performance; exactly what is required for industry's most complex applications. The Nexus® reference eliminates reference poisoning. The sensors are available in flat planar or bulb style design.

All measurement functions are combined in one compact body — measuring electrode, temperature sensor and an inner reference chamber. The 2-wire 4-20mA, 4-wire or 4-20mA + RS485 output options simplify calibration and communication with remote displays and controllers..

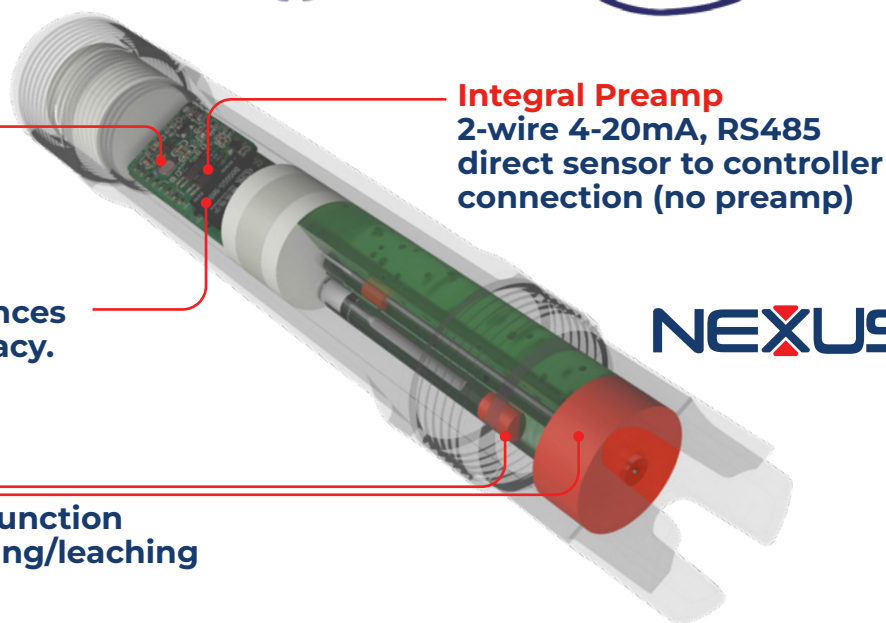
- ✓ 4-20mA Output
- ✓ Temperature Compensated
- ✓ Nexus® Solid KCl Reference
- ✓ PP or PPS Body Materials
- ✓ RS 485 Modbus Communication
- ✓ No Preamp Required
- ✓ 3/4" NPT Connection

**NO PREEMPT THE PREAMP**



Enhanced chip technology allows for remote calibration as well as diagnostic data

Digital output — longer distances without compromising accuracy.



**Integral Preamp**  
2-wire 4-20mA, RS485  
direct sensor to controller  
connection (no preamp)

**NEXUS®**

### Nexus® technology

- Solid KCl infused reference junction
- Eliminates reference poisoning/leaching
- Extended life expectancy

## 7 Distinct Sensors Designed for the Toughest pH Environments

Ultra-pure H2O



P14P

General



P14G

Complex



P14C

HF < 1000ppm



P14H

HF > 1000ppm



P14F

Seawater



P14S

Desulfurization



P14D



## Smart Sensor Technology

Advanced electronic circuitry stores pH data for automatic sensor recognition and trouble-free calibration when connected to the ProCon® Controller.

## Outputs

1. 4-20mA 2-Wire
2. 4-20mA + RS485

Both the measuring and reference electrodes are encapsulated within the non-porous advanced KCl infused polymer known as Nexus®.

## Less Calibration and Maintenance

Most sensors require on-going recalibration and are prone to premature failure due to what is known as gradient drift, or sensor drift.

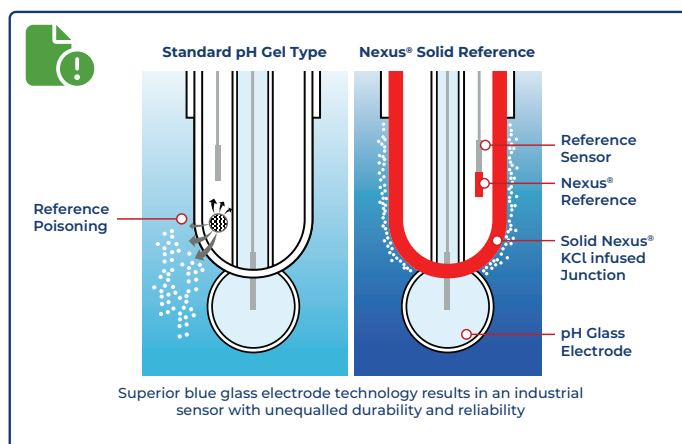
The Nexus® series is a solid reference material. Poisoning or leaching of the reference electrolyte that occurs in standard sensor is greatly reduced.

The Nexus reference helps to eliminate the need for ongoing maintenance or cleaning requirement due to fouling or film build up removal which occurs with many process applications with traditional pH sensors.

## Faster Response-Longer Lasting

The solid Nexus® reference provides for faster response time to changing pH values since there is no requirement for a junction.

- ✓ Double junction reference extends sensor life and protects against poisoning ions
- ✓ Durable crack resistant low ionic glass enhances performance and increased reliability
- ✓ Operates in sub-zero temperatures down to 14°F (-10°C)
- ✓ Advanced electronic diagnostics provides excellent repeatability and reliability



Direct D500 Controller with SimpliCal® Auto Calibration



Direct 4-Wire

Blue Glass Electrode

Nexus® Solid Reference

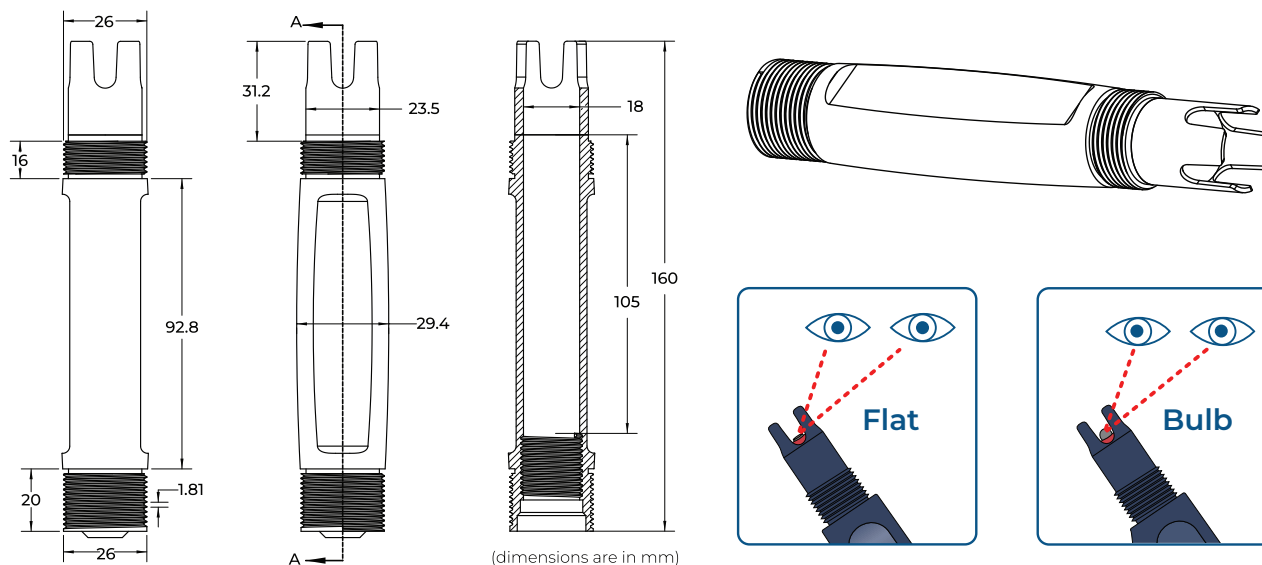




### Specifications

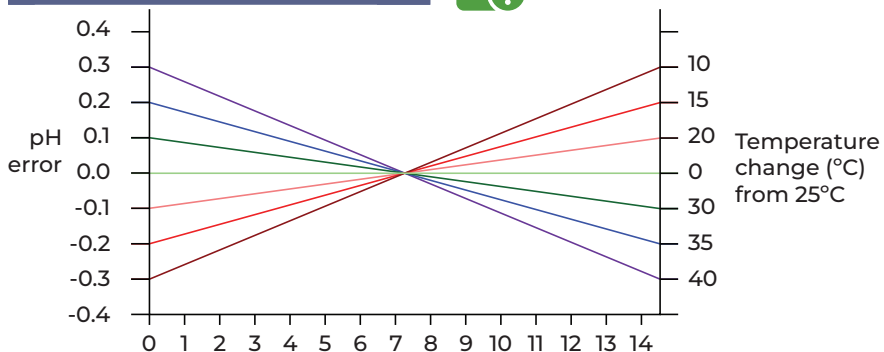
Measurement Range	
pH	0 – 14
Output Signal — No Preamp Required	
2 Wire Loop Powered   4-20mA + RS 485 Direct Sensor Output	
Accuracy	
7.00 ± 0.25	
Operating Temperature	
14 to 176°F   -10 to 80°C   Automatic Temperature Compensation	
Maximum Pressure	
150 Psi at 140°F (60°C) — See Pressure vs. Temp Graph	
Design	
Sensor body	PP Polypropylene (std)   Ryton®   PPS
Reference System	3.3 Mol Ag / AgCl / KCl Double Junction
pH electrode	Blue Glass   Bulb   Flat
Reference	Solid Nexus®   Porous Ceramic (P14G)
Connection	3/4" NPT
Measuring Electrode Resistance	< 500 MΩ   < 600 MΩ   < 800 MΩ
Impedance Range	102 – 675 MΩ
Temperature Compensation/Output- 4-20 + RS485 Model	
Pt-1000 (Std)	
Pt-100	

### Dimensions

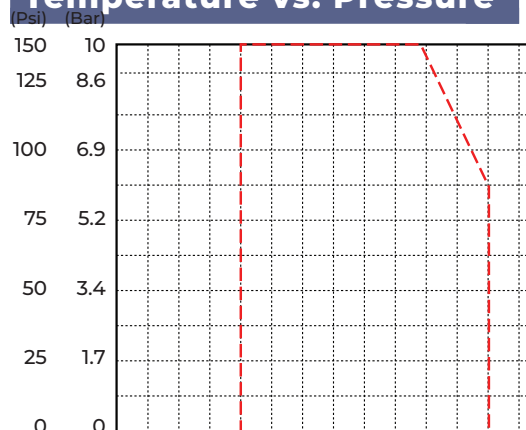




## Temperature Control



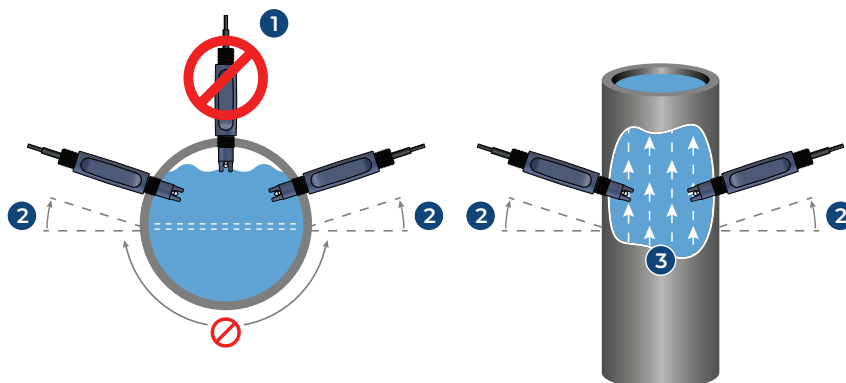
## Temperature vs. Pressure



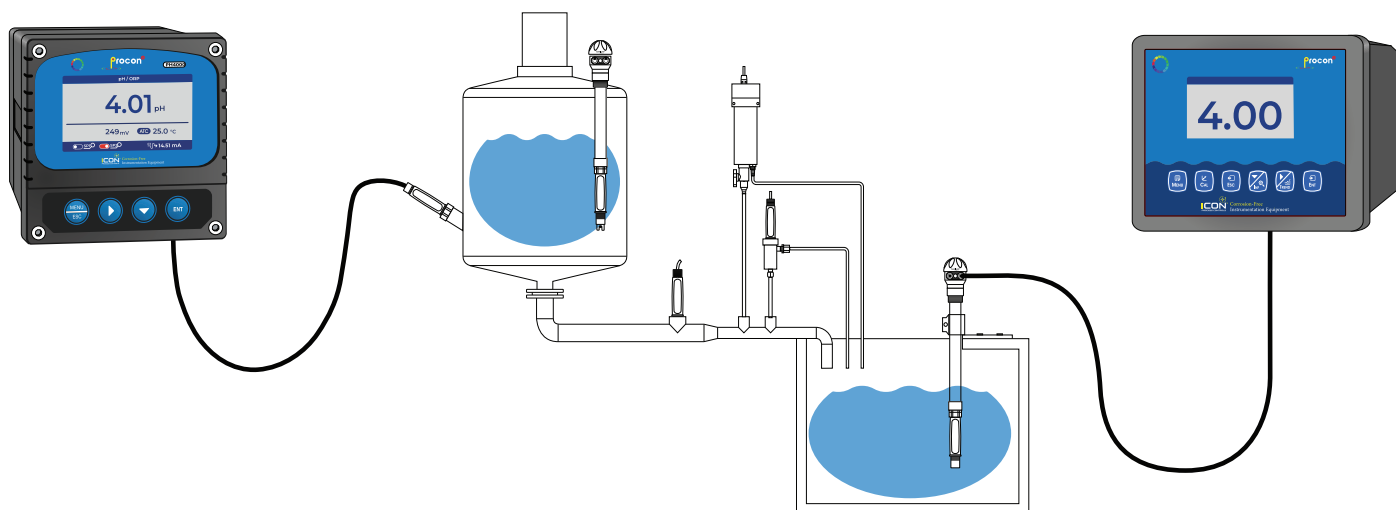
## In-line Mounting



1. Avoid vertical installation. (air may be present)
2. Optimum installation 15° above horizontal.
3. Process liquid should flow upward. (for downward flow ensure backpressure is present in order to avoid air within pipe)



## Typical Application



## Wiring — Flying Lead

### 4-20mA 2-wire

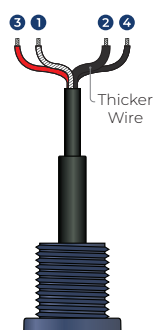
- 1 Blue: mA-
- 2 Brown: mA+



### 4-20mA 4-wire

- 1 Transparent: 4-20mA
- 2 Black (thick): Ref
- 3 Red: Temperature
- 4 Black: Temperature

Connects directly to ProCon® controller



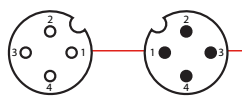
### 4-20mA + RS485 Output

- 1 Red: 9-24VDC +
- 2 Black: 9-24VDC -
- 3 Transparent: 4-20mA
- 4 Black (thick): Ref
- 5 Green: RS 485 A
- 6 White: RS 485 B



## Wiring — M12

### 4 Pin M12 Connection



M12 - Male      M12 - Female



### ■ 4-20mA | 4 Pin

Color	Description
Pin 1 - Brown	4-20mA +
Pin 2 - Blue	4-20mA -

### ■ 4-20mA + Controller | 4 Pin

Color	Description
Red	Temperature
Black	Temperature
Black (Thick)	Reference
Transparent	4-20mA

### 8 Pin M12 Connection



M12 - Female



### ■ 4-20mA + RS485 | 8 Pin

Color	Description
Red	9-24 VDC +
Black	9-24 VDC -
Transparent	4-20mA
Black (Thick)	Reference
Green	RS485 A
White	RS485 B

### 4 Pin IO - Link Connection



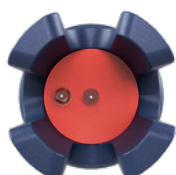
### ■ I-O Link | 4 Pin

Pin	Description
Pin 1	24 VDC +
Pin 2	
Pin 3	GND
Pin 4	4-20mA



P14G — General pH Sensor				
Part Number	Material	Output	Type	Connection
P14G-P-D-1-F-M	PP	4-wire (for ProCon® display)	Flat	M12
P14G-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14G-P-M-1-F-M	PP	4-20mA (2-wire, std)	Flat	M12
P14G-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14G-P-S-1-F-M	PP	RS485 + 4-20mA	Flat	M12
P14G-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



P14C — Complex pH Sensor				
Part Number	Material	Output	Type	Connection
P14C-P-D-1-F-M	PP	4-wire (for ProCon® display)	Flat	M12
P14C-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14C-P-M-1-F-M	PP	4-20mA (2-wire, std)	Flat	M12
P14C-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14C-P-S-1-F-M	PP	RS485 + 4-20mA	Flat	M12
P14C-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



P14H — HF < 1000ppm pH Sensor				
Part Number	Material	Output	Type	Connection
P14H-P-D-1-F-M	PP	4-wire (for ProCon® display)	Flat	M12
P14H-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14H-P-M-1-F-M	PP	4-20mA (2-wire, std)	Flat	M12
P14H-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14H-P-S-1-F-M	PP	RS485 + 4-20mA	Flat	M12
P14H-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



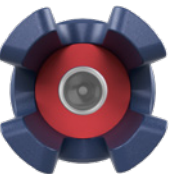
P14F — HF > 1000ppm pH Sensor				
Part Number	Material	Output	Type	Connection
P14F-P-D-1-F-M	PP	4-wire (for ProCon® display)	Flat	M12
P14F-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14F-P-M-1-F-M	PP	4-20mA (2-wire, std)	Flat	M12
P14F-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14F-P-S-1-F-M	PP	RS485 + 4-20mA	Flat	M12
P14F-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



P14S — Seawater pH Sensor				
Part Number	Material	Output	Type	Connection
P14S-P-D-1-F-M	PP	4-wire (for ProCon® display)	Flat	M12
P14S-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14S-P-M-1-F-M	PP	4-20mA (2-wire, std)	Flat	M12
P14S-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14S-P-S-1-F-M	PP	RS485 + 4-20mA	Flat	M12
P14S-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



P14D — Desulfurization pH Sensor				
Part Number	Material	Output	Type	Connection
P14D-P-D-1-F-M	PP	4-wire (for ProCon® display)	Flat	M12
P14D-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14D-P-M-1-F-M	PP	4-20mA (2-wire, std)	Flat	M12
P14D-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14D-P-S-1-F-M	PP	RS485 + 4-20mA	Flat	M12
P14D-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



P14P — Ultra-pure H <sub>2</sub> O pH Sensor				
Part Number	Material	Output	Type	Connection
P14P-P-D-1-B-M	PP	4-wire (for ProCon® display)	Bulb	M12
P14P-P-M-1-B-M	PP	4-20mA (2-wire, std)	Bulb	M12
P14P-P-S-1-B-M	PP	RS485 + 4-20mA	Bulb	M12

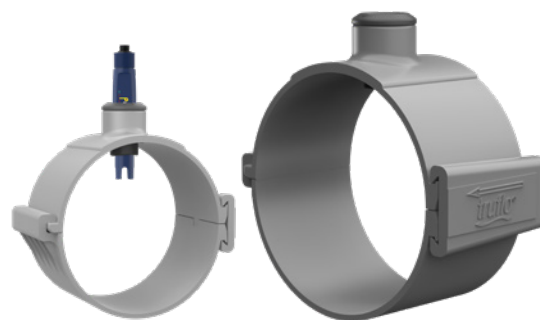
Last digit:  
"M" for M12 Connection (std)  
"B" Blind (J-Box)  
"F" Flying Lead



## Fittings

### Easy Install Clamp On Pipe Saddles

Part Number	Material	Size	Seal	Thread	Connection
PSA-2	PVC	2"	FPM	¾" NPT	PVC
PSA-3	PVC	3"	FPM	¾" NPT	PVC
PSA-4	PVC	4"	FPM	¾" NPT	PVC
PSA-6	PVC	6"	FPM	¾" NPT	PVC
PSA-8	PVC	8"	FPM	¾" NPT	PVC



### True Union Tee Fitting

Part Number	Material	Size	Seal	Thread	Connection
TUPA-PV-5	PVC	1/2"	FPM (std)   EPDM	¾" NPT	Socket   NPT
TUPA-PP-5	PP	1/2"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PF-5	PVDF	1/2"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PV-7	PVC	3/4"	FPM (std)   EPDM	¾" NPT	Socket   NPT
TUPA-PP-7	PP	3/4"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PF-7	PVDF	3/4"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PV-1	PVC	1"	FPM (std)   EPDM	¾" NPT	Socket   NPT
TUPA-PP-1	PP	1"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PF-1	PVDF	1"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PV-15	PVC	1 1/2"	FPM (std)   EPDM	¾" NPT	Socket   NPT
TUPA-PP-15	PP	1 1/2"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PF-15	PVDF	1 1/2"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PV-2	PVC	2"	FPM (std)   EPDM	¾" NPT	Socket   NPT
TUPA-PP-2	PP	2"	FPM (std)   EPDM	¾" NPT	Butt   NPT
TUPA-PF-2	PVDF	2"	FPM (std)   EPDM	¾" NPT	Butt   NPT



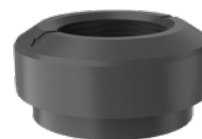
### Cast Iron Saddle Fitting

Part Number	Material	Size	Seal
CISSP020	Cast Iron / SS / PVC	2"	FKM O-Rings
CISSP030	Cast Iron / SS / PVC	3"	FKM O-Rings
CISSP040	Cast Iron / SS / PVC	4"	FKM O-Rings
CISSP060	Cast Iron / SS / PVC	6"	FKM O-Rings
CISSP080	Cast Iron / SS / PVC	8"	FKM O-Rings
CISSP100	Cast Iron / SS / PVC	10"	FKM O-Rings
CISSP120	Cast Iron / SS / PVC	12"	FKM O-Rings
CISSP140	Cast Iron / SS / PVC	14"	FKM O-Rings
CISSP160	Cast Iron / SS / PVC	16"	FKM O-Rings
CISSF020	Cast Iron/ SS/ PVDF	2"	FKM O-Rings
CISSF030	Cast Iron/ SS/ PVDF	3"	FKM O-Rings
CISSF040	Cast Iron/ SS/ PVDF	4"	FKM O-Rings
CISSF060	Cast Iron/ SS/ PVDF	6"	FKM O-Rings
CISSF080	Cast Iron/ SS/ PVDF	8"	FKM O-Rings
CISSF100	Cast Iron/ SS/ PVDF	10"	FKM O-Rings
CISSF120	Cast Iron/ SS/ PVDF	12"	FKM O-Rings
CISSF140	Cast Iron/ SS/ PVDF	14"	FKM O-Rings
CISSF160	Cast Iron/ SS/ PVDF	16"	FKM O-Rings



### Weldolet® Pipe Adaptor

Part Number	Material	Size	Connection
WAS-2	PVC	2"-4"	¾" NPT
WAS-6	PVC	6"-24"	¾" NPT
WPF-SS-2	SS	2"-4"	¾" NPT
WPF-SS-6	SS	6"-24"	¾" NPT





## Electrode preservation:



1. Clean the electrode correctly after use
2. Place the electrode in the electrode storage bottle for storage
3. The solution in the protective bottle is 3 mol/L KCl solution

pH/ORP Process Sensor	
P14S	Seawater Environment
P14C	Strong Acid, Strong Base, Chemical Process
P14D	Flue Gas Desulfurization
P14P	Pure Water Low Ion Concentration
P14F	Hydrofluoric Acid Environmental Applicable Concentration < 1000 ppm
P14H	Hydrofluoric Acid Environmental Applicable Concentration > 1000 ppm
P14G	General Application, Industrial Wastewater
P14E	Light Duty Applications

## Warranty

**Icon Process Controls** warrants this product to be free from significant deviations in material and workmanship for a period of one year from the date of purchase. If repair is necessary and has not been the result of abuse or misuse within the warranty period, please return to **Icon Process Controls** and amendment will be made without any charge. **Icon Process Controls** Customer Service Center will determine if product problem is due to deviations or customer abuse. Out of warranty products will be repaired on a charge basis.

Authorization must be obtained from **Icon Process Controls** Customer Service Center to issue a RIR number before returning items for any reason. When applying for authorization, please include the date and the reason of return. Instruments must be carefully packed to prevent damage in shipment and insured against possible damage or loss. **Icon Process Controls** will not be responsible for any damage resulting from careless or insufficient packing.

**Warning:** Damage as a result of inadequate packaging is the user / distributor's responsibility.



**Phone:** 905.469.9283 • **Sales:** sales@iconprocon.com • **Support:** support@iconprocon.com



Use with any of the following controllers — **NO PREAMP REQUIRED**



**SINGLE INPUT**



**DUAL INPUT**



**FIVE INPUT**



[iconprocon.com](http://iconprocon.com)