ISO-14001
ISO-9001

SPECIFICATION SHEET

TOADKK

TURBIDITY ANALYZER

Model: **TUF-100**

INTRODUCTION

This analyzer continuously measures the turbidity of water for public consumption, sewage, river water and water used in industrial processes. It provides both indication and output signals. The analyzer operates on the principle of surface scattering of light. A light flux is applied to an overflowing water surface and the resultant light scattering is measured.

FEATURES

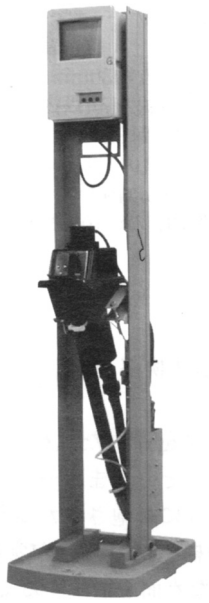
- Unique debubbling system provides effective removal of bubbles present in the sample prior to measurement.
- Newly developed measurement system eliminates interference from any bubbles not removed by the debubbling system (patent pending).
- The light source illuminates the sample directly. This provides enhanced illumination with 3 times higher dynamic range (compared to previous model).
- Optical system has been designed to minimise interference from stray light. This increases the S/N ratio.
- Unique design and construction reduces the number of individual components (patent pending). Maintenance requirements have been minimised providing excellent cost of ownership advantages. The use of aluminium for major components provides excellent corrosion resistance and enables easy recycling at the end of the service life.
- LED indicator provides immediate, visible indication of instrument status. Continuously illuminated indicates normal operation, flashing indicates instrument fault.

STANDARD SPECIFICATIONS

Product Name : Turbidity Analyzer.
Model : TUF-100.
Measurement Object : Turbidity of water.
Measurement Method : Surface scattering (continuous).
Indication : LCD display (0.00~2000).
Measurement Range : (Units; ppm, degree or mg/L)
[A] Single range:
0~2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000.
[B] Dual ranges, auto/manual or remote/manual switching:
0~2/20, 5/50, 10/100, 20/200, 50/500, 100/1000, 200/2000.
[C] 3 ranges, auto/manual or remote/manual switching:
0~2/5/10, 5/10/50, 20/100/500, 50/200/2000.

Output Signals

Measurement value	: DC 4~20mA (max. load 600Ω) isolated.
Range indication	: One side common closed contact, capacity DC 30V 0.1A.
Under maintenance	: Closed contact during maintenance, capacity DC 30V 0.1A.
Under cleaning	: (*1) closed contact during cleaning, capacity DC 30V 0.1A.
Under calibration	: (*2) closed contact during calibration, capacity DC 30V 0.1A.



Concentration upper limit alarm	: Closed contact indicates over scale capacity DC 30V.
Power cut off	: Closed contact during power failure, capacity DC 30V 0.1A.
Analyzer fault	: Closed contact during lamp failure or calibration error (*2) when 1, or 2, capacity DC 30V 0.1A.

Notes:
(*1) with auto cleaning.
(*2) with auto calibration.

Input Signals	: Range selection (*1) closed contact receiving range to be specified DC 30V 0.1A.
Cleaning command	: (*2) closed contact receiving to start cleaning capacity DC 30V 0.1A 100ms or more.
Calibration Request	: (*3) closed contact receiving to star calibrating. Capacity DC 30V 0.1A 100ms or more.

Notes:
(*1) Remote/Manual switching.
(*2) Auto cleaning.
(*3) Auto calibration.

Ambient Conditions	: -5~50°C 85% RH or less.
Sample Conditions	
Temperature	: 0~40°C (No freezing, provide air curtain if vapours present).
Pressure	: 0.02~0.3 MPa (0.2~3kgf/cm²).
Flow rate	: 2~7 L/min.
Water Utility Conditions (For zero filter or auto cleaning)	
Quality	: Turbidity 0.5ppm or less.
Temperature	: 2~30°C.
Pressure	: 0.1~0.5 MPa (1~5kgf/cm²).
Flow rate	: 1~7 L/min.

Power Requirements : AC 100V ± 10% 50/60Hz.
Power Consumption : Approx. 20VA (standard).
Major Materials/Finish : Aluminium die cast
Indicator/transmitter : Black AS resin (ASA), Hard PVC.
Sensor : Aluminium plate Munsell N6.
Installation : In door self-standing, drip proof.
Weight : Approx. 20kg.
Paint Colours
Controller : Pantone 537C (Munsell 5PB 1/8).
Frame : Grey (Munsell N6).

PERFORMANCE

Linearity : When Formazine or Kaolin standard solution is used.
Within ± 5% FS for 0~2000 range.
Repeatability : Within ± 1% FS (with standard scatter plate).
Stability
Zero drift : Within ± 1% FS/30 days (with zero calibration solution).
Span drift : Within ± 2% FS/30 days (with standard scatter plate).
Stabilisation Time : Approx. 30 minutes after supplying power and water.
Response Time : Within approx. 2 minutes for 90% responses. (Sample flow rate 3L/min.).
Effect of Ambient Temp. : Within ± 1% FS/10°C.
Effect of Line Voltage Fluctuation : Within ± 0.5% FS Within ± 10% of rated voltage).

OPTIONS

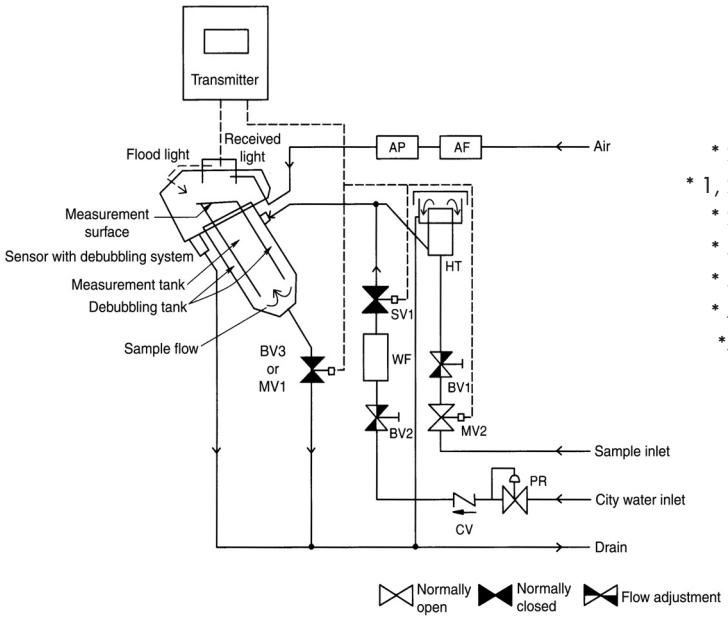
- **Sensor Air Curtain.**
  Required for applications where sample vapours are present, samples with higher than ambient temperatures or when corrosive vapours are present
- **Zero Water Filter.**
  Normally required for the measurement range of 50ppm or less to generate zero water from tap (city) water.

- **Automatic Cleaning**
  Cleaning Method : Cyclic cleaning with tap (city) water (0~50 range or less).
  Cleaning Start Mode : Auto… Cleaning initiated by internal timer. Remote… Cleaning initiated by external contact signal. (Preset at 0Hrs)
  Cleaning Cycle : 0~24 hrs, adjustable (Preset at 0hrs).
  Cleaning Time : 5 min, fixed.
  Waiting Time after Cleaning : 0~30 min., adjustable (Preset at 15 min).
  Output Hold Time During Cleaning : Cleaning time and waiting time.
- **Automatic Calibration (zero).**
  Calibration Method : Filtering (0~50 range or less). Tap water running or lamp cut-off (0~100 range or more).
  Calibration Start Modes : Auto: Calibration start by internal timer. Remote: Calibration starts on receipt of external contact switching signal.
  Calibration Cycle : 0~999hrs adjustable (Preset at 0hrs).
  Calibration Time : 60 min. or less.
  Output Hold Time During Calibration : Calibration time and waiting time.

PRINCIPLE OF OPERATION

This analyzer consists of an indicator/transmitter, analysis section, debubbling tank and mounting frame. The sample enters the debubbling tank via the sample adjust valve where bubbles are expelled. The sample is then discharged by an overflow. At the same time, sufficiently debubbled sample near the tank bottom flows into measurement tank. The measurement tank is designed to form a stable overflow surface with minimum ripples. A lamp emits a light flux which enters both the reference light receiver and the measurement tank. The light flux directed the measurement tank is subject to scattering, the amount of which, is dependant on the sample turbidity. A lens guides the scattered light to a receiver. Light that is not scattered continues downwards and is reflected at an angle that does not cause stray light to fall on to the sensor.

FLOW SCHEMATIC

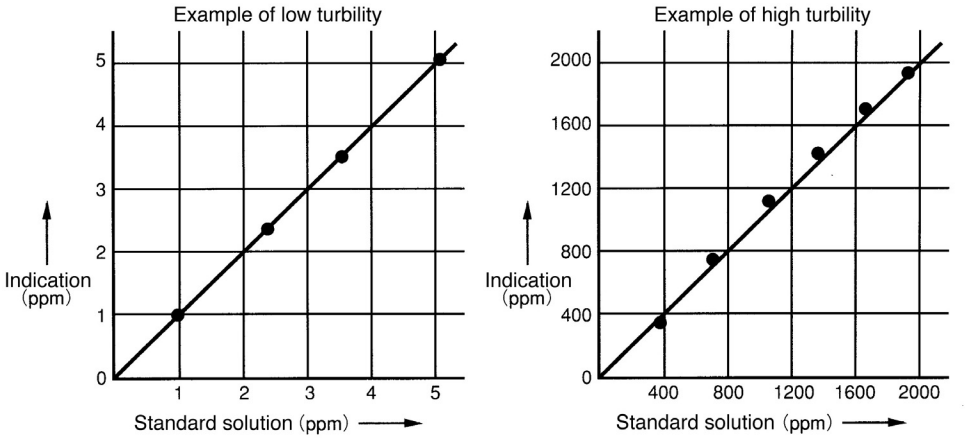


	Symbol	Name
	BV1	Sample adjust valve
	BV2	City water adjust valve
	BV3	Drain valve
	CV	Check valve
	PR	Pressure reducing valve
* 2	SV1	Solenoid valve
* 1, 2	MV1	Solenoid valve (For drain)
* 2	MV2	Solenoid valve (For sample)
* 3	AP	Air pump
* 3	AF	Air filter
* 4	WF	Zero filter
*5	HT	Head tank

NO	Name
*1	Automatic cleaning
*2	Automatic calibration (zero)
*3	Air curtain for sensor
*4	Zero filter (0~50 range or less)
*5	Head tank

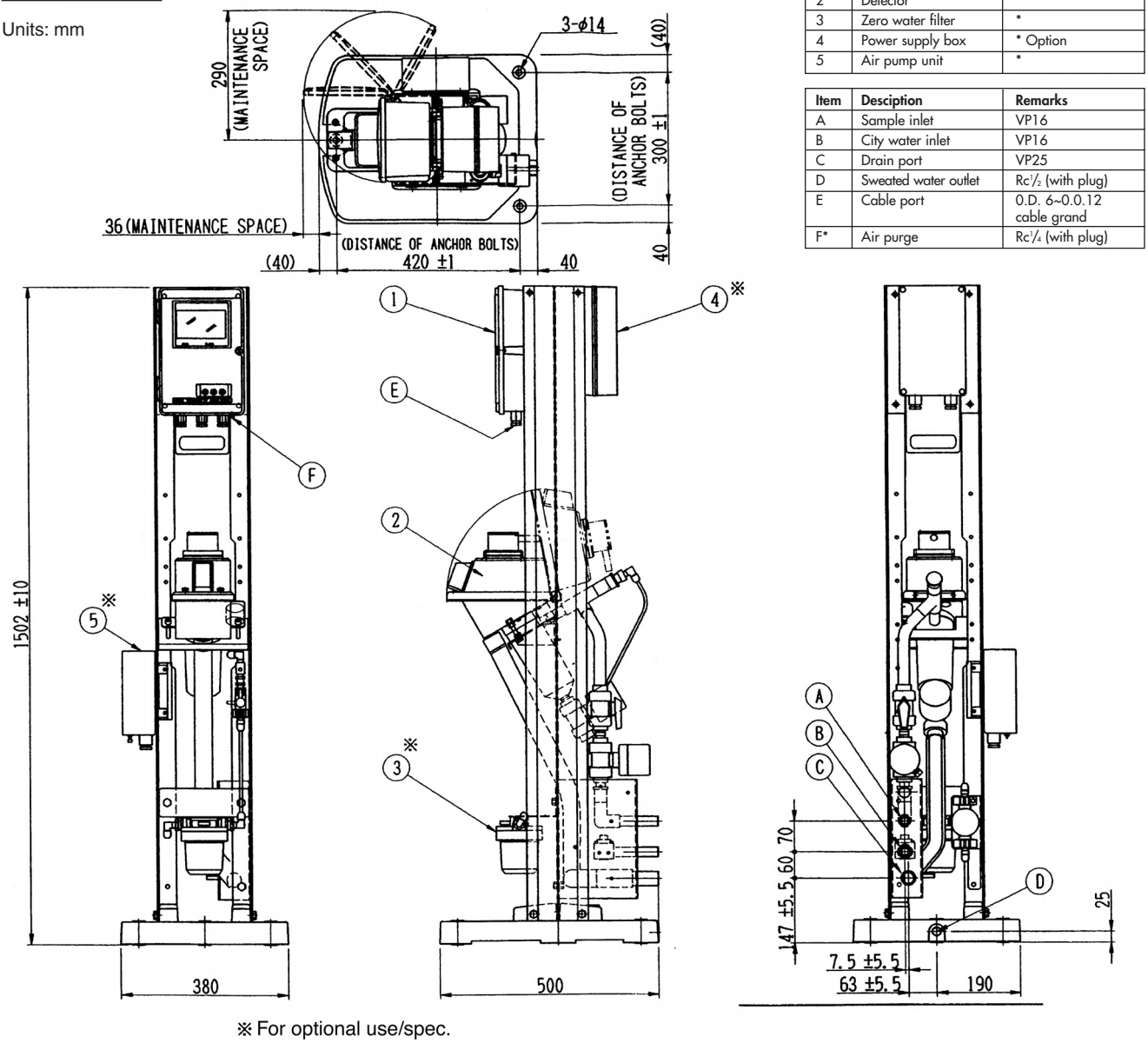
TYPICAL SYSTEM ARRANGEMENT

Generally, in high concentration measurements, linearity may cause measurement problems. This analyzer's linearity for both high and low concentration is as shown below.
Kaolin solution is used as the standard solution based on JIS standards.



DIMENSIONS

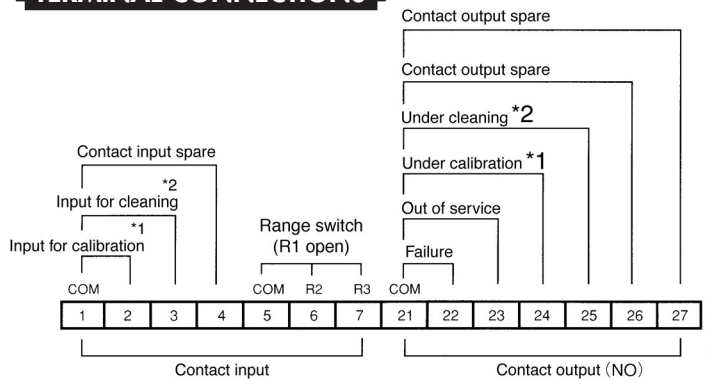
Units: mm

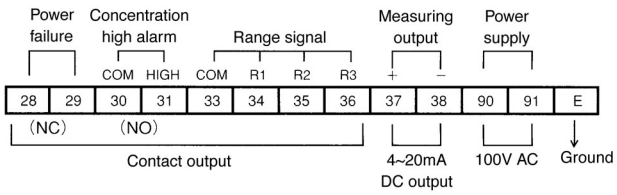


No.	Desciption	Remarks
1	Transmitter	
2	Detector	
3	Zero water filter	*
4	Power supply box	* Option
5	Air pump unit	*

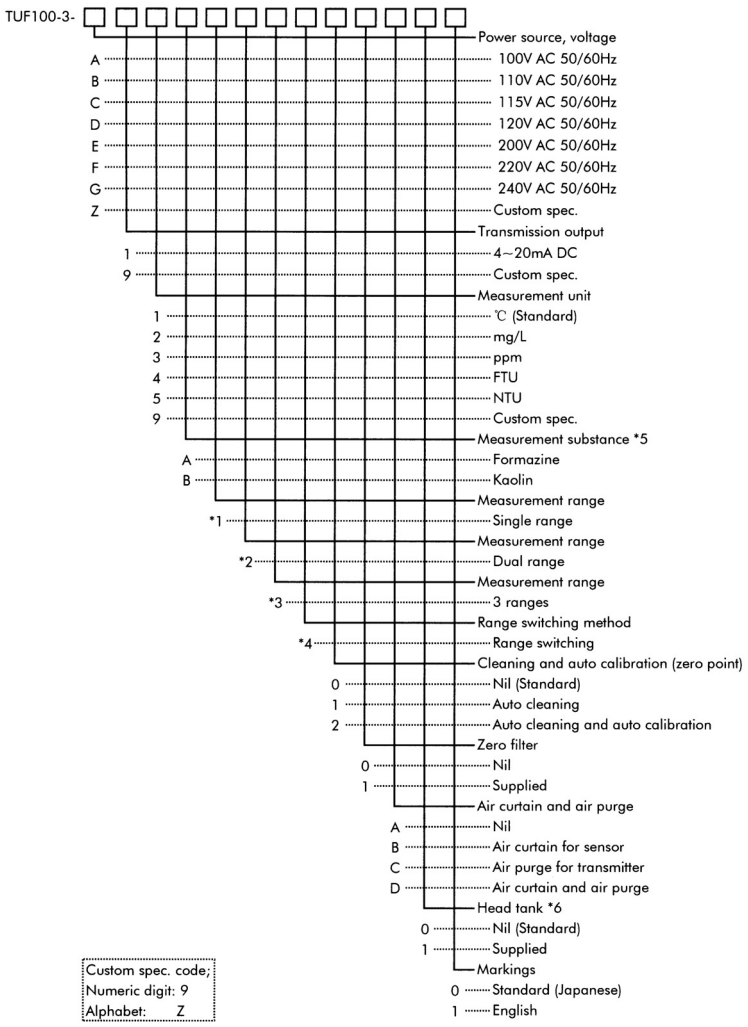
Item	Desciption	Remarks
A	Sample inlet	VP16
B	City water inlet	VP16
C	Drain port	VP25
D	Sweated water outlet	Rc½ (with plug)
E	Cable port	O.D. 6~0.0.12 cable grand
F*	Air purge	Rc¼ (with plug)

TERMINAL CONNECTIONS





PRODUCT CODE



*6. Select "1: Supplied" when sample pressure is expected to change.

4~20mA output : Max. load 600Ω
Input signal : Contact switching signal (rating: DC 30V, 0.1A)
Output signal : Contact switching signal (rating: DC 30V, 0.1A)
***1 : Auto-calibration (option)**
***2 : Auto-cleaning (option)**

Measurement Ranges			
Code	* 1 Single range	* 2 Dual range	* 3 Ranges
A	0~2	0~2/20	0~2/5/10
B	0~5	0~5/50	0~5/10/50
C	0~10	0~10/100	—
D	0~20	0~20/200	0~20/100/500
E	0~50	0~50/500	0~50/200/2000
F	0~100	0~100/1000	—
G	0~200	0~200/2000	—
H	0~500	—	—
J	0~1000	—	—
K	0~2000	—	—
Y	Not applicable	Not applicable	Not applicable
Z	Special	Special	Special

Code	*4 Range switching
1	Single range
2	Dual range Auto/Manual switch
3	Dual range Remote/Manual switch
4	3 ranges Auto/Manual switch
5	3 ranges Auto/Manual switch
9	Special

* 5	City water	Sewage, plant waste water etc...
Formazine	—	0
Kaolin Calibration	0	—

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⚠ CAUTION Do not operate products before consulting instruction manual.