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**W A L C H E M**

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**IWAKI America Inc.**

**CONTACTING CONDUCTIVITY  
GENERAL PURPOSE SENSORS  
Instruction Manual**

**Notice**

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## 1.0 Introduction

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The contacting conductivity sensors measure a voltage drop between two electrodes which is inversely proportional to the conductivity of the solution.

## 2.0 Specifications

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### 2.1 Measurement Performance

Part Number	Cell Constant	Range	Resolution	Accuracy
103903-10	0.01	0-300 $\mu\text{S/cm}$	0.01 $\mu\text{S/cm}$	$\pm 1\%$ of reading
103904-10	0.1	0-3,000 $\mu\text{S/cm}$	0.1 $\mu\text{S/cm}$	$\pm 1\%$ of reading
103905-10	1.0	0-30,000 $\mu\text{S/cm}$	1 $\mu\text{S/cm}$	$\pm 1\%$ of reading
103906-10	10	0-300,000 $\mu\text{S/cm}$	10 $\mu\text{S/cm}$	$\pm 1\%$ of reading

Note: Conductivity ranges above apply at 25°C. At higher temperatures, the range is reduced per the range multiplier chart.

Temperature °C	Range Multiplier
0	181.3
10	139.9
15	124.2
20	111.1
25	100.0
30	90.6
35	82.5
40	75.5
50	64.3
60	55.6
70	48.9

Temperature °C	Range Multiplier
80	43.5
90	39.2
100	35.7
110	32.8
120	30.4
130	28.5
140	26.9
150	25.5
160	24.4
170	23.6
180	22.9

### 2.2 Mechanical

Part Number	103903-10	103904-10	103905-10	103906-10
Length	5.25" (133 mm)	5.25" (133 mm)	5.25" (133 mm)	9.25" (235 mm)
Minimum immersion length	2.25" (57 mm)	0.5" (12.7 mm)	0.5" (12.7 mm)	5.25" (133 mm)
Diameter	0.5" (12.7 mm)			
Pressure (Polypropylene fitting)	0-100 psi (0-6.9 bar)			
Pressure (316SS fitting)	0-200 psi (0-13.8 bar)			
Temperature (Polypropylene fitting)	32-212 °F (0-100 °C)			
Temperature (316SS fitting)	32-248 °F (0-120 °C)			
Fitting Process Connection	½" NPTM			
Electrode Material	316SS			
Insulator Material	PTFE			
O-Ring Material	EPR			
Temperature Element	Pt1000 RTD			
Cable length	10 feet (3 m)			
Maximum cable length	250 feet (76 m)			

## 3.0 Installation

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### 3.1 Mechanical Installation

#### General Guidelines

- Mount the sensor as close as possible to the controller.

- Take care to shield the cable properly.
- Maximum cable length is 250 feet.
- Position the sensor such that a fresh, representative sample of the solution is available.
- Position the sensor such that air bubbles will not be trapped within the sensing area.
- Position the sensor where sediment or oil will not accumulate within the sensing area.
- If cable is installed in metal conduit (recommended), either flexible conduit should be used or some other provision made for removal of sensor from the process for maintenance.

### **Submersion Installations**

The submersion sensor requires a standard 1/2" NPTF coupling (user supplied) for connection of the sensor fitting to a standard compatible pipe. The sensor should be immersed away from the walls and floor of the tank by a minimum of 2 inches. The support pipe must be long enough to be above solution level. It should be sealed at the top, with a user supplied cable clamp, to prevent moisture from filling the pipe. See Figure 1. This pipe will usually be suspended from a bracket attached to the lip of the tank.

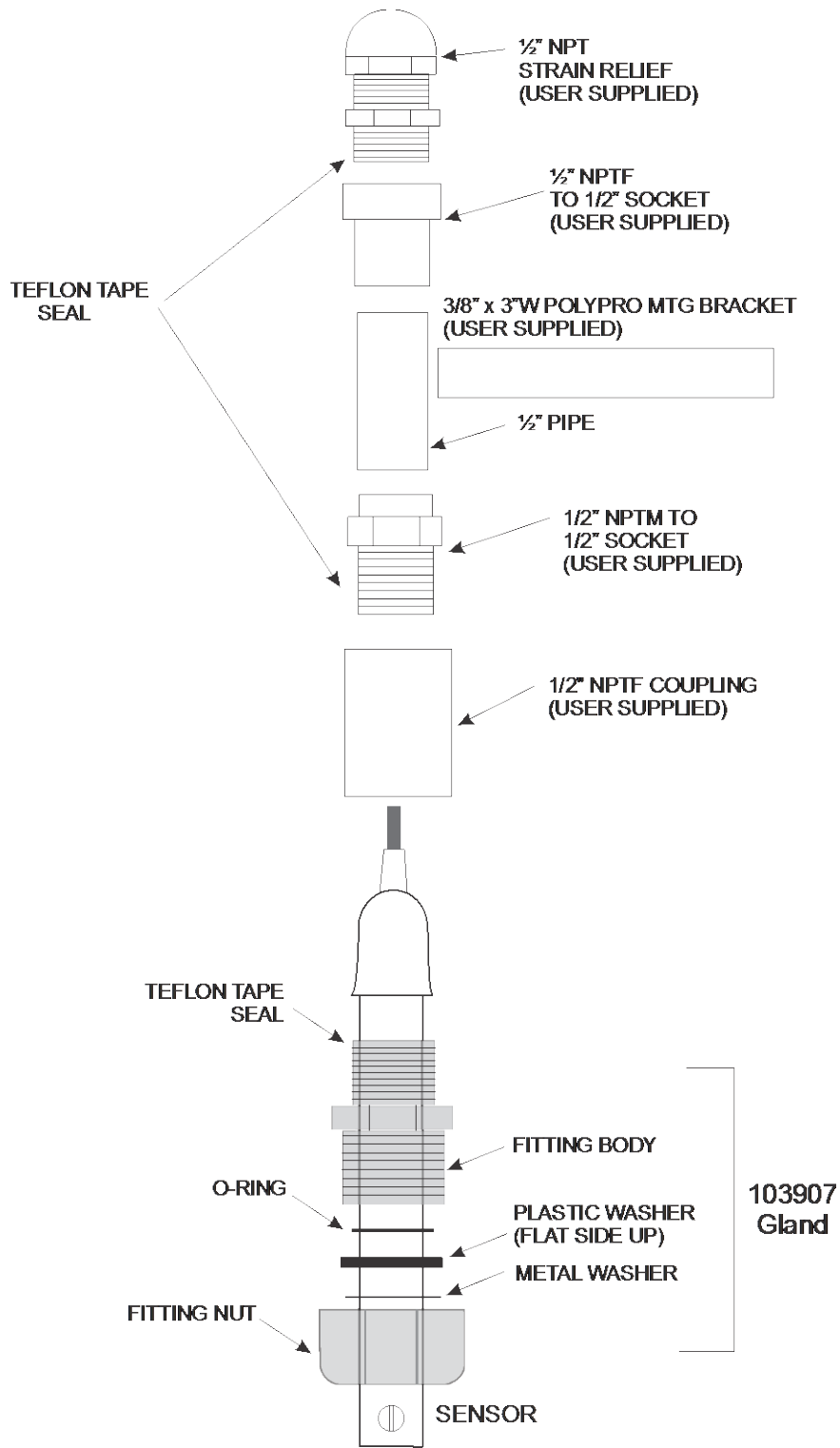
If the cable run will be exposed to moisture (rain, hosing, etc.), it must be protected with flexible conduit (preferably metal).

### **In-Line Installations**

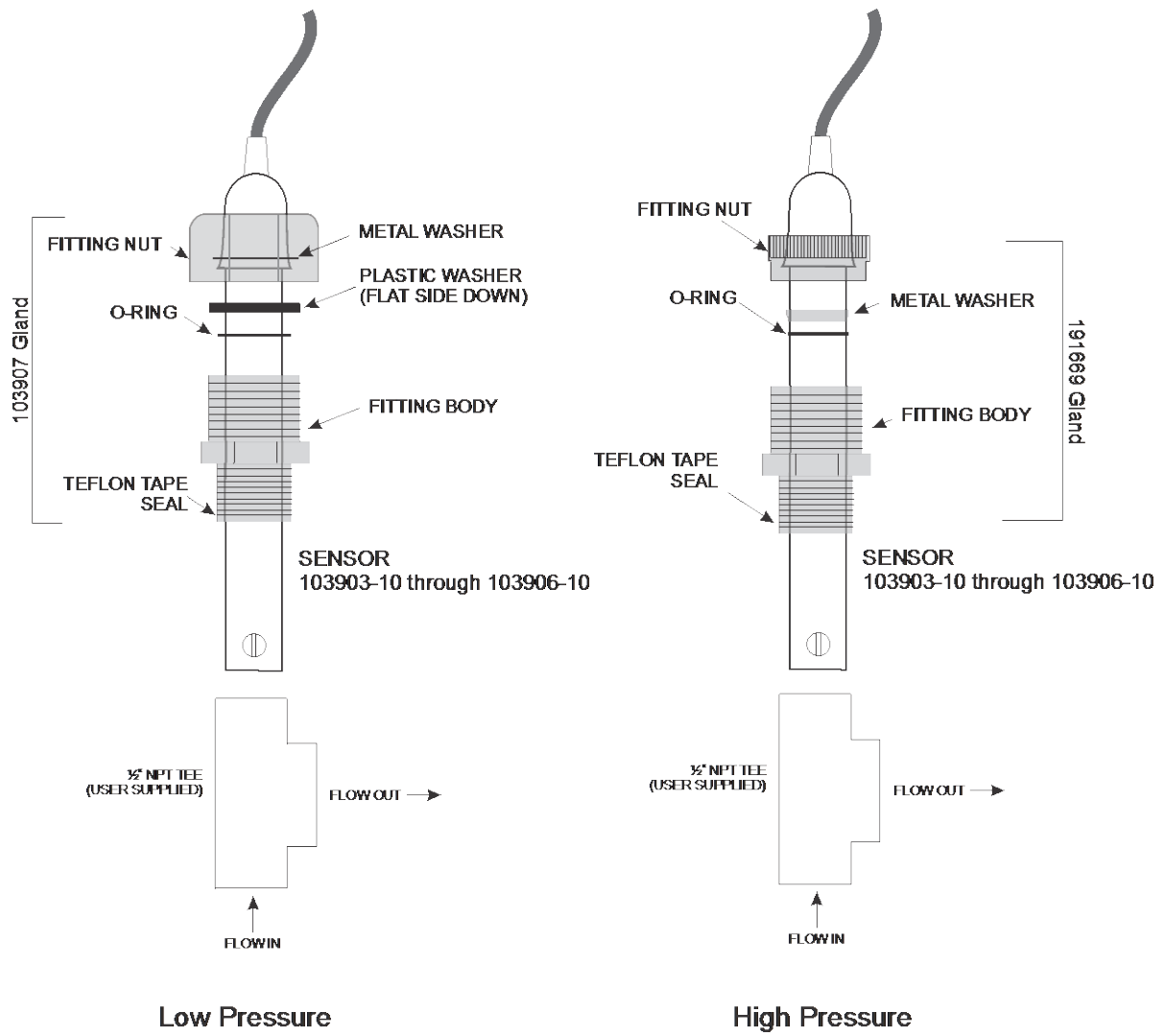
Thread the fitting into the end port of a 1/2" NPTF tee as shown in Figure 2.

**NOTE:** *It is important that the flow direction is in the end port and out the side port (as shown in Figure 2) to provide maximum cleaning of the sensor.*

If the sensor will be exposed to moisture (rain, hosing, etc.) the cable end must be protected.



*Figure 1 Submersion Installation*



*Figure 2 In-Line Installation*

### 3.3 Electrical Installation

Route the cable through one of the water tight cable glands on the WCN series controller, and connect the wires matching the wire label with the terminal block label.

## 4.0 Maintenance

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### 4.1 Cleaning the sensor

Note: the controller must be recalibrated after cleaning the probe.

- The probe should be cleaned periodically. The frequency required will vary by installation. In a new installation, it is recommended that the probe be cleaned after two weeks of service. To determine how often the probe must be cleaned, follow the procedure below:
- Read and record the conductivity.
- Remove, clean and replace the conductivity probe.
- Read conductivity and compare with the reading in step 1 above.
- If the variance in readings is greater than 5%, increase the frequency of probe cleaning. If there is less than 1% change in the reading, the probe was not dirty and can be cleaned less often.

#### Cleaning Procedure

An accumulation of dirt or debris on the sensor can affect the accuracy and the thermal time constant. This accumulation should be removed periodically. This can be accomplished by scrubbing with a toothbrush or stiff bottle brush. Detergent or isopropyl alcohol cleaner may help remove oils. A mild acid will remove calcium scale. Harsh abrasives should be avoided. Rinse the sensor thoroughly before returning to service.