SPECIFICATION SHEET

TURBIDITY ANALYZER TUF-1690

Measure the turbidity in the wash water using the 90 degree scattered light method.

Features

- ○Has the ability to ensure stable measurement by pressurization of the measurement tank, which minimizes bubble occurrence and eliminates as many scattering points as possible.
- ○Reduces susceptibility of influence from ripples and floating objects on the water surface. This is due to the measurement detector being submerged into the water.
- ○LED (light-emitting diode) enables long service life of the light source. Reduces susceptibility of ambient light and sample water color, due to the use of infrared light.
- ○Water jet washing removes stains to increase measurement stability.
- ○Supports the RS485 communication method (Modbus protocol), easy to build network.

Standard Specifications

Product name	: Turbidity Analyzer
Model	: TUF-1690
Measurement Object	: Turbidity of city water
Measurement Method	: 90 degree light scattering method (infrared light 870nm)
Measurement Ranges	: Single range ; 0 - 2, 0 - 5, 0 - 10 Dual ranges ; 0 - 2 / 5, 0 - 5 / 10 Three ranges ; 0 - 2 / 5 / 10
Measurement Units	: Select one of these ranges. Then, select NTU, ppm, degree, mg/L, or FTU as the unit of measurement.
Range Switching	: Automatic/manual/remote
Display	: LCD display
Transmission output	: 4 - 20 mA DC, a resistive load of 600 Ω or less
Output points	: 6 points (a contact 5 points, c contact 1 point) Assignment possible from the following 9 items (duplicate assignment possible) 1 Power off (c contact fixed), 2 Instrument error (zero calibration error, stability determination error, communication error, hard error, set value error), 3 During maintenance, 4 Concentration upper limit warning, 5 Range 1, 6 range 2, 7 Range 3, 8 During cleaning (in case of optional automatic cleaning), 9 During calibration (during automatic calibration)
Contact capacity	: 30 VDC, 0.1 A resistance load
Contact input signal	: input points; 3 points (no-voltage contact input) ON resistance 50 Ω or less, short circuit current maximum 10 mA, open circuit voltage 24 VDC Assignable from the following 4 items 1. Specify “Range 2” ... Select with closed contact reception 2. Specify "Range 3"... Select with closed contact reception Range 1 is selected when “Range 2” and “Range 3” are both opened or closed 3. Washing command ... Closed contact (pulse width of 100 m sec or more) 4. Calibration command ... Closed contact (pulse width of 100 m sec or more)
Communication method	: Interface RS-485 compliant (isolated) Communication speed ... Select from 1200/2400/4800/9600/19200/38400/57600 bps Protocol ... Modbus / RTU Data length ..... 8 bits Parity ... NONE / ODD / EVEN selection Stop bit ... 1 bit Data order ..... BIG ENDIAN

Analog signal input	: 4 - 20 mA DC (for external analog instrument) It can be converted to an arbitrary scale and read out by Modbus communication.
Power supply	: 100 - 240 VAC ± 10% 50/60 Hz
Power consumption	: Max. Approx. 60 VA Average; Approx. 15 VA (100 VAC), Approx. 30 VA (220 - 240 VAC)
Sample water condition	: Temperature; 0 - 40 °C Pressure; 0.1 - 0.5 MPa (fluctuation width within 0.3 MPa) Flow rate; Constant flow rate of 1 - 4 L/min (fluctuation range within 1 L/min)
Washing method	: Manual water washing (standard) Automatic water washing (option)
Washing water condition	: Temperature; 2 - 30 °C Pressure; 0.1 - 0.3 MPa Flow rate; 2 - 4 L / min (fluctuation width within 1 L / min) Water quality; city water (turbidity 2 degrees or less, chromaticity 5 degrees or less)
Construction	: indoor self-supporting rack type Transmitter; IP65 Detector; IPX 3
Material	: Transmitter; aluminum die casting Detector Parts; Aluminum plate Wetted Parts; hard PVC, soft rubber tube, 304SS
Painting color	: metallic silver
Piping Connections	: Sample water inlet; socket nominal diameter 16 Drain outlet; socket nominal diameter 25 City water inlet; socket nominal diameter 16
Cable connections	: 6 cable glands for external diameter φ 6 - 12 mm (One place is for transmitter and detector) When the cable gland is removed, G 1/2
Ambient temperature / humidity	: -5 – 50°C, 85%RH or less
Weight	: Approx. 25 kg
Performance	: Linearity ;Within ± 5% FS (in formazine solution) Repeatability; within ± 1% FS (in formazine solution) Stability; Zero drift ... ± 2.5% FS / within week (with zero water) Span drift ... ± 2.5% FS per week (in formazine solution)

Calibration method

Zero calibration	: Automatic zero calibration by lamp off or manual calibration using purified water
Span calibration	: Manual calibration using formazine, kaolin, or polystyrene (PSL) solution

Option

Automatic washing unit	: Performing water jet washing with the measuring tank empty. Start mode; automatic ... depending on internal timer Washing cycle; 1 - 24 hours (can be set) Washing time; 1 - 5 minutes (can be set) Standby time after cleaning; 0 - 30 minutes (can be set) ; Remote ... Closed contact input from outside ; Execute immediately with manual ... key operation

Principle of Operation

When sample water enters the measurement tank, particles in the water, which cause turbidity, reflect light emitted from the LED.

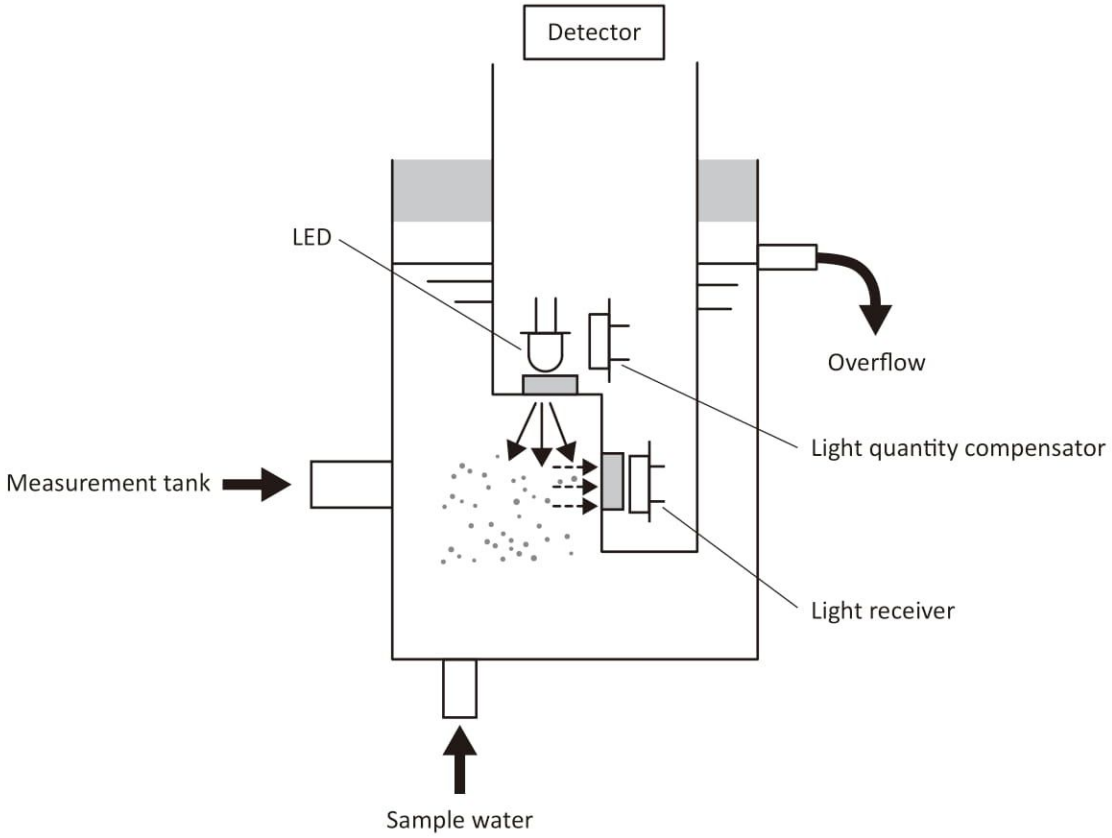
The scattered light reaches the light receiver, which is positioned 90 degrees relative to the incident light.

The scattered light is then converted into an electrical signal. If the amount of light from the light source is constant, the intensity of the electrical signal increases proportionally to the number of particles.

This intensity is calculated as turbidity by arithmetic processing.

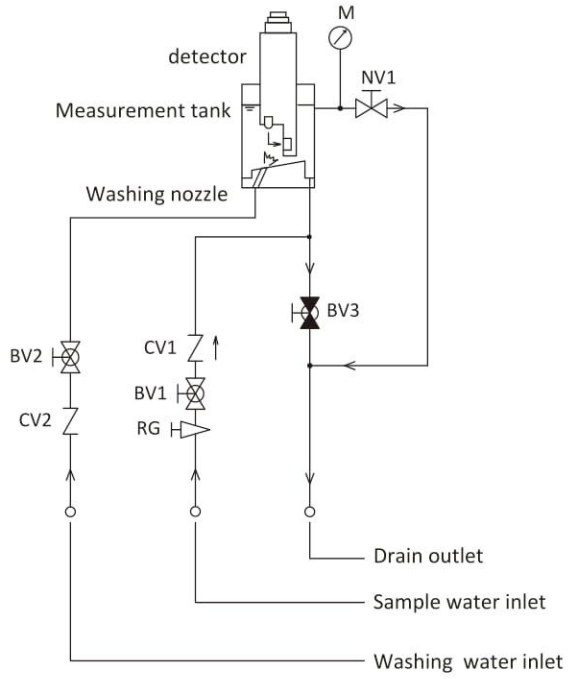
Because its optical system is under water, this instrument is not susceptible to influence from ripples and floating objects on the water surface.

Its measurement tank is pressurized to eliminate bubbles, resulting in stable measurements.



Flow Diagrams

● Standard Specifications

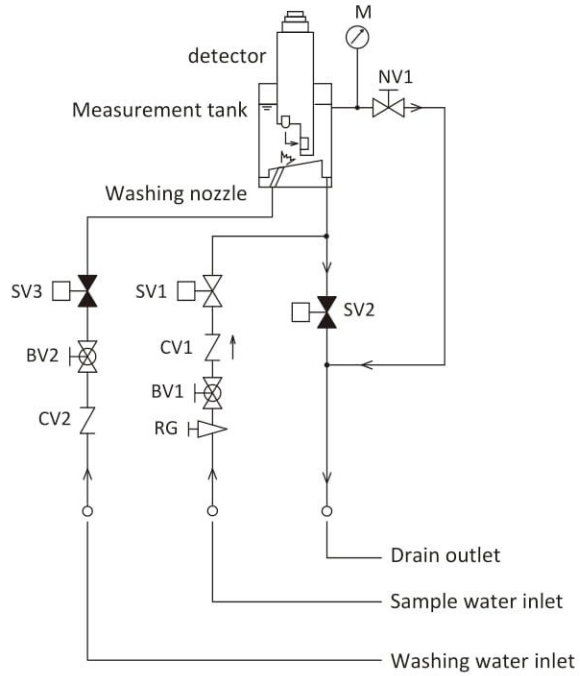


Symbol	Name	Remarks
BV1	Drain valve	1 - 4 L/min
BV2	Washing water flow rate control valve	
BV3	Washing water flow rate control valve	
RG	Pressure reducing valve	
NV1	Needle valve	
CV1	Check valve	
CV2	Check valve	
M	Pressure meter	

Normally open

Normally closed

● Automatic Washing (Option)



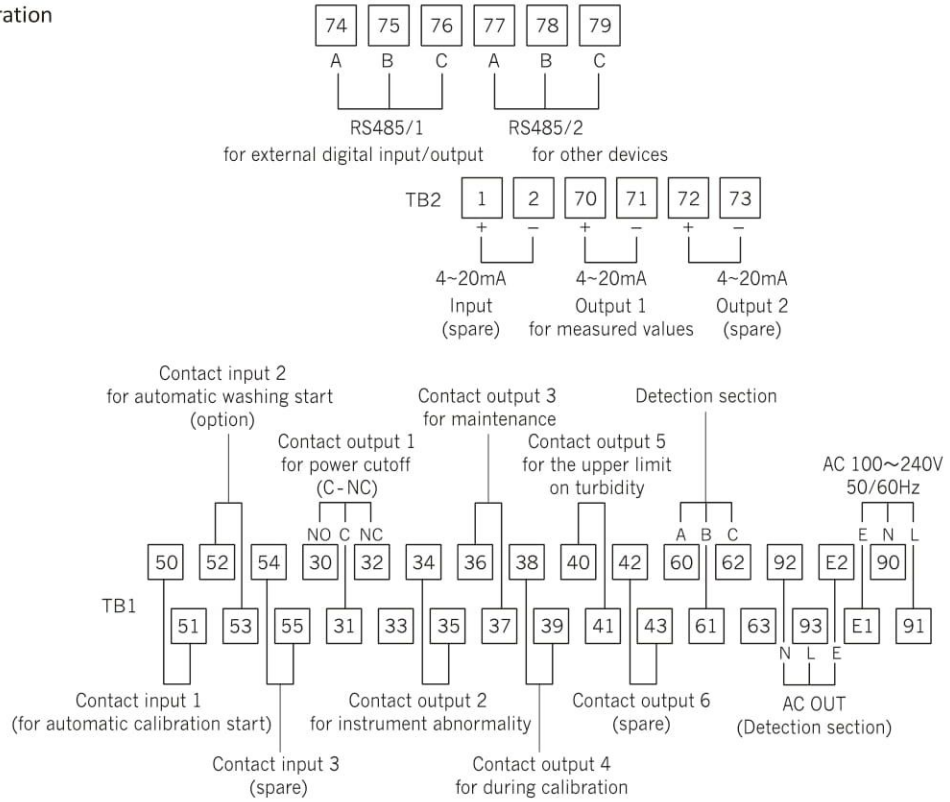
Symbol	Name	Remarks
BV1	Sample water flow rate control valve	1 - 4 L/min
BV2	Washing water flow rate control valve	1 - 4 L/min
SV1	Sample water supply solenoid valve	
SV2	Drainage water solenoid valve	
SV3	Washing water supply solenoid valve	
RG	Pressure reducing valve	
NV1	Needle valve	
CV1	Check valve	
CV2	Check valve	
M	Pressure meter	

Normally open

Normally closed

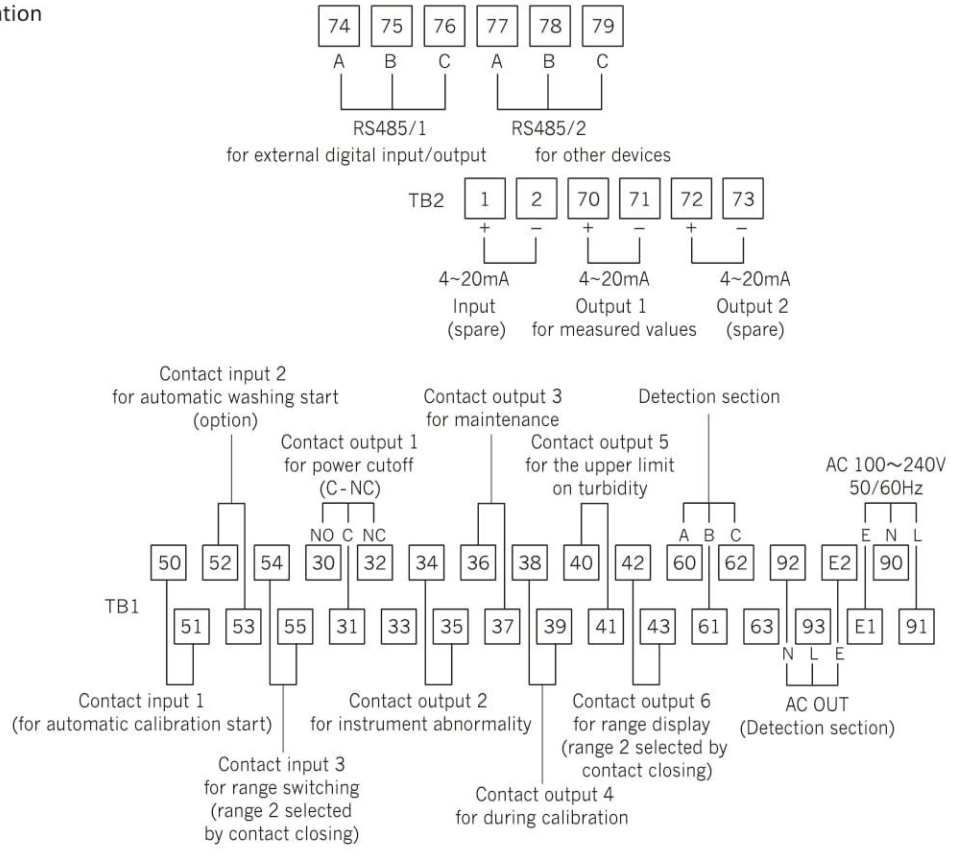
External Terminals

● For Single-Range Operation



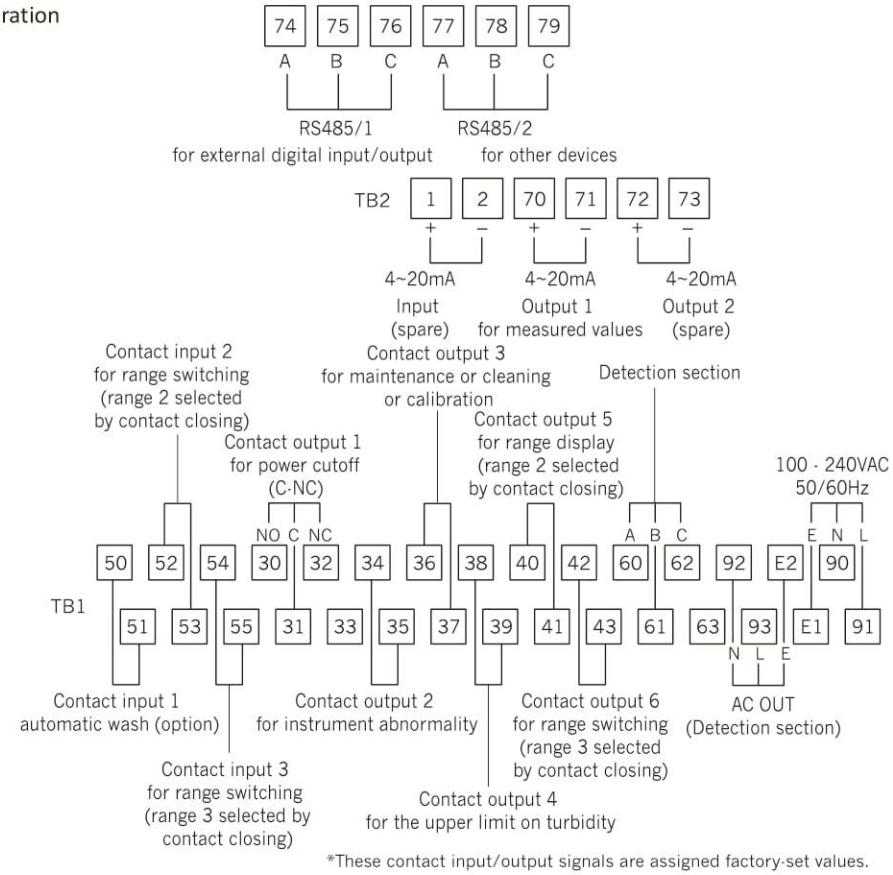
*These contact input/output signals are assigned factory-set values.

● For Dual-Range Operation



*These contact input/output signals are assigned factory-set values.

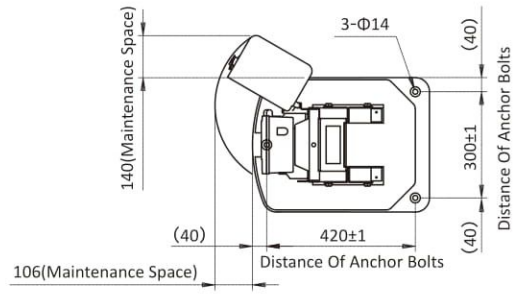
● For Three-Range Operation

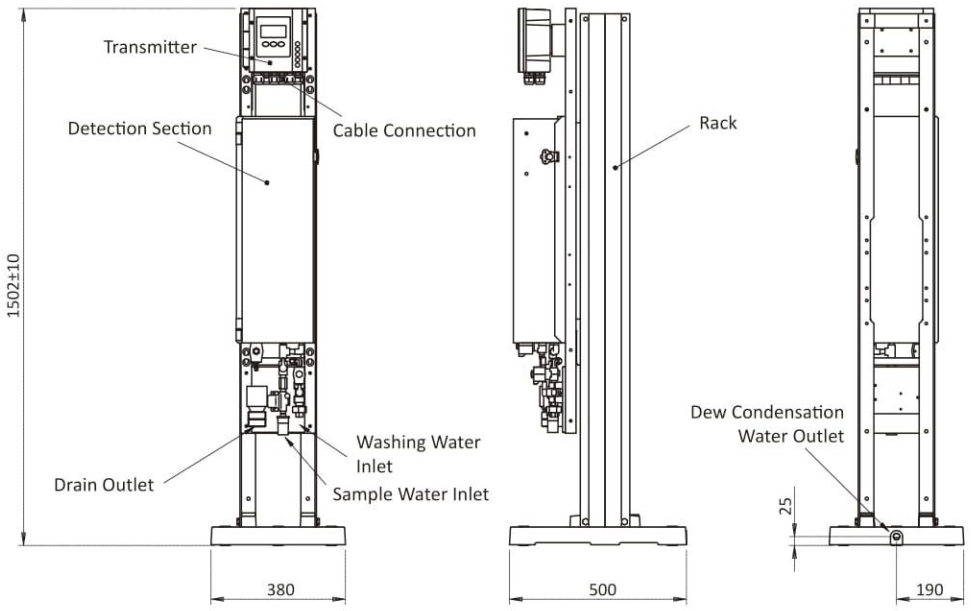


*These contact input/output signals are assigned factory-set values.

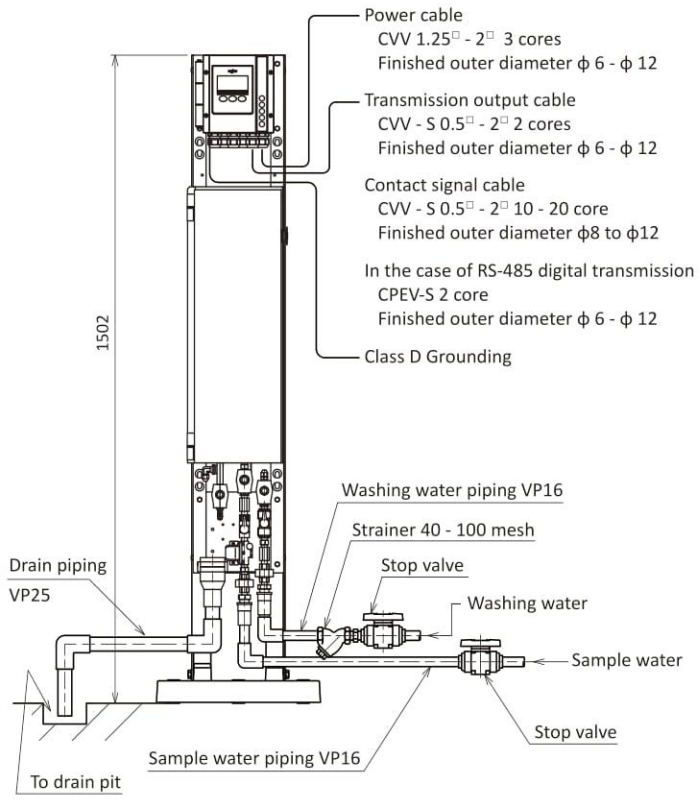
Dimensions Unit : mm

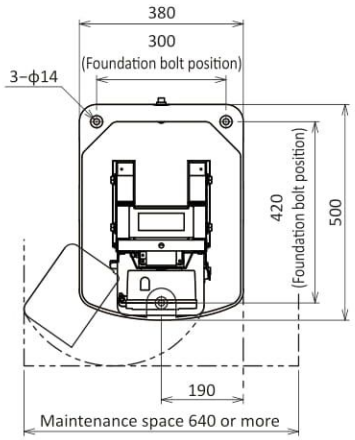
● Rack mounting (Option)





Installation





1. Instrument installation conditions
   Please install in a place that meets the following conditions
   a) Places where rain, wind, direct sunlight does not reach
   b) Where the temperature, pressure, etc. of the sample water can supply the water quality conforming to the "sample water condition" below
   c) There is no vibration
   d) Where there are no devices that become electrical noise sources
   e) where maintenance space can be secured and work can be easily done
2. Sample water supply piping
   a) Provide a stop valve as shown in the figure.
   b) Use piping materials with good corrosion resistance such as rigid PVC (VP16) or PVC pressure-resistant hose (VP16 equivalent diameter).
3. Drain piping
   a) Drain into the pit or the like with open air release piping.
   b) Use piping materials with good corrosion resistance such as rigid PVC (VP25) or flexible PVC hose (VP25 equivalent diameter).
4. Sample water supply piping
   a) Provide a stop valve / strainer (40 - 100 mesh) as shown in the figure. Also, please put in the union etc. in the vicinity of the equipment, and enforce it so that you can disconnect (disconnect) the piping from the equipment.
   b) Use piping materials with good corrosion resistance such as rigid PVC (VP16) or PVC pressure-resistant hose (VP16 equivalent diameter).
5. Wiring
   a) Refer to the standards shown in each figure for each cable.
   b) For grounding of the instrument, please install D grounding of earth screw on the lower side of the converter or E terminal of internal terminal (earth resistance of 100 Ω or less).
   c) When conduit piping (conduit pipe) is used, remove the cable gland and connect it to G 1/2 screw.