ALEC ELECTRONICS

DIGITAL DISPLAY · DIRECT READING TYPE

PORTABLE TURBIDITY METER

ATU1-D ATU2-D ATU30-D ATU40-D

ALEC ELECTRONICS CO.,LTD.

7-11 Ohishi-Kitamachi, Nada-ku
Kobe, Japan

Portable Turbidity Meter

MODEL ATU1-D

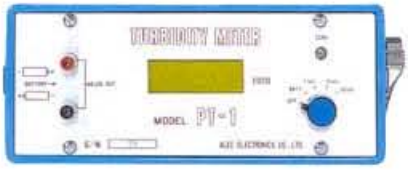
The ATU1-D Turbidity Meter is a direct reading portable instrument which comprises a Sensor Unit with 30m cable (standard length) attached and a compact rugged Display Unit housed in an FRP case. The Turbidity Meter uses an infrared back-scattering detection technique. Suspensoids are detected in the area where the pulsed beams from two transmitter elements meet.

The diffused light at this junction is sensed by a receiviug element located between the two transmitters. The receiver beam has an acceptance angle of 165° and, being located towards the rear of the unit, enables turbidity measurements to be made over a wide range without alteration of the optical axis span.

Accurate turbidity data are digitally displayed on an LCD panel with analogue output signals available for continuous recording purposes.

Specifications

Display Unit	Display Method	: Liquid Crystal Display
	Time Constant	: 1, 5, 10 sec. Selectable
	Batteries	: C-type Dry Cell -8 pcs.
	Current Consumption	: 40 mA
	Analog Outout	: 0~2 V (0~200 ppm)
	Size	: 225mm×200mm×130mm
	Weight	: 3 Kgs
Sensor Unit	Principle	: Infrared Back-scattering Method
	Wave-length	: 940nm
	Measuring Range	: 0~200 ppm
	Accuracy	: 2%
	Cable Length	: Standard 30 meters, maximum 100 meters
	Size	: Diameter 50mm, Length 206mm
	Weight	: 1.75 Kgs (exclusive of cable)



MODEL ATU2-D 200ppm/20000ppm Range Selectable

The ATU2-D uses the same sensor unit as model ATU1-D. The display unit however incorporates a CPU circuit which enables selection of measuring range between 0-200ppm or 0-2000ppm. An RS232C digital output is optionally available.

Specification

Display Unit	Display Method	: Liquid Crystal Display
	Time Constant	: 1, 5, 10 sec. Selectable
	Output	: Analog : 0~1V (0~200/2000 ppm) Digital : RS232C 9600 bps (Option)
	Power Source	: Integral Rechargeable Battery and AC (Specify voltage when ordering)
	Power Consumption	: 5W
	Dimensions	: 300mm×200mm×195mm
	Weight	: 5 Kgs

Portable Turbidity Meter With Depth MODEL ATU30-D

This model includes a Depth sensor but is otherwise the same as the ATU1-D. Subject to cable length, depth correlated turbidity measurements can be taken to 100m.
Turbidity and depth data are digitally displayed on an LCD panel. An RS232 output is standard specification.
When the integral rechargeable battery is fully charged (10 hours charge time) the instrument can be operated for 8 hours continuous.
External AC mains power can also be used.

Specifications

Sensor Unit

	Turbidity Sensor	Depth Sensor
Sensor type	Infrared Back-scattering (Wave-length:940 nm)	Semi-conductor Pressure Sensor (Auto Zero-adjust function)
Measuring Range	0~200 ppm	0~100 meters
Accuracy	±2%	±0.2%
Cable	ϕ 6mm×30m, Kevlar reinforced, Max. length:100m	
Dimensions	ϕ 60mm×252mm (height)	
Material	SUS316 (Titanium Alloy is also used.)	
Weight	Approx. 3 Kgs in air (Cable not included)	

Display Unit

Display Method	LCD Digital Display (Turbidity & Depth)
Time Constant	1, 5, 10 sec. Selectable
Output Signal	Digital RS232C 9600 bps 0~1V Analog Voltage (Option)
Power Source	Integral Rechargeable Battery and AC (Specify voltage when ordering)
Power Consumption	5 W
Dimensions	300mm×200mm×195mm
Weight	5 Kgs (Housed in FRP Box)

Portable Turbidity Meter With Temperature MODEL ATU40-D

The model ATU40-D incorporates a Water Temperature sensor but is otherwise the same as the model ATU1-D. Combined measurements can be taken to depths of 100m and data are displayed on the LCD panel. An RS232 output is standard specification.
Power supply facilities are the same as for model ATU30-D.

Specifications

Sensor Unit

	Turbidity Sensor	Water Temperature Sensor
Sensor type	Infrared Back-scattering (Wave-length:940 nm)	Platinum Resistance type (High Response)
Measuring Range	0~200 ppm	−5~40℃
Accuracy	±2%	±0.05℃
Cable	ϕ 6mm×30m, Kevlar reinforced, Max. length:100m	
Dimensions	ϕ 60mm×252mm (height)	
Material	SUS316 (Titanium Alloy is also used.)	
Weight	Approx. 3 Kgs in air (Cable not included)	

Display Unit

Display Method	LCD Digital Display (Turbidity & Temperature)
Time Constant	1, 5, 10 sec. Selectable
Output Signal	Digital RS232C 9600 bps 0~1V Analog Voltage (Option)
Power Source	Integral Rechargeable Battery and AC (Specify voltage when ordering)
Power Consumption	5 W
Dimensions	300mm×200mm×195mm
Weight	5 Kgs (Housed in FRP Box)

Principle and Calibration

Principle of Measurement

The ATU series turbidity meters employ the infrared back-scattering technique. Configuration of the sensor assembly is shown in Fig. 1. Two emitters, located behind the receiver and positioned with a 15° tilt angle, transmit the 800 cycle pulsed light at 940nm.

The emitted infrared light is scattered by the suspensoids and detected by the receiver photodiode. The received light signal is amplified by the integral electronics.

This technique has many advantageous features:

1) The glass surfaces of the transmitters and receiver are independent. Therefore potential corruption caused by dirt on the glass surfaces is eliminated.
2) The use of infrarared light in the water avoids any ambient light influence.
3) The combination of pulsed light emissions and the phase detecting circuitry further eliminates ambient light influence.
4) The sensor sonde is much smaller than comparable devices.
5) Power consumption is kept to a minimum.
6) Good linearity can be maintained over a wide measuring scale without range alteration.
7) Light emission from two directions produces a high level of back scattered light with improved signal-to-noise ratio.

Calibration

Turbidity calibration is performed using Kaolin according to JIS standards. Turbidity values may vary in accordance with the characteristics, shapes, colours etc of the suspensoids and planktons. Values measured by the ATU series of instruments may differ from those obtained by other types of turbidity meters. It is therefore recommended that, when an absolute value is required for inter-calibration purposes, a measure of the water sample or culture is taken to provide a base reference.

For reference, Figures 2-6 are shown.

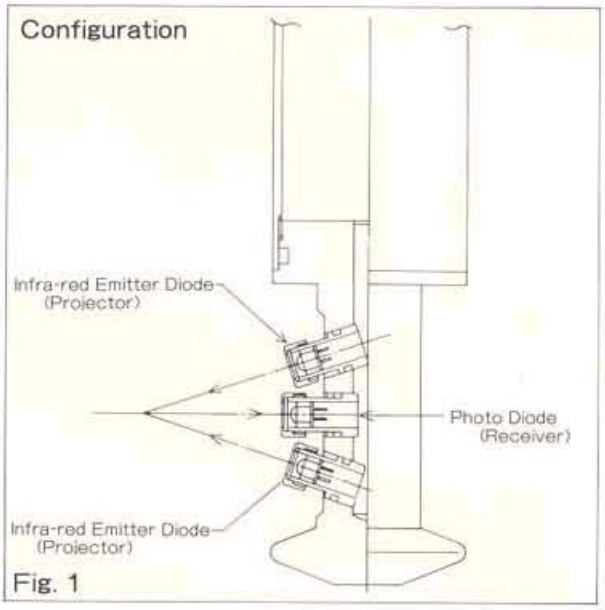


Fig. 1

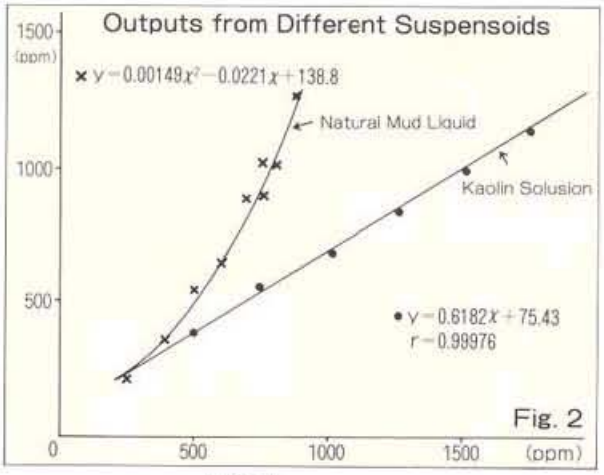


Fig. 2

Fig. 3

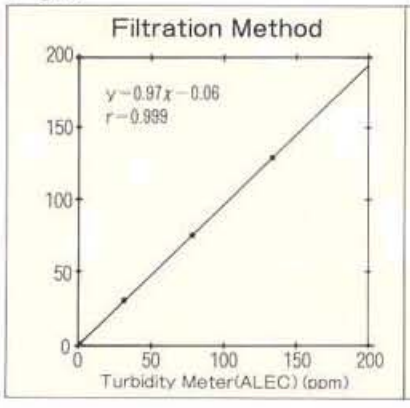


Fig. 4

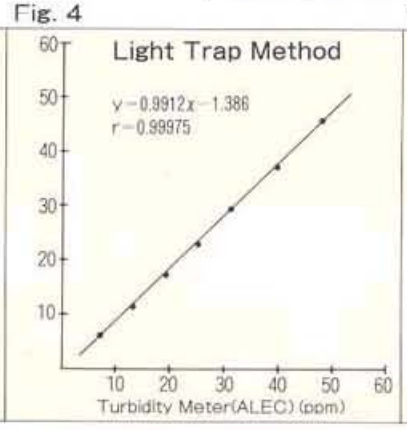
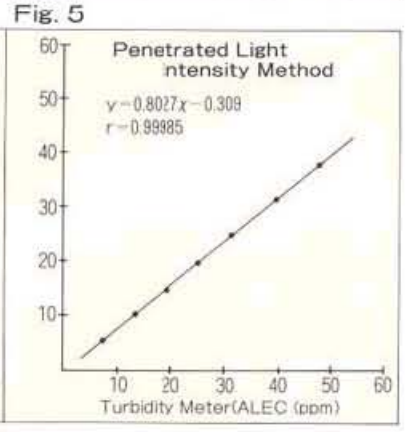


Fig. 5



ALEC ELECTRONICS CO.,LTD.

7-11 OHISHI-KITAMACHI, NADA-KU, KOBE, JAPAN, 657

TEL:078-802-2106

FAX:078-802-1865