

Instructions for InPro 7010 Series Conductivity Sensors

Safety Precautions

The sensors described in this instruction manual are to be used only for the purpose stated below. It is advisable to wear safety glasses and appropriate protective clothing when handling cleaning solutions. Chemicals released under pressure can cause severe injury including blindness.



Warnings!

Use care when connecting and disconnecting high pressure service connections. Use proper gloves and follow the recommended procedure to avoid severe injury to personnel or damage to equipment.

When processing hazardous liquids, follow the recommended procedures. Failure to do so could result in injury to personnel and damage to equipment.

Use only METTLER TOLEDO recommended replacement parts. Substitution parts could result in damage to equipment, damage to the process, and/or injury to personnel.

General Information

METTLER TOLEDO InPro 7010 Series conductivity sensors are either constructed of graphite, platinum, stainless steel or another metal. These metal electrodes serve as sensing elements and are placed at a fixed distance to make contact with the solution whose conductivity is to be determined. The distance between the electrodes divided by their surface area determines the cell constant.

A cell constant of 1.0 will produce a conductance reading equal to the solution conductivity. For solutions of low conductivity, the sensing electrodes can be placed closer together, resulting in cell constants of 0.1 or 0.01. This will increase the conductance reading by a factor of 10 or 100. Sensing electrodes can also be placed further apart to create cell constants of 10 or 100 for use in highly conductive solutions. This will reduce the conductance by a factor of 10 or 100.

In order to produce a measuring signal acceptable to the conductivity transmitter, it is very important that the user choose a conductivity electrode that has a cell constant appropriate for the sample. The table below lists the optimal conductivity range of sensors with different cell constants.

Cell constant	Optimum Conductivity Range	Maximum Conductivity Range
0.01	0.1 - 20 $\mu\text{S/cm}$	0.01 - 20 $\mu\text{S/cm}$
0.1	1.0 - 200 $\mu\text{S/cm}$	0.1 - 200 $\mu\text{S/cm}$
1.0	0.10 - 20 mS/cm	0.10 - 200 mS/cm^*

* The sensor InPro 7012 will measure up to 100 mS/cm with a system accuracy of $\pm 3\%$, and up to 150 mS/cm with a system accuracy of $\pm 10\%$. For measurements above 150 mS/cm this sensor is not recommendable.

Operating Instructions

Before use, soak the conductivity electrode in distilled or de-ionized water for 5 to 10 minutes. Connect the sensor to the transmitter and follow the transmitter instruction manual to standardize the sensor for use at a given temperature. Rinse the electrodes with distilled or de-ionized water between samples. **Note:** each conductivity sensor has a cell constant that is predetermined by the manufacturer and indicated on the electrode cable. The cell constant may change slightly during shipping and storage. Before initial use, it should be re-measured on the user's conductivity transmitter following the transmitter instruction manual.

Installation

The direction of flow should be towards the tip of the sensor. Avoid air or solids being trapped in the sensor cavity. Vertical mounting is possible if the pipe is full and no air can be trapped between the electrodes. If the sensor is mounted in a vertical pipe, the flow direction should be upwards and the sensor inclined by 30° .

Cleaning and storage

The single most important requirement for accurate and reproducible results in conductivity measurement is clean electrodes. Dirty electrodes can contaminate the solution and change its conductivity. Grease, oil, fingerprints, and other contaminants on the sensing elements can cause erroneous measurements and erratic responses.

Clean electrodes with detergent and / or diluted nitric acid (1%) by dipping or filling the sensor with cleaning solution and agitating for 2 to 3 minutes. Other diluted acids (e.g. sulfuric, hydrochloric, chromic) may be used for cleaning. When a stronger cleaning solution is required, try concentrated hydrochloric acid mixed with 50% isopropanol. Rinse the electrodes several times with distilled or deionized water and re-measure the cell constant before use. It is best to store sensors with the electrodes immersed in deionized water. Any sensor that has been stored dry should be soaked in distilled water for 5 to 10 minutes before use to assure complete wetting of the electrodes.

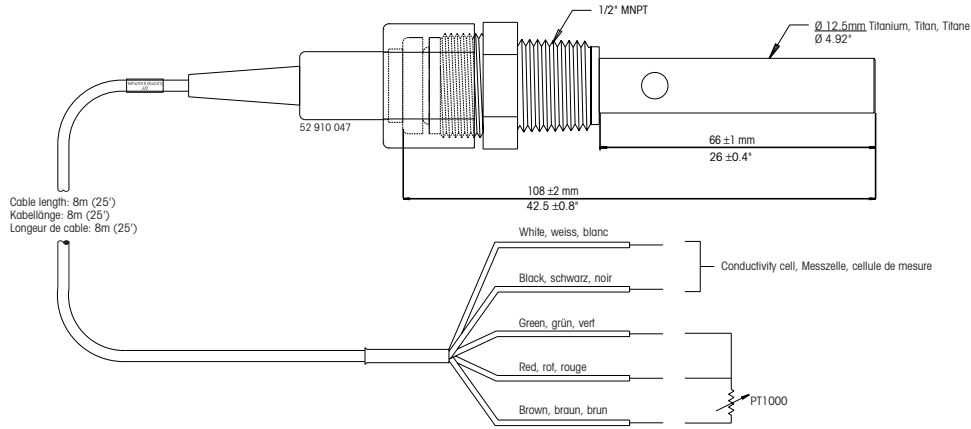
Troubleshooting

- Check all connections
- Check that temperature sensor is connected to the corresponding input in the transmitter
- Clean electrode surfaces according to the procedure described above
- Check for trapped air bubbles or solid contaminants

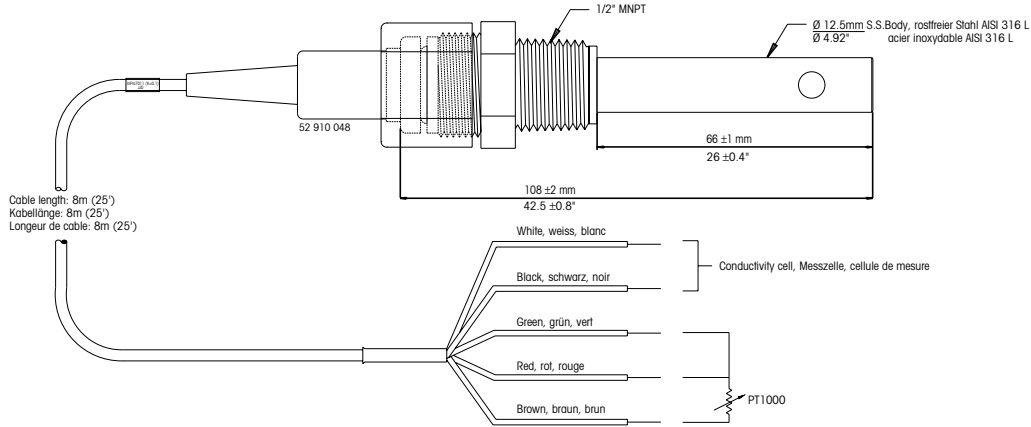
Disposal

The sensors described in this instruction manual typically can not be repaired. Dispose of sensors in accordance to local regulations. Sensors contain electronic components (cable) and metallic parts that may require special disposal to prevent any health hazards or risk to the environment.

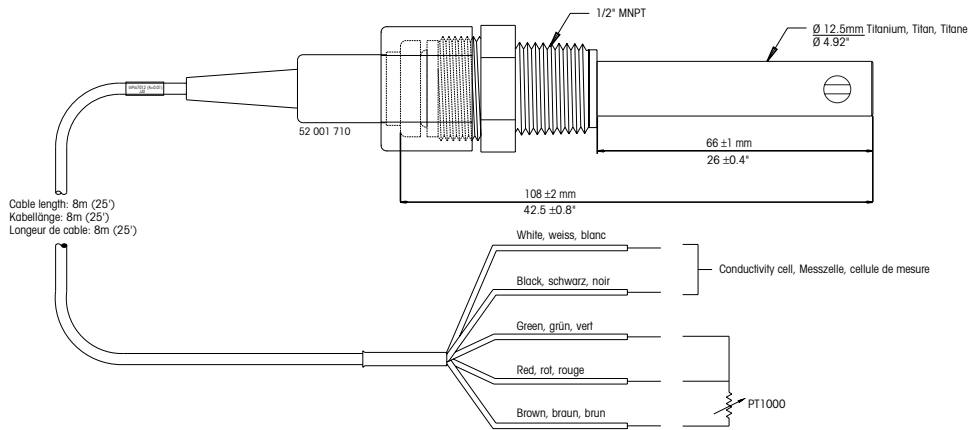
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