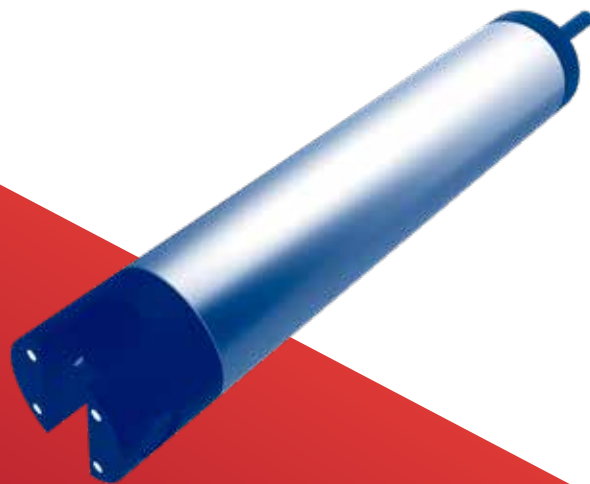




USER MANUAL

# **WQ440**

## Turbidity Sensor



# Index

1	General Description	3
2	Maintenance	3
3	Malfunction	4
4	Calibration	5
	Equipment	5
	Preparation	5
	Calibration	6
	Calculation	7
5	Technical Features	8
6	Warranty	9

Congratulations on your purchase of the WQ440 Turbidity Sensor. This instrument has been tested to provide accurate and reliable turbidity measurements. We are confident that you will find this product tailored to your needs. If you need assistance, our technical staff will be happy to help you.



# General Description

1

The WQ440 meter is a compact and robust instrument suitable for measuring turbidity in groundwater and surface water.

In accordance with USEPA Method 180.1 for turbidity measurement, the Turbidity Sensors are a 90 degree scatter nephelometer. Turbidity sensor directs to focused beam into the monitored water. The light beam reflects off particles in the water, and the resultant light intensity is measured by the turbidity sensor's photodetector positioned at 90 degrees to the light beam. The light intensity detected by the turbidity sensor is directly proportional to the turbidity of the water. The turbidity sensors use a second light detector to correct light intensity variations, color changes, and minor lens fouling.

An electronic board converts the 4÷20mA output signal, directly proportional to the water turbidity.

# Maintenance

2

- The WQ440 turbidimeter is an optical sensor and should be handled with care, avoiding hitting it or dropping it; do not expose the sensor to vibrations or to extreme hot or cold temperatures.
- The sensor should be checked regularly: if left for a long time without adequate care, aggressive environments can permanently damage the sensor optics.
- The deposits that develop on the optics must be cleaned weekly; the lenses can be cleaned gently with a cotton cloth soaked in alcohol.

Do not use abrasive materials. In clean water the sensor can be cleaned less frequently while in aggressive environments daily cleaning may be necessary.



- The sensor must be calibrated every 6 months.
- Turn off the power before connecting or disconnecting the cables.
- Air bubbles on the lenses can significantly affect the reading: make sure therefore the lenses are free of air bubbles.
- Under no circumstances should the sensor be disassembled: there are no adjustments or parts inside repairs that must be performed by the user. The sensor opening will cancel any warranty.
- The stainless steel body of the sensor is connected to the ground of the circuit and during the reading must be in contact with the liquid, otherwise reading errors may occur.

## Malfunction

3

Issue	Try to...
Incorrect reading	Clean the lenses with a cotton cloth soaked in alcohol Check that there are no air bubbles on the lenses Check the sensor calibration
No signal	Check the connections Check the integrity of the cable
Other issues	Contact SIM STRUMENTI for helpline: <a href="tel:+390297003039">+39 02 97003039</a> Send an email: <a href="mailto:sim@simstrumenti.com">sim@simstrumenti.com</a>



# Calibration

## 4

### Equipment

To proceed with calibration, the following accessories are required:

- Rod with clamp
- 500ml (No.3) and 1000ml (No.1) glasses
- Liquid with 1000 NTU standard turbidity
- Liquid with 50 NTU of standard turbidity
- Liquid with 0 NTU of standard turbidity
- Distilled water
- Power supply
- Multimeter

### Notes:

- If the instrument is connected to a data acquisition unit, this can be used instead of the power supply and the multimeter.
- The recommended standard turbidities are suspended polymer solutions, which are not toxic and do not require mixing or stirring before use.
- SIM STRUMENTI can provide standard solutions of turbidity.

### Preparation

1. Fix the sensor to the terminal connected to the rod, so as to be able to subsequently insert the glasses containing the liquid, bearing in mind that:
  - The stainless steel body of the sensor must be in contact with the liquid
  - The sensor end must be at least 3cm away from the bottom of the glass
2. The lenses should be cleaned with an alcohol wipe before calibration.
3. Fill a large glass with distilled water, necessary for rinsing the sensor to switch from one solution to another.
4. Fill 3 glasses of at least 500ml with the three solutions (0.50e1000NTU)



5. The calibration must not be carried out in full light: to prevent the dispersion of light from the outside, which can influence the readings, use glasses made of non-transparent material or possibly cover them.

## Calibration

If you are connected to a data acquisition unit or a reading unit, skip points 1, 2.

1. Connect the sensor as follows: green wire to the negative of the power supply, yellow wire to the positive of the multimeter (check that the multimeter is in mA both as a scale and as a connection).
2. Check that the power supply is between 10 and 30V and only now connect the red wire to the positive terminal of the power supply (make sure that the white wire is insulated).
3. Place the sensor in the beaker with distilled water, rinse, dry and clean the lenses with alcohol.
4. Insert the sensor in the glass with the 0 NTU solution, let a few seconds pass so that the reading stabilizes, check that there are no air bubbles and measure the current with the multimeter, or read with the unit of data acquisition the non-scaled analog value (the channel that corresponds to the 0-1000 NTU scale). This value is the zero value of the 0-1000 NTU scale.
5. Disconnect the yellow wire from the multimeter and isolate it, connect the white wire to the multimeter; if a data acquisition unit is used, position on the channel with the 0-50 NTU scale, measure the current with the multimeter or read the non-scaled analog value with the data acquisition unit. This value is the zero value of the 0-50 NTU scale.
6. Place the sensor in the beaker with distilled water, rinse, dry and clean the lenses with alcohol.
7. Insert the sensor into the glass with the 50 NTU solution, let a few seconds pass so that the reading stabilizes, check that there are no air bubbles and measure the current with the multimeter or read with the data acquisition unit the non-scaled analog value (the channel that corresponds to the 0-50 NTU scale). This value is the full scale value of the 0-50 NTU scale.
8. Place the sensor in the beaker with distilled water, rinse, dry and clean the lenses with alcohol.
9. Disconnect the white cable from the multimeter and isolate it, connect the yellow wire to the multimeter, if using a data acquisition unit, position on the channel with the 0-1000 NTU scale.



10. Insert the sensor in the glass with the 1000 NTU solution, let a few seconds pass so that the reading stabilizes, check that there are no air bubbles and measure the current with the multimeter or read with the data acquisition unit the non-scaled analog value (the channel that corresponds to the 0-1000 NTU scale). This value is the full scale value of the 0-1000 NTU scale.
11. Place the sensor in the beaker with distilled water, rinse, dry and clean the lenses with alcohol.

## Calculation

For the 0-1000 NTU scale :  $1\text{mA} = 1000 / (\text{Full scale value} - \text{Zero value}) \text{ NTU}$

For the 0-50 NTU scale:  $1\text{mA} = 50 / (\text{Full scale value} - \text{Zero value}) \text{ NTU}$

### Example of calculation for MYLOG:

Sensor scale: 0-1000 NTU

Zero value: 04.005

Full scale value: 19.997

Valore di START SCALE =  $(1000/(19.997-4.045))*(0-4.045) = -253$

Valore di END SCALE =  $(1000/(19.997-4.045))*16 = 1003$

### Example of calculation for MINILOG:

Sensor scale: 0-1000 NTU

Zero value: 04005 (4.045mA)

Full scale value: 19997 (19.997)

Valore di START SCALE =  $(1000/(19.997-4.045))*(4-4.045) = 3$

Valore di END SCALE =  $(1000/(19.997-4.045))*16 = 1003$





# Technical Features

5

Range	0÷50 NTU e 0÷1000 NTU
Supply	10÷36V
Output	2 outputs 4÷20mA
Consumption	20mA+output
Accuracy	1% FS
Max pressure	2 bar
Operating temperature	0 ÷ 50 °C
Warm up	8 sec
Dimensions	Ø 38 x 216 mm
Weight	0.454 Kg
Connections	
Red	+Supply
Green	Ground
Yellow	Out 4÷20mA scala 0÷1000 NTU
White	Out 4÷20mA scala 0÷50 NTU

NOTE: the sensor body is connected to the ground of the electronic circuit



TURN OFF THE POWER SUPPLY BEFORE CONNECTING OR DISCONNECTING THE WIRES



INCORRECT CONNECTION MAY CAUSE SERIOUS DAMAGE TO INSTRUMENTATION



# Warranty

## 6

The SIM STRUMENTI guarantees that all the equipment and instruments produced by it comply with the declared technical specifications and are suitable for the intended applications.

The SIM STRUMENTI guarantees that its products are free from defects in material and workmanship.

The warranty period is 12 (twelve) months from the date of shipment of the goods.

The claimed defective material must be sent to SIM STRUMENTI, together with the goods return form on the website and authorized in advance with an RMA number.

The shipment of the goods is always charged to the customer (from and to SIM STRUMENTI).

SIM STRUMENTI reserves the right to decide whether the warranty is applicable to defective goods, if this must be replaced or repaired.

Under no circumstances SIM STRUMENTI will be liable for defects caused by random damage, improper use not compliant with the user manual or natural events such as electric shocks, lightning, floods, earthquakes, fires, etc.

SIM STRUMENTI disclaims any responsibility for repairs or modifications made to instruments by unauthorized persons.

SIM STRUMENTI also disclaims any liability for damage caused to persons or property due to or due to the malfunction of its devices.

Under no circumstances will the responsibility of SIM STRUMENTI exceed the original purchase price.







**Sim Strumenti S.n.c.**

Via Merendi 42  
20010 CORNAREDO (MI)  
ITALY  
Tel: +39 02 9700 30 39  
Fax: +39 02 9729 01 67  
[www.simstrumenti.com](http://www.simstrumenti.com)  
[sim@simstrumenti.com](mailto:sim@simstrumenti.com)