

## The MicroTOL OnLine Process Turbidimeter

### Instrument Overview

The MicroTOL OnLine Turbidimeter is specifically designed for measuring turbidity continuously in filtered water, raw water, waste water final effluent and industrial applications.

The Optional HF OnLine software allows networking of up to 255 turbidimeters into a single computer. The software provides graphical trending, alarms and filter analysis.

The optional Auto Clean Ultrasonic cleaning system automatically cleans the optical chamber for Finished or Raw water applications.



### Standard Features

- Meets USEPA method 180.1 and ISO 7027 design and performance criteria.
- Range of 0 - 1000 NTU
- One-piece design eliminates the need to mount more than one module per turbidimeter.
- Fast response time and inexpensive calibration due to low ( 30 ml ) sample volume.
- Modular design reduces overall costs.
- Removeable sample cuvettes allow for easy cleaning and calibrating.
- Optics are not in contact with the sample which reduces the chance of false low readings.
- Convenient reusable primary calibration standards.
- Can network up to 255 turbidimeters.

# MicroTOL OnLine Process Turbidimeter

## Features

### Optical Design

New optical design allows consistent readings with laboratory and portable turbidimeters.

### Bubble Rejection System

The optical chamber of the MicroTOL has been designed to eliminate air in the sample while simultaneously creating a vortex cleaning action throughout the optical chamber.

### Calibration

Calibration with primary standards is completed using sealed cuvettes, similar to laboratory procedures. This dry method of calibration is fast, clean and reusable. On-screen menu items guide you through the calibration procedure quickly and easily.

### Certification

Listed or Certified to CE, UL, CSA (ETL,ETLc)

### Optional Data Network Interface Acquisition System

The data acquisition system is designed to sequentially collect data from a series of interfaced HF scientific, inc. turbidimeters. The software can monitor up to 255 turbidimeters on one computer. The software system stores data, prints reports, graphs and alarms on each individual turbidimeter. In addition it can compare filters and monitor individual or multiple filter efficiency.

### Minimum Hardware Requirements for Software:

- Pentium Class PC running at 90 MHz.
- 32 MB RAM (recommended 64 MB), 200 MB free hard disk space.
- Windows 98/95 or Windows NT version 4.0 with the latest service pack.
- Network card and TCP/IP networking installed on PCs to be connected (this is required only if the SCADA system is to operate on a multi-node network of PCs).

### New Design

One-piece mounted design allows for simple mounting and minimal use of space. Increased range of 0-1000 NTU allows for use of low NTU filtered water or raw water. New optical design increases accuracy and provides more consistent readings with online, laboratory and portable turbidimeters.

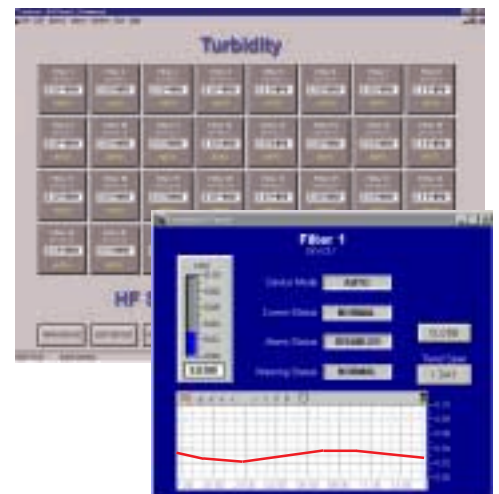
### Light Source

White light is recommended for use in turbidimeters reporting results under US EPA (US standard) jurisdiction. HF scientific has developed NEW krypton filled white light technology with lamp life expectancy up to 10 years.

Infrared light is recommended for use in turbidimeters reporting results under ISO 7027 (European standard) jurisdiction. Infrared light is also recommended for waste water final effluent and industrial applications where color is present in the sample stream.

### Regulatory

USEPA, ISO 7027, Standard Methods



HF OnLine Software

## MicroTOL Sample Specifications

The continuous monitoring system shall include a single modular unit with power supply, display and sensor as one single unit. The turbidimeter shall meet all requirements specified by the USEPA Method 180.1 (White Light Model), ISO 7027 (Infrared Model) and Standard Methods 2130B. The turbidimeter shall have a similar optical design to a laboratory turbidimeter, for accuracy. The turbidimeter shall have consistent readings with laboratory and portable turbidimeters. The turbidimeter shall be Modbus compatible. The Online Software will be able to integrate up to 255 turbidimeters. The turbidimeter shall have the option of using an automatic ultrasonic cleaning system in finished or raw water applications. Accuracy shall be 2% of reading or plus or minus .02, whichever is greater, from 0-10 NTU, and 5% of reading or plus or minus .02, whichever is greater, from 10-1000 NTU. Resolution will be 0.0001 NTU. Repeatability shall be plus or minus 1%.

The sensor shall consist of a rotational flow through assembly with a 30ml cuvette. The specially designed flow head bubble rejection system eliminates the need for a bubble trap and ensures an immediate response time. The sensor shall be able to accommodate grab samples. Calibration and standardization will be accomplished using small volumes (30ml) of reusable primary standards in a cuvette. The Primary Standards shall be reusable for multiple online turbidimeters and be interchangeable with laboratory turbidimeters. Calibration procedures can be completed without disrupting the sample flow. The lamp source and detector shall not come in contact with the sample, eliminating false low readings. The turbidimeter shall use menu driven software for user ease. The turbidimeter enclosure shall be NEMA 4X (IP66) and suitable for outdoor installation. The Online Turbidimeter shall be HF scientific **MicroTOL** Online Turbidimeter.



**Ultrasonic Cleaning System**  
Keeps the optical chamber clean in finished or raw water applications.



**MicroTOL with Calibration Cuvettes**  
A complete primary calibration can be completed in less than five minutes

# Specifications for MicroTOL OnLine Turbidimeter

Range	0 - 1000 NTU
Measurement Principle	Nephelometry (90 degrees)
Accuracy	2% of reading or $\pm 0.020$ below 40 NTU 5% of reading or $\pm 0.020$ above 40 NTU
Repeatability	$\pm 1\%$ of Reading
Resolution	0.0001 Selectable
Response Time	0-8 Seconds (0 - 100 NTU)
Flow Rate	0.026 - .26 gpm (100 ml/min - 1000ml/min)
Standard Outputs	4-20 ma Galvanic Isolated or RS-485
RS-485 Protocols	Modbus, HF Simplebus, HF Online Interface
Light Source	White Light - 10 year life, Infrared Light - 11 year life
User Alarms	2 High / Low Alarms
Alarm Contacts	FORMC 250 VAC 2A
Display	Multiline Custom LCD (Backlight Option)
Security Code	Prevents unauthorized access
Built in Diagnostics	Yes
Storage Temperature	-4°F to 140°F (-20°C to 60°C)
Operating Temperature	32°F to 122°F (0°C to 50°C)
Positive System Pressure	60 psi maximum (414 kPa or 4.22 kg/cm <sup>3</sup> ) (see Flow Rate)
Wetted Surfaces	Nylon, Borosilicate Glass, Silicon, Polypropylene, Stainless Steel
Enclosure	NEMA 4X, IP66
Outdoor Installation	32°F to 122°F (0°C to 50°C))
Certifications	USEPA, ISO 7027, CE Approved, ETL Listed to UL 3111-1 and ETL Certified to CSA 22.2 No. 1010-1-92
Dimensions	14 " x 12" x 12" ( 35 cm x 30 cm x 30 cm )
Shipping Weight	2.5 kg ( 5.5 lbs. )

*Specifications subject to change without notice.*

## Ordering Information

Catalog No.	Description*
20023	MicroTOL1, 0-1000 NTU, White Light (WL),
20024	MicroTOL1, 0-1000 NTU, Infrared Light (IR),
20053	MicroTOL2, 0-1000 NTU, WL, Backlight display, RS-485 with Modbus Protocol
20054	MicroTOL2, 0-1000 NTU, IR, Backlight display, RS-485 with Modbus Protocol
20055	MicroTOL3, 0-100 NTU, WL, Ultrasonic Auto Clean, Backlight Display, RS-485/Modbus Protocol
20056	MicroTOL3, 0-100 NTU, IR, Ultrasonic Auto Clean, Backlight Display, RS-485/Modbus Protocol
20063	MicroTOL4, 0-1000 NTU, WL, Ultrasonic Auto Clean, Backlight Display, RS-485/Modbus Protocol
20064	MicroTOL4, 0-1000 NTU, IR, Ultrasonic Auto Clean, Backlight Display, RS-485/Modbus Protocol

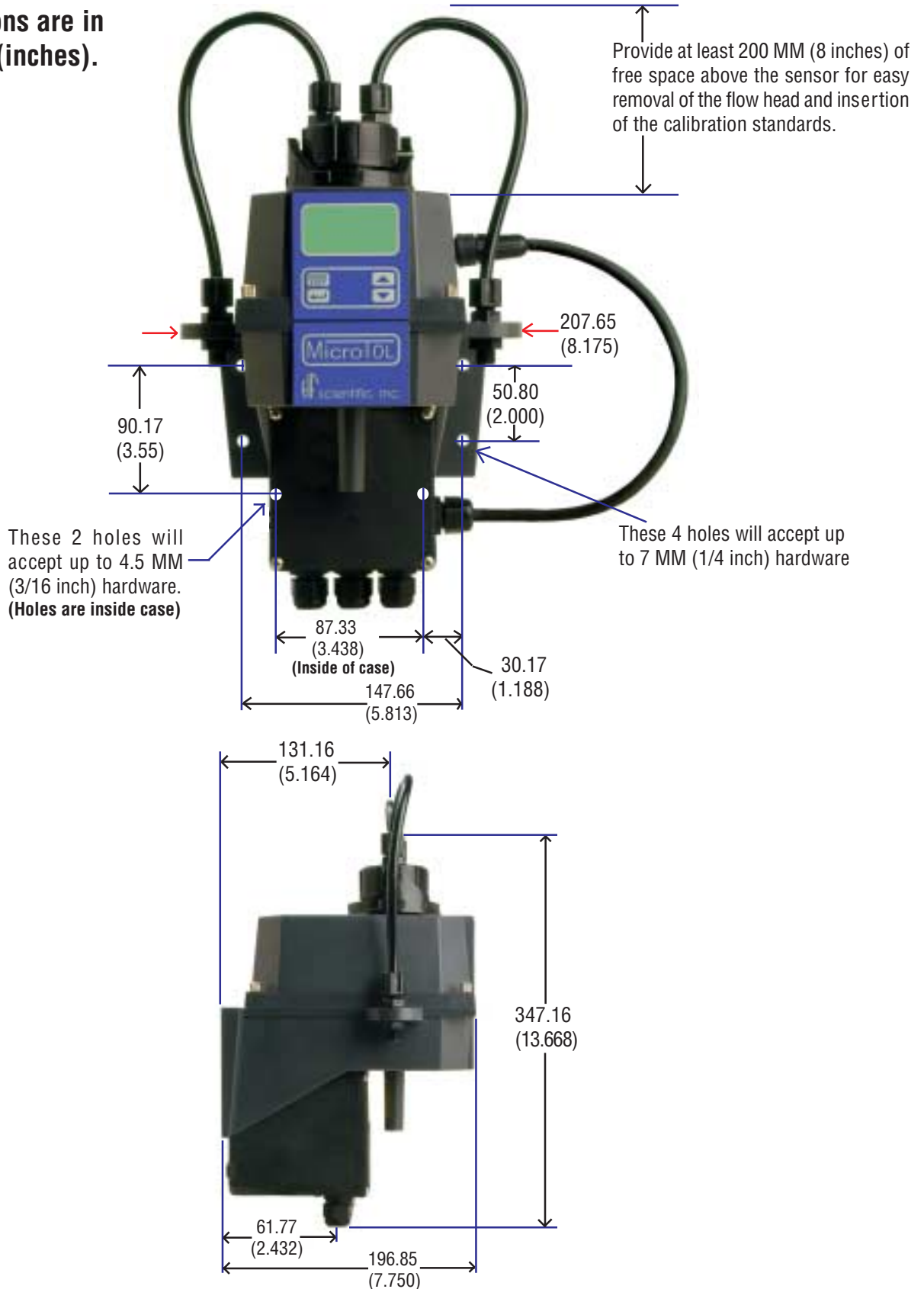
\*All models include 4-20ma, desiccant, power supply & manual. Models 1 & 2 also include spare measuring cuvette w/light shield.

## Accessories

19783	HF OnLine Windows Software for data collection and reporting
19609	Remote Display for an additional digital readout
19953	<del>PRIME</del> Primary Calibration Kit, .02 & 10 & 100 NTU
19957	<del>PRIME</del> Primary Calibration Kit, Full Range, .02, 10 & 1000 NTU
19778	Flow Regulator (recommended for Pressurized Systems)

# Dimensions for MicroTOL OnLine Turbidimeter

All Dimensions are in Millimeters (inches).



# Dimensions for MicroTOL OnLine Turbidimeter

