

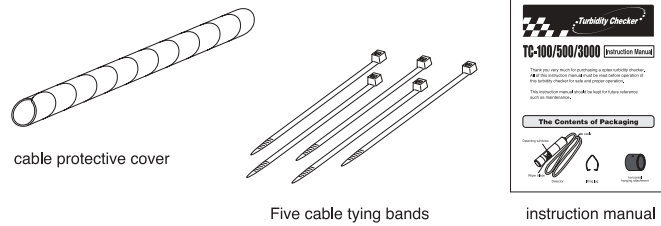
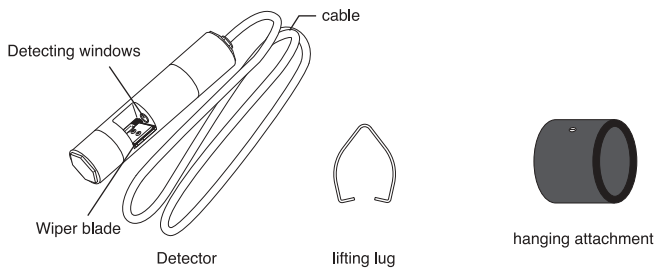
Turbidity Checker

TC-100/500/3000 Instruction Manual

Thank you very much for purchasing a optex turbidity checker. All of this instruction manual must be read before operation of this turbidity checker for safe and proper operation.

This instruction manual should be kept for future reference such as maintenance.

The Contents of Packaging



In the unlikely event of missing components or defectives, please contact your dealer.

1 For safe use

Be sure to read this instruction manual in order to use the turbidity checker properly.

- Please read the "For safe use" thoroughly before using the turbidity checker properly.
- Because these precautions are related to failure or malfunction, observe the precautions for use without fail.

Do not use the turbidity checker except for measurement of water quality.

In order to use the turbidity checker properly, observe the following precautions:

"⊘" denotes "Prohibited action", and "⚠" denotes "Required action".

<ul style="list-style-type: none"> • In the unlikely event of occurrence of abnormalities such as smoke or abnormal noise, immediately turn off the power. 	<ul style="list-style-type: none"> • Do not disassemble or modify the turbidity checker.
<ul style="list-style-type: none"> • Handle with care not to damage. 	<h3>DC12V</h3> <ul style="list-style-type: none"> • Use the turbidity checker with 12 VDC.
<ul style="list-style-type: none"> • To clean the detector, first wipe away lightly with a clean soft cloth immersed by diluted mild detergent solution and then wipe off moisture with a dry clean soft cloth, and so forth. 	<ul style="list-style-type: none"> • Do not wipe the detector with solvent such as benzene.
<ul style="list-style-type: none"> • Avoid strong physical shock to the detector or do not drop it. 	<ul style="list-style-type: none"> • Do not apply oil such as grease to the detector.

2 Installation

Make sure the cable is separated from the power supply before opening the unit.

"⊘" denotes "Prohibited action", and "⚠" denotes "Required action".

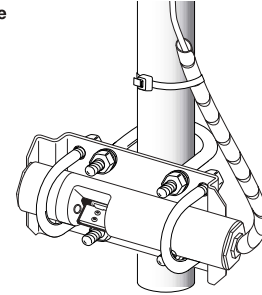
<ul style="list-style-type: none"> • Suspend the detector so as not to impinge upon a wall or facility equipment due to water flow. In the case of higher water flow, fix the detector. 	<ul style="list-style-type: none"> • Install the detector max.2m below the surface of the water.
<ul style="list-style-type: none"> • With fluctuation of water level taken into account, dispose the detector so as to be immersed up to of the order of 30 cm below the expected lowest water level. 	<ul style="list-style-type: none"> • Dispose the detector in water without air bubbles.

CAUTION:

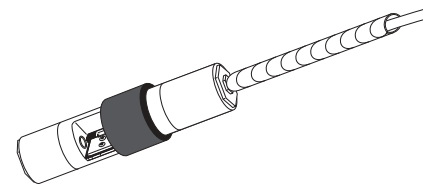
- Read precautions described in an instruction manual thoroughly before using a turbidity checker.
- Attach a cable protective cover without fail. Otherwise, there is a possibility that a cable is scratched during maintenance operation and water intrudes.
- Do not hang a detector with a detector cable.
- Do not cover over measuring surface by a hanging attachment.

When using a turbidity checker at a place at high water flow (for reference):

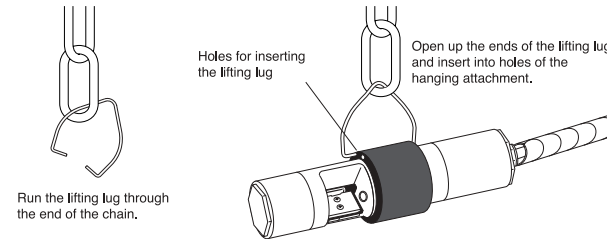
An optional mounting attachment (TA-1) is prepared for users who use the turbidity checker at a place at high water flow. This attachment serves to prevent a detector from impinging upon a side wall or turning around. For details, contact your dealer or see our website (<http://www.optex.co.jp/env/eng/index.html>).



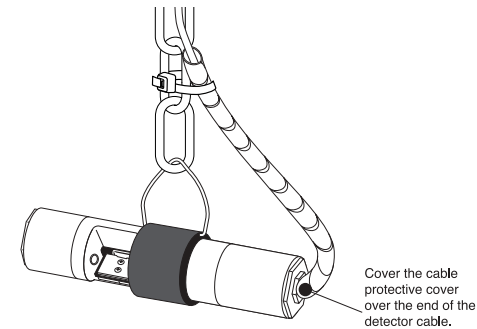
1 Wrap a cable protective cover on the detector side of the detector cable.



2 Hang the detector by a chain wire and so forth with an attached lifting lug (A chain wire and so forth should be supplied by a user).



3 Fasten the end of the cable protective cover on to the chain wire and so forth with a cable tying band.

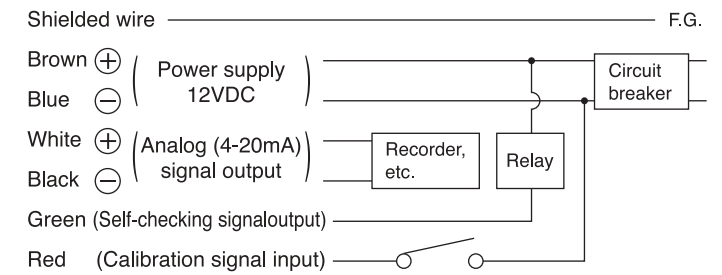


CAUTION:

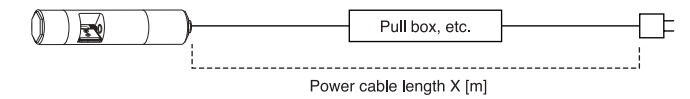
- An opening having the detecting window faces immediately lateral when hanging the detector.
- If the detector inclines at the time of hanging, make horizontal adjustments by changing a point where the cable is fastened on the chain wire and so forth.

3 Wiring

During wiring operations, disconnect the power cable from the power supply and wire the power cable at the last.



- Use a circuit breaker with rated current of 1A or more for power supply.
- When extending a detector cable, use a shielded cable (CVV-S) with a pull box, etc.
- For power cable length, refer to the Table below.



Nominal sectional area	Max. cable length X [m]
0.2[mm ²]	10[m]
0.3[mm ²]	20[m]
0.5[mm ²]	40[m]
0.75[mm ²]	50[m]

- For connection to the analog (4-20mA) signal output terminal, load resistance should be 300Ω or less (including wiring resistance).
- After operating the washing device, the analog (4-20mA) output is held for a certain period. Since this period differs depending on the type of turbidity checker, confirm it in the Table below. In reference to washing immediately after power-on, however, the analog (4-20mA) output is not held.

Type	Hold time (sec.)
TC-100	1
TC-500	60
TC-3000	60

- Output of self-detection output terminal is transistor output (open collector). When connecting to external equipment and so forth, connect between +12VDC and self-checking output by referring to the following items as occasion demands. (When external equipment is not connected, self-checking output terminal should be made open.)
 - Connect a resistor of 600Ω or more;
 - Connect a relay and so forth (Omron G6B series rated voltage 12VDC is recommended).
- Calibration signal input terminal should be pulled up to open or +12VDC during measurement.
- Adjust the analog (4-20mA) signal output receiving side as occasion demands.

CAUTION:

- The analog (4-20mA) signal output becomes of the order of 20mA for TC-100, 8mA for TC-500, and 4.5mA approx. for TC-3000 depending on the properties of equipment in the air, but this does not signify abnormalities.
- When two or more turbidity checkers are installed, use a power supply separately. Since +12VDC and +analog (4 to 20mA) signal output are not insulated, the analog (4 to 20mA) signal output will not be produced properly when two or more turbidity checkers are connected with one power supply.

Adjustment of analog (4 to 20mA) signal output

- There may be difference between measured water (forumajin, etc.) of known concentration and analog (4 to 20mA) signal output.

In this case, make adjustments on the analog (4 to 20mA) signal output receiving side.

Output method of 4 or 20mA

4mA: Immerse in distilled water or ion-exchange water;

20mA: Cut off the detecting windows for 30 seconds or more.

* When the detecting window are continuously cut off for ten minutes or more, self-checking output will be produced. (TC-3000 has not this function.)

4 Calibration

CAUTION:

The turbidity checker is designed to be able to measure stably for a prolonged period of time. In order to maintain the reliability of measurement, however, calibration should be carried out at least once a year.

When calibration is carried out, exercise care for the following points. Failure to observe these precautions may not carry out calibration properly.

- Clean the turbidity checker before carrying out calibration.
- Use distilled water or ion-exchange water for calibration. When distilled water or ion-exchange water is not available, use tap water while taking care for red water, and so forth.
- When air bubbles are produced on the detecting window, get rid of air bubbles before carrying out calibration.

- 1 Pull up the detector from water and clean the detector body and the detecting windows cleanly.
- 2 Immerse the detector in distilled water or ion-exchange water.
- 3 After accustoming the detector to water temperature for five minutes or so, make sure that air bubbles are not produced on the detecting windows and connect the calibration signal input terminal to -12 VDC for two seconds or more.
- 4 After two seconds or more is elapsed, disconnect the calibration signal input terminal from the -12 VDC. Calibration signal input terminal should be pulled up to open or +12VDC during measurement.
- 5 Immerse the detector in the measured water (forumajin, etc.) of known concentration and make sure of analog (4-20mA) signal output.
- 6 Adjust the analog (4-20mA) signal output receiving side as occasion demands.

5 Maintenance

CAUTION:

- To clean the detector, first wipe away lightly with a clean soft cloth, and so forth immersed by diluted mild detergent solution and then wipe off moisture with a dry clean soft cloth, and so forth.
- Do not wipe the detector with organic solvent such as benzene.
- Do not put oil such as grease on a wiper blade.

Maintenance (rough standard: once a month)

- Clean and wash the detecting windows and the wiper blade with tap water.
- Check whether or not the detecting windows are scratched or deteriorated.
- Check whether or not the wiper blade is worn or deformed.
- Make sure that the wiper blade is fixed securely.
- Check whether or not the detector cable is scratched or deteriorated.
- Check the lifting lug for corrosion.
- Immerse the detector in the measured water (forumajin, etc.) of known concentration and make sure of analog (4-20mA) signal output.

Replacement of consumables

- Replace the wiper blade once a year as rough standard. Besides, replace it when adequate wiping effect cannot be produced.
- Replace the lifting lug once a year as rough standard. Besides, replace it when it is corroded significantly.
- In reference to the wiper blade and lifting lug, purchase a maintenance kit (TC-MK).

Storage for a long time

- When the turbidity checker is not used over a prolonged period, keep it as follows:

Disconnect the power supply from the power source;

Pull up the detector from water and clean it.

Keep the detector at a place not being exposed to direct sunshine.

6 Troubleshooting

If self-detection output is produced, check the detector according to the following procedure.

- 1 Check if the detector is wired properly?
→ If there is any improper wiring, carry out wiring properly once again.
- 2 Check if the detector cable is disconnected or scratched or deteriorated?
→ If the detector cable is scratched or deteriorated, disconnect the power supply from the power source and contact your dealer.
- 3 Check if 12 VDC is supplied to the power supply?
- 4 Check whether or not the detecting windows are soiled?
→ If the detecting windows are soiled, clean it.
- 5 Check whether or not the measured water is abnormally turbid?
→ If the measured water is abnormally turbid, self-checking output will be produced.

* The TC-3000 will not produce self-diagnostic output even in the case of abnormal turbid water.

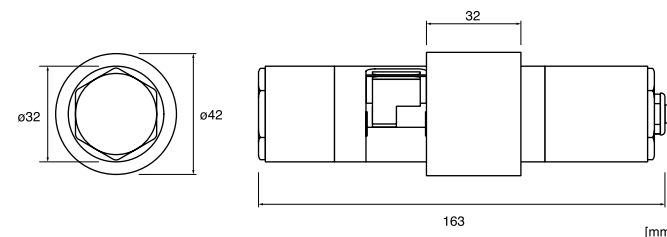
If self-checking output is produced even when there is not any aforementioned abnormality, the detector may be considered to be out of order. Accordingly, contact your dealer.

7 Specifications

Model No.	TC-100	TC-500	TC-3000
Measuring range	0-100 (FTU)	0-500 (FTU)	0-3000 (FTU)
Power supply	DC 12V±10%		
Current draw	At regular operation: 30mA (Max.), At cleaning operation: 240mA (Max.) (excluding analog signal output)		
Output	Analog (4-20mA) signal output: resistance load of 300Ω(Max.) 4mA: 0 FTU 20mA: 100 FTU (TC-100), 500 FTU (TC-500), 3000 FTU (TC-3000) Self-checking output: open collector (12VDC 20mA Max.)		
Input	calibration signal input		
Cleaning system	Both sided swing wiper cleaning system		
Time interval for cleaning	Clean once immediately after power-on, and subsequently clean once every 30 minutes	Clean once immediately after power-on, and subsequently clean once every 10 minutes	
Operating Temperature	0~40°C (unfrozen)		
Major Material	SUS 316L, sapphire glass, fluorocarbon rubber, EPDM, POM		
Dimensions	ø32x163mm (excluding hanging attachment)		
Weight	approx. 930g		
Degree of Protection	IP 68, maximum depth of 2 meters (underwater type)		
Detector cable length	10m		
Option	Display (TC-100H), Transmitter (SC-T3), Mounting attachment (TA-1), Maintenance kit (TC-MK)		

Note: Specifications and design are subject to change without prior notice.

8 Dimensions



For more information on OPTEX products, contact your dealer or visit our website listed below;

OPTEX CO., LTD.

5-8-12 Ogoto Otsu Shiga 520-0101 Japan

tel : +81-77-579-8680

fax : +81-77-579-8199

E-mail : env@optex.co.jp

website : <http://www.optex.co.jp/env/>

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