

User's Guide



Shop online at

omega.com[®]

OMEGA[®]

omega.com

e-mail: info@omega.com

For latest product manuals:

omegamanual.info



TRH444
Portable Turbidity Meter



OMEGAnet® Online Service
omega.com

Internet e-mail
info@omega.com

Servicing North America:

U.S.A.:
ISO 9001 Certified
One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047
TEL: (203) 359-1660
FAX: (203) 359-7700
e-mail: info@omega.com

Canada:
976 Bergar
Laval (Quebec) H7L 5A1, Canada
TEL: (514) 856-6928
FAX: (514) 856-6886
e-mail: info@omega.ca

For immediate technical or application assistance:

U.S.A. and Canada: Sales Service: 1-800-826-6342/1-800-TC-OMEGA®
Customer Service: 1-800-622-2378/1-800-622-BEST®
Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

Mexico:
En Español: (001) 203-359-7803
e-mail: espanol@omega.com
FAX: (001) 203-359-7807
info@omega.com.mx

Servicing Europe:

Czech Republic: Frystatska 184, 733 01 Karviná, Czech Republic
TEL: +420 (0)59 6311899
FAX: +420 (0)59 6311114
Toll Free: 0800-1-66342
e-mail: info@omegashop.cz

Germany/Austria: Daimlerstrasse 26, D-75392 Deckenpfronn, Germany
TEL: +49 (0)7056 9398-0
FAX: +49 (0)7056 9398-29
Toll Free in Germany: 0800 639 7678
e-mail: info@omega.de

United Kingdom:
ISO 9002 Certified
One Omega Drive, River Bend Technology Centre
Northbank, Irlam, Manchester
M44 5BD United Kingdom
TEL: +44 (0)161 777 6611
FAX: +44 (0)161 777 6622
Toll Free in United Kingdom: 0800-488-488
e-mail: sales@omega.co.uk

It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

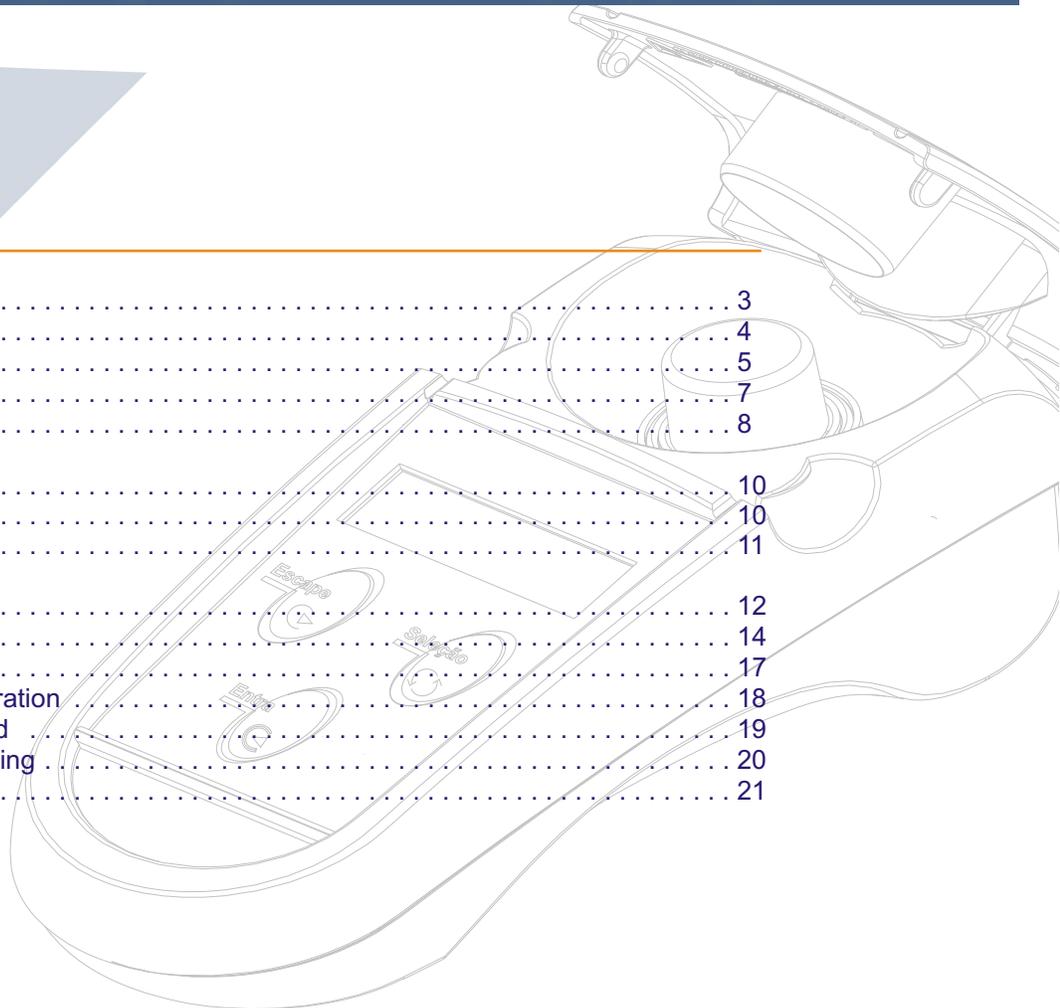
Instruction Manual

Portable Turbidity Meter

TRH444

Index

2. Specifications	3
3. Product Description	4
4. Principles	5
5. Turbidity Standard	7
6. Techniques	8
7. Equipment Operation	
Basic Operations	10
Turning On the equipment	10
Procedures for Set Up	11
Turbidity	
Procedures for Set Up	12
Procedures for calibration	14
Procedures for Read	17
Procedures for Manual Calibration	18
Procedures for Register Read	19
Procedures for Register Erasing	20
Turning Off the equipment	21



2. Specifications



Application	Read Turbidity
Display	Alphanumeric 2 Lines x 16 Characters
Turbidity Range	0 to 1000 NTU (automatically) from 0.01 to 10.00 NTU (selectable Range 1) from 0.01 to 100 NTU (selectable Range 2) from 0.01 to 1000 NTU (selectable Range 3)
Sulphate Range	from 0 to 70 mg/L
Resolution	0.01 / 0.1 / 1
Relative Precision	0.01 % (full scale)
Calibration Parameters	Automatic / Manual
Light Source	LED 890 nm (NIR)
Detector	Photocell
Case protection	IP-67
Vial (Ø x h)	24.5 mm x 60 mm
Minimum Sample Volume	20 mL
Power	Battery 9 Vcc
Battery Life	60 hours
Dimensions (LAP)	103 x 217 x 81 mm
Weight	569 g

Accessories Supplied with equipment

Instruction manual in English

Stabilized Primary Std 1000NTU (Model TRS-444)

Vial Kit 3 units Model TRV-444

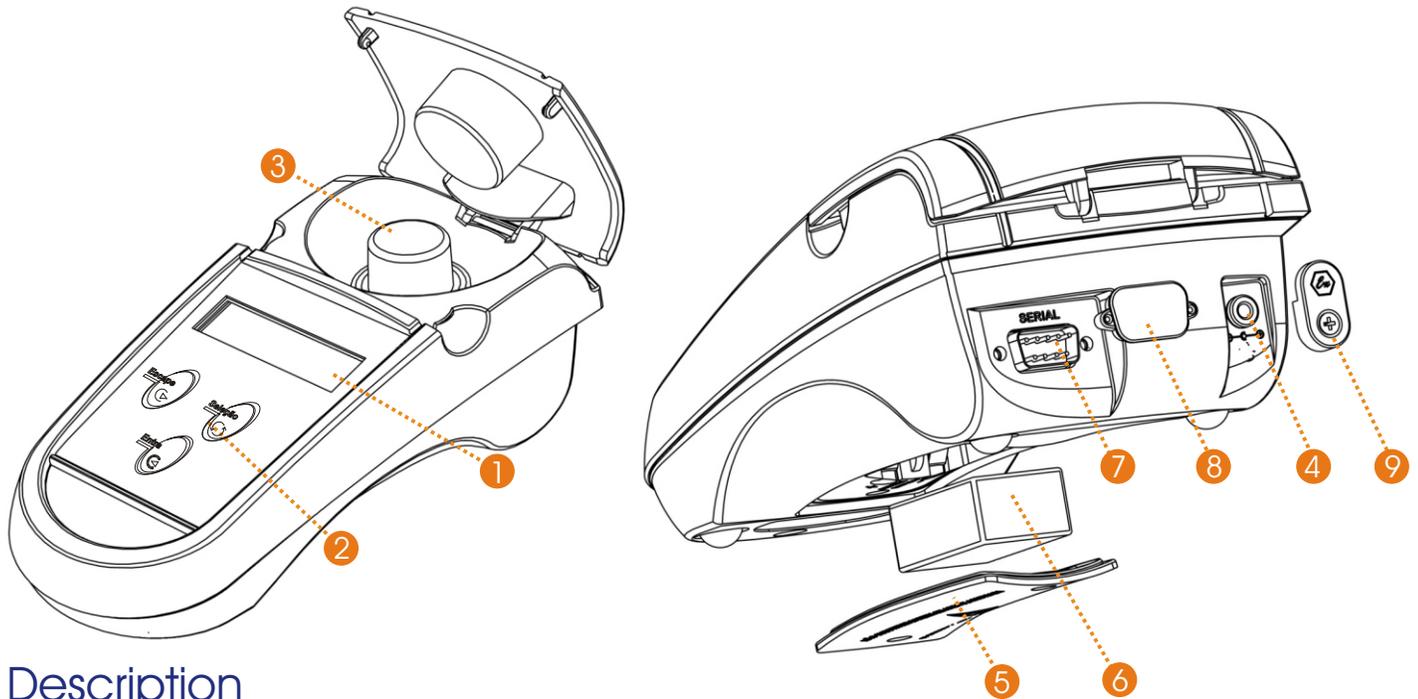
Carrying Case

Secondary Standard (Gel) 3vials (0.1, 10 & 90NTU) Model TRSS-444

Optional Accessories

AC Adapter CDH-30PW

3. Product Description



Description

- 1 - Display: Alphanumeric 2 Lines x 16 characters
- 2 - Keyboard: with 3 Tactile membrane keys
 - Key  Select the menu option, flashing option.
 - Key  Turns On the instrument and also confirms the flashing option.
 - Key  goes back one screen for every touch and also allows to access instrument shut down screen.
- 3 - Vial
- 4 - AC Adapter inlet, model CDH-30PW (Optional).
- 5 - Battery compartment cover lid.
- 6 - 9 VCC Battery (included)
- 7 - RS-232 Serial Output
- 8 - Covering caps for classified areas use.
- 9 - IP-67 Protection lid.



Carrying Case

Important:

For IP-67 protection, it is necessary to use lids as shown at above picture, items 8 & 9.

This instrument allows connection thru the power line by an AC Adapter Model CDH-30PW (optional) 90-240Vac (50/60Hz)



- Do not use any other AC Adapter as it may damage the instrument!
- Instrument floats when dropped in water.

Supplied with the instrument: Carrying Case, 3 Glass Vials (TRV-444), 3 Secondary Standard Gel Vials (<0.1, 9 & 90NTU Vials) and 1000NTU Stabilized Standard Solution (100ml).

Accessories: TRV-444 - 3 Glass Vials
TRSS-444 - Secondary Standards Gel (<0.1, 10, 100 & 800NTU Vials)
TRS-444 - Primary Standard Bottle of 1000NTU Formazine (250ml)

4. Principles

Turbidity Method

The measured **Turbidity** of a determined sample, is the reading referred by light dispersity and absorption that goes thru the sample.

Turbidity does not mean suspended solids measurement, but a effect determination of light refracted through Solids.

To understand turbidity it is helpful to think about the characteristics of mixture between substances. It is defined as **Homogenous** or **Monophase** mixtures are any set of substances that presents an unified visual aspect (also called **Solutions**) and **Heterogenous** or **Polyphase** mixtures are those where it is possible to confirm the presence of more then one visual aspect (also called **Suspensions**). This way, if noticed in a certain liquid a transparency lower than usually know, this is the presence beginning of any solid product in suspension, that defines the system as heterogeneous. The relation to this heterogeneous is how the turbidity concept is established. This turns to be a parameter that describes this quantity of suspended solid material in liquid being **bigger** as **bigger** is the **suspended solid quantity**.

Turbidity consists in evaluation of the quantity of particles presence in such a liquid sample, from the comparison of transparency degree/turbidity with a standard, with a know value, using a light. We denote that hazel liquids are colloidal materials, presenting Tyndall effect, that consists of light spreading when it goes thru a colloid. It is know that the light when hitting a material it can reflect, refract or absorbed.

As reflection is an inevitable phenomenon and common to any optical interaction, we must pay attention to two other phenomenons, as absorption is related to color and turbidity alters the refraction thru the working fluid. Digimed turbidimeters are nephelometric type, or simply nephelometric, that evaluate the Tyndall light spacing at 90° of the light hitting the sample.

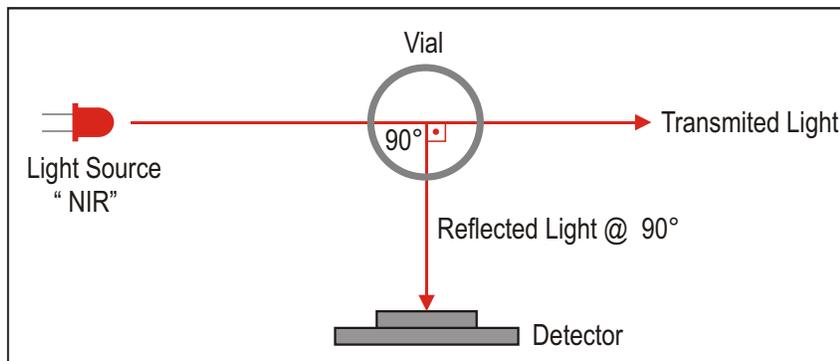
Color Compensation

In order to avoid interference caused by the color components of the mixture being analyzed, the light used at the nephelometric instrument in general presents closes to infra red range, as this range has relatively low Material absorption, increasing the light sensibility. So it is possible an efficient measurement of the liquid turbidity, as the turbidity measure at this instrument is done using the difference between the hitting light and the detected light at a silicium photodiode, placed in right angle to the hitting light, that transforms the transmitted light by the sample, in a tension signal proportional to Tyndal light source, being this light intensity compared to the emitted light by the source (LED).

The color compensation is done by signal conditioning of two photo-cells, transmittance and nephelometric, These area equalized in algorithm that performs the color compensation.

Sugar Reading

Internally at the equipment there is a curve for sugar analysis that can be selected during Set Up operation.



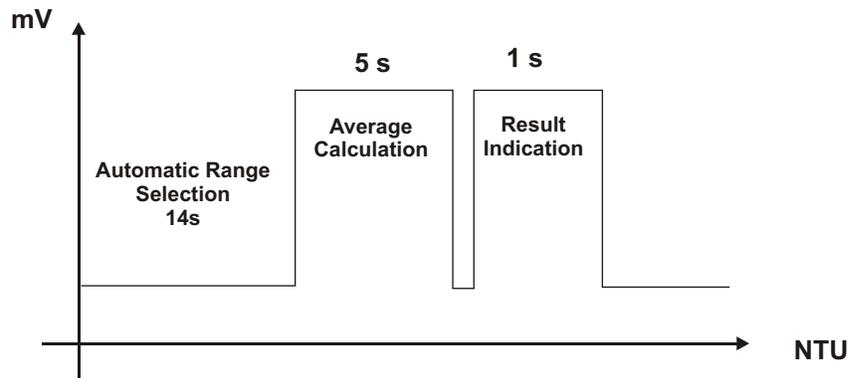
4. Principles (cont.)

As the detection involves the difference between the light hitting the vial and the transmitted by the sample located at the vial, it is convenient to minimize the effects that diminishes the transmitted light intensity, between some, the most important, is the absorption caused by the sample color.

So it is essential to work in a wavelength range where this absorption is minimum (near infrared), as if we worked at a visible electromagnetic spectrum, this color interference certainly would decisively affect the results of the turbidity quantity, it can be used many types of comparison standard, being the nephelometric Turbidity Unit (NTU) the most usual one, developed from formazine standard suspensions. So, it is possible to have a comparison standard scale between both materials, being possible to evaluate the turbidity with precision.

Fuctuations Compensation at Readings

For signal fluctuations compensation emitted by the photocell caused by any particle with irregular dimension, the Digimed turbidity meter execute the average reading during a time interval of 5s.. Considering the last 45 readings average executed during a maximum time interval of 20s., related to the turbidity to be measured.



Biographic References

Bela G. Lipták (editor in chief) *Analytical Instrumentation*;

Howard A. Strobel and William R. Heineman, *Chemical Instrumentation, A Systematic Approach*.

5. Turbidity Standards

Instructions on how to prepare the calibration solutions

1. Standard Zero

In order to obtain a turbidity close to Zero, use a good quality deionized or distilled water and filter it twice in a roll, using a 0.2 µm filter and theoretically you will obtain a water with 0.12NTU, that can be considered Zero (Blank).

Note: this water will be used to dilute the standard.

2. Standard Solutions

The instrument is supplied with a 100mL bottle of 1000NTU Stabilized Standard Solution, model# TRS-444, for dilution and calibration purpose.

Attention: if the Standard (DM-S14AK-100) had been stored for some time, shake the bottle strongly to mix the solution, then let it seat for about 15minutes, then start to manipulate below standards.

1 - Necessary Materials:

- 1.1 - 1 Volumetric Flask 100 mL
- 1 Volumetric Pipette 50 mL
- 2 L Distilled or Deionized Water, Filtered (0.2 µm)

2 - Calibration Solution 500 NTU

- 2.1 - In a 100ml Volumetric Flask, using the Volumetric Pipette add 50ml of 1000NTU Stabilized Standard Solution.
- 2.2 - Add filtered water up to the mark on the flask.
- 2.3 - Before using the solution mix it by gently inverting the flask several times. Avoid creating bubbles.
- 2.4 - The Solution is Valid for 15 days.

Note: For best storage conditions place the solution in a dark bottle and store it in a fresh and dark place.

3 - Calibration Solution 100 NTU

- 3.1 - In a 100ml Volumetric Flask, using the Volumetric Pipette add 10ml of 1000NTU Stabilized Standard Solution.
- 3.2 - Add filtered water up to the mark on the flask.
- 3.3 - Before using the solution mix it by gently inverting the flask several times. Avoid creating bubbles.
- 3.4 - The Solution is Valid for 10 days.
- 3.5 - After its use, discharge the solution.

Note: For best storage conditions place the solution in a dark bottle and store it in a fresh and dark place.

4 - Calibration Solution 10 NTU

- 4.1 - In a 100ml Volumetric Flask, using the Volumetric Pipette add 1ml of 1000NTU Stabilized Standard Solution.
- 4.2 - Add filtered water up to the mark on the flask.
- 4.3 - Before using the solution mix it by gently inverting the flask several times. Avoid creating bubbles.
- 4.4 - Stir it manually for before using it.
- 4.4 - The Solution is Valid for 5 days.
- 4.5 - After its use, discharge the solution.

Note: For best storage conditions place the solution in a dark bottle and store it in a fresh and dark Place.

Attention: for TURBIDITY, this instrument MUST BE calibrated using Formazine Standard and cannot be calibrated using Polymers!!!

6. Techniques

For the most accurate results follow the steps below:

- a. Use vials extremely clean on the inside and outside.
- b. Fill the vial to the top to eliminate any bubble. Fill carefully to avoid creating bubbles and to insure that the sample is homogeneous.
- c. After filling the vial, dry it with a soft, lint-free absorbent paper to remove external condensation caused by variation in temperature.
- d. Using one drop of silicone oil, clean the external portion of the cuvette, this will eliminate any small scratches (this is necessary for low Readings ONLY, below 20NTU).

Note: Instructions to apply: place one drop of silicone oil on the outside of the vial, using a cloth spread the oil, creating an uniform oil film at the surface.

- e. Observe cautiously for the presence of bubbles and micro bubbles in the sample. Bubbles are not desired! Bubbles will not disperse if the sample is allowed to rest, the particles in the sample will settle, altering the real turbidity value, so do not leave the sample to rest!

6. Techniques (cont.)

1. Zero Turbidity

A. It is very difficult to locate a water without turbidity. What is done on practice is to filter 2 times (2x) a deionized or distilled water using a 0.2 μm (0.2 micro meter) paper filter. So we can consider this water with turbidity of 0.12 NTU.

B. The water used as Zero, is used to dilute standards up to 40 NTU. Above this value, use can use normal deionized water.

2 - Technical Measurement Considerations for Low Turbidity Readings - Range 0 to 10 NTU

A. Use an extremely clean vial (inside and outside). After its use, never leave any solution inside the vial.

B. Fill the vial, do not overfill! Fill the most possible, this procedure avoids bubbles formation.

C. After filling it and closing the cap, dry the external surface of the vial using a lint free absorbent paper in order to avoid a possible condensation caused by temperature variation. DO NOT touch the vilas with your fingers!!!!!!

D. Always use matching Vials. When one of the vials break or needs to be replaced, it is necessary to replace the hole set! DO NOT replace only one vial of a set!

E. Verify for bubbles or micro bubbles presence inside the sample, as they are not desired. In case they are Noticed, try to eliminate them.

Note: Never let the sample to rest, as the particlues will decantate and this will alter the real turbidity value.

F. If obtained low values, below the expected between 0.12 to 10.0 NTU, the vial could be dirty. Remove it, clean and repeat the reading.

G. Keep the vial always at the same position, paying attention to the its direction, from calibration until the reading. Note that the vial has a vertical white line mark and when inserting the vial at the compartment, make sure that this mark matches the mark trace located at the vial compartment!

H. Recalibrate the equipment when the reading is lower than the first calibration point (0.12 NTU).

3 - Technical Measurement Considerations for Turbidity Readings - Range 0 to 100 NTU

A. Prepare the calibration standards (Standard 10 NTU and Standard 100 NTU) as indicated on page 7.

B. In order to obtain better precision results it is recommended to calibrate using above standards.

4 - Technical Measurement Consideratins for Turbidity Readings - Range 0 to 1000 NTU

A. Prepare the calibration standards (Standard 10 NTU, Standard 100 NTU and Standard 500NTU) as indicated on page 7.

B. In order to obtain better precision results it is recommended to calibrate using above standards.

Vials

The turbidity instrument TRH444, leaves the factory with 3 matching vials. This allows to use them for caibration or reading, any of the vials.

NOTE: in case one of the vials breaks it is necessary to purchase a new vial kit (TRV-444) do not mix the old vials with the new set, as they can present differences at reading values.

7. Equipment Operation

Basic Operations

1 - The software offers self explanatory menus with easy user interaction. The menu flashes at selected option (represented at this manual in **Blue Color**).

Use **<SELECT>** key to alter the flashing option of the menu then press **<ENTER>** key to confirm the option.

2 - In case of a mistake, or to change data or to return to prior menu, press **<ESCAPE>** key. At every touch the screen will be moved back to prior screen. But in order to exit the reading mode, user must press and hold **<ESCAPE>** key so the program can understand that the user really desires to exist this mode.

3 - The equipment stores all configurations in a non-volatile memory (E²PROM). Even when turned off, the last stored characteristics established for your work will be sustained.

4 - The equipment automatically monitors the battery charge. In order to save battery, the instrument will turn itself off after 2 minutes of inactivity. After the reading is completed, user must press **<ENTER>** to proceed to the next reading, otherwise the equipment will turn itself off after 2 minutes.

Turning On the equipment

1 - Turn on the equipment by pressing **<ENTER>** key. The display will show the main menu.

Press **<ENTER>** key in order to turn on the instrument



TURBIDIMETER
MODEL TRH444



TURBIDIMETER
Read/Set Up

7. Equipment Operation (cont.)

Set Up Procedures

The instrument allows the user to choose the Range (programmable) and also to pick the calibration values for the Standard Solutions, that can be programmed while at Set Up Operation. See below table for possible calibration values based on each calibration point ranges :

<i>Calibration</i>	<i>Minimum Value</i>	<i>Maximum Value</i>
1st Point	0.01NTU	1.00NTU
2sd Point	8.00NTU	10.00NTU
3th Point	80.0NTU	100NTU
4th Point	200NTU	900NTU

7. Equipment Operation - Turbidity Set Up

Set Up Procedures

Press **<ENTER>** key in order to turn on the instrument and to access the main menu as shown. Press **<SELECT>** key until option **Set Up** flashes, then press **<ENTER>** key to Confirm option chosen.

TURBIDIMETER
READ/SET UP

Press **<SELECT>** key until desired language option flashes, then press **<ENTER>** key to confirm the option chosen.

LANGUAGE: PORT./
ENGLISH/SPANISH

Press **<SELECT>** key until desired option flashes (**Turbidity**), then press **<ENTER>** key to confirm the option chosen.

READING OF:
TURBIDIT/SULPHAT

A Go to Page 18

Press **<SELECT>** key until desired option flashes, then press **<ENTER>** key to confirm the option chosen. This instrument can read turbidity in water or sugar.

READING OF:
WATER/SUGAR

Press **<SELECT>** key until desired unit flashes, then press **<ENTER>** key to confirm the option chosen.

UNIT:
NTU/ASBC/EBC/FTU

Select the Reding Range mode by pressing **<SELECT>** key until desired option flashes then press **<ENTER>** key. **Auto** range will work the instrument full range.

RANGES
MANUAL/AUTO

Ranges Value:
Range 1 - 0 to 10 NTU
Range 2 - 0 to 100 NTU
Range 3 - 0 to 1000 NTU

RANGES:
1 / 2 / 3

TURBIDITY
0 to 1000 NTU

RESOLUTION
1 / 0.1 / 0.01

Press **<SELECT>** key until desired resolution option flashes, then press **<ENTER>** key to confirm the option chosen.

NOTE: The Manual CALIBRATION function allows the user to calibrate the instrument based on a known value.
ATTENTION: This calibration does not replace the calibration using Formazine Standards. It allows small adjustment of the turbidity curve, after the reading operation is performed. Refer to Page 21.

CALIBRATION
MANUAL/AUTO

CALIBRATION
Pt.1 0.2 NTU <>

CALIBRATION
Pt.2 10.0 NTU <>

CALIBRATION
Pt.3 100 NTU <>

CALIBRATION
Pt.4 500 NTU <>

A Go to Page 13

Note A: Every time you see the symbols ">" or "<", that means that the user can adjust the displayed value up or down.

To increase the value press **<SEL>** key until ">" flashes, then press **<ENT>** to confirm, then press **<SEL>** key and at every touch the value will increase by one unit.

To decrease the value press **<SEL>** key until "<" flashes, then press **<ENT>** to confirm, then press **<SEL>** key and at every touch the value will decrease by one unit.

If a mistake is made, press **<ESC>** key to return and correct the value!

If user press and holds **<SEL>** key, the units will move faster, but be careful when gets closer to the desired number, as you can miss it and if that happens, press **<ESC>** key to move back and correct the mistake.

7. Equipment Operation - Turbidity Set Up (cont.)

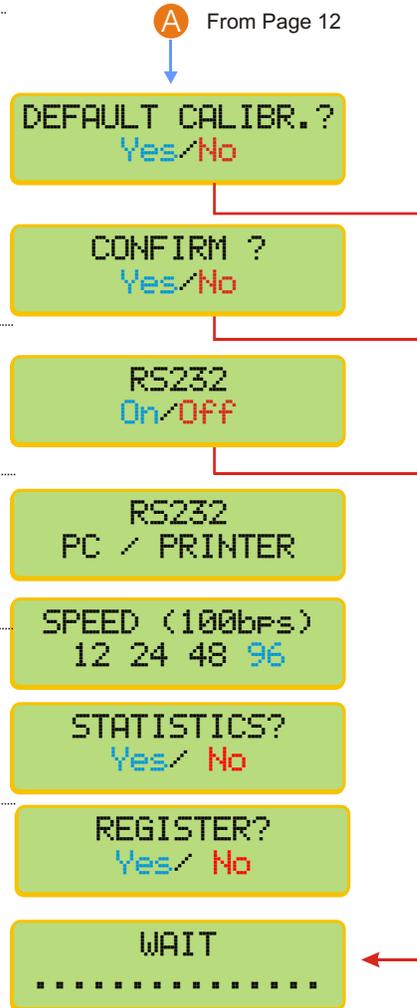
Press **<SELECT>** key until desired option flashes, then press **<ENTER>** key to confirm the option chosen. This option is offered to user, so the instrument can be calibrated as when it left factory. Say user is in a location where it is not possible to work with Standards or does not have the standards, choose Yes and confirm it and the instrument will calibrate as when left the factory.

User can activate or not the RS 232 output. Press **<SELECT>** key until desired option flashes, then press **<ENTER>** key to confirm the option chosen.

User can choose between PC or Printer. Press **<SELECT>** key until desired option flashes, then press **<ENTER>** key to confirm the option chosen.

Statistics calculation can be chosen or not. Press **<SELECT>** key until desired option flashes, then press **<ENTER>** key to confirm the option chosen.

If user desires to store data into memory (up to 99points), **Yes** must be selected. Press **<SELECT>** key until desired option flashes, then press **<ENTER>** key to confirm the option chosen. Refer to page 22 for further details.



7. Equipment Operation - Turbidity Calibration

Calibration Procedures

Press **<SELECT>** key until option **Read** flashes, then press **<ENTER>** key to confirm option chosen.

TURBIDIMETER
READ/SET UP

Press **<SELECT>** key until option **Calibrate** flashes, then press **<ENTER>** key to confirm option chosen.

TURBIDIMETER
READ/CALIBRATE

User will still have the option to accept every calibration point chosen during Set Up Operation. Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

POINT:0.17 NTU
CALIBRATE? Y/N

Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

CONFIRM ?
Yes / No

Place vial with Standard 0.17NTU at compartment, then press **<ENTER>** key.
Make sure the white vertical line of the vial matches the mark at the vial compartment then push slowly the vial into the compartment, all the way to the end.

PLACE STANDARD
0.2 NTU
@ VIAL COMPARTN.
Ready ?

WAIT
STABILIZATION

The instrument program, verifies if the standard is within conformance. Press **<ENTER>** key. Then user can proceed with operation or go back and replace the standard.

STAND. NOT IN
CONFORM. <ENTER>

Note: if any problem occurs during the Reading operation, the display will show: **ATTENTION ! VERIFY VIAL <ENTER>**

CONFIRM STANDARD
Yes / No

User will still have the option to accept every calibration point chosen during Set Up Operation. Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

POINT:10.0 NTU
CALIBRATE? Y/N

Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

CONFIRM?
Yes / No

Place vial with Standard 10.0NTU at compartment, then press **<ENTER>** key.
Make sure the white vertical line of the vial matches the mark at the vial compartment then push slowly the vial into the compartment, all the way to the end.

PLACE STANDARD
10.0 NTU
@ VIAL COMPARTN.
Ready ?

WAIT
STABILIZATION

The instrument program, verifies if the standard is within conformance. Press **<ENTER>** key. Then user can proceed with operation or go back and replace the standard.

STAND. NOT IN
CONFORM. <ENTER>

Note: if any problem occurs during the Reading operation, the display will show: **ATTENTION ! VERIFY VIAL <ENTER>**

CONFIRM STANDARD
Yes / No

Go to Page 15 **A**

A Go to page 15

7. Equipment Operation-Turbidity Calibrat.(cont.)

Calibration Procedures

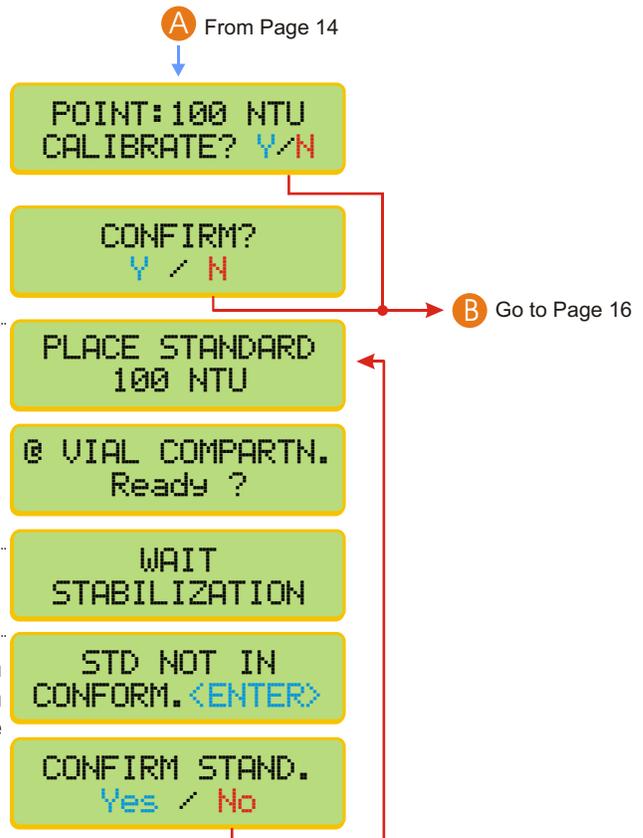
User will still have the option to accept every calibration point chosen during Set Up Operation. Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

Place vial with Standard 100NTU at compartment, then press **<ENTER>** key.
Make sure the white vertical line of the vial matches the mark at the vial compartment then push slowly the vial into the compartment, all the way to the end.

The instrument program, verifies if the standard is within conformance. Press **<ENTER>** key. Then user can proceed with operation or go back and replace the standard.

Note: if any problem occurs during the Reading operation, the display will show: **ATTENTION! VERIFY VIAL <ENTER>**



Attention: for TURBIDITY, this instrument MUST BE calibrated using Formazine Standard and cannot be calibrated using Polymers!!!

7. Equipment Operation - Turbidity Calibrat.(cont.)

Calibration Procedure

User will still have the option to accept every calibration point chosen during Set Up Operation. Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

Press **<SELECT>** until desired option flashes, then press **<ENTER>** key to confirm it.

Place vial with Standard 500NTU at compartment, then press **<ENTER>** key.
Make sure the white vertical line of the vial matches the mark at the vial compartment then push slowly the vial into the compartment, all the way to the end.

The instrument program, verifies if the standard is within conformance. Press **<ENTER>** key. Then user can proceed with operation or go back and replace the standard.

Note: if any problem occurs during the Reading operation, the display will show: **ATTENTION ! VERIFY VIAL <ENTER>**

If user is ready to measure the sample, place vial with sample at compartment, then press **<ENTER>** key.

For a new reading, press **<ENTER>** or press and hold **<ESCAPE>** key in order to exit Reading Mode. If instrument is left under Reading Mode, without pressing **<ENTER>** for another reading, it will turn itself off after 2 minutes, in order to save battery life!

B From Page 15



Attention: for TURBIDITY, this instrument MUST BE calibrated using Formazine Standard and cannot be calibrated using Polymers!!!

7. Equipment Operation - Turbidity Read

Reading Procedures

Press **<SELECT>** key until option **Read** flashes, then press **<ENTER>** key to confirm option chosen.

TURBIDIMETER
READ/SET UP

Press **<SELECT>** key until option **Read** flashes, then press **<ENTER>** key to confirm option chosen.

TURBIDIMETER
Read/Res./Calibr

The option Register will only be displayed if user choose Yes for Register option during Set Up operation (page13)!

This option will only be displayed if RS-232 is On (chosen during Set Up operation). If chosen Off for RS-232, this option will not appear. User can adjust the Initial Sample number, refer to below instructions on how to change this number.

INITIAL SAMPLE:
N.: 1 <>

If user is ready to measure the sample, place vial with sample at compartment, then press **<ENTER>** key. Make sure the white vertical line of the vial matches the mark at the vial compartment then push slowly the vial into the compartment, all the way to the end.

Go to Sample!
Ready ?

WAIT
READING

For a new reading, press **<ENTER>** or press and hold **<ESCAPE>** key in order to exit Reading Mode. If instrument is left under Rading Mode, without pressing **<ENTER>** for another reading, it will turn itself off after 2 minutes, in order to save battery life!

-> 1.70 NTU

if the sample being measured is above equipment range, user will see the following screen. Please verify the sample used and change for a valid value, within equipment range.

-> ----- NTU

Note A: Every time you see the symbols ">" or "<", that means that the user can adjust the displayed value up or down.

To increase the value press **<SEL>** key until ">" flashes, then press **<ENT>** to confirm, then press **<SEL>** key and at every touch the value will increase by one unit.

To decrease the value press **<SEL>** key until "<" flashes, then press **<ENT>** to confirm, then press **<SEL>** key and at every touch the value will decrease by one unit.

If a mistake is made, press **<ESC>** key to return and correct the value!

If user press and holds **<SEL>** key, the units will move faster, but be careful when gets closer to the desired number, as you can miss it and if that happens, press **<ESC>** key to move back and correct the mistake.

7. Equipment Operation - Register

Reading Register Procedure

This Meter offers 99 points of datalogging for Readings storage. In order to activate this function, user must choose option **YES** when asked about Option **REGISTER** during **SET UP** operation. If chosen **NO** the Sub menu Reg will not be Displayed on the screen.

Turn on the instrument by pressing **<ENTER>**

TURBIDIMETER
VERSION : U5a

Press **<SELECT>** key until **Read** flashes, then press **<ENTER>** to confirm.

TURBIDIMETER
Read/Set Up

Press **<SELECT>** key until **Reg.** Flashes, Then press **<ENTER>** to confirm.

TURBIDIMETER
Read/Reg./Cal.

Press **<SELECT>** key until **Read** flashes, then press **<ENTER>** to confirm. This procedure will allow Reading value to be stored!

REGISTER
Read/Cons./Erase

This option will only be displayed if RS-232 is On (chosen during Set Up operation). If chosen Off for RS-232, this option will not appear. User can adjust the Initial Sample number, refer to below instructions on how to change this number.

INITIAL SAMPLE:
N. : 1 <>

Place the vial into the compartment , then press **<ENTER>** to start Reading operation.

Go to Sample!
Ready ?

WAIT
READING

The Read value will be displayed, press **<SELECT>** key to memorize the value.

-> 1.70 NTU

Resister: 01
WAIT

Press **<ENTER>** key to start a new the Reading

1.70 NTU

To exit this mode, prss and hold **<ESCAPE>** key.

*User can also Consult saved Readings, simple choose the option REGISTER (see above menu) and press **<ENTER>** key to display every Reading stored!*

7. Equipment Operation - Register (cont.)

Erase Register Procedure

Turn on the instrument by pressing <ENTER>

TURBIDIMETER
VERSION : U5a

Press <SELECT> key until Read flashes, then press <ENTER> to confirm.

TURBIDIMETER
Read/Set Up

Press <SELECT> key until Reg. Flashes, then press <ENTER> to confirm.

TURBIDIMETER
Read/Res./Cal.

Press <SELECT> key until Erase flashes, then press <ENTER> to confirm. This procedure will erase ALL Registered values!

REGISTER
Read/Cons./Erase

Press <SELECT> key until Yes flashes, then press <ENTER> to confirm.
This is your last chance NOT to erase the stored values!

CONFIRM ?
Yes / No

WAIT
.....

7. Equipment Operation - Turning Off

Turning Off the Equipment

1 - Press **<ESCAPE>** key repeatedly until the following message appears

```
TURN OFF?  
Yes / No
```

2 - Press **<SELECT>** key until **YES** flashes then press **<ENTER>** key to confirm and turn it off.
Follow instructions below to turn the instrument off:

Press and hold **<ESCAPE>** key in order to exit the reading mode and access the main menu.

```
TURBIDIMETER  
->070 PPM
```

Press **<ESCAPE>** key to move back

```
TURBIDIMETER  
Read/Calibrate
```

Press **<ESCAPE>** key to move back

```
TURBIDIMETER  
Read/Set Up
```

Press **<SELECT>** key in order to select option **Yes** (flashing), then press **<ENTER>** to confirm.

```
TURN OFF?  
Yes / No
```

A message will display on the screen and the equipment will turn off.

```
GOOD BYE !  
.....
```

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2007 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? **OMEGA...Of Course!** *Shop online at omega.com*

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M-4713/0908